

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

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01
Boring Location: Sta. 680+08.82, 173.00' Lt. C.L.

Boring No.: B-4-09

Boring Surface Elev.: + 57.85

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 40.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/2/09		40.0	38.0	31.1	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: Ft.;
 No. of 2 in. Dia. Shelby Tubes: Ft.;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 U-Samples: 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
	2/2/09	1	0.5'	2 3 3	Moist firm brown silt w/trace of fine to coarse sand.	A-4(0)	6" of topsoil.
			2.0'		10" RECOVERY		
2.8		2	2.0'	4 4 7 10	Moist stiff brown clayey silt w/some fine sand, trace of coarse sand.	A-4(5)	
			4.0'		22" RECOVERY		
		3	4.0'	2 4 5 7	Moist stiff brown clayey silt w/some fine sand, trace of coarse sand.	A-4(5)	
5.6			6.0'		19" RECOVERY		
		4	6.0'	6 6 8 9	Moist stiff orange clayey fine sandy silt w/some coarse sand.	A-4(2)	
			8.0'		20" RECOVERY		
8.4		5	8.0'	4 5 7 9	Moist medium dense orange fine to coarse sand and gravel w/some silt.	A-1-b	
			10.0'		18" RECOVERY		
11.2		6	10.0'	7 7 10 11	Moist very stiff orange clay w/some fine sand, trace of coarse sand.	A-6(12)	
			12.0'		21" RECOVERY		
		7	12.0'	6 13 17 15	Moist medium dense orange coarse to fine sand and gravel w/trace of silt.	A-1-b	
14			14.0'		20" RECOVERY		
		8	14.0'	6 9 10 11	Moist very stiff orange fine to coarse sandy silt w/some clay, trace of gravel.	A-4(0)	4" clay lens @ 15.0'.
			16.0'		20" RECOVERY		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
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F.A. Project: U.S. 301 Maryland State Line to I-95
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Boring No.: B-4-09








Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	11 12 15 12	Moist very stiff orange fine sandy silt w/some coarse sand, trace of gravel.	A-4(0)	3" clay lens @ 17.0'.
			18.0'		19" RECOVERY		
		10	18.0'	3 7	Moist stiff pink fine sandy clay w/trace of coarse sand.	A-6(9)	
			19.0'		11" RECOVERY		
19.6		10A	19.0'	10 11	Moist very stiff light brown clayey silt w/trace of fine to coarse sand and gravel.	A-4(0)	
			20.0'		9" RECOVERY		
		11	20.0'	11 26 27 26	Moist very dense orange coarse sand and gravel w/some fine sand and silt.	A-1-b	
			22.0'		15" RECOVERY		
22.4		12	22.0'	13 13 11 13	Moist medium dense orange gravel and coarse sand w/some silt and fine sand.	A-1-b	
			24.0'		20" RECOVERY		
		13	24.0'	14 18 16 16	No Sample Recovery		
25.2			26.0'		0" RECOVERY		
		14	26.0'	6 7 13 15	Moist medium dense orange coarse sand and gravel w/trace of silt and fine sand.	A-1-b	
28			28.0'		17" RECOVERY		
		15	28.0'	11 13 11 14	Moist medium dense orange gravel and coarse sand w/trace of silt and fine sand.	A-1-b	
			30.0'		18" RECOVERY		
30.8		16	30.0'	14 14 14 14	No Sample Recovery		Water encountered at 31.1'.
			32.0'		0" RECOVERY		
		17	32.0'	2 4 4 4	Wet loose brown fine to coarse sand and gravel w/trace of silt.	A-1-b	
33.6			34.0'		18" RECOVERY		
		18	34.0'	1 6 9 12	Wet medium dense brown coarse to fine sand and gravel w/trace of silt.	A-1-b	
			36.0'		18" RECOVERY		
36.4		19	36.0'	9 9 10 12	Wet medium dense brown gravel and coarse to fine sand w/trace of silt.	A-1-b	
			38.0'		20" RECOVERY		
39.2		20	38.0'	8 7 8 9	No Sieve Analysis		pH sample sent to GTA for testing.
			40.0'		16" RECOVERY		
					End of Boring.		
42							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Silt
	Silty low plasticity clay
	Low plasticity clay
	Silty sand
	Poorly graded sand with silt
	Poorly graded clayey silty sand
	Well graded sand with silt

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Notes:

1. Exploratory borings were drilled on 2/2/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Traylor 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 blow counts are uncorrected.

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

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

Boring No.: B-4-10W

Contract: 28-113-01

Boring Location: Sta. 683+80.18, 364.00' Lt. C.L.

Boring Surface Elev.: + 53.62

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 50.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/30/09		40.0	38.0	36.1	

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/30/09	1	0.5'	2 4 5	Moist stiff brown clayey silt w/trace of fine to coarse sand.	A-4(7)	5" of topsoil, 8" of frost.
			2.0'		18" RECOVERY		
2.8		2	2.0'	2 4 4 4	Moist firm brown clayey fine to coarse sandy silt w/trace of gravel.	A-4(1)	
			4.0'		21" RECOVERY		
		3	4.0'	3 3 3 5	Moist firm brown fine to coarse sandy silt.	A-4(0)	
5.6			6.0'		18" RECOVERY		
		4	6.0'	3 3 5 7	Moist firm brown clayey silt w/some coarse to fine sand, trace of gravel.	A-4(3)	
			8.0'		21" RECOVERY		
8.4		U-1	8.0'		Wet orange brown mottled silty fine to coarse sand, trace of gravel.		Pressed Shelby Tube, 15" recovery.
			10.0'		15" RECOVERY		
		5	10.0'	6 6 6	Moist medium dense brownish orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
11.2			12.0'		22" RECOVERY		
		6	12.0'	5 5 4 5	Moist loose brownish orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			14.0'		20" RECOVERY		
14		7	14.0'	4 4 5 5	Moist loose brownish orange coarse sand w/some fine sand, trace of silt and gravel.	A-1-b	
			16.0'		22" RECOVERY		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-10W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		8	16.0'	5 6 7	Moist medium dense brownish orange coarse sand w/some fine sand and silt, trace of gravel. 21" RECOVERY	A-1-b	
19.6		9	18.0'	3 6 8 8	Moist stiff grayish red clayey silt w/some coarse to fine sand. 22" RECOVERY	A-4(3)	
22.4		10	20.0'	5 6 7	Moist medium dense brownish orange coarse sand w/some fine sand and silt, trace of gravel. 20" RECOVERY	A-1-b	
25.2		11	22.0'	2 5 7 10	Moist medium dense brownish orange coarse sand w/some fine sand and silt, trace of gravel. 20" RECOVERY	A-1-b	
28		12	24.0'	3 4 4 5	Moist loose light brown and orange fine to coarse sand w/some silt, trace of gravel. 22" RECOVERY	A-2-4(0)	
30.8		13	26.0'	3 3 4 5	Wet loose light brown and orange fine to coarse sand w/some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
33.6		14	28.0'	2 2 2 4	Wet very loose brown silty fine sand. 22" RECOVERY	A-2-4(0)	
36.4		15	30.0'	3 3 2 3	Wet loose brown fine sand w/some silt, trace of coarse sand. 21" RECOVERY	A-2-4(0)	
39.2		16	32.0'	1 1 1 2	Wet very loose brown fine sand w/some silt, trace of coarse sand. 23" RECOVERY	A-2-4(0)	
42		17	34.0'	2 3 3 3	Wet loose brown fine sand w/some silt, trace of coarse sand and gravel. 23" RECOVERY	A-2-4(0)	
		18	36.0'	3 8 6 9	Wet medium dense brownish black fine to coarse sand w/trace of silt and gravel. 22" RECOVERY	A-3	Water encountered at 36.1'.
		19	38.0'	3 8 7 8	Wet medium dense brownish black coarse to fine sand w/trace of silt and gravel. 22" RECOVERY	A-3	
		20	40.0'	4 9 8 9	Wet medium dense brownish black fine to coarse sand w/trace of silt and gravel. 23" RECOVERY	A-3	Washed out augers using mud/water mix.
		21	42.0'	4 6	Saturated medium dense brownish black fine	A-2-4(0)	Washed out augers using

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F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-10W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				10 12	sand w/some coarse sand and silt, trace of gravel.		mud/water mix.
			44.0'		19" RECOVERY		
44.8		22	44.0'	7 8 11 10	Saturated medium dense brownish orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	Washed out augers using mud/water mix.
			46.0'		19" RECOVERY		
		23	46.0'	8 8 10 11	Saturated medium dense brownish orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	Washed out augers using mud/water mix.
47.6			48.0'		22" RECOVERY		
		24	48.0'	7 9 12 15	No Sieve Analysis		pH sample sent to GTA for testing.
			50.0'		22" RECOVERY		
50.4					End of Boring.		
					DRAFT		
53.2					NOT FOR BIDDING		
					AUGUST 2015		
56							
58.8							
61.6							
64.4							
67.2							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/30/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Traylor 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 blow counts are uncorrected.

**STATE OF DELAWARE
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F.A. Project: U.S. 301 Maryland State Line to I-95

Boring No.: B-4-11

Contract: 28-113-01

Boring Location: Sta. 687+52.09, 341.00' Lt. C.L.

Boring Surface Elev.: + 46.96

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 40.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 2/4/09	Time	28.0	26.0	24.2	

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: Jason Truver
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/3/09	1	0.0'	6 7 7	Moist medium dense orange clayey coarse sand and gravel, trace of fine sand.	A-2-7(2)	
			2.0'		12" RECOVERY		
2.8		2	2.0'	6 6 5	Moist medium dense orange coarse sand w/ some silt and gravel, trace of fine sand.	A-1-b	
			4.0'		20" RECOVERY		
5.6		3	4.0'	3 4 5 2	Moist loose orange coarse sand w/ some gravel and silt, trace of fine sand.	A-1-b	
			6.0'		15" RECOVERY		
		4	6.0'	2 3 2 3	Moist loose orange coarse sand, trace of silt, fine sand, and gravel.	A-1-b	
			8.0'		17" RECOVERY		
8.4		5	8.0'	2 2 3 2	Moist loose orange coarse sand, trace of silt, fine sand, and gravel.	A-1-b	
			10.0'		14" RECOVERY		
11.2		6	10.0'	3 4 4 3	Moist loose yellow coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
			12.0'		20" RECOVERY		
		7	12.0'	5 5 7	Moist medium dense yellow coarse sand, trace of fine sand, silt, and gravel.	A-1-b	
14			14.0'		18" RECOVERY		
		8	14.0'	4 3 3 4	Moist loose orange coarse sand w/ some silt, trace of fine sand and gravel.	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-11

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		18" RECOVERY		
16.8		9	16.0'	4 3 5 6	Moist loose orange coarse sand w/ some gravel, trace of silt and fine sand.	A-1-b	
			18.0'		18" RECOVERY		
19.6		10	18.0'	3 4 6 7	Moist loose orange coarse sand, trace of silt, fine sand, and gravel.	A-1-b	
			20.0'		16" RECOVERY		
		11	20.0'	6 10 18 13	Moist medium dense orange coarse sand and gravel w/ some fine sand, trace of gravel.	A-1-b	Contains cemented sands.
			22.0'		14" RECOVERY		
22.4		12	22.0'	7 7 5 4	Wet medium dense yellow, orange, and white mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			24.0'		18" RECOVERY		
25.2		13	24.0'	3 4 3 4	Wet loose brown and light brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Water encountered at 24.2'.
			26.0'		21" RECOVERY		
		14	26.0'	3 4 6 10	Wet loose brown and light brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
28			28.0'		15" RECOVERY		
		15	28.0'	3 3 5 5	Wet loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			30.0'		14" RECOVERY		
30.8		16	30.0'	7 11 16 18	Wet medium dense orange fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			32.0'		18" RECOVERY		
33.6		17	32.0'	1 14 13 30	Wet medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Contains cemented sands.
			34.0'		24" RECOVERY		
		18	34.0'	13 14 19 22	Wet dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			36.0'		20" RECOVERY		
36.4		19	36.0'	28 36 21 42	Wet very dense orange fine to coarse sand, trace of silt and gravel.	A-3	
			38.0'		16" RECOVERY		
39.2		20	38.0'	11 21 21 20	Indication of wet dense orange fine to coarse sand, trace of silt and gravel.		pH sample sent to GTA for testing.
			40.0'		18" RECOVERY		
					End of Boring.		
42							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/3/2009 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 recommendations 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
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DIVISION OF HIGHWAYS**

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

Boring No.: B-4-12

Contract: 28-113-01

Boring Location: Sta. 690+81.42, 192.00' Lt. C.L.

Boring Surface Elev.: + 28.06

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 40.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 1/26/09	Time	10.0	8.0	5.1	

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

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/26/09	1	0.5'	2 1 10	Wet stiff brown clayey coarse sandy silt w/ some fine sand, trace of gravel. 12" RECOVERY	A-4(1)	Topsoil - 6".
2.8		2	2.0'	3 4 5	Wet stiff brown clayey coarse sandy silt w/ some gravel, trace of fine sand. 18" RECOVERY	A-4(2)	
5.6		3	4.0'	1 1 2	Wet soft gray and orange mottled gravelly and coarse sandy silt w/ some fine sand. 8" RECOVERY	A-4(0)	
8.4		4	6.0'	1 5 7 6	No Sample Recovery 0" RECOVERY		
		5	8.0'	1 2 1 1	Wet very loose yellow fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
11.2		6	10.0'	2 3 4 4	Wet loose yellow and light brown coarse sand w/ some fine sand, trace of silt and gravel. 24" RECOVERY	A-1-b	
		7	12.0'	1 4 5 10	Saturated loose orange fine to coarse sand w/ some silt, trace of gravel. 12" RECOVERY	A-2-4(0)	
14		8	14.0'	10 10 12 15	Saturated medium dense orange fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
			16.0'				

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-12

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	9 11 11 14	Saturated medium dense orange fine to coarse sand, trace of silt and gravel.	A-3	
			18.0'		24" RECOVERY		
19.6		10	18.0'	5 15 24 13	Saturated dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			20.0'		20" RECOVERY		
22.4		11	20.0'	6 10 13 18	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			22.0'		22" RECOVERY		
25.2		12	22.0'	5 5 18 20	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			24.0'		21" RECOVERY		
28		13	24.0'	9 10 11 16	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			26.0'		21" RECOVERY		
30.8		14	26.0'	14 16 25 36	Saturated dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			28.0'		22" RECOVERY		
33.6		15	28.0'	9 10 18 21	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			30.0'		24" RECOVERY		
36.4		16	30.0'	9 14 23 24	Saturated dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			32.0'		20" RECOVERY		
39.2		17	32.0'	9 14 26 26	Saturated dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			34.0'		24" RECOVERY		
42		18	34.0'	10 13 16 22	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			36.0'		23" RECOVERY		
		19	36.0'	8 10 16 26	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			38.0'		18" RECOVERY		
		20	38.0'	8 13 18 24	Saturated dense orange fine sand with some silt.		pH sample sent to GTA for testing.
			40.0'		24" RECOVERY		
					End of Boring		

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt



Well graded sand

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Notes:

1. Exploratory borings were drilled on 1/26/2009 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 recommendations 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 I-95
Contract: 28-113-01
Boring Location: Sta. 700+36.79, 224.00' Lt. C.L.
Boring Surface Elev.: + 44.17

Boring No.: B-4-20

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
 S-Sampler:
 U-Sampler:
 Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 40.0

Water Level Readings
Date 1/22/09

Time

Depth of Hole
26.0

Depth of Casing
24.0

Depth of Water
22.0

Elev. of Water

Pay 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.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/22/09	1	1.0'	3 3	Moist firm brown fine sandy silt w/ some coarse sand, trace of gravel. 10" RECOVERY	A-4(0)	Topsoil - 9".
2.8		2	2.0'	1 5 6 6	Moist stiff brown clayey silt w/ some fine to coarse sand, trace of gravel. 18" RECOVERY	A-4(3)	
5.6		3	4.0'	5 6 7 8	Moist stiff orange and gray clayey fine sandy silt, trace of coarse sand. 15" RECOVERY	A-6(6)	
8.4		4	6.0'	8 11 10 10	Moist very stiff orange and yellow mottled fine sandy silt, trace of coarse sand. 23" RECOVERY	A-4(0)	
		5	8.0'	2 2 5 7	Moist firm orange and yellow mottled fine sandy silt, trace of coarse sand. 20" RECOVERY	A-4(0)	
11.2		6	10.0'	7 8 10 10	Moist medium dense orange-yellow mottled silty fine sand. 22" RECOVERY	A-2-4(0)	
		7	12.0'	4 6 9 9	Moist medium dense brown fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
14		8	14.0'	4 8 14 13	Moist medium dense brown coarse sand and gravel w/ some fine sand and silt. 18" RECOVERY	A-1-b	
		9	16.0'	11 8	Moist medium dense orange and yellow	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-20

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				9 11	coarse to fine sand w/ some gravel, trace of silt. 20" RECOVERY		
19.6		10	18.0'	4 4 5 6	Wet loose yellow fine to coarse sand, trace of silt and gravel. 18" RECOVERY	A-3	
		11	20.0'	5 5 5 6	Wet loose yellow fine to coarse sand, trace of silt and gravel. 22" RECOVERY	A-3	
22.4		12	22.0'	3 6 12 13	Wet medium dense orange fine to coarse sand and gravel w/ some silt. 13" RECOVERY	A-1-b	
		13	24.0'	5 10 5 6	Wet medium dense orange fine to coarse sand w/ some silt and gravel. 18" RECOVERY	A-2-4(0)	
25.2		14	26.0'	4 7 4 4	Wet medium dense orange coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-1-b	
28		15	28.0'	5 8 10 13	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
		16	30.0'	8 11 14 16	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 22" RECOVERY	A-2-4(0)	
30.8		17	32.0'	8 11 14 16	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 22" RECOVERY	A-2-4(0)	
33.6		18	34.0'	9 11 13 18	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 21" RECOVERY	A-2-4(0)	
36.4		19	36.0'	8 18 24 25	Saturated dense orange fine to coarse sand, trace of silt and gravel. 14" RECOVERY	A-3	
		20	38.0'	18 20 22 31	Saturated dense brown fine to coarse sand with some silt. 24" RECOVERY		pH sample sent to GTA for testing.
39.2			40.0'		End of Boring		
42							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Silty low plasticity
clay



Low plasticity
clay



Poorly graded sand
with silt



Well graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/22/2009 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 recommendations 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 I-95
Contract: 28-113-01
Boring Location: Sta. 707+51.38, 263.00' Lt. C.L.

Boring No.: B-4-27

Boring Surface Elev.: +49.71

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 40.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/21/09		30.0	28.0	26.6	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 No. of U-Samples:
 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
	1/21/09	1	0.5'	4 4 4	Moist firm brown fine sandy silt w/ some clay and gravel, trace of coarse sand. 12" RECOVERY	A-4(0)	Topsoil - 6".
2.8		2	2.0'	5 6 6 5	Moist medium dense orange silty fine sand w/ some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	
5.6		3	4.0'	4 3 3 4	Moist loose orange coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY	A-1-b	
		4	6.0'	5 6 5 5	Moist medium dense orange fine to coarse sand w/ some silt, trace of gravel. 21" RECOVERY	A-2-4(0)	
8.4		5	8.0'	5 6 7 2	Moist medium dense orange coarse sand and gravel w/ some fine sand and silt. 16" RECOVERY	A-1-b	
11.2		6	10.0'	1 3 4 3	Moist loose orange coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-1-b	
		7	12.0'	3 2 6 7	Moist loose orange and yellow coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY	A-1-b	
14		8	14.0'	5 6 9 6	Moist medium dense orange and yellow coarse sand w/ some gravel, trace of fine sand and silt. 16" RECOVERY	A-1-b	
			16.0'				

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-27

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	7 7 5 5	Moist medium dense orange and yellow coarse to fine sand w/ some silt, trace of gravel. 23" RECOVERY	A-1-b	
		10	18.0'	5 6 5 6	Moist medium dense orange and yellow coarse to fine sand w/ some silt, trace of gravel. 21" RECOVERY	A-1-b	
19.6		11	20.0'	3 5 5	Moist loose orange and yellow coarse to fine sand w/ some silt, trace of gravel. 21" RECOVERY	A-1-b	
		12	22.0'	5 8 20 26	Moist medium dense yellow, orange, and brown coarse to fine sand w/ some silt and gravel. 18" RECOVERY	A-1-b	
		13	24.0'	14 17 24 21	Moist dense yellow, orange, and brown gravel and coarse sand w/ some fine sand, trace of silt. 18" RECOVERY	A-1-b	
25.2		14	26.0'	22 18 11 13	Moist medium dense yellow, orange, and brown gravel and coarse sand w/ some fine sand, trace of silt. 18" RECOVERY	A-1-b	
		15	28.0'	2 3 4 5	Wet loose yellow fine to coarse sand, trace of silt and gravel. 24" RECOVERY	A-3	
		16	30.0'	5 5 7 7	Saturated medium dense yellow fine to coarse sand, trace of silt and gravel. 24" RECOVERY	A-3	
30.8		17	32.0'	2 3 3 4	Saturated loose yellow fine to coarse sand, trace of silt. 24" RECOVERY	A-3	
		18	34.0'	10 6 4 4	Saturated loose orange fine to coarse sand, trace of silt and gravel. 24" RECOVERY	A-3	
		19	36.0'	8 9 10 10	Saturated medium dense orange fine sand w/ some silt and coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
		20	38.0'	5 6 7 9	Saturated medium dense orange brown silty fine to coarse sand. 24" RECOVERY		pH sample sent to GTA for testing.
39.2			40.0'		End of Boring		
42							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 1/20/2009 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 recommendations 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 I-95

Boring No.: BR1-04-01

Contract: 25-113-01

Boring Location: Sta. 688+30.49, 67' Rt. C.L.

Boring Surface Elev.: 32.06

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	34.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/15/08		4.0'	4.0'	3.8'	28.3 32.1 32.1 32.1

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:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			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	0.0'	1 4 4 4	Saturated firm brown silt with some fine sand, trace of coarse sand and gravel.	A-4(6)	
2.49		2	2.0'	3 5 8 9	20" RECOVERY Wet stiff brown coarse sandy silt with some fine sand red and clay, trace of gravel.	A-4(0)	
4.98		3	4.0'	3 5 18 18	15" RECOVERY Wet medium dense brown gravelly coarse sand with some fine sand and silt.	A-4(2)	
7.47		4	6.0'	10 13 15 14	18" RECOVERY Wet medium dense brown gravelly coarse sand with some silt and fine sand.	A-2-4(0)	
9.96		5	8.0'	8 12 12 13	24" RECOVERY Moist medium dense brown coarse sandy gravel, trace of silt and fine sand.	A-2-4(0)	
12.45		6	10.0'	19 19 15 13	4" RECOVERY Moist dense brown fine sandy gravel with some coarse sand, trace of silt.	A-2-4(0)	
		7	12.0'	16 16 17 18	18" RECOVERY Saturated dense brown coarse to fine sand, trace of silt.	A-2-4(0)	

Remarks: Mud Rotary @ 34.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-04-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	12 12 13 8	6" RECOVERY Wet medium dense brown coarse sandy gravel with some fine sand, trace of silt.	A-2-6(0)	
17.43		9	16.0' 16.0'	5 9 8 11	5" RECOVERY Saturated medium dense brown fine sandy gravel with some coarse sand, trace of silt.	A-2-4(0)	
19.92		10	18.0' 18.0'	6 8 7 11	24" RECOVERY Saturated medium dense brown fine sand with some silt and coarse sand.	A-2-4(0)	
22.41		U-1	20.0' 20.0'		16" RECOVERY No Sample Recovery - Tube Bent		Press Sample - Shelby Tube.
24.9		11	24.0' 24.0'	5 8 8 10	0" RECOVERY Saturated medium dense brown fine sand with some silt and coarse sand, trace of gravel.	A-2-4(0)	
27.39			26.0'		19" RECOVERY		
29.88		12	29.0'	8 10 17 20	N.S.A - Sample sent to GTA lab.		pH Sample
32.37		13	31.0' 31.0'	15 19 21 23	20" RECOVERY Saturated dense brown fine sand with some silt, coarse sand, and gravel.	A-2-4(0)	
34.86			33.0'		24" RECOVERY		
37.35		14	34.0' 34.0'	10 10 11 10	12" RECOVERY Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel.	A-2-4(0)	

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

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

Boring No.: BR1-04-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		15	39.0'	9 12 15 20	Saturated medium dense reddish-brown fine sand with some silt and coarse sand, trace of gravel.	A-2-4(0)	
			41.0'		24" RECOVERY		
42.33							
44.82		16	44.0'	6 15 18 25	Saturated dense brown fine sand with some silt and coarse sand.	A-3	
			46.0'		18" RECOVERY		
47.31							
49.8		17	49.0'	10 15 20 23	Saturated dense gray silty fine sand, trace of coarse sand.	A-3	
			51.0'		20" RECOVERY		
52.29							
54.78		18	54.0'	10 15 23 23	Saturated dense gray silty fine sand, trace of coarse sand and gravel.	A-3	
			56.0'		20" RECOVERY		
57.27							
59.76		19	59.0'	18 15 20 20	Saturated dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	

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

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

Boring No.: BR1-04-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		24" RECOVERY		
62.25							
		20	64.0'	10 12 13 13	Saturated medium dense gray silty fine sand with some coarse sand, trace of gravel and seashells.	A-3	
64.74			66.0'		20" RECOVERY		
67.23							
		21	69.0'	13 15 17 24	Saturated hard gray fine sandy silt, trace of coarse sand and gravel.	A-3	
69.72			71.0'		24" RECOVERY		
72.21							
		22	74.0'	12 14 17 24	Saturated dense gray fine sand with some silt, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
74.7			76.0'		24" RECOVERY		
					Boring Terminated at 75.8'		
77.19							
79.68							
82.17							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Poorly graded clayey
silty sand



Silty sand



Well graded gravel
with silt



Poorly graded gravel
with silt



Well graded sand
with silt



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/15/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55
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.

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

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

Boring No.: BR1-04-02

Contract: 25-113-01

Boring Location: Sta. 691+01.78, 67' Rt. C.L.

Boring Surface Elev.: + 30.60

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	56.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/29/2008		6.0'	6.0'	4.5'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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	0.0'	1 3 5 5	Moist loose brown gravel with some clay, trace of fine to coarse sand.	A-4(3)	
			2.0'		6" RECOVERY		
2.49		2	2.0'	6 6 7 7	Moist medium dense brown silty coarse to fine sand with some gravel.	A-4(6)	
			4.0'		14" RECOVERY		
4.98		3	4.0'	2 1 2 3	Wet very loose brown coarse sand with some fine sand and gravel, trace of silt.	A-4(3)	
			6.0'		11" RECOVERY		
7.47		4	6.0'	3 3 11 10	Wet medium dense brown coarse sand with some fine sand and clay, trace of gravel.	A-6(3)	
			8.0'		16" RECOVERY		
9.96		5	8.0'	4 4 16 16	Wet medium dense brown silty coarse sand with some fine sand, trace of gravel.	A-1-b	
			10.0'		9" RECOVERY		
		6	10.0'	8 8 7 7	Wet medium dense brown coarse sand with some fine sand, trace of silt and gravel.	A-2-4(0)	
			12.0'		7" RECOVERY		
12.45		7	12.0'	1 2 4 5	Saturated loose brown fine to coarse sand with some silt, trace of gravel.	A-2-4(0)	

Remarks: Mud Rotary @ 56.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-04-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	3 7 7	13" RECOVERY Wet medium dense brown fine to coarse sand with some silt, trace of gravel.	A-4(0)	
17.43		9	16.0' 16.0'	8 13 16 20	17" RECOVERY Wet medium dense brown fine to coarse sand with some silt, trace of gravel.	A-1-b	
19.92		10	18.0' 18.0'	2 6 10 12	16" RECOVERY Saturated medium dense brown fine sand with some silt and coarse sand, trace of gravel.	A-2-4(0)	
22.41			20.0'		10" RECOVERY		
24.9		11	24.0'	6 6 7	Saturated medium dense brown silty fine sand with some coarse sand, trace of gravel.	A-2-4(0)	
27.39			26.0'		19" RECOVERY		
29.88		12	29.0' 31.0'	7 13 16 18	Saturated medium dense brown fine sand with some coarse sand, trace of silt.	A-1-b	
32.37					16" RECOVERY		
34.86		13	34.0' 36.0'	9 11 18 16	Saturated medium dense brown fine sand with some silt and coarse sand, trace of gravel.	A-2-4(0)	
37.35					15" RECOVERY		

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

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

Boring No.: BR1-04-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	11 11 12 10	Saturated medium dense brown fine sand with some coarse sand and silt.	A-2-4(0)	
			41.0'		16" RECOVERY		
42.33							
44.82		15	44.0'	9 10 13 16	Saturated medium dense brownish-gray fine sand with some coarse sand, trace of silt.	A-2-4(0)	
			46.0'		19" RECOVERY		
47.31							
49.8		16	49.0'	9 13 16 19	Saturated medium dense brownish-gray fine sand with some silt, trace of coarse sand and gravel.	A-2-4(0)	
			51.0'		17" RECOVERY		
52.29							
54.78		17	54.0'	9 15 17 24	Saturated dense gray silty fine sand with some coarse sand.	A-2-4(0)	
			56.0'		20" RECOVERY		
57.27							
59.76		18	58.0'	8 12 18 44	Saturated hard gray fine sandy silt with some clay, trace of coarse sand and seashells.	A-2-4(0)	
			60.0'		24" RECOVERY		

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

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

Boring No.: BR1-04-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		19	63.0'	9 15 19 25	Saturated dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
64.74			65.0'		24" RECOVERY		
67.23							
		20	68.0'	5 8 15 16	Saturated very stiff gray fine sandy silt with some coarse sand and clay, trace of gravel.	A-2-4(0)	
69.72			70.0'		24" RECOVERY		
72.21							
		21	73.0'	8 15 20 22	Saturated hard gray fine sandy silt, trace of coarse sand.	A-2-4(0)	
74.7			75.0'		24" RECOVERY		
					Boring Terminated at 75.0'		
77.19							
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded gravel
with clay



Silty sand



Well graded sand
with silt



Poorly graded clayey
silty sand



Poorly graded sand
with silt



Poorly graded sand

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Notes:

1. Exploratory borings were drilled on 2/29/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
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.

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

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

Boring No.: BR1-04-03

Contract: 25-113-01

Boring Location: Sta. 689+88.45, 50' Lt. C.L.

Boring Surface Elev.: +29.17

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

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	35.0
Hollow Stem Auger:			From Depth of:		To:	

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/19/2008		6.0'	6.0'	5.5'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 2 4 4	Saturated firm brown silt with some fine sand, trace of coarse sand.	A-4(0)	
2.49		2	2.0'	3 3 2 2	16" RECOVERY Saturated firm brown silt, trace of fine to coarse sand.	A-4(0)	
4.98		3	4.0'	1 2 1 8	16" RECOVERY Saturated medium dense brown fine to coarse sand and gravel, little silt.	A-1-a	
7.47		4	6.0'	17 10 9 10	3" RECOVERY Wet medium dense grayish-brown coarse to fine sand with some gravel and silt.	A-1-b	
9.96		5	8.0'	2 3 6 8	17" RECOVERY Saturated loose grayish-brown silty coarse to fine sand, trace of gravel.	A-1-b	
12.45		6	10.0'	6 6 6 7	14" RECOVERY Saturated medium dense brown fine to coarse sand with some silt, trace of gravel.	A-7-5(2)	
		7	12.0'	4 5 6 6	15" RECOVERY Saturated medium dense brown fine sand with some coarse sand, trace of silt and gravel.	A-2-7(1)	

Remarks: Mud Rotary @ 35.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-04-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	1 5 7 7	13" RECOVERY Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel.	A-7-5(2)	
17.43		9	16.0' 16.0'	8 9 10 12	14" RECOVERY Saturated medium dense brown fine sand with some silt and coarse sand.	A-2-7(1)	
19.92		10	18.0' 18.0'	10 12 12 16	24" RECOVERY Saturated medium dense brown fine sand with some silt and coarse sand.	A-7-5(4)	
22.41			20.0'		24" RECOVERY		
24.9		11	24.0'	9 11 12 12	Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel.	A-5(0)	
27.39			26.0'		15" RECOVERY		
29.88		12	29.0'	5 5 8 10	Saturated medium dense brown fine sand with some coarse sand and silt.	A-2-4(0)	
32.37			31.0'		17" RECOVERY		
34.86		13	34.0'	3 7 14 15	Saturated medium dense brown fine sand with some coarse sand, trace of silt.	A-2-4(0)	
37.35			36.0'		17" RECOVERY		

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

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

Boring No.: BR1-04-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	6 11 14 20	Saturated medium dense brown fine sand with some silt and coarse sand.	A-2-4(0)	
			41.0'		17" RECOVERY		
42.33							
44.82		15A	44.0'	7 11 23	Saturated dense brown silty fine sand, trace of coarse sand.	A-2-4(0)	
			45.0'		12" RECOVERY		
		15B	45.5'	23	Saturated dense gray silty fine sand, trace coarse gravel	A-3	
		15B	46.0'		4" RECOVERY		
47.31			46.3'		Saturated dense gray silty fine sand, trace of coarse sand.		
49.8		16	49.0'	8 14 23 25	Saturated dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
			51.0'		15" RECOVERY		
52.29		U-1	52.0'		No recovery.		Press Sample - Shelby Tube.
			52.0'		0" RECOVERY		
54.78		17	54.0'	13 11 17 19	Saturated very stiff gray fine sandy silt, trace of coarse sand and seashells.	A-2-4(0)	
			56.0'		15" RECOVERY		
57.27							
59.76		18	59.0'	9 10 22 26	Saturated hard gray fine sandy silt, trace of coarse sand and gravel.	A-2-4(0)	

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

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

Boring No.: BR1-04-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		24" RECOVERY		
62.25							
		19	64.0'	13 19 26 34	Saturated dense gray silty fine sand, trace of coarse sand, gravel, and seashells.	A-2-4(0)	
64.74			66.0'		24" RECOVERY		
67.23							
		20	69.0'	11 15 18 42	Saturated hard gray fine sandy silt with some clay, trace of coarse sand and gravel.	A-2-4(0)	
69.72			71.0'		24" RECOVERY		
72.21							
		21	73.0'	8 30 50/3"	Saturated very dense gray silty fine sand with some coarse sand.	A-2-4(0)	
74.7			75.0'		Boring Terminated at 74.8' 8" RECOVERY		
77.19							
79.68							
82.17							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55
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.

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

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

Boring No.: BR1-04-04

Contract: 25-113-01

Boring Location: Sta. 689+44.36, 52' Rt. C.L.

Boring Surface Elev.: + 30.37

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 38.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 2/15/2008	Time	6.0'	6.0'	4.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Cecil Velazlo
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 2 2 3	Saturated soft brownish-gray silt, trace of fine to coarse sand and gravel.	A-3	
2.49		2	2.0' 2.0'	2 2 2 1	16" RECOVERY Saturated soft brownish-gray silt, trace of fine to coarse sand.	A-4(0)	
4.98		3	4.0' 4.0'	1 1 2 2	16" RECOVERY Saturated soft grayish-black silt with some fine sand, clay, and organic matter, trace of coarse sand and gravel.	A-4(5)	
7.47		4	6.0' 6.0'	1 5 10 13	13" RECOVERY Saturated stiff gray silt with some fine sand, trace of coarse sand, gravel, clay, and organic matter.	A-4(0)	
		5A	8.0' 8.0'	2 12	10" RECOVERY Saturated very stiff gray silt with some fine to coarse sand and gravel, trace of organic matter.	A-4(0)	
9.96		5B	9.0' 9.0'	14 11	12" RECOVERY Saturated medium dense brown coarse to fine sand with some silt, trace of gravel.	A-1-b	
			10.0'		8" RECOVERY		
12.45		7	12.0'	5 6 7 6	Saturated medium dense brownish-gray fine to coarse sand with some silt, trace of gravel.	A-2-4(0)	

Remarks: Mud Rotary @ 38.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-04-04

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 6	16" RECOVERY Saturated loose brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
17.43		9	16.0' 16.0'	2 6 7 7	12" RECOVERY Saturated medium dense brown fine sand with some silt and coarse sand, trace of gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	2 5 7 9	18" RECOVERY Saturated medium dense brown fine sand with some silt and coarse sand, trace of gravel.	A-2-4(0)	
22.41			20.0'		17" RECOVERY		
24.9		11	24.0'	6 5 6 8	Saturated medium dense brown fine sand with some silt and coarse sand.	A-2-4(0)	
27.39			26.0'		19" RECOVERY		
29.88		12	29.0'	2 6 10 11	Saturated medium dense brown fine sand with some silt and coarse sand, trace of gravel.	A-2-4(0)	
32.37			31.0'		16" RECOVERY		
34.86		U-1	34.0'		Saturated orange/brown fine sand with some coarse sand, trace of gravel	A-3	Press Sample - Shelby Tube.
37.35		13	36.0' 36.0'	2 5 14 19	24" RECOVERY Saturated medium dense brown fine sand with some coarse sand and silt.	A-2-4(0)	

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

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

Boring No.: BR1-04-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			38.0'		24" RECOVERY		
39.84		14	39.0'	13 15 21 19	Saturated dense brown fine sand with some coarse sand and silt.	A-2-4(0)	
			41.0'		20" RECOVERY		
42.33							
44.82		15	44.0'	7 13 28 23	Saturated dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
			46.0'		16" RECOVERY		
47.31							
49.8		16	48.0'	6 11 20 22	Saturated dense gray fine sand with some silt, trace of coarse sand and gravel.	A-2-4(0)	
			50.0'		16" RECOVERY		
52.29							
54.78		17	53.0'	12 16 19 23	Saturated dense gray silty fine sand with some coarse sand, trace of gravel.	A-2-4(0)	
			55.0'		24" RECOVERY		
57.27							
59.76		18	58.0'	8 14 21 23	Saturated dense gray fine sand with some clay, trace of coarse sand.	A-2-4(0)	
			60.0'		24" RECOVERY		

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

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

Boring No.: BR1-04-04







Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		19	63.0'	11 14 29 42	Saturated hard gray fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
64.74			65.0'		24" RECOVERY		
67.23							
		20	68.0'	10 10 16 22	Saturated very stiff gray fine sandy silt with some coarse sand and clay, trace of gravel and organic matter.	A-4(0)	
69.72			70.0'		24" RECOVERY		
72.21							
		21	73.0'	7 13 24 29	Saturated hard gray fine sandy silt with some clay, trace of coarse sand, gravel, and organic matter.	A-4(0)	
74.7			75.0'		24" RECOVERY		
					Boring Terminated at 75.0'		
77.19							
79.68							
82.17							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Silt
	Well graded sand with silt
	Silty sand
	Poorly graded sand
	Poorly graded sand with silt
	Poorly graded clayey silty sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/15/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
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.

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

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

Boring No.: BR1-04-05

Contract: 25-113-01

Boring Location: Sta. 690+58.49, 67' Rt. C.L.

Boring Surface Elev.: + 31.21

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 51.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/20/2008		6.0'	6.0'	3.8'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: A. Joseph/T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 2 4 3	Wet firm brown coarse sandy silt with some fine sand and clay, trace of gravel.	A-4(2)	
2.49		2	2.0'	2 2 3 4	24" RECOVERY Wet loose brown coarse sand with some gravel fine sand and clay.	A-7-5(1)	
4.98		3	4.0'	1 5 7 14	14" RECOVERY Wet medium dense brown gravelly coarse sand, trace of fine sand and silt.	A-2-4(0)	
7.47		4	6.0'	7 17 17 14	15" RECOVERY Wet dense brown gravelly coarse sand with some fine sand and silt.	A-2-4(0)	
9.96		5	8.0'	4 10 8 7	22" RECOVERY Saturated medium dense brownish-gray coarse to fine sand with some silt, trace of gravel.	A-2-5(0)	
12.45		6	10.0'	3 3 3 3	10" RECOVERY Wet loose brownish-gray coarse to fine sand, trace of silt and gravel.	A-5(0)	
		7	12.0'	5 4 4 5	17" RECOVERY Saturated loose brownish-gray coarse to fine sand, trace of silt and gravel.	A-2-4(0)	

Remarks: Mud Rotary @ 51.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-04-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	3 4 6 7	16" RECOVERY Saturated loose brown fine to coarse sand, trace of silt and gravel.	A-2-4(0)	
17.43		9	16.0' 16.0'	6 7 10 11	16" RECOVERY No Sample Recovery		
19.92		10	18.0' 18.0'	7 10 11 15	0" RECOVERY Wet medium dense brown fine to coarse sand with some gravel, trace of silt.	A-2-4(0)	
22.41			20.0'		9" RECOVERY		
24.9		11	24.0'	7 10 7 11	Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel.	A-4(0)	
27.39			26.0'		16" RECOVERY		
29.88		12	29.0'	9 10 18 19	Saturated medium dense brown fine sand with some silt and coarse sand.	A-2-4(0)	
32.37			31.0'		17" RECOVERY		
34.86		13	34.0'	9 10 13 17	Saturated medium dense brown fine sand with some coarse sand, trace of silt.	A-2-4(0)	
37.35			36.0'		16" RECOVERY		

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

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

Boring No.: BR1-04-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	10 12 15 20	Saturated medium dense brown fine sand with some coarse sand, trace of silt.	A-2-4(0)	
			41.0'		17" RECOVERY		
42.33							
44.82		15	44.0'	7 12 18 18	Saturated medium dense brownish-gray fine sand with some silt and coarse sand.	A-2-4(0)	
			46.0'		19" RECOVERY		
47.31							
49.8		16	49.0'	10 18 22 28	Saturated dense gray fine sand with some silt, trace of coarse sand and gravel.	A-2-4(0)	
			51.0'		20" RECOVERY		
52.29							
54.78		17	53.0'	12 22 32 39	Saturated very dense grayish-green fine sand with some silt and coarse sand, trace of gravel.	A-2-4(0)	
			55.0'		14" RECOVERY		
57.27							
59.76		18	58.0'	10 16 22 30	Saturated dense grayish-green silty fine sand with some coarse sand, trace of gravel.	A-2-4(0)	
			60.0'		24" RECOVERY		

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

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

Boring No.: BR1-04-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		19	63.0'	7 12 16 20	Saturated medium dense grayish-green silty fine sand with some coarse sand, trace of gravel.	A-2-4(0)	
64.74			65.0'		24" RECOVERY		
67.23							
		20	68.0'	7 7 16 16	Saturated medium dense grayish-green fine sand with some coarse sand and clay.	A-2-4(0)	
69.72			70.0'		24" RECOVERY		
72.21							
		21	74.0'	7 12 22 25	Saturated dense grayish-green fine sand with some clay, trace of coarse sand.	A-4(0)	
74.7			76.0'		24" RECOVERY		
77.19					Boring Terminated at 76.0'		
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Well graded sand
with silt



Poorly graded sand
with silt



Silty sand



Poorly graded sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/20/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55
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.

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

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

Boring No.: BR1-04-06

Contract: 25-113-01

Boring Location: Sta. 688+75.08, 67' Lt. C.L.

Boring Surface Elev.: + 30.20

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	51.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/18/2008		10.0'	10.0'	7.4'	

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:		Ft.;		No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				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	0.0'	3 5 5	Saturated stiff brownish-gray silt with some clay, trace of fine to coarse sand and gravel.	A-4(4)	
2.49		2	2.0'	4 6 11	15" RECOVERY Wet stiff gray silt with some clay, coarse sand, and gravel, trace of fine sand.	A-4(7)	
4.98		3	4.0'	25 41 50/5"	8" RECOVERY Moist very dense brown gravel with some coarse sand, trace of silt and fine sand.	A-4(2)	
7.47		4	6.0'	19 11 12 11	11" RECOVERY Wet medium dense brown gravelly fine to coarse sand with some silt.	A-1-b	
9.96		5	8.0'	6 6 9 11	18" RECOVERY Wet medium dense brownish-gray coarse to fine sand with some silt, trace of gravel.	A-1-b	
12.45		6	10.0'	7 10 11 13	20" RECOVERY Wet medium dense brownish-gray coarse to fine sand with some silt, trace of gravel.	A-1-b	
		7	12.0'	6 12 9 13	21" RECOVERY Wet medium dense brownish-gray fine to coarse sand with some gravel and silt.	A-4(0)	

Remarks: Mud Rotary @ 51.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-04-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	7 9 9 13	18" RECOVERY Saturated medium dense brown silty fine sand with some coarse sand.	A-2-4(0)	
17.43		9	16.0' 16.0'	5 7 9 14	14" RECOVERY Saturated medium dense brown fine sand with some coarse sand and silt.	A-6(8)	
19.92		10	18.0' 18.0'	7 13 23 18	18" RECOVERY Saturated dense brown fine sand with some silt and coarse sand, trace of gravel.	A-4(7)	
22.41			20.0'		17" RECOVERY		
24.9		11	24.0'	7 13 15 23	Saturated medium dense brown fine sand with some silt and coarse sand.	A-4(3)	
27.39			26.0'		18" RECOVERY		
29.88		12	29.0'	11 12 19 22	Saturated dense brown fine sand with some coarse sand, trace of silt.	A-3	
32.37			31.0'		17" RECOVERY		
34.86		13	34.0'	10 17 21 23	Saturated dense brown fine to coarse sand, trace of silt.	A-1-b	
37.35			36.0'		24" RECOVERY		

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

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

Boring No.: BR1-04-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.5'	13 18 21 24	Saturated dense brown fine sand with some coarse sand, trace of silt.	A-1-b	
			41.5'		17" RECOVERY		
42.33							
44.82		15	44.0'	17 24 41 50/5"	Saturated very dense brown silty fine sand, trace of coarse sand.	A-1-b	
			46.0'		17" RECOVERY		
47.31							
49.8		16	49.0'	12 18 30 36	Saturated dense gray silty fine sand, trace of coarse sand and gravel.	A-1-b	
			51.0'		19" RECOVERY		
52.29							
54.78		17	54.0'	12 18 24 26	Saturated dense gray silty fine sand with some coarse sand, trace of gravel.	A-3	
			56.0'		17" RECOVERY		
57.27							
59.76		18	59.0'	7 15 17 34	Saturated hard gray fine sandy silt with some clay, trace of coarse sand and gravel.	A-3	

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DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

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

Boring No.: BR1-04-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		21" RECOVERY		
62.25							
		19	64.0'	7 16 24 24	Saturated hard gray fine sandy silt, trace of coarse sand.	A-2-4(0)	
64.74			66.0'		22" RECOVERY		
67.23							
		20	69.0'	13 16 20 23	Saturated hard gray fine sandy silt, trace of coarse sand and gravel.	A-2-4(0)	
69.72			71.0'		20" RECOVERY		
72.21							
		21	74.0'	12 14 16 24	Saturated very stiff gray fine sandy silt, trace of coarse sand and gravel.	A-2-4(0)	
74.7			76.0'		24" RECOVERY		
					Boring Terminated at 76.0'		
77.19							
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Well graded gravel
with silt



Silty sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand

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Notes:

1. Exploratory borings were drilled on 2/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
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.

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

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

Boring No.: BR1-04-07

Contract: 25-113-01

Boring Location: Sta. 691+01.90, 29' Lt. C.L.

Boring Surface Elev.: + 31.50

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 56.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 2/29/2008	Time	8.0'	6.0'	4.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

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	0.0'	1 2 3 6	Wet firm brownish-gray coarse to fine sandy silt with some clay, trace of gravel.	A-4(2)	
2.49		2	2.0'	8 9 9 9	11" RECOVERY Moist medium dense brown coarse sand with some fine sand and silt, trace of gravel.	A-1-b	
4.98		3	4.0'	3 3 4 4	15" RECOVERY Wet loose brown coarse sand with some fine sand and gravel, trace of silt.	A-2-4(0)	
7.47		4	6.0'	3 4 5 7	17" RECOVERY Wet loose brown coarse to fine sand with some silt, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	10 8 5 5	14" RECOVERY Wet medium dense brown coarse to fine sand with some silt and gravel.	A-7-5(3)	
12.45		6	10.0'	4 6 7 7	19" RECOVERY Wet medium dense brownish-gray coarse to fine sand, trace of silt and gravel.	A-2-4(0)	
		7	12.0'	3 3 10 11	15" RECOVERY Saturated medium dense brown fine to coarse sand with some silt, trace of gravel.	A-2-4(0)	

Remarks: Mud Rotary @ 56.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-04-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	17 17 20 26	14" RECOVERY Wet dense brown coarse to fine sand, trace of silt and gravel.	A-2-5(0)	
17.43		9	16.0' 16.0'	6 6 9 11	16" RECOVERY Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	7 8 9 10	8" RECOVERY No Sample Recovery		
22.41			20.0'		0" RECOVERY		
24.9		11	24.0' 24.0'	8 10 10 17	Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel.	A-2-4(0)	
27.39			26.0'		19" RECOVERY		
29.88		12	29.0' 29.0'	12 11 11 12	Saturated medium dense brown fine sand with some coarse sand, trace of silt.	A-2-4(0)	
32.37			31.0'		16" RECOVERY		
34.86		13	34.0' 34.0'	7 10 12 17	Saturated medium dense brown fine sand with some coarse sand and silt.	A-2-4(0)	
37.35			36.0'		16" RECOVERY		

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DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

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

Boring No.: BR1-04-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	8 10 10 14	Saturated medium dense brown fine sand with some coarse sand, trace of silt.	A-2-4(0)	
			41.0'		23" RECOVERY		
42.33							
44.82		15	44.0'	8 12 17 20	Saturated medium dense brownish gray fine sand with some silt and coarse sand.	A-2-4(0)	
			46.0'		20" RECOVERY		
47.31							
49.8		16	49.0'	10 10 11 13	Saturated medium dense gray fine sand with some silt, trace of coarse sand and gravel.	A-2-4(0)	
			51.0'		18" RECOVERY		
52.29							
54.78		U-1	54.0'		No recovery.		Press Sample - Shelby Tube.
			56.0'		0" RECOVERY		
57.27							
59.76		17	58.0'	9 10 15 17	Saturated medium dense gray silty fine sand with some coarse sand, trace of gravel.	A-2-4(0)	
			60.0'		24" RECOVERY		

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

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

Boring No.: BR1-04-07


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		18	63.0'	10 12 15 16	Saturated medium dense gray clayey fine sand with some coarse sand, trace of gravel.	A-2-4(0)	
64.74			65.0'		24" RECOVERY		
67.23							
		19	68.0'	9 11 15 26	Saturated very stiff gray fine sandy silt, trace of coarse sand.	A-4(0)	
69.72			70.0'		24" RECOVERY		
72.21							
		20	73.0'	10 11 13 15	Saturated medium dense gray fine sand with some silt, trace of coarse sand.	A-2-4(0)	
74.7			75.0'		24" RECOVERY		
					Boring Terminated at 75.0'		
77.19							
79.68							
82.17							


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
KEY TO SYMBOLS


Symbol Description


Strata symbols

 Poorly graded clayey
silty sand

 Silty sand

 Well graded sand
with silt

 Poorly graded sand
with silt

 Clayey sand

 Silt

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/28/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
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.

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

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

Boring No.: BR1-04-08

Contract: 25-113-01

Boring Location: Sta. 688+30.49, 29' Rt. C.L.

Boring Surface Elev.: + 32.54

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 36.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/18/2088		10.0'	10.0'	8.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: J. Hiilebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	5 5 5 5	Saturated stiff brown silt, trace of fine to coarse sand.	A-4(0)	
2.49		2	2.0' 2.0'	3 4 5 5	8" RECOVERY Saturated stiff brown silt with some fine to coarse sand, trace of gravel.	A-1-b	
4.98		3	4.0' 4.0'	5 18 17 31	10" RECOVERY Wet dense brown silty gravel with some coarse to fine sand.	A-2-4(0)	
7.47		4	6.0' 6.0'	27 18 14 27	14" RECOVERY Wet medium dense brown coarse sandy gravel with some fine sand and silt.	A-4(1)	
9.96		5	8.0' 8.0'	12 9 12 10	24" RECOVERY Wet medium dense brown coarse sandy gravel with some silt and fine sand.	A-1-b	
12.45		6	10.0' 10.0'	4 6 10 9	3" RECOVERY Wet medium dense brown coarse to fine sand with some silt, trace of gravel.	A-1-b	
		7	12.0' 12.0'	3 4 6 7	24" RECOVERY Saturated loose brown coarse to fine sand, trace of silt and gravel.	A-1-b	

Remarks: Mud Rotary @ 36.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-04-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	3 10 8 8	24" RECOVERY Wet medium dense brown fine to coarse sand with some gravel and silt.	A-1-b	
17.43		9	16.0' 16.0'	8 8 9 7	12" RECOVERY Saturated medium dense brown fine sand with some silt and coarse sand, trace of gravel.	A-1-b	
19.92		10	18.0' 18.0'	10 11 9 8	24" RECOVERY Saturated medium dense brown fine sand with some coarse sand and silt, trace of gravel.	A-1-b	
22.41			20.0'		24" RECOVERY		
24.9		11	24.0'	8 11 11 12	Saturated medium dense brown fine sand with some silt, coarse sand, and gravel.	A-2-4(0)	
27.39			26.0'		18" RECOVERY		
29.88		12	29.0'	6 6 12 15	Saturated medium dense reddish-brown fine to coarse sand with some silt, trace of gravel.	A-1-b	
32.37			31.0'		24" RECOVERY		
34.86		13	34.0'	7 7 12 16	Saturated medium dense reddish-brown fine sand with some silt and coarse sand, trace of gravel.	A-3	
37.35			36.0'		24" RECOVERY		

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

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

Boring No.: BR1-04-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	11 11 16 15	Saturated medium dense reddish-brown silty fine sand with some coarse sand, trace of gravel.	A-2-4(0)	
			41.0'		18" RECOVERY		
42.33		U-1	42.0'		Saturated dense orange and brown fine sand with some coarse sand.	A-3	Press Sample - Shelby Tube.
			43.5'		18" RECOVERY		
44.82		15	43.5'	6 15 17 20	Saturated dense brown fine sand with some coarse sand, trace of silt and gravel.	A-3	
			45.5'		24" RECOVERY		
47.31							
49.8		16	49.0'	8 10 12 20	Saturated medium dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
			51.0'		18" RECOVERY		
52.29							
54.78		17	54.0'	15 19 20 22	Saturated dense gray silty fine sand with some coarse sand, trace of gravel.	A-3	
			56.0'		20" RECOVERY		
57.27							
59.76		18	59.0'	14 12 20 18	Saturated dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	

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

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

Boring No.: BR1-04-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		20" RECOVERY		
62.25							
		19	64.0'	10 11 12 14	Saturated very stiff gray fine sandy silt, trace of coarse sand and gravel.	A-2-4(0)	
64.74			66.0'		24" RECOVERY		
67.23							
		20	69.0'	10 10 14 13	Saturated very stiff gray fine sandy silt, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
69.72			71.0'		24" RECOVERY		
72.21							
		21	73.0'	18 27 31 40	Saturated hard gray fine sandy silt with some clay, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
74.7			75.0'		24" RECOVERY		
					Boring Terminated at 75.0'		
77.19							
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded sand
with silt



Poorly graded sand



Poorly graded clayey
silty sand

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Notes:

1. Exploratory borings were drilled on 2/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55
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.

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

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

Boring No.: BR1-05-01

Contract: 25-113-01

Boring Location: Sta. 674+48.48, 75' Lt. C.L.

Boring Surface Elev.: + 51.47

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0'		To: 76'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/24/08		51.0'		24.5	
	1/28/08		28.8'		Dry	
	1/29/08		28.8		Dry	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 76.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

3
No. of
Core Drilling in Rock: Ft.

Dia. U-Sample Boring: Ft.
U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Jason Turner
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	4 3 7	Wet firm brown coarse sandy silt w/ some fine sand and clay, trace of gravel.	A-1-b	
2.49		2	2.0'	7 10 11 14	14" RECOVERY Wet medium dense brown silty coarse to fine sand, trace of gravel.	A-1-b	
4.98		3	4.0'	4 7 6 7	8" RECOVERY Wet medium dense brown coarse sand w/ some fine sand, gravel, and clay.	A-1-b	
7.47		4	6.0'	5 4 3 6	18" RECOVERY Wet firm brown coarse sandy silt w/ some fine sand and clay, trace of gravel.	A-1-b	
9.96		5	8.0'	5 7 5	12" RECOVERY Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
12.45		6	10.0'	6 7 7 7	18" RECOVERY Moist medium dense brown coarse to fine sand w/ some gravel and silt.	A-2-4(0)	
		7	12.0'	5 5 7 8	16" RECOVERY Moist medium dense brown coarse to fine sand w/ some gravel and silt.	A-3	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-05-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	4 5 7 7	18" RECOVERY Moist medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
17.43		9	16.0' 16.0'	7 8 9 10	20" RECOVERY Moist medium dense brown coarse sand w/ some fine sand and silt, trace of gravel.	A-3	
19.92		10	18.0' 18.0'	8 8 8 8	24" RECOVERY Moist medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-3	
22.41			20.0'		24" RECOVERY		
24.9		11	24.0'	3 4 5 5	Saturated loose brown fine to coarse sand w/ some silt, trace of gravel.	A-3	
27.39			26.0'		20" RECOVERY		
29.88		12	29.0'	6 2 4 7	Saturated loose brown coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
32.37			31.0'		24" RECOVERY		
34.86		13	34.0'	4 6 8 9	Saturated medium dense brown coarse to fine sand, trace of silt and gravel.	A-3	
37.35			36.0'		12" RECOVERY		

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

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

Boring No.: BR1-05-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	5 9 10 11	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-4(0)	
			41.0'		20" RECOVERY		
42.33							
44.82		15	44.0'	4 7 9 11	Saturated medium dense reddish brown fine sand w/ some coarse sand, trace of silt and gravel.	A-4(0)	
			46.0'		24" RECOVERY		
47.31							
49.8		16	49.0'	9 10 14 16	Sample selected for corroison potential testing.		pH Testing.
			51.0'		18" RECOVERY		
52.29		17	51.0'	17 25 35 23	Saturated dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			53.0'		20" RECOVERY		
54.78		18	54.0'	6 11 11 11	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-2-4(0)	
			56.0'		24" RECOVERY		
57.27							
59.76		19	59.0'	9 11 13 17	Saturated medium dense reddish brown fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	

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

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

Boring No.: BR1-05-01


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		15" RECOVERY		
62.25							
		20	64.0'	9 10 11 13	Saturated medium dense brown fine sand w/ some silt, trace of coarse sand and gravel.	A-4(0)	
64.74							
			66.0'		14" RECOVERY		
67.23							
		21	69.0'	10 13 17 24	Saturated medium dense gray silty fine sand w/ some coarse sand, trace of gravel.	A-4(0)	
69.72							
			71.0'		20" RECOVERY		
72.21							
		22	74.0'	10 19 20 24	Saturated dense grayish green silty fine sand w/ some coarse sand, trace of gravel.	A-4(0)	
74.7							
			76.0'		24" RECOVERY		
77.19					Boring Terminated at 76.0'		
79.68							
82.17							


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
KEY TO SYMBOLS


Symbol Description

Strata symbols

 Silty low plasticity clay

 Silty sand

 Poorly graded clayey silty sand

 Poorly graded sand with silt

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Notes:

1. Exploratory borings were drilled on 1/24/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a truck mounted CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations and elevations were surveyed by Century Engineering using information contained in the project development scope.
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.

