

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

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

Boring No.: BR2-9-01

Contract: 25-113-01

Boring Location: Sta. 258+03.55, 91' Lt. C.L.

Boring Surface Elev.: 59.43

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: | |
| Hollow Stem Auger: | | | From Depth of: | | To: | 24.0' |

| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|----------------------|---------|------|---------------|-----------------|----------------|----------------|
| | 2/14/08 | | 75.0' | | 22.4' | 37.0 |
| | 2/15/08 | | 26.0' | | 20.0' | 39.4 |
| | 2/18/08 | | 26.0' | | 18.0' | 41.4 |
| | | | | | | 59.4 |

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 U-Samples: 3
 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 | 1.0' | 5 6 | Moist loose light brown silty fine sand w/ some coarse sand, trace of gravel. 12" RECOVERY | A-2-4(0) | 10" Cultivated Soils |
| 2.49 | | 2 | 2.0' | 6 3 12 18 | Moist stiff light brown fine to coarse sandy silt, trace of gravel. 16" RECOVERY | A-4(0) | |
| 4.98 | | 3 | 4.0' | 6 7 9 6 | Moist medium dense light brown silty fine to coarse sand. 24" RECOVERY | A-2-4(0) | |
| 7.47 | | 4 | 6.0' | 6 8 6 8 | Moist medium dense light brown fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY | A-2-4(0) | |
| 9.96 | | 5 | 8.0' | 4 7 5 5 | Moist medium dense light brown silty fine to coarse sand w/ some gravel. 16" RECOVERY | A-2-4(0) | |
| 12.45 | | 6 | 10.0' | 7 6 7 8 | Moist medium dense light brown coarse to fine sand w/ some gravel and silt. 20" RECOVERY | A-1-b | |
| | | 7 | 12.0' | 5 4 5 5 | Moist loose light brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 3 7 12 11 | Moist medium dense light brown coarse sand and gravel w/ some fine sand and silt. | A-1-b | |

Remarks: Mud Rotary @ 24.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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

Boring No.: BR2-9-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|----------------------------|
| | | | 16.0' | | 18" RECOVERY | | |
| | | 9 | 16.0' | 8 11 12 14 | Wet medium dense reddish-brown silty fine to coarse sand. | A-2-4(0) | |
| 17.43 | | | 18.0' | | 24" RECOVERY | | |
| | | U-1 | 18.0' | | Saturated orange yellow brown fine to coarse sand with some clay. | A-2-4(0) | Press Sample - Shelby Tube |
| 19.92 | | | 20.0' | | 21" RECOVERY | | |
| | | 10 | 20.0' | 10 10 15 16 | Wet medium dense brown silty fine to coarse sand. | A-2-4(0) | |
| | | | 22.0' | | 21" RECOVERY | | |
| 22.41 | | | | | | | |
| | | 11 | 24.0' | 4 6 10 11 | Saturated medium dense brown fine to coarse sand, trace of silt. | A-3 | |
| 24.9 | | | 26.0' | | 20" RECOVERY | | |
| | | | | | | | |
| 27.39 | | | | | | | |
| | | 12 | 29.0' | 7 8 8 20 | Saturated medium dense reddish-brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 29.88 | | | 31.0' | | 18" RECOVERY | | |
| | | | | | | | |
| 32.37 | | | | | | | |
| | | 13 | 34.0' | 7 8 8 9 | Saturated medium dense light brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 34.86 | | | 36.0' | | 18" RECOVERY | | |
| | | | | | | | |
| 37.35 | | | | | | | |

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Contract: 25-113-01

Boring No.: BR2-9-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---|
| 39.84 | | 14 | 39.0' | 8 10 11 12 | Saturated medium dense brown silty fine to coarse sand. | A-2-4(0) | |
| | | | 41.0' | | 20" RECOVERY | | |
| 42.33 | | | | | | | |
| 44.82 | | 15 | 44.0' | 10 13 13 14 | Saturated medium dense brown fine to coarse sand, trace of silt. | A-3 | |
| | | | 46.0' | | 24" RECOVERY | | |
| 47.31 | | | | | | | |
| 49.8 | | 16 | 49.0' | 8 8 10 13 | Saturated medium dense greenish-brown fine sand w/ some coarse sand and silt, trace of gravel. | A-2-4(0) | |
| | | | 51.0' | | 19" RECOVERY | | |
| 52.29 | | | | | | | |
| 54.78 | | 17 | 54.0' | 6 10 12 10 | Saturated medium dense greenish-brown fine sand w/ some coarse sand, trace of silt. | A-3 | |
| | | | 56.0' | | 19" RECOVERY | | |
| 57.27 | | 18 | 56.0' | 8 11 10 12 | Visual description: saturated medium dense greenish-brown fine sand w/ some coarse sand, trace of silt. | | Sample brought to GTA lab for pH testing. |
| | | | 58.0' | | 18" RECOVERY | | |
| 59.76 | | 19 | 59.0' | 12 13 14 15 | Saturated medium dense greenish-brown fine sand w/ some silt and coarse sand. | A-2-4(0) | |
| | | | 61.0' | | 24" RECOVERY | | |

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Contract: 25-113-01

Boring No.: BR2-9-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| 62.25 | | | | | | | |
| 64.74 | | 20 | 64.0' | 10 11 11 12 | Saturated medium dense greenish-brown fine sand w/ some silt, trace of coarse sand. | A-2-4(0) | |
| | | | 66.0' | | 15" RECOVERY | | |
| 67.23 | | | | | | | |
| 69.72 | | 21 | 69.0' | 10 11 11 12 | Saturated medium dense greenish-brown fine sand w/ some silt, trace of coarse sand. | A-2-4(0) | |
| | | | 71.0' | | 14" RECOVERY | | |
| 72.21 | | | | | | | |
| 74.7 | | 22 | 73.0' | 10 12 12 17 | Saturated medium dense dark green and gray fine sand w/ some silt and coarse sand, trace of organic matter and clay. | 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



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 2/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
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.: BR2-9-02

Contract: 25-113-01

Boring Location: Sta. 257+32.07, 122' Rt. C.L.

Boring Surface Elev.: 53.16

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: | 26.0' |
| | Hollow Stem Auger: | | From Depth of: | | To: | |

| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|----------------------|---------|------|---------------|-----------------|----------------|----------------|
| | 2/14/08 | | 85.4' | | 11.5' | 41.7 |
| | 2/15/08 | | 19.0' | | 11.0' | 42.2 |
| | 2/18/08 | | 19.0' | | 10.0' | 43.2 |
| | | | | | | 53.2 |

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 85.4 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: U-Samples: 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' | 2 3 4 5 | Wet firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel. | A-4(1) | 10" Cultivated Soils |
| 2.49 | | 2 | 2.0' | 5 | 16" RECOVERY Wet stiff brown fine sandy silt w/ some clay, trace of coarse sand and gravel. | A-4(0) | |
| | | 2A | 2.5' | 5 6 8 | 6" RECOVERY Wet stiff orange fine sandy silt w/ some coarse sand. | A-4(0) | |
| 4.98 | | 3 | 4.0' | 3 7 7 7 | 13" RECOVERY Wet medium dense orange fine sand w/ some coarse sand, trace of silt. | A-3 | |
| 7.47 | | 4 | 6.0' | 7 7 7 9 | 19" RECOVERY Wet medium dense light brown fine sand w/ some silt and coarse sand, trace of gravel. | A-2-4(0) | |
| 9.96 | | 5 | 8.0' | 7 10 13 15 | 18" RECOVERY Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 12.45 | | 6 | 10.0' | 16 17 15 17 | 18" RECOVERY Saturated dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | 7 | 12.0' | 7 15 13 18 | 22" RECOVERY Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |