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

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

Boring No.: BR1-05-02

Contract: 25-113-01

Boring Location: Sta. 678+38.38, 85' Rt. C.L.

Boring Surface Elev.: 61.28

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 56.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/24/08		76.0'		32.5'	28.8 61.3 61.3 61.3

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 4 4 5	Wet firm brownish gray silt w/ some fine sand and clay, trace of coarse sand and gravel.	A-4(3)	
2.49		2	2.0'	3 4 6 6	18" RECOVERY Saturated stiff brown silty clay w/ some fine to coarse sand, trace of gravel.	A-4(0)	
		3	4.0'	2 4	23" RECOVERY Wet firm brown fine to coarse sandy silt w/ some clay, trace of gravel.	A-2-4(0)	
4.98		3A	5.0'	5 3	10" RECOVERY Wet loose brown silty fine sand w/ some coarse sand.	A-1-b	
		4	6.0'	6 9 10 5	9" RECOVERY Moist medium dense brown coarse sandy gravel w/ some fine sand and silt.	A-1-b	
7.47		5	8.0'	6 8 9 9	19" RECOVERY Moist medium dense brown gravelly coarse sand w/ some silt, trace of fine sand.	A-1-b	
9.96		6	10.0'	2 5 5 5	16" RECOVERY Wet loose brown coarse sand w/ some silt and fine sand, trace of gravel.	A-2-4(0)	
12.45		7	12.0'	5 3 5 5	17" RECOVERY Wet loose brown silty fine to coarse sand, trace of gravel.	A-6(12)	

Remarks: Mud Rotary @ 56.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-05-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	2 4 7 9	20" RECOVERY Saturated stiff brown silty clay w/ some fine sand, trace of coarse sand.	A-6(5)	
			16.0'		18" RECOVERY		
		9	16.0'	9 9	Wet very stiff gray silty fine sandy clay.	A-4(3)	
17.43		9A	17.0' 17.0'	12 11	9" RECOVERY Moist medium dense brownish gray fine sand w/ some silt.	A-2-4(0)	
			18.0'		9" RECOVERY		
		10	18.0'	3 4 6 10	Saturated stiff brownish gray fine sandy silt w/ some clay, trace of coarse sand.	A-2-4(0)	
19.92			20.0'		20" RECOVERY		
		U-1	20.0'		Saturated medium dense brown coarse to fine sand w/ some gravel, trace silt	A-2-4(0)	Press Sample - Shelby Tube.
22.41			22.0'		24" RECOVERY		
24.9		11	24.0'	11 13 16 12	Moist medium dense brown silty gravel w/ some fine to coarse sand.	A-1-b	
			26.0'		18" RECOVERY		
27.39							
29.88		12	29.0'	11 15 17 14	Moist dense brown fine sandy gravel w/ some silt, trace of coarse sand.	A-1-b	
			31.0'		15" RECOVERY		
32.37							
34.86		13	34.0'	10 10 9 8	Wet medium dense brown fine sandy gravel w/ some silt, trace of coarse sand.	A-4(0)	
			36.0'		9" RECOVERY		
37.35							

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

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

Boring No.: BR1-05-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	6 7 7	Saturated stiff brownish gray coarse sandy silt w/ some fine sand, trace of gravel.	A-2-4(0)	
			41.0'		11" RECOVERY		
42.33							
44.82		15	44.0'	4 5 7 8	Saturated medium dense brownish gray silty fine to coarse sand.	A-2-4(0)	
			46.0'		15" RECOVERY		
47.31							
49.8		16	49.0'	12 10 11 13	Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
			51.0'		16" RECOVERY		
52.29							
54.78		17	54.0'	12 14 19 22	Saturated dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			56.0'		20" RECOVERY		
57.27							
59.76		18	59.0'	8 9 13 13	Saturated medium dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	

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

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

Boring No.: BR1-05-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		15" RECOVERY		
62.25							
		19	64.0'	7 10 15 17	Saturated medium dense brownish gray silty fine sand w/ some coarse sand.	A-2-4(0)	
64.74			66.0'		15" RECOVERY		
67.23							
		20	69.0'	9 15 16 18	Saturated dense brownish gray silty fine sand w/ some coarse sand.	A-2-4(0)	
69.72			71.0'		15" RECOVERY		
72.21							
		21	74.0'	14 17 19 22	Saturated dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
74.7			76.0'		20" RECOVERY		
					Boring Terminated at 76.0'		
77.19							
79.68							
82.17							

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AUGUST 2015

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

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/24/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a truck mounted CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations and elevations were surveyed by Century Engineering using information contained in the project development scope.
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.

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

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

Boring No.: BR1-05-03

Contract: 25-113-01

Boring Location: Sta. 675+58.34, at C.L.

Boring Surface Elev.: + 59.65

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 76.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/24/08		76.0'		31.7'	
	1/25/08		27.5'		Dry	
	1/28/08		27.5'		Dry	

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

Boring Contractor: Walton Corporation
Driller: Gary Turner
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	3 4 3 4	Saturated firm brown clayey silt w/ some coarse sand, trace of fine sand.	A-4(2)	
2.49		2	2.0'	3 5 5 8	15" RECOVERY Saturated stiff brown silt w/ some clay, trace of fine to coarse sand.	A-1-a	
4.98		3	4.0'	6 8 12 14	20" RECOVERY Wet very stiff brown fine sandy silt w/ some coarse sand and clay, trace of gravel.	A-4(2)	
7.47		4	6.0'	10 12 13 15	22" RECOVERY Wet medium dense brown gravelly coarse sand w/ some silt and fine sand.	A-1-b	
9.96		5	8.0'	6 9 10	19" RECOVERY Wet medium dense brown gravelly coarse sand w/ some fine sand and silt.	A-1-b	
12.45		6	10.0'	10 12 15 14	20" RECOVERY Wet medium dense brown coarse sand w/ some fine sand, silt, and gravel.	A-3	
		7A	12.0'	4 8	19" RECOVERY Saturated very stiff brown fine sandy silt, trace of coarse sand.	A-2-4(0)	
		7B	13.0'	10	12" RECOVERY Wet medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
		7C	13.5'	8		A-6(8)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-05-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		U-1	14.0' 14.0'		6" RECOVERY Saturated very stiff brownish gray silty clay, trace of coarse sand and gravel. 6" RECOVERY	A-6(11)	
			16.0'		Saturated very stiff tan clay with some fine sand		
		8A	16.0'	2		A-2-4(0)	
		8B	16.5'	4	Saturated firm brownish gray clayey silt w/ some fine sand.	A-4(3)	
17.43		8C	17.0' 17.0'	5 7	6" RECOVERY Saturated stiff brown fine sandy silt w/ some clay, trace of coarse sand. 6" RECOVERY	A-2-4(0)	
		9	18.0'	8 17 25 22	6" RECOVERY Saturated dense coarse to fine sand w/ silt, trace gravel. 12" RECOVERY	A-2-4(0)	
19.92			20.0'		Saturated dense brown coarse sandy gravel w/ some fine sand and silt. 13" RECOVERY		
22.41							
24.9		10	24.0'	7 12 14 18	Saturated medium dense brown gravelly coarse sand, trace of fine sand and silt.	A-2-4(0)	
			26.0'		17" RECOVERY		
27.39							
29.88		11	29.0'	6 11 10 13	Wet medium dense brown coarse sand w/ some gravel and fine sand, trace of silt.	A-2-4(0)	
			31.0'		18" RECOVERY		
32.37							
34.86		12	34.0'	6 7 15 18	Wet medium dense brown gravelly coarse sand, trace of fine sand and silt.	A-2-4(0)	
			36.0'		20" RECOVERY		
37.35							

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

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

Boring No.: BR1-05-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	9 12 11 12	Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-2-4(0)	
			41.0'		11" RECOVERY		
42.33							
44.82		14	44.0'	9 7 7 9	Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-2-4(0)	
			46.0'		24" RECOVERY		
47.31							
49.8		15	49.0'	10 11 13 17	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			51.0'		19" RECOVERY		
52.29							
54.78		16	54.0'	10 10 19 22	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-4(0)	
			56.0'		19" RECOVERY		
57.27							
59.76		17	59.0'	12 15 29 30	Saturated dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	

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

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

Boring No.: BR1-05-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		22" RECOVERY		
62.25							
		18	64.0'	13 22 29 32	Saturated very dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
64.74			66.0'		19" RECOVERY		
67.23							
		19	69.0'	15 13 17 19	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
69.72			71.0'		19" RECOVERY		
72.21							
		20	74.0'	19 30 36 40	Saturated very dense brown fine sand, trace of silt and coarse sand.	A-3	
74.7			76.0'		24" RECOVERY		
					Boring Terminated at 76.0'		
77.19							
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Poorly graded sand
with silt



Silty sand



Well graded sand
with silt



Poorly graded sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/24/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a truck mounted CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations and elevations were surveyed by Century Engineering using information contained in the project development scope.
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.

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

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

Boring No.: BR1-05-04

Contract: 25-113-01

Boring Location: Sta. 677+82.45, 89' Rt. C.L.

Boring Surface Elev.: + 57.17

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

Casing Size:	3 1/4	Inches	From Depth of:	0.0'	To:	29.0'
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/29/08		49.0'		28.4'	
	3/3/08		18.1'		Dry	
	3/4/08		18.1'		Dry	

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

Boring Contractor: Walton Corporation
Driller: Gary Turner
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	6 7	Wet stiff brown silty fine sandy clay w/ some coarse sand, trace of gravel. 12" RECOVERY	A-4(1)	4" Asphalt - 6" Road Base
2.49		2	2.0'	12 13 15 17	Moist medium dense brown gravelly coarse sand w/ some silt, trace of fine sand. 14" RECOVERY	A-1-a	
4.98		3	4.0'	14 12 8 8	Wet very stiff brown gravelly fine sandy silt w/ some coarse sand and clay. 18" RECOVERY	A-1-b	
7.47		4	6.0'	4 5 6 8	Wet stiff brown silty fine sandy clay, trace of coarse sand and gravel. 20" RECOVERY	A-2-4(0)	
9.96		5	8.0'	5 5 6 7	Wet medium dense brown silty fine sand, trace of gravel and coarse sand. 10" RECOVERY	A-4(0)	
12.45		6	10.0'	11 9 11 12	Saturated very stiff brown silty clay w/ some fine sand, trace of coarse sand. 12" RECOVERY	A-2-4(0)	
		U-1	12.0'		Saturated medium dense light brown coarse to fine sand, trace silt and gravel 24" RECOVERY	A-3	Press Sample - Shelby Tube.
		7	14.0'	4 5 9 11	Saturated stiff brown silty clay w/ some fine sand, trace of coarse sand.	A-2-4(0)	

Remarks: Mud Rotary @ 29.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-05-04

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		14" RECOVERY		
17.43		8	16.0'	5 8 11 27	Wet medium dense brown silty fine to coarse sand w/ some gravel.	A-2-5(0)	
			18.0'		18" RECOVERY		
19.92		9	18.0'	16 20 26 30	Moist dense brown coarse to fine sandy gravel, trace of silt.	A-1-b	
			20.0'		18" RECOVERY		
22.41							
24.9		10	24.0'	16 20 26 30	Moist dense brown coarse sandy gravel w/ some fine sand, trace of silt.	A-2-4(0)	
			26.0'		14" RECOVERY		
27.39							
29.88		11	29.0'	11 14 13 17	Wet medium dense brown coarse sandy gravel, trace of fine sand and silt.	A-2-4(0)	
			31.0'		8" RECOVERY		
32.37							
34.86		12	34.0'	12 15 14 14	Wet medium dense brown coarse sandy gravel, trace of fine sand and silt.	A-2-4(0)	
			36.0'		8" RECOVERY		
37.35							

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

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

Boring No.: BR1-05-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	7 5 7 7	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			41.0'		10" RECOVERY		
42.33							
44.82		14	44.0'	10 10 13 15	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			46.0'		18" RECOVERY		
47.31							
49.8		15	49.0'	13 19 30 35	Saturated dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			51.0'		18" RECOVERY		
52.29							
54.78		16	54.0'	12 11 15 13	Saturated medium dense brown fine to coarse sand, trace of silt and gravel.	A-2-4(0)	
			56.0'		19" RECOVERY		
57.27		17	56.0'	21 20 22 34	N.S.A.		pH Testing.
			58.0'		20" RECOVERY		
59.76		18	59.0'	12 14 17 19	Saturated dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			61.0'		18" RECOVERY		

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

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

Boring No.: BR1-05-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		19	64.0' 65.8'	16 21 36 50/3"	Saturated very dense brown fine sand w/ some coarse sand, trace of silt. 21" RECOVERY	A-2-4(0)	
67.23							
69.72		20	69.0' 71.0'	17 30 50 80	Saturated very dense brown fine sand w/ some silt, trace of coarse sand and gravel. 15" RECOVERY	A-2-4(0)	
72.21							
74.7		21	74.0' 76.0'	24 24 19 31	Saturated hard gray fine sandy silt, trace of coarse sand and gravel. 20" RECOVERY	A-2-4(0)	
77.19					Boring Terminated at 76.0'		
79.68							
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand



Poorly graded sand
with silt



Poorly graded gravel
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/29/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a truck mounted CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations and elevations were surveyed by Century Engineering using information contained in the project development scope.
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.

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

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

Boring No.: BR1-05-05

Contract: 25-113-01

Boring Location: Sta. 675+37.70, 75' Lt. C.L.

Boring Surface Elev.: 54.29

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

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0'	To: 34.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/27/08		34.0'		27.5'	26.8
	2/29/08		17.5'		14.5'	39.8
						54.3
						54.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	75.0	Ft.;		No. of: 3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		Core Drilling in Rock:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:						

Boring Contractor: Walton Corporation
Driller: Gary Turner
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	3 5 5	Saturated stiff brown silt w/ some fine sand and clay, trace of coarse sand and gravel.	A-4(4)	
2.49		2	2.0'	3 5 5	12" RECOVERY Saturated stiff brown silt w/ some clay, trace of fine to coarse sand.	A-4(6)	
4.98		3	4.0'	3 10 12	24" RECOVERY Saturated stiff brown silt w/ some clay, trace of fine to coarse sand and gravel.	A-2-4(0)	
7.47		4	6.0'	5 10 10 10	12" RECOVERY Moist medium dense brown coarse sand w/ some fine sand, trace of silt and gravel.	A-2-4(0)	
9.96		5	8.0'	2 5 6 10	14" RECOVERY Saturated stiff brown silt w/ some clay, trace of fine to coarse sand and gravel.	A-2-4(0)	
12.45		U-1	10.0'		24" RECOVERY Saturated brown medium dense coarse to fine sand w/ some gravel, trace silt	A-2-6(0)	Press Sample - Shelby Tube.
			10.9'		10" RECOVERY		
		6	12.0'	6 15 13 12	Moist medium dense brown gravelly coarse sand w/ some fine sand, trace of silt.	A-2-4(0)	

Remarks: Mud Rotary @ 34.0'

Reviewed By: Kelly Maureen

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-05-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		7	14.0' 14.0'	6 7 10 12	12" RECOVERY Moist medium dense brown coarse to fine sand w/ some gravel, trace of silt.	A-2-4(0)	
17.43		8	16.0' 16.0'	9 9 9	16" RECOVERY Moist medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-2-5(0)	
19.92		9	18.0' 18.0'	4 5 6 7	18" RECOVERY Moist medium dense brown coarse to fine sand, trace of silt and gravel.	A-5(0)	
22.41			20.0'		20" RECOVERY		
24.9		10	24.0'	5 5 5	Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
27.39			26.0'		20" RECOVERY		
29.88		11	29.0'	2 3 5 7	Wet loose brown coarse to fine sand, trace of silt and gravel.	A-2-4(0)	
32.37			31.0'		20" RECOVERY		
34.86		12	34.0'	7 7 7	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
37.35			36.0'		12" RECOVERY		

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

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

Boring No.: BR1-05-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	5 4 5 7	Saturated loose brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			41.0'		20" RECOVERY		
42.33							
44.82		14	44.0'	17 23 23 21	Saturated dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			46.0'		18" RECOVERY		
47.31							
49.8		15	49.0'	11 18 25 30	Saturated dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			51.0'		18" RECOVERY		
52.29							
54.78		16	54.0'	16 20 25 27	Saturated dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			56.0'		16" RECOVERY		
57.27							
59.76		17	59.0'	8 8 13 16	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	

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

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

Boring No.: BR1-05-05


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		16" RECOVERY		
62.25							
		18	64.0'	12 12 15 19	Saturated medium dense brown fine sand w/ some silt, trace of coarse sand.	A-4(0)	
64.74			66.0'		18" RECOVERY		
67.23							
		19	69.0'	11 19 25 29	Saturated dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
69.72			71.0'		20" RECOVERY		
72.21							
		20	73.0'	13 19 19 28	Saturated hard gray fine sandy silt w/ some clay, trace of coarse sand.	A-2-4(0)	
74.7			75.0'		24" RECOVERY		
					Boring Terminated at 75.0'		
77.19							
79.68							
82.17							


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KEY TO SYMBOLS


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
Strata symbols


 Silty low plasticity clay

 Low plasticity clay

 Poorly graded sand with silt

 Poorly graded sand

 Well graded sand with silt

 Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a truck mounted CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day.
3. Boring locations and elevations were surveyed by Century Engineering using information contained in the project development scope.
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.

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

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

Boring No.: BR1-06-01

Contract: 25-113-01

Boring Location: Sta. 699+65.89, 292' Lt. C.L.

Boring Surface Elev.: 29.33

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

Casing Size: 3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:		From Depth of: 0.0'		To: 43.5'

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 2/6/08	Time	10.0'	8.0'	9.0'	20.3 29.3 29.3 29.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	91.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Danny Taylor
Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	3 6	Wet stiff brown clayey silt w/ some fine to coarse sand, trace of gravel. 12" RECOVERY	A-2-4(0)	10" Asphalt
2.49		2	2.0'	5 3 8 27	Wet stiff brown clayey fine sandy silt w/ some coarse sand and gravel. 12" RECOVERY	A-2-4(0)	
		3	4.0'	7 12 6	Wet medium dense orange-brown coarse sand and gravel w/ some fine sand, trace of silt. 6" RECOVERY	A-2-4(0)	
4.98		3A	5.5'	7	Wet stiff orange-brown clay w/ some fine sand, trace of coarse sand and gravel. 6" RECOVERY	A-2-4(0)	
		4	6.0'	8 11 11 12	Wet very stiff orange-brown fine sandy silt, trace of coarse sand. 24" RECOVERY	A-2-4(0)	
7.47		5	8.0'	6 6 4 4	Saturated loose orange-brown fine to coarse sand w/ some gravel, trace of silt. 15" RECOVERY	A-2-4(0)	
9.96		6	10.0'	2 4 5 2	Saturated loose orange-brown fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
12.45		7	12.0'	3 3 2 4	Saturated loose orange-brown fine sand w/ some silt, trace of coarse sand and gravel. 19" RECOVERY	A-2-5(0)	
		8	14.0'	1 2 4 5	Saturated loose orange-brown fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	

Remarks: Mud Rotary @ 43.5'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-06-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		24" RECOVERY		
17.43		9	16.0'	5 9 7 10	Saturated medium dense orange-brown fine sand w/ some silt, trace of coarse sand and gravel.	A-3	
			18.0'		22" RECOVERY		
19.92		10	18.0'	4 9 9	Saturated medium dense orange-brown fine sand w/ some coarse sand and silt.	A-7-5(9)	
			20.0'		16" RECOVERY		
22.41							
24.9		11	23.5'	5 4 6 6	Saturated loose orange-brown fine sand w/ some coarse sand, trace of silt and gravel.	A-1-b	
			25.5'		19" RECOVERY		
27.39			25.5'	4 7 8 10	Visual description: Saturated loose orange-brown fine sand w/ some coarse sand and silt.		Sample brought to GTA lab for pH testing.
			27.5'		20" RECOVERY		
29.88		12	28.5'	3 4 5 6	Saturated loose orange-brown fine sand w/ some silt, trace of coarse sand.	A-1-b	
			30.5'		22" RECOVERY		
32.37							
34.86		13	33.5'	3 5 9	Saturated medium dense orange-brown fine sand w/ some silt, trace of coarse sand.	A-1-b	
			35.5'		21" RECOVERY		
37.35							

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DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

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

Boring No.: BR1-06-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	38.5'	7 9 10 11	Saturated medium dense green-brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			40.5'		23" RECOVERY		
42.33							
44.82		15	43.5'	4 9 9 17	Saturated very stiff gray fine sandy silt, trace of coarse sand and gravel.	A-2-4(0)	
			45.5'		24" RECOVERY		
47.31							
49.8		16	49.0'	6 9 10 14	Saturated medium dense gray fine sand w/ some silt, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
			51.0'		24" RECOVERY		
52.29							
54.78		17	54.0'	3 5 5 8	Saturated loose gray clayey fine sand w/ some coarse sand, trace of organic matter.	A-2-4(0)	
			56.0'		24" RECOVERY		
57.27							
59.76		18	59.0'	4 4 8 12	Saturated medium dense gray fine sand w/ some clay, trace of coarse sand and organic matter.	A-4(0)	
			61.0'		23" RECOVERY		
		U-1	61.5'		No recovery.		Press Sample - Shelby Tube.

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DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

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

Boring No.: BR1-06-01

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
			63.5'		0" RECOVERY		
64.74		19	64.0'	4 8 9 13	Saturated medium dense gray silty fine sand, trace of coarse sand, gravel, organic matter, and seashells.	A-3	
			66.0'		24" RECOVERY		
67.23							
69.72		20	69.0'	6 12 11 14	Saturated very stiff gray fine sandy silt, trace of coarse sand, gravel, and organic matter.	A-4(0)	
			71.0'		24" RECOVERY		
72.21							
74.7		21	74.0'	9 11 14 27	Saturated very stiff gray clayey fine sandy silt, trace of organic matter and gravel.	A-4(0)	
			76.0'		24" RECOVERY		
77.19							
79.68		22	79.0'	8 9 12 18	Saturated medium dense dark gray silty fine sand, trace of organic matter, coarse sand, gravel, and seashells.	A-2-4(0)	
			81.0'		24" RECOVERY		
82.17							
84.66		23	84.0'	15 18 18 24	Saturated hard dark green fine sandy silt, trace of organic matter, coarse sand, and gravel.	A-4(0)	glaucinitic.

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DEPARTMENT OF TRANSPORTATION
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F.A. Project: U.S. 301, Maryland State Line to I-95
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Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			86.0'		24" RECOVERY		
87.15							
		24	89.0'	7 10	Saturated medium dense dark green fine sand w/ some clay, trace of coarse sand, organic matter, gravel, and seashells.	A-2-4(0)	
89.64		24A	90.0'	12 16	12" RECOVERY	A-6(15)	
			91.0'		Saturated very stiff dark gray clayey silt, trace of fine to coarse sand, organic matter, and seashells.		
92.13					12" RECOVERY Boring terminated at 91.0 feet.		
94.62							
97.11							
99.6							
102.09							
104.58							
107.07							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Well graded sand
with silt



Low plasticity
clay



Poorly graded sand
with silt



Silty sand



Poorly graded clayey
silty sand

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Notes:

1. Exploratory borings were drilled on 2/6/2008 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 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: BR1-06-02

Contract: 25-113-01

Boring Location: Sta. 671+81.87, 183' Lt. C.L.

Boring Surface Elev.: 32.34

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

Casing Size: 3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:		From Depth of: 0.0'		To: 100.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/8/08		8.0'	6.0'	6.8'	25.5
	2/16/08		9.3'		7.9'	24.4
						32.3
						32.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100.0	Ft.;		
No. of 2 in. Dia. Shelby Tubes:		Ft.;	3	Dia. U-Sample Boring:
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		U-Samples:
				Core Drilling in Rock:
				Ft.

Boring Contractor: Walton Corporation
Driller: Wayne Hurd
Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	4 2 5 4	No Sample Recovery		4" Topsoil
2.49		2	2.0' 2.0'	3 3 3 4	0" RECOVERY Wet loose tan fine to coarse sand w/ some silt and gravel. (Fill)	A-4(0)	
4.98		3	4.0' 4.0'	2 1 5 3	10" RECOVERY Wet loose tan fine to coarse sand, trace of silt and gravel.	A-1-a	
7.47		4	6.0' 6.0'	2 1 3 3	16" RECOVERY Saturated very loose tan coarse to fine sand, trace of silt and gravel.	A-2-4(0)	
9.96		5	8.0' 8.0'	5 4 4 5	18" RECOVERY Saturated loose tan coarse to fine sand, trace of silt and gravel.	A-2-4(0)	
		6	10.0' 10.0'	3 3 4 4	20" RECOVERY Saturated loose tan to orange-brown coarse to fine sand, trace of silt and gravel.	A-1-b	
12.45		7	12.0' 12.0'	2 1 1 1	24" RECOVERY Saturated very loose orange-brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-06-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	1 1 2 3	20" RECOVERY Saturated very loose light brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
17.43		9	16.0' 16.0'	2 1 3 5	22" RECOVERY Saturated very loose light brown fine to coarse sand, trace of silt and gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	2 4 5 4	22" RECOVERY Saturated loose light brown fine to coarse sand w/ some gravel, trace of silt.	A-2-5(0)	
22.41			20.0'		18" RECOVERY		
24.9		11	23.0' 23.5'	50/4"	Saturated very dense light brown fine sand and gravel w/ some coarse sand, trace of silt. 4" RECOVERY	A-2-4(0)	
27.39		12	28.0' 30.0'	6 5 7 9	Saturated medium dense light brown fine sand w/ some coarse sand, trace of silt and gravel. 20" RECOVERY	A-2-4(0)	
32.37		13	33.0' 35.0'	8 6 7 10	Saturated medium dense light brown fine sand w/ some coarse sand, trace of silt. 18" RECOVERY	A-2-4(0)	
34.86							
37.35							

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

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

Boring No.: BR1-06-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	38.0'	5 7 7 8	Saturated medium dense light brown silty fine sand w/ some coarse sand.	A-2-4(0)	
39.84			40.0'		16" RECOVERY		
42.33							
		15	43.0'	3 5 6 6	Saturated medium dense light brown fine sand w/ some coarse sand, trace of silt and gravel.	A-2-4(0)	
44.82			45.0'		22" RECOVERY		
47.31							
		16	48.0'	4 5 8 10	Saturated stiff light gray fine sandy silt, trace of coarse sand.	A-2-4(0)	
49.8			50.0'		24" RECOVERY		
52.29							
		17	53.0'	6 6 10 16	Saturated very stiff light gray fine sandy silt w/ some coarse sand, trace of organic matter.	A-2-4(0)	
54.78			55.0'		24" RECOVERY		
57.27							
		18	58.0'	6 6 8 13	Saturated medium dense light gray silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
59.76			60.0'		24" RECOVERY		

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DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

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

Boring No.: BR1-06-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
		19	63.0'	4 6 9 16	Saturated medium dense light gray silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
64.74			65.0'		24" RECOVERY		
67.23							
		20	68.0'	4 7 7 9	Saturated medium dense light gray silty fine sand, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
69.72			70.0'		24" RECOVERY		
72.21							
		21	73.0'	5 7 8 12	Saturated stiff light gray fine sandy silt, trace of coarse sand, gravel, organic matter, and seashells.	A-2-4(0)	
74.7			75.0'		24" RECOVERY		
77.19							
		22	78.0'	10 11 12 15	Saturated very stiff gray fine sandy silt w/ some clay, trace of gravel, coarse sand, organic matter, and seashells.	A-4(0)	
79.68			80.0'		24" RECOVERY		
82.17							
		23	83.0'	8 12 16 25	Saturated very stiff dark gray fine sandy silt, trace of coarse sand, organic matter, and seashells.	A-4(0)	

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

Boring No.: BR1-06-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
84.66			85.0'		22" RECOVERY		
87.15							
		24	88.0'	12 20 30 38	Saturated dense dark gray silty fine sand, trace of coarse sand, organic matter, and seashells.	A-2-4(0)	
89.64			90.0'		22" RECOVERY		
92.13							
		25	93.0'	6 7 9	Saturated medium dense dark gray silty fine sand, trace of coarse sand, gravel, organic matter, and seashells.	A-2-4(0)	
94.62			95.0'		22" RECOVERY		
97.11							
		26	98.0'	8 11 13 16	Saturated very stiff dark gray clay w/ some organic matter, trace of fine sand.	A-7-6(29)	
99.6			100.0'		24" RECOVERY		
					Boring terminated at 100.0 feet.		
102.09							
104.58							
107.07							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Fill



Poorly graded sand



Well graded sand
with silt



Silty sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand



High plasticity
clay

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Notes:

1. Exploratory borings were drilled on 2/8/2008 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.
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.

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

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

Boring No.: BR1-06-03

Contract: 25-113-01

Boring Location: Sta. 670+28.94, 241' Lt. C.L.

Boring Surface Elev.: 28.54

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	81.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/2/08		8.0'	6.0'	7.2'	21.3
	2/5/08		8.5'		6.0'	22.5
	2/6/08		8.5'		5.8'	22.7
						28.5

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 91.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3 No. of U-Sample Boring: Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: J. Hillebrand

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	3 8	Moist loose brown coarse to fine sand w/ some gravel and silt. 10" RECOVERY	A-1-b	10" Asphalt
2.49		2	2.0'	16 14 8 8	Moist medium dense tan and gray fine to coarse sand w/ some silt and gravel. 14" RECOVERY	A-2-4(0)	
		3	4.0'	1 2 4	Wet soft gray silt, trace of fine to coarse sand and gravel. 18" RECOVERY	A-4(0)	
4.98		4	6.0'	3 4 4 6	Saturated firm gray silt, trace of fine to coarse sand and clay. 18" RECOVERY	A-4(2)	
		5	8.0'	2 3	Saturated loose gray gravel and fine sand w/ some coarse sand, trace of gravel. 5" RECOVERY	A-1-b	
		5A	9.0'	11 10	Saturated stiff gray organic fine sandy silt w/ some coarse sand, trace of gravel. 10" RECOVERY	A-4(0)	
9.96		6	10.0'	5 10 14 16	Saturated medium dense orange gravel and coarse to fine sand, trace of silt. 18" RECOVERY	A-1-b	
		7	12.0'	W/R W/R 1 4	Saturated very loose orange fine to coarse sand w/ some gravel, trace of silt. 9" RECOVERY	A-3	
12.45		U-1	14.0'		Wet orange fine to coarse sand, trace of silt and gravel.	A-3	Press Sample - Shelby Tube.

Remarks: Mud Rotary @ 81.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-06-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		20" RECOVERY		
		8	16.0'	10 9 12 15	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
17.43			18.0'		18" RECOVERY		
		9	18.0'	7 7 8 12	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			20.0'		18" RECOVERY		
19.92							
22.41							
24.9		10	24.0'	7 6 7 8	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			26.0'		19" RECOVERY		
27.39							
29.88		11	29.0'	11 5 5 10	Saturated loose orange fine sand w/ some silt and coarse sand.	A-2-4(0)	
			31.0'		22" RECOVERY		
32.37							
34.86		12	34.0'	5 7 9 11	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
			36.0'		21" RECOVERY		
37.35							

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

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

Boring No.: BR1-06-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		13	39.0'	10 8 14 10	Saturated medium dense brown-gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
			41.0'		21" RECOVERY		
42.33							
44.82		14	44.0'	7 10 16 20	Saturated medium dense gray silty fine sand w/ some coarse sand, trace of gravel and organic matter.	A-2-4(0)	
			46.0'		21" RECOVERY		
47.31							
49.8		15	49.0'	10 9 10 11	Saturated medium dense gray silty fine sand, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
			51.0'		24" RECOVERY		
		U-2	51.0'		Saturated medium dense gray clayey fine to coarse sand.	A-2-4(0)	Press Sample - Shelby Tube.
52.29			53.0'		15" RECOVERY		
54.78		16	54.0'	5 6 8 9	Saturated medium dense gray silty fine sand w/ some coarse sand, trace of organic matter.	A-2-4(0)	
			56.0'		24" RECOVERY		
57.27							
59.76		17	59.0'	4 6 6 11	Saturated medium dense gray silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
			61.0'		24" RECOVERY		

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

Boring No.: BR1-06-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		18	64.0'	5 7 11 22	Saturated medium dense gray silty fine sand, trace of coarse sand, gravel, and organic matter. 20" RECOVERY	A-2-4(0)	
67.23			66.0'				
69.72		19	69.0'	8 8 8 16	Saturated medium dense gray silty fine sand, trace of coarse sand, silt, and organic matter. 24" RECOVERY	A-2-4(0)	
72.21			71.0'				
74.7		20	74.0'	8 10 10 17	Saturated medium dense gray fine sandy silt w/ some coarse sand and clay, trace of gravel and organic matter. 19" RECOVERY	A-4(0)	
77.19			76.0'				
79.68		21	79.0'	8 12 15 19	Saturated medium dense gray silty fine sand, trace of coarse sand, gravel, and organic matter. 24" RECOVERY	A-2-4(0)	
82.17			81.0'				
84.66		22	84.0'	14 21 19 23	Saturated dense green-gray silty fine sand, trace of organic matter and coarse sand.	A-2-4(0)	glaucinitic

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

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

Boring No.: BR1-06-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			86.0'		20" RECOVERY		
87.15							
89.64		23	89.0'	14 14 18 20	Saturated dense gray-green silty fine sand w/ some organic matter, trace of coarse sand and gravel.	A-2-4(0)	glaucinitic
			91.0'		24" RECOVERY		
					Boring terminated at 91.0 feet.		
92.13							
94.62							
97.11							
99.6							
102.09							
104.58							
107.07							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded sand
with silt



Silty sand



Silt



Poorly graded clayey
silty sand

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Notes:

1. Exploratory borings were drilled on 2/2/2008 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.
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.

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

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

Boring No.: BR1-06-04

Contract: 25-113-01

Boring Location: Sta. 671+25.11

Boring Surface Elev.: 28.78

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

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0'	To: 50.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/4/08		12.0'	10.0'	8.0'	20.8
	2/6/08		6.0'		6.0'	22.8
	2/7/08		6.0'		6.0'	22.8
						28.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	101.0	Ft.;	
No. of 2 in. Dia. Shelby Tubes:		Ft.;	3
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	No. of U-Sample Boring: 3
			U-Samples: 3
			Core Drilling in Rock: 3

Boring Contractor: Walton Corporation
Driller: Danny Taylor
Helpers: A. Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	7 12 11	Moist medium dense orange-brown fine to coarse sand w/ some silt, trace of gravel. (Fill)	A-2-4(0)	6" Asphalt
			2.0'		16" RECOVERY		
2.49		2	2.0'	8 6 7	Moist medium dense orange-brown silty fine to coarse sand, trace of gravel. (Fill)	A-2-4(0)	
			4.0'		24" RECOVERY		
4.98		3	4.0'	5 4 5 3	Wet loose tan coarse to fine sand, trace of gravel and silt.	A-1-b	
			6.0'		15" RECOVERY		
7.47		4	6.0'	4 4 10	Wet loose tan coarse to fine sand w/ some silt and gravel.	A-1-b	
			7.5'		18" RECOVERY		
		4A	7.5'	3	Wet stiff gray organic fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(3)	
		5	8.0'	2	6" RECOVERY	A-4(2)	
		5A	8.5'	8	Saturated stiff gray clayey silt w/ some fine to coarse sand and gravel, trace of organic matter.	A-1-b	
			8.5'	14 13			
9.96		6	10.0'	10 11 10 10	Saturated medium dense orange-brown gravel and fine to coarse sand, trace of silt.	A-1-b	
			12.0'		10" RECOVERY		
12.45		7	12.0'	4 2 3 4	Saturated medium dense orange-brown gravel w/ some fine to coarse sand and silt.	A-2-4(0)	
			14.0'		6" RECOVERY		
			14.0'		Saturated loose orange-brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
		8	14.0'	W/R 3	Saturated loose orange-brown fine sand w/	A-3	

Remarks: Mud Rotary @ 50.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-06-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94				3 3	some coarse sand, trace of silt and gravel.		
			16.0'		14" RECOVERY		
		9	16.0'	W/H 2 4 4	Saturated loose orange-brown fine sand w/ some coarse sand, trace of silt.	A-3	
17.43			18.0'		16" RECOVERY		
		10	18.0'	2 3 4 7	Saturated loose orange-brown fine sand w/ some coarse sand and silt.	A-3	
19.92			20.0'		17" RECOVERY		
22.41							
		11	23.5'	W/H 1 3 5	Saturated very loose orange-brown fine sand w/ some coarse sand, trace of silt.	A-3	
24.9			25.5'		24" RECOVERY		
		12	25.5'	4 5 6 8	Visual description: Saturated medium dense orange-brown fine sand, trace of silt and coarse sand.		Sample brought to GTA lab for pH testing.
27.39			27.5'		18" RECOVERY		
		13	28.5'	4 6 6 7	Saturated medium dense orange-brown fine sand, trace of silt and coarse sand.	A-3	
29.88			30.5'		19" RECOVERY		
32.37							
		14	33.5'	4 4 6 7	Saturated loose orange-brown fine sand, trace of coarse sand and silt.	A-3	
34.86			35.5'		20" RECOVERY		
37.35							

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

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

Boring No.: BR1-06-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		15	38.5'	1 1 1	Saturated very loose brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			40.5'		22" RECOVERY		
42.33		U-1	41.5'		No recovery.		Press Sample - Shelby Tube.
			43.5'		0" RECOVERY		
44.82		16	43.5'	3 4 7 8	Saturated medium dense gray clayey fine sand, trace of coarse sand.	A-2-4(0)	
			45.5'		17" RECOVERY		
47.31							
49.8		17	48.5'	6 8 14 20	Saturated medium dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
			50.5'		24" RECOVERY		
52.29		U-2	51.5'		Saturated medium dense gray clayey fine to coarse sand w/ some silt.	A-2-4(0)	Press Sample - Shelby Tube.
			53.5'		24" RECOVERY		
54.78		18	54.5'	3 4 6 8	Saturated loose gray clayey fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			56.5'		24" RECOVERY		
57.27							
59.76		19	59.0'	4 4 6 9	Saturated loose gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
			61.0'		24" RECOVERY		

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

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

Boring No.: BR1-06-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		20	64.0'	5 9 11 21	Saturated medium dense gray silty fine sand, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
			66.0'		24" RECOVERY		
67.23							
69.72		21	69.0'	6 7 10	Saturated medium dense gray silty fine sand, trace of coarse sand, organic matter, gravel, and seashells.	A-2-4(0)	
			71.0'		24" RECOVERY		
72.21							
74.7		22	74.0'	7 9 12 15	Saturated very stiff gray clayey fine sandy silt, trace of gravel, organic matter, and seashells.	A-4(0)	
			76.0'		24" RECOVERY		
77.19							
79.68		23	79.0'	8 11 17 23	Saturated medium dense dark gray silty fine sand, trace of organic matter, coarse sand, and seashells.	A-2-4(0)	
			81.0'		24" RECOVERY		
82.17							
84.66		24	84.0'	13 23 34 35	Saturated very dense dark gray silty fine sand, trace of organic matter, gravel, and seashells.	A-2-4(0)	

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

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

Boring No.: BR1-06-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			86.0'		17" RECOVERY		
87.15							
		25	89.0'	6 7 10 3	Saturated medium dense dark gray silty fine sand, trace of coarse sand, organic matter, gravel, and seashells.	A-2-4(0)	
89.64			91.0'		24" RECOVERY		
92.13							
		26	94.0'	7 10 11 19	Saturated very stiff dark gray clay w some organic matter, trace of fine sand, gravel, and seashells.	A-7-6(32)	
94.62			96.0'		24" RECOVERY		
97.11							
		27	99.0'	12 22 30 36	Saturated hard dark gray fine sandy silt, trace of organic matter and seashells.	A-4(0)	
99.6			101.0'		24" RECOVERY		
					Boring terminated at 101.0 feet		
102.09							
104.58							
107.07							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Fill



Well graded sand
with silt



Silty sand



Silt



Poorly graded sand
with silt



Clayey sand



Poorly graded clayey
silty sand



High plasticity
organic clays

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Notes:

1. Exploratory borings were drilled on 1/31/2008 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.
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.

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

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

Boring No.: BR1-06-05

Contract: 25-113-01

Boring Location: Sta. 671+97.00, 209' Lt. C.L.

Boring Surface Elev.: 31.12

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 76.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/4/08		10.0'	8.0'	7.2'	23.9
	2/6/08		14.0'		9.3'	21.8
	2/7/08		9.0'		6.5'	24.6
						31.1

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 76.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

3
No. of
Core Drilling in Rock: Ft.

Dia. U-Sample Boring: Ft.
U-Samples: 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	1.0'	6 6	Moist medium dense orange coarse sand w/ some clay, gravel, and fine sand. 8" RECOVERY	A-2-4(0)	10" Asphalt
2.49		2	2.0'	4 4 4 3	Moist loose light brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-1-b	
4.98		3	4.0'	3 3 2 3	Wet loose light brown coarse to fine sand, trace of silt and gravel. 12" RECOVERY	A-1-b	
7.47		4	6.0'	5 3 3 3	Wet loose light brown coarse to fine sand, trace of silt and gravel. 6" RECOVERY	A-1-b	
9.96		5	8.0'	W/R W/H 1 2	Saturated very loose light brown fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
12.45		6	10.0'	2 1 1 2	Saturated very loose light brown fine to coarse sand, trace of silt and gravel. 20" RECOVERY	A-3	
		7	12.0'	2 2 3 4	Saturated loose orange fine to coarse sand w/ some silt, trace of gravel. 11" RECOVERY	A-2-4(0)	
		8	14.0'	3 2 4 5	Saturated loose brown-orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-06-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		16" RECOVERY		
		9	16.0'	4 5 8 8	Saturated medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
17.43			18.0'		24" RECOVERY		
		10	18.0'	8 6 9 9	Saturated medium dense brown fine sand and gravel w/ some coarse sand and silt.	A-2-4(0)	
19.92			20.0'		12" RECOVERY		
22.41							
		11	24.0'	10 10 13 15	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
24.9			26.0'		16" RECOVERY		
27.39							
		12	29.0'	10 10 12 15	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
29.88			31.0'		24" RECOVERY		
32.37							
		13	34.0'	8 6 6 9	Saturated medium dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
34.86			36.0'		20" RECOVERY		
37.35							

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

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

Boring No.: BR1-06-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	8 5 6 8	Saturated medium dense brown fine sand, trace of coarse sand and silt.	A-3	
			41.0'		20" RECOVERY		
42.33							
44.82		15	44.0'	3 2 1 2	Saturated very loose brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			46.0'		24" RECOVERY		
47.31							
49.8		16	49.0'	8 10 12 15	Saturated medium dense brown-gray silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		U-1	51.0'		19" RECOVERY		Press Sample - Shelby Tube.
			51.0'		No recovery.		
52.29			52.7'		0" RECOVERY		
54.78		17	54.0'	8 13 17 15	Saturated medium dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
			56.0'		24" RECOVERY		
57.27							
59.76		18	59.0'	6 13 15 20	Saturated medium dense gray clayey fine sand w/ some coarse sand, trace of gravel and organic matter.	A-2-4(0)	
		U-2	61.0'		24" RECOVERY		Press Sample - Shelby Tube.
			61.0'		No recovery.		

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

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

Boring No.: BR1-06-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25			62.3'		0" RECOVERY		
64.74		19	64.0'	10 14 17 24	Saturated dense gray fine to coarse sand w/ some silt, trace of gravel and organic matter.	A-2-4(0)	
67.23		U-3	66.0'		10" RECOVERY No recovery.		Press Sample - Shelby Tube.
69.72			67.8'		0" RECOVERY		
72.21		20	69.0'	9 15 35 50/5"	Saturated dense gray silty fine sand, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
74.7			71.0'		14" RECOVERY		
77.19		21	74.0'	10 15 17 29	Saturated hard gray fine sandy silt, trace of coarse sand, organic matter, clay, and gravel.	A-4(0)	
79.68			76.0'		24" RECOVERY		
82.17					Boring terminated at 76.0 feet.		
84.66							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt



Poorly graded clayey
silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/4/2008 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.
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.

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

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

Boring No.: BR1-06-06

Contract: 25-113-01

Boring Location: Sta. 669+57.61, 248' Lt. C.L.

Boring Surface Elev.: 29.20

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 75.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/31/08		10.0'	8.0'	7.2'	22.0
	2/1/08		9.6'		7.0'	22.2
	2/4/08		8.5'		6.0'	23.2
						29.2

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 75.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

No. of: 3
 Core Drilling in Rock: Ft.

Dia. U-Sample Boring: Ft.
 U-Samples: 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	1.0'	2 5	Moist firm gray silt w/ some fine to coarse sand and clay, trace of gravel. (Fill)	A-4(1)	8" Asphalt - 8" Stone
2.49		2	2.0'	2 4 5 6	Moist stiff gray clayey coarse sandy silt w/ some fine sand and gravel. (Fill)	A-4(2)	
			4.0'		12" RECOVERY		
4.98		3	4.0'	2 6 34 12	Moist dense brown gravel and coarse sand, trace of fine sand and silt. (Fill)	A-1-a	
			6.0'		4" RECOVERY		
7.47		4	6.0'	9 6 12 14	Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			8.0'		12" RECOVERY		
		5	8.0'	5 5 5 5	Saturated loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
9.96			10.0'		18" RECOVERY		
		6	10.0'	4 3 3 5	Saturated loose brown fine to coarse sand, trace of silt and gravel.	A-3	
			12.0'		24" RECOVERY		
12.45		7	12.0'	2 3 2 3	Saturated loose brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			14.0'		17" RECOVERY		
		8	14.0'	4 3 3 4	Saturated loose brown fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-06-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		20" RECOVERY		
		9	16.0'	2 4 6 7	Saturated loose brown fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	
17.43			18.0'		24" RECOVERY		
		10	18.0'	5 6 7 10	Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
			20.0'		24" RECOVERY		
19.92							
22.41							
		11	24.0'	6 8 13 15	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
24.9			26.0'		24" RECOVERY		
27.39							
		12	29.0'	10 11 12 13	Saturated medium dense brown fine sand, trace of coarse sand and silt.	A-3	
29.88			31.0'		20" RECOVERY		
32.37							
		13	34.0'	7 7 11 12	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
34.86			36.0'		20" RECOVERY		
37.35							

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AUGUST 2015

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

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

Boring No.: BR1-06-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	8 8 11 13	Saturated medium dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
			41.0'		19" RECOVERY		
42.33		U-1	41.0'		Saturated medium dense gray fine to coarse sand w/ some silt.	A-2-4(0)	Press Sample - Shelby Tube.
			43.0'		11" RECOVERY		
44.82		15	44.0'	8 10 11 11	Saturated medium dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
			46.0'		24" RECOVERY		
47.31							
49.8		16	49.0'	7 9 15 25	Saturated medium dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
			51.0'		24" RECOVERY		
52.29							
54.78		17	54.0'	7 9 13 15	Saturated medium dense gray silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
			56.0'		24" RECOVERY		
57.27							
59.76		18	59.0'	6 10 10 9	Saturated medium dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
			61.0'		24" RECOVERY		

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

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

Boring No.: BR1-06-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		19	64.0'	9 14 20 32	Saturated dense gray silty fine sand, trace of coarse sand and gravel. 24" RECOVERY	A-2-4(0)	
67.23			66.0'				
69.72		20	69.0'	10 11 14 16	Saturated medium dense gray fine sand w/ some silt and coarse sand. 24" RECOVERY	A-2-4(0)	
72.21			71.0'				
74.7		21	73.0'	8 8 15 20	Saturated very stiff gray clayey fine sandy silt, trace of organic matter and coarse sand. 20" RECOVERY	A-4(0)	
77.19			75.0'		Boring terminated at 75.0 feet.		
79.68							
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Fill



Silty sand



Poorly graded sand
with silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on 1/31/2008 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.
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.

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

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

Boring No.: BR1-06-07

Contract: 25-113-01

Boring Location: Sta. 119+17, 26' Rt. C.L.

Boring Surface Elev.: +28.45

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Spoon		O.D.	O.D. of Sampler: 2		IN.
S-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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 101.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/12/09		12.0	10.0	8.5	

Pay Quantities:

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

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

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/11/09	1	0.0'		Augered to 2.0'.		Asphalt - 14". Subgrade - 10".
			2.0'		0" RECOVERY		
3		2	2.0'	2 1 2	Wet soft gray silt w/ some fine sand and clay, trace of coarse sand and gravel.	A-4(1)	
			4.0'		22" RECOVERY		
		3	4.0'	2	Wet soft gray silt w/ some fine sand and clay, trace of coarse sand and gravel.	A-4(1)	
		3A	4.5'	3	Wet soft gray silt w/ some fine sand and clay, trace of coarse sand and gravel.	A-4(0)	
			4.5'	2 2	6" RECOVERY		
6			6.0'		Wet soft gray coarse to fine sandy silt w/ some gravel, trace of clay.	A-4(0)	
		4	6.0'	2 2 3 3	13" RECOVERY		
			8.0'		Wet firm gray fine sandy silt w/ some coarse sand, trace of gravel.		
9		5	8.0'	14 16 19 14	18" RECOVERY No Sample Recovery		
			10.0'		0" RECOVERY		
		6	10.0'	4 4 3 3	Saturated loose orange fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	
12			12.0'		13" RECOVERY		
		7	12.0'	4 4 3 4	Saturated loose orange fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			14.0'		17" RECOVERY		
15		8	14.0'	3 3 3 3	Saturated loose orange fine sand w/ some coarse sand, trace of silt.	A-3	
			16.0'		17" RECOVERY		
		9	16.0'	3 3 3	Saturated loose orange fine sand, trace of silt	A-3	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-06-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	3	and coarse sand. 17" RECOVERY		
		10	18.0'	3 6 9 13	Saturated medium dense orange fine sand w/ some coarse sand and silt. 19" RECOVERY	A-2-4(0)	
21			20.0'				
24							
		11	24.0'	10 9 11 9	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 19" RECOVERY	A-3	
27			26.0'				
30		12	29.0'	7 6 10 13	Saturated medium dense brown fine sand, trace of coarse sand and silt. 20" RECOVERY	A-3	
			31.0'				
33							
		13	34.0'	6 8 9 10	Saturated medium dense brown fine sand, trace of silt and coarse sand. 19" RECOVERY	A-3	Mud Rotary @ 34.0'.
36			36.0'				
39							
		14	39.0'	8 11 12	Saturated medium dense light brown fine sand w/ some silt and coarse sand, trace of gravel. 19" RECOVERY	A-2-4(0)	
42			41.0'				
45		15	44.0'	7 10 16 16	Saturated medium dense gray fine sand w/ some clay, trace of coarse sand and gravel.	A-2-4(0)	

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

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

Boring No.: BR1-06-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		24" RECOVERY		
48							
		16	49.0'	11 10 18 20	Saturated medium dense gray clayey fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
51			51.0'		24" RECOVERY		
54							
		17	54.0'	3 6 10 18	Saturated medium dense gray clayey fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
			56.0'		23" RECOVERY		
57							
60		18	59.0'	4 7 16 19	Saturated medium dense gray silty fine sand, trace of coarse sand, organic matter, and gravel.	A-2-4(0)	
			61.0'		23" RECOVERY		
63							
		19	64.0'	5 6 16 45	Saturated medium dense gray silty fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
66			66.0'		24" RECOVERY		
69							
		20	69.0'	7 11 19 22	Saturated medium dense gray clayey fine sand, trace of coarse sand and organic matter.	A-2-4(0)	
			71.0'		24" RECOVERY		
72							

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DIVISION OF HIGHWAYS**

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

Boring No.: BR1-06-07


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		21	74.0'	6 10 16 17	Saturated very stiff gray clayey fine sandy silt, trace of organic matter.	A-4(0)	
			76.0'		24" RECOVERY		
78							
		22	79.0'	6 9 25 37	Saturated hard gray fine sandy silt, trace of organic matter and coarse sand.	A-4(0)	
81			81.0'		22" RECOVERY		
84							
	2/12/09	23	84.0'	18 35 34 27	Saturated very dense green silty fine sand, trace of organic matter, coarse sand, and gravel.	A-2-4(0)	Glauconitic
			86.0'		17" RECOVERY		
87							
		24	89.0'	4 7	Saturated medium dense green-gray clayey fine sand, trace of organic matter, coarse sand, and gravel.	A-2-4(0)	Glauconitic
90			90.0'				
		24A	90.0'	12 15	12" RECOVERY	A-7-6(21)	
			91.0'		Saturated very stiff gray silty clay w/ some fine sand, trace of organic matter. 8" RECOVERY		
93							
		25	94.0'	4 8 12 13	Saturated very stiff gray clay w/ some fine sand and organic matter, trace of coarse sand.	A-7-6(19)	
96			96.0'		24" RECOVERY		
99							
		26	99.0'	8 18 26 45	Saturated dense gray fine sand w/ some silt, trace of organic matter and gravel.	A-2-4(0)	
			101.0'		21" RECOVERY		
					End of Boring		


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KEY TO SYMBOLS


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
Strata symbols


 Silty low plasticity clay


 Silty sand

 Silt

 Poorly graded sand with silt

 Poorly graded clayey silty sand

 Clayey sand

 Low plasticity clay

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Notes:

1. Exploratory borings were drilled on 2/11/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Truck 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 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.: BR1-6-08

Contract: 25-113-01

Boring Location: Sta. 116+48.6 21 RT C.L.

Boring Surface Elev.: + 35.52

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
 S-Sampler:
 U-Sampler:
 Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4 **Inches**
Hollow Stem Auger:

From Depth of: **To:**
From Depth of: 0.0 **To:** 18.0

Water Level Readings
Date **Time**
3/1/2010

Depth of Hole **Depth of Casing** **Depth of Water** **Elev. of Water**
10.0 8.0 7.7

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: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/1/10	1	0.0'	2 2 4 4	Moist loose brown fine gravelly coarse sand w/some fine sand, trace of silt.	A-1-b	Topsoil - 2".
2.5		2	2.0'	3 3 2	12" RECOVERY Moist loose brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
5		3	4.0'	4 6 7 7	15" RECOVERY No Sample Recovery		
7.5		4	6.0'	8 9 7 6	0" RECOVERY No Sieve Analysis - Indication of moist tan medium dense silty sand.		
10		5	8.0'	1 3 3 4	2" RECOVERY Wet loose tan coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
12.5			10.0'		16" RECOVERY		
		6	13.0'	1 2 4 4	Wet loose tan fine to coarse sand w/trace of silt and fine gravel.	A-3	

Remarks: Switch to Mud Rotary @ 18.0 feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-6-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15			15.0'		14" RECOVERY		
17.5							
20		7	18.0'	3 3 4 4	Wet loose tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	Mud Rotary @ 18.0'.
			20.0'		19" RECOVERY		
22.5							
25		8	23.0'	6 8 10 13	Saturated medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
			25.0'		20" RECOVERY		
27.5							
30		9	28.0'	9 10 12 14	Saturated medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
			30.0'		21" RECOVERY		
32.5							
35		10	33.0'	7 8 11 12	Saturated medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
			35.0'		17" RECOVERY		
37.5							

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

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

Boring No.: BR1-6-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		11	38.0'	10 10 13 14	Saturated medium dense brown fine sand w/some silt and coarse sand.	A-2-4(0)	
40			40.0'		18" RECOVERY		
42.5							
		12	43.0'	5 8 11 12	Saturated medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
45			45.0'		16" RECOVERY		
47.5							
		13	48.0'	7 8 7 10	Saturated medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
50			50.0'		21" RECOVERY		
52.5							
		14	53.0'	8 10 10 14	Saturated very stiff brown clayey fine sandy silt w/trace of coarse sand.	A-4(0)	
55			55.0'		24" RECOVERY		
57.5							
		15	58.0'	16 16 22 26	Saturated dense brown silty fine sand w/some clay, trace of coarse sand.	A-2-4(0)	
60			60.0'		22" RECOVERY		

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

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

Boring No.: BR1-6-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
		16	63.0'	8 10 12 13	Saturated very stiff gray clayey fine sandy silt w/trace of coarse sand.	A-4(0)	
65			65.0'		23" RECOVERY		
67.5							
		17	68.0'	5 10 12 20	Saturated medium dense gray clayey fine sand w/trace of coarse sand and silt.	A-2-4(0)	
70			70.0'		23" RECOVERY		
72.5							
		18	73.0'	9 10 16 21	Saturated very stiff gray fine sandy silt w/some clay, trace of coarse sand and fine gravel.	A-4(0)	
75			75.0'		24" RECOVERY		
77.5							
		19	78.0'	9 14 17 17	Saturated hard gray clayey fine sandy silt w/trace of coarse sand.	A-4(0)	
80			80.0'		22" RECOVERY		
					End of Boring		
82.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded sand
with silt



Well graded sand
with silt



Silty sand



Clayey sand



Poorly graded clayey
silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/1/2010 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.: BR1-6-09

Contract: 25-113-01

Boring Location: Sta. 116+48.12 21 LT C.L.

Boring Surface Elev.: + 48.75

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:	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.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					38.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/24/2010		30.0	28.0	27.9	

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: Gary Truver
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/24/10	1	0.5'	4 9 8	Moist stiff brown fine gravelly clay w/some coarse sand and silt, trace of fine sand.	A-6(2)	Topsoil - 6".
			2.0'		6" RECOVERY		
2.5		2	2.0'	7 9 6 6	Moist medium dense brown clayey coarse sandy fine gravel w/some fine sand and silt.	A-2-4(0)	
			4.0'		15" RECOVERY		
		3	4.0'	3 5 7 8	Moist medium dense brown fine gravelly coarse sand w/some silt and fine sand.	A-1-b	
5			6.0'		16" RECOVERY		
		4	6.0'	7 8 6 5	Moist medium dense brown coarse sandy fine gravel w/some fine sand and silt.	A-1-b	
7.5			8.0'		16" RECOVERY		
		5	8.0'	4 3 4 4	Moist loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			10.0'		8" RECOVERY		
10							
12.5							
		6	13.0'	11 14 18 21	Moist dense brown fine gravel w/some coarse to fine sand and silt.	A-1-a	

Remarks: Switch to Mud Rotary @ 38.0 feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-6-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15			15.0'		10" RECOVERY		
17.5							
20		7	18.0'	4 6 8	Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
22.5			20.0'		16" RECOVERY		
25		8	23.0'	4 8 7 6	Moist medium dense orange fine gravelly coarse to fine sand w/trace of silt.	A-1-b	
27.5			25.0'		17" RECOVERY		
30		9	28.0'	1 3 4 6	Wet loose tan coarse sand w/some fine sand, trace of fine gravel and silt.	A-1-b	
32.5			30.0'		20" RECOVERY		
35		10	33.0'	3 6 11 11	Wet medium dense tan fine to coarse sand w/trace of silt and fine gravel.	A-3	
37.5			35.0'		6" RECOVERY		

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

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

Boring No.: BR1-6-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		11	38.0'	8 10 9 7	Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	Mud Rotary @ 38.0'.
40			40.0'		15" RECOVERY		
42.5							
		12	43.0'	11 13 12 15	Wet medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
45			45.0'		18" RECOVERY		
47.5							
	3/1/10	13	48.0'	8 13 15 17	Wet medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
50			50.0'		16" RECOVERY		
52.5							
		14	53.0'	9 10 15 20	Wet medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
55			55.0'		15" RECOVERY		
57.5							
		15	58.0'	7 10 17 15	Wet medium dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
60			60.0'		15" RECOVERY		

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

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

Boring No.: BR1-6-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.5							
		16	63.0'	9 10 13 14	Wet medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
65			65.0'		14" RECOVERY		
67.5							
		17	68.0'	9 12 14 13	Wet medium dense brown fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
70			70.0'		16" RECOVERY		
72.5							
		18	73.0'	13 17 20 30	wet dense brown silty fine sand w/trace of coarse sand and silt.	A-2-4(0)	
75			75.0'		24" RECOVERY		
77.5							
		19	78.0'	7 14 17 17	Wet dense gray silty fine sand w/trace of fine gravel and organic matter.	A-2-4(0)	
80			80.0'		24" RECOVERY		
82.5							
		20	83.0'	7 10 13 21	Wet medium dense gray silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
85			85.0'		24" RECOVERY		

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

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

Boring No.: BR1-6-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
87.5							
		21	88.0'	4 8 13 19	Wet medium dense gray silty fine sand w/trace of coarse sand, fine gravel and organic matter.	A-2-4(0)	
90			90.0'		22" RECOVERY		
					End of Boring		
92.5							
95							
97.5							
100							
102.5							
105							
107.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt



Well graded sand



Well graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/24/2010 using a 3 1/4- inch diameter continuous 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 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 I-95

Boring No.: BR1-06-10

Contract: 25-113-01

Boring Location: Sta. 913+20 20' Lt C.L.

Boring Surface Elev.: + 45.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 18.0

Water Level Readings

Date
7/8/10

Time

Depth of Hole

18.0

Depth of Casing

18.0

Depth of Water

17.5

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 100.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;

Ft.;

Dia. U-Sample Boring:

No. of U-Samples:

Core Drilling in Rock:

Ft.

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
	7/8/10	1	0.5'	15 13 9	Moist very stiff brown silt w/some fine to coarse sand, fine gravel and clay.	A-4(0)	Topsoil - 4".
			2.0'		15" RECOVERY		
3		2	2.0'	6 5 6 4	No Sample Recovery		Gravel blocking spoon.
			4.0'		0" RECOVERY		
		3	4.0'	4 5 5 5	Moist loose brown clayey coarse to fine sand w/some fine gravel, trace silt.	A-2-4(0)	
6			6.0'		17" RECOVERY		
		4	6.0'	5 6 8 5	Moist medium dense brown coarse sandy fine gravel w/some fine sand and silt.	A-1-b	
			8.0'		15" RECOVERY		
9		5	8.0'	6 7 7 6	Moist medium dense brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
			10.0'		10" RECOVERY		
		6	10.0'	4 5 5 5	Moist loose orange coarse to fine sand w/some silt, trace fine gravel.	A-1-b	
12			12.0'		21" RECOVERY		
		7	12.0'	5 6 4 5	Moist loose orange coarse sand w/some fine sand, fine gravel and silt.	A-1-b	
			14.0'		17" RECOVERY		
15		8	14.0'	5 5 7 6	Moist medium dense orange coarse sand w/some fine sand and fine gravel, trace silt.	A-1-b	
			16.0'		17" RECOVERY		
		9	16.0'	5 7 5 5	Wet medium dense tan coarse sand w/some fine sand, trace silt and fine gravel.	A-1-b	

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-06-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		16" RECOVERY		
		10	18.0'	4 5 6	Wet medium dense tan fine to coarse sand w/ some fine gravel, trace silt.	A-1-b	Mud Rotary @ 18.0'
			20.0'		18" RECOVERY		
21							
		11	23.0'	4 5 6 5	Wet medium dense tan coarse to fine sand w/ trace silt and fine gravel.	A-1-b	
24			25.0'		16" RECOVERY		
27							
		12	28.0'	5 5 5 6	Wet loose brown fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
30			30.0'		15" RECOVERY		
33		13	33.0'	6 8 10 13	Saturated medium dense reddish brown fine sand w/some coarse sand and silt.	A-2-4(0)	
			35.0'		20" RECOVERY		
36							
		14	38.0'	8 10 7 7	Saturated medium dense reddish brown fine sand w/some coarse sand and silt, trace fine gravel.	A-2-4(0)	
39			40.0'		17" RECOVERY		
42							
		15	43.0'	6 6 7 8	Saturated medium dense brown fine sand w/ some coarse sand, trace silt.	A-3	
45			45.0'		19" RECOVERY		

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

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

Boring No.: BR1-06-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	7 9 10 13	Saturated medium dense brown fine sand w/ some coarse sand, trace silt.	A-3	
			50.0'		18" RECOVERY		
51							
54		17	53.0'	5 7 9 10	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			55.0'		17" RECOVERY		
57							
60		18	58.0'	6 7 7 7	Saturated medium dense brown fine sand w/ some coarse sand, trace silt and fine gravel.	A-3	
			60.0'		20" RECOVERY		
63							
		19	63.0'	11 8 11 12	Saturated medium dense tan fine sand w/some silt, trace coarse sand, fine gravel and clay.	A-2-4(0)	
			65.0'		21" RECOVERY		
66							
69		20	68.0'	5 6 10 12	Saturated medium dense gray silty fine sand w/trace coarse sand.	A-2-4(0)	
			70.0'		24" RECOVERY		
72							
		21	73.0'	6 8 12	Saturated very stiff gray fine sandy silt w/ trace coarse sand and clay.	A-4(0)	

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

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

Boring No.: BR1-06-10


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75			75.0'	19	22" RECOVERY		
78		22	78.0'	6 7 9 11	Saturated medium dense gray silty fine sand w/trace coarse sand.	A-2-4(0)	
81			80.0'		24" RECOVERY		
84		23	83.0'	8 8 9 13	Saturated very stiff gray fine sandy silt w/ trace coarse sand, fine gravel and clay.	A-4(0)	
87			85.0'		22" RECOVERY		
90		24	88.0'	10 11 13 14	Saturated medium dense gray silty fine sand w/trace coarse sand.	A-2-4(0)	
93			90.0'		24" RECOVERY		
96		25	93.0'	5 8 10 10	Saturated very stiff greenish gray fine sandy silt w/trace fine gravel, coarse sand and clay.	A-4(0)	
99			95.0'		20" RECOVERY		
102		26	98.0'	7 13 16 24	Saturated medium dense green silty fine sand w/some organic matter, trace fine gravel and coarse sand.	A-2-4(0)	
			100.0'		24" RECOVERY		
					End of Boring		


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
KEY TO SYMBOLS


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
Strata symbols


 Silty low plasticity clay

 Poorly graded clayey silty sand

 Silty sand

 Poorly graded sand with silt

 Well graded sand with silt

 Poorly graded sand

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Notes:

1. Exploratory borings were drilled on July 8, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55 ATV.
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 Preferred Alternative Contract 1A

Boring No.: BR1-07-01

Contract: 25-113-01

Boring Location: Sta. 668+62.39, 46' Rt. C.L.

Boring Surface Elev.: +27.07

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

Casing Size: 3 1/4"	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 56.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/28/2008		14.0'	12.0'	9.3	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	91.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				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
		1	0.0'	2 3 3 4	Moist brown loose silty coarse to fine sand w/ trace of gravel.	A-2-4(0)	FILL
			2.0'		13" RECOVERY		
3		2	2.0'	4 3 3 4	Wet loose brown coarse sand w/some fine sand, gravel and clay.	A-2-4(0)	FILL
			4.0'		14" RECOVERY		
		3	4.0'	3 3 4 4	Wet firm brown coarse sandy silt w/some fine sand and gravel, trace of clay.	A-4(0)	FILL
6			6.0'		10" RECOVERY		
		4	6.0'	3 2 2 2	Wet very loose brown silty coarse to fine sand w/some gravel.	A-1-b	FILL
			8.0'		14" RECOVERY		
9		5	8.0'	2 W/H W/H W/H	Saturated soft gray clay w/some fine sand, trace of coarse sand.	A-7-6(22)	FILL
			10.0'		3" RECOVERY		
		6	10.0'	1 1 2	Saturated soft gray silt w/some clay and organic matter, trace of fine to coarse sand and gravel.	A-4(5)	FILL
12		6A	11.5'	4	12" RECOVERY		
		7	12.0'	7 20 19 13	No Sieve Analysis	6" RECOVERY	A-1-b
			14.0'		11" RECOVERY		
15		8	14.0'	1 2 4 4	Saturated loose brown silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
			16.0'		20" RECOVERY		
		9	16.0'	2 2 4	Saturated loose brown fine to coarse sand w/	A-3	

Remarks: Mud Rotary starting @ 56.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	8	trace of silt and gravel. 15" RECOVERY		
		10	18.0'	3 7 8	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 15" RECOVERY	A-3	
21			20.0'				
24		11	23.5'	4 7 8 9	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel. 19" RECOVERY	A-3	
			25.5'				
27							
30		12	28.5'	5 6 9 9	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 18" RECOVERY	A-3	
			30.5'				
33							
36		13	33.5'	3 5 8 12	Saturated medium dense brown fine sand w/ trace of coarse sand and silt. 19" RECOVERY	A-3	
			35.5'				
39		14	38.5'	2 5 6 7	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 18" RECOVERY	A-3	
			40.5'				
42							
45		15	43.5'	5 8 8 12	Saturated medium dense brownish gray fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			45.5'		20" RECOVERY		
48							
		16	49.0'	3 5 8 10	Saturated medium dense gray silty fine sand w/some coarse sand, trace of gravel and organic matter.	A-2-4(0)	
51			51.0'		24" RECOVERY		
54							
		17	54.0'	6 7 10 11	Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter.	A-4(0)	
			56.0'		23" RECOVERY		
57							
60		18	59.0'	3 4 5 6	Saturated loose gray silty fine sand w/some coarse sand, trace of organic matter.	A-2-4(0)	
			61.0'		22" RECOVERY		
63							
		19	64.0'	4 7 9 15	Saturated dense gray fine sand w/some clay, trace of coarse sand and organic matter.	A-2-4(0)	
66			66.0'		20" RECOVERY		
69							
		20	69.0'	5 7 9 15	Saturated medium dense silty fine sand w/ trace of coarse sand, gravel and organic matter.	A-2-4(0)	
			71.0'		22" RECOVERY		
72							

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		21	74.0'	6 9 11 12	Saturated medium dense gray fine sand w/ some clay, trace of coarse sand, gravel and organic matter. 22" RECOVERY	A-2-4(0)	
			76.0'				
78							
81		22	79.0'	5 9 11 13	Saturated very stiff grayish green silt w/some clay, trace of coarse sand, gravel and organic matter. 24" RECOVERY	A-4(0)	
			81.0'				
84							
87		23	84.0'	7 13 20 37	Saturated dense grayish green silty fine sand w/trace of coarse sand and organic matter. 24" RECOVERY	A-2-4(0)	
			86.0'				
90		24	89.0'	9 10 11 13	Saturated medium dense green silty fine sand w/trace of coarse sand, gravel and organic matter. 24" RECOVERY	A-2-4(0)	
			91.0'				
93					Boring Terminated at 91 feet		
96							
99							

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand



Low plasticity
clay



Silty low plasticity
clay



Poorly graded sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/28/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
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.

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

F.A. Project: US 301 Preferred Alternative Contract 1A

Boring No.: BR1-07-02

Contract: 25-113-01

Boring Location: Sta. 670+44.23, 37' Lt. C.L.

Boring Surface Elev.: + 33.0'

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

Casing Size: 3 1/4"	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0'	To: 39.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/6/2008		12.0'	10.0'	6.8'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	101.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: William Sharp
Helpers: Amber Joseph

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	2 3 3 3	No Sieve Analysis		
		2	2.0'	4 6 7 7	2" RECOVERY No Sieve Analysis		
3			2.0'				
		3	4.0'	3 3 2 3	2" RECOVERY Wet loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			4.0'				
6		4	6.0'	3 3 2 2	22" RECOVERY Wet loose brown fine to coarse sand w/trace of silt and gravel.	A-3	
			6.0'				
		5	8.0'	1 1 1 2	20" RECOVERY Wet very loose brown fine to coarse sand w/some silt.	A-2-4(0)	
9			8.0'				
		6	10.0'	2 2 2 3	18" RECOVERY Wet very loose brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			10.0'				
12		7	12.0'	2 2 2 3	20" RECOVERY Wet very loose brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			12.0'				
		8	14.0'	2 3 3 3	16" RECOVERY Saturated loose brown coarse to fine sand w/trace of gravel and silt.	A-1-b	
15			14.0'				
		9	16.0'	4 5 5	12" RECOVERY Saturated loose brown coarse to fine sand w/	A-1-b	
			16.0'				

Remarks: Mur Rotary starting @ 39.0'

Reviewed By: _____ **Soils Supervisor:** _____

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	4	some gravel, trace of silt. 22" RECOVERY		
		10	18.0'	3 5 4 4	Saturated loose brown fine to coarse sand w/ trace of silt and gravel. 20" RECOVERY	A-3	
21			20.0'				
24			24.0'	5 6 7 8	Saturated medium dense brown silty fine sand w/some coarse sand, trace of gravel. 20" RECOVERY	A-2-4(0)	
27			26.0'				
30		12	29.0'	6 8 7 8	Saturated medium dense brown fine sand w/ some gravel, trace of coarse sand and silt. 18" RECOVERY	A-3	
			31.0'				
			31.0'	4 5 7 12	22" RECOVERY		pH sample only.
33			33.0'				
36		13	34.0'	4 6 8 8	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel. 22" RECOVERY	A-3	
			36.0'				
39			39.0'	4 7 9 11	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 24" RECOVERY	A-3	
			41.0'				
42			44.0'	8 10 13 14	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
45							

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		22" RECOVERY		
48							
		16	49.0'	7 9 11 11	Saturated medium dense grayish green silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	
51			51.0'		24" RECOVERY		
54							
		17	54.0'	5 9 12 14	Saturated medium dense grayish green silty fine sand w/some coarse sand.	A-2-4(0)	
			56.0'		18" RECOVERY		
57							
60		18	59.0'	W/R 4 3 5	Saturated loose gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
			61.0'		17" RECOVERY		
		U-1	62.0'		No Sample Recovery - Tube only pushed 14".		Press Sample - Shelby Tube.
63							
			64.0'		0" RECOVERY		
		19	64.0'	3 3 8 17	Saturated medium dense gray silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	
66			66.0'		20" RECOVERY		
69							
		20	69.0'	4 5 8 10	Saturated stiff gray fine sandy silt w/some clay, trace of coarse sand.	A-4(0)	
			71.0'		24" RECOVERY		
72							

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		21	74.0'	8 9 12 19	Saturated very stiff gray fine sandy silt w/ trace of coarse sand, gravel and organic matter. 24" RECOVERY	A-4(0)	
			76.0'				
78							
81		22	79.0'	10 11 15 19	Saturated medium dense gray fine sand w/ some clay, trace of coarse sand, gravel, organic matter and sea shells. 24" RECOVERY	A-2-4(0)	
			81.0'				
84							
87		23	84.0'	6 9 12 17	Saturated medium dense gray silty fine sand w/trace of coarse sand, gravel, organic matter and sea shells. 24" RECOVERY	A-2-4(0)	
			86.0'				
90		24	89.0'	12 21 34 50/4"	Saturated very dense green silty fine sand w/ trace of coarse sand, organic matter and sea shells. 20" RECOVERY	A-2-4(0)	
			91.0'				
93							
96		25	94.0'	7 11 17 25	Saturated medium dense gray silty fine sand w/trace of coarse sand and organic matter. 24" RECOVERY	A-2-4(0)	
			96.0'				
99							
		26	99.0'	7 11 17 22	Saturated very stiff gray clay w/some fine sand and organic matter, trace of sea shells. 24" RECOVERY	A-6(13)	
			101.0'				
					Boring Terminated at 101 feet.		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Poorly graded sand



Poorly graded clayey
silty sand



Low plasticity
clay

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/28/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
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.

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

F.A. Project: US 301 Preferred Alternative Contract 1A

Boring No.: BR1-07-03

Contract: 25-113-01

Boring Location: Sta. 667+53.23, 30' Rt. C.L.

Boring Surface Elev.: +29.60

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

Casing Size: 3 1/4"	Inches	From Depth of:		To:
Hollow Stem Auger:		From Depth of: 0.0'		To: 51.0'

Water Level Readings					
Date 2/25/2008	Time	Depth of Hole 18.0'	Depth of Casing 16.0'	Depth of Water 14.0'	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 100.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;			U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 4 4 4	Saturated firm brown silt w/trace of fine to coarse sand, gravel and clay.	A-4(1)	
			2.0'		16" RECOVERY		
3		2	2.0'	2 3 4 5	Saturated firm gray silt w/trace of fine to coarse sand.	A-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	3 4 5 14	Saturated loose gray gravel w/trace of coarse to fine sand and silt.	A-1-a	
6			6.0'		6" RECOVERY		
		4	6.0'	6 9 11 5	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			8.0'		16" RECOVERY		
9		5	8.0'	3 5 8 8	Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	6 8 11 11	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
12			12.0'		14" RECOVERY		
		7	12.0'	4 7 7 9	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			14.0'		15" RECOVERY		
15		8	14.0'	W/R 3 5 8	Saturated loose brown fine sand w/some silt and coarse sand.	A-2-4(0)	
			16.0'		15" RECOVERY		
		9	16.0'	5 10 11	Saturated medium dense brownish red silty	A-2-4(0)	

Remarks: Mud Rotary starting @ 51.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	15	fine sand w/some coarse sand.		
			16" RECOVERY				
		10	18.0'	2 2 6 8	Saturated loose brown fine sand w/some silt and coarse sand.	A-2-4(0)	
			20.0'		12" RECOVERY		
21							
24							
		11	24.0'	6 6 8 8	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			26.0'		15" RECOVERY		
27							
30		12	29.0'	7 8 8 7	Saturated medium dense brown fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			31.0'		13" RECOVERY		
33							
36		13	34.0'	3 3 4 6	Saturated loose brown fine sand w/some coarse sand, trace of silt.	A-3	
			36.0'		17" RECOVERY		
39							
42		14	39.0'	2 3 3 3	Saturated loose brown silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
			41.0'		23" RECOVERY		
45		15	44.0'	3	Saturated loose brown fine sand w/some silt,	A-2-4(0)	
		15A	44.5'	5	trace of coarse sand and gravel.	A-2-4(0)	
			44.5'	5			

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				7	6" RECOVERY		
			46.0'		Saturated medium dense gray fine sand w/ some coarse sand and clay. 16" RECOVERY		
48							
		U-1	49.0'		No Sample Recovery		Press Sample - Shelby Tube.
51			51.0'		0" RECOVERY		
54		16	53.0'	3 6 6 10	Saturated medium dense gray fine sand w/ some coarse sand and clay.	A-2-4(0)	
			55.0'		24" RECOVERY		
57							
		17	58.0'	3 3 6 6	Saturated stiff gray fine sandy silt w/trace of coarse sand.	A-4(0)	
60			60.0'		24" RECOVERY		
63							
		18	63.0'	6 7 8 14	Saturated stiff gray fine sandy silt w/trace of coarse sand and gravel.	A-4(0)	
			65.0'		24" RECOVERY		
66							
		19	68.0'	6 8 10 13	Saturated very stiff grayish green fine sandy silt w/trace of coarse sand and gravel.	A-4(0)	
69			70.0'		23" RECOVERY		
72							
		20	73.0'	10			

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75			75.0'	12 12 13	Saturated very stiff grayish green fine sandy silt w/some clay, trace of coarse sand. 24" RECOVERY	A-4(0)	
78		21	78.0' 80.0'	9 10 16 22	Saturated medium dense green fine sand w/ some clay, trace of gravel and coarse sand. 24" RECOVERY	A-2-4(0)	
84		22	83.0' 84.5'	15 23 50	Saturated very dense green silty fine sand w/ trace of coarse sand. 17" RECOVERY	A-2-4(0)	
87							
90		23	88.0' 90.0'	8 10 15 13	Saturated very stiff green fine sandy silt w/ trace of coarse sand and gravel. 24" RECOVERY	A-4(0)	
93							
96		24	93.0' 95.0'	8 12 12 17	Saturated very stiff gray clay w/some organic matter, trace of fine to coarse sand. 24" RECOVERY	A-7-6(23)	
99		25	98.0' 100.0'	16 30 40 50	Saturated hard grayish green fine sandy silt w/ trace of coarse sand. 18" RECOVERY	A-4(0)	
					Boring Terminated at 100 feet.		

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Poorly graded gravel



Silty sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand



Silty low plasticity
clay



Low plasticity
clay

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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 ATV CME 55
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.

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

F.A. Project: US 301 Preferred Alternative Contract 1A

Boring No.: BR1-07-04

Contract: 25-113-01

Boring Location: Sta. 668+75.28, 29' Lt. C.L.

Boring Surface Elev.: +26.50'

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

Casing Size: 3 1/4"	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 96.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/18/2008		8.0'	10.0'	2.8'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	96.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: William Sharp
Helpers: William Hurd

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	1 2 2 3	Saturated soft brownish gray silt w/trace of fine sand.	A-4(0)	
			2.0'		20" RECOVERY		
3		2	2.0'	4 3 3 4	Saturated firm brownish gray silt w/trace of fine to coarse sand and gravel.	A-4(0)	
			4.0'		24" RECOVERY		
		3	4.0'	1 1 2 2	Saturated soft gray silt w/some fine sand and organic matter, trace of coarse sand and gravel.	A-4(0)	
6			6.0'		14" RECOVERY		
		4	6.0'	1 2	Saturated soft gray fine sandy silt w/some clay and organic matter, trace of coarse sand.	A-4(1)	
			7.0'		8" RECOVERY		
		4A	7.0'	6 12	Saturated medium dense brown gravel w/some fine to coarse sand, trace of silt.	A-1-a	
			8.0'		4" RECOVERY		
9		5	8.0'	3 3 7 6	Saturated loose brown fine sand and gravel w/some coarse sand and silt.	A-2-4(0)	
			10.0'		12" RECOVERY		
		6	10.0'	3 3 4 6	Saturated loose brown fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	
12			12.0'		20" RECOVERY		
		7	12.0'	3 4 6 7	Saturated loose brown fine sandy silt w/some coarse sand, trace of gravel.	A-4(0)	
			14.0'		20" RECOVERY		
15		8	14.0'	3 3 5 7	Saturated loose brown fine sand w/some coarse sand, trace of silt.	A-3	
			16.0'		20" RECOVERY		
		9	16.0'	5 6 7	Saturated medium dense brown silty fine sand	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	9	w/some coarse sand. 22" RECOVERY		
		10	18.0'	3 6 5 7	Saturated medium dense brown fine sand w/ some silt and coarse sand. 22" RECOVERY	A-2-4(0)	
21			20.0'				
24							
		11	24.0'	2 4 7 8	Saturated medium dense brown fine sand w/ some silt and coarse sand. 20" RECOVERY	A-2-4(0)	
			26.0'				
27							
30		12	29.0'	2 4 6 8	Saturated loose brown silty fine sand w/trace of coarse sand and gravel. 18" RECOVERY	A-2-4(0)	
			31.0'				
33							
		13	34.0'	4 4 8 11	Saturated medium dense brown silty fine sand w/trace of coarse sand and gravel. 20" RECOVERY	A-2-4(0)	
36			36.0'				
39							
		14	39.0'	5 5 6 7	Saturated medium dense grayish green fine sand w/some silt, trace of coarse sand and gravel. 24" RECOVERY	A-2-4(0)	
			41.0'				
42							
45		15	44.0'	4 5 9 14	Saturated medium dense grayish green silty fine sand w/some coarse sand, trace of gravel	A-2-4(0)	

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		and organic matter. 24" RECOVERY		
48							
		16	49.0'	4 6 8 12	Saturated stiff grayish green fine sandy silt w/ trace of coarse sand, gravel and organic matter. 24" RECOVERY	A-4(0)	
51			51.0'				
54							
		17	54.0'	3 5 7 7	Saturated medium dense grayish green silty fine sand w/trace of coarse sand and organic matter. 22" RECOVERY	A-2-4(0)	
			56.0'				
57							
60		18	59.0'	3 4 6 6	Saturated stiff grayish green fine sandy silt w/ trace of coarse sand and organic matter. 24" RECOVERY	A-4(0)	
			61.0'				
63							
66		19	64.0'	6 9 11 15	Saturated medium dense gray silty fine sand w/trace of coarse sand, gravel, organic matter and sea shells. 24" RECOVERY	A-2-4(0)	
			66.0'				
69							
		20	69.0'	3 5 9 11	Saturated stiff gray fine sandy silt w/some clay, trace of coarse sand, gravel, organic matter and sea shells. 24" RECOVERY	A-4(0)	
			71.0'				
72							

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		21	74.0'	10 15 19 23	Saturated hard gray fine sandy silt w/some clay, trace of fine sand, gravel, organic matter and sea shells. 24" RECOVERY	A-4(0)	
			76.0'				
78							
		22	79.0'	7 15 23 28	Saturated hard gray fine sandy silt w/trace of coarse sand, organic matter and sea shells. 22" RECOVERY	A-4(0)	
81			81.0'				
84							
		23	84.0'	7 9 11 17	Saturated very stiff gray fine sandy silt w/trace of coarse sand, gravel, organic matter and sea shells. 24" RECOVERY	A-4(0)	
			86.0'				
87							
90		24	89.0'	5 9 11 13	Saturated very stiff gray clay w/trace of fine to coarse sand and organic matter. 24" RECOVERY	A-7-6(21)	
			91.0'				
93							
		25	94.0'	10 11 13 16	Saturated very stiff gray clay w/some organic matter, trace of fine to coarse sand and sea shells. 24" RECOVERY	A-7-6(27)	
96			96.0'				
					Boring Terminated at 96 feet.		
99							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Poorly graded gravel



Silty sand



Poorly graded sand



Poorly graded clayey
silty sand



Low plasticity
clay

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
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.

**STATE OF DELAWARE
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F.A. Project: US 301 Preferred Alternative Contract 1A

Boring No.: BR1-07-05

Contract: 25-113-01

Boring Location: Sta. 667+59.36, 67' Lt. C.L.

Boring Surface Elev.: + 30.0'

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

Casing Size: 3 1/4"	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 84.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/20/2008		8.0'	10.0'	5.8'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	101.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: William Sharp
Helpers: William Hurd

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	W/H 4 7 13	Wet medium dense brown fine sandy gravel w/some silt and coarse sand.	A-1-b	
			2.0'		16" RECOVERY		
3		2	2.0'	7 9 11 12	Wet medium dense brown coarse sandy gravel w/some fine sand, trace of silt.	A-1-b	
			4.0'		20" RECOVERY		
		3	4.0'	6 8 7 6	Wet medium dense brown coarse to fine sandy gravel w/trace of silt.	A-1-b	
6			6.0'		16" RECOVERY		
		4	6.0'	4 4 5 6	Wet loose brown silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	3 4 4 4	Saturated loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'		18" RECOVERY		
		6	10.0'	3 4 6 8	Saturated loose brown fine to coarse sand w/ trace of silt and gravel.	A-3	
12			12.0'		22" RECOVERY		
		7	12.0'	6 5 5 8	Saturated loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			14.0'		18" RECOVERY		
15		8	14.0'	6 5 6 9	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
		9	16.0'	9 8 8	Saturated medium dense brown fine sand w/	A-2-4(0)	

Remarks: Mud Rotary starting @ 84.0'

Reviewed By: Maureen Kellery

Soils Supervisor: Randy Ferguson

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	9	some gravel, coarse sand and silt. 20" RECOVERY		
		10	18.0'	5 5 8 10	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel. 20" RECOVERY	A-3	
21			20.0'				
24							
		11	24.0'	6 6 10 12	Saturated medium dense brown fine sand w/ some silt and coarse sand. 22" RECOVERY	A-2-4(0)	
27			26.0'				
30		12	29.0'	7 6 8 7	Saturated medium dense brown fine sand w/ some silt and coarse sand. 20" RECOVERY	A-2-4(0)	
			31.0'				
33							
		13	34.0'	2 3 5 6	Saturated loose brown fine sand w/some silt and coarse sand. 20" RECOVERY	A-2-4(0)	
36			36.0'				
39							
		14	39.0'	4 8 12 15	Saturated medium dense brownish green fine sand w/some silt and coarse sand. 24" RECOVERY	A-2-4(0)	
42			41.0'				
45		15	44.0'	4 6 10 11	Saturated very stiff gray fine sandy silt w/ trace of coarse sand and gravel.	A-4(0)	

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		24" RECOVERY		
48							
		16	49.0'	4 7 9 11	Saturated medium dense grayish green silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	
51			51.0'		22" RECOVERY		
54							
		17	54.0'	4 7 11 15	Saturated medium dense grayish green fine sand w/some clay, trace of coarse sand and gravel.	A-2-4(0)	
			56.0'		24" RECOVERY		
57							
60		18	59.0'	4 6 8 14	Saturated medium dense grayish green silty fine sand w/trace of coarse sand.	A-2-4(0)	
			61.0'		24" RECOVERY		
63							
		19	64.0'	6 7 9 13	Saturated very stiff grayish green fine sand w/ trace of coarse sand, gravel and clay.	A-4(0)	
66			66.0'		24" RECOVERY		
69							
		20	69.0'	6 9 13 18	Saturated medium dense grayish green silty fine sand w/trace of coarse sand.	A-2-4(0)	
			71.0'		24" RECOVERY		
72							

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		21	74.0'	8 10 12 17	Saturated very stiff grayish green fine sandy silt w/some clay, trace of coarse sand, gravel and sea shells. 24" RECOVERY	A-4(0)	
			76.0'				
78							
81		22	79.0'	9 15 17 28	Saturated dense grayish green fine sand w/ some clay, trace of coarse sand, gravel and sea shells. 22" RECOVERY	A-2-4(0)	
			81.0'				
84							
87		23	84.0'	10 19 28 32	Saturated dense grayish green silty fine sand w/trace of gravel, coarse sand and sea shells. 24" RECOVERY	A-2-4(0)	
			86.0'				
90		24	89.0'	7 12 13 21	Saturated very stiff grayish green fine sandy silt w/trace of coarse sand and sea shells. 24" RECOVERY	A-4(0)	
			91.0'				
93							
96		25	94.0'	7 9 13 15	Saturated very stiff gray fine sandy clay w/ some organic matter, trace of sea shells. 24" RECOVERY	A-7-6(13)	
			96.0'				
99							
		26	99.0'	9 13 16 22	Saturated very stiff gray clay w/some organic matter, trace of fine sand and sea shells. 24" RECOVERY	A-7-6(25)	
			101.0'				
					Boring Terminated at 101 feet.		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Poorly graded sand



Clayey sand



Poorly graded clayey
silty sand



Silt



Low plasticity
clay

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/20/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
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.

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

F.A. Project: US 301 Preferred Alternative Contract 1A

Boring No.: BR1-07-06

Contract: 25-113-01

Boring Location: Sta. 669+61.56, 67' Rt. C.L.

Boring Surface Elev.: + 37.39'

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

Casing Size: 3 1/4"	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 31.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
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Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 100.5 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3 No. of U-Sample Boring: Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: 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
		1	0.0'	1 3 4 9	Saturated firm brown coarse sandy silt w/ some fine sand and clay, trace of gravel.	A-4(2)	
		2	2.0'	8	12" RECOVERY No Sample Recovery		
3			2.0'	5 3 1			
		3	4.0'	2 2 2 2	0" RECOVERY Saturated very loose brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
6			6.0'		15" RECOVERY		
		4	6.0'	2 2 3 2	Saturated loose brown coarse to fine sand w/ trace of silt and gravel.	A-1-b	
		5	8.0'	1 2 2 2	16" RECOVERY Saturated very loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
9			10.0'		19" RECOVERY		
		6	10.0'	W/H 1 W/H 1	Saturated very loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12			12.0'		16" RECOVERY		
		7	12.0'	2 1 1 1	Saturated very loose brown fine to coarse sand w/trace of silt and gravel.	A-3	
		8	14.0'	1 1 2 2	19" RECOVERY Saturated very loose brown fine to coarse sand w/trace of silt and gravel.	A-3	
15			16.0'		16" RECOVERY		
		9	16.0'	1 1 2	Saturated very loose brown coarse sand w/	A-1-b	

Remarks: Mud Rotary starting @ 31.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	3	some fine sand, trace of silt and gravel. 13" RECOVERY		
		10	18.0'	3 1 3 7	Saturated very loose brown fine to coarse sand w/some silt, trace of gravel. 19" RECOVERY	A-2-4(0)	
21			20.0'				
24							
		11	24.0'	1 2 5 10	Saturated loose brown fine sand w/some coarse sand and gravel, trace of silt. 17" RECOVERY	A-3	
27			26.0'				
30		12	29.0'	5 6 10 12	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 18" RECOVERY	A-3	
			31.0'				
33							
		13	34.0'	5 9 10 13	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 19" RECOVERY	A-3	
36			36.0'				
39		14	38.5'	3 5 6 9	Saturated medium dense brown fine sand w/ trace of coarse sand and silt. 19" RECOVERY	A-3	
			40.5'				
42							
		15	43.5'	3 5 5 6	Saturated loose brown fine sand w/trace of coarse sand and silt.	A-3	
45							

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			45.5'		17" RECOVERY		
48		16	48.5'	3 3 5 6	Saturated loose brown fine sand w/some coarse sand, trace of silt and gravel.	A-3	
			50.5'		17" RECOVERY		
51							
		17	53.5'	7 10 13 17	Saturated medium dense gray fine sand w/ some clay, trace of coarse sand and organic matter.	A-2-4(0)	
			55.5'		21" RECOVERY		
		U-1	55.5'		Saturated gray clayey fine sand w/some coarse sand, trace of gravel and organic matter.	A-2-4(0)	Press Sample - Shelby Tube.
57			57.5'		24" RECOVERY		
		18	58.5'	6 8 12 15	Saturated medium dense gray silty fine sand w/some coarse sand, trace of organic matter.	A-2-4(0)	
60			60.5'		24" RECOVERY		
63							
		19	63.5'	6 9 12 15	Saturated medium dense gray silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
			65.5'		20" RECOVERY		
66							
69		20	68.5'	3 5 6 17	Saturated medium dense gray silty fine sand w/trace of coarse sand, gravel and organic matter.	A-2-4(0)	
			70.5'		21" RECOVERY		
72							

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		21	73.5'	5 7 10 12	Saturated medium dense gray fine sand w/ some clay, trace of coarse sand, gravel and organic matter. 24" RECOVERY	A-2-4(0)	
			75.5'				
78							
		22	78.5'	1 7 11 15	Saturated medium dense gray silty fine sand w/trace of coarse sand, gravel and organic matter. 19" RECOVERY	A-2-4(0)	
			80.5'				
81							
		23	83.5'	7 10 10 13	Saturated very stiff gray clayey fine sandy silt w/trace of coarse sand and organic matter. 21" RECOVERY	A-4(0)	
			85.5'				
84							
		24	88.5'	10 12 16 22	Saturated medium dense green silty fine sand w/trace of coarse sand, gravel and organic matter. 24" RECOVERY	A-2-4(0)	
			90.5'				
87							
		25	94.0'	18 25 37 45	Saturated very dense green silty fine sand w/ trace of coarse sand, gravel and organic matter. 19" RECOVERY	A-2-4(0)	
			96.0'				
90							
		26	98.5'	5 6 10 14	Saturated medium dense green silty fine sand w/trace of coarse sand and organic matter. 22" RECOVERY	A-2-4(0)	
			100.5'				
93							
96							
99							
					Boring Terminated at 100.5 feet.		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Well graded sand
with silt



Poorly graded sand
with silt



Well graded sand



Silty sand



Clayey sand



Poorly graded clayey
silty sand

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Notes:

1. Exploratory borings were drilled on 1/29/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
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.

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

F.A. Project: US 301 Preferred Alternative Contract 1A

Boring No.: BR1-07-07

Contract: 25-113-01

Boring Location: Sta. 667+51.56 67' Lt. C.L.

Boring Surface Elev.: +27.00'

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

Casing Size: 3 1/4"	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 101.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/22/2008		10.0'	8.0'	7.3'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	101.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Bill Holden
Helpers: Tom Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	3	No Sieve Analysis		
			1.0'	3			
			1.0'	2			
			2.0'		6" RECOVERY		
3		2	2.0'	2	Saturated soft gray silt w/some clay, trace of fine to coarse sand and gravel.	A-4(4)	
				2			
			4.0'		3" RECOVERY		
		3	4.0'	1	Saturated soft grayish brown gravelly silt w/some fine to coarse sand, trace of clay.	A-4(0)	
				1			
6			6.0'	3	10" RECOVERY		
		4	6.0'	2	Saturated medium dense brown coarse sandy gravel w/some fine sand and silt.	A-1-a	
				21			
				24			
			8.0'		14" RECOVERY		
9		5	8.0'	3	Saturated loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
				4			
				6			
				5			
			10.0'		18" RECOVERY		
		6	10.0'	5	Saturated medium dense brown fine to coarse sand w/some gravel and silt.	A-2-4(0)	
				6			
				8			
				7			
12			12.0'		11" RECOVERY		
		7	12.0'	2	Saturated medium dense brown fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	
				4			
				7			
				11			
			14.0'		20" RECOVERY		
15		8	14.0'	8	Saturated medium dense brown silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
				10			
				12			
				12			
			16.0'		16" RECOVERY		
		9	16.0'	8	Saturated medium dense brown fine sand w/	A-3	
				12			
				13			

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	15	some coarse sand, trace of silt. 15" RECOVERY		
		10	18.0'	10 12 17 17	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 21" RECOVERY	A-3	
21			20.0'				
24							
		11	24.0'	5 10 11 11	Saturated medium dense brown fine sand w/ some coarse sand and silt. 18" RECOVERY	A-2-4(0)	
27			26.0'				
30		12	29.0'	23 19 9 10	Saturated medium dense brown fine sand w/ some coarse sand and silt. 22" RECOVERY	A-2-4(0)	
			31.0'				
33							
		13	34.0'	8 10 11 13	Saturated medium dense brown fine sand w/ some silt, trace of coarse sand. 17" RECOVERY	A-2-4(0)	
36			36.0'				
39							
		14	39.0'	4 6 6 5	Saturated medium dense brownish red fine sand w/some coarse sand and silt, trace of gravel. 16" RECOVERY	A-3	
42			41.0'				
		U-1	42.0'		No Sample Recovery		Press Sample - Shelby Tube.
			44.0'		0" RECOVERY		
45		15	44.0'	6 7 11 15	Saturated very stiff gray fine sandy silt w/ some clay, trace of coarse sand and gravel.	A-4(0)	

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		22" RECOVERY		
48							
		16	49.0'	6 8 9 12	Saturated medium dense gray fine sand w/ some clay, trace of coarse sand and gravel.	A-2-4(0)	
51			51.0'		22" RECOVERY		
54							
57							
60		17	59.0'	6 10 12 13	Saturated very stiff gray fine sandy silt w/ trace of coarse sand and gravel.	A-4(0)	
			61.0'		23" RECOVERY		
63							
66		18	64.0'	6 7 8 12	Saturated stiff gray fine sandy silt w/some coarse sand, trace of gravel.	A-4(0)	
			66.0'		22" RECOVERY		
69							
		19	69.0'	9 13 18 18	Saturated hard grayish green fine sandy silt w/ trace of coarse sand and gravel.	A-4(0)	
			71.0'		21" RECOVERY		
72							

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		20	74.0'	12 13 16 18	Saturated very stiff grayish green fine sandy silt w/some clay, trace of coarse sand and gravel. 22" RECOVERY	A-4(0)	
			76.0'				
78							
		21	79.0'	9 12 18 18	Saturated very stiff grayish green fine sandy silt w/trace of coarse sand and gravel. 24" RECOVERY	A-4(0)	
81			81.0'				
84							
		22	84.0'	17 25 43 50/4"	Saturated very dense green silty fine sand w/ trace of coarse sand, gravel and organic matter. 17" RECOVERY	A-2-4(0)	
			86.0'				
87							
90		23	89.0'	9 15 24 30	Saturated hard green fine sandy silt w/trace of coarse sand and organic matter. 21" RECOVERY	A-4(0)	
			91.0'				
93							
		24	94.0'	9 12 23 50/3"	Saturated hard green silty fine sandy clay w/ trace of coarse sand, gravel and organic matter. 18" RECOVERY	A-6(8)	
96			96.0'				
99							
		25	99.0'	5 6 16 16	No Sample Recovery 0" RECOVERY		
			101.0'				
					Boring Terminated at 101 feet.		

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Clayey sand



Silt



Low plasticity
clay

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/19/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
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.

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

F.A. Project: US 301 Preferred Alternative Contract 1A

Boring No.: BR1-07-08

Contract: 25-113-01

Boring Location: Sta. 670+10.20, 28' Lt. C.L.

Boring Surface Elev.: + 36.83'

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

Casing Size: 3 1/4"	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0'	To: 33.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/31/2008		14.0'	12.0'	10.3'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
		1	0.0'	2 2 2 2	Wet very loose brown silty fine to coarse sand w/some gravel.	A-2-4(0)	
			2.0'		11" RECOVERY		
3		2	2.0'	2 2 4 5	Wet loose brown coarse sandy gravel w/some silt and fine sand.	A-1-b	
			4.0'		9" RECOVERY		
		3	4.0'	2 2 2 2	Wet very loose brown fine to coarse sand w/some silt and gravel.	A-2-4(0)	
6			6.0'		17" RECOVERY		
		4	6.0'	2 3 3 3	Wet loose brown coarse sand w/some fine sand and silt, trace of gravel.	A-1-b	
			8.0'		17" RECOVERY		
9		5	8.0'	2 3 2 2	Wet loose brown coarse to fine sand w/some silt, trace of gravel.	A-1-b	
			10.0'		21" RECOVERY		
		6	10.0'	1 1 1 1	Saturated very loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12			12.0'		20" RECOVERY		
		7	12.0'	2 3 2 3	Saturated loose brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
15		8	14.0'	1 1 1 1	Saturated very loose brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			16.0'		18" RECOVERY		
		9	16.0'	1 1 1	Saturated very loose brown fine to coarse	A-3	

Remarks: Mud Rotary starting @ 33.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	2	sand w/trace of silt and gravel. 14" RECOVERY		
		10	18.0'	4 2 2	Saturated very loose brown fine to coarse sand w/some silt, trace of gravel. 22" RECOVERY	A-2-4(0)	
21			20.0'				
24							
		11	24.0'	3 3 4 8	Saturated loose brown fine sand w/trace of coarse sand, gravel and silt. 20" RECOVERY	A-3	
27			26.0'				
30		12	29.0'	4 4 6 10	Saturated loose brown fine sand w/some coarse sand and silt. 19" RECOVERY	A-2-4(0)	
			31.0'				
33							
		13	33.0'	4 6 7 7	Saturated medium dense brown fine sand w/some coarse sand, trace of gravel. 19" RECOVERY	A-3	
36			35.0'				
39							
		14	38.0'	4 5 6 10	Saturated medium dense brown fine sand w/some coarse sand, trace of silt. 21" RECOVERY	A-3	
42			40.0'				
		15	43.0'	4 5 6 6	Saturated medium dense brown fine sand w/trace of silt and coarse sand. 18" RECOVERY	A-3	
45			45.0'				

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	9 10 12	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel. 14" RECOVERY	A-2-4(0)	
51		16A	49.5' 50.0'	15	Saturated medium dense gray fine sand w/ some silt and coarse sand, trace of gravel. 6" RECOVERY	A-2-4(0)	
54		17	53.0'	4 5 7 10	Saturated medium dense gray silty fine sand w/trace of coarse sand. 24" RECOVERY	A-2-4(0)	
57		18	58.0'	5 7 8 10	Saturated medium dense gray silty fine sand w/trace of coarse sand, gravel and organic matter. 24" RECOVERY	A-2-4(0)	
60			60.0'				
63		19	63.0'	5 6 10 12	Saturated medium dense gray silty fine sand w/some coarse sand, trace of organic matter. 24" RECOVERY	A-2-4(0)	
66			65.0'				
69		20	68.0'	5 6 8 12	Saturated stiff gray fine sandy silt w/some clay, trace of coarse sand, gravel and organic matter. 24" RECOVERY	A-4(0)	
72			70.0'				
		21	73.0'	6			

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

F.A. Project: US 301 Preferred Alternative Contract 1A
Contract: 25-113-01

Boring No.: BR1-07-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75			75.0'	7 8 11	Saturated stiff gray fine sandy silt w/trace of coarse sand, gravel and organic matter.	A-4(0)	Press Sample - Shelby Tube.
		U-1	75.0'		24" RECOVERY No Sample Recovery		
			77.0'		24" RECOVERY		
78		22	78.0'	6 10 12 17	Saturated medium dense grayish green silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
			80.0'		24" RECOVERY		
81							
84		23	83.0'	9 15 15 21	Saturated very stiff green fine sandy silt w/ some clay, trace of gravel, silt and organic matter.	A-4(0)	
			85.0'		24" RECOVERY		
87							
90		24	88.0'	6 11 16 24	Saturated medium dense green silty fine sand w/trace of coarse sand, gravel and organic matter.	A-2-4(0)	
			90.0'		22" RECOVERY		
93							
		25	93.0'	16 22 30 28	Saturated very dense blackish green silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
			95.0'		24" RECOVERY		
96							
99		26	98.0'	9 12 16 24	Saturated medium dense green silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
			100.0'		24" RECOVERY		
					Boring Terminated at 100 feet.		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand



Clayey sand

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Notes:

1. Exploratory borings were drilled on 1/31/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55
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.

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

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

Boring No.: BR1-07-09

Contract: 25-113-01

Boring Location: Sta. 665+76, 22' Rt. C.L.

Boring Surface Elev.: + 36.85

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Spoon		O.D.	O.D. of Sampler: 2		IN.
S-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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 101.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 2/10/09	Time	14.0	12.0	10.5	

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

Boring Contractor: Walton Corporation
Driller: B. Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/10/09	1	0.0'	2 3 9 9	Moist stiff brown silt w/ some fine sand and clay, trace of coarse sand and gravel.	A-4(1)	Topsoil - 2".
			2.0'		20" RECOVERY		
3		2	2.0'	9 8 9 8	Moist very stiff brown fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
			4.0'		17" RECOVERY		
		3	4.0'	6 10 8 4	Moist medium dense orange coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
6			6.0'		10" RECOVERY		
		4	6.0'	4 5 5 6	Wet loose orange fine sand w/ some silt and coarse sand.	A-2-4(0)	
			8.0'		21" RECOVERY		
9		5	8.0'	3 4 4 4	Wet loose orange fine sand w/ some silt and coarse sand.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	4 5 5 7	Saturated loose orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
12			12.0'		19" RECOVERY		
		7	12.0'	2 6 7 9	Saturated medium dense red and brown fine to coarse sand, trace of silt and gravel.	A-3	
			14.0'		20" RECOVERY		
15		8	14.0'	5 5 6 8	Saturated medium dense red-brown fine sand w/ some coarse sand, trace of silt.	A-3	
			16.0'		17" RECOVERY		
		9	16.0'	4 7 11	Saturated medium dense red-brown fine sand	A-3	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-07-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	16	w/ some coarse sand, trace of silt.		
		10	18.0'	5 8 11	17" RECOVERY Saturated medium dense red-brown fine to coarse sand, trace of silt.	A-3	
21			20.0'		17" RECOVERY		
24		11	24.0'	8 9 13 14	Saturated medium dense red-brown coarse to fine sand, trace of silt.	A-1-b	
			26.0'		20" RECOVERY		
27							
30		12	29.0'	4 4 7 10	Saturated medium dense red-brown coarse sand w/ some fine sand, trace of silt and gravel.	A-1-b	Mud Rotary @ 29.0'.
			31.0'		20" RECOVERY		
33							
36	2/13/09	13	34.0'	3 4 6 8	Saturated loose brown coarse sand w/ some fine sand, trace of silt.	A-1-b	
			36.0'		18" RECOVERY		
39		14	39.0'	2 5 7 9	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
			41.0'		18" RECOVERY		
42							
45		15	44.0'	2 5 7 8	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	

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

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

Boring No.: BR1-07-09

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		19" RECOVERY		
48							
		16	49.0'	5 8 13 15	Saturated medium dense gray and brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
51			51.0'		21" RECOVERY		
54							
		17	54.0'	4 9 14 17	Saturated medium dense gray clayey fine sand w/ some coarse sand.	A-2-4(0)	
			56.0'		19" RECOVERY		
57							
60		18	59.0'	6 9 13 16	Saturated medium dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
			61.0'		22" RECOVERY		
63							
66		19	64.0'	4 7 11 14	Saturated medium dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
			66.0'		21" RECOVERY		
69							
		20	69.0'	4 6 9 9	Saturated stiff gray clayey fine sandy silt, trace of coarse sand.	A-4(0)	
			71.0'		20" RECOVERY		
72							

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

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

Boring No.: BR1-07-09


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		21	74.0'	4 11 22 22	Saturated dense gray silty fine sand, trace of coarse sand and organic matter. 24" RECOVERY	A-2-4(0)	
			76.0'				
78							
81		22	79.0'	6 11 18 22	Saturated very stiff gray clayey fine sandy silt, trace of organic matter, coarse sand, and gravel. 24" RECOVERY	A-4(0)	
			81.0'				
84							
	2/16/09	23	84.0'	5 12 17 19	Saturated very stiff gray clayey fine sandy silt, trace of organic matter and coarse sand. 24" RECOVERY	A-4(0)	
87			86.0'				
90		24	89.0'	6 12 23 33	Saturated dense gray silty fine sand, trace of organic matter and coarse sand. 23" RECOVERY	A-2-4(0)	
			91.0'				
93							
96		25	94.0'	11 18 25 38	Saturated dense gray silty fine sand, trace of organic matter and coarse sand. 24" RECOVERY	A-2-4(0)	Glaucinitic
			96.0'				
99							
		26	99.0'	5 10 13 15	Saturated very stiff gray clay w/ some fine sand. 24" RECOVERY	A-7-6(28)	
			101.0'				
					End of Boring		

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KEY TO SYMBOLS


Symbol Description


Strata symbols


 Silty low plasticity clay


 Silt


 Well graded sand with silt

 Silty sand

 Poorly graded sand with silt

 Poorly graded clayey silty sand

 Clayey sand

 High plasticity clay

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Notes:

1. Exploratory borings were drilled on 2/10/2009 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 recommendations 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 I-95

Boring No.: BR1-07-10

Contract: 25-113-01

Boring Location: Sta. 666+58, 60' Lt. C.L.

Boring Surface Elev.: 33.89'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Spoon		O.D.	O.D. of Sampler: 2		IN.
S-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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 101	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/6/09		10.0	8.0	7.0	26.9 33.9 33.9 33.9

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: G. Truver/B. Holden
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/6/09	1	0.0'	7 8 7	Moist medium dense orange silty fine to coarse sand w/ some gravel. 12" RECOVERY	A-2-4(0)	Topsoil - 2"
			1.5'				
3		2	2.0'	4 3 2 3	Moist loose orange fine sand w/ some silt and coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)	
			4.0'				
6		3	4.0'	2 4 2 4	Wet loose orange fine sand w/ some coarse sand and silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
			6.0'				
		4	6.0'	2 4 4 6	Wet loose orange fine to coarse sand w/ some silt, trace of gravel. 21" RECOVERY	A-2-4(0)	
			8.0'				
9		5	8.0'	2 4 5 7	Saturated loose orange fine sand w/ some coarse sand and silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
			10.0'				
		6	10.0'	4 7 14	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt. 17" RECOVERY	A-3	
			12.0'				
12	2/9/09	7	12.0'	3 4 5 8	Saturated loose brown fine sand w/ some coarse sand, trace of silt and gravel. 19" RECOVERY	A-3	
			14.0'				
15		8	14.0'	2 5 6 8	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
			16.0'				
		9	16.0'	6 9 12	Saturated medium dense brown fine sand w/	A-3	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-07-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	15	some coarse sand, trace of silt and gravel. 16" RECOVERY		
		10	18.0'	5 9 9 12	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 18" RECOVERY	A-3	
21			20.0'				
24							
		11	24.0'	6 6 7 9	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 20" RECOVERY	A-3	
27			26.0'				
		12	29.0'	3 5 8 9	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 21" RECOVERY	A-3	
30			31.0'				
33							
		13	34.0'	6 5 7 7	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 20" RECOVERY	A-3	
36			36.0'				
39							
		14	39.0'	4 5 7 8	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. 19" RECOVERY	A-3	Mud Rotary @ 39.0'.
42			41.0'				
		15	44.0'	4 5 7 10	Saturated medium dense gray silty fine sand w/ some coarse sand, trace of organic matter.	A-2-4(0)	
45							

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

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

Boring No.: BR1-07-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		18" RECOVERY		
48							
		16	49.0'	4 6 7 11	Saturated medium dense gray clayey fine sand, trace of coarse sand, organic matter, and gravel.	A-2-4(0)	
51			51.0'		22" RECOVERY		
54							
		17	54.0'	6 7 10 12	Saturated medium dense gray silty fine sand, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
			56.0'		21" RECOVERY		
57							
60		18	59.0'	3 5 9 14	Saturated stiff gray clayey fine sandy silt, trace of coarse sand, organic matter, and gravel.	A-4(0)	
			61.0'		24" RECOVERY		
63							
		19	64.0'	4 5 10 10	Saturated stiff gray clayey fine sandy silt, trace of coarse sand, gravel, and organic matter.	A-4(0)	
66			66.0'		23" RECOVERY		
69							
		20	69.0'	4 4 7 9	Saturated medium dense gray silty fine sand, trace of coarse sand, gravel, and organic matter.	A-2-4(0)	
			71.0'		22" RECOVERY		
72							

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

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

Boring No.: BR1-07-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		21	74.0'	6 9 3 16	Saturated very stiff gray fine sandy silt, trace of gravel, coarse sand, and organic matter.	A-4(0)	
			76.0'		24" RECOVERY		
78							
		22	79.0'	5 11 15 21	Saturated very stiff gray fine sandy silt, trace of organic matter and clay.	A-4(0)	
81			81.0'		24" RECOVERY		
84							
	2/10/09	23	84.0'	7 13 18 28	Saturated dense gray silty fine sand, trace of organic matter, coarse sand, and gravel.	A-2-4(0)	
			86.0'		24" RECOVERY		
87							
		24	89.0'	14 23 38 41	Saturated very dense green silty fine sand, trace of organic matter, gravel, and coarse sand.	A-2-4(0)	Glauconitic
90			91.0'		23" RECOVERY		
93							
		25	94.0'	8 10 13	Saturated very stiff gray and green fine sandy silt, trace of organic matter, coarse sand, and gravel.	A-4(0)	Glauconitic
			95.5'		18" RECOVERY		
96		25A	95.5' 96.0'	18	Saturated very stiff gray clay w/ some organic matter, trace of fine sand and gravel.	A-7-6(20)	
					6" RECOVERY		
99		26	99.0'	7 8 12 18	Saturated very stiff gray clay w/ some organic matter, trace of fine sand.	A-7-6(25)	
			101.0'		24" RECOVERY		
					End of Boring		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand



Clayey sand



Low plasticity
clay

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/6/2009 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 recommendations 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 I-95

Boring No.: BR1-07-11

Contract: 25-113-01

Boring Location: Sta. 668+50, 20' Lt. C.L.