Remarks: Mud Rotary @ 26.0'

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

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Boring No.: BR2-9-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|----------------------|--|-------------|---------|
| 14.94 | | 8 | 14.0' 14.0' | 7 15 17 25 | 20" RECOVERY Saturated dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 17.43 | | 9 | 16.0' 16.0' | 3 9 9 14 | 22" RECOVERY Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 19.92 | | 10 | 18.0' 18.0' | 10 13 19 20 | 23" RECOVERY Saturated dense brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 22.41 | | | 20.0' | | 20" RECOVERY | | |
| 24.9 | | 11 | 24.0' | 8 13 13 14 | Saturated medium dense brown fine to coarse sand, trace of silt and gravel. | A-3 | |
| 27.39 | | | 26.0' | | 13" RECOVERY | | |
| 29.88 | | 12 | 29.0' | 9 14 18 20 | Saturated dense 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' | 7 14 17 18 | Saturated dense brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 37.35 | | | 36.0' | | 20" RECOVERY | | |

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Contract: 25-113-01

Boring No.: BR2-9-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|------|--------------|----------------------|--|-------------|----------------------------|
| 39.84 | | 14 | 39.0' | 9 20 25 20 | Saturated dense brown fine sand w/ some coarse sand, trace of silt and gravel. | A-3 | |
| | | | 41.0' | | 20" RECOVERY | | |
| 42.33 | | | | | | | |
| 44.82 | | 15 | 44.0' | 10 15 18 20 | Saturated dense brown fine sand w/ some coarse sand and silt. | A-2-4(0) | |
| | | | 46.0' | | 19" RECOVERY | | |
| 47.31 | | | | | | | |
| 49.8 | | 16 | 49.0' | 9 14 16 18 | Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. | A-3 | |
| | | | 51.0' | | 20" RECOVERY | | |
| | | PH-1 | 51.0' | 9 14 13 14 | Sample used for corrosion potential testing. | | pH Testing. |
| 52.29 | | | 53.0' | | 19" RECOVERY | | |
| 54.78 | | 17 | 54.0' | 6 10 14 18 | Saturated medium dense green fine sand w/ some silt and coarse sand. | A-2-4(0) | |
| | | | 56.0' | | 22" RECOVERY | | |
| 57.27 | | U-1 | 56.5' | | Saturated green brown fine sand w/ some silt. | A-2-4(0) | Press Sample - Shelby Tube |
| | | | 58.5' | | 22" RECOVERY | | |
| 59.76 | | 18 | 59.0' | 6 8 10 11 | Saturated medium dense dark green fine sand w/ some silt, trace of coarse sand and organic matter. | A-2-4(0) | |

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

Boring No.: BR2-9-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | | 61.0' | | 18" RECOVERY | | |
| 62.25 | | | | | | | |
| | | 19 | 64.0' | | No Sample | | |
| 64.74 | | | | | | | |
| | | | 66.0' | | 0" RECOVERY | | |
| 67.23 | | | | | | | |
| | | 20 | 69.0' | 8 12 19 20 | Saturated dense dark green fine sand w/ some silt and coarse sand, trace of organic matter and gravel. | A-2-4(0) | |
| 69.72 | | | | | | | |
| | | | 71.0' | | 21" RECOVERY | | |
| 72.21 | | | | | | | |
| | | 21 | 74.0' | 11 20 30 44 | Saturated dense dark green silty fine sand w/ some coarse sand and organic matter, trace of gravel. | A-2-4(0) | |
| 74.7 | | | | | | | |
| | | | 76.0' | | 20" RECOVERY | | |
| 77.19 | | | | | | | |
| | | 22 | 79.0' | 21 30 49 50 | Saturated very dense dark green silty fine to coarse sand w/ some organic matter, trace of gravel. | A-2-4(0) | |
| 79.68 | | | | | | | |
| | | | 81.0' | | 22" RECOVERY | | |
| 82.17 | | | | | | | |
| | | 23 | 84.0' | 15 42 | Saturated very dense dark green silty fine to | A-2-4(0) | |

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Contract: 25-113-01

Boring No.: BR2-9-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|---------|
| 84.66 | | | | 50/5" | coarse sand w/ some organic matter, trace of gravel. 17" RECOVERY | | |
| | | | 85.5' | | | | |
| | | | | | Boring terminated at 85.4 feet. | | |
| 87.15 | | | | | | | |
| 89.64 | | | | | | | |
| 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



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 2/14/2008 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.: BR2-9-03

Contract: 25-113-01

Boring Location: Sta. 257+31.58, 111' Rt. C.L.

Boring Surface Elev.: 55.62

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: 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: 80.3 |

| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|----------------------|---------|------|---------------|-----------------|----------------|----------------|
| | 2/14/08 | | 80.3 | | 16.4 | 39.2 |
| | 2/15/08 | | 3.8' | | Dry | |
| | 2/18/08 | | 3.8' | | Dry | 55.6 |

Pay Quantities:

| | | | |
|---------------------------------------|------|------|--|
| 2 1/2 in. Dia. Dry Sample Boring: | 80.3 | Ft.; | |
| No. of 2 in. Dia. Shelby Tubes: | | Ft.; | |
| 2 1/2 in. Dia. Contin. Sample Boring: | | Ft.; | |

| | | | |
|--|---|------------------------|-----|
| | 3 | Dia. U-Sample Boring: | Ft. |
| | | No. of U-Samples: | |
| | | Core Drilling in Rock: | Ft. |

Boring Contractor: Walton Corporation
Driller: John Foley
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-----------------------------|
| | | 1 | 1.0' | 2 3 | Moist soft brown fine sandy silt w/ some coarse sand, trace of clay and gravel. 12" RECOVERY | A-4(0) | 8" Cultivated Soils |
| 2.49 | | 2 | 2.0' | 3 5 5 | Moist loose brown and orange silty fine sand w/ some coarse sand. 17" RECOVERY | A-2-4(0) | |
| 4.98 | | 3 | 4.0' | 2 3 7 8 | Moist loose orange coarse to fine sand and gravel w/ some silt. 15" RECOVERY | A-1-b | |
| 7.47 | | 4 | 6.0' | 6 8 8 8 | Moist medium dense orange coarse to fine sand and gravel w/ some silt. 20" RECOVERY | A-1-b | |
| 9.96 | | 5 | 8.0' | 4 3 | Moist loose brown coarse to fine sand w/ some gravel and silt. 7" RECOVERY | A-1-b | |
| | | 5A | 9.0' | 3 3 | Wet loose light brown silty fine sand, trace of coarse sand and gravel. 8" RECOVERY | A-2-4(0) | |
| 12.45 | | U-1 | 10.0' | | Wet orange brown gravelly fine to coarse sand, trace of silt. 22" RECOVERY | A-1-b | |
| | | 7 | 12.0' | 7 9 13 13 | Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel. 17" RECOVERY | A-2-4(0) | Press Sample - Shelby Tube. |
| | | 8 | 14.0' | 6 10 12 13 | Wet medium dense brown fine to coarse sand w/ some silt. | A-2-4(0) | |

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
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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.: BR2-9-03

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| | | | 16.0' | | 18" RECOVERY | | |
| | | 9 | 16.0' | 12 20 25 29 | Saturated dense brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| 17.43 | | | 18.0' | | 22" RECOVERY | | |
| | | 10 | 18.0' | 10 12 14 16 | Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 20.0' | | 18" RECOVERY | | |
| 19.92 | | | | | | | |
| | | | | | | | |
| 22.41 | | | | | | | |
| | | 11 | 24.0' | 5 7 14 18 | Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 24.9 | | | 26.0' | | 21" RECOVERY | | |
| | | | | | | | |
| 27.39 | | | | | | | |
| | | 12 | 29.0' | 4 8 12 12 | Saturated medium dense 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' | 12 17 19 19 | Saturated dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 34.86 | | | 36.0' | | 18" 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.: BR2-9-03