Boring Surface Elev.: 28.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4 **Inches** **From Depth of:** 0.0 **To:** 101.0
Hollow Stem Auger: **From Depth of:** **To:**

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/4/09		8.0	10.0	6.6	21.4 28.0 28.0 28.0

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

Boring Contractor: Walton Corporation
Driller: G. Truver
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/4/09	1	0.0'	2 4 4	Wet firm brown silt w/ some clay, trace of fine to coarse sand and gravel.	A-4(4)	Topsoil - 3".
			1.5'		14" RECOVERY		
3		2	2.0'	6 5 5	Wet stiff brown silt, trace of fine to coarse sand and gravel.	A-4(0)	
			4.0'		16" RECOVERY		
6		3	4.0'	1 2 3 3	Wet firm brown silt w/ some fine sand, trace of coarse sand and gravel.	A-4(0)	
			6.0'		14" RECOVERY		
		4	6.0'	2 3 2 2	Wet firm gray silt w/ some fine sand, trace of coarse sand and gravel.	A-4(0)	
			8.0'		15" RECOVERY		
9		5	8.0'	14 18 9 9	Wet medium dense orange gravel and coarse sand w/ some fine sand, trace of silt.	A-1-a	
			10.0'		13" RECOVERY		
12		6	10.0'	5 3 4 4	Saturated loose orange fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			12.0'		15" RECOVERY		
		7	12.0'	W/R 2 5 6	Saturated loose orange fine sand w/ some silt, trace of coarse sand and gravel.	A-2-4(0)	
			14.0'		14" RECOVERY		
15		8	14.0'	1 3 7 9	Saturated loose orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			16.0'		15" RECOVERY		
		9	16.0'	8 8 12	Saturated medium dense orange fine sand w/	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-07-11

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	23	some coarse sand and silt.		
		10	18.0'	4 8 10 13	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			20.0'		20" RECOVERY		
21							
24		11	24.0'	6 6 7 8	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			26.0'		20" RECOVERY		
27							
30	2/5/09	12	29.0'	6 6 9 9	Saturated medium dense orange fine sand, trace of silt and coarse sand.	A-3	
			31.0'		20" RECOVERY		
33							
36		13	34.0'	4 4 8 9	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			36.0'		21" RECOVERY		
39							
42		14	39.0'	4 5 6 9	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Mud Rotary @ 39.0'.
			41.0'		22" RECOVERY		
45		15	44.0'	2 5 9 12	Saturated stiff gray fine sandy silt, trace of coarse sand and gravel.	A-4(0)	

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Boring No.: BR1-07-11

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		22" RECOVERY		
48							
		16	49.0'	3 8 10 13	Saturated medium dense gray silty fine sand, trace of coarse sand, organic matter, and gravel.	A-2-4(0)	
51			51.0'		23" RECOVERY		
54							
		17	54.0'	3 4 8 10	Saturated stiff gray clayey fine sandy silt, trace of coarse sand, organic matter, and gravel.	A-4(0)	
			56.0'		24" RECOVERY		
57							
60		18	59.0'	3 6 10 16	Saturated very stiff gray fine sandy silt, trace of coarse sand, organic matter, and gravel.	A-4(0)	
			61.0'		24" RECOVERY		
63							
66		19	64.0'	4 6 6 7	Saturated medium dense gray silty fine sand, trace of coarse sand, organic matter, and gravel.	A-2-4(0)	
			66.0'		24" RECOVERY		
69	2/6/09	20	69.0'	2 5 9 12	Saturated stiff gray fine sandy silt w/ some clay, trace of coarse sand, organic matter, and gravel.	A-4(0)	
			71.0'		21" RECOVERY		
72							

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Contract: 25-113-01

Boring No.: BR1-07-11


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75		21	74.0'	4 8 10 11	Saturated very stiff gray clayey fine sandy silt, trace of organic matter and coarse sand.	A-4(0)	
			76.0'		23" RECOVERY		
78							
		22	79.0'	5 10 19 23	Saturated medium dense gray silty fine sand, trace of organic matter and coarse sand.	A-2-4(0)	
81			81.0'		22" RECOVERY		
84							
		23	84.0'	9 19 29 35	Saturated dense green silty fine sand, trace of organic matter and coarse sand.	A-2-4(0)	Glauconitic
			86.0'		20" RECOVERY		
87							
90		24	89.0'	6 8 11 15	Saturated medium dense gray and green silty fine sand, trace of organic matter and coarse sand.	A-2-4(0)	Glauconitic
			91.0'		19" RECOVERY		
93							
		25	94.0'	4 7 11 13	Saturated very stiff gray silty clay w/ some organic matter, trace of fine sand.	A-7-6(28)	
96			96.0'		24" RECOVERY		
99							
		26	99.0'	4 17 28 32	Saturated dense gray silty fine sand, trace of organic matter, coarse sand, and gravel.	A-2-4(0)	
			101.0'		19" RECOVERY		
					End of Boring		

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KEY TO SYMBOLS


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
Strata symbols


 Silty low plasticity clay

 Silt

 Poorly graded sand with silt

 Silty sand

 Poorly graded clayey silty sand

 Low plasticity clay

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Notes:

1. Exploratory borings were drilled on 2/4/2009 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 recommendations 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 I-95

Boring No.: BR1-08-01

Contract: 25-113-01

Boring Location: Sta. 629+57.39, 90' Rt. C.L.

Boring Surface Elev.: 76.67

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 77.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	1/25/08		36.0'	34.0'	31.0'	45.7
						76.7
						76.7
						76.7

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 77.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 No. of: 3 Dia. U-Sample Boring: Ft.
 Core Drilling in Rock: U-Samples: 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'	5 3 4 4	Wet firm light brown clayey silt, trace of fine to coarse sand.	A-4(6)	8" Cultivated Soils
2.49		2	2.0'	3 3 2 3	10" RECOVERY Wet firm light brown fine sandy silt w/ some coarse sand and clay.	A-2-4(0)	
4.98		3	4.0'	2 3 6 8	24" RECOVERY Wet firm light brown fine to coarse sandy silt, trace of gravel and clay.	A-4(1)	
7.47		4	6.0'	4 7 7 7	14" RECOVERY Wet medium dense orange brown clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
9.96		5	8.0'	3 4 5 7	24" RECOVERY Wet loose orange brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
12.45		6	10.0'	6 6 13 11	19" RECOVERY Wet medium dense orange brown silty fine sand w/ some coarse sand.	A-7-6(1)	
		7	12.0'	4 4 8 9	10" RECOVERY Wet stiff reddish brown fine sandy clay w/ some coarse sand, trace of gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-08-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	5 7 11 11	14" RECOVERY Wet very stiff reddish brown fine sandy clay w/ some coarse sand.	A-2-7(0)	
17.43		9	16.0' 16.0'	11 11 14 15	16" RECOVERY Wet medium dense reddish brown silty fine to coarse sand, trace of gravel.	A-2-7(0)	
19.92		10	18.0' 18.0'	7 14 14 8	17" RECOVERY Wet medium dense reddish brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	
22.41			20.0'		8" RECOVERY		
24.9		11	24.0'	7 7 8 15	Wet medium dense reddish brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
27.39			26.0'		24" RECOVERY		
29.88		12	29.0'	2 4 4 9	Wet loose light brown and reddish brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
32.37		U-1	31.0' 31.0'		24" RECOVERY Saturated medium dense light brown and reddish brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Press Sample - Shelby Tube.
34.86			32.8'		18" RECOVERY		
37.35		13	34.0' 34.0'	4 6 7 9	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			36.0'		24" RECOVERY		

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

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

Boring No.: BR1-08-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	7 7 9 10	Saturated medium dense reddish brown fine to coarse sand w/ some silt.	A-3	
			41.0'		24" RECOVERY		
42.33							
44.82		15	44.0'	11 11 10 17	Saturated medium dense reddish brown fine to coarse sand w/ some silt.	A-2-4(0)	
			46.0'		24" RECOVERY		
47.31							
49.8		16	49.0'	11 14 21 24	Saturated dense brown fine sand w/ some coarse sand and silt.	A-3	
			51.0'		14" RECOVERY		
52.29							
54.78		17	54.0'	11 14 17 25	Saturated dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
			56.0'		16" RECOVERY		
57.27							
59.76		18	59.0'	5 9 13 15	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-3	

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

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

Boring No.: BR1-08-01


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		24" RECOVERY		
62.25							
		19	64.0'	8 11 13 15	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
64.74			66.0'		24" RECOVERY		
67.23							
		20	69.0'	10 12 21 20	Saturated dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
69.72			71.0'		19" RECOVERY		
72.21							
		21	73.0'	7 10 17 24	Visual Description: Saturated medium dense light brown clayey fine to coarse sand.		Sample brought to GTA lab for pH testing.
74.7			75.0'		18" RECOVERY		
		22	75.0'	8 13 18 20	Saturated dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			77.0'		12" RECOVERY		
77.19					Boring terminated at 77.0 feet.		
79.68							
82.17							


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KEY TO SYMBOLS


Symbol Description

Strata symbols


 Silty low plasticity clay

 Clayey sand

 Poorly graded sand with silt

 Silty sand

 Silt

 Elastic silt

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Notes:

1. Exploratory borings were drilled on 1/25/2008 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.
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.

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

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

Boring No.: BR1-08-02

Contract: 25-113-01

Boring Location: Sta. 629+22.39, 90' Lt. C.L.

Boring Surface Elev.: 77.13

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	77.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
1/26/08		31.0'	29.0'	27.0'	50.1 77.1 77.1 77.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	77.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:				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'	3 3 3	Wet firm brown silt w/ some clay, trace of fine to coarse sand.	A-4(3)	10" Cultivated Soils
2.49		2	2.0' 2.0'	2 2 2 4	18" RECOVERY Wet soft brown silt w/ some clay, trace of fine to coarse sand.	A-4(4)	
4.98		3	4.0' 4.0'	3 4 6 6	10" RECOVERY Wet loose brown fine to coarse sand w/ some silt.	A-2-4(0)	
7.47		4	6.0' 6.0'	4 6 8 8	10" RECOVERY Wet stiff orange brown fine sandy silt w/ some coarse sand, trace of gravel.	A-4(1)	
9.96		5	8.0' 8.0'	4 5 6 9	20" RECOVERY Wet medium dense orange brown clayey gravel and coarse sand w/ some fine sand.	A-2-4(0)	
12.45		6	10.0' 10.0'	6 7 9 9	22" RECOVERY Wet medium dense light brown silty fine sand, trace of coarse sand.	A-2-4(0)	
		7	12.0' 12.0'	10 11 9 9	24" RECOVERY Wet very stiff reddish brown organic fine to coarse sandy silt w/ some gravel, trace of clay.	A-7-6(1)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-08-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	9 9 17 13	13" RECOVERY Wet medium dense reddish brown clayey fine to coarse sand w/ some gravel and organic matter.	A-2-4(0)	
17.43		9	16.0' 16.0'	8 11 11 13	10" RECOVERY Wet medium dense reddish brown clayey fine to coarse sand w/ some organic matter, trace of gravel.	A-2-7(0)	
19.92		10	18.0' 18.0'	9 7 7 5	24" RECOVERY Wet medium dense reddish brown clayey coarse to fine sand w/ some gravel.	A-2-7(0)	
22.41			20.0'		10" RECOVERY		
24.9		11	24.0'	6 4 4 4	Wet loose light brown silty fine to coarse sand.	A-2-4(0)	
27.39		U-1	26.0' 26.0'		8" RECOVERY Saturated loose light brown fine to coarse sand w/ some silt.	A-2-4(0)	Press Sample - Shelby Tube
29.88		12	28.0' 29.0'	3 4 6 7	22" RECOVERY Saturated loose light brown and reddish brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
32.37			31.0'		20" RECOVERY		
34.86		13	34.0' 34.0'	4 5 5 4	Saturated loose brown fine to coarse sand w/ some silt.	A-2-4(0)	
37.35			36.0'		24" RECOVERY		

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

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

Boring No.: BR1-08-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	4 5 10 13	Saturated medium dense orange brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			41.0'		24" RECOVERY		
42.33							
44.82		15	44.0'	9 11 12 14	Saturated medium dense orange brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			46.0'		24" RECOVERY		
47.31							
49.8		16	49.0'	10 11 13 13	Saturated medium dense brown fine to coarse sand, trace of silt.	A-3	
			51.0'		24" RECOVERY		
52.29							
54.78		17	54.0'	11 14 15 21	Saturated medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
			56.0'		17" RECOVERY		
57.27							
59.76		18	59.0'	7 8 12 13	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	

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

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

Boring No.: BR1-08-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		24" RECOVERY		
62.25							
		19	64.0'	11 10 13 13	Saturated medium dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	
64.74			66.0'		18" RECOVERY		
67.23							
		20	69.0'	15 12 13 14	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
69.72			71.0'		24" RECOVERY		
72.21							
		21	73.0'	17 20 22 29	Visual Description: Saturated dense gray silty fine sand, trace of coarse sand		Sample brought to GTA lab for pH testing.
74.7			75.0'		12" RECOVERY		
		22	75.0'	16 19 23 25	Saturated dense gray silty fine sand, trace of coarse sand.	A-2-4(0)	
			77.0'		18" RECOVERY		
77.19					Boring terminated at 77.0 feet.		
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 1/26/2008 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.
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.

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

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

Boring No.: BR1-08-03

Contract: 25-113-01

Boring Location: Sta. 629+30.71, at C.L.

Boring Surface Elev.: 75.88

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To:	75.0'

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 1/30/08	Time	36.0'	34.0'	31.0'	44.9
					75.9
					75.9
					75.9

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 75.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;		No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	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	1.0'	3 4	Wet firm brown clayey silt w/ some fine sand, trace of coarse sand. 8" RECOVERY	A-4(6)	6" Asphalt
2.49		2	2.0'	7 7 7 6	Wet stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 10" RECOVERY	A-4(1)	
4.98		3	4.0'	7 6 7 7	Wet stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 18" RECOVERY	A-4(2)	
7.47		4	6.0'	7 8 7 9	Wet medium dense brown clayey coarse to fine sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
9.96		5	8.0'	4 5 9 9	Wet medium dense brown silty fine sand, trace of coarse sand and gravel. 20" RECOVERY	A-2-4(0)	
12.45		6	10.0'	9 11 9 10	Wet medium dense light brown silty fine sand, trace of coarse sand. 20" RECOVERY	A-2-4(0)	
		7	12.0'	6 6 7 9	Wet medium dense light brown silty fine sand w/ some gravel, trace of coarse sand. 17" RECOVERY	A-2-4(0)	
		8	14.0'	4 6 12 14	Wet medium dense reddish brown clayey fine to coarse sand, trace of gravel.	A-2-6(0)	

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-08-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		14" RECOVERY		
		9	16.0'	7 5 6 7	Wet medium dense reddish brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
17.43			18.0'		17" RECOVERY		
		10	18.0'	3 4 4 5	Wet loose reddish brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
19.92			20.0'		12" RECOVERY		
		U-1	20.0'		Saturated reddish brown clayey fine to coarse sand w/ some silt and gravel.	A-2-7(0)	Press Sample - Shelby Tube
			22.0'		19" RECOVERY		
22.41							
		11	24.0'	4 5 7 7	Wet medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
24.9			26.0'		14" RECOVERY		
27.39							
		12	29.0'	4 4 4 4	Wet loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
29.88			31.0'		18" RECOVERY		
32.37							
		13	34.0'	5 8 9 10	Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
34.86			36.0'		24" RECOVERY		
37.35							

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

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

Boring No.: BR1-08-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	7 8 12 12	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			41.0'		24" RECOVERY		
42.33							
44.82		15	44.0'	10 14 17 26	Saturated dense brown fine sand w/ some coarse sand and silt.	A-3	
			46.0'		24" RECOVERY		
47.31							
49.8		16	49.0'	5 9 10 13	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
			51.0'		24" RECOVERY		
52.29							
54.78		17	54.0'	16 18 22 26	Saturated dense brown fine sand w/ some coarse sand, trace of gravel.	A-3	
			56.0'		24" RECOVERY		
57.27							
59.76		18	59.0'	7 9 16 20	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			61.0'		24" RECOVERY		

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

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

Boring No.: BR1-08-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
62.25							
64.74		19	64.0'	9 11 16 14	Saturated medium dense brown fine sand, trace of coarse sand and silt.	A-3	
			66.0'		24" RECOVERY		
67.23							
69.72		20	69.0'	9 10 11 10	Saturated medium dense brown fine sand, trace of coarse sand, silt, and gravel.	A-3	
			71.0'		20" RECOVERY		
72.21							
74.7		21	73.0'	10 17 27 29	Saturated dense brown silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
			75.0'		24" RECOVERY		
					Boring terminated at 75.0 feet.		
77.19							
79.68							
82.17							
84.66							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/30/2008 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.
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.

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

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

Boring No.: BR1-08-04

Contract: 25-113-01

Boring Location: Sta. 629+05.87, 93' Rt. C.L.

Boring Surface Elev.: 76.00

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

Casing Size:	3 1/4	Inches	From Depth of:	0.0'	To:	46.0'
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings							
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water		
1/25/08		36.0'	34.0'	31.8'	44.2	76.0	76.0
					76.0	76.0	76.0

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:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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	0.0'	1 3 3 3	Wet firm orange clayey fine sandy silt w/ some coarse sand.	A-4(3)	5" Cultivated Soils
2.49		2	2.0' 2.0'	2 2 2 3	14" RECOVERY Wet soft brown silt w/ some fine sand, trace of coarse sand and gravel.	A-4(4)	
4.98		3	4.0' 4.0'	2 6 7 11	16" RECOVERY Wet stiff orange fine to coarse sandy clay, trace of gravel.	A-6(1)	
7.47		4	6.0' 6.0'	6 7 8 7	15" RECOVERY Wet medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
9.96		5	8.0' 8.0'	4 7 7 9	20" RECOVERY Wet medium dense orange silty fine to coarse sand.	A-2-4(0)	
12.45		6	10.0' 10.0'	5 7 8 10	19" RECOVERY Wet medium dense orange silty fine sand w/ some coarse sand.	A-2-4(0)	
		7	12.0' 12.0'	8 12 13 10	21" RECOVERY Wet medium dense orange fine to coarse sand and gravel w/ some silt.	A-2-4(0)	

Remarks: Mud Rotary @ 46.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-08-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	4 8 11 14	17" RECOVERY Wet medium dense green and brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
17.43		9	16.0' 16.0'	8 10 12 17	15" RECOVERY Wet medium dense red and orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	4 6 7 10	18" RECOVERY Wet medium dense red and orange silty coarse to fine sand w/ some gravel.	A-2-4(0)	
22.41			20.0'		16" RECOVERY		
24.9		11	24.0'	4 4 5 6	Wet loose brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
27.39		U-1	26.0' 26.0'		19" RECOVERY Saturated loose reddish orange fine to coarse sand w/ some silt.	A-2-7(0)	Press Sample - Shelby Tube
29.88		12	28.0' 28.0'	4 4 4 5	24" RECOVERY Wet loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
32.37			30.0'		24" RECOVERY		
34.86		13	34.0' 34.0'	4 6 7 9	Saturated medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
37.35			36.0'		24" RECOVERY		

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

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

Boring No.: BR1-08-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	8 10 15 18	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			41.0'		22" RECOVERY		
42.33							
44.82		15	44.0'	9 12 13 19	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			46.0'		18" RECOVERY		
47.31							
49.8		16	49.0'	11 12 13 15	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
			51.0'		18" RECOVERY		
52.29							
54.78		17	54.0'	13 14 15 19	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
			56.0'		20" RECOVERY		
57.27							
59.76		18	59.0'	9 10 12 14	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	

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

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

Boring No.: BR1-08-04






Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		16" RECOVERY		
62.25							
		19	64.0'	8 13 16 21	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
64.74			66.0'		16" RECOVERY		
67.23							
		20	69.0'	7 10 11 12	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
69.72			71.0'		17" RECOVERY		
72.21							
		21	74.0'	6 9 14 15	Saturated medium dense gray clayey fine sand, trace of coarse sand and gravel.	A-2-4(0)	
74.7			76.0'		24" RECOVERY		
					Boring terminated at 76.0 feet.		
77.19							
79.68							
82.17							

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KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Clayey sand
	Silty sand
	Poorly graded sand with silt
	Poorly graded clayey silty sand

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Notes:

1. Exploratory borings were drilled on 1/25/2008 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.
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.

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

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

Boring No.: BR1-08-05

Contract: 25-113-01

Boring Location: Sta. 629+74.82, 86' Lt. C.L.

Boring Surface Elev.: 76.79

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 46.0'	

Water Level Readings					
Date 1/25/08	Time	Depth of Hole 41.0'	Depth of Casing 39.0'	Depth of Water 33.7'	Elev. of Water
					43.1
					76.8
					76.8
					76.8

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

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	6 5 4 5	Wet stiff brown silt w/ some clay, trace of fine to coarse sand.	A-4(3)	6" Cultivated Soils
2.49		2	2.0'	5 8 10 8	16" RECOVERY Wet very stiff brown silt, trace of fine to coarse sand and clay.	A-4(6)	
4.98		3	4.0'	2 3 4 5	20" RECOVERY Wet firm brown silt w/ some clay, trace of fine to coarse sand and gravel.	A-4(3)	
7.47		4	6.0'	6 7 10	19" RECOVERY Wet stiff brown clay w/ some fine to coarse sand and gravel.	A-6(3)	
9.96		4A	7.5'	12	16" RECOVERY Wet medium dense orange silty coarse sand w/ some fine sand, trace of gravel.	A-1-b	
		5	8.0'	6 7 7 8	6" RECOVERY Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
12.45		6	10.0'	9 11 9 11	24" RECOVERY Wet medium dense orange silty fine sand, trace of coarse sand.	A-2-4(0)	
		7	12.0'	16 15	24" RECOVERY Wet hard orange fine sandy silt w/ some coarse sand and gravel.	A-4(0)	
		7A	13.0'	14 16	12" RECOVERY Wet medium dense brown gravel and fine sand w/ some silt and coarse sand.	A-1-b	

Remarks: Mud Rotary @ 46.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-08-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.94		8	14.0' 14.0'	6 12 23 10	12" RECOVERY Wet dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
17.43		9	16.0' 16.0'	14 17 21 19	18" RECOVERY Wet dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
19.92		10	18.0' 18.0'	9 8	22" RECOVERY Wet medium dense brown coarse to fine sand w/ some gravel and silt.	A-1-b	
19.92		10A	19.0' 19.0'	5 11	12" RECOVERY Wet medium dense brown gray silty coarse to fine sand, trace of gravel.	A-2-4(0)	
22.41		U-1	20.0' 20.0'		3" RECOVERY Saturated medium dense brown clayey fine to coarse sand w/ some silt, trace of gravel.	A-2-7(2)	Press Sample - Shelby Tube
24.9		11	24.0' 25.0'	8 6	24" RECOVERY Wet medium dense brown and light brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
27.39		11A	25.0' 26.0'	8 9	11" RECOVERY Wet medium dense light brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
29.88		12	29.0' 29.0'	5 6 5 9	11" RECOVERY Wet medium dense light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
32.37			31.0'		17" RECOVERY		
34.86		13	34.0' 34.0'	6 10 12 15	Wet medium dense light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
37.35			36.0'		24" RECOVERY		

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

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

Boring No.: BR1-08-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
39.84		14	39.0'	7 14 20 21	Saturated dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			41.0'		24" RECOVERY		
42.33							
44.82		15	44.0'	8 16 17 22	Saturated dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			46.0'		24" RECOVERY		
47.31							
49.8		16	49.0'	4 10 27 50/5"	Saturated dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			51.0'		22" RECOVERY		
52.29							
54.78		17	54.0'	18 19 18 21	Saturated dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
			56.0'		19" RECOVERY		
57.27							
59.76		18	59.0'	17 17 20 20	Saturated dense brown silty fine sand w/ some coarse sand.	A-2-4(0)	

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

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

Boring No.: BR1-08-05


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			61.0'		19" RECOVERY		
62.25							
		19	64.0'	15 14 15 18	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
64.74			66.0'		23" RECOVERY		
67.23							
		20	69.0'	11 12 15 20	Saturated medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
69.72			71.0'		24" RECOVERY		
72.21							
		21	74.0'	9 20 26 37	Saturated hard brown fine sandy silt, trace of coarse sand and clay.	A-4(0)	
74.7			76.0'		24" RECOVERY		
					Boring terminated at 76.0 feet.		
77.19							
79.68							
82.17							


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KEY TO SYMBOLS


Symbol Description


Strata symbols


 Silty low plasticity clay

 Low plasticity clay

 Silt

 Silty sand

 Poorly graded sand with silt

 Poorly graded clayey silty sand

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Notes:

1. Exploratory borings were drilled on 1/25/2008 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.
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.

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

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

Boring No.: BR1-4-9

Contract: 25-113-01

Boring Location: Sta. 830+12, 90' Lt. C.L.

Boring Surface Elev.: +27.4

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:	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.

Casing Size:	3 1/4	Inches	From Depth of:	0.0	To:	
	Hollow Stem Auger:		From Depth of:		To:	38.0

Water Level Readings						
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water	
9/25/2009		6.0	4.0	4.0		

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	100	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	9/25/09	1	0.0'	1 1 1 1	Moist soft gray silt w/some clay, trace of organic matter and fine to coarse sand.	A-4(4)	Forrest Duff - 3"
			2.0'		13" RECOVERY		
		2	2.0'	1 2 2 4	Wet soft gray silt w/trace of coarse to fine sand and gravel.	A-4(0)	
3.5			4.0'		16" RECOVERY		
		3	4.0'	1 7 18 13	Wet medium dense grayish orange gravel and coarse sand w/some fine sand and silt.	A-1-b	
			6.0'		14" RECOVERY		
		4	6.0'	5 7 9 9	Wet medium dense tan coarse sand w/some fine sand, trace of gravel and silt.	A-1-b	
7			8.0'		24" RECOVERY		
		5	8.0'	1 1 2 5	Wet very loose brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			10.0'		12" RECOVERY		
		6	10.0'	5 5 7 9	Wet medium dense orange fine to coarse sand w/some silt, trace of tgravel.	A-2-4(0)	
10.5			12.0'		16" RECOVERY		
		7	12.0'	4 8 10 15	Wet medium dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
		8	14.0'	7 13 14 16	Wet medium dense orange fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
			16.0'		16" RECOVERY		
		9	16.0'	7 9 9 16	Wet medium dense orange fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	Cemented Sands
17.5			18.0'		14" RECOVERY		
		10	18.0'	6 9 10 10	Wet medium dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	Cemented Sands

Remarks: Mud Rotary @ 38.0 feet

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-4-9

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21			20.0'		16" RECOVERY		
24.5		11	23.0'	8 10 21 25	Wet dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	Cemented Sands
28			25.0'		18" RECOVERY		
31.5		12	28.0'	9 16 15 21	Wet dense orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	Cemented Sands
35			30.0'		18" RECOVERY		
38.5	9/28/09	13	33.0'	9 15 19 20	Wet dense orange fine sand w/some coarse sand, trace of silt and gravel.	A-3	Cemented Sands
42			35.0'		18" RECOVERY		
45.5		14	38.0'	6 11 13 13	wet medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	Mud Rotary @ 38.0'.
49			40.0'		17" RECOVERY		
52.5		15	43.0'	8 7 10 12	Wet medium dense brown fine sand w/some coarse sand, trace of silt and gravel.	A-3	
			45.0'		20" RECOVERY		
		16	48.0'	10 20 18 23	Wet dense green silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Glauconit
			50.0'		21" RECOVERY		

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

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

Boring No.: BR1-4-9

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		17	53.0'	5 7 8 11	Wet medium dense gray clayey fine sand w/trace of coarse sand and gravel.	A-2-4(0)	Glaucinit
			55.0'		22" RECOVERY		
56							
		18	58.0'	9 11 20 23	Wet dense gray clayey fine sand w/trace of coarse sand and gravel.	A-2-4(0)	Glaucinit
			60.0'		23" RECOVERY		
59.5							
		19	63.0'	4 7 9 11	Wet medium dense green clayey fine sand w/trace of coarse sand and gravel.	A-2-6(0)	Glaucinit
			65.0'		23" RECOVERY		
63							
		20	68.0'	8 9 15 17	wet medium dense gray fine sand w/some clay, trace of coarse sand.	A-2-4(0)	Glaucinit
			70.0'		23" RECOVERY		
70							
		21	73.0'	5 8 11 17	Wet medium dense gray silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	
			75.0'		23" RECOVERY		
73.5							
		22	78.0'	4 8 9 11	Wet medium dense gray clayey fine sand w/some gravel, trace of coarse sand.	A-2-4(0)	
			80.0'		22" RECOVERY		
80.5							
		23	83.0'	9 11 17 32	Wet medium dense green clayey fine sand w/trace of organic matter, gravel and coarse sand.	A-2-4(0)	Glaucinit
			85.0'		23" RECOVERY		
84							

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

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

Boring No.: BR1-4-9

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
87.5							
		24	88.0'	9 17 50/5"	Wet very dense green silty fine sand w/trace of organic matter, coarse sand and gravel. 15" RECOVERY	A-2-4(0)	Glauconit
			90.0'				
91							
		25	93.0'	18 22 27 32	Wet dense green clayey fine sand w/trace of organic matter, gravel and coarse sand. 23" RECOVERY	A-2-4(0)	Glauconit
94.5			95.0'				
98		26	98.0'	19 22 23 33	Wet dense green clayey fine sand w/trace of organic matter, gravel and coarse sand. 22" RECOVERY	A-2-4(0)	
			100.0'		End of Boring		
101.5							
105							
108.5							
112							
115.5							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded sand



Poorly graded sand
with silt



Poorly graded clayey
silty sand



Clayey sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/25/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: BR1-4-10

Contract: 25-113-01

Boring Location: Sta. 830+22, 90' Lt. C.L.

Boring Surface Elev.: 26.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 16.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/23/2009		6.0	4.0	4.0	22.0 26.0 26.0 26.0

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/09	1	0.5'	3 2 3	Moist firm brownish gray silt w/some clay and coarse to fine sand, trace of gravel. 14" RECOVERY	A-4(1)	Cultivated Soil - 8"
		2	2.0'	3 4 7 7	Moist stiff brownish gray coarse sandy silt w/some fine sand, trace of gravel. 15" RECOVERY	A-4(0)	
3.5		3	4.0'	3 10 10 10	Wet medium dense orangish gray mottled fine to coarse sand w/some silt, trace of gravel. 12" RECOVERY	A-2-4(0)	
		4	6.0'	6 10 6 6	Wet medium dense brownish orange coarse to fine sand w/some silt, trace of gravel. 24" RECOVERY	A-2-4(0)	
7		5	8.0'	4 6 6 2	Wet medium dense tan coarse to fine sand w/trace of silt and gravel. 6" RECOVERY	A-1-b	
		6	10.0'	3 3 4 6	Wet loose tan coarse to fine sand w/trace of silt and gravel. 20" RECOVERY	A-1-b	
10.5		7	12.0'	3 6 6 8	Wet medium dense orange coarse to fine sand w/trace of silt and gravel. 17" RECOVERY	A-1-b	
14		8	14.0'	1 1 4 6	Wet loose orange fine to coarse sand w/some silt, trace of gravel. 17" RECOVERY	A-2-4(0)	
		9	16.0'	5 5 7 7	Wet medium dense orange fine sand w/some coarse sand and silt, trace of gravel. 18" RECOVERY	A-2-4(0)	Mud Rotary @ 16.0.
17.5		10	18.0'	7 8 7 9	Wet medium dense orange fine sand w/some coarse sand and silt, trace of gravel. 14" RECOVERY	A-2-4(0)	
			20.0'				

Remarks: Mud Rotary @ 16.0 feet

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-4-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21							
24.5		11	23.0'	6 8 17 15	Wet medium dense orange fine sand w/some coarse sand and silt.	A-2-4(0)	
			25.0'		20" RECOVERY		
28		12	28.0'	9 10 15 11	Wet medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
			30.0'		17" RECOVERY		
31.5							
35		13	33.0'	9 15 17 21	Wet dense orange fine sand w/some coarse sand, trace of silt.	A-3	
			35.0'		21" RECOVERY		
38.5		14	38.0'	7 17 17 20	Wet dense tan and orange fine sand w/some silt and coarse sand.	A-2-4(0)	
			40.0'		20" RECOVERY		
42							
45.5		15	43.0'	12 19 26 26	Wet dense gray silty fine sand w/trace of coarse sand.	A-2-4(0)	
			45.0'		12" RECOVERY		
49		16	48.0'	10 20 20 23	Wet dense gray fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
			50.0'		24" RECOVERY		
52.5							

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

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

Boring No.: BR1-4-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks																																																																																													
	9/24/09	17	53.0'	8 18 21 18	Wet dense gray silty fine sand w/some coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)																																																																																														
56			55.0'							18	58.0'	14 12 12 12	Wet very stiff gray clayey fine sandy silt w/some coarse sand, trace of gravel. 24" RECOVERY	A-4(0)		59.5	60.0'				19	63.0'	8 24 31 50	Wet hard gray fine sandy silt w/some clay, trace of coarse sand. 24" RECOVERY	A-4(0)		63	65.0'				20	68.0'	8 23 30 49	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)		66.5	70.0'				21	73.0'	6 8 12 13	Wet very stiff gray fine sandy silt w/some clay, trace of coarse sand and gravel. 21" RECOVERY	A-4(0)		70	75.0'				22	78.0'	4 11 24 20	Wet dense gray silty fine sand w/trace of coarse sand and gravel. 19" RECOVERY	A-2-4(0)		73.5	80.0'				23	83.0'	10 11 19 19	Wet very stiff gray clayey fine sandy silt w/trace of coarse sand. 24" RECOVERY	A-4(1)		77	85.0'										80.5																84		
		18	58.0'	14 12 12 12	Wet very stiff gray clayey fine sandy silt w/some coarse sand, trace of gravel. 24" RECOVERY	A-4(0)																																																																																														
59.5			60.0'							19	63.0'	8 24 31 50	Wet hard gray fine sandy silt w/some clay, trace of coarse sand. 24" RECOVERY	A-4(0)		63	65.0'				20	68.0'	8 23 30 49	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)		66.5	70.0'				21	73.0'	6 8 12 13	Wet very stiff gray fine sandy silt w/some clay, trace of coarse sand and gravel. 21" RECOVERY	A-4(0)		70	75.0'				22	78.0'	4 11 24 20	Wet dense gray silty fine sand w/trace of coarse sand and gravel. 19" RECOVERY	A-2-4(0)		73.5	80.0'				23	83.0'	10 11 19 19	Wet very stiff gray clayey fine sandy silt w/trace of coarse sand. 24" RECOVERY	A-4(1)		77	85.0'										80.5																84													
		19	63.0'	8 24 31 50	Wet hard gray fine sandy silt w/some clay, trace of coarse sand. 24" RECOVERY	A-4(0)																																																																																														
63			65.0'							20	68.0'	8 23 30 49	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)		66.5	70.0'				21	73.0'	6 8 12 13	Wet very stiff gray fine sandy silt w/some clay, trace of coarse sand and gravel. 21" RECOVERY	A-4(0)		70	75.0'				22	78.0'	4 11 24 20	Wet dense gray silty fine sand w/trace of coarse sand and gravel. 19" RECOVERY	A-2-4(0)		73.5	80.0'				23	83.0'	10 11 19 19	Wet very stiff gray clayey fine sandy silt w/trace of coarse sand. 24" RECOVERY	A-4(1)		77	85.0'										80.5																84																								
		20	68.0'	8 23 30 49	Wet very dense gray silty fine sand w/some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)																																																																																														
66.5			70.0'							21	73.0'	6 8 12 13	Wet very stiff gray fine sandy silt w/some clay, trace of coarse sand and gravel. 21" RECOVERY	A-4(0)		70	75.0'				22	78.0'	4 11 24 20	Wet dense gray silty fine sand w/trace of coarse sand and gravel. 19" RECOVERY	A-2-4(0)		73.5	80.0'				23	83.0'	10 11 19 19	Wet very stiff gray clayey fine sandy silt w/trace of coarse sand. 24" RECOVERY	A-4(1)		77	85.0'										80.5																84																																			
		21	73.0'	6 8 12 13	Wet very stiff gray fine sandy silt w/some clay, trace of coarse sand and gravel. 21" RECOVERY	A-4(0)																																																																																														
70			75.0'							22	78.0'	4 11 24 20	Wet dense gray silty fine sand w/trace of coarse sand and gravel. 19" RECOVERY	A-2-4(0)		73.5	80.0'				23	83.0'	10 11 19 19	Wet very stiff gray clayey fine sandy silt w/trace of coarse sand. 24" RECOVERY	A-4(1)		77	85.0'										80.5																84																																														
		22	78.0'	4 11 24 20	Wet dense gray silty fine sand w/trace of coarse sand and gravel. 19" RECOVERY	A-2-4(0)																																																																																														
73.5			80.0'							23	83.0'	10 11 19 19	Wet very stiff gray clayey fine sandy silt w/trace of coarse sand. 24" RECOVERY	A-4(1)		77	85.0'										80.5																84																																																									
		23	83.0'	10 11 19 19	Wet very stiff gray clayey fine sandy silt w/trace of coarse sand. 24" RECOVERY	A-4(1)																																																																																														
77			85.0'													80.5																84																																																																				
80.5																																																																																																				
84																																																																																																				

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

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

Boring No.: BR1-4-10

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
87.5							
		24	88.0'	8 12 19 28	Wet dense gray fine sandy silt w/some clay, trace of gravel and coarse sand. 24" RECOVERY	A-4(0)	
			90.0'				
91							
		25	93.0'	12 21 39 50/4"	Wet very dense green silty fine sand w/trace of organic matter, coarse sand and gravel. 15" RECOVERY	A-2-4(0)	Glauconit & Sea Shells
94.5			95.0'				
98		26	98.0'	8 9 19 38	Wet very stiff green fine sandy silt w/some organic matter and clay, trace of coarse sand and gravel. 21" RECOVERY	A-4(0)	Glauconit & sea Shells
			100.0'		End of Boring		
101.5							
105							
108.5							
112							
115.5							
119							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt



Poorly graded clayey
silty sand



Clayey sand

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Notes:

1. Exploratory borings were drilled on 9/23/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: BR1-5-06

Contract: 25-113-01

Boring Location: Sta. 815+84.53 8 LT C.L.

Boring Surface Elev.: + 57.87

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0
To:
To: 28

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/22/2010		30.0	28.0	28.3	

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: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/22/10	1	0.5'	2 4 5	Wet firm brown clayey silt w/some coarse to fine sand and fine gravel.	A-4(3)	Topsoil - 4".
			2.0'		12" RECOVERY		
3.5		2	2.0'	5 7 9 6	Wet very stiff brown clayey coarse sandy fine gravelly silt w/some fine sand.	A-4(0)	
			4.0'		12" RECOVERY		
		3	4.0'	3 4 4 4	Wet loose brown clayey coarse sandy fine gravel w/some fine sand and silt.	A-2-4(0)	
			6.0'		6" RECOVERY		
7		4	6.0'	4 3 3 3	Wet firm brown clayey coarse sandy silt w/some fine sand and fine gravel.	A-4(1)	
			8.0'		4" RECOVERY		
		5	8.0'	3 3 3 3	Wet loose brown clayey coarse sandy fine gravel w/some fine sand, trace of silt.	A-2-4(0)	
10.5			10.0'		8" RECOVERY		
14		6	13.0'	2 2 4 4	Wet loose brown clayey coarse sandy silt w/some fine sand and fine gravel.	A-4(1)	
			15.0'		14" RECOVERY		
17.5							
		7	18.0'	3 3 3 3	Wet loose brown clayey coarse sandy fine gravel w/some fine sand, trace of silt.	A-2-4(0)	
			20.0'		16" RECOVERY		

Remarks: Mud Rotary at 28.0

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-5-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21					No Sample Recovery 0" RECOVERY		Gravel blocking spoon.
24.5		8	23.0'	50/2"			
			25.0'				
28					Wet loose tan fine to coarse sand w/trace of silt and fine gravel. 20" RECOVERY	A-3	Mud Rotary @ 28.0'.
31.5		9	28.0'	3 3 5 6			
			30.0'				
35					Wet medium dense tan fine to coarse sand w/trace of silt and fine gravel. 15" RECOVERY	A-3	
		10	33.0'	6 6 6 6			
			35.0'				
38.5					Wet medium dense orange fine sand w/some silt and coarse sand. 20" RECOVERY	A-2-4(0)	
		11	38.0'	3 4 5 5			
			40.0'				
42					Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel. 16" RECOVERY	A-2-4(0)	
	2/24/10	12	43.0'	5 5 6 8			
			45.0'				
45.5					Wet medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel. 22" RECOVERY	A-2-4(0)	
		13	48.0'	7 8 8 10			
			50.0'				
49							
52.5							

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

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

Boring No.: BR1-5-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	53.0'	11 12 13 18	Wet medium dense brown fine sand w/some coarse sand, trace of silt and fine gravel.	A-3	
			55.0'		21" RECOVERY		
56							
		15	58.0'	11 13 21 27	Wet dense brown fine sand w/some coarse sand, trace of silt and fine gravel.	A-3	
			60.0'		19" RECOVERY		
59.5							
		16	63.0'	8 9 12 15	Wet medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
			65.0'		22" RECOVERY		
63							
		17	68.0'	9 11 14	Wet medium dense brown fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
			70.0'		20" RECOVERY		
66.5							
		18	73.0'	13 17 27 34	Wet dense brown fine sand w/some silt and coarse sand, trace of fine gravel.	A-2-4(0)	
			75.0'		18" RECOVERY		
70							
		19	78.0'	14 18 24 26	Wet dense gray silty fine sand w/trace of coarse sand and fine gravel.	A-2-4(0)	
			80.0'		24" RECOVERY		
73.5							
77							
80.5					End of Boring		
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Poorly graded sand
with silt



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/22/2010 using a 3 1/4 inch continues flight power auger. Rig is a Track 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 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.: BR1-5-07

Contract: 25-113-01

Boring Location: Sta. 817+52.70 RT C.L.

Boring Surface Elev.: + 58.95

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 28.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/2/2010		30.0	28.0	27.6	

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: Gary Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/2/10	1	0.0'		No Sampling		Asphalt - 4". Stone - 8"
			2.0'		0" RECOVERY		
3.5		2	2.0'	5 6 10 12	Wet very stiff orange clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(1)	
			4.0'		16" RECOVERY		
		3	4.0'	7 12 7 9	Wet medium dense brown clayey fine gravelly fine to coarse sand.	A-2-4(0)	
			6.0'		17" RECOVERY		
7		4	6.0'	12 15 14 14	Wet medium dense brown coarse sandy fine gravel w/some fine sand and silt.	A-1-b	
			8.0'		18" RECOVERY		
		5	8.0'	5 6 6 6	No Sieve Analysis - Indication of wet medium dense brown silty sand.		
			10.0'		1" RECOVERY		
10.5							
14		6	13.0'	2 3 6 8	Wet stiff tan silty clay w/some fine sand.	A-6(9)	
			15.0'		18" RECOVERY		
17.5							
		7	18.0'	17 19 17 19	Wet dense tan coarse sandy fine gravel w/trace of fine sand.	A-1-a	

Remarks: Switch to Mud Rotary @ 28.0 feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-5-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21			20.0'		14" RECOVERY		
24.5		8	23.0'	11 14 17 18	Wet dense tan fine gravelly coarse sand w/trace of fine sand.	A-1-b	
28			25.0'		15" RECOVERY		
31.5		9	28.0'	5 7 9 7	No Sieve Analysis - Indication of wet medium dense brown coarse sandy fine gravel.		
35			30.0'		11" RECOVERY		
35	3/4/10	10	33.0'	20	Wet medium dense tan fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
38.5			35.0'		17" RECOVERY		
42		11	38.0'	6 4 7 8	Wet medium dense tan fine to coarse sand w/trace of silt.	A-3	
45.5			40.0'		16" RECOVERY		
49		12	43.0'	11 11 18 20	Wet medium dense brown fine sand w/some coarse sand, trace of silt and fine gravel.	A-3	
52.5			45.0'		19" RECOVERY		
		13	48.0'	11 20 24 20	Wet dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
			50.0'		22" RECOVERY		

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

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

Boring No.: BR1-5-07

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		14	53.0'	13 15 18 19	Wet dense brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
			55.0'		18" RECOVERY		
56							
		15	58.0'	12 17 18 18	Wet dense brown fine sand w/some coarse sand, trace of silt.	A-3	
			60.0'		21" RECOVERY		
59.5							
63							
		16	63.0'	10 14 30 36	Wet dense brown fine sand w/some coarse sand and silt.	A-2-4(0)	
			65.0'		18" RECOVERY		
66.5							
		17	68.0'	18 18	Wet dense tan silty fine sand w/trace of coarse sand.	A-2-4(0)	
			69.0'		12" RECOVERY		
		17A	69.0'	25 26	Wet very dense gray silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
70			70.0'		8" RECOVERY		
73.5		18	73.0'	13 17 26 29	Wet dense gray fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
			75.0'		18" RECOVERY		
77							
		19	78.0'	13 16 26 27	Wet dense gray fine sand w/some silt and coarse sand, trace of organic matter.	A-2-4(0)	
			80.0'		23" RECOVERY		
80.5					End of Boring		
84							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Low plasticity
clay



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/2/2010 using a 3 1/4 inch diameter continuous flight power auger. Rig is a ATV mounted CME 55.
2. Groundwater levels recorded at the time of drillign 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
Contract: 25-113-01

Boring No.: BR1-7-12

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18		7	18.0'	5 6 12 15	Saturated medium dense brown fine sand w/some coarse sand, trace of silt. 21" RECOVERY	A-3	
			20.0'				
21							
24		8	23.0'	5 6 9 12	Saturated medium dense brownish orange fine sand w/some coarse sand and silt. 20" RECOVERY	A-2-4(0)	
			25.0'				
27							
30		9	28.0'	7 7 9 10	Saturated medium dense brownish orange fine sand w/some coarse sand, trace of silt. 20" RECOVERY	A-3	
			30.0'				
33							
36		10	33.0'	7 9 11 10	Saturated medium dense brown fine sand w/some silt, trace of coarse sand. 19" RECOVERY	A-2-4(0)	
			35.0'				
39		11	38.0'	5 7 8 8	Saturated medium dense brownish orange fine sand w/some silt, trace of coarse sand. 19" RECOVERY	A-2-4(0)	
			40.0'				
42							
45		12	43.0'	4 5 7 7	Saturated medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel. 20" RECOVERY	A-3	
			45.0'				

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

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

Boring No.: BR1-7-12

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48							
		13	48.0'	4 6 6 8	Saturated medium dense gray clayey fine sand w/some silt, trace of fine gravel and coarse sand.	A-2-4(0)	
			50.0'		22" RECOVERY		
51							
	2/24/10	14	53.0'	6 11 19 23	Saturated medium dense gray silty fine sand w/some clay, trace of coarse sand and fine gravel.	A-2-4(0)	
54			55.0'		22" RECOVERY		
57							
		15	58.0'	5 7 11 23	Saturated medium dense gray silty fine sand w/some coarse sand, trace of organic matter.	A-2-4(0)	
60			60.0'		22" RECOVERY		
63							
		16	63.0'	6 6 10 11	Saturated medium dense gray clayey fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			65.0'		23" RECOVERY		
66							
		17	68.0'	5 7 10 17	Saturated medium dense gray silty fine sand w/some clay, trace of coarse sand, fine gravel and organic matter.	A-2-4(0)	
69			70.0'		23" RECOVERY		
72							
		18	73.0'	10 15 23	Saturated hard gray fine sandy silt w/some clay, trace of coarse sand, fine gravel and organic matter.	A-4(0)	

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

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

Boring No.: BR1-7-12

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75			75.0'	50/4"	22" RECOVERY		
78		19	78.0'	10 19 23 31	Saturated hard gray clayey fine sandy silt w/trace of organic matter.	A-4(1)	
81			80.0'		23" RECOVERY		
84		20	83.0'	11 14 19 22	Saturated dense green clayey fine sand w/some silt, trace of coarse sand, organic matter and shell fragments.	A-2-4(0)	
87			85.0'		23" RECOVERY		
90		21	88.0'	23 33 50/5"	Saturated very dense green silty fine sand w/trace of coarse sand, fine gravel, organic matter and shell fragments.	A-2-4(0)	
93			90.0'		21" RECOVERY		
96		22	93.0'	7 10 13 20	Saturated medium dense green clayey fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
99			95.0'		22" RECOVERY		
102		23	98.0'	7 12 14 20	Saturated very stiff gray silty clay w/some organic matter, trace of fine sand and shell fragments.	A-7-6(33)	
			100.0'		23" RECOVERY		
					End of Boring		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Clayey sand



Poorly graded sand
with silt



Silty sand



High plasticity
clay

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/22/2010 using a 3 1/4 inch diameter continuous flight power auger. Rig is a Track mounted CME 55.
2. Groundwater levels recorded at the time of drillign 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.: BR1-7-13

Contract: 25-113-01

Boring Location: Sta. 805+75.8 66 RT C.L.

Boring Surface Elev.: + 32.49

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 23.0

Water Level Readings

Date
3/5/2010

Time

Depth of Hole
10.0

Depth of Casing
8.0

Depth of Water
4.0

Elev. of Water

Pay 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.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
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
	3/5/10	1	0.5'	7 7 6	Wet stiff brown silty clay w/trace of fine to coarse sand and fine gravel. 17" RECOVERY	A-6(13)	Topsoil - 6".
3		2	2.0'	3 7 12	Wet stiff brown clayey silt w/some fine sand, trace of coarse sand and fine gravel. 22" RECOVERY	A-4(7)	
		3	4.0'	4 10 7 7	Saturated medium dense brown silty fine sandy fine gravel w/some coarse sand and clay. 16" RECOVERY	A-2-4(0)	
6		4	6.0'	13 17 15 15	Saturated dense brown coarse to fine sandy fine gravel w/some silt. 23" RECOVERY	A-1-b	
		5	8.0'	5 13 14 18	Saturated medium dense brown fine gravelly coarse to fine sand w/trace of silt. 18" RECOVERY	A-1-b	
9			10.0'				
		6	13.0'	5 8 11 13	Saturated medium dense orangish brown fine sand w/some coarse sand and silt, trace of fine gravel. 22" RECOVERY	A-2-4(0)	
12			15.0'				
15							

Remarks: Switch to Mud Rotary @ 23.0 feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-7-13

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18		7	18.0'	7 11 11 13	Saturated medium dense orangish brown fine sand w/some coarse sand, trace of silt and fine gravel.	A-3	
			20.0'		21" RECOVERY		
21							
24		8	23.0'	13 17 17 19	Saturated dense orangish brown fine sand w/some coarse sand, trace of silt.	A-3	Mud Rotary @ 23.0'.
			25.0'		23" RECOVERY		
27							
30		9	28.0'	10 11 13 17	Saturated dense brown fine sand w/some coarse sand, trace of silt.	A-3	
			30.0'		23" RECOVERY		
33							
36		10	33.0'	6 7 10 15	Saturated medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
			35.0'		23" RECOVERY		
39		11	38.0'	6 8 10 12	Saturated medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
			40.0'		22" RECOVERY		
42							
45		12	43.0'	8 11 12 17	Saturated medium dense brown fine sand w/some coarse sand, trace of silt and fine gravel.	A-3	
			45.0'		22" RECOVERY		

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

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

Boring No.: BR1-7-13

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48							
		13	48.0'	8 13 14 33	Saturated medium dense gray clayey fine sand w/trace of silt, coarse sand and fine gravel.	A-2-4(0)	
			50.0'		23" RECOVERY		
51							
		14	53.0'	10 17 24 49	Saturated dense gray clayey fine sand w/trace of silt, coarse sand, fine gravel and organic matter.	A-2-4(0)	
			55.0'		23" RECOVERY		
57							
		15	58.0'	10 15 24 50/5"	Saturated dense gray clayey fine sand w/trace of silt, coarse sand, fine gravel and organic matter.	A-2-4(0)	
			60.0'		23" RECOVERY		
63							
	3/8/10	16	63.0'	6 7 11 20	Saturated medium dense gray silty fine sand w/trace of coarse sand, fine gravel and organic matter.	A-2-4(0)	
			65.0'		22" RECOVERY		
66							
		17	68.0'	8 10 13 41	Saturated very stiff gray clayey fine sandy silt w/trace of coarse sand, fine gravel and organic matter.	A-4(0)	
			70.0'		23" RECOVERY		
72							
		18	73.0'	10 13 20	Saturated dense gray silty fine sand w/trace of coarse sand, fine gravel and organic matter.	A-2-4(0)	

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

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

Boring No.: BR1-7-13

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
75			75.0'	24	22" RECOVERY		
78		19	78.0'	13 20 21 50/3"	Saturated dense gray silty fine sand w/trace of coarse sand, fine gravel and organic matter.	A-4(0)	
81			80.0'		23" RECOVERY		
84		20	83.0'	4 15 17 27	Saturated dense gray clayey fine sand w/trace of silt, fine gravel, coarse sand and organic matter.	A-2-4(0)	
87			85.0'		23" RECOVERY		
90		21	88.0'	15 21 33 50/4"	Saturated very dense gray silty fine sand w/trace of coarse sand, fine gravel and organic matter.	A-2-4(0)	
93			90.0'		22" RECOVERY		
96		22	93.0'	8 12 15 22	Saturated medium dense gray silty fine sand w/trace of fine gravel, organic matter and coarse sand.	A-2-4(0)	
99			95.0'		23" RECOVERY		
102		23	98.0'	10 11 15 26	Saturated very stiff gray silty clay w/some organic matter, trace of fine sand.	A-7-6(23)	
			100.0'		22" RECOVERY		
					End of Boring		

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on 3/5/2010 using a 3 1/4 inch diameter continues flight power auger. Rig is a Track mounted CME 55.
2. Groundwater levels recorded at the time of drillign 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.: BR1-7-14

Contract: 25-113-01

Boring Location: Sta. 806+60.96 18 RT C.L.

Boring Surface Elev.: + 32.1

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 10.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/1/2010	Time	10.0	8.0	4.0	

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	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
3	3/1/10	1	1.5'	6	Moist firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 6" RECOVERY	A-4(2)	Topsoil - 18".
		2	2.0'	10		A-1-b	
6	3/1/10	3	4.0'	3	Moist dense brown coarse sandy fine gravel w/some fine sand and silt. 12" RECOVERY	A-1-b	
		4	4.0'	4			
9	3/1/10	4	6.0'	8	Saturated medium dense brown fine gravelly coarse sand w/trace of fine sand and silt. 11" RECOVERY	A-1-b	
		5	8.0'	7			
15	3/1/10	5	10.0'	8	Saturated medium dense orange fine sand w/some coarse sand and silt. 24" RECOVERY	A-1-b	Mud Rotary @ 10.0'.
		6	13.0'	9			
18				6			

Remarks: Switch to Mud Rotary @ 10.0 feet.