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 39.84 | | 14 | 39.0' | 5 10 14 14 | Saturated medium dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 41.0' | | 16" RECOVERY | | |
| 42.33 | | | | | | | |
| 44.82 | | 15 | 44.0' | 7 10 12 11 | Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel. | A-2-4(0) | |
| | | | 46.0' | | 16" RECOVERY | | |
| 47.31 | | | | | | | |
| 49.8 | | 16 | 49.0' | 10 11 12 10 | Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. | A-3 | |
| | | | 51.0' | | 17" RECOVERY | | |
| 52.29 | | | | | | | |
| 54.78 | | 17 | 54.0' | 10 10 13 14 | Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel. | A-2-4(0) | |
| | | | 56.0' | | 18" RECOVERY | | |
| 57.27 | | | | | | | |
| 59.76 | | 18 | 59.0' | 4 5 7 9 | Saturated medium dense brown and green fine sand w/ some silt, trace of coarse sand. | A-2-4(0) | |
| | | | 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.: BR2-9-03

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---------|
| 62.25 | | | | | | | |
| 64.74 | | 19 | 64.0' | 8 9 10 | Saturated medium dense brown and green fine sand w/ some silt, trace of coarse sand. | A-2-4(0) | |
| | | | 66.0' | | 17" RECOVERY | | |
| 67.23 | | | | | | | |
| 69.72 | | 20 | 69.0' | 4 9 14 19 | Saturated medium dense green fine sand w/ some silt, trace of coarse sand and organic matter. | A-2-4(0) | |
| | | | 71.0' | | 21" RECOVERY | | |
| 72.21 | | | | | | | |
| 74.7 | | 21 | 74.0' | 6 13 23 30 | Saturated dense green fine sand w/ some silt and coarse sand, trace of organic matter and gravel. | A-2-4(0) | |
| | | | 76.0' | | 20" RECOVERY | | |
| 77.19 | | | | | | | |
| 79.68 | | 22 | 79.0' | 12 35 50/4" | Saturated very dense dark green fine to coarse sand w/ some silt, trace of organic matter, gravel, and clay. | A-2-4(0) | |
| | | | 80.5' | | 16" RECOVERY | | |
| 82.17 | | | | | Boring terminated at 80.3 feet. | | |
| 84.66 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 2/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45C.
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: US 301, Maryland State Line to I-95

Boring No.: BR2-9-04

Contract: 25-113-01

Boring Location: Sta. 199+20, 30.00' Lt. C.L.

Boring Surface Elev.: + 58.83

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: | | 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: 46.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 12/17/2008 | 9:00 a.m. | 24.0' | 24.0' | 19.8' | |

Pay Quantities:

| | | | | |
|---------------------------------------|-------|-------------|-------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 100.0 | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|---|-------------|-----------------------|
| 2.5 | 12/17/08 | 1 | 1.0' | 5 5 | Moist loose brown silty coarse to fine sand. | A-2-4(0) | Cultivated Soil - 8". |
| | | | 2.0' | | 11" RECOVERY | | |
| 5 | | 2 | 2.0' | 7 9 11 | Moist medium dense orange silty fine to coarse sand w/trace of gravel. | A-2-4(0) | |
| | | | 4.0' | | 14" RECOVERY | | |
| 7.5 | | 3 | 4.0' | 6 6 9 | Moist medium dense orange silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 6.0' | | 13" RECOVERY | | |
| 10 | | 4 | 6.0' | 9 8 10 | Moist medium dense orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| | | | 8.0' | | 20" RECOVERY | | |
| 12.5 | | 5 | 8.0' | 4 5 6 | Moist loose orange fine sand and gravel w/ trace of silt and coarse sand. | A-3 | |
| | | | 10.0' | | 18" RECOVERY | | |
| | | 6 | 10.0' | 5 5 6 | Moist loose orange fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 12.0' | | 19" RECOVERY | | |
| | | 7 | 12.0' | 7 9 10 11 | Wet medium dense brown coarse to fine sand w/some silt, trace of gravel. | A-2-4(0) | |
| | | | 14.0' | | 18" RECOVERY | | |
| | | 8 | 14.0' | 9 9 10 12 | Wet medium dense brown coarse to fine sand w/some silt, trace of gravel. | A-1-b | |

Remarks: Mud Rotary @ 46.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR2-9-04

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | | 16.0' | | 17" RECOVERY | | |
| | | 9 | 16.0' | 11 13 16 19 | Wet medium dense brown coarse to fine sand w/some silt, trace of gravel. | A-2-4(0) | |
| 17.5 | | | 18.0' | | 18" RECOVERY | | |
| | | 10 | 18.0' | 9 10 11 13 | Saturated medium dense brown fine to coarse sand w/trace of silt and gravel. | A-3 | |
| 20 | | | 20.0' | | 18" RECOVERY | | |
| | | | | | | | |
| 22.5 | | | | | | | |
| | | 11 | 24.0' | 14 16 20 18 | Saturated dense brown coarse to fine sand w/trace of silt and gravel. | A-3 | |
| 25 | | | 26.0' | | 18" RECOVERY | | |
| | | | | | | | |
| 27.5 | | | | | | | |
| | | 12 | 29.0' | 12 17 18 19 | Saturated dense brown fine to coarse sand w/trace of silt and gravel. | A-3 | |
| 30 | | | 31.0' | | 17" RECOVERY | | |
| | | | | | | | |
| 32.5 | | | | | | | |
| | | 13 | 34.0' | 1 7 14 21 | Saturated medium dense brown fine to coarse sand w/trace of silt. | A-3 | |
| 35 | | | 36.0' | | 15" RECOVERY | | |
| | | | | | | | |
| 37.5 | | | | | | | |

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

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

Boring No.: BR2-9-04

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------------|
| 40 | | 14 | 39.0' | 5 11 13 17 | Saturated medium dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 41.0' | | 16" RECOVERY | | |
| 42.5 | | | | | | | |
| 45 | | 15 | 44.0' | 1 7 12 18 | Saturated medium dense brown fine to coarse sand w/trace of silt. | A-3 | |
| | | | 46.0' | | 12" RECOVERY | | |
| 47.5 | | | | | | | |
| 50 | | 16 | 49.0' | 10 12 13 15 | Saturated medium dense brown fine to coarse sand w/trace of silt. | A-3 | Mud Rotary @ 46.0'. |
| | | | 51.0' | | 21" RECOVERY | | |
| 52.5 | | | | | | | |
| 55 | | 17 | 54.0' | 11 13 16 19 | Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel. | A-2-4(0) | |
| | | | 56.0' | | 22" RECOVERY | | |
| 57.5 | | | | | | | |
| 60 | 12/18/08 | 18 | 59.0' | 7 7 9 11 | Saturated medium dense brown fine sand w/ some coarse sand and silt. | A-2-4(0) | |
| | | | 61.0' | | 17" RECOVERY | | |

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

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

Boring No.: BR2-9-04

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------------|--|-------------|------------|
| 62.5 | | | | | | | |
| 65 | | 19 | 64.0' | 5 6 9 9 | Saturated medium dense brown fine sand w/ trace of silt and coarse sand. 19" RECOVERY | A-3 | |
| 67.5 | | | 66.0' | | | | |
| 70 | | 20 | 69.0' | 7 7 | Saturated medium dense brown fine sand w/ some silt, trace of coarse sand. 12" RECOVERY | A-2-4(0) | |
| | | 20A | 70.0' | 9 12 | Saturated medium dense green fine sand w/ some silt, trace of coarse sand. 12" RECOVERY | A-2-4(0) | Glauconite |
| | | | 71.0' | | | | |
| 72.5 | | | | | | | |
| 75 | | 21 | 74.0' | 7 8 11 12 | Saturated medium dense green fine sand w/ some silt and coarse sand. 20" RECOVERY | A-2-4(0) | Glauconite |
| | | | 76.0' | | | | |
| 77.5 | | | | | | | |
| 80 | | 22 | 79.0' | 13 14 17 26 | Saturated dense green silty fine to coarse sand w/some clay, trace of organic matter and gravel. 24" RECOVERY | A-2-4(0) | Glauconite |
| | | | 81.0' | | | | |
| 82.5 | | | | | | | |
| 85 | | 23 | 84.0' | 14 22 30 50/4" | Saturated very dense green fine to coarse sand w/some silt. | A-2-4(0) | Glauconite |

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

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

Boring No.: BR2-9-04

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------------|--|-------------|------------|
| | | | 86.0' | | 20" RECOVERY | | |
| 87.5 | | | | | | | |
| | | 24 | 89.0' | 14 29 50/5" | Saturated very dense green fine to coarse sand w/some silt. | A-2-4(0) | Glauconite |
| 90 | | | 90.5' | | 17" RECOVERY | | |
| | | | | | | | |
| 92.5 | | | | | | | |
| | | 25 | 94.0' | 21 50/2" | Saturated very dense green silty fine sand w/ some coarse sand and gravel. | A-2-4(0) | Glauconite |
| 95 | | | 95.0' | | 8" RECOVERY | | |
| | | | | | | | |
| 97.5 | | | | | | | |
| | | 26 | 98.0' | 19 28 44 50/2" | Saturated very dense green silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| | | | | | | | |
| 100 | | | 100.0' | | 18" RECOVERY | | |
| | | | | | End of Boring | | |
| 102.5 | | | | | | | |
| | | | | | | | |
| 105 | | | | | | | |
| | | | | | | | |
| 107.5 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 12-17-2008 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: US. 301, Maryland State Line to I-95

Boring No.: BR2-9-05

Contract: 25-113-01

Boring Location: Sta. 196+70, 30.00' Rt. C.L.

Boring Surface Elev.: + 59.33

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: | | 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 12/18/2008 | Time 11:00 a.m. | 26.0' | 24.0' | 22.0' | |

Pay Quantities:

| | | | | |
|---------------------------------------|-------|-------------|-------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 100.0 | 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: Jason Truver
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-----------------------|
| | 12/18/08 | 1 | 1.0' | 2 | Moist very loose brown clayey fine to coarse sand. | A-2-4(0) | Cultivated Soil - 9". |
| 2.5 | | 2 | 2.0' | 1 3 4 5 | 11" RECOVERY Moist loose brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 5 | | 3 | 4.0' | 5 6 9 | 15" RECOVERY Moist medium dense orange fine to coarse sand w/some silt. | A-2-4(0) | |
| 7.5 | | 4 | 6.0' | 8 10 9 9 | 17" RECOVERY Moist medium dense orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 10 | | 5 | 8.0' | 4 8 7 10 | 19" RECOVERY Moist medium dense orange coarse to fine sand w/some silt and gravel. | A-1-b | |
| 12.5 | | 6 | 10.0' | 7 11 13 13 | 17" RECOVERY Moist medium dense orange coarse sand w/ some fine sand and gravel, trace of silt. | A-1-b | |
| | | 7 | 12.0' | 11 11 8 10 | 20" RECOVERY Moist medium dense orange coarse to fine sand and gravel w/some silt. | A-1-b | |
| | | 8 | 14.0' | 11 14 15 14 | 15" RECOVERY Wet medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |

Remarks: Mud Rotary @ 39.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR2-9-05

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | | 16.0' | | 16" RECOVERY | | |
| | | 9 | 16.0' | 9 14 21 18 | Wet dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 17.5 | | | | | | | |
| | | | 18.0' | | 22" RECOVERY | | |
| | | 10 | 18.0' | 11 15 16 17 | Wet dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 20 | | | 20.0' | | 21" RECOVERY | | |
| | | | | | | | |
| 22.5 | | | | | | | |
| | | 11 | 24.0' | 11 14 17 20 | Saturated dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 25 | | | 26.0' | | 20" RECOVERY | | |
| | | | | | | | |
| 27.5 | | | | | | | |
| | | 12 | 29.0' | 14 16 21 24 | Saturated dense brown fine to coarse sand w/ trace of silt and gravel. | A-3 | |
| 30 | | | 31.0' | | 20" RECOVERY | | |
| | | | | | | | |
| 32.5 | | | | | | | |
| | | 13 | 34.0' | 1 7 10 14 | Saturated medium dense brown fine to coarse sand w/trace of silt and gravel. | A-3 | |
| 35 | | | 36.0' | | 14" RECOVERY | | |
| | | | | | | | |
| 37.5 | | | | | | | |

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

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

Boring No.: BR2-9-05

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------------|----|----------|----|-------|----------------------|---|----------|--|------|-------|--|----|--|----|-------|----------------------|---|----------|--|------|-------|--|----|--|----|-------|----------------------|---|----------|--|------|-------|--|----|--|----|-------|------------------|--|
| 40 | | 14 | 39.0' | 1 6 10 15 | Saturated medium dense brown fine to coarse sand w/some silt, trace of gravel. 12" RECOVERY | A-2-4(0) | Mud Rotary @ 39.0'. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42.5 | | | 41.0' | | | | | 45 | 12/23/08 | 15 | 44.0' | 7 9 12 12 | Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel. 20" RECOVERY | A-2-4(0) | | 47.5 | 46.0' | | 50 | | 16 | 49.0' | 9 10 10 12 | Saturated medium dense brown fine to coarse sand w/some silt. 22" RECOVERY | A-2-4(0) | | 52.5 | 51.0' | | 55 | | 17 | 54.0' | 10 11 12 13 | Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel. 19" RECOVERY | A-2-4(0) | | 57.5 | 56.0' | | 60 | | 18 | 59.0' | 7 7 8 8 | Saturated medium dense greenish brown fine sand w/some silt and coarse sand. 21" RECOVERY |
| 45 | 12/23/08 | 15 | 44.0' | 7 9 12 12 | Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel. 20" RECOVERY | A-2-4(0) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47.5 | | | 46.0' | | | | | 50 | | 16 | 49.0' | 9 10 10 12 | Saturated medium dense brown fine to coarse sand w/some silt. 22" RECOVERY | A-2-4(0) | | 52.5 | 51.0' | | 55 | | 17 | 54.0' | 10 11 12 13 | Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel. 19" RECOVERY | A-2-4(0) | | 57.5 | 56.0' | | 60 | | 18 | 59.0' | 7 7 8 8 | Saturated medium dense greenish brown fine sand w/some silt and coarse sand. 21" RECOVERY | A-2-4(0) | | | 61.0' | | | | | | | |
| 50 | | 16 | 49.0' | 9 10 10 12 | Saturated medium dense brown fine to coarse sand w/some silt. 22" RECOVERY | A-2-4(0) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52.5 | | | 51.0' | | | | | 55 | | 17 | 54.0' | 10 11 12 13 | Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel. 19" RECOVERY | A-2-4(0) | | 57.5 | 56.0' | | 60 | | 18 | 59.0' | 7 7 8 8 | Saturated medium dense greenish brown fine sand w/some silt and coarse sand. 21" RECOVERY | A-2-4(0) | | | 61.0' | | | | | | | | | | | | | | | | | | |
| 55 | | 17 | 54.0' | 10 11 12 13 | Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel. 19" RECOVERY | A-2-4(0) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 57.5 | | | 56.0' | | | | | 60 | | 18 | 59.0' | 7 7 8 8 | Saturated medium dense greenish brown fine sand w/some silt and coarse sand. 21" RECOVERY | A-2-4(0) | | | 61.0' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60 | | 18 | 59.0' | 7 7 8 8 | Saturated medium dense greenish brown fine sand w/some silt and coarse sand. 21" RECOVERY | A-2-4(0) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 61.0' | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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