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR1-7-14

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
21		7	18.0'	7 11 14	Saturated medium dense orange fine sand w/some coarse sand and silt. 21" RECOVERY	A-2-4(0)	
			20.0'				
24		8	23.0'	6 7 10 11	Saturated medium dense brown fine sand w/some coarse sand and silt. 24" RECOVERY	A-2-4(0)	
			25.0'				
27		9	28.0'	6 7 8 10	Saturated medium dense brown fine sand w/some coarse sand, trace of silt. 22" RECOVERY	A-3	
			30.0'				
33		10	33.0'	5 7 8	Saturated medium dense brown fine sand w/some coarse sand, trace of silt. 22" RECOVERY	A-3	
			35.0'				
36		11	38.0'	4 5 6 7	Saturated medium dense brown fine sand w/some coarse sand and silt. 24" RECOVERY	A-2-4(0)	
			40.0'				
39		12	43.0'	4 5 6 6	Saturated medium dense brown fine sand w/some fine gravel and coarse sand, trace of silt. 24" RECOVERY	A-3	
			45.0'				
42							
45							

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

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

Boring No.: BR1-7-14

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48							
		13	48.0'	5 7 10 13	Saturated medium dense gray clayey fine sand w/some coarse sand and silt, trace of organic matter.	A-2-4(0)	
			50.0'		24" RECOVERY		
51							
		14	53.0'	7 10 13 14	Saturated medium dense gray clayey fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
54			55.0'		24" RECOVERY		
57							
		15	58.0'	5 7 9 10	Saturated medium dense gray clayey fine sand w/some silt, trace of coarse sand and organic matter.	A-2-4(0)	
60			60.0'		24" RECOVERY		
63							
		16	63.0'	5 11 20 22	Saturated dense gray clayey fine sand w/some silt, trace of coarse sand, fine gravel and organic matter.	A-2-4(0)	
			65.0'		12" RECOVERY		
66							
		17	68.0'	7 9 11 12	Saturated medium dense gray silty fine sand w/some clay, trace of coarse sand and organic matter.	A-2-4(0)	
69			70.0'		24" RECOVERY		
72							
	3/2/10	18	73.0'	12 12 16 17	Saturated medium dense gray clayey fine sand w/some silt, trace of coarse sand and organic matter.	A-4(0)	

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

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

Boring No.: BR1-7-14



Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			75.0'		12" RECOVERY		
78		19	78.0'	7 11 14 17	Saturated very stiff gray fine sandy clay w/some silt, trace of organic matter and coarse sand.	A-6(2)	
			80.0'		24" RECOVERY		
81							
		20	83.0'	20 22 18 22	Saturated dense dark gray silty fine sand w/trace of coarse sand, fine gravel and organic matter.	A-2-4(0)	
84			85.0'		17" RECOVERY		
87							
		21	88.0'	16 20 26 30	Saturated dense dark gray silty fine sand w/trace of coarse sand and organic matter.	A-2-4(0)	
90			90.0'		24" RECOVERY		
93		22	93.0'	12 9 13 17	Saturated very stiff dark gray silty fine sandy clay w/trace of organic matter and coarse sand.	A-6(12)	Hole had caving issues could not get farther than 95.0'.
			95.0'		18" RECOVERY		
96					End of Boring		
99							
102							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silty sand
	Poorly graded clayey silty sand
	Poorly graded sand
	Well graded sand
	Poorly graded sand with silt
	Clayey sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/1/2010 using a 3 1/4 inch diameter continuous flight power auger. Rig is a Track mounted CME 55.
2. Groundwater levels recorded at the time of drillign 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.: IT1-21

Contract: 28-113-01

Boring Location: Sta. 568+00, 93.00' Rt. C.L.

Boring Surface Elev.: + 66.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 7/10/2009
Time

Depth of Hole 12.0
Depth of Casing 10.0
Depth of Water 9.7
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
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
3	7/10/09	1	0.5'	8 9 10	Moist very stiff gray clay w/some fine to coarse sand, trace of gravel. 17" RECOVERY	A-6(8)	Cultivated Soil - 6"
		2	2.0'	18 13 16 18	Moist very stiff gray clay w/trace of fine to coarse sand and gravel. 19" RECOVERY	A-6(11)	
6		3	4.0'	7 12 15 10	Moist very stiff grayish orange mottled fine sandy silt w/some clay, trace of coarse sand and gravel. 18" RECOVERY	A-4(0)	USDA Classifica - Sandy Loam.
		4	6.0'	9 12 10 9	Moist medium dense orange silty fine sand w/trace of coarse sand. 18" RECOVERY	A-2-4(0)	
9		5	8.0'	4 5 6 7	Wet medium dense orange fine sand w/some silt and coarse sand, trace of gravel. 19" RECOVERY	A-2-4(0)	
		6	10.0'	13 14 15 14	Wet medium dense orange coarse to fine sand w/trace of silt and gravel. 9" RECOVERY	A-1-b	
12		7	12.0'	5 5 6 6	Wet medium dense orange coarse sand w/some gravel and fine sand, trace of silt. 21" RECOVERY	A-1-b	
		8	14.0'	13 15 11 8	Wet medium dense orange coarse sand and gravel w/some fine sand, trace of silt. 24" RECOVERY	A-1-b	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand

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Notes:

1. Exploratory borings were drilled on 7/10/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-22

Contract: 28-113-01

Boring Location: Sta. 573+00, 101.00' Lt. C.L.

Boring Surface Elev.: + 64.2

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/13/2009		12.0	8.0	7.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			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
	7/13/09	1	0.5'	8 9 6	Moist very stiff gray clayey silt w/trace of fine to coarse sand.	A-4(8)	Cultivated Soil - 8".
			2.0'		16" RECOVERY		
3		2	2.0'	5 7 8 10	Moist stiff gray silt w/some clay, trace of fine to coarse sand.	A-4(2)	
			4.0'		16" RECOVERY		
6		3	4.0'	5 6 7 5	Wet medium dense orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			6.0'		18" RECOVERY		
9		4	6.0'	4 4 6 13	Wet loose orange silty coarse sand w/some fine sand and gravel.	A-1-b	
			8.0'		16" RECOVERY		
12		5	8.0'	4 8 7 8	Wet medium dense orange gravel and coarse sand w/some fine sand, trace of silt.	A-1-a	
			10.0'		11" RECOVERY		
15		6	10.0'	15 9 5 4	wet medium dense orange coarse sand and gravel w/some fine sand, trace of silt.	A-1-b	
			12.0'		10" RECOVERY		
		7	12.0'	3 4 4 6	Wet stiff orange gravelly clay w/some fine to coarse sand.	A-7-6(5)	
			14.0'		16" RECOVERY		
		8	14.0'	7 8 10 5	Wet medium dense orange clayey fine to coarse sand w/some gravel.	A-2-5(0)	Cemented sands.
			16.0'		12" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Well graded sand
with silt



Clayey sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-23

Contract: 28-113-01

Boring Location: Sta. 578+00, 91.00' Rt. C.L.

Boring Surface Elev.: + 65.4

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:	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.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 14.0

Water Level Readings		Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		7/10/2009		14.0	12.0	11.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	7/10/09	1	0.5'	4 3 3	Moist firm grayish orange mottled clay w/trace of fine to coarse sand.	A-6(14)	Cultivated Soil - 6".
			2.0'		14" RECOVERY		
3		2	2.0'	6 7 5 7	Moist stiff gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(5)	
			4.0'		17" RECOVERY		
		3	4.0'	3 6 6 8	Moist medium dense orangish gray fine to coarse sand and gravel w/some silt, trace of clay.	A-2-4(0)	USDA Classifica - Loamy Sand.
6			6.0'		16" RECOVERY		
		4	6.0'	8 7 8 8	Moist medium dense orange fine to coarse sand and gravel w/some silt.	A-1-b	
			8.0'		9" RECOVERY		
9		5	8.0'	6 7 5 6	wet stiff orange fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(2)	
			10.0'		18" RECOVERY		
		6	10.0'	7 7 8 8	Wet stiff greenish orange fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(11)	
12			12.0'		12" RECOVERY		
		7	12.0'	9 9 7 6	Wet medium dense greenish brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
15		8	14.0'	3 4 7 4	Wet medium dense greenish brown clayey fine sand w/some coarse sand and gravel.	A-2-7(2)	
			16.0'		18" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Elastic silt

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Notes:

1. Exploratory borings were drilled on 7/10/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-24

Contract: 28-113-01

Boring Location: Sta. 583+00, 108.00' Lt. C.L.

Boring Surface Elev.: + 68.0

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:	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.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 14.0

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date						
7/13/2009			16.0	14.0	10.4	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	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
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	3 5 6	Moist stiff orange clayey fine sandy silt w/some coarse sand.	A-4(3)	Cultivated Soil - 6".
			2.0'		12" RECOVERY		
3		2	2.0'	9 12	Moist medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
			3.0'		11" RECOVERY		
		2A	3.0'	14 7	Moist medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
			4.0'		4" RECOVERY		
		3	4.0'	8 14	Moist very stiff orange silt w/some fine sand, trace of coarse sand and gravel.	A-4(0)	
			5.0'		7" RECOVERY		
6		3A	5.0'	12 6	Moist medium dense orange fine to coarse sand w/some silt, trace of clay.	A-2-4(0)	USDA Classification - Sand.
			6.0'		11" RECOVERY		
		4	6.0'	9 12 11 14	Moist medium dense orangish yellow mottled silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		16" RECOVERY		
9		5	8.0'	9 9 16 11	Moist medium dense orange coarse to fine sand and gravel w/some silt.	A-1-b	
			10.0'		17" RECOVERY		
		6	10.0'	9 4	No Sieve Analysis - Indication of wet medium dense orange coarse to fine sand and gravel w/some silt.		
			11.0'		6" RECOVERY		
		6A	11.0'	4 5	No Sieve Analysis - Indication of wet very stiff green sandy clay.		
12			12.0'		11" RECOVERY		
		7	12.0'	4 5 6 6	Wet stiff green fine to coarse sandy clay w/trace of gravel.	A-6(0)	
			14.0'		18" RECOVERY		
15		8	14.0'	3 4 9 4	Wet medium dense orangish green mottled clayey fine to coarse sand w/ some gravel.	A-2-7(0)	
			16.0'		14" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-25

Contract: 28-113-01

Boring Location: Sta. 587+00, 95.00' Rt. C.L.

Boring Surface Elev.: + 68.0

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/13/2009	Time	14.0	12.0	10.4	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

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
	7/13/09	1	0.5'	4 4 4	Moist firm gray clayey silt w/some fine sand, trace of coarse sand.	A-4(4)	Cultivated Soil - 8".
			2.0'		12" RECOVERY		
3		2	2.0'	3 5 7 7	Moist stiff orange fine sandy silt w/some clay, trace of coarse sand.	A-4(1)	
			4.0'		18" RECOVERY		
		3	4.0'	4 5 9 7	Moist stiff orange fine sandy silt w/trace of coarse sand.	A-4(0)	
6			6.0'		24" RECOVERY		
		4	6.0'	8 12 17 13	Moist very stiff brownish gray mottled fine sandy silt and clay w/some coarse sand and gravel.	A-6(3)	USDA Classifica - Sandy Clay
			8.0'		24" RECOVERY		Loam.
9		5	8.0'	3 4 5 5	Moist stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-6(2)	
			10.0'		15" RECOVERY		
		6	10.0'	3 8 7 9	Wet stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(18)	
12			12.0'		20" RECOVERY		
		7	12.0'	4 4 5 7	Wet loose orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			14.0'		18" RECOVERY		
15		8	14.0'	5 6 7 9	Wet medium dense orangish brown mottled silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					End of Boring		

Remarks:


Reviewed By: Maureen Kelley


Soils Supervisor: Randy Ferguson


KEY TO SYMBOLS


Symbol Description

Strata symbols

 Silty low plasticity
clay

 Silty sand

 Clayey sand

 High plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-26

Contract: 28-113-01

Boring Location: Sta. 593+00, 108.00' Lt. C.L.

Boring Surface Elev.: + 69.2'

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:	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.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					14.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
7/14/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	7/14/09	1	0.5'	4 5 4	Moist stiff brown clayey silt w/trace of fine to coarse sand. 17" RECOVERY	A-4(8)	Cultivated Soil - 5".
3		2	2.0'	3 4 6 10	Moist stiff brown silt w/some clay, trace of fine to coarse sand. 15" RECOVERY	A-4(2)	
		3	4.0'	3 5 8 7	Moist medium dense tan silty fine to coarse sand w/trace of clay and gravel. 18" RECOVERY	A-2-4(0)	USDA Classifica - Loamy Sand.
6		4	6.0'	8 10 11 13	Moist medium dense brownish orange silty fine sand w/some gravel and coarse sand. 18" RECOVERY	A-2-4(0)	
		5	8.0'	5 10 17 8	Wet very stiff brown coarse to fine sandy clay w/trace of gravel. 15" RECOVERY	A-7-5(3)	
9		6	10.0'	8 10 11 12	Wet very stiff brown fine sandy clay w/some coarse sand, trace of gravel. 17" RECOVERY	A-7-5(6)	
12		7	12.0'	3 4 3 3	Wet loose brown clayey coarse to fine sand w/trace of gravel. 19" RECOVERY	A-2-7(1)	
		8	14.0'	3 4 5 7	Wet loose brown clayey coarse to fine sand w/trace of gravel. 22" RECOVERY	A-2-7(1)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-27

Contract: 28-113-01

Boring Location: Sta. 598+00, 96.00' Rt. C.L.

Boring Surface Elev.: + 72.1

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
7/14/2009

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
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
3	7/14/09	1	0.5'	7 8 8	Moist very stiff brown clayey silt w/trace of fine to coarse sand. 15" RECOVERY	A-4(3)	Topsoil - 5".
		2	2.0'	11 11 14	Moist very stiff brown silt w/some fine sand, trace of clay and coarse sand. 18" RECOVERY	A-4(1)	
6	7/14/09	2A	3.5'	14	Moist medium dense brown silty fine sand w/some coarse sand. 6" RECOVERY	A-2-4(0)	
		3	4.0'	2 3 6 10	Wet stiff grayish orange mottled clay w/some fine sand, trace of coarse sand and gravel. 22" RECOVERY	A-6(6)	
9	7/14/09	4	6.0'	14 14 16 16	Moist very stiff grayish orange mottled fine sandy clay w/some coarse sand, trace of gravel. 20" RECOVERY	A-6(6)	
		5	8.0'	10 11 12 12	Moist medium dense white silty fine sand w/trace of clay and coarse sand. 20" RECOVERY	A-2-4(0)	USDA Classifica - Sandy Loam.
12	7/14/09	6	10.0'	4 8 8 8	Moist medium dense orangish gray coarse sand w/some silt and fine sand, trace of gravel. 16" RECOVERY	A-1-b	
		7	12.0'	14 22 26 11	Moist dense orangish tan coarse sand and gravel w/some silt and fine sand. 16" RECOVERY	A-1-b	
15	7/14/09	8	14.0'	18 20 14 16	Wet dense brownish red clayey coarse sand w/some fine sand and gravel. 19" RECOVERY	A-2-5(0)	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Silty sand



Low plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-28

Contract: 28-113-01

Boring Location: Sta. 603+00, 119.00' Lt. C.L.

Boring Surface Elev.: + 75.4

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:	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.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/13/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	7/13/09	1	0.5'	6 4 5	Moist stiff brown clayey silt w/trace of fine sand and gravel.	A-4(6)	Topsoil - 5".
			2.0'		14" RECOVERY		
3		2	2.0'	7 6 7 9	Moist stiff brown clayey silt w/trace of fine sand.	A-4(9)	
			4.0'		19" RECOVERY		
		3	4.0'	4 5 5 9	Moist stiff brown clayey silt w/some fine sand, trace of coarse sand.	A-4(6)	
6			6.0'		17" RECOVERY		
		4	6.0'	5 7 8 8	Moist stiff orangish gray mottled clay w/some fine to coarse sand, trace of gravel.	A-6(6)	
			8.0'		22" RECOVERY		
9		5	8.0'	5 7 8 12	Moist stiff orangish gray mottled fine to coarse sandy clay w/trace of gravel.	A-6(6)	
			10.0'		22" RECOVERY		
		6	10.0'	13 11 13 19	Moist very stiff orangish gray mottled fine to coarse sandy clay w/trace of gravel.	A-6(4)	
12			12.0'		20" RECOVERY		
		7	12.0'	6 10 10 11	Moist very stiff brownish green fine sandy clay w/some coarse sand and gravel.	A-7-5(4)	
			14.0'		15" RECOVERY		
15		8	14.0'	11 11 13 16	Moist very stiff brownish green fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(4)	
			16.0'		23" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-29

Contract: 28-113-01

Boring Location: Sta. 608+00, 89.00' Rt. C.L.

Boring Surface Elev.: + 76.97

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/14/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
3	7/14/09	1	0.5'	8 8 7	Moist stiff brown clayey silt w/some fine sand, trace of coarse sand. 13" RECOVERY	A-4(6)	Topsoil - 6".
		2	2.0'	7 8 8 10	Moist medium dense brown fine to coarse sand w/some silt. 21" RECOVERY	A-2-4(0)	
6		3	4.0'	2 2 3 3	Moist firm tan and gray clayey silt w/some fine sand, trace of coarse sand. 20" RECOVERY	A-4(6)	
		4	6.0'	4 6 6 8	Moist stiff tan and orange slightly mottled clay w/some fine sand, trace of coarse sand. 22" RECOVERY	A-6(14)	
9		5	8.0'	4 6 4 6	Moist stiff orange fine sandy silt w/some coarse sand, trace of gravel. 20" RECOVERY	A-4(0)	
		6	10.0'	5 5 7 6	Moist medium dense orange silty fine sand w/trace of coarse sand and gravel. 19" RECOVERY	A-2-4(0)	
12		7	12.0'	5	No Sieve Analysis - Indication of moist medium dense orangish gray mottled sand w/some clay. 3" RECOVERY	A-2-4(0)	
		7A	12.5'	8 8 9	Moist medium dense brown silty fine sand w/some coarse sand, trace of gravel. 16" RECOVERY	A-1-b	
15		8	14.0'	11 14 16 16	Moist medium dense brown coarse sand and gravel w/some fine sand, trace of silt. 19" RECOVERY		
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-30

Contract: 28-113-01

Boring Location: Sta. 613+00, 129.00' Lt. C.L.

Boring Surface Elev.: + 71.1

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:	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.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/13/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	7/13/09	1	0.5'	3 3 4	Moist firm brown clayey fine sandy silt w/some coarse sand, trace of gravel.	A-4(1)	Topsoil - 6".
			2.0'		13" RECOVERY		
3		2	2.0'	3 3 3 3	Moist firm brown clayey silt w/some fine to coarse sand, trace of gravel.	A-4(6)	
			4.0'		16" RECOVERY		
		3	4.0'	2 3 4 7	Moist firm brown silt w/some fine to coarse sand and clay, trace of gravel.	A-4(4)	USDA Classifica - Loam.
6			6.0'		20" RECOVERY		
		4	6.0'	5 6 7 8	Moist medium dense brownish red silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	4 5 6 7	Wet medium dense brownish red silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			10.0'		14" RECOVERY		
		6	10.0'	7 9 9 10	Wet medium dense brownish red silty fine to coarse sand.	A-2-4(0)	
12			12.0'		21" RECOVERY		
		7	12.0'	3 2 3 2	Wet loose brownish gray mottled silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
15		8	14.0'	4 6 6 5	Wet medium dense brownish gray mottled fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			16.0'		20" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-31

Contract: 28-113-01

Boring Location: Sta. 618+00, 210.00' Lt. C.L.

Boring Surface Elev.: + 87.8

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:	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.

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0	To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/13/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	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: Jason Truver
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	4 4 4	Moist firm brown clayey silt w/trace of fine to coarse sand and gravel. 14" RECOVERY	A-4(8)	Topsoil - 5".
3		2	2.0'	7 5 5 6	Moist stiff brown clayey silt w/trace of fine to coarse sand. 18" RECOVERY	A-4(8)	
		3	4.0'	5 5 7 8	Moist stiff brownish gray silt w/some clay and fine sand, trace of coarse sand and gravel. 19" RECOVERY	A-4(3)	
6		4	6.0'	5 5 7 8	Moist stiff brown silt w/some clay and fine sand, trace of coarse sand. 21" RECOVERY	A-4(4)	
		5	8.0'	7 5 7 7	Moist stiff brown clayey fine sandy silt w/some coarse sand and gravel. 17" RECOVERY	A-4(1)	
9		6	10.0'	7 9 9 11	Moist very stiff orange fine sandy silt w/some coarse sand and clay. 19" RECOVERY	A-4(0)	USDA Classifica - Sandy Loam.
12		7	12.0'	5 7 8 9	Moist medium dense orange silty fine sand w/some coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	
		8	14.0'	8 11 13 13	Moist medium dense orange coarse to fine sand w/some silt, trace of gravel. 18" RECOVERY	A-1-b	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Clayey sand



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-32

Contract: 28-113-01

Boring Location: Sta. 619+00, 70.00' Rt. C.L.

Boring Surface Elev.: +76.25

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:	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.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 14.0

Water Level Readings		Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
		7/13/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	7/13/09	1	0.5'	4 2 2	Moist soft brown clayey fine sandy silt w/some coarse sand, trace of gravel.	A-4(2)	Topsoil - 5".
			2.0'		12" RECOVERY		
3		2	2.0'	5 5 5 6	Moist stiff brown clayey silt w/some coarse to fine sand, trace of gravel.	A-4(3)	
			4.0'		18" RECOVERY		
		3	4.0'	5 6 6 6	Moist medium dense brown clayey fine to coarse sand w/some gravel.	A-2-4(0)	
6			6.0'		19" RECOVERY		
		4	6.0'	5 6 6 7	Moist medium dense brown coarse to fine sand w/some silt, trace of clay and gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	5 4 7 6	Moist medium dense brown silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	4 6 9 10	Moist medium dense brown fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
12			12.0'		17" RECOVERY		
		7	12.0'	9 11 13 16	Moist medium dense brown silty gravel and fine sand w/some coarse sand.	A-1-b	
			14.0'		17" RECOVERY		
15		8	14.0'	13 10 17 18	Wet medium dense orangish black silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-33

Contract: 28-113-01

Boring Location: Sta. 623+00, 90.00' Lt. C.L.

Boring Surface Elev.: + 76.4

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/13/2009	Time	16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	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: Jason Truver
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	4 3 3	Moist firm brown clay w/trace of fine to coarse sand.	A-6(11)	Topsoil - 5".
3		2	2.0'	4 5 7 6	Moist stiff brown fine sandy silt w/some clay and coarse sand, trace of gravel.	A-4(2)	
		3	4.0'	4 5 6 6	Moist stiff tan clay w/some fine sand, trace of coarse sand and gravel.	A-6(13)	
6		4	6.0'	8 11 14 16	Moist very stiff orange fine sandy clay w/some coarse sand and gravel.	A-6(4)	
9		5	8.0'	5 6 6 8	Moist medium dense orange silty fine to coarse sand w/trace of clay and gravel.	A-2-4(0)	USDA Classifica - Sandy Loam
		6	10.0'	12 7 9 7	Moist medium dense tan coarse to fine sand w/some silt and gravel.	A-1-b	
12		7	12.0'	10 9 11 14	Moist medium dense tan coarse to fine sand w/some silt and gravel.	A-2-4(0)	
15		8	14.0'	17 19 21 26	Moist dense brown clayey coarse sand and gravel w/some fine sand.	A-2-6(0)	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-34

Contract: 28-113-01

Boring Location: Sta. 623+00, 283.00' Rt. C.L.

Boring Surface Elev.: + 76.1

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/14/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
3	7/14/09	1	0.5'	3 4 4	Moist firm brown clayey silt w/trace of fine to coarse sand. 14" RECOVERY	A-4(4)	Topsoil - 5".
		2	2.0'	5 7 9 9	Moist very stiff brown clayey silt w/trace of fine to coarse sand. 20" RECOVERY	A-4(7)	
6		3	4.0'	4 4 7 8	Moist medium dense orange clayey fine to coarse sand w/trace of gravel. 19" RECOVERY	A-2-6(0)	
		4	6.0'	3 6 7 8	Moist stiff orange fine to coarse sandy clay w/trace of gravel. 18" RECOVERY	A-6(5)	
9		5	8.0'	3 5 5 7	Moist loose orange silty fine sand w/trace of clay, coarse sand and gravel. 16" RECOVERY	A-2-4(0)	USDA Classifica - Sandy Loam
		6	10.0'	3 4 4 5	Moist loose orange silty fine sand. 18" RECOVERY	A-2-4(0)	
12		7	12.0'	6 7 7 8	Moist stiff orange fine sandy silt. 19" RECOVERY	A-4(0)	
		8	14.0'	16 13 11 6	Moist medium dense brownish red coarse to fine sand w/some silt and gravel. 13" RECOVERY	A-1-b	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-35

Contract: 28-113-01

Boring Location: Sta. 628+00, 85.00' Rt. C.L.

Boring Surface Elev.: + 75.3

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/14/2009		16.0	14.0	0.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
3	7/14/09	1	0.5'	3 3 4	Moist firm brown clayey silt w/trace of fine sand. 13" RECOVERY	A-4(7)	Topsoil - 5".
			2.0'	7 8 8 10	Moist very stiff brown clayey silt w/some fine sand, trace of coarse sand and gravel. 18" RECOVERY	A-4(4)	
6		3	4.0'	3 5 7 8	Moist medium dense orange clayey coarse to fine sand w/trace of gravel. 19" RECOVERY	A-2-6(0)	
			6.0'	9 11 9 10	Moist medium dense orange coarse sand w/some silt and fine sand, trace of gravel and clay. 21" RECOVERY	A-1-b	USDA Classifica - Sand
9		5	8.0'	4 6 5 5	Moist medium dense orange silty fine to coarse sand w/trace of gravel. 20" RECOVERY	A-2-4(0)	
			10.0'	6 9 11 13	Moist medium dense orange silty fine sand w/some coarse sand, trace of gravel. 16" RECOVERY	A-2-4(0)	
12		7	12.0'	14 14 18 14	Moist hard brownish red fine sandy clay w/some coarse sand, trace of gravel. 19" RECOVERY	A-7-5(6)	
			14.0'	11 13 11 10	Moist medium dense greenish red silty fine to coarse sand w/trace of gravel. 18" RECOVERY	A-2-4(0)	
15		8	16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/14/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-36

Contract: 28-113-01

Boring Location: Sta. 628+00, 458.00' Lt. C.L.

Boring Surface Elev.: + 77.3

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
7/15/2009

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
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
3	7/15/09	1	0.5'	3 4 4	Moist firm brown clayey silt w/trace of fine to coarse sand. 12" RECOVERY	A-4(9)	Topsoil - 7".
		2	2.0'	4 6 9 8	Moist stiff brown clayey silt w/trace of fine to coarse sand. 16" RECOVERY	A-4(9)	
6		3	4.0'	3 8 10 8	Moist very stiff brown coarse to fine snady clay w/trace of gravel. 20" RECOVERY	A-6(1)	
		4	6.0'	9 10 7 7	MOist medium dense brown clayey fine to coarse sand w/some silt, trace of gravel. 21" RECOVERY	A-2-4(0)	USDA Classifica - Sandy Loam
9		5	8.0'	4 5 6 6	Moist medium dense brown silty fine sand w/trace of coarse sand. 20" RECOVERY	A-2-4(0)	
		6	10.0'	9 6 9 15	Moist medium dense brown silty fine sand w/trace of coarse sand. 22" RECOVERY	A-2-4(0)	
12		7	12.0'	7 9 11 13	Moist medium dense brownish red clayey coarse to fine sand w/trace of gravel. 17" RECOVERY	A-2-5(0)	
		8	14.0'	7 8 6 8	Wet medium dense brownish red clayey coarse to fine sand w/trace of gravel. 20" RECOVERY	A-2-7(0)	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/15/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-37

Contract: 28-113-01

Boring Location: Sta. 633+00, 89.00' Lt. C.L.

Boring Surface Elev.: + 70.6

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/15/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
3	7/15/09	1	0.5'	5 4 4	Moist firm brown clayey silt w/trace of fine sand and gravel. 13" RECOVERY	A-4(8)	Topsoil - 5".
		2	2.0'	4 4 6 10	Moist stiff brown clayey silt w/trace of fine to coarse sand. 20" RECOVERY	A-4(9)	
6		3	4.0'	4 8 7 8	Moist stiff brownish green clay w/some gravel and fine to coarse sand. 18" RECOVERY	A-7-6(8)	
		4	6.0'	6 10 10 10	Moist very stiff brownish green silty fine sandy clay w/trace of coarse sand. 21" RECOVERY	A-7-6(10)	USDA Classifica - Clay
9		5	8.0'	6 7 7 8	Moist medium dense greenish orange clayey fine to coarse sand w/trace of gravel. 16" RECOVERY	A-2-7(0)	
		6	10.0'	7 8 14 11	Moist very stiff greenish orange clayey coarse sandy silt w/some fine sand and gravel. 22" RECOVERY	A-5(1)	
12		7	12.0'	3 5 4 8	Wet loose orange coarse to fine sand w/some silt, trace of gravel. 20" RECOVERY	A-1-b	
		8	14.0'	7 9 10 11	Wet medium dense orange clayey coarse to fine sand w/trace of gravel. 21" RECOVERY	A-2-7(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/15/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-38

Contract: 28-113-01

Boring Location: Sta. 633+00, 436.00' Rt. C.L.

Boring Surface Elev.: + 74.5

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 7/17/2009	Time	16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		; Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			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
	7/17/09	1	0.5'	5 5 5	Moist stiff brown clayey silt w/trace of fine sand. 13" RECOVERY	A-4(10)	Topsoil - 7".
3		2	2.0'	5 7 8	Moist stiff brown clayey silt w/trace of fine to coarse sand. 14" RECOVERY	A-4(7)	
		3	4.0'	3 3 9	Moist stiff brown clayey fine andy silt w/some coarse sand, trace of gravel. 17" RECOVERY	A-4(2)	
6		4	6.0'	6 5 6 6	Moist medium dense orange coarse sand w/some silt and fine sand, trace of gravel. 18" RECOVERY	A-1-b	
		5	8.0'	3 6 8 15	Moist medium dense orange gravel and coarse to fine sand w/some silt, trace of clay. 19" RECOVERY	A-1-b	USDA Classifica - Loamy Sand
		6	10.0'	15 20 25 20	Moist dense brown gravel and coarse sand w/some silt and fine sand. 12" RECOVERY	A-1-b	Pulverized gravel in tip of spoon.
12		7	12.0'	5 4 5 5	Wet stiff green coarse to fine sandy clay w/trace of gravel. 16" RECOVERY	A-7-5(4)	
		8	14.0'	3 7 5 4	Wet medium dense brown coarse to fine sand w/some silt, trace of gravel. 13" RECOVERY	A-1-b	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/17/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-39

Contract: 28-113-01

Boring Location: Sta. 638+00, 104.00' Rt. C.L.

Boring Surface Elev.: + 66.9

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/16/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
3	7/16/09	1	0.5'	6 6 6	Moist stiff clayey silt w/some gravel, trace of fine to coarse sand. 12" RECOVERY	A-4(7)	Topsoil - 6".
		2	2.0'	6 8 9 11	Moist very stiff brown clayey silt w/trace of fine to coarse sand. 18" RECOVERY	A-4(9)	
6		3	4.0'	4 5 5 8	Moist stiff brownish orange mottled clayey silt w/trace of fine to coarse sand. 20" RECOVERY	A-4(7)	USDA Classifica- - Silt
		4	6.0'	7 21 12 14	Moist dense brown clayey gravel w/some coarse sand, trace of fine sand. 8" RECOVERY	A-1-b	Pulverized gravel in tip of spoon.
9		5	8.0'	3 5 7 10	Moist medium dense greenish orange clayey gravel and fine sand w/some silt and coarse sand. 17" RECOVERY	A-2-6(0)	
		6	10.0'	6 8 12 8	Moist medium dense orange coarse to fine sand and gravel w/some silt. 17" RECOVERY	A-1-b	
12		7	12.0'	3 3 3 4	Wet loose orange silty coarse to fine sand w/some gravel. 21" RECOVERY	A-2-4(0)	
		8	14.0'	12 9 6 21	Wet medium dense brown coarse sand and gravel w/some coarse sand and silt. 20" RECOVERY	A-1-b	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty clayey gravel



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/16/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-40

Contract: 28-113-01

Boring Location: Sta. 638+00, 164.00' Lt. C.L.

Boring Surface Elev.: + 70.5

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/16/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	7/16/09	1	0.5'	7 5 7	Moist stiff brown clayey silt w/trace of fine sand. 11" RECOVERY	A-4(10)	Topsoil - 7".
3		2	2.0'	7 4 4 5	Moist firm brown silt w/some clay, trace of fine sand. 19" RECOVERY	A-4(4)	
		3	4.0'	3 7 7 13	Moist medium dense brown clayey gravel w/some coarse to fine sand. 16" RECOVERY	A-2-4(0)	
6		4	6.0'	11 12 13 18	Moist medium dense tan gravel and coarse to fine sand w/some silt, trace of clay. 14" RECOVERY	A-1-b	USDA Classifica - Sandy Loam
		5	8.0'	4 10 8 9	Moist medium dense orangish green clayey fine sand w/some coarse sand and gravel. 13" RECOVERY	A-2-7(1)	
9		6	10.0'	8 7 8 10	Moist medium dense orangish green clayey gravel and fine sand w/some coarse sand. 20" RECOVERY	A-2-7(1)	
12		7	12.0'	3 5 7 5	Wet medium dene orange silty coarse to fine sand and gravel. 16" RECOVERY	A-1-b	
		8	14.0'	4 13 9 8	Wet medium dense orange silty coarse to fine sand and gravel. 13" RECOVERY	A-1-b	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/16/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-41

Contract: 28-113-01

Boring Location: Sta. 643+00, 126.00' Lt. C.L.

Boring Surface Elev.: + 66.8

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/16/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	7/16/09	1	0.5'	5 6 6	Moist stiff brown clayey silt w/trace of fine to coarse sand. 15" RECOVERY	A-4(7)	Topsoil - 5".
3		2	2.0'	4 8 10 15	Moist very stiff brown clayey coarse sandy silt w/some fine sand and gravel. 17" RECOVERY	A-4(2)	USDA Classifica - Loam
		3	4.0'	8 23 13 12	No Sieve Analysis - Indication of moist dense brown silty sand w/trace of gravel. 3" RECOVERY		Piece of gravel in tip of spoon.
6		4	6.0'	13 10 13 12	No Sieve Analysis - Indication of moist medium dense brown silty sand w/trace of gravel. 2" RECOVERY		Piece of gravel in tip of spoon.
		5	8.0'	3 5 6 6	Wet medium dense orange fine to coarse sand w/some silt, trace of gravel. 15" RECOVERY	A-2-4(0)	
9		6	10.0'	6 5 6 6	Wet medium dense orange clayey coarse to fine sand w/some gravel. 17" RECOVERY	A-2-7(1)	
12		7	12.0'	3 5 7 7	Wet medium dense orange silty coarse to fine sand w/some gravel. 20" RECOVERY	A-1-b	
		8	14.0'	3 5 8 7	Wet medium dense orange silty coarse to fine sand w/some gravel. 22" RECOVERY	A-2-4(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded sand
with silt



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/16/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-42

Contract: 28-113-01

Boring Location: Sta. 648+00, 111.00' Rt. C.L.

Boring Surface Elev.: + 62.79

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/16/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
3	7/16/09	1	0.5'	17 18 22	Moist hard brown clayey gravelly silt w/trace of fine to coarse sand. 10" RECOVERY	A-4(1)	Topsoil - 6".
		2	2.0'	23 21 15 16	Moist dense brown clayey gravel w/some fine to coarse sand. 13" RECOVERY	A-2-4(0)	
6		3	4.0'	13 15 14 14	Moist medium dense orangish brown clayey gravel and fine sand w/some coarse sand. 16" RECOVERY	A-2-7(1)	
		4	6.0'	14 8 11 13	Wet medium dense orange clayey gravel and fine sand w/some coarse sand. 15" RECOVERY	A-2-7(0)	
9		5	8.0'	16 15 13 5	Wet very stiff orange coarse to fine sandy clay w/trace of gravel. 4" RECOVERY	A-7-5(2)	
		6	10.0'	4 4 7 8	Wet medium dense orange silty coarse to fine sand w/trace of gravel. 17" RECOVERY	A-2-4(0)	
12		7	12.0'	4 5 7 7	Wet medium dense orange silty coarse sand and gravel w/some fine sand. 10" RECOVERY	A-1-b	
		8	14.0'	6 5 7 7	Wet medium dense orange silty coarse to fine sand w/some gravel. 18" RECOVERY	A-2-4(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/16/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-43

Contract: 28-113-01

Boring Location: Sta. 653+00, 100.00' Lt. C.L.

Boring Surface Elev.: + 64.8

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/17/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	7/17/09	1	0.5'	5 5	Moist stiff brown clayey silt w/trace of fine to coarse sand.	A-4(8)	Topsoil - 7".
			2.0'		12" RECOVERY		
3		2	2.0'	5 6 7 6	Moist stiff brown clayey silt w/some fine sand, trace of coarse sand and gravel.	A-4(6)	
			4.0'		20" RECOVERY		
		3	4.0'	3 4 5 7	Moist stiff brown silty clay w/some fine sand, trace of coarse sand and gravel.	A-6(9)	USDA Classifica - Clay Loam
6			6.0'		18" RECOVERY		
		4	6.0'	5 6 5	Wet stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(7)	
			8.0'		17" RECOVERY		
9		5	8.0'	3 4 5	Wet stiff orangish green coarse sandy clay w/some fine sand, trace of gravel.	A-7-5(5)	
			10.0'		12" RECOVERY		
		6	10.0'	5 6 7 9	Wet medium dense orangish brown silty coarse sand w/some fine sand and gravel.	A-2-4(0)	
12			12.0'		18" RECOVERY		
		7	12.0'	3 5 5 8	Wet loose orangish brown silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			14.0'		19" RECOVERY		
15		8	14.0'	8 4 7 13	Wet medium dense brownish orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/17/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-44

Contract: 28-113-01

Boring Location: Sta. 658+00, 98.00' Rt. C.L.

Boring Surface Elev.: + 56.2

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
7/17/2009

Time

Depth of Hole
16.0

Depth of Casing
14.0

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
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
3	7/17/09	1	0.5'	6 6 8	Moist stiff brown clayey silt w/trace of fine to coarse sand and gravel. 13" RECOVERY	A-4(7)	Topsoil - 5".
		2	2.0'	5 7	Moist very stiff brown clayey silt w/some fine to coarse sand, trace of gravel. 10" RECOVERY	A-4(4)	
6	7/17/09	2A	3.0'	18 10	Moist medium dense brown coarse to fine sand w/some gravel and silt. 12" RECOVERY	A-1-b	
		3	4.0'	7 8 7 9	Moist medium dense brown coarse to fine sand and gravel w/some silt. 18" RECOVERY	A-1-b	
9	7/17/09	4	6.0'	6 7 5 6	Moist medium dense brown fine to coarse sand w/some silt, trace of gravel and clay. 18" RECOVERY	A-2-4(0)	USDA Classifica - Sand
		5	8.0'	5 7 10 7	Moist medium dense brownish orange silty coarse to fine sand w/trace of gravel. 15" RECOVERY	A-2-4(0)	
12	7/17/09	6	10.0'	6 6 5 6	Wet medium dense brownish orange silty coarse to fine sand w/trace of gravel. 18" RECOVERY	A-2-4(0)	
		7	12.0'	5 3 4 4	Wet loose orangish brown silty fine to coarse sand w/trace of gravel. 15" RECOVERY	A-2-4(0)	
15	7/17/09	8	14.0'	3 4 5 6	Wet loose orangish brown silty fine to coarse sand w/trace of gravel. 20" RECOVERY	A-2-4(0)	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/17/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-45

Contract: 28-113-01

Boring Location: Sta. 663+00, 105.00' Lt. C.L.

Boring Surface Elev.: + 50.5

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/17/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	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
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/17/09	1	0.5'	11 12 12	Moist very stiff brown clayey silt w/trace of fine to coarse sand and gravel. 13" RECOVERY	A-4(5)	Topsoil - 5".
3		2	2.0'	8 8 9 11	Moist very stiff orange fine sandy clay w/trace of coarse sand and gravel. 17" RECOVERY	A-6(8)	
		3	4.0'	6 10 16 16 10	Moist medium dense brown coarse to fine sand w/some gravel and silt. 18" RECOVERY	A-1-b	
6		4	6.0'	5 7 8 15	Moist medium dense orange fine to coarse sand w/some silt and gravel, trace of clay. 16" RECOVERY	A-2-4(0)	USDA Classifica - Sand
		5	8.0'	3 5 5 5	Wet loose brownish orange silty fine to coarse sand w/trace of gravel. 19" RECOVERY	A-2-4(0)	
9		6	10.0'	4 5 4 5	Wet loose brown fine to coarse sand w/some silt, trace of gravel. 19" RECOVERY	A-2-4(0)	
		7	12.0'	4 6 7 8	Wet medium dense brown fine to coarse sand w/some silt, trace of gravel. 23" RECOVERY	A-2-4(0)	
12		8	14.0'	8 10 8 10	Wet medium dense brownish orange fine to coarse sand w/some silt, trace of gravel. 22" RECOVERY	A-2-4(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/17/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-46

Contract: 28-113-01

Boring Location: Sta. 673+00, 98.00' Rt. C.L.

Boring Surface Elev.: + 61.6

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/21/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: Bill Holden

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/21/09	1	1.0'	7 7	Moist stiff orange clayey silt w/trace of gravel and fine to coarse sand. 12" RECOVERY	A-4(7)	Cultivated Soil - 12".
		2	2.0'	8 9 12 14	Moist very stiff orange gravelly clay w/some coarse sand, trace of fine sand. 16" RECOVERY	A-6(3)	
3		3	4.0' 4.0'	9 9	Moist medium dense orange clayey gravel and coarse sand w/trace of fine sand. 16" RECOVERY	A-2-6(1)	
6		4	6.0' 6.0'	8 11 14 20	Moist medium dense orange clayey gravel w/some coarse sand, trace of fine sand. 12" RECOVERY	A-2-6(0)	
9		5	8.0' 8.0'	9 9 9	MOist medium dense orange coarse to fine sand and gravel w/some silt. 17" RECOVERY	A-1-b	
12		6	10.0' 10.0'	10 4 4 4	Moist loose orange silty fine sand w/some coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
15		7	12.0' 12.0'	5 6 9 10	Moist medium dense orange coarse to fine sand and gravel w/some silt. 20" RECOVERY	A-1-b	
		8	14.0' 14.0'	9 7 6 7	Moist medium dense orange coarse to fine sand w/some gravel, trace of silt. 22" RECOVERY	A-1-b	
			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/21/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-47

Contract: 28-113-01

Boring Location: Sta. 678+00, 110.00' Lt. C.L.

Boring Surface Elev.: + 62.7

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/7/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
3	7/6/09	1	0.5'	4 4 7	Moist stiff brown clay w/trace of fine to coarse sand and gravel. 12" RECOVERY	A-6(12)	Topsoil - 7".
		2	2.0'	8 9 9 10	Moist very stiff brown clayey silt w/trace of fine to coarse sand. 16" RECOVERY	A-4(8)	
6		3	4.0'	7 6 7 6	Moist stiff brown clay w/some fine to coarse sand, trace of gravel. 18" RECOVERY	A-6(7)	
		4	6.0'	9 8 6 8	Moist stiff brown clay w/some fine to coarse sand and gravel. 17" RECOVERY	A-6(8)	
9		5	8.0'	6 5 6 12	Moist medium dense brown silty coarse sand w/some fine sand, trace of gravel. 19" RECOVERY	A-1-b	
		6	10.0'	7 10 9 9	Moist medium dense brown coarse to fine sand w/some gravel and silt. 21" RECOVERY	A-1-b	
12		7	12.0'	8 10 9 10	Moist medium dense brown fine to coarse sand w/some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
		8	14.0'	8 9 9 7	Moist medium dense brown fine to coarse sand w/some gravel and silt. 10" RECOVERY	A-2-4(0)	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Truck 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 un corrected.

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

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

Boring No.: IT1-48

Contract: 28-113-01

Boring Location: Sta. 683+00, 91.00' Rt. C.L.

Boring Surface Elev.: +44.7

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:	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.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/6/2009		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	7/6/09	1	0.5'	10 14 17	Moist medium dense gravel w/some fine to coarse sand and silt.	A-1-b	Cultivated Soil - 6".
			2.0'		14" RECOVERY		
3		2	2.0'	6 9 7 12	Moist medium dense orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	6 5 7 6	Moist medium dense orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	6 6 5 5	Moist medium dense orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			8.0'		14" RECOVERY		
9		5	8.0'	6 7 5	Moist medium dense orange coarse sand w/some fine sand, trace of silt, gravel and clay.	A-1-b	USDA Classifica- - Sand
			10.0'		16" RECOVERY		
		6	10.0'	7 8 10 9	Moist medium dense orange coarse sand w/some fine sand and silt, trace of gravel.	A-1-b	
12			12.0'		15" RECOVERY		
		7	12.0'	9 10 14 10	Moist medium dense brown coarse sand and gravel w/some fine sand, trace of silt.	A-1-b	
			14.0'		14" RECOVERY		
15		8	14.0'	15 19 21 17	No Sample Recovery		Gravel blocking spoon.
			16.0'		0" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Truck 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 un corrected.

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

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

Boring No.: IT1-49

Contract: 28-113-01

Boring Location: Sta. 688+00, 91.00' Lt. C.L.

Boring Surface Elev.: + 33.9

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 7/6/2009
Time

Depth of Hole 16.0
Depth of Casing 14.0
Depth of Water 7.8
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;
No. of:
Core Drilling in Rock:
Dia. U-Sample Boring:
U-Samples:
Ft.
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
	7/6/09	1	0.5'	5 4 4	Moist loose brown coarse sand w/some clay, gravel and fine sand. 12" RECOVERY	A-2-4(0)	Topsoil - 4".
3		2	2.0'	6 6 6	Moist stiff brown clayey coarse sandy silt w/some gravel, trace of fine sand. 15" RECOVERY	A-4(1)	
		3	4.0'	4 4 4 7	Moist loose brown clayey coarse sand w/some gravel and fine sand. 18" RECOVERY	A-2-4(0)	
6		4	6.0'	16 19 22 14	Moist dense brown coarse sand w/some fine sand and silt, trace of gravel. 16" RECOVERY	A-1-b	
		5	8.0'	11 9 12 14	Wet medium dense brown silty coarse sand and gravel w/some fine sand. 14" RECOVERY	A-1-b	
9		6	10.0'	12 11 14 9	Wet medium dense brown coarse sand and gravel w/some fine sand and silt. 19" RECOVERY	A-1-b	
12		7	12.0'	6 6 3 4	Wet loose brown fine to coarse sand w/trace of silt and gravel. 15" RECOVERY	A-3	
		8	14.0'	6 5 14 12	Wet medium dense brown fine to coarse sand w/some gravel, trace of silt. 14" RECOVERY	A-3	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Clayey sand



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-50

Contract: 28-113-01

Boring Location: Sta. 693+00, 88.00' Rt. C.L.

Boring Surface Elev.: +40.1

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 7/6/2009
Time

Depth of Hole 16.0
Depth of Casing 14.0
Depth of Water 14.0
Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;
No. of:
Core Drilling in Rock:
Dia. U-Sample Boring:
U-Samples:
Ft.
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
	7/6/09	1	0.5'	4 3 2	Moist firm brown clayey coarse sandy silt w/trace of fine sand.	A-4(4)	Cultivated Soil - 6"
			2.0'		15" RECOVERY		
3		2	2.0'	4 5 5 5	Moist stiff brown coarse to fine sandy silt w/trace of gravel.	A-4(0)	
			4.0'		14" RECOVERY		
6		3	4.0'	7 5 5 3	Moist stiff brown fine sandy silt w/some coarse sand, trace of gravel.	A-4(0)	
			6.0'		16" RECOVERY		
9		4	6.0'	8 12 13 9	Moist medium dense brown coarse sand and gravel w/some fine sand, trace of silt.	A-1-b	
			8.0'		18" RECOVERY		
12		5	8.0'	15 11 10 13	Moist medium dense brown coarse sand w/some fine sand and clay, trace of silt.	A-1-b	USDA classificat - Loamy Sand
			10.0'		5" RECOVERY		
15		6	10.0'	16 13 10 10	Moist medium dense brown coarse sand w/some gravel, silt and fine sand.	A-1-b	
			12.0'		20" RECOVERY		
		7	12.0'	9 9 7 8	Moist medium dense brown coarse sand w/some fine sand, trace of silt and gravel.	A-1-b	
			14.0'		15" RECOVERY		
		8	14.0'	6 6 6 6	Wet medium dense brown coarse to fine sand w/trace of silt and gravel.	A-1-b	
			16.0'		17" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

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

Notes:

1. Exploratory borings were drilled on 7/6/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-51

Contract: 28-113-01

Boring Location: Sta. 698+00, 110.00' Lt. C.L.

Boring Surface Elev.: + 36.9

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/6/2009		16.0	14.0	11.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
3	7/6/09	1	0.5'	3 4 3	Moist firm brown clayey silt w/some fine to coarse sand, trace of gravel. 13" RECOVERY	A-4(2)	Cultivated Soil - 4"
		2	2.0'	3 5 4 9	Moist stiff brown fine sandy silt w/some clay, coarse sand and gravel. 16" RECOVERY	A-4(0)	
6		3	4.0'	7 9 9 11	Moist medium dense brown fine sand w/some silt, coarse sand and gravel. 16" RECOVERY	A-2-4(0)	
		4	6.0'	11 14 17 19	Moist dense brown fine to coarse sand w/some clay and silt, trace of gravel. 21" RECOVERY	A-2-4(0)	USDA Classifica - Sandy Loam
9		5	8.0'	20 14 10 11	Moist medium dense brown gravel and fine sand w/some silt and coarse sand. 15" RECOVERY	A-1-b	
		6	10.0'	12 11 10 5	Wet medium dense brown coarse to fine sand w/some gravel, trace of silt. 14" RECOVERY	A-1-b	
12		7	12.0'	10 6 5 4	Wet medium dense tan fine to coarse sand w/trace of silt and gravel. 17" RECOVERY	A-3	
		8	14.0'	3 4 6 6	Wet loose tan coarse to fine sand w/trace of silt and gravel. 17" RECOVERY	A-1-b	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt



Poorly graded sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-52

Contract: 28-113-01

Boring Location: Sta. 703+00, 53.00' Rt. C.L.

Boring Surface Elev.: +47.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
7/6/2009

Time

Depth of Hole

16.0

Depth of Casing

14.0

Depth of Water

Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
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
	7/6/09	1	0.5'	3 3 3	Moist firm brown clay w/some fine to coarse sand, trace of gravel. 10" RECOVERY	A-6(4)	Cultivated Soil - 7"
3		2	2.0'	2 2 2 2	Moist soft brown coarse to fine sandy silt w/trace of gravel. 15" RECOVERY	A-4(0)	
		3	4.0'	7 6 7 6	Moist medium dense brown silty fine to coarse sand w/trace of gravel. 13" RECOVERY	A-2-4(0)	
6		4	6.0'	5 6 7 6	Moist medium dense brown fine to coarse sand w/some silt, trace of clay and gravel. 16" RECOVERY	A-2-4(0)	USDA Classifica - Loamy Sand
		5	8.0'	8 7 6 7	Moist medium dense brown coarse sand w/some fine sand and silt. 15" RECOVERY	A-1-b	
		6	10.0'	8 8 7 9	Moist medium dense brown coarse sand w/trace of silt, fine sand and gravel. 20" RECOVERY	A-1-b	
12		7	12.0'	5 4 4 7	Moist loose brown coarse sand w/trace of fine sand, gravel and silt. 16" RECOVERY	A-1-b	
		8	14.0'	9 13 20 29	Moist dense brown gravel and coarse sand w/trace of fine sand and silt. 14" RECOVERY	A-1-b	
15			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/6/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: IT1-58

Contract: 25-113-01

Boring Location: Sta.110+09, Lt. C.L.

Boring Surface Elev.:

Reference:

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

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

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

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:

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/30/09	1	0.0'		No Sample Taken		Hand Auger - Topsoil
			1.0'		0" RECOVERY		
1.5		2	1.0'		Wet brown clay w/trace of fine to coarse sand.	A-6(11)	Hand Auger
			2.0'		12" RECOVERY		
		3	2.0'		Wet greenish brown clay w/trace of coarse to fine sand and gravel.	A-6(8)	Hand Auger
3			3.0'		12" RECOVERY		
		4	3.0'		Wet brownish gray clay w/some fine to coarse sand, trace of gravel.	A-6(8)	Hand Auger
			4.0'		12" RECOVERY		
4.5		5	4.0'		Wet brownish gray clay w/some gravel and fine sand, trace of coarse sand.	A-6(12)	Hand Auger
			5.0'		12" RECOVERY		
		6	5.0'		Wet brownish gray silty clay w/some gravel and fine sand, trace of coarse sand.	A-6(10)	Hand Auger
6			6.0'		12" RECOVERY		USDA Classification
		7	6.0'		Wet brownish gray clayey gravel w/some fine to coarse sand.	A-2-6(2)	- Clay Loam
			7.0'		12" RECOVERY		Hand Auger
7.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/30/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-59

Contract: 25-113-01

Boring Location: Sta. 717+96, Lt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5		1	1.0'		Wet gray silt w/some fine sand and clay, trace of coarse sand.	A-4(2)	Hand Auger
			2.0'		12" RECOVERY		
		2	2.0'		Wet gray clayey silt w/some fine sand, trace of coarse sand.	A-4(2)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown silty fine to coarse sand w/some gravel.	A-2-4(0)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet orange coarse to fine sand w/some silt, trace of gravel.	A-1-b	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet orange silt w/some fine sand, trace of coarse sand.	A-4(0)	Hand Auger
			6.0'		12" RECOVERY		
6		6	6.0'		Wet orange coarse to fine sand w/some silt.	A-2-4(0)	Hand Auger
			7.0'		12" RECOVERY		
7.5		7	7.0'		Wet orange coarse sand w/some fine sand and silt, trace of gravel.	A-1-b	Hand Auger
			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/29/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-60

Contract: 25-113-01

Boring Location: Sta. 719+55, Rt C.L.