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

Boring No.: BR2-9-05

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------------|--|-------------|------------|
| 62.5 | | | | | | | |
| 65 | | 19 | 64.0' | 7 7 7 8 | Saturated medium dense greenish brown fine sand w/some silt, trace of coarse sand. | A-2-4(0) | |
| | | | 66.0' | | 20" RECOVERY | | |
| 67.5 | | | | | | | |
| 70 | | 20 | 69.0' | 7 9 9 8 | Saturated medium dense greenish brown fine sand w/some silt, trace of coarse sand. | A-2-4(0) | |
| | | | 71.0' | | 22" RECOVERY | | |
| 72.5 | | | | | | | |
| 75 | | 21 | 74.0' | 6 12 17 18 | Saturated medium dense green fine sand w/ some silt and coarse sand, trace of organic matter. | A-2-4(0) | Glauconite |
| | | | 76.0' | | 23" RECOVERY | | |
| 77.5 | | | | | | | |
| 80 | | 22 | 79.0' | 12 18 21 28 | Saturated dense green fine sand w/some coarse sand and silt, trace of organic matter and gravel. | A-2-4(0) | Glauconite |
| | | | 81.0' | | 24" RECOVERY | | |
| 82.5 | | | | | | | |
| 85 | | 23 | 84.0' | 18 34 48 50/3" | Saturated very dense green fine to coarse sand w/some silt and organic matter. | A-2-4(0) | Glauconite |

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

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

Boring No.: BR2-9-05

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------------|---|-------------|------------|
| | | | 86.0' | | 20" RECOVERY | | |
| 87.5 | | | | | | | |
| | | 24 | 89.0' | 15 25 39 50/5" | Saturated very dense green fine to coarse sand w/some silt and organic matter. | A-2-4(0) | Glauconite |
| 90 | | | 91.0' | | 23" RECOVERY | | |
| | | | | | | | |
| 92.5 | | | | | | | |
| | | 25 | 94.0' | 17 50/4" | Saturated hard green organic fine sandy clay w/some coarse sand, trace of gravel. | A-6(1) | Glauconite |
| 95 | | | 95.0' | | 10" RECOVERY | | |
| | | | | | | | |
| 97.5 | | | | | | | |
| | | 26 | 98.0' | 17 33 45 50/2" | Saturated very dense green clayey fine sand w/some coarse sand, trace of organic matter and gravel. | A-2-6(0) | Glauconite |
| | | | 100.0' | | 20" RECOVERY | | |
| 100 | | | | | End of Boring | | |
| | | | | | | | |
| 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

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Notes:

1. Exploratory borings were drilled on 12-18-2008 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: US 301, Maryland State Line to I-95

Boring No.: BR2-9-06

Contract: 25-113-01

Boring Location: Sta. 256+76, C.L.

Boring Surface Elev.: + 56.45

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: 31.0'

Water Level Readings

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|------------|-----------|---------------|-----------------|----------------|----------------|
| 12/30/2008 | 9:00 a.m. | 18.0' | 18.0' | 16.4' | |

Pay Quantities:

| | | | | |
|---------------------------------------|-------|------|------------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 94.5' | 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 |
|-------------|----------------|-----|--------------|---------------------|---|-------------|------------------------|
| | 12/30/08 | 1 | 1.0' | 2 2 | Moist soft brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 12" RECOVERY | A-4(0) | Cultivated Soil - 10". |
| 2.5 | | 2 | 2.0' | 3 6 7 8 | Moist medium dense orange silty fine to coarse sand w/trace of gravel. 17" RECOVERY | A-2-4(0) | |
| 5 | | 3 | 4.0' | 3 7 5 | Moist medium dense orange silty fine to coarse sand w/trace of gravel. 16" RECOVERY | A-2-4(0) | |
| 7.5 | | 4 | 6.0' | 5 4 4 5 | Moist loose orange fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| 10 | | 5 | 8.0' | 3 4 4 5 | Moist loose orange fine to coarse sand w/ some gravel, trace of silt. 17" RECOVERY | A-3 | |
| 12.5 | | 6 | 10.0' | 7 6 8 11 | Wet medium dense brown silty fine to coarse sand w/trace of gravel. 15" RECOVERY | A-2-4(0) | |
| | | 7 | 12.0' | 3 7 8 8 | Wet medium dense brown fine to coarse sand w/some silt, trace of gravel. 13" RECOVERY | A-2-4(0) | |
| | | 8 | 14.0' | 5 11 15 20 | Wet medium dense brown fine to coarse sand w/some silt. | A-2-4(0) | |

Remarks: Mud Rotary @ 31.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR2-9-06

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------------|
| | | | 16.0' | | 18" RECOVERY | | |
| | | 9 | 16.0' | 17 20 24 24 | Saturated dense brownish red fine to coarse sand w/some silt. | A-2-4(0) | |
| 17.5 | | | 18.0' | | 20" RECOVERY | | |
| | | 10 | 18.0' | 11 15 21 21 | Saturated dense brownish red fine to coarse sand w/some silt. | A-2-4(0) | |
| 20 | | | 20.0' | | 22" RECOVERY | | |
| 22.5 | | | | | | | |
| | | 11 | 24.0' | 6 15 20 21 | Saturated dense brownish red fine to coarse sand w/some silt. | A-2-4(0) | |
| 25 | | | 26.0' | | 19" RECOVERY | | |
| 27.5 | | | | | | | |
| | | 12 | 29.0' | 6 15 30 37 | Saturated dense brownish red fine to coarse sand w/some silt. | A-2-4(0) | |
| 30 | | | 31.0' | | 16" RECOVERY | | |
| 32.5 | | | | | | | |
| | | 13 | 34.0' | 8 11 11 12 | Saturated medium dense brown fine to coarse sand w/trace of silt. | A-3 | Mud Rotary @ 31.0'. |
| 35 | | | 36.0' | | 18" RECOVERY | | |
| 37.5 | | | | | | | |

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

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

Boring No.: BR2-9-06

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|--|-------------|---------|
| 40 | | 14 | 39.0' | 4 7 8 8 | Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel. | A-3 | |
| | | | 41.0' | | 19" RECOVERY | | |
| 42.5 | | | | | | | |
| 45 | | 15 | 44.0' | 5 7 8 9 | Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. | A-3 | |
| | | | 46.0' | | 18" RECOVERY | | |
| 47.5 | | | | | | | |
| 50 | | 16 | 49.0' | 5 7 13 15 | Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. | A-3 | |
| | | | 51.0' | | 19" RECOVERY | | |
| 52.5 | | | | | | | |
| 55 | | 17 | 54.0' | 6 8 11 13 | Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. | A-3 | |
| | | | 56.0' | | 17" RECOVERY | | |
| 57.5 | | | | | | | |
| 60 | | 18 | 59.0' | 5 6 8 8 | Saturated medium dense brownish green fine sand w/some silt and coarse sand. | A-2-4(0) | |
| | | | 61.0' | | 17" RECOVERY | | |

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

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

Boring No.: BR2-9-06

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|------------|
| 62.5 | | | | | | | |
| 65 | | 19 | 64.0' | 5 5 7 | Saturated medium dense brownish green fine sand w/some silt, trace of coarse sand. | A-2-4(0) | |
| | | | 66.0' | | 21" RECOVERY | | |
| 67.5 | | | | | | | |
| 70 | 12/31/08 | 20 | 69.0' | 6 7 9 | Saturated medium dense green fine sand w/ some silt, trace of coarse sand and organic matter. | A-2-4(0) | Glauconite |
| | | | 71.0' | | 20" RECOVERY | | |
| 72.5 | | | | | | | |
| 75 | | 21 | 74.0' | 8 12 19 23 | Saturated dense green fine sand w/some coarse sand and silt, trace of gravel and organic matter. | A-2-4(0) | Glauconite |
| | | | 76.0' | | 21" RECOVERY | | |
| 77.5 | | | | | | | |
| 80 | | 22 | 79.0' | 10 33 50/3" | Saturated very dense green fine to coarse sand w/some silt, trace of organic matter and gravel. | A-2-4(0) | Glauconite |
| | | | 80.5' | | 14" RECOVERY | | |
| 82.5 | | | | | | | |
| 85 | | 23 | 84.0' | 14 14 22 24 | Saturated dense green silty fine to coarse sand w/some organic matter, trace of gravel. | A-2-4(0) | Glauconite |

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

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

Boring No.: BR2-9-06

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|----------------------|---|-------------|--|
| | | | 86.0' | | 24" RECOVERY | | |
| 87.5 | | | | | | | |
| | | 24 | 89.0' | 15 20 24 32 | Saturated dense green fine to coarse sand w/ some silt and organic matter, trace of gravel | A-2-4(0) | Glaucinite |
| 90 | | | | | | | |
| | | | 91.0' | | 23" RECOVERY | | |
| 92.5 | | | | | | | |
| | | 25 | 94.0' 94.5' | | No Sample Recovery - Lost spoon shoe in hole. | | Spoon shoe blocked rotary bit from advancing. |
| 95 | | | | | 0" RECOVERY | | |
| | | | | | End of Boring | | |
| 97.5 | | | | | | | |
| | | | | | | | |
| 100 | | | | | | | |
| | | | | | | | |
| 102.5 | | | | | | | |
| | | | | | | | |
| 105 | | | | | | | |
| | | | | | | | |
| 107.5 | | | | | | | |
| | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 12-30-2008 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: US. 301, Maryland State Line to I-95

Boring No.: BR2-9-07

Contract: 25-113-01

Boring Location: Sta. 256+35, 90.00' Rt. C.L.

Boring Surface Elev.: + 55.02

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: 26.0'

Water Level Readings

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|------------|-----------|---------------|-----------------|----------------|----------------|
| 12/23/2008 | 9:00 a.m. | 18.0' | 16.0' | 13.0' | |

Pay Quantities:

| | | | | |
|---------------------------------------|-------|------|------------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 101.0 | 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: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|---|-------------|---------------------|
| | 12/23/08 | 1 | 0.5' | 2 4 5 | Moist stiff brown fine sandy silt w/some clay and coarse sand, trace of gravel. | A-4(0) | |
| | | | 2.0' | | 18" RECOVERY | | |
| 2.5 | | 2 | 2.0' | 2 3 3 | Moist firm brown clayey fine sandy silt w/some coarse sand, trace of gravel. | A-4(1) | |
| | | | 4.0' | | 19" RECOVERY | | |
| | | 3 | 4.0' | 4 8 13 | Moist medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 5 | | | 6.0' | | 21" RECOVERY | | |
| | | 4 | 6.0' | 4 5 5 6 | Moist loose brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 7.5 | | | 8.0' | | 21" RECOVERY | | |
| | | 5 | 8.0' | 6 6 10 10 | Moist medium dense brown coarse to fine sand w/some silt and gravel. | A-1-b | |
| 10 | | | 10.0' | | 20" RECOVERY | | |
| | | 6 | 10.0' | 6 8 10 14 | Wet medium dense brownish green fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| | | | 12.0' | | 23" RECOVERY | | |
| 12.5 | | 7 | 12.0' | 5 5 10 14 | Wet medium dense brownish green coarse to fine sand w/some silt, trace of gravel. | A-2-4(0) | |
| | | | 14.0' | | 19" RECOVERY | | |
| | | 8 | 14.0' | 5 11 | No Sample Recovery | | Lost shoe on spoon. |

Remarks: Mud Rotary at 26.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR2-9-07

Contract: 25-113-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|--------------------|
| 15 | | | | 14 15 | | | |
| | | | 16.0' | | 0" RECOVERY | | |
| | | 9 | 16.0' | 14 14 17 19 | Saturated dense brownish green fine to coarse sand w/some silt. | A-2-4(0) | |
| 17.5 | | | | | | | |
| | | | 18.0' | | 20" RECOVERY | | |
| | | 10 | 18.0' | 9 11 15 12 | Saturated medium dense brownish green fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 20 | | | 20.0' | | 21" RECOVERY | | |
| | | | | | | | |
| 22.5 | | | | | | | |
| | | | | | | | |
| | | 11 | 24.0' | 10 14 17 19 | Saturated dense brownish green fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 25 | | | 26.0' | | 21" RECOVERY | | |
| | | | | | | | |
| 27.5 | | | | | | | |
| | | | | | | | |
| | | 12 | 29.0' | 9 12 15 16 | Saturated medium dense brownish green fine to coarse sand w/some silt. | A-2-4(0) | Mud Rotary @ 26.0' |
| 30 | | | 31.0' | | 22" RECOVERY | | |
| | | | | | | | |
| 32.5 | | | | | | | |
| | | | | | | | |
| | | 13 | 34.0' | 9 10 11 | Saturated medium dense brown fine to coarse sand w/trace of silt and gravel. | A-3 | |
| 35 | | | 36.0' | | 23" RECOVERY | | |
| | | | | | | | |
| 37.5 | | | | | | | |

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

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

Boring No.: BR2-9-07

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| 40 | | 14 | 39.0' | 9 10 10 14 | Saturated medium dense brown fine to coarse sand w/trace of silt and gravel. | A-3 | |
| | | | 41.0' | | 21" RECOVERY | | |
| 42.5 | | | | | | | |
| 45 | | 15 | 44.0' | 10 11 14 16 | Saturated medium dense brown fine to coarse sand w/trace of gravel. | A-3 | |
| | | | 46.0' | | 22" RECOVERY | | |
| 47.5 | | | | | | | |
| 50 | | 16 | 49.0' | 7 9 10 10 | Saturated medium dense brown fine sand w/ some coarse sand, trace of silt. | A-3 | |
| | | | 51.0' | | 20" RECOVERY | | |
| 52.5 | | | | | | | |
| 55 | | 17 | 54.0' | 6 6 9 8 | Saturated medium dense brownish green fine sand w/some coarse sand, trace of silt. | A-3 | |
| | | | 56.0' | | 18" RECOVERY | | |
| 57.5 | | | | | | | |
| 60 | | 18 | 59.0' | 6 7 10 | Saturated medium dense brownish green fine sand w/some silt and coarse sand. | A-2-4(0) | |
| | | | 61.0' | | 20" RECOVERY | | |

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

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

Boring No.: BR2-9-07

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|------------|
| 62.5 | | | | | | | |
| 65 | | 19 | 64.0' | 5 5 5 | Saturated loose green fine sand w/some silt, trace of coarse sand. | A-3 | |
| | | | 66.0' | | 22" RECOVERY | | |
| 67.5 | | | | | | | |
| 70 | | 20 | 69.0' | 6 8 9 | Saturated medium dense green fine sand w/ some silt, trace of coarse sand and organic matter. | A-2-4(0) | Glauconite |
| | | | 71.0' | | 23" RECOVERY | | |
| 72.5 | | | | | | | |
| 75 | | 21 | 74.0' | 15 16 17 21 | Saturated dense green fine sand and gravel w/ some coarse sand and silt, trace of organic matter. | A-2-4(0) | Glauconite |
| | | | 76.0' | | 21" RECOVERY | | |
| 77.5 | | | | | | | |
| 80 | | 22 | 79.0' | 15 47 50/4" | Saturated very dense green fine to coarse sand w/some silt and organic matter, trace of gravel. | A-2-4(0) | Glauconite |
| | | | 80.5' | | 16" RECOVERY | | |
| 82.5 | | | | | | | |
| 85 | | 23 | 84.0' | 14 17 28 45 | Saturated dense green silty fine to coarse sand w/trace of organic matter and gravel. | A-2-4(0) | Glauconite |