Boring Surface Elev.:

Reference:

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

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

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

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

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/09	1	0.0'		No Sample Taken		Hand Auger Topsoil - 6"
1.5		2	1.0'		0" RECOVERY Moist gray gravel and coarse sand w/some fine sand and silt.	A-1-b	Hand Auger
			2.0'		12" RECOVERY		
3		3	2.0'		Wet gray clay w/some fine sand, trace of coarse sand.	A-6(12)	Hand Auger
			3.0'		12" RECOVERY		
		4	3.0'		Wet gray clayey fine sandy silt w/trace of coarse sand.	A-4(0)	Hand Auger
			4.0'		12" RECOVERY		
4.5		5	4.0'		Wet gray silty fine sand w/trace of coarse sand.	A-2-4(0)	Hand Auger USDA Classifica
			5.0'		12" RECOVERY		
		6	5.0'		Wet gray silty fine sand w/trace of coarse sand.	A-2-4(0)	- Loamy Sand. Hand Auger
6			6.0'		12" RECOVERY		
		7	6.0'		Wet gray silty fine sand w/some coarse sand.	A-2-4(0)	Hand Auger
			7.0'		12" RECOVERY		
7.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Low plasticity
clay



Silty low plasticity
clay

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/29/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-61

Contract: 25-113-01

Boring Location: 730+20, Lt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/25/09	1	0.5'		Moist brown clayey silt w/trace of fine sand.	A-4(10)	Hand Auger
		2	1.0'		Moist gray clayey silt w/trace of fine to coarse sand.	A-4(8)	Topsoil - 6"
1.5			1.5'		6" RECOVERY		Hand Auger
			2.0'		12" RECOVERY		Hand Auger
		3	2.0'		Moist orange fine sandy silt w/some coarse sand and clay.	A-4(0)	Hand Auger
			3.0'		12" RECOVERY		
3		4	3.0'		Wet orange clayey silt w/some fine sand, trace of coarse sand.	A-4(3)	Hand Auger
			4.0'		12" RECOVERY		
4.5		5	4.0'		Wet orange clayey fine to coarse sand.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		USDA Classification
		6	5.0'		Wet orange clayey gravel w/some fine to coarse sand.	A-2-4(0)	- Sandy Loam.
			6.0'		12" RECOVERY		Hand Auger
6		7	6.0'		Saturated green fine sandy clay w/some gravel, trace of coarse sand.	A-7-6(8)	Hand Auger
			7.0'		12" RECOVERY		
7.5					End of Boring		

Remarks:






Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silty low plasticity clay
	Poorly graded clayey silty sand
	Clayey sand
	Silt

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/25/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-62

Contract: 25-113-01

Boring Location: Sta. 728+728+84, Rt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/25/09		0.0'		No Sample Taken		Hand Auger Topsoil - 6".
1.5		1	1.0' 1.0'		0" RECOVERY Wet brown clayey silt w/trace of fine to coarse sand.	A-4(6)	Hand Auger
		2	2.0' 2.0'		12" RECOVERY Wet gray clayey silt w/trace of fine to coarse sand.	A-4(8)	Hand Auger
3		3	3.0' 3.0'		12" RECOVERY Wet gray clayey silt w/trace of fine to coarse sand.	A-4(7)	Hand Auger
		4	4.0' 4.0'		12" RECOVERY Wet orange clayey silt w/some fine sand, trace of coarse sand.	A-4(4)	Hand Auger
4.5		5	5.0' 5.0'		12" RECOVERY Wet orange clayey fine sandy silt w/some coarse sand.	A-4(2)	Hand Auger
6		6	6.0' 6.0'		12" RECOVERY Wet green silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Hand Auger
		7	7.0' 7.0'		12" RECOVERY Wet green silty fine to coarse sand w/some gravel.	A-2-4(0)	Hand Auger
7.5			8.0'		12" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/29/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-64

Contract: 25-113-01

Boring Location: Sta. 731+03, Rt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/09	1	0.0'		No Sample Taken		Hand Auger
			1.0'		0" RECOVERY		
1.5		2	1.0'		Wet brown clay w/trace of fine to coarse sand and gravel.	A-6(9)	Hand Auger
			2.0'		12" RECOVERY		
		3	2.0'		Wet brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(8)	Hand Auger
3			3.0'		12" RECOVERY		
		4	3.0'		Wet brownish green clayey fine sandy silt w/some coarse sand and gravel.	A-4(1)	Hand Auger
			4.0'		12" RECOVERY		
4.5		5	4.0'		Wet brownish green silty fine sand w/some coarse sand and gravel.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		USDA Classifica
		6	5.0'		Wet brown clayey silt w/trace of fine to coarse sand and gravel.	A-4(9)	- Sandy Loam.
6			6.0'		12" RECOVERY		Hand Auger
					End of Boring		
7.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/29/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-65

Contract: 25-113-01

Boring Location: Sta. 738+71, Lt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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

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:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/22/09	1	0.0'		No Sample Taken		Hand Auger
1.5		2	1.0' 1.0'		12" RECOVERY Wet brown silt w/some fine sand and clay, trace of coarse sand.	A-4(3)	Hand Auger
3		3	2.0' 2.0'		12" RECOVERY Wet brown fine to coarse sand w/some silt.	A-2-4(0)	Hand Auger
4.5		4	3.0' 3.0'		12" RECOVERY Wet brown coarse to fine sand w/some silt.	A-2-4(0)	Hand Auger
6		5	4.0' 4.0'		12" RECOVERY Wet brown fine sandy silt w/some coarse sand and clay.	A-4(0)	Hand Auger
		6	5.0' 5.0'		12" RECOVERY Wet brown clayey silt w/some fine sand, trace of coarse sand.	A-4(6)	Hand Auger
7.5			6.0'		12" RECOVERY End of Boring		

Remarks:

Reviewed By: _____ **Soils Supervisor:** _____

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Low plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/22/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-66

Contract: 25-113-01

Boring Location: Sta. 739+70, Lt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/22/09	1	1.0'		Wet brown silt w/some fine sand and clay, trace of coarse sand.	A-4(1)	Hand Auger Topsoil - 6".
					12" RECOVERY		
		2	2.0'		Wet brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(8)	Hand Auger
					12" RECOVERY		
3		3	3.0'		Wet gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(8)	Hand Auger
					12" RECOVERY		
4.5		4	4.0'		Wet gray fine sandy silt w/some coarse sand.	A-4(0)	Hand Auger
					12" RECOVERY		
		5	5.0'		Wet gray fine sandy silt w/some coarse sand and clay, trace of gravel.	A-4(0)	Hand Auger USDA Classifica
					12" RECOVERY		
6		6	6.0'		Wet gray fine sandy silt w/some coarse sand and clay, trace of gravel.	A-4(0)	- Sandy Loam.
					12" RECOVERY		
			7.0'		End of Boring		
7.5							
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/22/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-67

Contract: 25-113-01

Boring Location: Sta. 739+11, Rt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller:

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5		1	1.0'		Wet brown clayey silt w/trace of fine to coarse sand.	A-4(4)	Hand Auger
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown clay w/trace of fine to coarse sand.	A-6(11)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(10)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet brown clayey silt w/some fine sand, trace of coarse sand and silt.	A-4(3)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet brown fine sandy silt w/some coarse sand and clay.	A-4(0)	Hand Auger
6			6.0'		12" RECOVERY		USDA Classification - Sandy Loam.
					End of Boring		
7.5							
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/22/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-69

Contract: 25-113-01

Boring Location: Sta. 745+44, Rt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller:

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/22/09	1	1.0'		Wet gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(7)	Hand Auger Topsoil - 6".
			2.0'		12" RECOVERY		
		2	2.0'		Wet gray clay w/trace of fine to coarse sand and gravel.	A-6(11)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet gray clayey silt w/some fine sand, trace of coarse sand.	A-4(4)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet gray clayey fine sandy silt w/some coarse sand, trace of gravel.	A-4(2)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet gray silty clay w/some fine sand, trace of coarse sand.	A-6(6)	Hand Auger
			6.0'		12" RECOVERY		
6		6	6.0'		Wet gray clay w/some fine sand, trace of coarse sand and gravel.	A-6(9)	USDA Classification - Loam. Hand Auger
			7.0'		12" RECOVERY		
7.5		7	7.0'		Wet gray fine sandy clay w/trace of coarse sand and gravel.	A-6(10)	Hand Auger
			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/22/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-71

Contract: 25-113-01

Boring Location: Sta. 750+73, Lt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/24/09	1	1.0'		Wet brown clayey silt w/some fine sand, trace of coarse sand.	A-4(4)	Hand Auger Topsoil - 6".
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown clayey fine to coarse sand w/trace of gravel.	A-2-4(0)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet orange fine sandy silt w/trace of coarse sand and gravel.	A-4(0)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet orange silty fine sand w/some clay, trace of coarse sand.	A-2-4(0)	Hand Auger USDA
			6.0'		12" RECOVERY		Classifica
6		6	6.0'		Wet orange gravel and coarse sand w/some fine sand, trace of silt.	A-1-a	- Sandy Loam.
			7.0'		12" RECOVERY		Hand Auger
7.5		7	7.0'		Wet orange gravel w/some coarse to fine sand and clay.	A-1-b	Hand Auger
			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand



Well graded sand
with silt



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/24/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-72

Contract: 25-113-01

Boring Location: 751+30, Rt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/09	1	0.0'		No Sample Taken		Hand Auger
1.5		2	1.0' 1.0'		12" RECOVERY Wet brown silt w/some fine to coarse sand and clay.	A-4(1)	Hand Auger
3		3	2.0' 2.0'		12" RECOVERY Wet brown clayey fine sandy silt w/some coarse sand.	A-4(2)	Hand Auger
4.5		4	3.0' 3.0'		12" RECOVERY Wet brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(11)	Hand Auger
6		5	4.0' 4.0'		12" RECOVERY Wet brown fine sandy clay w/some coarse sand and silt, trace of gravel.	A-6(5)	Hand Auger USDA Classifica
		6	5.0' 5.0'		12" RECOVERY Wet brownish orange clayey fine to coarse sand w/some gravel.	A-2-6(0)	- Loam. Hand Auger
		7	6.0' 6.0'		12" RECOVERY Wet brownish orange silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	Hand Auger
7.5			7.0'		12" RECOVERY End of Boring		

Remarks:


Reviewed By: Maureen Kelley


Soils Supervisor: Randy Ferguson


KEY TO SYMBOLS


Symbol Description

Strata symbols

 Silty low plasticity
clay

 Low plasticity
clay

 Clayey sand

 Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/23/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-73

Contract: 25-113-01

Boring Location: Sta. 752+95, Rt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller:

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/23/09	1	1.0'		Wet brown clayey silt w/trace of fine to coarse sand and gravel.	A-4(8)	Hand Auger Topsoil - 8"
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown clay w/trace of fine to coarse sand.	A-6(11)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown clay silt w/trace of fine to coarse and gravel.	A-4(9)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet brown clayey silt w/trace of fine to coarse sand.	A-4(5)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet brown fine sandy silt w/some coarse sand and clay.	A-4(0)	Hand Auger USDA
			6.0'		12" RECOVERY		Classifica
6		6	6.0'		Wet brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	- Loam. Hand Auger
			7.0'		12" RECOVERY		
7.5		7	7.0'		Wet brown silty fine sand w/trace of coarse sand.	A-2-4(0)	Hand Auger
			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/23/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-74

Contract: 25-113-01

Boring Location: Sta. 762+00, Lt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/24/09	1	1.0'		Moist brown clayey gravel w/some fine to coarse sand.	A-2-6(0)	Hand Auger Topsoil - 6".
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown clayey gravelly silt w/some fine sand, trace of coarse sand.	A-4(2)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown clayey fine sand w/some coarse sand, trace of gravel.	A-2-6(0)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet orange silty fine to coarse sand w/trace of gravel.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet orange silty fine to coarse sand w/some clay, trace of gravel.	A-2-4(0)	Hand Auger
			6.0'		12" RECOVERY		
6		6	6.0'		Wet orange fine to coarse sand w/some silt.	A-2-4(0)	Hand Auger USDA Classification - Loamy Sand.
			7.0'		12" RECOVERY		
		7	7.0'		Wet orange fine to coarse sand w/some silt.	A-2-4(0)	Hand Auger
7.5			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/24/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-75

Contract: 25-113-01

Boring Location: Sta. 764+53, Rt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/23/09	1	1.0'		Wet brown clayey silt w/trace of fine to coarse sand.	A-4(4)	Hand Auger
			2.0'		12" RECOVERY		
3		2	2.0'		Wet brown clayey silt w/trace of fine to coarse sand and gravel.	A-4(8)	Hand Auger
			3.0'		12" RECOVERY		
4.5		3	3.0'		Wet brown clay w/some fine sand, trace of coarse sand and gravel.	A-6(8)	Hand Auger
			4.0'		12" RECOVERY		
		4	4.0'		Wet orange clayey fine to coarse and w/trace of gravel.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		
6		5	5.0'		Wet orange silty fine and w/some clay, trace of coarse sand.	A-2-4(0)	Hand Auger USDA Classifica
			6.0'		12" RECOVERY		
		6	6.0'		Wet orange silty fine asand w/trace of coarse sand.	A-2-4(0)	- Sandy Loam. Hand Auger
			7.0'		12" RECOVERY		
7.5					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/23/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-76

Contract: 25-113-01

Boring Location: Sta. 765+72, Lt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/23/09	1	0.0'		No Sample Taken		Hand Auger
1.5		2	1.0' 1.0'		12" RECOVERY Wet brownish gray clayey silt w/trace of fine to coarse sand.	A-4(10)	Hand Auger
3		3	2.0' 2.0'		12" RECOVERY Wet brownish gray clayey silt w/trace of fine sand.	A-4(8)	Hand Auger
4.5		4	3.0' 3.0'		12" RECOVERY Wet brown clay w/trace of fine to coarse sand.	A-6(11)	Hand Auger
6		5	4.0' 4.0'		12" RECOVERY Wet brown clayey coarse to fine sandy silt w/some gravel.	A-4(0)	Hand Auger USDA Classifica
		6	5.0' 5.0'		12" RECOVERY Wet brown silty coarse to fine sand w/some gravel.	A-1-b	- Sandy Loam. Hand Auger
7.5			6.0'		12" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/23/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-78

Contract: 25-113-01

Boring Location: Sta. 788+46, Lt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/28/09	1	1.0'		Wet brown clay w/trace of fine to coarse and.	A-6(10)	Hand Auger Topsoil - 6".
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown clay w/trace of fine to coarse sand and gravel.	A-6(14)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown silty gravel and fine asand w/some coarse sand.	A-2-4(0)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet brown clayey fine sand and gravel w/trace of coarse sand.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet brown fine sandy silt w/some clay, trace of coarse sand.	A-4(0)	Hand Auger USDA
6			6.0'		12" RECOVERY		Classifica
					End of Boring		- Sandy Loam.
7.5							
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/28/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-79

Contract: 25-113-01

Boring Location: Sta. 787+00, Rt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.		
2 1/2 in. Dia. Contin. Sample Boring:	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
	9/28/09	1	0.0'		No Sample Taken		Hand Auger - Topsoil
			1.0'		0" RECOVERY		
1.5		2	1.0'		Wet brown clay w/trace of fine to coarse sand.	A-6(12)	Hand Auger
			2.0'		12" RECOVERY		
		3	2.0'		Wet brown clay w/trace of fine to coarse sand.	A-6(11)	Hand Auger
3			3.0'		12" RECOVERY		
		4	3.0'		Wet brown clayey silt w/trace fine to coarse and gravel.	A-4(7)	Hand Auger
			4.0'		12" RECOVERY		
4.5		5	4.0'		Wet brown clayey gravel and coarse sand w/trace of silt and fine sand.	A-2-6(0)	Hand Auger
			5.0'		12" RECOVERY		
		6	5.0'		Wet brown gravel w/some coarse sand, trace of fine sand and silt.	A-1-a	Hand Auger
6			6.0'		12" RECOVERY		
					End of Boring		
7.5							

Remarks:

Reviewed By: _____ **Soils Supervisor:** _____

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded gravel
with clay



Well graded gravel
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/28/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-80

Contract: 25-113-01

Boring Location: Sta. 789+04, Rt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/28/09	1	1.0'		Wet brown clayey silt w/trace of gravel and fine to coarse sand.	A-4(5)	Hand Auger Topsoil - 6".
			2.0'		12" RECOVERY		
		2	2.0'		Wet brown clayey silt w/trace of gravel and fine to coarse sand.	A-4(9)	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Wet brown clayey silt w/trace of fine sand.	A-4(8)	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Wet brown fine to coarse sandy silt w/some clay, trace of gravel.	A-4(0)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		Wet brown coarse sand w/some silt and fine sand, trace of clay and gravel.	A-1-b	Hand Auger USDA
			6.0'		12" RECOVERY		Classifica
					End of Boring		- Loamy Sand.
7.5							
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/28/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-83

Contract: 25-113-01

Boring Location: Sta. 836+24, Rt. C.L.

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.5	9/30/09	1	1.0'		Moist brown silty coarse to fine sand w/trace of gravel.	A-2-4(0)	Hand Auger Topsoil - 8".
			2.0'		12" RECOVERY		
		2	2.0'		Moist brown coarse to fine sand and gravel w/some silt.	A-1-b	Hand Auger
			3.0'		12" RECOVERY		
3		3	3.0'		Moist brown fine to coarse sand and gravel w/some silt.	A-1-b	Hand Auger
			4.0'		12" RECOVERY		
4.5		4	4.0'		Moist orange coarse to fine sand w/some silt, trace of gravel.	A-2-4(0)	Hand Auger
			5.0'		12" RECOVERY		
		5	5.0'		MOist orange fine to coarse sand w/trace of silt, clay and gravel.	A-3	Hand Auger USDA Classifica
6			6.0'		12" RECOVERY		- Sand.
		6	6.0'		Moist orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	Hand Auger
			7.0'		12" RECOVERY		
7.5		7	7.0'		Moist orange fine to coarse sand w/trace of silt and gravel.	A-3	Hand Auger
			8.0'		12" RECOVERY		
					End of Boring		
9							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/30/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. 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.: IT1-84

Contract: 25-113-01

Boring Location:

Boring Surface Elev.:

Reference:

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

Casing Size:	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
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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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller:
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	9/29/09	1	0.0'		No Sample Taken		Hand Auger - Topsoil
			1.0'		0" RECOVERY		
1.5		2	1.0'		Wet brownish gray clayey silt w/trace of fine to coarse sand.	A-4(7)	Hand Auger
			2.0'		12" RECOVERY		
		3	2.0'		Wet brownish gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(7)	Hand Auger
3			3.0'		12" RECOVERY		
		4	3.0'		Wet brownish gray clayey fine sandy silt w/trace of coarse sand and gravel.	A-4(2)	Hand Auger
			4.0'		12" RECOVERY		
4.5		5	4.0'		Wet brownish gray silty fine sand w/some clay, trace of coarse sand and gravel.	A-2-4(0)	Hand Auger USDA Classifica
			5.0'		12" RECOVERY		
		6	5.0'		Wet brownish orange coarse to fine sand w/some silt, trace of gravel.	A-1-b	- Sandy Loam. Hand Auger
6			6.0'		12" RECOVERY		
		7	6.0'		Wet brownish orange coarse sand w/some fine sand, trace of silt and gravel.	A-1-b	Hand Auger
			7.0'		12" RECOVERY		
7.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 9/29/2009 using a hand auger.
2. Surveyed boring location and elevation was provided by Century Engineering.
3. These logs are subject to the limitations, conclusions, and recommendations in this report.
4. Results of tests conducted on samples recovered are reported on the logs.

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

F.A. Project: US 301 Maryland State Line to SR-1

Boring No.: IT1-85

Contract: 25-113-01

Boring Location: STA. 723+00 103' Rt. C.L.

Boring Surface Elev.: + 68.28

Reference:

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

Casing Size:	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
	2/24/11		8.5		8.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	8.5	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
Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
2.53	2/24/11	1	1.5'		Wet tan clayey silt w/trace of fine to coarse sand. 12" RECOVERY	A-4(6)	Topsoil - 8". Hand Auger
		2	2.5'		Wet grayish brown silty clay w/trace of fine to coarse sand. 12" RECOVERY	A-6(14)	Hand Auger
		3	3.5'		Wet brown fine sandy silt w/trace of coarse sand and clay. 12" RECOVERY	A-4(0)	Hand Auger
5.06			6.5'		36" RECOVERY		
		4	6.5'		Wet orange silty coarse to fine sand w/trace of fine gravel. 12" RECOVERY	A-2-4(0)	Hand Auger
7.59			7.5'				
		5	7.5'		Saturated orange coarse sandy fine gravel w/ some fine sand, trace of silt. 12" RECOVERY	A-1-a	Hand Auger
			8.5'		End of Boring		
10.12							
12.65							
15.18							

Remarks: Hand Auger

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silt



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on February 24, 2011 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 recommendations 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: US 301 Maryland State Line to SR-1

Boring No.: IT1-86

Contract: 25-113-01

Boring Location: STA. 804+00 122' Rt. C.L.

Boring Surface Elev.: + 41.11

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of: To:
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
2/17/11		10.0	10.0	9.5	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	2/17/11	1	1.0'	2 2	Wet soft brown clayey silt w/some fine sand, trace of coarse sand and fine gravel. 10" RECOVERY	A-4(5)	Topsoil - 12".
2.53		2	2.0'	2 5 5	Wet loose brown silty coarse to fine sand w/ some fine gravel. 14" RECOVERY	A-1-b	
		3	4.0'	5 5 4 4	Wet loose brown fine to coarse sand w/some silt, trace of fine gravel. 14" RECOVERY	A-2-4(0)	
5.06		4	6.0'	4 5 5 5	Wet loose brown fine to coarse sand w/some silt, trace of clay. 18" RECOVERY	A-2-4(0)	USDA Classification : Loamy Sand
7.59		5	8.0'	1 4 4 4	Wet loose brown fine to coarse sand w/some silt. 18" RECOVERY	A-2-4(0)	
10.12			10.0'		End of Boring		
12.65							

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on February 17, 2011 using 3 1/4 inch diameter continuous flight power auger. Rig is 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 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 I-95

Boring No.: R1-014

Contract: 25-113-01

Boring Location: Sta. 525+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 60.0'

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

Casing Size: 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
	2/20/08		10.0'	8.0'	4.1'	

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	6 12	Wet very stiff gray clayey silt w/ some fine to coarse sand, trace of gravel.	A-4(4)	Cultivated Soil - 12".
		2	2.0'	9 14 20 25	11" RECOVERY Wet dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
3		3	4.0'	10 12 16 15	12" RECOVERY Saturated medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
		4	6.0'	16 17 18 16	15" RECOVERY Saturated dense brown and light brown gravel and coarse to fine sand w/ some silt.	A-1-b	
6		5	8.0'	8 9 10 10	20" RECOVERY Saturated medium dense orange coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
9			10.0'		18" RECOVERY Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/20/2008 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. 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
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 I-95

Boring No.: R1-015

Contract: 25-113-01

Boring Location: Sta. 530+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 64.0'

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

Casing Size:	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
2/20/08		10.0'	8.0'	7.5'	

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	1 2 3	Moist soft brown coarse sandy silt w/ some clay and fine sand, trace of gravel.	A-4(1)	Topsoil - 5".
			2.0'		10" RECOVERY		
3		2	2.0'	5 10 11 15	Moist medium dense orange coarse to fine sand w/ some silt and gravel.	A-1-b	
			4.0'		20" RECOVERY		
		3	4.0'	10 16 15 15	Moist dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
6			6.0'		19" RECOVERY		
		4	6.0'	14 19 29 22	Wet hard orange and brown gravelly silt w/ some coarse to fine sand.	A-4(0)	
			8.0'		17" RECOVERY		
9		5	8.0'	2 2 6 8	Saturated loose brown silty fine to coarse sand.	A-2-4(0)	
			10.0'		16" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/20/2008 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. 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
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 I-95

Boring No.: R1-016

Contract: 25-113-01

Boring Location: Sta. 535+00.00, 130' Lt. C.L.

Boring Surface Elev.: + 63.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/20/08		14.0'	12.0'	5.8'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	1 2	Wet soft light brown silt w/ some gravel and fine to coarse sand, trace of clay. 12" RECOVERY	A-4(0)	Topsoil - 4"
		2	2.0'	3 5	Wet loose light brown coarse sand w/ some silt, fine sand, and gravel. 7" RECOVERY	A-1-b	
3		2A	3.0'	11 22	Wet dense brown silty fine sand w/ some coarse sand, trace of gravel. 11" RECOVERY	A-2-4(0)	
		3	4.0'	11 14 13 13	Wet medium dense brown coarse sand w/ some fine sand, silt, and gravel. 18" RECOVERY	A-1-b	
6		4	6.0'	10 10 10 11	Saturated medium dense brown coarse to fine sand w/ some silt, trace of gravel. 19" RECOVERY	A-1-b	
		5	8.0'	5 6 5 4	Saturated medium dense brown coarse to fine sand w/ some silt and gravel. 16" RECOVERY	A-3	
9		6	10.0'	2 4 6 10	Saturated loose brown fine to coarse sand, trace of silt and gravel. 18" RECOVERY	A-2-4(0)	
12		7	12.0'	W/R 2 3 6	Saturated loose brown fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY	A-3	
		8	14.0'	6 11 19 22	Saturated medium dense brown fine sand and gravel w/ some coarse sand, trace of silt. 17" RECOVERY		
15			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/20/2008 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 recommendations 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 I-95

Boring No.: R1-017

Contract: 25-113-01

Boring Location: Sta. 540+00.00, 139' Rt. C.L.

Boring Surface Elev.: + 71.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/12/08	Time	14.0'	12.0'	10.1'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;			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
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.8'	3 6	Moist stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 13" RECOVERY	A-4(1)	Topsoil - 10".
3		2	2.0'	6 12 16 16	Moist very stiff brown fine sandy silt w/ some coarse sand and gravel. 22" RECOVERY	A-4(0)	
		3	4.0'	9 16 17 13	Moist hard brown fine sandy silt w/ some coarse sand, trace of gravel. 22" RECOVERY	A-4(0)	
6		4	6.0'	12 15 12 6	Moist medium dense brown silty coarse to fine sand w/ some gravel. 19" RECOVERY	A-1-b	
9		5	8.0'	4 5 5 4	Moist loose light brown coarse sand w/ some gravel, fine sand, and silt. 14" RECOVERY	A-1-b	
		6	10.0'	5 5 6 4	Wet medium dense light brown coarse to fine sand w/ some gravel and silt. 13" RECOVERY	A-1-b	
12		7	12.0'	4 4 4 14	Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. 24" RECOVERY	A-1-b	
15		8	14.0'	7 5 6 5	Saturated medium dense light brown coarse sand and gravel w/ some fine sand, trace of silt. 5" RECOVERY	A-1-b	
			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

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 recommendations 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 I-95

Boring No.: R1-018

Contract: 25-113-01

Boring Location: Sta. 550+00.00, 46' Lt. C.L.

Boring Surface Elev.: + 64.0'

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date			10.0'	8.0'	5.4'	
3/5/08						

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.7'	4 8	Wet stiff gray clay, trace of fine to coarse sand.	A-6(14)	Forest Duff - 8".
3		2	2.0' 2.0'	14 16 22 14	Wet hard gray clayey fine sandy silt w/ some coarse sand, trace of gravel. 12" RECOVERY	A-4(1)	
		3	4.0' 4.0'	4 4 12 15	Wet medium dense orange and gray mottled silty fine sand w/ some gravel, trace of coarse sand. 18" RECOVERY	A-2-4(0)	
6		4	6.0' 6.0'	10 12 10 9	Saturated medium dense brown coarse to fine sand w/ some silt and gravel. 12" RECOVERY	A-1-b	
		5	8.0' 8.0'	3 7 8 9	Saturated medium dense brown coarse to fine sand, trace of silt and gravel. 18" RECOVERY	A-1-b	
9			10.0'		24" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Well graded sand
with silt

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 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-019

Contract: 25-113-01

Boring Location: Sta. 555+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 62.0'

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

Casing Size:	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
3/5/08		10.0'	8.0'	4.4'	

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.7'	1 4	Wet firm gray clay w/ some gravel and organic matter, trace of fine to coarse sand.	A-6(5)	Forest Duff - 8".
3		2	2.0' 2.0'	4 11 14 19	Wet very stiff gray and brown mottled clayey gravelly silt w/ some coarse to fine sand, trace of organic matter.	A-4(0)	
		3	4.0' 4.0'	3 6 9 9	16" RECOVERY 16" RECOVERY Saturated medium dense gray coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
6		4	6.0' 6.0'	10 9 8 9	17" RECOVERY Saturated medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
9		5	8.0' 8.0'	5 9 10 13	17" RECOVERY Saturated medium dense brown coarse to fine sand w/ some silt and gravel.	A-1-b	
			10.0'		14" RECOVERY Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



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 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-020

Contract: 25-113-01

Boring Location: Sta. 560+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 66.0'

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

Casing Size:	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
3/5/08		10.0'	8.0'	8.0'	

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.8'	3 5	Wet firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(6)	Cultivated Soil - 10".
3		2	2.0' 2.1'	4 5 6 6	Wet medium dense brown clayey coarse to fine sand, trace of gravel. 14" RECOVERY	A-2-4(0)	
		3	4.0' 4.0'	6 9 12 12	Wet medium dense brown silty coarse to fine sand w/ some gravel. 23" RECOVERY	A-2-4(0)	
6		4	6.0' 6.0'	11 14 16 14	Wet medium dense brown coarse to fine sand w/ some silt and gravel. 19" RECOVERY	A-1-b	
9		5	8.0' 8.0'	13 14 12 6	Saturated very stiff brown clayey fine to coarse sandy silt, trace of gravel. 11" RECOVERY	A-4(0)	
			10.0'		Boring terminated at 10.0 feet 4" RECOVERY		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



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 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-021

Contract: 25-113-01

Boring Location: Sta. 565+00.00, 118' Rt. C.L.

Boring Surface Elev.: + 69.0'

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

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0'	To: 16.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/5/08		14.0'	12.0'	10.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	1.0'	2 4	Moist firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 11" RECOVERY	A-4(4)	Cultivated Soil - 12".
3		2	2.0'	4 5 10 10	Moist stiff brown clayey gravelly coarse sandy silt w/ some fine sand. 22" RECOVERY	A-4(0)	
		3	4.0'	4 5 10 10	Moist medium dense brown and light brown silty fine to coarse sand, trace of gravel. 18" RECOVERY	A-2-4(0)	
6		4	6.0'	9 9 9 8	Moist medium dense orange silty fine to coarse sand, trace of gravel. 21" RECOVERY	A-2-4(0)	
		5	8.0'	3 5 4 3	Wet loose brown fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
		6	10.0'	3 5 6 5	Wet medium dense brown fine to coarse sand and gravel w/ some silt. 12" RECOVERY	A-1-b	
12		7	12.0'	4 5 19 10	Saturated medium dense brown coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY	A-1-b	
		8	14.0'	6 10 11 12	Saturated medium dense brown gravel and coarse sand w/ some fine sand and silt. 19" RECOVERY	A-1-b	
15			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

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

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 45.
2. Groundwater levels recorded at 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-022

Contract: 25-113-01

Boring Location: Sta. 570+00.00, 108' Lt. C.L.

Boring Surface Elev.: + 69.0'

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/6/08		14.0'	12.0'	10.7'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	2 1 3	Moist soft brown and light brown silt w/ some fine to coarse sand and clay. 18" RECOVERY	A-4(2)	Forest Duff - 3".
3		2	2.0'	3 6 8 12	Moist medium dense light brown silty coarse to fine sand w/ some gravel. 18" RECOVERY	A-2-4(0)	
		3	4.0'	11 16 18 17	Moist hard light brown coarse sand w/ some silt and fine sand, trace of gravel. 19" RECOVERY	A-1-b	
6		4	6.0'	11 13 13 12	Wet medium dense brown silty coarse to fine sand w/ some gravel. 20" RECOVERY	A-1-b	
		5	8.0'	6 9 5 6	Wet medium dense brown coarse to fine sand w/ some silt and gravel. 20" RECOVERY	A-1-b	
		6	10.0'	3 5 12 9	Wet medium dense orange coarse to fine sand and gravel w/ some silt. 17" RECOVERY	A-1-b	
12		7	12.0'	17 9	Wet medium dense orange coarse sand and gravel w/ some fine sand, trace of silt. 12" RECOVERY	A-1-b	
		7A	13.0'	7 8	Saturated medium dense brown clayey gravel and fine to coarse sand. 12" RECOVERY	A-2-7(1)	
		8	14.0'	10 4 6 5	Saturated stiff brown and green fine sandy clay w/ some coarse sand, trace of gravel. 15" RECOVERY	A-7-5(2)	
15			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/6/2008 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 recommendations 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 I-95

Boring No.: R1-023

Contract: 25-113-01

Boring Location: Sta. 575+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 65.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/5/08	Time	10.0'	8.0'	6.3'	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 No. of U-Sample Boring: 3 Ft.
 Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.3'	3 7 9	Moist very stiff brown and orange coarse to fine sandy clay, trace of gravel.	A-6(1)	Forest Duff - 3".
			2.0'		20" RECOVERY		
3		2	2.0'	12 12 11 14	Moist medium dense brown coarse to fine sand w/ some silt and gravel.	A-1-b	
			4.0'		21" RECOVERY		
		3	4.0'	7 7 8 7	Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
6			6.0'		24" RECOVERY		
		4	6.0'	6 7 10 14	Saturated medium dense brown fine sand w/ some coarse sand, silt, and gravel.	A-2-4(0)	
			8.0'		18" RECOVERY		
9		5	8.0'	4 7 7 9	Saturated stiff brown fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(9)	
			10.0'		16" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand



Elastic silt

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 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-024

Contract: 25-113-01

Boring Location: Sta. 580+00.00, 127' Lt. C.L.

Boring Surface Elev.: + 67.0'

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

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0'	To: 16.0'

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/6/08		14.0'	12.0'	10.0'	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.9'	6 10	Moist very stiff gray and brown mottled clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(6)	Cultivated Soil - 11".
3		2	2.0'	8 10 13 13	Moist medium dense brown fine sand w/ some clay and coarse sand, trace of gravel. 20" RECOVERY	A-2-4(0)	
		3	4.0'	6 8 9 15	Moist medium dense light brown silty fine sand, trace of coarse sand and gravel. 16" RECOVERY	A-2-4(0)	
6		4	6.0'	12 18 26 13	Moist dense light brown coarse to fine sand and gravel w/ some silt. 10" RECOVERY	A-1-b	
9		5	8.0'	8 23 17 9	No Sample Recovery 0" RECOVERY		
12		6	10.0'	4 8 14 11	Saturated very stiff brown and green fine to coarse sandy clay, trace of gravel. 19" RECOVERY	A-7-5(2)	
		7	12.0'	7 9 12 13	Saturated very stiff green-gray fine to coarse sandy clay, trace of gravel. 21" RECOVERY	A-7-5(1)	
15		8	14.0'	8 11 4 3	Saturated medium dense green silty fine to coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/5/2008 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 recommendations 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 I-95

Boring No.: R1-025

Contract: 25-113-01

Boring Location: Sta. 585+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 70.0'

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date			10.0'	8.0'	Dry	
3/6/08						

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.8'	3 3	Moist firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 15" RECOVERY	A-4(5)	Cultivated Soils - 9".
		2	2.0'	3 5 6 9	Moist stiff brown fine sandy silt w/ some coarse sand and clay. 16" RECOVERY	A-4(0)	
3		3	4.0'	4 4 9 8	Moist stiff brown and gray mottled fine sandy silt w/ some coarse sand. 24" RECOVERY	A-4(0)	
		4	6.0'	7 9 7 6	Moist very stiff light brown and gray fine to coarse sandy silt, trace of gravel. 15" RECOVERY	A-4(0)	
6		5	8.0'	9 14 14 14	Moist medium dense light brown and gray silty fine to coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)	
9			10.0'		Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/6/2008 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. 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
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 I-95

Boring No.: R1-026

Contract: 25-113-01

Boring Location: Sta. 590+00.00, 45' Lt. C.L.

Boring Surface Elev.: +68.11'

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

Casing Size: 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
	3/6/08		10.0'	8.0'	Dry	68.1 68.1 68.1

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 No. of U-Sample Boring: 3 Ft.
 Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/6/08	1	1.0'	7 7	Wet stiff brown silt w/ some clay and fine sand, trace of coarse sand.	A-4(3)	Cultivated Soil - 11".
		2	2.0'	5 11 11 13	11" RECOVERY Wet very stiff brown fine sandy silt, trace of coarse sand.	A-4(0)	
3		3	4.0'	6 5 8 10	21" RECOVERY Wet stiff brown and gray clayey gravelly silt w/ some fine to coarse sand.	A-4(1)	
6		4	6.0'	7 9 13 19	13" RECOVERY Wet very stiff brown fine sandy clay w/ some coarse sand, trace of gravel.	A-6(2)	
9		5	8.0'	4 8 11 14	22" RECOVERY Wet very stiff brown fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(2)	
			10.0'		19" RECOVERY Boring terminated at 10.0 feet		
12							
15							

Remarks:


Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson


KEY TO SYMBOLS


Symbol Description

Strata symbols

 Silty low plasticity
clay

 Silt

 Clayey sand

 Silty 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 ATV CME 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-027

Contract: 25-113-01

Boring Location: Sta. 595+00.00, 131' Rt. C.L.

Boring Surface Elev.: + 72.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/21/08		16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/21/08	1	0.0'	1 3 7 8	Wet stiff tan silt w/ some clay and fine sand, trace of coarse sand.	A-4(1)	Cultivated Soil - 11".
			2.0'		12" RECOVERY		
3		2	2.0'	6 5 9 9	Wet stiff brown fine sandy silt w/ some clay and coarse sand.	A-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	6 8 9 10	Wet very stiff orange and gray clayey silt w/ some fine to coarse sand, trace of gravel.	A-4(2)	
6			6.0'		16" RECOVERY		
		4	6.0'	8 10	Wet very stiff gray clay w/ some fine sand, trace of coarse sand and gravel.	A-6(10)	
			7.0'		12" RECOVERY		
		4A	7.0'	15 16	Wet dense gray clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		6" RECOVERY		
9		5	8.0'	5 9 9 8	Wet medium dense gray silty fine sand w/ some coarse sand.	A-2-4(0)	
			10.0'		20" RECOVERY		
		6	10.0'	3 11	Wet stiff gray clayey fine sandy silt, trace of coarse sand and gravel.	A-4(3)	
			11.0'		5" RECOVERY		
12		6A	11.0'	15 14	Wet medium dense gray gravel w/ some coarse and fine sand and silt.	A-1-a	
			12.0'		9" RECOVERY		
		7	12.0'	16 49 27 19	Wet very dense brown gravel w/ some coarse sand and silt, trace of fine sand and rock fragments.	A-1-b	Chattering in auger drilling to 14 ft.
			14.0'		8" RECOVERY		
15		8	14.0'	4 9 7 10	Wet medium dense brown silty fine to coarse sand w/ some gravel, trace of cemented sands.	A-4(0)	
			16.0'		12" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Clayey sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-028

Contract: 25-113-01

Boring Location: Sta. 600+00.00, 45' Lt. C.L.

Boring Surface Elev.: +75.0'

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

Casing Size: 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
	2/21/08		10.0'	8.0'	Dry	75.0 75.0 75.0

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/21/08	1	0.0'	1 3 6 6	Wet stiff brown clayey silt w/ some fine sand, trace of coarse sand.	A-4(4)	Cultivated Soil - 11".
			2.0'		14" RECOVERY		
3		2	2.0'	8 7 8 8	Wet stiff brown fine sandy silt, trace of coarse sand and clay.	A-4(0)	
			4.0'		18" RECOVERY		
6		3	4.0'	2 3 6 6	Wet stiff gray clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(4)	
			6.0'		20" RECOVERY		
		4	6.0'	6 9 13 14	Wet very stiff gray clay w/ some fine to coarse sand, trace of gravel.	A-6(5)	
			8.0'		22" RECOVERY		
9		5	8.0'	6 9 11 12	Wet medium dense gray silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
12					Boring terminated at 10.0 feet		
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty sand

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-029

Contract: 25-113-01

Boring Location: Sta. 605.00.00, 122' Rt. C.L.

Boring Surface Elev.: + 77.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/21/08		16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/21/08	1	0.0'	2 3 6 9	Wet stiff brown clayey silt, trace of fine to coarse sand.	A-4(7)	Cultivated Soil - 11".
			2.0'		14" RECOVERY		
3		2	2.0'	10 15 17 20	Wet hard gray and brown silt w/ some clay, trace of fine to coarse sand.	A-4(3)	
			4.0'		24" RECOVERY		
		3	4.0'	4 7 11 11	Wet very stiff gray and brown clayey silt w/ some fine sand, trace of coarse sand.	A-4(3)	
6			6.0'		24" RECOVERY		
		4	6.0'	8 10	Wet very stiff brown fine sandy clay w/ some coarse sand.	A-6(4)	
			7.0'		10" RECOVERY		
		4A	7.0'	11 14	Wet medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		10" RECOVERY		
9		5	8.0'	5 8 7 11	Wet medium dense orange clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	8 13 14 11	Wet medium dense brown silty gravel and coarse sand w/ some fine sand.	A-1-b	
12			12.0'		14" RECOVERY		
		7	12.0'	9 16 16 12	Wet dense brown silty fine sand w/ some coarse sand and gravel.	A-2-4(0)	
			14.0'		16" RECOVERY		
15		8	14.0'	4 6 7 13	Wet medium dense brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			16.0'		20" RECOVERY		
					Boring terminated at 16.0		

Remarks:






Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silty low plasticity clay
	Poorly graded clayey silty sand
	Clayey sand
	Silty sand

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-030

Contract: 25-113-01

Boring Location: Sta. 610+00.00, 148' Lt. C.L.

Boring Surface Elev.: + 73.0'

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

Casing Size:	3 1/4	Inches	From Depth of:	0.0'	To:	16.0'
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings						
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water	
2/21/08		16.0'	14.0'	Dry		

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/21/08	1	1.0'	3	10" RECOVERY	A-4(6)	Cultivated Soil - 12".
			2.0'	3		A-4(1)	
3		2	2.0'	5 4 6	Wet stiff brown clayey fine to coarse sandy silt, trace of gravel.		
			4.0'		17" RECOVERY		
		3	4.0'	3 2 3 5	Wet firm orange fine sandy silt, trace of coarse sand.	A-4(0)	
6			6.0'		21" RECOVERY		
		4	6.0'	5 7 7 8	Wet medium dense orange and light brown fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			8.0'		18" RECOVERY		
9		5	8.0'	5 5 7 6	Wet medium dense orange and light brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		22" RECOVERY		
		6	10.0'	7 10 8 9	Wet medium dense brown clayey fine to coarse sand, trace of gravel.	A-2-5(0)	
12			12.0'		11" RECOVERY		
		7	12.0'	7 8 10 9	Wet medium dense brown clayey fine to coarse sand, trace of gravel.	A-2-5(0)	
			14.0'		20" RECOVERY		
15		8	14.0'	11 9 10 11	Wet medium dense brown coarse to fine sand w/ some silt and gravel.	A-1-b	
			16.0'		18" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silt



Silty sand

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-031

Contract: 25-113-01

Boring Location: Sta. 615.00.00, 120' Rt. C.L.

Boring Surface Elev.: + 79.0'

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



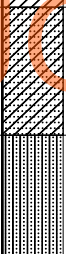
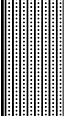
Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/21/2008		10.0'	8.0'	Dry	

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
	2/21/08	1	1.0'	1	 <p>Saturated medium stiff brown clay with a trace of fine to coarse sand and gravel. 8" RECOVERY</p>	A-4(8)	Cultivated Soil - 12".	
			2.0'	2				
3		2	2.0'	3			A-4(8)	
			4.0'	5				
			4.0'	4				
		3	4.0'	2	 <p>No Sieve Analysis: Indication of Saturated medium stiff brown clay with a trace of fine to coarse sand. 19" RECOVERY</p>			
6			6.0'	3				
			6.0'	4				
		4	6.0'	4	 <p>Saturated stiff brown clayey fine to coarse sand with some gravel. 22" RECOVERY</p>	A-6(2)		
			8.0'	5				
9		5	8.0'	3	 <p>Wet medium dense orange silty fine to coarse sand with a trace of gravel. 21" RECOVERY</p>	A-2-4(0)		
			10.0'	5				
				6				
					20" RECOVERY			
					Boring terminated at 10.0 feet			
12								
15								

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/21/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-032

Contract: 25-113-01

Boring Location: Sta. 620+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 81.0'

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time			Dry	
2/20/08		10.0'	8.0'		

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;

3
No. of U-Sample Boring: Ft.
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/20/08	1	0.8'	3 3 4	Wet firm brown clay, trace of fine to coarse sand. 15" RECOVERY	A-6(13)	Cultivated Soil - 9".
3		2	2.0'	5 4 6 9	Wet stiff brown clayey silt, trace of fine to coarse sand and gravel. 24" RECOVERY	A-4(6)	
		3	4.0'	5 5	Wet stiff brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 9" RECOVERY	A-4(3)	
6		3A	5.0'	6 6	Wet stiff brown fine sandy silt w/ some coarse sand, trace of gravel. 10" RECOVERY	A-4(0)	
		4	6.0'	2 4 6 7	Wet stiff brown clayey silt w/ some fine sand, trace of coarse sand. 24" RECOVERY	A-4(6)	
9		5	8.0'	3 5 7 7	Wet medium dense brown clayey coarse sand and gravel w/ some fine sand. 18" RECOVERY	A-2-4(0)	
			10.0'		Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/20/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-033

Contract: 25-113-01

Boring Location: Sta. 625+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 74.0'

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

Casing Size: 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
	2/20/08		10.0'	8.0'	Dry	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 10.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: 3 No. of U-Sample Boring: Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/20/08	1	0.0'	1 3 3 4	Wet firm brown clayey silt, trace of fine to coarse sand.	A-4(8)	Cultivated Soil - 10".
			2.0'		14" RECOVERY		
3		2	2.0'	2 4 5 4	Wet stiff brown clayey silt, trace of fine to coarse sand and gravel.	A-4(6)	
			4.0'		19" RECOVERY		
		3	4.0'	6 7 9 9	Wet very stiff orange fine sandy silt, trace of gravel and coarse sand.	A-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	7 9 10 9	Wet very stiff orange fine sandy silt.	A-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	4 8 8 20	Wet very stiff orange fine sandy silt, trace of gravel and coarse sand.	A-4(0)	
			10.0'		19" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory boring was drilled on 2/20/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-034

Contract: 25-113-01

Boring Location: Sta. 635+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 71.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 10.0'	

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/4/08			10.0'	8.0'	Dry	

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
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/4/08	1	1.0'	3 4	Moist firm brown clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(7)	Cultivated Soil - 10".
3		2	2.0'	4 5 6 7	Moist stiff brown silt w/ some clay and fine to coarse sand, trace of gravel. 18" RECOVERY	A-4(1)	
		3	4.0'	4 9 9 8	Moist medium dense light brown silty coarse sand w/ some fine sand, trace of gravel. 19" RECOVERY	A-1-b	
6		4	6.0'	7 8 10 9	Moist medium dense brown coarse sand w/ some silt, fine sand, and gravel. 20" RECOVERY	A-1-b	
9		5	8.0'	8 11 12 12	Moist medium dense brown gravel and coarse to fine sand w/ some silt. 14" RECOVERY	A-1-b	Sample contains rock fragments (gravel).
			10.0'		Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

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 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-035

Contract: 25-113-01

Boring Location: Sta. 639+99.11, 45' Rt. C.L.

Boring Surface Elev.: + 65.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/4/08	Time	16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/4/08	1	1.0'	4 4	Moist firm brown clayey silt, trace of fine sand.	A-4(7)	Cultivated Soil - 11".
			2.0'		10" RECOVERY	A-4(0)	
3		2	2.0'	3 7	Moist stiff brown silt w/ some gravel, coarse to fine sand, and clay.	A-1-b	
		2A	3.0'	14 13	7" RECOVERY		
			4.0'		Moist medium dense brown gravel and coarse sand w/ some silt and fine sand.	A-7-6(2)	
		3	4.0'	7 9 14 15	7" RECOVERY		
6			6.0'		Wet very stiff brown fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(6)	
		4	6.0'	8 6 9 14	11" RECOVERY		
			8.0'		18" RECOVERY		
9		5	8.0'	4 7 5 6	Wet stiff brown fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(3)	
			10.0'		12" RECOVERY		
		6	10.0'	3 3 5 7	Wet loose brown clayey coarse to fine sand w/ some gravel.	A-2-5(0)	
12			12.0'		19" RECOVERY		
		7	12.0'	6 5 11 10	Wet medium dense brown clayey coarse to fine sand w/ some gravel.	A-2-5(0)	
			14.0'		18" RECOVERY		
15		8	14.0'	2 13 7 5	Wet medium dense brown silty coarse to fine sand w/ some gravel.	A-2-4(0)	
			16.0'		18" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty 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 45.
2. Groundwater levels recorded at 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-036

Contract: 25-113-01

Boring Location: Sta. 645+00.00, 99' Lt. C.L.

Boring Surface Elev.: + 68.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To:	16.0'

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/4/08	Time	16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	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
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/4/08	1	1.0'	3	11" RECOVERY	A-6(12)	Cultivated Soil - 12".
			2.0'	3		A-4(8)	
3		2	2.0'	4	18" RECOVERY		
			4.0'	4			
		3	4.0'	2	23" RECOVERY	A-2-6(0)	Sample contains rock fragments.
			4.0'	4			
6		4	6.0'	15	21" RECOVERY	A-2-6(0)	Sample contains rock fragments.
			6.0'	15			
		5	8.0'	14	17" RECOVERY	A-2-7(0)	Sample contains rock fragments.
9			8.0'	17			
		6	10.0'	9	23" RECOVERY	A-2-6(0)	
			10.0'	11			
12		7	12.0'	4	19" RECOVERY	A-2-7(1)	
			12.0'	6			
		8	14.0'	3	19" RECOVERY	A-2-7(0)	
15			14.0'	9			
			16.0'	7			
				9	Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty 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 45.
2. Groundwater levels recorded at 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-037

Contract: 25-113-01

Boring Location: Sta. 650+00.00, 57' Rt. C.L.

Boring Surface Elev.: + 65.0'

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











Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	15.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date						
3/4/08			15.0'	13.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	15.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;		No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;		Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/4/08	Bulk/1	1.0'	3		A-6(10)	Cultivated Soil - 11".
			2.0'	4		A-6(11)	
3		2	2.0'	5		A-4(7)	
				6			
			4.0'				
		3	4.0'	2		A-2-4(0)	
6			5.0'				
		3A	5.0'	6		A-4(1)	
			6.0'				
		4	6.0'	26		A-1-a	
9			8.0'				
		5	8.0'	15			
			10.0'				
12							
15			13.0'				
		6	13.0'	12		A-2-4(0)	
			15.0'				
					Boring terminated at 15.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Clayey sand



Silty low plasticity
clay



Silty 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 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-038

Contract: 25-113-01

Boring Location: Sta. 655+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 63.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 15.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/3/08	Time	15.0'	13.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	15.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	1.0'	3 5	Wet firm brown clayey silt, trace of fine to coarse sand.	A-4(9)	Cultivated Soil - 10".
			2.0'			10" RECOVERY	A-4(4)
3		2	2.0'	3 4 5 5	Wet stiff brown silt w/ some clay, trace of fine to coarse sand and gravel.		
			4.0'		20" RECOVERY		
		3	4.0'	4 4 4 9	Wet loose brown clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	8 9 11 11	Wet medium dense orange and brown gravel w/ some fine to coarse sand and silt.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	7 8 9 10	Wet medium dense orange and brown gravel and fine sand w/ some coarse sand and silt.	A-1-b	
			10.0'		20" RECOVERY		
12							
		6	13.0'	2 7 8 4	Wet medium dense orange and brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
15			15.0'		16" RECOVERY		
					Boring terminated at 15.0 feet		

Remarks:


Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson


KEY TO SYMBOLS


Symbol Description

Strata symbols

 Low plasticity
clay

 Silt

 Clayey sand

 Silty 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 ATV CME 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-039

Contract: 25-113-01

Boring Location: Sta. 660+00.00, 127' Rt. C.L.

Boring Surface Elev.: + 52.0'

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/3/08		16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	0.8'	3 6 7	Moist medium dense brown gravel w/ some silt and fine sand, trace of coarse sand. 12" RECOVERY	A-1-b	Cultivated Soil - 9".
3		2	2.0'	2 3 4 5	Moist loose brown fine to coarse sand w/ some silt, trace of gravel. 16" RECOVERY	A-2-4(0)	
		3	4.0'	5 7 6 8	Moist medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
6		4	6.0'	5 5 5 18	Moist loose light brown coarse to fine sand w/ some silt and gravel. 19" RECOVERY	A-1-b	
		5	8.0'	5 7 8 10	Wet medium dense brown silty fine to coarse sand, trace of gravel. 21" RECOVERY	A-2-4(0)	
9		6	10.0'	5 10 11 15	Wet very stiff brown fine to coarse sandy silt, trace of gravel. 24" RECOVERY	A-5(0)	
		7	12.0'	11 12 14 13	Wet very stiff brown fine to coarse sandy silt w/ some gravel. 19" RECOVERY	A-4(0)	
		8	14.0'	5 7 11 10	Wet medium dense brown fine to coarse sand, trace of silt and gravel. 20" RECOVERY	A-3	
15			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty gravel



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 ATV CME 45.
2. Groundwater levels recorded at 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-040

Contract: 25-113-01

Boring Location: Sta. 680+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 56.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 15.0'	

Water Level Readings					
Date 3/3/08	Time	Depth of Hole 15.0'	Depth of Casing 13.0'	Depth of Water Dry	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 15.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;		No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
	3/3/08	Bulk/	1.0'	3	[Hatched Pattern]	A-6(5)	Cultivated Soil - 10".	
		1	2.0'	4		Moist brown fine to coarse sandy lean clay.		A-4(6)
3		2	2.0'	3	[Hatched Pattern]	A-4(6)		
				4		Wet firm brown clayey silt, trace of fine sand.		
				5		12" RECOVERY		
6			4.0'	5	[Hatched Pattern]			
		3	4.0'	5		Wet stiff brown clayey silt, trace of fine to coarse sand.		A-4(0)
9			6.0'	3	[Hatched Pattern]			
			4.0'	5		23" RECOVERY		
		4	4.0'	8		Wet stiff brown silt w/ some fine to coarse sand, trace of gravel.		A-4(0)
12			6.0'	7	[Hatched Pattern]			
		4	6.0'	10		24" RECOVERY		
15			8.0'	3	[Hatched Pattern]			
		5	8.0'	9		Wet very stiff brown fine sandy gravelly silt w/ some clay and coarse sand.		A-6(9)
			10.0'	5	[Hatched Pattern]			
				9		20" RECOVERY		
			13.0'	4	[Hatched Pattern]			
		6	13.0'	6		Wet very stiff brown clay w/ some fine sand, trace of coarse sand.		A-4(4)
			15.0'	4	[Hatched Pattern]			
				10		24" RECOVERY		
					Boring terminated at 15.0 feet			

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Low plasticity
clay



Poorly graded clayey
silty 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 ATV CME 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-041

Contract: 25-113-01

Boring Location: Sta. 685+00.00, 120' Lt. C.L.

Boring Surface Elev.: +44.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings					
Date 3/3/08	Time	Depth of Hole 16.0'	Depth of Casing 14.0'	Depth of Water Dry	Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0	Ft.;		3	Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;			No. of U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;			Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	1.0'	3	11" RECOVERY	A-4(7)	Cultivated Soil - 11".
			2.0'	3			
3		2	2.0'	3	21" RECOVERY	A-4(3)	
			2.0'	4			
			4.0'	4	23" RECOVERY	A-4(1)	
		3	4.0'	4			
6		4	6.0'	9	18" RECOVERY	A-1-b	
			6.0'	11			
9		5	8.0'	4	18" RECOVERY	A-1-b	3" clay lens at 8.5'
			8.0'	5			
			10.0'	5	24" RECOVERY	A-1-b	
		6	10.0'	8			
12		7	12.0'	5	22" RECOVERY	A-1-b	
			12.0'	6			
15		8	14.0'	6	21" RECOVERY	A-1-b	
			14.0'	11			
			16.0'	9			
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty low plasticity
clay



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 ATV CME 45.
2. Groundwater levels recorded at 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-042

Contract: 25-113-01

Boring Location: Sta. 695+00.00, 128' Rt. C.L.

Boring Surface Elev.: + 39.0'

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	16.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	3/3/08		16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	0.8'	1 1 4	Moist firm brown clayey coarse sandy silt w/ some fine sand and gravel. 9" RECOVERY	A-4(0)	Cultivated Soil - 9".
		2	2.0'	3	Moist very loose coarse sand w/ some fine sand, silt, and gravel. 5" RECOVERY	A-1-b A-6(12)	
3		2A	2.5'	4 4 6	Moist stiff brown clay w/ some coarse sand, trace of fine sand. 15" RECOVERY	A-6(10)	
		3	4.0'	3 6 9 12	Moist stiff brown clay w/ some fine sand, trace of gravel and coarse sand. 12" RECOVERY	A-1-b	
6		4	6.0'	10 9 6 5	Moist medium dense light brown coarse sand w/ some fine sand and silt, trace of gravel. 20" RECOVERY	A-1-b	
		5	8.0'	5 5 7 7	Moist medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-1-b	
9		6	10.0'	7 6 7 12	Moist medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY	A-1-b	
12		7	12.0'	8 5 6 5	Wet medium dense light brown coarse to fine sand, trace of silt and gravel. 18" RECOVERY	A-1-b	
		8	14.0'	5 3 3 2	Wet loose light brown coarse to fine sand w/ some silt, trace of gravel. 21" RECOVERY	A-2-4(0)	
15			16.0'		Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



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 45.
2. Groundwater levels recorded at 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-043

Contract: 25-113-01

Boring Location: Sta. 700+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 41.0'

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

Casing Size:	3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:			From Depth of:	0.0'	To:	10.0'

Water Level Readings		Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date			10.0'	8.0'	Dry	
3/3/08						

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	1.0'	3 4	Moist firm brown clay w/ some coarse to fine sand, trace of gravel.	A-6(6)	Cultivated Soil - 10".
			2.0'		10" RECOVERY		
3		2	2.0'	3 6 9 12	Moist stiff brown clayey fine to coarse sandy silt, trace of gravel.	A-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	9 12 17 7	Moist medium dense brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
6			6.0'		15" RECOVERY		
		4	6.0'	5 6 7 12	Moist medium dense light brown and brown silty fine sand w/ some coarse sand and gravel.	A-2-4(0)	
			8.0'		15" RECOVERY		
9		5	8.0'	6 11 11 12	Moist medium dense light brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	4" clay lens at 9.8 ft.
			10.0'				
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty 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 ATV CME 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-044

Contract: 25-113-01

Boring Location: Sta. 705+00.00, 16' Rt. C.L.

Boring Surface Elev.: + 48.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To:	10.0'

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/3/08	Time	10.0'	8.0'	Dry	

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	0.0'	1 3 4 4	Moist loose brown clayey coarse sand w/ some fine sand and gravel.	A-2-4(0)	Cultivated Soil - 10".
			2.0'		12" RECOVERY		
3		2	2.0'	6 10 10 12	Moist medium dense brown silty coarse to fine sand w/ some gravel.	A-1-b	
			4.0'		21" RECOVERY		
		3	4.0'	6 7 8 9	Wet medium dense brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
6			6.0'		22" RECOVERY		
		4	6.0'	9 6 5 4	Wet medium dense brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	4 5 4 6	Wet loose brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			10.0'		24" RECOVERY		
					Boring terminated at 10.0 feet		
12							
15							

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty 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 ATV CME 45.
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.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT blow counts are uncorrected.

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

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

Boring No.: R1-045

Contract: 25-113-01

Boring Location: Sta. 719+00.00, 65' Lt. C.L.

Boring Surface Elev.: + 53.0'

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

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0'		To: 16.0'	

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date 3/3/08	Time	16.0'	14.0'	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0	Ft.;		3	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;			No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;			Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/3/08	1	1.0'	2 3	Moist firm brown clayey silt w/ some fine to coarse sand, trace of gravel.	A-4(5)	Cultivated Soil - 10".
			2.0'		10" RECOVERY		
3		2	2.0'	4 7 9 12	Moist medium dense brown silty coarse sand w/ some fine sand, trace of gravel.	A-1-b	
			4.0'		14" RECOVERY		
		3	4.0'	11 10 9 8	Moist medium dense brown and light brown silty coarse sand, trace of gravel.	A-1-b	
6			6.0'		18" RECOVERY		
		4	6.0'	6 6 4 2	Moist loose brown and light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			8.0'		20" RECOVERY		
9		5	8.0'	6 2 3 3	Moist loose brown and light brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	3 6 7 5	Moist medium dense brown and light brown gravel and fine sand w/ some coarse sand and silt.	A-1-b	
12			12.0'		18" RECOVERY		
		7	12.0'	5 7 8 9	Moist medium dense brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
			14.0'		17" RECOVERY		
15		8	14.0'	7 7 6 7	Moist medium dense brown coarse to fine sand and gravel w/ some silt.	A-1-b	
			16.0'		18" RECOVERY		
					Boring terminated at 16.0 feet		

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty 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 ATV CME 45.
2. Groundwater levels recorded at 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All SPT 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.: R1-046

Contract: 25-113-01

Boring Location: Sta. 460+00, 100.00' Lt. C.L.