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AUGUST 2015

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

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

Boring No.: BR2-9-07

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|----------------------|--|-------------|------------|
| | | | 86.0' | | 20" RECOVERY | | |
| 87.5 | | | | | | | |
| | | 24 | 89.0' | 17 19 31 37 | Saturated dense green fine to coarse sand w/ some silt and organic matter, trace of gravel. | A-2-4(0) | Glauconite |
| 90 | | | | | | | |
| | | | 91.0' | | 20" RECOVERY | | |
| 92.5 | | | | | | | |
| | | 25 | 94.0' 94.5' | 50/4" | Saturated very dense green fine to coarse sand w/some silt, trace of gravel. 4" RECOVERY | A-2-4(0) | Glauconite |
| 95 | | | | | | | |
| | | | | | | | |
| 97.5 | | | | | | | |
| | | 26 | 99.0' | 15 13 31 52 | Saturated dense greenish gray silty fine sand w/some coarse sand, trace of gravel. | A-2-4(0) | |
| 100 | | | | | | | |
| | | | 101.0' | | 22" RECOVERY | | |
| | | | | | End of Boring | | |
| 102.5 | | | | | | | |
| | | | | | | | |
| 105 | | | | | | | |
| | | | | | | | |
| 107.5 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 12-23-2008 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: US. 301, Maryland State Line to I-95

Boring No.: BR2-9-08

Contract: 25-113-01

Boring Location: Sta. 257+07, 90.00' Rt. C.L.

Boring Surface Elev.: + 54.21

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: | | 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: 0.0' | To: | 31.0' |

| | | | | | |
|-----------------------------|------------------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date 12/18/2008 | Time 12:00 p.m. | 16.0' | 14.0' | 13.2' | |

Pay Quantities:

| | | | | |
|---------------------------------------|-------|-------------|-------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 101.0 | 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: Bill Holden
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---------------|
| | 12/18/08 | 1 | 0.5' | 1 2 4 | Moist firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel. | A-4(1) | Topsoil - 6". |
| | | | 2.0' | | 16" RECOVERY | | |
| 2.5 | | 2 | 2.0' | 4 5 5 | Moist loose brown silty fine sand w/some coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | 4 4 5 6 | Moist loose brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 5 | | | 6.0' | | 20" RECOVERY | | |
| | | 4 | 6.0' | 3 5 5 10 | Moist loose brownish orange fine to coarse sand w/trace of silt and gravel. | A-3 | |
| 7.5 | | | 8.0' | | 19" RECOVERY | | |
| | | 5 | 8.0' | 6 7 7 10 | Wet medium dense brownish orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| | | | 10.0' | | 15" RECOVERY | | |
| 10 | | 6 | 10.0' | 7 15 17 17 | Wet dense brownish orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| | | | 12.0' | | 20" RECOVERY | | |
| 12.5 | | 7 | 12.0' | 7 9 11 10 | Wet medium dense brownish orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| | | | 14.0' | | 21" RECOVERY | | |
| | | 8 | 14.0' | 6 8 | Saturated medium dense brownish orange fine | A-2-4(0) | |

Remarks: Mud Rotary @ 31.0'

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

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

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

Boring No.: BR2-9-08

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|---------------------|
| 15 | | | | 9 12 | to coarse sand w/some silt, trace of gravel. | | |
| | | | 16.0' | | 19" RECOVERY | | |
| | | 9 | 16.0' | 7 7 12 13 | Saturated medium dense brownish green fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 17.5 | | | 18.0' | | 22" RECOVERY | | |
| | | 10 | 18.0' | 5 6 10 11 | Saturated medium dense brownish green fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 20 | | | 20.0' | | 22" RECOVERY | | |
| 22.5 | | | | | | | |
| | | 11 | 24.0' | 8 10 15 18 | Saturated medium dense brownish green fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 25 | | | 26.0' | | 20" RECOVERY | | |
| 27.5 | | | | | | | |
| | | 12 | 29.0' | 8 10 11 15 | Saturated medium dense brownish green fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 30 | | | 31.0' | | 22" RECOVERY | | |
| 32.5 | | | | | | | |
| | | 13 | 34.0' | 9 11 15 | Saturated medium dense brown fine to coarse sand w/trace of silt and gravel. | A-3 | Mud Rotary @ 31.0'. |
| 35 | | | 36.0' | | 19" RECOVERY | | |
| 37.5 | | | | | | | |

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

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

Boring No.: BR2-9-08

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| 40 | | 14 | 39.0' | 8 10 14 | Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel. | A-2-4(0) | |
| | | | 41.0' | | 21" RECOVERY | | |
| 42.5 | | | | | | | |
| 45 | | 15 | 44.0' | 9 10 12 | Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel. | A-3 | |
| | | | 46.0' | | 18" RECOVERY | | |
| 47.5 | | | | | | | |
| 50 | | 16 | 49.0' | 10 10 11 13 | Saturated medium dense brownish orange fine sand w/some coarse sand, trace of silt and gravel. | A-3 | |
| | | | 51.0' | | 20" RECOVERY | | |
| 52.5 | | | | | | | |
| 55 | | 17 | 54.0' | 7 7 8 9 | Saturated medium dense brownish orange fine sand w/some coarse sand, trace of silt. | A-3 | |
| | | | 56.0' | | 19" RECOVERY | | |
| 57.5 | | | | | | | |
| 60 | | 18 | 59.0' | 7 7 7 | Saturated medium dense green fine sand w/ some silt, trace of coarse sand. | A-2-4(0) | |
| | | | 61.0' | | 23" RECOVERY | | |

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

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

Boring No.: BR2-9-08

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 62.5 | | | | | | | |
| 65 | | 19 | 64.0' | 5 6 6 7 | Saturated medium dense green fine sand w/ trace of silt and coarse sand. 21" RECOVERY | A-3 | |
| 67.5 | | | 66.0' | | | | |
| 70 | | 20 | 69.0' | 7 9 9 10 | Saturated medium dense dark green fine sand w/some silt, trace of coarse sand and organic matter. 23" RECOVERY | A-2-4(0) | |
| 72.5 | | | 71.0' | | | | |
| 75 | | 21 | 74.0' | 10 18 22 23 | Saturated dense green fine to coarse sand w/ some silt and gravel, trace of organic matter. 23" RECOVERY | A-2-4(0) | |
| 77.5 | | | 76.0' | | | | |
| 80 | | 22 | 79.0' | 40 35 50/4" | Saturated very dense green fine to coarse sand w/some organic matter and silt, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| 82.5 | | | 80.5' | | | | |
| 85 | | 23 | 84.0' | 18 25 24 40 | Saturated dense green silty fine to coarse sand w/some organic matter, 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, Maryland State Line to I-95
Contract: 25-113-01

Boring No.: BR2-9-08

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------------|--|-------------|---------|
| | | | 86.0' | | 23" RECOVERY | | |
| 87.5 | | | | | | | |
| | | 24 | 89.0' | 33 40 41 50 | Saturated hard green organic fine sandy silt w/some coarse sand, trace of clay and gravel. | A-4(0) | |
| 90 | | | | | | | |
| | | | 91.0' | | 22" RECOVERY | | |
| 92.5 | | | | | | | |
| | | 25 | 94.0' | 18 30 33 50/2" | Saturated very dense green clayey fine sand w/some coarse sand, trace of gravel. | A-2-6(0) | |
| 95 | | | | | | | |
| | | | 96.0' | | 18" RECOVERY | | |
| 97.5 | | | | | | | |
| | | 26 | 99.0' | 18 30 33 50/2" | Saturated very dense green clayey fine sand w/some coarse sand, trace of gravel. | A-2-4(0) | |
| 100 | | | | | | | |
| | | | 101.0' | | 20" RECOVERY | | |
| | | | | | End of Boring | | |
| 102.5 | | | | | | | |
| | | | | | | | |
| 105 | | | | | | | |
| | | | | | | | |
| 107.5 | | | | | | | |

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Clayey sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12-18-2008 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.: BR3-1-01

Contract: 25-113-01

Boring Location: Sta. 138+18.92, 83' Lt. C.L.