Boring Surface Elev.: + 65.80'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Spoon	O.D.	O.D. of Sampler:	2	IN.
	S-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.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					39.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
2/27/09		12.0	12.0	11.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: J. Truver
Helpers: J. Lafferty

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/27/09	1	0.5'	3 3 3	Moist firm brown silt w/ some clay, trace of fine to coarse sand.	A-4(3)	Topsoil - 5".
			2.0'		17" RECOVERY		
3		2	2.0'	3 4 8 9	Moist medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			4.0'		22" RECOVERY		
		3	4.0'	2 2 2 3	Moist soft brown clayey gravelly silt w/ some fine sand, trace of coarse sand.	A-4(1)	
6			6.0'		18" RECOVERY		
		4	6.0'	6 6 6 8	Moist medium dense tan coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	1 5 7 7	Moist medium dense tan coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		21" RECOVERY		
		6	10.0'	7 9 10 11	Moist medium dense brown gravel and coarse sand w/ some silt, trace of fine sand.	A-1-b	
12			12.0'		20" RECOVERY		
		7	12.0'	9 14 13 13	Indication of moist medium dense brown gravel and coarse sand, trace of clay and fine sand.		No sieve analysis.
			14.0'		17" RECOVERY		
15		8	14.0'	11 9 7 7	Indication of moist medium dense orange silty sand w/ some gravel.		No sieve analysis.
			16.0'		3" RECOVERY		
		9	16.0'	6 6 8 9	Wet medium dense orange, green, and brown clayey gravel and fine sand w/ some coarse	A-2-6(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-046


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		sand. 16" RECOVERY		
		10	18.0'	3 4 5 6	Saturated stiff green and brown fine sandy clay, trace of gravel and coarse sand.	A-7-6(3)	
			20.0'		15" RECOVERY		
21							
24							
		11	24.0'	3 6 8 10	Saturated stiff green and brown clayey fine sandy silt, trace of coarse sand.	A-4(0)	
			26.0'		22" RECOVERY		
27							
30		12	29.0'	4 7 8 10	Saturated medium dense green fine sand w/ some silt and coarse sand, trace of organic matter and gravel.	A-2-4(0)	Glauconitic.
			31.0'		21" RECOVERY		
33							
36		13	34.0'	W/H 6 9 11	Saturated medium dense green fine to coarse sand w/ some silt, trace of organic matter and gravel.	A-2-4(0)	Glauconitic.
			36.0'		21" RECOVERY		
39							
		14	39.0'	5 7 9 10	Saturated medium dense green clayey fine to coarse sand w/ some organic matter and gravel.	A-2-4(0)	Glauconitic.
			41.0'		23" RECOVERY		
42					End of Boring		
45							


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KEY TO SYMBOLS


Symbol Description


Strata symbols

 Silty low plasticity clay

 Silty sand

 Poorly graded sand with silt

 Clayey sand

 Poorly graded clayey silty sand

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 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 recommendations 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.: R1-047

Contract: 25-113-01

Boring Location: Sta. 465+00, 100.00' Rt. C.L.

Boring Surface Elev.: + 60.5'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/6/09		10.0	10.0	8.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	58.9	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/6/09	1	0.5'	2 3 2	Moist loose tan silty fine to coarse sand w/ some gravel. 7" RECOVERY	A-2-4(0)	Forrest Duff - 4".
3		2	2.0'	5 11 11 6	Moist medium dense orange gravel w/ some fine to coarse sand and silt. 13" RECOVERY	A-1-b	
		3	4.0'	5 6 6 6	Wet stiff brown fine sandy clay w/ some coarse sand. 13" RECOVERY	A-7-6(3)	
6		4	6.0'	4 4 6 5	Wet stiff brown fine sandy clay w/ some coarse sand. 17" RECOVERY	A-7-6(3)	
		5	8.0'	3 4 4 5	Saturated firm brown fine sandy clay w/ some coarse sand, trace of organic matter. 15" RECOVERY	A-6(2)	
		6	10.0'	3 4 6 7	Saturated loose brown clayey fine sand w/ some coarse sand. 13" RECOVERY	A-2-4(0)	
12		7	12.0'	3 4 5 5	Saturated stiff brown fine sandy clay, trace of coarse sand. 17" RECOVERY	A-7-6(3)	
		8	14.0'	3 3 5 7	Saturated firm brown-orange fine sandy clay, trace of coarse sand. 16" RECOVERY	A-7-6(4)	Started mud rotary at 14.0'.
15		9	16.0'	2 3 5 6	Saturated firm brown-orange fine sandy clay, trace of coarse sand.	A-7-6(3)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-047

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		12" RECOVERY		
		10	18.0'	3 5 7 10	Saturated stiff brown-orange fine sandy clay, trace of coarse sand.	A-6(4)	
			20.0'		24" RECOVERY		
21							
24							
		11	24.0'	3 4 5 7	Saturated loose dark green silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	
			26.0'		24" RECOVERY		
27							
30		12	29.0'	4 6 7 10	Saturated medium dense dark green fine to coarse sand w/ some silt, trace of organic matter and gravel.	A-2-4(0)	
			31.0'		23" RECOVERY		
33							
36		13	34.0'	7 7 16 15	Saturated medium dense dark green organic silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			36.0'		20" RECOVERY		
39							
		14	39.0'	5 4 7 11	Saturated medium dense dark green coarse to fine sand w/ some silt and gravel, trace of organic matter.	A-2-4(0)	
			41.0'		14" RECOVERY		
42							
45		15	44.0'	6 13 25 29	Saturated dense dark gray silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	

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

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

Boring No.: R1-047

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		24" RECOVERY		
48							
		16	49.0'	18 23 50/4"	Saturated very dense dark gray fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
51			50.5'		12" RECOVERY		
54							
		17	54.0'	45 50/3"	Saturated very dense dark gray fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
57			55.0'		9" RECOVERY		
60		18	59.0'	39 50/5"	Saturated very dense dark gray fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			60.0'		8" RECOVERY		
					End of Boring		
63							
66							
69							
72							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Clayey sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/6/2009 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 recommendations 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.: R1-048

Contract: 25-113-01

Boring Location: Sta. 540+00, 70.00' Lt. C.L.

Boring Surface Elev.: + 69.92'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 38.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/23/09		14.0	14.0	13.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/23/09	1	0.0'	2 3 4 6	Moist firm light brown fine sandy silt w/ some coarse sand and clay, trace of gravel.	A-4(0)	Topsoil - 2".
			2.0'		22" RECOVERY		
3		2	2.0'	6 8 8 10	Moist medium dense light brown and orange silty fine to coarse sand, trace of mica.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	5 12 13 14	Moist medium dense dark brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
6			6.0'		20" RECOVERY		
		4	6.0'	15 13 13 12	Moist medium dense dark brown silty coarse to fine sand w/ some gravel.	A-1-b	
			8.0'		16" RECOVERY		
9		5	8.0'	7 9 10 13	Moist medium dense light gray coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		23" RECOVERY		
		6	10.0'	10 11 10 12	Moist medium dense light gray coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
12			12.0'		24" RECOVERY		
		7	12.0'	4 4 6 7	Wet loose brown and black mottled coarse to fine sand w/ some silt and gravel.	A-1-b	
			14.0'		23" RECOVERY		
15		8	14.0'	5 5 3 3	Wet loose light brown gravel and fine sand w/ some silt and coarse sand.	A-1-b	
			16.0'		14" RECOVERY		
		9	16.0'	8 10 9	Indication of wet very stiff dark black clayey		No sieve analysis.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-048

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	9	sandy silt.		Glauconitic.
			18.0'	6" RECOVERY			
		10	18.0'	8 9 11 9	Saturated very stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-6(3)	Glauconitic.
			20.0'	21" RECOVERY			
21		11	20.0'	3 5 8 9	Saturated stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-6(2)	Glauconitic.
			22.0'	21" RECOVERY			
		12	22.0'	8 12 13 16	Saturated very stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-6(5)	Glauconitic.
24			24.0'	23" RECOVERY			
		13	24.0'	5 7 8 9	Saturated stiff dark black fine sandy silt, trace of coarse sand and gravel.	A-4(0)	Glauconitic.
			26.0'	23" RECOVERY			
27		14	26.0'	12 13 18 22	Saturated hard dark black fine sandy clay, trace of coarse sand.	A-6(3)	Glauconitic.
			28.0'	14" RECOVERY			
		15	28.0'	3 4 6 10	Saturated stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-6(5)	
30			30.0'	10" RECOVERY			
		16	30.0'	13 9 14 17	Saturated very stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-7-6(4)	Glauconitic.
			32.0'	9" RECOVERY			
33		17	32.0'	3 5 8 8	Saturated stiff dark black fine sandy clay, trace of coarse sand and gravel.	A-7-6(5)	Glauconitic.
			34.0'	12" RECOVERY			
		18	34.0'	2 3 6 7	Saturated loose black clayey fine to coarse sand w/ some organic matter, trace of gravel.	A-2-6(1)	
36			36.0'	22" RECOVERY			
		19	36.0'	14 18 27 24	Saturated hard black organic fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
			38.0'	19" RECOVERY			
39		20	38.0'	5 11 18 24	Saturated medium dense black organic silty fine to coarse sand w/ some gravel.	A-2-5(0)	
			40.0'	8" RECOVERY			
42					End of Boring		
45							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Clayey sand



Low plasticity
clay

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Notes:

1. Exploratory borings were drilled on 3/23/2009 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 recommendations 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.: R1-049

Contract: 25-113-01

Boring Location: Sta. 545+00, 30.00' Lt. C.L.

Boring Surface Elev.: + 68.23'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 38.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/27/09		18.0	16.0	15.7	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 40.0	Ft.;		Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:	Ft.;	No. of	U-Samples:		Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:			Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/27/09	1	0.0'	2 3 3 5	Moist firm brown clay w/ some fine to coarse sand.	A-6(6)	
			2.0'		21" RECOVERY		
3		2	2.0'	5 10 8 5	Moist medium dense brown to orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			4.0'		22" RECOVERY		
		3	4.0'	3 3 5 6	Moist loose brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
6			6.0'		20" RECOVERY		
		4	6.0'	9 7 7 5	Moist medium dense brown coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
			8.0'		22" RECOVERY		
9		5	8.0'	5 7 6 6	Moist medium dense brown coarse sand w/ some fine sand, gravel, and silt.	A-1-b	
			10.0'		17" RECOVERY		
		6	10.0'	6 10 7 6	Moist medium dense brown coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
12			12.0'		18" RECOVERY		
		7	12.0'	2 4 6 8	Wet loose brown coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
			14.0'		18" RECOVERY		
15		8	14.0'	7 5 4 7	Wet loose brown coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
			16.0'		23" RECOVERY		
		9	16.0'	9 11 15	Wet medium dense coarse sand w/ some fine	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-049

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	16	sand and gravel, trace of silt. 23" RECOVERY		
		10	18.0'	17 6 7 5	Wet medium dense brown coarse to fine sand w/ some gravel and silt.	A-1-b	
			20.0'		18" RECOVERY		
21		11	20.0'	10 10 8 8	Wet medium dense brown coarse to fine sand w/ some gravel and silt.	A-1-b	
			22.0'		19" RECOVERY		
		12	22.0'	4 6 7 9	Saturated stiff brown to gray fine sandy clay, trace of coarse sand and gravel.	A-7-6(5)	
24			24.0'		18" RECOVERY		
		13	24.0'	4 11 14 17	Saturated very stiff gray fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(2)	
			26.0'		23" RECOVERY		
27		14	26.0'	14 18 20 22	Saturated hard gray fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(6)	
			28.0'		24" RECOVERY		
		15	28.0'	7 8 10 11	Saturated medium dense black silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
30			30.0'		18" RECOVERY		
		16	30.0'	8 8 10 12	Saturated medium dense black fine sand w/ some coarse sand, silt, and organic matter, trace of gravel.	A-2-4(0)	
			32.0'		20" RECOVERY		
33		17	32.0'	8 10 12 13	Saturated medium dense black silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			34.0'		23" RECOVERY		
		18	34.0'	4 5 8 14	Saturated medium dense black silty coarse to fine sand, trace of gravel.	A-2-4(0)	
36			36.0'		21" RECOVERY		
		19	36.0'	5 7 11 15	Saturated medium dense black silty coarse to fine sand w/ some gravel.	A-2-4(0)	
			38.0'		24" RECOVERY		
39		20	38.0'	42 50/3"	Saturated very dense black silty fine to coarse sand w/ some gravel.	A-2-5(0)	
			39.0'		10" RECOVERY		
42					End of Boring		
45							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Silt

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AUGUST 2015

Notes:

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 recommendations 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.: R1-050

Contract: 25-113-01

Boring Location: Sta. 550+00, 100.00' Rt. C.L.

Boring Surface Elev.: + 63.87

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 38.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
3/30/09		12.0	10.0	8.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	40.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/30/09	1	0.0'	2 4 4 6	Moist stiff brown clayey fine sandy silt, trace of coarse sand.	A-4(2)	
			2.0'		20" RECOVERY		
3		2	2.0'	3 4 8 8	Moist stiff brown clayey fine sandy silt w/ some coarse sand and gravel.	A-4(1)	
			4.0'		18" RECOVERY		
		3	4.0'	5 4 4 3	Moist loose brown silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
6			6.0'		18" RECOVERY		
		4	6.0'	3 2 2 5	Moist very loose brown and orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			8.0'		17" RECOVERY		
9		5	8.0'	3 4 8 6	Moist medium dense brown-orange coarse to fine sand and gravel w/ some silt.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	8 9 7 5	Moist medium dense brown-orange coarse sand and gravel w/ some fine sand and silt.	A-1-b	
12			12.0'		18" RECOVERY		
		7	12.0'	2 2 5 6	Moist medium dense brown and orange fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			14.0'		19" RECOVERY		
15		8	14.0'	3 4 4 8	Moist loose orange coarse sand w/ some silt and fine sand, trace of gravel.	A-1-b	
			16.0'		20" RECOVERY		
		9	16.0'	8 5 8	Wet medium dense green clayey coarse to	A-2-6(1)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-050

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	10	fine sand, trace of gravel.		
			18.0'		19" RECOVERY		
		10	18.0'	5 5 10 11	Wet medium dense green silty fine to coarse sand, trace of organic matter and gravel.	A-2-4(0)	
			20.0'		18" RECOVERY		
21		11	20.0'	8 10 7 10	Saturated medium dense green silty fine to coarse sand w/ some gravel and organic matter.	A-2-4(0)	
			22.0'		18" RECOVERY		
		12	22.0'	2 3 6 8	Saturated stiff green fine sandy clay w/ some coarse sand, trace of organic matter and gravel.	A-6(0)	
24			24.0'		21" RECOVERY		
		13	24.0'	4 18 12 12	Saturated very stiff green organic fine sandy silt w/ some clay and coarse sand, trace of gravel.	A-4(0)	
			26.0'		20" RECOVERY		
27		14	26.0'	4 7 14 20	Saturated medium dense green silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			28.0'		19" RECOVERY		
		15	28.0'	5 8 14 31	Saturated very stiff green fine to coarse sandy clay, trace of gravel.	A-7-5(2)	
30			30.0'		17" RECOVERY		
		16	30.0'	30 50/4"	Saturated very dense green clayey fine sand w/ some coarse sand and gravel.	A-2-5(0)	
			31.0'		10" RECOVERY		
		17	32.0'	10 28 34 50/5"	Saturated very dense green silty fine to coarse sand, trace of gravel.	A-2-4(0)	
33			34.0'		19" RECOVERY		
		18	34.0'	30 20 23 28	Saturated dense green silty fine to coarse sand, trace of gravel.	A-2-5(0)	
36			36.0'		18" RECOVERY		
		19	36.0'	13 15 17 18	Saturated dense green fine to coarse sand w/ some gravel and silt.	A-2-4(0)	
			38.0'		18" RECOVERY		
39		20	38.0'	20 32 38 50/3"	Saturated very dense green clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
			40.0'		18" RECOVERY		
42					End of Boring		
45							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on 3/30/2009 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 recommendations 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.: R1-051

Contract: 25-113-01

Boring Location: Sta. 555+00, 100.00' Lt. C.L.

Boring Surface Elev.: + 62.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Spoon		O.D.	O.D. of Sampler: 2		IN.
S-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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 34.0	

Water Level Readings					
Date 4/1/09	Time	Depth of Hole 6.0	Depth of Casing 4.0	Depth of Water 3.1	Elev. of Water

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 60.0 Ft.;
 No. of 2 in. Dia. Shelby Tubes: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 Dia. U-Sample Boring: Ft.
 U-Samples: Ft.
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	4/1/09	1	0.5'	1 3 4	Wet firm gray clayey silt, trace of fine sand and gravel. 18" RECOVERY	A-4(8)	Topsoil - 3".
3		2	2.0'	9 8 9 13	Wet very stiff gray clayey silt, trace of fine to coarse sand and gravel. 19" RECOVERY	A-4(6)	
		3	4.0'	9 18 14 14	Wet hard gray-brown gravelly silt w/ some coarse to fine sand, trace of clay. 15" RECOVERY	A-4(0)	
6		4	6.0'	9 9 13 15	Wet medium dense brown and orange coarse to fine sand w/ some silt, trace of gravel. 19" RECOVERY	A-1-b	
9		5	8.0'	6 10 9 12	Wet medium dense brown coarse to fine sand w/ some gravel, trace of silt. 19" RECOVERY	A-1-b	
		6	10.0'	11 2 6 6	Wet medium dense brown coarse sand w/ some gravel and fine sand, trace of silt. 20" RECOVERY	A-1-b	
12		7	12.0'	5 4 3 3	Wet loose tan fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
		8	14.0'	2 3 5 6	Wet loose tan fine to coarse sand w/ some silt, trace of gravel. 17" RECOVERY	A-2-4(0)	
15		9	16.0'	7 6 9 10	Wet medium dense tan-brown coarse sand w/ some silt, fine sand, and gravel.	A-1-b	

Remarks: Mud Rotary @ 34.0 Feet.

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-051

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		19" RECOVERY		
		10	18.0'	12 10 8 8	Wet medium dense tan-brown coarse sand w/ some fine sand, trace of silt and gravel.	A-1-b	
			20.0'		18" RECOVERY		
21							
24							
		11	24.0'	3 4 6 7	Saturated loose brown coarse sand w/ some fine sand, silt, and gravel.	A-1-b	
			26.0'		18" RECOVERY		
27							
30		12	29.0'	6 5 11 10	Saturated medium dense green coarse to fine sand w/ silt and gravel.	A-2-4(0)	Glauconitic.
			31.0'		18" RECOVERY		
33							
36		13	34.0'	8 9 12 14	Saturated medium dense green-brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	Mud Rotary @ 34.0'.
			36.0'		20" RECOVERY		
39							
42		14	39.0'	1 2 4 6	Saturated loose green-brown fine to coarse sand, trace of silt.	A-3	
			41.0'		20" RECOVERY		
45							
45		15	44.0'	9 9 13 16	Saturated medium dense green-brown fine sand w/ some coarse sand and silt.	A-2-4(0)	

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

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

Boring No.: R1-051

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			46.0'		21" RECOVERY		
48							
		16	49.0'	18 28 38 50/4"	Saturated very dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
51			51.0'		19" RECOVERY		
54							
		17	54.0'	14 26 33 50/4"	Saturated very dense green fine sand, trace of silt and coarse sand.	A-3	
			56.0'		17" RECOVERY		
57							
		18	58.0' 59.0'	28 50/3"	Saturated very dense green fine sand w/ some coarse sand and silt.	A-2-4(0)	
					9" RECOVERY		
60					End of Boring		
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Well graded sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 4/1/2009 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 recommendations 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.: R1-052

Contract: 25-113-01

Boring Location: Sta. 682+00, 40.00' Lt. C.L.

Boring Surface Elev.: + 50.61'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/10/09		20.0	18.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	20.0	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: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/10/09	1	1.0'	3 4 4	Moist firm brown clayey silt, trace of coarse to fine sand.	A-4(9)	Cultivated Soil - 8".
3		2	2.0'	4	Moist firm brown clayey silt, trace of fine to coarse sand.	A-4(7)	
			2.5'	4 4 3 4			
6		3	4.0'	2 9 9 6	14" RECOVERY	A-2-4(0)	
			4.0'		18" RECOVERY		
			4.0'		Moist medium dense orange gravel and fine sand w/ some clay, trace of coarse sand.		
9		4	6.0'	7 8 8 9	10" RECOVERY	A-2-4(0)	
			6.0'		Moist medium dense orange silty fine sand and gravel w/ some coarse sand.		
			8.0'		18" RECOVERY		
12		5	8.0'	3 3 7 3	Moist loose orange silty fine sand, trace of coarse sand and gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
			10.0'		Moist stiff orange fine sandy silt, trace of coarse sand.		
15		7	12.0'	3 4 5 5	19" RECOVERY	A-2-4(0)	
			12.0'		Moist loose orange fine to coarse sand w/ some silt, trace of gravel.		
			14.0'		21" RECOVERY		
15		8	14.0'	3 4 3 3	Moist loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			16.0'		15" RECOVERY		
		9	16.0'	3 18 17 16	Moist dense orange gravel and coarse sand w/ some fine sand, trace of silt.	A-1-a	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-052

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			18.0'		14" RECOVERY		
		10	18.0'	20 20 20 17	Moist dense orange gravel and coarse sand w/ some silt, trace of fine sand.	A-1-a	
			20.0'		18" RECOVERY		
21					End of Boring		
24							
27							
30							
33							
36							
39							
42							
45							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Poorly graded clayey
silty sand



Silty sand



Poorly graded gravel
with silt

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Notes:

1. Exploratory borings were drilled on 2/10/2009 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 recommendations 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.: R1-053

Contract: 25-113-01

Boring Location: Sta. 622+00, 190.00' Rt. C.L.

Boring Surface Elev.: + 78.42'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 48.0

Water Level Readings

Date
2/25/09

Time

Depth of Hole
39.0

Depth of Casing
39.0

Depth of Water
35.2

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 50.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/24/09	1	1.0'	4 5	Moist stiff tan clayey silt, trace of fine to coarse sand.	A-4(6)	Cultivated soil - 9"; 4" frozen soil.
		2	2.0'	6 7 6 5	10" RECOVERY Moist stiff tan silt, trace of fine to coarse sand and gravel.	A-4(0)	
3		3	4.0' 4.0'	3 5 5 6	16" RECOVERY Moist stiff tan clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(1)	
6		4	6.0' 6.0'	7 6 6 7	14" RECOVERY Moist stiff tan clay w/ some fine sand, trace of coarse sand and gravel.	A-6(9)	
9		5	8.0'	2 3 6 7	24" RECOVERY Moist stiff tan fine sandy silt w/ some gravel, clay, and coarse sand.	A-4(0)	
12		6	10.0' 10.0'	9 8 11 11	14" RECOVERY Moist medium dense orange silty fine to coarse sand w/ some gravel.	A-2-4(0)	
15		7	12.0' 12.0'	6 13 13 16	24" RECOVERY Moist medium dense orange coarse to fine sand and gravel w/ some silt.	A-1-b	
		8	14.0' 14.0'	8 10 10 9	14" RECOVERY Moist medium dense orange coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
		9	16.0' 16.0'	15 14 12 12	19" RECOVERY Moist medium dense orange coarse to fine sand w/ some silt and gravel.	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-053

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0'	10 18 10 9	17" RECOVERY	A-1-b	Cemented sands.
			18.0'		Wet medium dense orange coarse to fine sand and gravel w/ some silt.		
21			20.0'		17" RECOVERY		
24		11	24.0'	8 9 6 5	Wet medium dense orange-brown silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			26.0'		14" RECOVERY		
27							
30		12	29.0'	5 4 6 5	Saturated loose orange-brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			31.0'		24" RECOVERY		
33							
36	2/25/09	13	34.0'	2 4 5 7	Saturated loose orange and gray mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			36.0'		24" RECOVERY		
39							
42		14	39.0'	5 6 7 8	Saturated medium dense orange and gray mottled fine sand w/ some coarse sand and silt.	A-2-4(0)	
			41.0'		24" RECOVERY		
45		15	44.0'	8 10 14 11	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			46.0'		24" RECOVERY		

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

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

Boring No.: R1-053

Contract: 25-113-01


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48							
		16	48.0'	7 9 14 14	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			50.0'		24" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							


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AUGUST 2015


KEY TO SYMBOLS


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
Strata symbols


 Silty low plasticity clay

 Silt

 Low plasticity clay

 Poorly graded clayey silty sand

 Silty sand

 Poorly graded sand with silt

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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 recommendations 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.: R1-054

Contract: 25-113-01

Boring Location: Sta. 622+00, 250.00' Lt. C.L.

Boring Surface Elev.: + 76.07'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 48.0

Water Level Readings

Date
2/23/09

Time

Depth of Hole
34.0

Depth of Casing
34.0

Depth of Water
32.5

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 50.0
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/23/09	1	1.0'	3 4	Moist firm brown clay, trace of fine sand.	A-6(11)	Cultivated Soil - 9".
			2.0'		11" RECOVERY		
3		2	2.0'	3 7 6 6	Moist stiff brown clayey silt w/ some fine to coarse sand.	A-4(4)	
			4.0'		16" RECOVERY		
6		3	4.0'	3 4 5 6	Moist loose orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			6.0'		14" RECOVERY		
		4	6.0'	6 7 9 8	Moist medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		24" RECOVERY		
9		5	8.0'	2 6 7 7	Moist medium dense yellow silty fine to coarse sand.	A-2-4(0)	
			10.0'		15" RECOVERY		
		6	10.0'	6 7 7 8	Moist medium dense yellow fine to coarse sand and gravel w/ some silt.	A-2-4(0)	
12			12.0'		20" RECOVERY		
		7			Wet medium dense brown, green, and orange silty coarse to fine sand w/ some gravel.	A-2-4(0)	Cemented sands.
			14.0'		14" RECOVERY		
15		8	14.0'	5 8 9 9	Wet medium dense brown, green, and orange silty fine to coarse sand w/ some gravel.	A-2-4(0)	Cemented sands.
			16.0'		14" RECOVERY		
		9	16.0'	5 5 6 8	Wet medium dense brown, green, and orange coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	Cemented sands.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-054

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0'	7 7 11 9	12" RECOVERY	A-1-b	Cemented sands.
			18.0'		Wet medium dense brown, green, and orange coarse to fine sand w/ some silt and gravel.		
21			20.0'		9" RECOVERY		
		11	24.0'	4 5 6 9	Wet medium dense brown, green, and orange fine to coarse sand w/ some silt and gravel.	A-2-4(0)	Cemented sands.
24			26.0'		20" RECOVERY		
27							
		12	29.0'	3 5 7 6	Wet medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	Cemented sands.
30			31.0'		24" RECOVERY		
33							
		13	34.0'	2 6 11 8	Wet medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	Cemented sands.
36			36.0'		20" RECOVERY		
39		14	39.0'	6 10 11 14	Wet medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Cemented sands.
			41.0'		21" RECOVERY		
42							
		15	44.0'	13 18 33 45	Wet dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Cemented sands.
45			46.0'		16" RECOVERY		

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

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

Boring No.: R1-054

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	7 7 10 12	Wet medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Cemented sands.
			50.0'		20" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 2/23/2009 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 recommendations 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.: R1-055

Contract: 25-113-01

Boring Location: Sta. 627+00, 360.00' Rt. C.L.

Boring Surface Elev.: +72.15'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 50.0

Water Level Readings

Date
2/26/09

Time

Depth of Hole
29.0

Depth of Casing
29.0

Depth of Water
26.9

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 50.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	2/25/09	1	1.0'	4 5	Moist stiff tan clayey silt, trace of fine to coarse sand.	A-4(10)	Cultivated Soil - 10".
		2	2.0'	4 5	10" RECOVERY	A-4(10)	
6	2/25/09	2A	3.0'	6 5	Moist stiff tan clayey silt, trace of fine to coarse sand.	A-2-4(0)	
		3	4.0'	4 9 8 9	Moist medium dense tan-orange clayey coarse to fine sand w/ some gravel.	A-2-6(0)	
		4	6.0'	10 10 11 10	Moist medium dense yellow-orange clayey coarse to fine sand, trace of gravel.	A-1-b	
9	2/25/09	5	8.0'	12 13 14 10	Moist medium dense orange gravel and fine sand w/ some coarse sand and silt.	A-1-b	
		6	10.0'	9 11 15 9	Moist medium dense orange coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
12	2/25/09	7	12.0'	6 11 11 9	Moist medium dense orange coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
		8	14.0'	6 8 9 6	Moist medium dense brown silty gravel and coarse sand w/ some fine sand.	A-1-b	Cemented sands.
15	2/25/09	8	14.0'	6 8 9 6	Wet very stiff brown fine to coarse sandy silt, trace of gravel.	A-4(0)	Cemented sands.
		9	16.0'	6 10 9 6	Wet medium dense brown clayey coarse to fine sand w/ some gravel.	A-2-5(0)	Cemented sands.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-055

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
		10	18.0'	6 2 2 3	9" RECOVERY	A-2-4(0)	Cemented sands.	
			18.0'		Wet very loose orange silty coarse to fine sand w/ some gravel.			
21			20.0'		12" RECOVERY			
24								
	2/26/09	11	24.0'	5 10 7 4	Wet medium dense green-orange coarse to fine sand and gravel w/ some silt.	A-1-b	Cemented sands.	
					26.0'			17" RECOVERY
27								
		12	29.0'	8 7 7 8	Saturated medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)		
30			31.0'		21" RECOVERY			
33								
		13	34.0'	4 6 10 12	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)		
			36.0'		20" RECOVERY			
36								
		14	39.0'	6 7 8 8	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)		
			41.0'		22" RECOVERY			
42								
		15	44.0'	9 10 17 20	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3		
45			46.0'		16" RECOVERY			

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

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

Boring No.: R1-055

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	15 15 18 20	Saturated dense orange fine sand w/ some coarse sand and silt.	A-3	
			50.0'		16" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 2/25/2009 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 recommendations 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.: R1-056

Contract: 25-113-01

Boring Location: Sta. 627+00, 360.00' Lt. C.L.

Boring Surface Elev.: + 80.38'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 48

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/23/09		39.0	39.0	38.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	50.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/20/09	1	1.0'	4 5	Moist stiff tan clayey silt, trace of fine to coarse sand.	A-4(8)	Cultivated Soil - 8".
			2.0'		10" RECOVERY		
3		2	2.0'	5 6 8 6	Moist stiff tan-orange fine sandy silt w/ some coarse sand, trace of clay.	A-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	4 4 4 4	Moist firm tan-orange fine sandy silt w/ some coarse sand.	A-4(0)	
6			6.0'		15" RECOVERY		
		4	6.0'	2 5 10 12	Moist stiff orange clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
			8.0'		22" RECOVERY		
9		5	8.0'	5 6 6 7	Moist medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		19" RECOVERY		
		6	10.0'	7 6 8 10	Moist medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
12			12.0'		24" RECOVERY		
		7	12.0'	4 6 7 12	Moist medium dense yellow coarse sand and gravel w/ some fine sand and silt.	A-1-b	
			14.0'		15" RECOVERY		
15		8	14.0'	25 17 12 11	Moist medium dense yellow fine to coarse sand and gravel w/ some silt.	A-1-b	
			16.0'		6" RECOVERY		
		9	16.0'	27 10 10 10	Moist medium dense yellow silty coarse sand and gravel w/ some fine sand.	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-056

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
		10	18.0'	6 10 8 9	15" RECOVERY	A-7-5(1)		
			18.0'		Wet very stiff brown-orange fine sandy clay w/ some coarse sand and gravel.			
21			20.0'		18" RECOVERY			
		11	24.0'	7 4 4 4	Wet loose brown-orange silty fine to coarse sand, trace of gravel.	A-2-4(0)		
24			26.0'		14" RECOVERY			
27								
		12	29.0'	2 5 7 6	Wet medium dense brown-orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)		
30			31.0'		24" RECOVERY			
33								
		13	34.0'	2 4 7 7	Wet medium dense orange-white mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)		
36			36.0'		23" RECOVERY			
39								
	2/23/09	14	39.0'	3 4 6 8	Wet loose orange-white mottled fine to coarse sand, trace of silt.	A-3		
42					41.0'			22" RECOVERY
45								
		15	44.0'	5 8 12 20	Wet medium dense orange-white mottled fine sand w/ some coarse sand and silt.	A-2-4(0)		
			46.0'		24" RECOVERY			

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

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

Boring No.: R1-056

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48							
		16	48.0'	10 16 17 15	Wet dense orange-white mottled fine to coarse sand, trace of silt and gravel.	A-3	
			50.0'		24" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 2/20/2009 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 recommendations 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.: R1-057

Contract: 25-113-01

Boring Location: Sta. 632+00, 380.00' Rt. C.L.

Boring Surface Elev.: + 70.58'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split-Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 48.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/17/09		29.0	29.0	27.1	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	50.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/17/09	1	1.0'	3 4	Moist firm gray clay, trace of fine to coarse sand.	A-6(11)	Cultivated Soil - 9".
			2.0'		10" RECOVERY	A-6(9)	
3		2	2.0'	5 6 8 9	Moist stiff gray clay, trace of gravel and fine to coarse sand.		
			4.0'		20" RECOVERY		
		3	4.0'	3 5 7 8	Moist medium dense orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
6			6.0'		15" RECOVERY		
		4	6.0'	7 50/5"	Moist very dense orange coarse to fine sand w/ some gravel and silt.	A-1-b	
			7.0'		8" RECOVERY		
9		5	8.0'	4 5 7 8	Wet stiff orange-brown fine sandy clay w/ some gravel and coarse sand.	A-7-5(5)	Cemented sands.
			10.0'		12" RECOVERY		
		6	10.0'	6 7 13 14	Wet very stiff orange-brown fine sandy clay w/ some gravel and coarse sand.	A-7-5(8)	Cemented sands.
12			12.0'		20" RECOVERY		
		7	12.0'	4 7 8 11	Wet medium dense orange-brown clayey fine sand w/ some gravel and coarse sand.	A-2-6(0)	Cemented sands.
			14.0'		18" RECOVERY		
15		8	14.0'	4 8 8 9	Wet medium dense orange-brown and green silty fine to coarse sand w/ some gravel.	A-2-4(0)	
			16.0'		17" RECOVERY		
		9	16.0'	8 10 7 8	Wet medium dense orange-brown and green silty coarse to fine sand w/ some gravel.	A-2-4(0)	Cemented sands.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-057

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0'	8 3 7 8	20" RECOVERY	A-2-4(0)	Cemented sands.
			18.0'		Wet loose orange-brown and green silty coarse to fine sand w/ some gravel.		
21			20.0'		15" RECOVERY		
		11	24.0'	6 3 5 3	Wet loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Cemented sands.
24			26.0'		24" RECOVERY		
		12	29.0'	3 4 5 6	Wet loose yellow and gray mottled fine to coarse sand, trace of silt and gravel.	A-3	
27			31.0'		24" RECOVERY		
		13	34.0'	6 9 11 12	Wet medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
30			36.0'		24" RECOVERY		
		14	39.0'	7 9 11 12	Wet medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
33			41.0'		24" RECOVERY		
		15	44.0'	6 6 10 12	Wet medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
36			46.0'		17" RECOVERY		
39							
42							
45							

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

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

Boring No.: R1-057

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	10 12 22 30	Wet dense orange fine sand w/ some fine sand, trace of silt.	A-3	
			50.0'		21" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Elastic silt



Poorly graded sand
with silt

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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 recommendations 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.: R1-059

Contract: 25-113-01

Boring Location: Sta. 637+00, 220.00' Rt. C.L.

Boring Surface Elev.: + 63.68'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Spoon	O.D.	O.D. of Sampler:	2	IN.
	S-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.

Casing Size:	3 1/4	Inches	From Depth of:		To:
	Hollow Stem Auger:		From Depth of:	0.0	To:
					48.0

Water Level Readings		Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
Date	Time				
2/16/09		29.0	29.0	25.8	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	50.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/13/09	1	1.0'	4 4	Moist firm brown clayey silt, trace of fine to coarse sand and gravel.	A-4(9)	Cultivated Soil - 9".
			2.0'		10" RECOVERY	A-4(7)	
3		2	2.0'	6 7	Moist very stiff brown clayey silt, trace of fine to coarse sand and gravel.	A-1-b	
		2A	3.0'	11 7	8" RECOVERY	A-7-5(11)	
		3	4.0'	4 6 7 10	Moist medium dense brown clayey gravel and coarse sand w/ some silt and fine sand.		
			4.0'		4" RECOVERY		
6			6.0'		Moist stiff brown fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(4)	Cemented sands.
		4	6.0'	8 7 10 13	12" RECOVERY		
			8.0'		16" RECOVERY		
		5	8.0'	3 5 6 8	Wet medium dense brown-orange clayey coarse to fine sand w/ some gravel.	A-2-7(1)	Cemented sands.
9			10.0'		15" RECOVERY		
		6	10.0'	4 7 9 10	Wet medium dense brown-orange clayey coarse to fine sand, trace of gravel.	A-2-7(0)	Cemented sands.
12			12.0'		21" RECOVERY		
		7	12.0'	5 3 7 7	Wet loose brown-orange silty coarse to fine sand and gravel.	A-1-b	Cemented sands.
			14.0'		14" RECOVERY		
		8	14.0'	3 8 5 5	Wet medium dense brown-orange silty coarse to fine sand w/ some gravel.	A-1-b	Cemented sands.
15			16.0'		15" RECOVERY		
		9	16.0'	5 7 7 5	Wet medium dense brown-orange silty coarse to fine sand w/ some gravel.	A-2-4(0)	Cemented sands.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-059

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0'	3 3 3 5	21" RECOVERY	A-2-4(0)	
			18.0'		Wet loose orange fine to coarse sand w/ some silt, trace of gravel.		
21			20.0'		21" RECOVERY		
24		11	24.0'	3 5 6 7	Wet medium dense tan and yellow fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			26.0'		24" RECOVERY		
27							
30		12	29.0'	5 5 6 9	Wet medium dense tan and yellow fine to coarse sand, trace of silt and gravel.	A-3	
			31.0'		24" RECOVERY		
33							
36		13	34.0'	3 7 9 21	Wet medium dense orange fine to coarse sand, trace of silt.	A-3	
			36.0'		24" RECOVERY		
39							
42		14	39.0'	2 6 9 12	Wet medium dense orange fine to coarse sand, trace of silt.	A-3	
			41.0'		24" RECOVERY		
45		15	44.0'	6 13 14 19	Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
			46.0'		20" RECOVERY		

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

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

Boring No.: R1-059

Contract: 25-113-01






Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	4 4 7 13	Wet medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			50.0'		19" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols

	Low plasticity clay
	Silt
	Poorly graded clayey silty sand
	Elastic silt
	Silty sand
	Poorly graded sand with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/13/2009 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 recommendations 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.: R1-060

Contract: 25-113-01

Boring Location: Sta. 637+00, 150.00' Lt. C.L.

Boring Surface Elev.: +70.91'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 48.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/13/09		34.0	34.0	30.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	50.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3	2/12/09	1	1.0'	2 3 4	Moist firm brown clay, trace of fine sand.	A-6(13)	Cultivated Soil - 8".
		2	2.0' 2.5'	7 6 6	Moist stiff brown clayey silt, trace of fine to coarse sand and gravel. 14" RECOVERY	A-4(8)	
		3	4.0' 4.0'	2 4 5 6	18" RECOVERY Moist loose tan and orange mottled clayey coarse to fine sand w/ some gravel.	A-2-4(0)	
6		4	6.0' 6.0'	3 10 11 12	10" RECOVERY Moist medium dense tan and orange gravel and coarse to fine sand w/ some silt.	A-1-b	
			8.0'		12" RECOVERY		
9	2/13/09	5	8.0'	7 11 8 7	Moist medium dense tan and orange clayey coarse sand and gravel w/ some fine sand.	A-2-7(0)	
			10.0'		13" RECOVERY		
12		6	10.0'	7 16 15 17	Moist hard brown and green coarse to fine sandy clay w/ some gravel.	A-7-5(3)	Cemented sands.
			12.0'		18" RECOVERY		
15		7	12.0'	7 9 8 10	Wet medium dense orange clayey coarse to fine sand w/ some gravel.	A-2-5(0)	
			14.0'		12" RECOVERY		
		8	14.0'	6 8 3 4	Wet medium dense orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	Cemented sands.
			16.0'		20" RECOVERY		
		9	16.0'	14 8 4 7	Wet medium dense orange silty coarse to fine sand w/ some gravel.	A-1-b	Cemented sands.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-060

Contract: 25-113-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
48		16	48.0'	6 10 12 13	Wet medium dense orange fine to coarse sand, trace of silt.	A-3	
			50.0'		24" RECOVERY		
51					End of Boring		
54							
57							
60							
63							
66							
69							
72							

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AUGUST 2015

KEY TO SYMBOLS

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

Notes:

1. Exploratory borings were drilled on 2/12/2009 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 recommendations 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.: R1-061

Contract: 25-113-01

Boring Location: Sta. 629+50, 200.00' Lt. C.L.

Boring Surface Elev.: + 76.68'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 2/19/09
Time

Depth of Hole **Depth of Casing** **Depth of Water** **Elev. of Water**
Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16.0 Ft.;
No. of 2 in. Dia. Shelby Tubes: ;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;
Dia. U-Sample Boring: Ft.
U-Samples:
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: J. Truver
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/19/09	1	1.0'	4	Moist firm tan silt w/ some clay, trace of fine to coarse sand.	A-4(3)	Asphalt - 6".
			2.0'	4		10" RECOVERY	
3		2	2.0'	4 5 5 4	Moist stiff tan clayey silt, trace of fine to coarse sand and gravel.		
			4.0'		16" RECOVERY		
		3	4.0'	2 3 4 5	Moist firm tan clayey silt w/ some fine sand, trace of coarse sand.	A-4(3)	Offset 2' south to obtain shelby tube.
6		4	6.0'	6 10 11 11	Moist very stiff orange clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(2)	
			8.0'		19" RECOVERY		
		5	8.0'	4 7 7 7	Moist stiff orange silty fine to coarse sand w/ some gravel.	A-2-4(0)	
			10.0'		16" RECOVERY		
		6	10.0'	7 9 10 11	Moist very stiff orange and white mottled fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	Cemented sands.
12		7	12.0'	2 6 6 8	Moist medium dense orange-gray mottled silty fine sand.	A-2-4(0)	Contains mica.
			14.0'		18" RECOVERY		
		8	14.0'	10 14	Moist hard orange-gray mottled fine sandy silt, trace of coarse sand.	A-4(0)	
15		8A	15.0'	17 20	Moist dense orange-brown silty coarse to fine sand w/ some gravel.	A-2-4(0)	Cemented sands.
			16.0'		12" RECOVERY		
					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Clayey sand



Silty sand

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/19/2009 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 recommendations 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.: R1-062

Contract: 25-113-01

Boring Location: Sta. 629+40, 200.00' Rt. C.L.

Boring Surface Elev.: + 73.50'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 16.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/19/09		16.0	14.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks																																																																																						
	2/19/09	1	1.0'	3	Moist firm brown silt w/ some clay and fine to coarse sand, trace of gravel. 8" RECOVERY	A-4(2)	Asphalt - 6".																																																																																						
			2.0'	4				3		2	2.0'	3	Moist loose orange clayey gravel and fine to coarse sand. 15" RECOVERY	A-2-4(0)			4		5	6		3	4.0'	3	Moist loose orange clayey fine to coarse sand, trace of gravel. 15" RECOVERY	A-2-4(0)			4		6	9		4	6.0'	8	Moist medium dense orange fine to coarse sand w/ some silt and gravel. 9" RECOVERY	A-2-4(0)			9		17	12		5	8.0'	5	Moist very stiff brown and green gravelly clay w/ some fine to coarse sand. 11" RECOVERY	A-7-6(5)			9		12	15		6	10.0'	12	Wet very stiff brown and green fine sandy clay w/ some coarse sand, trace of gravel. 19" RECOVERY	A-7-5(6)			14		18			7	12.0'	4	Wet very stiff brown clayey fine to coarse sandy silt, trace of gravel. 21" RECOVERY	A-5(0)	Cemented sands.		7		11			8	14.0'	8	Wet medium dense brown silty fine to coarse sand, trace of gravel. 21" RECOVERY	A-2-4(0)	Cemented sands.		10		14		
3		2	2.0'	3	Moist loose orange clayey gravel and fine to coarse sand. 15" RECOVERY	A-2-4(0)																																																																																							
				4																																																																																									
				5																																																																																									
6		3	4.0'	3	Moist loose orange clayey fine to coarse sand, trace of gravel. 15" RECOVERY	A-2-4(0)																																																																																							
				4																																																																																									
				6																																																																																									
9		4	6.0'	8	Moist medium dense orange fine to coarse sand w/ some silt and gravel. 9" RECOVERY	A-2-4(0)																																																																																							
				9																																																																																									
				17																																																																																									
12		5	8.0'	5	Moist very stiff brown and green gravelly clay w/ some fine to coarse sand. 11" RECOVERY	A-7-6(5)																																																																																							
				9																																																																																									
				12																																																																																									
15		6	10.0'	12	Wet very stiff brown and green fine sandy clay w/ some coarse sand, trace of gravel. 19" RECOVERY	A-7-5(6)																																																																																							
				14																																																																																									
				18																																																																																									
		7	12.0'	4	Wet very stiff brown clayey fine to coarse sandy silt, trace of gravel. 21" RECOVERY	A-5(0)	Cemented sands.																																																																																						
				7																																																																																									
				11																																																																																									
		8	14.0'	8	Wet medium dense brown silty fine to coarse sand, trace of gravel. 21" RECOVERY	A-2-4(0)	Cemented sands.																																																																																						
				10																																																																																									
				14																																																																																									
			16.0'		End of Boring																																																																																								

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Poorly graded clayey
silty sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/19/2009 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 recommendations 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.: R1-063

Contract: 25-113-01

Boring Location: Sta. 667+00, C.L.

Boring Surface Elev.: + 31.44'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 18.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/11/09		6.0	6.0	5.6	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	20.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/11/09	1	0.0'	2 17 13 8	Moist very stiff brown fine sandy silt w/ some coarse sand, trace of gravel.	A-4(0)	
			2.0'		6" RECOVERY		
3		2	2.0'	1 3 8 8	Moist medium dense brown silty fine sand and gravel w/ some coarse sand.	A-2-4(0)	
			4.0'		7" RECOVERY		
		3	4.0'	1 3 4 5	Moist loose brown gravel and coarse sand w/ some fine sand, trace of silt.	A-1-a	
6			6.0'		4" RECOVERY		
		4	6.0'	3 5 7 8	Moist medium dense brown coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
			8.0'		20" RECOVERY		
9		5	8.0'	4 5 8 8	Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
			10.0'		24" RECOVERY		
		6	10.0'	10 12 16 16	Wet medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
12			12.0'		19" RECOVERY		
		7	12.0'	6 9 11 14	Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			14.0'		10" RECOVERY		
15		8	14.0'	4 7 12 9	Wet medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	Cemented sands.
			16.0'		14" RECOVERY		
		9	16.0'	9 10 12	Wet medium dense brown fine sand w/ some	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-063

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'	16	coarse sand and silt.		
			18.0'		18" RECOVERY		
		10	18.0'	6 7 9	Wet medium dense brown fine to coarse sand w/ some silt.	A-2-4(0)	
			20.0'		21" RECOVERY		
21					End of Boring		
24							
27							
30							
33							
36							
39							
42							
45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded gravel



Poorly graded sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/11/2009 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 recommendations 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.: R1-064

Contract: 25-113-01

Boring Location: Sta. 670+00, C.L.

Boring Surface Elev.: +39.8'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 18.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
2/11/09		16.0	16.0	14.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	20.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/11/09	1	0.5'	4 4 5	Moist loose orange-yellow clayey gravel and coarse sand w/ some fine sand. 16" RECOVERY	A-2-4(0)	Forest Duff - 3".
3		2	2.0'	7 5 3 2	Moist loose orange-yellow coarse sand and gravel w/ some fine sand and silt. 12" RECOVERY	A-1-b	
		3	4.0'	3 2 2 2	Moist very loose orange coarse to fine sand w/ some silt, trace of gravel. 13" RECOVERY	A-1-b	
6		4	6.0'	4 2 3 3	Moist loose orange coarse to fine sand, trace of silt and gravel. 20" RECOVERY	A-1-b	
		5	8.0'	3 2 3 3	Moist loose orange coarse sand w/ some fine sand, trace of silt and gravel. 20" RECOVERY	A-1-b	
		6	10.0'	2 2 3 4	Moist loose orange coarse to fine sand, trace of silt and gravel. 19" RECOVERY	A-3	
12		7	12.0'	1 2 2 4	Wet very loose orange coarse to fine sand, trace of silt and gravel. 19" RECOVERY	A-1-b	
		8	14.0'	1 2 1 2	Wet very loose orange coarse to fine sand, trace of silt and gravel. 21" RECOVERY	A-2-4(0)	
15		9	16.0'	1 1 3 4	Wet very loose orange fine sand w/ some coarse sand and silt, trace of gravel.		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-064

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
18			18.0'		24" RECOVERY		
		10	18.0'	3 4 5 6	Wet loose orange coarse to fine sand, trace of silt and gravel.	A-1-b	
			20.0'		22" RECOVERY		
21					End of Boring		
24							
27							
30							
33							
36							
39							
42							
45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/11/2009 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 recommendations 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.: R1-065

Contract: 25-113-01

Boring Location: Sta. 741+00, C.L.

Boring Surface Elev.: + 16.7'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 26.0

Water Level Readings

Date
1/20/09

Time

Depth of Hole

10.0

Depth of Casing

10.0

Depth of Water

9.9

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 26.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;

Ft.;

Dia. U-Sample Boring:

No. of

Core Drilling in Rock:

Ft.

U-Samples:

Ft.

Boring Contractor: Walton Corporation

Driller: G. Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/20/09	1	1.0'	10 9	Moist dense orange fine to coarse sand w/ some gravel and silt.	A-2-4(0)	Topsoil - 9"; fill material.
			2.0'		12" RECOVERY		
3		2	2.0'	7 8 11 17	Moist medium dense orange coarse to fine sand w/ some gravel and silt.	A-1-b	Fill material.
			4.0'		20" RECOVERY		
6		3	4.0'	11 11 20 29	Moist dense orange fine to coarse sand and gravel w/ some silt.	A-1-b	Fill material.
			6.0'		11" RECOVERY		
9		4	6.0'	38 31 40 30	Moist very dense brown coarse sand w/ some fine sand, silt, and gravel.	A-1-b	Fill material.
			8.0'		18" RECOVERY		
12		5	8.0'	7 9 6 7	Wet medium dense orange coarse to fine sand w/ some gravel and silt.	A-1-b	
			10.0'		16" RECOVERY		
15		6	10.0'	3 4	Wet loose light brown coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	
			11.0'		10" RECOVERY		
		6A	11.0'	4 5	Wet loose orange fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			12.0'		10" RECOVERY		
		7	12.0'	1 2 2 2	Saturated very loose orange fine sand w/ some coarse sand, trace of silt.	A-3	
			14.0'		16" RECOVERY		
		8	14.0'	1 2 2 3	Saturated very loose orange fine sand w/ some coarse sand, trace of silt.	A-3	
			16.0'		19" RECOVERY		
		9	16.0'	3 3 3 4	Saturated loose orange fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: R1-065

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			18.0'		18" RECOVERY		
		10	18.0'	4 2 3 4	Saturated loose orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			20.0'		17" RECOVERY		
21		11	20.0'	1 1 2 2	Saturated very loose orange fine sand w/ some silt and coarse sand.	A-2-4(0)	
			22.0'		13" RECOVERY		
		12	22.0'	1 1 2 3	Saturated very loose orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
24			24.0'		19" RECOVERY		
		13	24.0'	10 15 17 19	Saturated dense brown silty fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
			26.0'		18" RECOVERY		
27					End of Boring		
					<div style="font-size: 48px; color: orange; margin: 0;">DRAFT</div> <div style="font-size: 72px; color: orange; margin: 0;">NOT FOR BIDDING</div> <div style="font-size: 72px; color: orange; margin: 0;">AUGUST 2015</div>		
30							
33							
36							
39							
42							
45							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/20/2009 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 recommendations 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.: R1-066

Contract: 25-113-01

Boring Location: Sta. 744+50, C.L.

Boring Surface Elev.: + 16.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 26.0

Water Level Readings

Date
1/23/09

Time

Depth of Hole
14.0

Depth of Casing
14.0

Depth of Water
12.1

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 26.0

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;

Ft.;

Dia. U-Sample Boring:

No. of U-Samples:

Core Drilling in Rock:

Ft.

Ft.

Boring Contractor: Walton Corporation

Driller: G. Truver

Helpers: T. Kane

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/23/09	1	1.0'	8 8	Moist medium dense orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	Topsoil - 10", fill material.
		2	2.0'	18 19 16 15	8" RECOVERY Moist dense orange fine to coarse sand w/ some silt and gravel.	A-2-4(0)	Fill material.
3		3	4.0'	5 13 15 18	18" RECOVERY Moist medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	Fill material.
6		4	6.0'	22 18 19 20	17" RECOVERY Wet dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	Fill material.
9		5	8.0'	11 23 24 27	20" RECOVERY Wet dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	Fill material.
12		6	10.0'	31 34 31 39	20" RECOVERY Wet very dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Fill material.
15		7	12.0'	15 20 25 27	21" RECOVERY Wet dense light brown coarse sand w/ some fine sand, gravel, and silt.	A-1-b	
		8	14.0'	9 15 21 27	21" RECOVERY Wet dense light brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
		9	16.0'	11 24 23 18	20" RECOVERY Wet 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

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

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

Boring No.: R1-066

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		10	18.0' 18.0'	W/H 2 5 4	12" RECOVERY Wet loose light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
21		11	20.0' 20.0'	1 3 8 8	12" RECOVERY Wet medium dense light brown fine to coarse sand w/ some silt and gravel.	A-1-b	
		12	22.0' 22.0'	1 2 3 3	16" RECOVERY No Sample Recovery		
24		13	24.0' 24.0'	6 15 25 17	0" RECOVERY Saturated dense dark gray fine sand and gravel w/ some coarse sand, trace of silt.	A-3	
			26.0'		10" RECOVERY End of Boring		
27							
30							
33							
36							
39							
42							
45							

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/23/2009 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 recommendations 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.: R1-075

Contract: 28-113-01

Boring Location: Sta. 907+00 20' Rt. C.L.

Boring Surface Elev.: + 33.92

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/9/10		20.0	18.0	7.0	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	20.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	7/9/10	1	0.5'	13 14 13	Moist very stiff brown clayey silt w/some fine sand, trace coarse sand and fine gravel. 10" RECOVERY	A-4(5)	Topsoil - 4".
		2	2.0'	11 9	Moist very stiff brown clayey silt w/some fine sand, trace coarse sand and fine gravel. 10" RECOVERY	A-4(2)	
3.6		2A	3.0'	9 10	8" RECOVERY	A-2-4(0)	
		3	4.0'	7 8 8 6	Moist medium dense brown silty fine sand w/some coarse sand, trace fine gravel. 10" RECOVERY	A-2-4(0)	
		4	6.0'	4 5 6 7	Wet medium dense brown fine to coarse sand w/some silt, trace fine gravel. 16" RECOVERY	A-2-4(0)	
7.2		5	8.0'	3 3 4 4	Wet medium dense orange fine sand w/some silt and coarse sand, trace fine gravel. 14" RECOVERY	A-2-4(0)	
		6	10.0'	4 5 8 7	Wet loose orange fine sand w/some coarse sand and silt, trace fine gravel. 18" RECOVERY	A-2-4(0)	
10.8		7	12.0'	3 3 3 3	Wet medium dense orange fine to coarse sand w/some silt, trace fine gravel. 18" RECOVERY	A-2-4(0)	
		8	14.0'	4 12 11 13	Wet loose orange fine to coarse sand w/some silt, trace fine gravel. 14" RECOVERY	A-2-4(0)	
14.4		9	16.0'	5 10 15 16	Wet medium dense orange fine sand w/some fine gravel, coarse sand and silt. 16" RECOVERY	A-2-4(0)	
		10	18.0'	11 26 24 25	Wet medium dense brown fine sand w/some silt, trace fine gravel and coarse sand. 18" RECOVERY	A-2-4(0)	
18			20.0'		Wet very dense brown fine to coarse sand w/some fine gravel, trace silt. 19" RECOVERY	A-1-b	
					End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 9, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55 ATV.
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.: R1-076

Contract: 28-113-01

Boring Location: Sta 923+00 20' Lt. C.L.

Boring Surface Elev.: + 53.55

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 20.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/12/10		20.0	18.0	Dry	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	20.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		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
	7/12/10	1	1.0'	7 10	Moist very stiff brown clayey silt w/some coarse to fine sand and fine gravel.	A-4(3)	Asphalt - 4". Stone - 8".
		2	2.0'	7 5 5 6	8" RECOVERY Wet stiff brown silty clay w/trace fine to coarse sand and fine gravel.	A-6(13)	
3.6		3	4.0'	13 5 6 7	17" RECOVERY Wet stiff brown fine sandy silt w/some coarse sand and clay, trace fine gravel.	A-4(0)	
		4	6.0'	9 8 7 8	13" RECOVERY Wet stiff gray fine sandy silt w/some coarse sand and clay.	A-4(0)	
7.2		5	8.0'	9 11 7 8	15" RECOVERY Wet medium dense orange silty fine sand w/trace coarse sand.	A-2-4(0)	
		6	10.0'	6 5 5 7	14" RECOVERY Wet stiff tan fine sandy silt w/trace coarse sand.	A-4(0)	
10.8		7	12.0'	5 6 8 7	19" RECOVERY Wet medium dense tan silty fine sand w/trace coarse sand and fine gravel.	A-2-4(0)	
		8	14.0'	4 5 6 5	6" RECOVERY Wet medium dense tan fine to coarse sand w/some silt, trace fine gravel.	A-2-4(0)	
14.4		9	16.0'	4 6 10 11	19" RECOVERY Wet medium dense orange coarse to fine sand w/some silt, trace fine gravel.	A-2-4(0)	
18		10	18.0'	9 9 11 15	20" RECOVERY Wet medium dense brown fine gravelly coarse sand w/trace silt and fine sand.	A-1-b	
			20.0'		14" RECOVERY End of Boring		

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty low plasticity
clay



Silty sand



Silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on July 12, 2010 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55 ATV.
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.: SWM1-10-1

Contract: 25-113-01

Boring Location: Sta. 514+00, 250.00' Rt. C.L.

Boring Surface Elev.: + 53.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings
Date 2/25/09

Time

Depth of Hole 16.0

Depth of Casing

Depth of Water 4.9

Elev. of Water

Pay 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.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/25/09	1	0.5'	6 4 4	Moist firm brown fine sandy silt w/ some clay and coarse sand, trace of gravel. 15" RECOVERY	A-4(0)	Topsoil - 5".
		2	2.0'	4 8 13 8	Moist medium dense brown gravel and coarse sand w/ some fine sand, trace of silt. 19" RECOVERY	A-1-a	
3.5		3	4.0'	4 5 8	Moist loose brown coarse sand and gravel w/ some silt and fine sand. 6" RECOVERY	A-1-b	
		4	6.0'	4 4 4 5	Wet loose brown coarse sand w/ some fine sand, silt, and gravel. 22" RECOVERY	A-1-b	
7		5	8.0'	6 7 7	Wet medium dense brown coarse sand w/ some gravel, silt, and fine sand. 21" RECOVERY	A-1-b	
		6	10.0'	4 8 8 13	Wet medium dense green and brown gravel w/ some coarse to fine sand and silt. 16" RECOVERY	A-1-a	
		7	12.0'	6 6 6	Saturated medium dense green and brown clayey fine to coarse sand, trace of gravel. 21" RECOVERY	A-2-4(0)	
14		8	14.0'	6 6 7 8	Saturated medium dense green and brown clayey fine to coarse sand w/ some gravel. 20" RECOVERY	A-2-4(0)	
			16.0'		End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Poorly graded sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-1-1

Contract: 25-113-01

Boring Location: Sta. 462+00, 330' Rt. C.L.

Boring Surface Elev.: + 58.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/28/2009		10.0	8.0	7.2	

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	16.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:			Core Drilling in Rock:		

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
	7/28/09	1	0.0'	4 5 6 4	Moist stiff brown silt w/some clay and fine to coarse sand.	A-4(2)	
			2.0'		22" RECOVERY		
		2	2.0'	4 5 7 10	Moist medium dense brown gravel w/some clay and coarse to fine sand.	A-1-b	
3.5			4.0'		15" RECOVERY		
		3	4.0'	8 4 3 3	Moist to wet loose brown silty fine to coarse sand w/some gravel.	A-2-4(0)	
			6.0'		16" RECOVERY		
		4	6.0'	4 3 4 6	Wet firm brown fine sandy clay w/some coarse sand.	A-7-6(4)	
7			8.0'		18" RECOVERY		
		5	8.0'	2 3 4 5	Wet firm green fine sandy clay w/some coarse sand, trace of gravel.	A-7-6(4)	
			10.0'		14" RECOVERY		
		6	10.0'	4 4 6 9	Wet stiff green fine sandy clay w/some coarse sand.	A-7-6(4)	
10.5			12.0'		18" RECOVERY		
		7	12.0'	3 5 7 8	Wet stiff green fine sandy clay w/trace of coarse sand.	A-6(3)	
			14.0'		17" RECOVERY		
		8	14.0'	6 7 9 12	Wet very stiff green fine sandy clay w/trace of coarse sand.	A-6(4)	
			16.0'		18" RECOVERY		
					End of Boring		
17.5							

Remarks:


Reviewed By: Maureen Kelley


Soils Supervisor: Randy Ferguson


KEY TO SYMBOLS


Symbol Description

Strata symbols

 Silty low plasticity clay

 Poorly graded clayey silty sand

 Silty sand

 Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWMI-11-1

Contract: 25-113-01

Boring Location: Sta. 516+60, 270.00' Rt. C.L.

Boring Surface Elev.: + 53.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 2/26/09
Time

Depth of Hole 16.0

Depth of Casing

Depth of Water 5.6

Elev. of Water

Pay 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.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation
Driller: J. Truver
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/26/09	1	0.5'	2 2 3	Moist firm brown silt w/ some clay, fine to coarse sand, and gravel.	A-4(1)	Topsoil - 5".
			2.0'		17" RECOVERY		
		2	2.0'	4 4 4 6	Moist loose brown gravel and coarse sand w/ some silt and fine sand.	A-1-b	
3.5			4.0'		20" RECOVERY		
		3	4.0'	2 2 2	Wet very loose brown coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
			6.0'		12" RECOVERY		
		4	6.0'	2 7 5 7	Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
7			8.0'		20" RECOVERY		
		5	8.0'	5 5 7 7	Wet medium dense brown fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			10.0'		21" RECOVERY		
		6	10.0'	4 5 7 7	Saturated medium dense brown and green silty fine sand w/ some coarse sand and gravel.	A-2-4(0)	
			12.0'		20" RECOVERY		
		7	12.0'	8 11 13 16	Saturated medium dense brown and green clayey fine sand w/ some coarse sand and gravel.	A-2-4(0)	
14			14.0'		15" RECOVERY		
		8	14.0'	9 11 14 18	Saturated medium dense brown and green fine to coarse sand w/ some gravel and silt.	A-2-4(0)	
			16.0'		17" RECOVERY		
					End of Boring		
17.5							

Remarks:


Reviewed By: Maureen Kelley


Soils Supervisor: Randy Ferguson


KEY TO SYMBOLS

Symbol Description

Strata symbols

 Silty low plasticity
clay

 Silty sand

 Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/26/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-12-1

Contract: 25-113-01

Boring Location: Sta. 543+50, 280.00' Rt. C.L.

Boring Surface Elev.: + 65.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler Split Spoon		O.D.	O.D. of Sampler: 2		IN.
S-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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	3/30/09		16.0		Dry	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/30/09	1	0.5'	2 1 2	Moist soft brown clayey fine sandy silt, trace of coarse sand and gravel.	A-4(1)	Topsoil - 6".
			2.0'		17" RECOVERY		
3.5		2	2.0'	7 21 30 24	Moist very dense brown coarse sand and gravel w/ some fine sand and silt.	A-1-b	
			4.0'		20" RECOVERY		
		3	4.0'	9 12 13 12	Moist medium dense brown coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
			6.0'		18" RECOVERY		
7		4	6.0'	22 20 17 17	Moist dense brown gravel and coarse sand w/ some fine sand, trace of silt.	A-1-b	
			8.0'		18" RECOVERY		
		5	8.0'	6 6 7 4	Wet medium dense brown and orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			10.0'		18" RECOVERY		
10.5		6	10.0'	8 8 11 12	Wet medium dense brown and orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			12.0'		15" RECOVERY		
		7	12.0'	4 8 12 11	Wet medium dense brown and orange coarse sand w/ some fine sand, trace of gravel and silt.	A-1-b	
14			14.0'		19" RECOVERY		
		8	14.0'	5 7 9 13	Wet medium dense brown and orange coarse to fine sand, trace of gravel and silt.	A-1-b	
			16.0'		17" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

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

Notes:

1. Exploratory borings were drilled on 3/30/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWMI-13-1

Contract: 25-113-01

Boring Location: Sta. 547+00, 240.00' Lt. C.L.

Boring Surface Elev.: + 66.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 3/23/09
Time

Depth of Hole 16.0
Depth of Casing
Depth of Water 7.3
Elev. of Water

Pay 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.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/23/09	1	0.5'	4 5	Moist stiff brown silt w/ some coarse to fine sand and clay, trace of gravel. 10" RECOVERY	A-4(1)	Topsoil - 6".
		2	2.0'	8 8 9 11	Moist medium dense brown and gray clayey fine sandy silt, trace of coarse sand and gravel. 13" RECOVERY	A-4(1)	
3.5		3	4.0'	4 6 8 11	Moist medium dense brown and black mottled clayey fine to coarse sand, trace of gravel. 10" RECOVERY	A-2-4(0)	
		4	6.0'	7 9 8 6	Wet medium dense brown and black mottled coarse to fine sand w/ some silt, trace of gravel. 11" RECOVERY	A-2-4(0)	
7		5	8.0'	5 4 5 6	Wet loose brown and black mottled fine to coarse sand w/ some silt and gravel. 16" RECOVERY	A-2-4(0)	
		6	10.0'	5 7 6 7	Wet medium dense brown and black mottled fine to coarse sand w/ some silt, trace of gravel. 12" RECOVERY	A-2-4(0)	
10.5		7	12.0'	11 6 7 8	Wet medium dense brown coarse to fine sand w/ some gravel, trace of silt. 21" RECOVERY	A-1-b	
14		8	14.0'	3 5 8 10	Wet medium dense brown coarse to fine sand and gravel, trace of silt. 20" RECOVERY	A-1-b	
			16.0'		End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/23/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-14-1

Contract: 25-113-01

Boring Location: Sta. 558+60, 210.00' Lt. C.L.

Boring Surface Elev.: + 65.0

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer:	140	Lbs.	Average Fall:	30	IN.
Type of:	D-Sampler: Split Spoon	O.D.	O.D. of Sampler:	2	IN.
	S-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.

Casing Size:	3 1/4	Inches	From Depth of:		To:
Hollow Stem Auger:			From Depth of:	0.0	To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	4/8/09		16.0		6.3	

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	4/8/09	1	0.5'	2 5 6	Moist stiff gray and brown fine sandy silt, trace of coarse sand and clay.	A-4(0)	Topsoil - 6".
			2.0'		18" RECOVERY		
		2	2.0'	10 17 22 16	Moist dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	Iron staining.
3.5			4.0'		24" RECOVERY		
		3	4.0'	10 7 12 14	Wet medium dense brown and orange coarse to fine sand w/ some clay, trace of gravel.	A-2-4(0)	
			6.0'		21" RECOVERY		
		4	6.0'	20 18 20 15	Wet dense gray coarse sand w/ some gravel, fine sand, and silt.	A-1-b	
7			8.0'		20" RECOVERY		
		5	8.0'	6 7 6 7	Wet medium dense gray coarse to fine sand w/ some gravel and silt.	A-1-b	
			10.0'		12" RECOVERY		
		6	10.0'	14 8 9 7	Wet medium dense gray coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
			12.0'		14" RECOVERY		
		7	12.0'	2 5 5 9	Wet loose gray coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
			14.0'		18" RECOVERY		
		8	14.0'	20 25 18 19	Wet dense gray coarse to fine sand w/ some gravel and silt.	A-1-b	
			16.0'		23" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 4/8/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-15-1

Contract: 25-113-01

Boring Location: Sta. 563+52, 218.00' Rt. C.L.

Boring Surface Elev.: + 67.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of: 0.0
From Depth of: 0.0
To: 14.0
To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/10/2009		12.0	10.0	6.5	

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	6 6 7	Moist stiff orange clayey fine sandy silt w/some coarse sand and gravel.	A-4(1)	Cultivated Soil - 8".
			2.0'		7" RECOVERY		
		2	2.0'	14 18 14 12	Moist dense orange coarse to fine sand w/some silt and gravel.	A-1-b	
3.5			4.0'		18" RECOVERY		
		3	4.0'	10 10 10 10	Moist medium dense silty coarse to fine sand w/trace of gravel.	A-2-4(0)	
			6.0'		21" RECOVERY		
		4	6.0'	10 16 7 12	Moist medium dense orange gravel and coarse sand w/some fine sand and silt.	A-1-b	
7			8.0'		15" RECOVERY		
		5	8.0'	4 9 9 8	Wet medium dense orange gravel and coarse sand w/some fine sand and silt.	A-1-b	
			10.0'		12" RECOVERY		
		6	10.0'	9 8 13 20	Wet medium dense orange gravel and coarse sand w/some fine sand, trace of silt.	A-1-b	
10.5			12.0'		23" RECOVERY		
		7	12.0'	8 7 16 12	Wet very stiff green fine sandy clay w/some coarse sand and gravel.	A-7-5(4)	
			14.0'		14" RECOVERY		
14		8	14.0'	10 13 14 17	Wet very stiff green fine sandy clay w/trace of coarse sand and gravel.	A-7-5(14)	
			16.0'		9" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: _____ **Soils Supervisor:** _____

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt



Elastic silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWMI-16-1

Contract: 25-113-01

Boring Location: Sta. 570+13, 187.00' Rt. C.L.

Boring Surface Elev.: + 65.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/10/2009		10.0	8.0	6.8	

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

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	5 8 12	Moist very stiff gray silt w/some clay, trace of fine to coarse sand and gravel. 15" RECOVERY	A-4(3)	Cultivated Soil - 8"
		2	2.0'	8 12 12 14	Moist very stiff orangish gray mottled fine sandy silt w/some clay and coarse sand, trace of gravel. 18" RECOVERY	A-4(0)	
3.5		3	4.0'	10 5 4 2	Moist loose orange fine to coarse sand w/some silt, trace of gravel. 19" RECOVERY	A-2-4(0)	
		4	6.0'	6 4 3 1	Moist loose orangish gray mottled coarse to fine sand w/some silt, trace of gravel. 14" RECOVERY	A-1-b	
7		5	8.0'	2 3 4 5	Wet loose orange silty fine sand w/some coarse sand, trace of gravel. 16" RECOVERY	A-2-4(0)	
		6	10.0'	7 8 12 11	Wet medium dense orange coarse sand and gravel w/some fine sand, trace of silt. 24" RECOVERY	A-1-b	
10.5		7	12.0'	7 8 11 20	Wet very stiff greenish brown mottled fine sandy clay w/some coarse sand and gravel. 17" RECOVERY	A-7-5(1)	
14		8	14.0'	10 12 11 12	Wet medium dense green clayey fine to coarse sand w/some gravel. 10" RECOVERY	A-2-6(0)	Glauconit
			16.0'		End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

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

Notes:

1. Exploratory borings were drilled on 7/10/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-17-1

Contract: 25-113-01

Boring Location: Sta. 570+34, 190.00' Lt. C.L.

Boring Surface Elev.: + 67.0

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:	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.

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0	To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/13/2009		14.0	12.0	11.9	

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	3 4 3	Moist firm tan clayey silt w/trace of fine to coarse sand.	A-4(5)	Forrest Duff - 3"
			2.0'		14" RECOVERY		
		2	2.0'	5 5 6 8	Moist stiff tan clayey coarse sandy silt w/some fine sand, trace of gravel.	A-4(3)	
3.5			4.0'		20" RECOVERY		
		3	4.0'	8 10 5 8	Moist medium dense orange silty fine sand w/some coarse sand.	A-2-4(0)	
			6.0'		18" RECOVERY		
		4	6.0'	6 7 5 6	Moist medium dense orange silty fine sand w/some coarse sand.	A-2-4(0)	
7			8.0'		21" RECOVERY		
		5	8.0'	4 5 6 4	Wet medium dense orange fine sand and gravel w/some silt and coarse sand.	A-2-4(0)	
			10.0'		14" RECOVERY		
		6	10.0'	3 6 7 7	Wet medium dense orange coarse to fine sand w/some silt, trace of gravel.	A-2-4(0)	
10.5			12.0'		19" RECOVERY		
		7	12.0'	7 5 5 8	Wet stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(7)	
			14.0'		14" RECOVERY		
14		8	14.0'	7 14 12 17	Wet very stiff greenish brown fine sandy clay w/some coarse sand.	A-7-6(9)	
			16.0'		24" RECOVERY		
					End of Boring		
17.5							

Remarks:


Reviewed By: Maureen Kelley


Soils Supervisor: Randy Ferguson


KEY TO SYMBOLS


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
Strata symbols

 Silty low plasticity clay

 Low plasticity clay

 Silty sand

 Poorly graded sand with silt

 Elastic silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-18-1

Contract: 25-113-01

Boring Location: Sta. 573+15, 237.00' Rt. C.L.

Boring Surface Elev.: + 67.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
7/10/2009		12.0	10.0	9.0	

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation

Driller: Dave Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/10/09	1	0.5'	2 2 4	Moist firm gray clayey silt w/trace of fine to coarse sand and gravel.	A-4(5)	Cultivated Soil - 6"
			2.0'		16" RECOVERY		
3.5		2	2.0'	6 6 7 9	Wet stiff greenish brown and gray mottled silty fine sandy clay w/trace of gravel and coarse sand.	A-6(8)	USDA Classifica - Clay Loam
			4.0'		19" RECOVERY		
		3	4.0'	7 9 9 7	Wet very stiff greenish brown fine sandy clay w/some coarse sand.	A-7-5(12)	
			6.0'		16" RECOVERY		
7		4	6.0'	8 9 10 10	Wet very stiff green fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(2)	Glaucinit
			8.0'		19" RECOVERY		
		5	8.0'	3 7 10 8	Wet medium dense green silty fine to coarse sand.	A-2-4(0)	Glaucinit
			10.0'		18" RECOVERY		
10.5		6	10.0'	8 9 9 10	Wet very stiff green fine sandy silt w/some clay, organic matter and coarse sand.	A-4(0)	Glaucinit
			12.0'		21" RECOVERY		
		7	12.0'	1 2 1 1	Wet soft green clayey fine sandy silt w/some organic matter, trace of coarse sand and silt.	A-4(1)	Glaucinit
14			14.0'		21" RECOVERY		
		8	14.0'	1 1 1 1	Wet soft green organic fine to coarse sandy clay w/trace of gravel.	A-7-5(4)	Glaucinit
			16.0'		21" RECOVERY		
					End of Boring		
17.5							

Remarks:


Reviewed By: Maureen Kelley


Soils Supervisor: Randy Ferguson


KEY TO SYMBOLS


Symbol Description

Strata symbols

 Silty low plasticity clay

 Low plasticity clay

 Elastic silt

 Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/10/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-19-1

Contract: 25-113-01

Boring Location: Sta. 574+68, 209.00' Lt. C.L.

Boring Surface Elev.: + 66.0

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:	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.

Casing Size: 3 1/4	Inches	From Depth of:	To:
Hollow Stem Auger:		From Depth of: 0.0	To: 14.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	7/13/2009		12.0	10.0	9.2	

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
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	7/13/09	1	0.5'	4 3 4	Moist firm gray silt w/some clay and fine sand, trace of coarse sand.	A-4(2)	Cultivated Soil - 6".
			2.0'		16" RECOVERY		
		2	2.0'	8 12 14 13	Moist medium dense orangish gray coarse sand w/some clay and fine sand, trace of gravel and silt.	A-1-b	USDA Classifica
3.5			4.0'		20" RECOVERY		- Sandy
		3	4.0'	6 7 6 6	Moist medium dense orange silty coarse to fine sand w/trace of gravel.	A-2-4(0)	Clay Loam
			6.0'		18" RECOVERY		
		4	6.0'	5 7 7 6	Moist to wet medium dense orange fine to coarse sand w/some silt.	A-2-4(0)	
7			8.0'		16" RECOVERY		
		5	8.0'	4 4 3 10	Wet loose orange silty fine sand w/some coarse sand, trace of gravel.	A-2-4(0)	
			10.0'		16" RECOVERY		
10.5		6	10.0'	14 15 9 9	Wet medium dense orange gravel and fine to coarse sand w/some silt.	A-1-b	
			12.0'		24" RECOVERY		
		7	12.0'	4 6 7	Wet loose green clayey fine to coarse sand w/trace of gravel.	A-2-7(1)	Glauconit
14			14.0'		223" RECOVERY		
		8	14.0'	5 8 13 20	Wet medium dense green clayey fine to coarse sand w/trace of gravel.	A-2-7(2)	Glauconit
			16.0'		14" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/13/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-20-1

Contract: 25-113-01

Boring Location: Sta. 586+86, 192.00' Rt. C.L.

Boring Surface Elev.: + 67.0

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:		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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	6/26/2009		12.0	10.0	8.9	

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	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
	6/26/09	1	0.5'	2 3 5	Moist firm tan clayey silt w/trace of fine to coarse sand.	A-4(4)	Cultivated Soil - 8"
			2.0'		10" RECOVERY		
3.5		2	2.0'	4 5 8 9	Moist stiff tan fine sandy silt w/some clay, trace of coarse sand.	A-4(0)	
			4.0'		12" RECOVERY		
		3	4.0'	3 6 7 8	Moist stiff brown fine sandy silt w/some coarse sand, trace of clay.	A-4(0)	USDA Classifica - Sandy Loam
			6.0'		17" RECOVERY		
7		4	6.0'	12 13 15 8	Moist medium dense tan silty fine to coarse sand w/some gravel.	A-2-4(0)	
			8.0'		17" RECOVERY		
		5	8.0'	3 5 6 7	Wet stiff brownish green fine sandy clay w/some coarse sand, trace of gravel.	A-7-6(9)	
			10.0'		17" RECOVERY		
10.5		6	10.0'	7 8 10	Wet very stiff brownish green fine sandy clay w/trace of coarse sand and gravel.	A-7-5(19)	
			12.0'		20" RECOVERY		
		7	12.0'	3 4 6 5	Wet stiff brown fine to coarse sandy clay w/trace of gravel.	A-7-5(3)	
			14.0'		16" RECOVERY		
14		8	14.0'	2 2 4 6	Wet firm gray fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(2)	
			16.0'		19" RECOVERY		
17.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Elastic silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/26//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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-2-1

Contract: 25-113-01

Boring Location: Sta. 465+50, 250.00' Rt. C.L.

Boring Surface Elev.: + 60.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
3/6/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
8.5

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 16
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: J. Truver

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	3/6/09	1	0.5'	2 2 2	Moist soft light brown silt w/ some fine to coarse sand, trace of clay and gravel. 17" RECOVERY	A-4(0)	Cultivated Soil - 6".
3.5		2	2.0'	4 4 6 14	Moist loose orange silty fine sand w/ some gravel and coarse sand. 16" RECOVERY	A-2-4(0)	
		3	4.0'	9 10 9 11	Moist medium dense orange silty gravel and fine sand w/ some coarse sand. 13" RECOVERY	A-2-4(0)	
7		4	6.0'	9 9 10 11	Wet medium dense brown fine to coarse sand w/ some clay, trace of gravel. 20" RECOVERY	A-2-4(0)	
		5	8.0'	3 5 6 6	Wet medium dense brown clayey fine sand w/ some coarse sand. 15" RECOVERY	A-2-6(0)	
10.5		6	10.0'	4 6 8 9	Wet stiff brown fine sandy clay w/ some coarse sand. 17" RECOVERY	A-7-6(2)	
		7	12.0'	3 4 8 8	Saturated medium dense brown clayey fine sand w/ some coarse sand. 18" RECOVERY	A-2-6(1)	
14		8	14.0'	3 6 8 10	Saturated medium dense brown silty fine sand w/ some coarse sand. 15" RECOVERY	A-2-4(0)	
			16.0'		End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/6/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-22-1

Contract: 25-113-01

Boring Location: Sta. 595+65, 199.00' Rt. C.L.

Boring Surface Elev.: + 71.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/27/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/27/09	1	1.0'	7 7	Moist stiff brown clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(8)	Cultivated Soil - 11".
		2	2.0'	8 7 6	Moist stiff brown and gray clay w/ some fine sand, trace of coarse sand. 12" RECOVERY	A-6(8)	
7	2/27/09	3	4.0' 4.0'	9 7 10 12	Moist very stiff gray fine sandy clay, trace of coarse sand and gravel. 24" RECOVERY	A-6(6)	
		4	6.0' 6.0'	5 8 13 20	Moist very stiff brown and gray mottled fine sandy clay, trace of coarse sand and gravel. 24" RECOVERY	A-6(8)	
10.5	2/27/09	5	8.0' 8.0'	3 6 14 15	Moist medium dense white silty fine sand and gravel, trace of coarse sand. 15" RECOVERY	A-2-4(0)	
		6	10.0' 10.0'	19 25 14 11	Moist dense gray to orange clayey gravel and coarse sand w/ some fine sand. 17" RECOVERY	A-2-4(0)	Cemented sands.
14	2/27/09	7	12.0' 12.0'	7 11 12 16	Wet very stiff brown fine sandy clay w/ some coarse sand, trace of gravel. 12" RECOVERY	A-7-5(4)	
		8	14.0' 14.0'	23 17 12 13	Wet medium dense orange clayey fine to coarse sand w/ some gravel. 24" RECOVERY	A-2-7(0)	
17.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-23-1

Contract: 25-113-01

Boring Location: Sta. 600+00, 190.00' Rt. C.L.

Boring Surface Elev.: + 76.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/27/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/27/09	1	1.0'	7 6	Moist stiff brown clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(8)	Cultivated Soil - 9"
		2	2.0'	6 8 9 11	Moist very stiff brown clayey fine sandy silt w/ some coarse sand. 16" RECOVERY	A-4(3)	
7		3	4.0'	3 7 4 6	Moist medium dense orange silty fine sand w/ some coarse sand. 17" RECOVERY	A-2-4(0)	
		4	6.0'	4 4 6 4	Moist stiff orange to gray clay w/ some fine sand, trace of coarse sand. 24" RECOVERY	A-6(7)	
10.5		5	8.0'	1 4 7 8	Moist stiff orange and gray mottled fine sandy clay w/ some coarse sand, trace of gravel. 18" RECOVERY	A-6(4)	
		6	10.0'	7 7 14 16	Moist very stiff gray fine sandy clay w/ some coarse sand, trace of gravel. 20" RECOVERY	A-6(4)	
14		7	12.0'	3 9 10 11	Moist medium dense gray and orange mottled coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY	A-1-b	
		8	14.0'	12 15 19 27	Moist dense gray and orange mottled coarse sand and gravel w/ some fine sand, trace of silt. 20" RECOVERY	A-1-b	
17.5			16.0'		End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Clayey sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-23-2

Contract: 25-113-01

Boring Location: Sta. 605+00, 205.00' Rt. C.L.

Boring Surface Elev.: + 74.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/27/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/27/09	1	1.0'	7 8	Moist stiff brown silt, trace of fine to coarse sand. 10" RECOVERY	A-4(0)	Cultivated Soil - 11"
		2	2.0'	6 6 5	Moist stiff brown clayey silt w/ some fine sand, trace of coarse sand.	A-4(3)	
3.5			4.0'		19" RECOVERY		
		3	4.0'	3 4 7	Moist stiff gray clayey silt w/ some fine sand, trace of coarse sand. 20" RECOVERY	A-4(6)	
			6.0'		24" RECOVERY		
7		4	6.0'	3 5 7 8	Moist stiff gray clay w/ some fine sand, trace of coarse sand.	A-6(11)	
			8.0'		24" RECOVERY		
		5	8.0'	3 5 8 8	Moist medium dense yellow fine to coarse sand w/ some silt, trace of gravel. 17" RECOVERY	A-2-4(0)	
10.5		6	10.0'	12 9 7 8	Moist medium dense yellow silty fine sand w/ some coarse sand, trace of gravel. 17" RECOVERY	A-2-4(0)	
			12.0'		17" RECOVERY		
		7	12.0'	8 7 6 9	Moist medium dense orange fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY	A-2-4(0)	
14			14.0'		18" RECOVERY		
		8	14.0'	8 13 11 11	Moist medium dense orange fine sand and gravel w/ some silt and coarse sand. Moist medium dense orange fine sand and gravel w/ some silt and coarse sand. 16" RECOVERY	A-2-4(0)	
			16.0'		16" RECOVERY		
17.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-24-1

Contract: 25-113-01

Boring Location: Sta. 605+49, 196.00' Lt. C.L.

Boring Surface Elev.: + 76.0

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/27/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/27/09	1	1.0'	5 6	Moist stiff tan fine sandy silt w/ some clay and coarse sand. 12" RECOVERY	A-4(1)	Topsoil - 8"
		2	2.0'	6 9 7	Moist very stiff tan silt w/ some fine sand, trace of clay and coarse sand.	A-4(0)	
7	2/27/09	3	4.0'	10 15	18" RECOVERY Moist stiff orange clay w/ some fine sand, trace of coarse sand and gravel.	A-6(11)	
		4	6.0'	6 8	15" RECOVERY Moist very stiff orange gray mottled fine sandy clay, trace of coarse sand and gravel.	A-6(7)	
10.5	2/27/09	4A	7.0'	10 15	12" RECOVERY Moist medium dense orange-gray mottled silty fine to coarse sand, trace of gravel.	A-2-4(0)	
		5	8.0'	5 7 7 6	12" RECOVERY Moist medium dense orange-gray mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
14	2/27/09	6	10.0'	5 7 9 10	15" RECOVERY Moist medium dense orange-gray mottled silty fine to coarse sand, trace of gravel.	A-2-4(0)	
		7	12.0'	5 6 11 11	22" RECOVERY Moist medium dense orange fine sand and gravel w/ some coarse sand and silt.	A-2-4(0)	
17.5	2/27/09	8	14.0'	22 12 12 12	15" RECOVERY Wet very stiff orange and brown coarse sandy clay w/ some fine sand and gravel.	A-7-5(3)	Cemented sands.
			16.0'		14" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-25-1

Contract: 25-113-01

Boring Location: Sta. 605+80, 174.00' Rt. C.L.

Boring Surface Elev.: + 74.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/27/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
3.5	2/27/09	1	1.0'	4	Moist stiff tan clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(8)	Topsoil - 8"	
			2.0'	6				
7	2/27/09	2	2.0'	12	Moist very stiff tan clayey silt w/ some fine sand, trace of coarse sand. 21" RECOVERY	A-4(3)		
			4.0'	13				
			4.0'	11				
10.5	2/27/09	3	4.0'	8	Moist stiff tan and gray mottled clayey silt w/ some fine sand, trace of coarse sand. 18" RECOVERY	A-4(5)		
			6.0'	5				
			6.0'	14				
			7.0'	13				
14	2/27/09	4A	7.0'	12	Moist very stiff tan and gray mottled clayey silt w/ some fine sand, trace of coarse sand and gravel. 12" RECOVERY	A-2-4(0)		
			8.0'	4				
			8.0'	6				
17.5	2/27/09	5	8.0'	7	Moist medium dense orange and gray mottled silty fine sand w/ some coarse sand. 10" RECOVERY	A-2-4(0)		
			10.0'	8				
			10.0'	15				
14	2/27/09	6	10.0'	11	Moist medium dense orange and yellow mottled silty fine sand, trace of coarse sand. 16" RECOVERY	A-2-4(0)		
			12.0'	10				
			12.0'	20				
14	2/27/09	7	12.0'	4	Moist dense brown gravel and coarse to fine sand w/ some silt. 11" RECOVERY	A-1-b		
			14.0'	10				
			14.0'	24				
14	2/27/09	8	14.0'	17	Wet dense brown clayey fine to coarse sand w/ some gravel. 16" RECOVERY	A-2-7(1)		
			14.0'	14				
			14.0'	17				
17.5	2/27/09		16.0'	13	End of Boring			

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/26/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-27-1

Contract: 25-113-01

Boring Location: Sta. 613+27, 225.00' Lt. C.L.

Boring Surface Elev.: + 71.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split-Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/26/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/26/09	1	1.0'	4 3	Moist firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(1)	Cultivated Soil - 10"
		2	2.0'	3 4 4 3	12" RECOVERY Moist loose orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	
3.5			4.0'		16" RECOVERY		
		3	4.0'	4 4 3 4	Moist loose orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			6.0'		20" RECOVERY		
7		4	6.0'	6 24 10 7	Moist dense orange coarse to fine sand and gravel w/ some silt.	A-1-b	Cemented sands.
			8.0'		14" RECOVERY		
		5	8.0'	3 3 8 5	Wet medium dense orange silty coarse sand and gravel w/ some fine sand.	A-2-4(0)	Cemented sands.
			10.0'		9" RECOVERY		
10.5		6	10.0'	5 9 9 6	Wet medium dense orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	Cemented sands.
			12.0'		19" RECOVERY		
		7	12.0'	2 6 8 10	Wet medium dense orange silty coarse to fine sand, trace of gravel.	A-2-5(0)	Cemented sands.
14			14.0'		13" RECOVERY		
		8	14.0'	7 9 8 10	Wet medium dense orange silty coarse to fine sand, trace of gravel.	A-1-b	Cemented sands.
			16.0'		19" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/26/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-28-1

Contract: 25-113-01

Boring Location: Sta. 624+80, 168.00' Lt. C.L.

Boring Surface Elev.: + 75.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/23/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/23/09	1	1.0'	3 3	Moist firm brown and tan silt w/ some clay, trace of fine to coarse sand and gravel.	A-4(3)	Cultivated Soil - 9"
		2	2.0'	5 6 7	12" RECOVERY Moist stiff brown and tan clayey silt, trace of fine to coarse sand and gravel.	A-4(5)	
3.5		3	4.0' 4.0'	4 6 7	16" RECOVERY Moist medium dense tan clayey fine sand w/ some coarse sand, trace of gravel.	A-2-4(0)	
		4	6.0' 6.0'	6 8 9 9	14" RECOVERY Moist medium dense tan silty fine sand, trace of coarse sand.	A-2-4(0)	Contains trace of mica.
7		5	8.0' 8.0'	4 5 7 7	16" RECOVERY Moist medium dense orange-brown mottled silty fine sand, trace of gravel and coarse sand.	A-2-4(0)	Contains mica.
		6	10.0' 10.0'	10 10 12 13	17" RECOVERY Moist very stiff orange-brown, yellow, and white mottled fine sandy silt, trace of coarse sand.	A-4(0)	Contains mica.
10.5		7	12.0' 12.0'	7 12 22 8	24" RECOVERY Moist dense orange-brown fine to coarse sand w/ some gravel, trace of silt.	A-3	Cemented sands.
14		8	14.0' 14.0'	7 6 6 8	16" RECOVERY Wet medium dense orange and brown silty coarse to fine sand w/ some gravel/	A-2-5(0)	Cemented sands.
			16.0'		15" RECOVERY End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/23/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-29-1

Contract: 25-113-01

Boring Location: Sta. 625+05, 173.00' Rt. C.L.

Boring Surface Elev.: + 74.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of: **To:**
From Depth of: 0.0 **To:** 14.0

Water Level Readings
Date **Time**
2/25/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/25/09	1	1.0'	3 4	Moist firm tan clayey silt, trace of fine to coarse sand. 6" RECOVERY	A-4(7)	Cultivated Soil - 8"
		2	2.0'	3 4 6 7	Moist stiff tan silt w/ some fine to coarse sand and clay, trace of gravel.	A-4(0)	
3.5			4.0'		14" RECOVERY		
		3	4.0'	3 4 6 7	Moist stiff orange fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
			6.0'		15" RECOVERY		
		4	6.0'	4 7 7 4	Moist stiff orange fine sandy silt.	A-4(0)	
7			8.0'		19" RECOVERY		
		5	8.0'	2 4 6 6	Moist stiff orange fine sandy silt, trace of coarse sand and gravel.	A-4(0)	
			10.0'		18" RECOVERY		
10.5		6	10.0'	20 17 18 30	Moist dense orange, tan, white mottled gravel and coarse sand w/ some fine sand and silt.	A-1-b	Auger refusal at 10.5'.
			12.0'		16" RECOVERY		Boring offset 3.0' east to completion of boring.
		7	12.0'	19 20 12 7	Moist dense orange clayey coarse sand and gravel w/ some fine sand.	A-2-6(0)	
14			14.0'		12" RECOVERY		Cemented sands.
		8	14.0'	8 15 15 16	Wet medium dense orange silty fine to coarse sand w/ some gravel.	A-2-5(0)	
			16.0'		16" RECOVERY		Cemented sands.
					End of Boring		Cemented sands.
17.5							Cemented sands.

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-30-1

Contract: 25-113-01

Boring Location: Sta. 625+84, 485.00' Rt. C.L.

Boring Surface Elev.: + 74.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/26/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks																																																																								
	2/26/09	1	1.0'	5	Moist stiff tan clay, trace of fine sand. 12" RECOVERY	A-6(13)	Cultivated Soil - 8"																																																																								
			2.0'	5				3.5		2	2.0'	6	Moist stiff tan clayey silt, trace of fine to coarse sand. 19" RECOVERY	A-4(9)		4.0'	7	7		3	4.0'	7	Moist stiff tan silt w/ some fine to coarse sand, trace of clay and gravel. 11" RECOVERY	A-4(1)		6.0'	8			4	6.0'	5	Moist stiff orange fine sandy silt w/ some clay and coarse sand, trace of gravel. 17" RECOVERY	A-4(0)		8.0'	6	10.5		5	8.0'	3	Moist loose yellow silty fine sand, trace of coarse sand. 15" RECOVERY	A-2-4(0)		10.0'	4	14		6	10.0'	10	Moist medium dense yellow silty fine sand, trace of coarse sand. 20" RECOVERY	A-2-4(0)		12.0'	9			7	12.0'	6	Moist medium dense yellow fine to coarse sand w/ some gravel and silt. 16" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	12	17.5		8	14.0'	16	Moist very dense yellow gravel and coarse sand w/ some fine sand and silt. 17" RECOVERY	A-1-b	Cemented sands.	16.0'	29		
3.5		2	2.0'	6	Moist stiff tan clayey silt, trace of fine to coarse sand. 19" RECOVERY	A-4(9)																																																																									
			4.0'	7				7		3	4.0'	7	Moist stiff tan silt w/ some fine to coarse sand, trace of clay and gravel. 11" RECOVERY	A-4(1)		6.0'	8			4	6.0'	5	Moist stiff orange fine sandy silt w/ some clay and coarse sand, trace of gravel. 17" RECOVERY	A-4(0)		8.0'	6	10.5		5	8.0'	3	Moist loose yellow silty fine sand, trace of coarse sand. 15" RECOVERY	A-2-4(0)		10.0'	4	14		6	10.0'	10	Moist medium dense yellow silty fine sand, trace of coarse sand. 20" RECOVERY	A-2-4(0)		12.0'	9			7	12.0'	6	Moist medium dense yellow fine to coarse sand w/ some gravel and silt. 16" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	12	17.5		8	14.0'	16	Moist very dense yellow gravel and coarse sand w/ some fine sand and silt. 17" RECOVERY	A-1-b	Cemented sands.	16.0'	29						End of Boring						
7		3	4.0'	7	Moist stiff tan silt w/ some fine to coarse sand, trace of clay and gravel. 11" RECOVERY	A-4(1)																																																																									
			6.0'	8						4	6.0'	5	Moist stiff orange fine sandy silt w/ some clay and coarse sand, trace of gravel. 17" RECOVERY	A-4(0)		8.0'	6	10.5		5	8.0'	3	Moist loose yellow silty fine sand, trace of coarse sand. 15" RECOVERY	A-2-4(0)		10.0'	4	14		6	10.0'	10	Moist medium dense yellow silty fine sand, trace of coarse sand. 20" RECOVERY	A-2-4(0)		12.0'	9			7	12.0'	6	Moist medium dense yellow fine to coarse sand w/ some gravel and silt. 16" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	12	17.5		8	14.0'	16	Moist very dense yellow gravel and coarse sand w/ some fine sand and silt. 17" RECOVERY	A-1-b	Cemented sands.	16.0'	29						End of Boring																
		4	6.0'	5	Moist stiff orange fine sandy silt w/ some clay and coarse sand, trace of gravel. 17" RECOVERY	A-4(0)																																																																									
			8.0'	6				10.5		5	8.0'	3	Moist loose yellow silty fine sand, trace of coarse sand. 15" RECOVERY	A-2-4(0)		10.0'	4	14		6	10.0'	10	Moist medium dense yellow silty fine sand, trace of coarse sand. 20" RECOVERY	A-2-4(0)		12.0'	9			7	12.0'	6	Moist medium dense yellow fine to coarse sand w/ some gravel and silt. 16" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	12	17.5		8	14.0'	16	Moist very dense yellow gravel and coarse sand w/ some fine sand and silt. 17" RECOVERY	A-1-b	Cemented sands.	16.0'	29						End of Boring																										
10.5		5	8.0'	3	Moist loose yellow silty fine sand, trace of coarse sand. 15" RECOVERY	A-2-4(0)																																																																									
			10.0'	4				14		6	10.0'	10	Moist medium dense yellow silty fine sand, trace of coarse sand. 20" RECOVERY	A-2-4(0)		12.0'	9			7	12.0'	6	Moist medium dense yellow fine to coarse sand w/ some gravel and silt. 16" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	12	17.5		8	14.0'	16	Moist very dense yellow gravel and coarse sand w/ some fine sand and silt. 17" RECOVERY	A-1-b	Cemented sands.	16.0'	29						End of Boring																																				
14		6	10.0'	10	Moist medium dense yellow silty fine sand, trace of coarse sand. 20" RECOVERY	A-2-4(0)																																																																									
			12.0'	9						7	12.0'	6	Moist medium dense yellow fine to coarse sand w/ some gravel and silt. 16" RECOVERY	A-2-4(0)	Cemented sands.	14.0'	12	17.5		8	14.0'	16	Moist very dense yellow gravel and coarse sand w/ some fine sand and silt. 17" RECOVERY	A-1-b	Cemented sands.	16.0'	29						End of Boring																																														
		7	12.0'	6	Moist medium dense yellow fine to coarse sand w/ some gravel and silt. 16" RECOVERY	A-2-4(0)	Cemented sands.																																																																								
			14.0'	12				17.5		8	14.0'	16	Moist very dense yellow gravel and coarse sand w/ some fine sand and silt. 17" RECOVERY	A-1-b	Cemented sands.	16.0'	29						End of Boring																																																								
17.5		8	14.0'	16	Moist very dense yellow gravel and coarse sand w/ some fine sand and silt. 17" RECOVERY	A-1-b	Cemented sands.																																																																								
			16.0'	29									End of Boring																																																																		
					End of Boring																																																																										

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-31-1

Contract: 25-113-01

Boring Location: Sta. 627+59, 178.00' Rt. C.L.

Boring Surface Elev.: + 73.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings
Date 2/25/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/25/09	1	1.0'	4	Moist firm tan clayey silt, trace of fine to coarse sand and gravel. 12" RECOVERY	A-4(5)	Cultivated Soil - 8"
		2	2.0'	5		Moist stiff tan clayey silt w/ some fine to coarse sand, trace of gravel.	
7	2/25/09	3	4.0'	3	Moist stiff orange fine sandy silt, trace of coarse sand and gravel. 18" RECOVERY	A-4(0)	Contains mica.
		4	6.0'	9		Moist medium dense orange silty fine sand, trace of coarse sand and gravel. 16" RECOVERY	
10.5	2/25/09	5	8.0'	3	Wet stiff orange fine sandy clay w/ some coarse sand and gravel. 17" RECOVERY	A-7-5(4)	Cemented sands.
		6	10.0'	10		Wet very stiff green fine sandy clay w/ some coarse sand, trace of gravel. 12" RECOVERY	
14	2/25/09	7	12.0'	4	Wet stiff green clayey fine to coarse sandy silt, trace of gravel. 17" RECOVERY	A-4(0)	Cemented sands.
		8	14.0'	8		Wet medium dense orange silty coarse to fine sand w/ some gravel. 15" RECOVERY	
17.5	2/25/09		16.0'		24" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-32-1

Contract: 25-113-01

Boring Location: Sta. 631+28, 196.00' Rt. C.L.

Boring Surface Elev.: + 73.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/18/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/18/09	1	1.0'	3 4	Moist firm brown and tan clayey silt, trace of fine to coarse sand. 11" RECOVERY	A-4(9)	Cultivated Soil - 8"; boring offset 12' west due to over head wires.
		2	2.0'	5 6 8 9	Moist stiff orange clayey fine sandy silt w/ some coarse sand and gravel.	A-4(1)	
7	2/18/09	3	4.0'	10 11 13	15" RECOVERY Moist loose orange clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
		4	6.0'	9 10	14" RECOVERY Moist medium dense brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	
10.5	2/18/09	4A	7.0'	7 11	10" RECOVERY Wet very stiff orange fine sandy silt w/ some clay, trace of coarse sand and gravel.	A-4(0)	
		5	8.0'	7 10 12 14	10" RECOVERY Wet medium dense brown and green clayey fine sand and gravel w/ some coarse sand.	A-2-7(0)	
14	2/18/09	6	10.0'	8 21 33 13	16" RECOVERY Wet hard brown and green fine sandy clay w/ some coarse sand, trace of gravel.	A-7-5(2)	
		7	12.0'	4 5 7 12	16" RECOVERY Wet medium dense brown, green, and gray mottled silty fine to coarse sand, trace of gravel.	A-2-4(0)	
17.5	2/18/09	8	14.0'	8 10 7 7	18" RECOVERY Wet medium dense orange and red clayey fine to coarse sand w/ some gravel.	A-2-5(0)	
			16.0'		15" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/18/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-33-1

Contract: 25-113-01

Boring Location: Sta. 637+31, 390.00' Rt. C.L.

Boring Surface Elev.: + 66.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/12/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/12/09	1	1.0'	2 4 8	Moist stiff brown and orange clayey gravelly silt w/ some fine sand, trace of coarse sand.	A-4(1)	Cultivated Soil - 8"
		2	2.0' 2.5'	13 13 13 18	Moist medium dense yellow-tan gravel w/ some coarse sand, trace of silt and fine sand.	A-1-a	
3.5		3	4.0' 4.0'	4 8 10 9	No sample recovery.		
			6.0'		0" RECOVERY		
7		4	6.0'	12 15 19 13	Wet hard brown fine sandy clay w/ some gravel, trace of coarse sand.	A-7-5(10)	
			8.0'		8" RECOVERY		
		5	8.0'	2 4 5 7	Wet loose orange and brown clayey fine to coarse sand w/ some gravel.	A-2-7(1)	Cemented sands.
			10.0'		12" RECOVERY		
10.5		6	10.0'	2 3 3 2	Wet loose orange and brown clayey coarse to fine sand, trace of gravel.	A-2-5(0)	Cemented sands.
			12.0'		20" RECOVERY		
		7	12.0'	3 4 6 6	Wet stiff orange and brown coarse to fine sandy clay, trace of gravel.	A-7-5(2)	Cemented sands.
14			14.0'		19" RECOVERY		
		8	14.0'	4 6 7 8	Wet medium dense orange and brown silty coarse to fine sand, trace of gravel.	A-1-b	Cemented sands.
			16.0'		20" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded gravel
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-34-1

Contract: 25-113-01

Boring Location: Sta. 638+75, 311.00' Lt. C.L.

Boring Surface Elev.: + 69.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/12/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/12/09	1	1.0'	2 3	Moist firm orange clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(8)	Cultivated Soil - 9"
		2	2.0'	4 7 7 6	Moist stiff orange clayey fine sandy silt w/ some coarse sand and gravel.	A-4(1)	
3.5			4.0'		10" RECOVERY		
		3	4.0'	5 11 19 14	Moist medium dense gray clay gravel w/ some coarse to fine sand. 16" RECOVERY	A-2-4(0)	
			6.0'		10" RECOVERY		
7		4	6.0'	10 10 10 11	Moist medium dense brown and orange silty coarse sand w/ some gravel and fine sand. 8" RECOVERY	A-1-b	Cemented sands.
			8.0'		8" RECOVERY		
		5	8.0'	3 6 8 7	Wet medium dense brown and green silty coarse sand w/ some fine sand, trace of gravel. 8" RECOVERY	A-2-4(0)	Cemented sands.
			10.0'		8" RECOVERY		
10.5		6	10.0'	12 13 11 10	Wet medium dense orange clayey coarse to fine sand, trace of gravel. 18" RECOVERY	A-2-7(1)	Cemented sands.
			12.0'		18" RECOVERY		
		7	12.0'	3 6 5 14	Wet medium dense orange silty coarse to fine sand, trace of gravel. 15" RECOVERY	A-2-4(0)	Cemented sands.
14			14.0'		15" RECOVERY		
		8	14.0'	20 10 12 14	Wet medium dense orange silty coarse to fine sand w/ some gravel. 13" RECOVERY	A-2-4(0)	Cemented sands.
			16.0'		13" RECOVERY		
					End of Boring		
17.5							

Remarks:


Reviewed By: Maureen Kelley


Soils Supervisor: Randy Ferguson


KEY TO SYMBOLS

Symbol Description

Strata symbols

 Low plasticity
clay

 Clayey sand

 Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-35-1

Contract: 25-113-01

Boring Location: Sta. 642+97, 236.00' Rt. C.L.

Boring Surface Elev.: + 56.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Spoon		O.D.	O.D. of Sampler: 2		IN.
S-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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/12/09		16.0		Dry	

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:	Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/12/09	1	1.0'	6	Wet medium dense brown clayey coarse to fine sand, trace of gravel. 12" RECOVERY	A-2-7(0)	Cultivated Soil - 9". Cemented sands.
		2	2.0'	6		Wet medium dense brown clayey coarse to fine sand, trace of gravel.	
3.5			4.0'		16" RECOVERY		
		3	4.0'	2	Wet medium dense orange-brown silty coarse to fine sand w/ some gravel. 12" RECOVERY	A-1-b	Cemented sands.
			6.0'	10			
7			8.0'		19" RECOVERY		
		5	8.0'	2	Wet loose orange fine to coarse sand w/ some silt, trace of gravel. 8" RECOVERY	A-2-4(0)	Cemented sands.
			10.0'	4			
10.5			12.0'		20" RECOVERY		
		7	12.0'	2	Wet firm orange silt w/ some fine sand, trace of coarse sand and gravel. 18" RECOVERY	A-4(0)	
			14.0'	3			
14			14.0'		24" RECOVERY		
		8	14.0'	4	End of Boring		
			16.0'	6			
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01
Boring Location: Sta. 648+20, 209.00' Rt. C.L.
Boring Surface Elev.: + 59.0'

Boring No.: SWM1-36-1

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
 S-Sampler:
 U-Sampler:
 Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings
Date 2/12/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay 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.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
3.5	2/12/09	1	1.0'	2 4	Wet firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel.	A-4(6)	Cultivated Soil - 9";
		2	2.0'	2 3 3 4	12" RECOVERY Wet firm brown fine sandy clay, trace of gravel and coarse sand.	A-7-6(13)	cemented sands.
7	2/12/09	3	4.0'	2 4 5 10	13" RECOVERY Wet stiff orange fine sandy clay w/ some coarse sand and gravel.	A-7-5(5)	Cemented sands.
		4	6.0'	5 5 8 7	14" RECOVERY Wet medium dense orange clayey coarse sand w/ some fine sand and gravel.	A-2-7(1)	Cemented sands.
10.5	2/12/09	5	8.0'	2 4 6 14	19" RECOVERY Wet stiff orange-gray mottled coarse to fine sandy clay, trace of gravel.	A-7-5(3)	Cemented sands.
		6	10.0'	4 6 6 19	16" RECOVERY Wet medium dense orange-gray mottled clayey coarse to fine sand, trace of gravel.	A-2-5(0)	Cemented sands.
14	2/12/09	7	12.0'	2 10 12 14	19" RECOVERY Wet medium dense orange-brown coarse sand w/ some fine sand, gravel, and silt.	A-1-b	Cemented sands.
		8	14.0'	13 12 9 10	13" RECOVERY Wet medium dense orange-brown coarse to fine sand w/ some gravel and silt.	A-1-b	Cemented sands.
17.5			16.0'		23" RECOVERY End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-37-1

Contract: 25-113-01

Boring Location: Sta. 664+13, 224.00' Lt. C.L.

Boring Surface Elev.: + 45.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger: Inches

From Depth of:
From Depth of: 0.0
To:
To: 14.0

Water Level Readings
Date 2/11/2009
Time

Depth of Hole **Depth of Casing** **Depth of Water** **Elev. of Water**
Dry

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: Ft.;
No. of 2 in. Dia. Shelby Tubes: ;
2 1/2 in. Dia. Contin. Sample Boring: Ft.;

Dia. U-Sample Boring: Ft.
U-Samples:
Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: D. Burt
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/11/09	1	0.0'	4 4 4 6	Moist firm brown clayey fine sandy silt, trace of gravel and coarse sand.	A-4(1)	No topsoil.
			2.0'		18" RECOVERY		
		2	2.0'	9 7 14 16	Moist medium dense orange coarse to fine sand and gravel, trace of silt.	A-1-b	Cemented sands.
3.5			4.0'		20" RECOVERY		
		3	4.0'	2 14 12 12	Moist medium dense brown coarse sand and gravel w/ some fine sand and silt.	A-1-b	Cemented sands.
			6.0'		16" RECOVERY		
7		4	6.0'	6 7 7 8	Wet medium dense dark orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			8.0'		23" RECOVERY		
		5	8.0'	3 4 5 5	Wet loose dark orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	Cemented sands.
			10.0'		20" RECOVERY		
10.5		6	10.0'	7 7 7 7	Wet medium dense orange-gray mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			12.0'		24" RECOVERY		
		7	12.0'	2 6 5 6	Wet medium dense orange-gray mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
14			14.0'		23" RECOVERY		
		8	14.0'	8 7 8 9	Wet medium dense orange-gray mottled fine to coarse sand w/ some silt.	A-2-4(0)	
			16.0'		24" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Well graded sand
with silt



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 25-113-01
Boring Location: Sta. 495+50, 300.00' Rt. C.L.
Boring Surface Elev.: + 50.0

Boring No.: SWM1-7-1

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
 S-Sampler:
 U-Sampler:
 Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4 **Inches**
Hollow Stem Auger:

Reference:
From Depth of: **To:**
From Depth of: 0.0 **To:** 16.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/27/09		16.0		10.1	

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

Boring Contractor: Walton Corporation
Driller: J. Truver
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/27/09	1	0.5'	5 3 4	Moist firm brown clayey coarse to fine sandy silt, trace of gravel.	A-4(0)	Topsoil - 5".
			2.0'		18" RECOVERY		
3.5		2	2.0'	1 5 8 6	Wet stiff gray and orange mottled clayey silt w/ some gravel, trace of fine to coarse sand.	A-4(6)	
			4.0'		20" RECOVERY		
		3	4.0'	6 6 6 7	Wet stiff gray and orange mottled clay, trace of fine to coarse sand.	A-6(12)	
			6.0'		19" RECOVERY		
7		4	6.0'	1 5 5 6	Wet stiff brown and green fine sandy clay, trace of coarse sand.	A-6(2)	
			8.0'		19" RECOVERY		
		5	8.0'	2 2 4 4	Saturated firm brown and green fine sandy clay, trace of coarse sand and gravel.	A-6(2)	
			10.0'		15" RECOVERY		
10.5		6	10.0'	3 6 5 5	Saturated stiff brown and green clayey fine sandy silt, trace of coarse sand.	A-4(2)	
			12.0'		20" RECOVERY		
		7	12.0'	4 7 7 9	Saturated stiff green and brown fine sandy clay w/ some coarse sand, trace of gravel.	A-6(2)	
14			14.0'		18" RECOVERY		
		8	14.0'	4 6 6 7	Saturated stiff green and brown fine sandy clay w/ some coarse sand, trace of gravel.	A-6(4)	Glauconit
			16.0'		19" RECOVERY		
					End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/27/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

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

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

Boring No.: SWM1-9-1

Contract: 25-113-01

Boring Location: Sta. 506+14, 199.00' Rt. C.L.

Boring Surface Elev.: + 55.0'

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140		Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split Spoon		O.D.	O.D. of Sampler: 2		IN.
S-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.

Casing Size: 3 1/4	Inches	From Depth of:		To:	
Hollow Stem Auger:		From Depth of: 0.0		To: 14.0	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	2/25/09		16.0		7.2	

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:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: J. Truver
Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/25/09	1	0.5'	2 2 2	Moist soft brown clayey silt w/ some gravel and fine sand, trace of coarse sand. 16" RECOVERY	A-4(2)	Topsoil - 6".
3.5		2	2.0'	11 11 8 14	Moist medium dense brown coarse sand and gravel w/ some fine sand, trace of silt. 18" RECOVERY	A-1-b	
		3	4.0'	11 18 19 30	Moist dense brown coarse sand and gravel w/ some fine sand and silt. 19" RECOVERY	A-1-b	
7		4	6.0'	11 11 13 14	Wet medium dense brown coarse sand and gravel w/ some fine sand and silt. 22" RECOVERY	A-1-b	
		5	8.0'	7 8 11 14	Wet medium dense brown coarse to fine sand and gravel w/ some silt. 11" RECOVERY	A-1-b	
10.5		6	10.0'	4 4 13 18	Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY	A-1-b	
		7	12.0'	7 10 11 13	Saturated very stiff brown and green fine sandy clay w/ some coarse sand, trace of gravel. 20" RECOVERY	A-6(1)	
14		8	14.0'	8 9 11	Saturated very stiff brown and green fine sandy clay w/ some coarse sand, trace of gravel. 20" RECOVERY	A-7-6(2)	
			16.0'		End of Boring		
17.5							

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Well graded sand
with silt



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/25/2009 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 recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.