Boring Surface Elev.: 68.15

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: | 31.0' |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|------------------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 3/10/08 | | 59.0' | | 3.8' | 64.4 68.2 68.2 68.2 |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|-------------|-------------------------------|------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 99.3 | 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, Sr.
Helpers: A. Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | 1 | 0.0' | 3 9 9 12 | Wet very stiff gray clayey silt, trace of fine to coarse sand. | A-4(8) | |
| 2.49 | | 2 | 2.0' | 9 13 19 24 | 22" RECOVERY Wet to saturated dense brown silty fine to coarse sand w/ some gravel. | A-2-4(0) | |
| 4.98 | | 3 | 4.0' | 7 10 12 12 | 18" RECOVERY Saturated medium dense light brown silty coarse to fine sand w/ some gravel. | A-2-4(0) | |
| 7.47 | | 4 | 6.0' | 10 10 10 10 | 22" RECOVERY Saturated medium dense light brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| 9.96 | | 5 | 8.0' | W/R 1 4 5 | 15" RECOVERY Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 12.45 | | 6 | 10.0' | 3 4 5 16 | 16" RECOVERY Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | 7 | 12.0' | W/R 6 11 12 | 20" RECOVERY Saturated medium dense brown gravel w/ some silt and coarse to fine sand. | A-1-b | |

Remarks: Mud Rotary @ 31.0'

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.: BR3-1-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|----------------------|---|-------------|-----------------------------|
| 14.94 | | 8 | 14.0' 14.0' | 5 7 9 9 | 10" RECOVERY Saturated medium dense orange-brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 17.43 | | 9 | 16.0' 16.0' | 5 10 12 14 | 13" RECOVERY Saturated medium dense light brown w/ dark brown streaks coarse to fine sand, trace of silt and gravel. | A-1-b | |
| 19.92 | | 10 | 18.0' 18.0' | W/R 4 10 9 | 17" RECOVERY Saturated medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 22.41 | | | 20.0' | | 15" RECOVERY | | |
| 24.9 | | 11 | 24.0' | 5 12 19 22 | Saturated hard brown silt, trace of fine to coarse sand, clay, and gravel. | A-7-5(32) | |
| 27.39 | | | 26.0' | | 20" RECOVERY | | |
| 29.88 | | U-1 | 27.0' | | Saturated dense brown-gray clayey fine sand. | A-2-7(2) | Press Sample - Shelby Tube. |
| 32.37 | | | 29.0' | | 24" RECOVERY | | |
| 34.86 | | 12 | 29.0' 29.0' | 11 20 25 35 | Saturated hard gray coarse sandy clay w/ some fine sand. | A-6(5) | |
| 37.35 | | | 31.0' | | 24" RECOVERY | | |
| | | 13 | 34.0' 34.0' | 33 35 40 29 | Saturated very dense red-brown coarse sand w/ some gravel, silt, and fine sand. | A-1-b | |
| | | | 36.0' | | 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 I-95
Contract: 25-113-01

Boring No.: BR3-1-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|----------------------|---|-------------|-------------|
| 39.84 | | 14 | 39.0' | 4 13 13 12 | Saturated medium dense brown coarse sand w/ some fine sand, trace of gravel and silt. | A-1-b | |
| | | | 41.0' | | 14" RECOVERY | | |
| 42.33 | | | | | | | |
| 44.82 | | 15 | 44.0' | 20 21 21 28 | Saturated dense brown coarse sand w/ some fine sand and gravel, trace of silt. | A-1-b | |
| | | | 46.0' | | 17" RECOVERY | | |
| 47.31 | | | | | | | |
| 49.8 | | 16 | 49.0' 49.5' | 50/5" | Saturated very dense green-brown gravel and coarse sand w/ some fine sand, trace of silt. | A-1-a | |
| | | | | | 3" RECOVERY | | |
| 52.29 | | | | | | | |
| 54.78 | | 17 | 54.0' | 31 50/5" | Saturated very dense green coarse to fine sand, trace of silt | A-3 | glaucanitic |
| | | | 55.0' | | 11" RECOVERY | | |
| 57.27 | | | | | | | |
| 59.76 | | 18 | 59.0' | 25 50/5" | No Sample Recovery | | |
| | | | 60.0' | | 0" 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.: BR3-1-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|-------------|--|-------------|---|
| 62.25 | | | | | | | |
| 64.74 | | 19 | 64.0' 65.0' | 38 50/4" | Saturated very dense green fine to coarse sand, trace of silt 9" RECOVERY | A-3 | glaucinitic |
| 67.23 | | 20 | 66.0' 67.0' | 64 50/4" | Visual description: Saturated very dense green fine sand w/ some silt. 9" RECOVERY | | Sample brought to GTA lab for pH testing. |
| 69.72 | | 21 | 69.0' 69.5' | 50/4" | Saturated very dense green fine to coarse sand w/ some silt. 3" RECOVERY | A-2-4(0) | glaucinitic |
| 72.21 | | | | | | | |
| 74.7 | | 22 | 74.0' 74.5' | 50/3" | Saturated very dense green fine to coarse sand w/ some silt. 2" RECOVERY | A-2-4(0) | glaucinitic |
| 77.19 | | | | | | | |
| 79.68 | | 23 | 79.0' 79.5' | 50/4" | Saturated very dense green fine to coarse sand w/ some silt, trace of gravel. 4" RECOVERY | A-2-4(0) | glaucinitic |
| 82.17 | | | | | | | |
| | | 24 | 84.0' | 50 | Saturated very dense green fine to coarse | A-3 | 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.: BR3-1-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|-------------|---|-------------|-------------|
| 84.66 | | | 84.5' | | sand, trace of gravel. 4" RECOVERY | | |
| 87.15 | | | | | | | |
| 89.64 | | 25 | 89.0' 89.5' | 50/2" | Saturated very dense green silty fine sand w/ some coarse sand. 2" RECOVERY | A-2-4(0) | glaucinitic |
| 92.13 | | | | | | | |
| 94.62 | | 26 | 94.0' 95.0' | 33 50/4" | Saturated very dense green fine to coarse sand w/ some silt. 6" RECOVERY | A-2-4(0) | glaucinitic |
| 97.11 | | | | | | | |
| 99.6 | | 27 | 99.0' 99.5' | 50/4" | Saturated very dense green fine to coarse sand w/ some silt 1" RECOVERY | A-2-4(0) | glaucinitic |
| | | | | | Boring terminated at 99.3 ft. | | |
| 102.09 | | | | | | | |
| 104.58 | | | | | | | |
| 107.07 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



High plasticity
clay



Clayey sand



Silt



Well graded sand



Well graded sand
with silt



Poorly graded gravel
with silt

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Notes:

1. Exploratory borings were drilled on 3/10/2008 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.: BR3-1-02

Contract: 25-113-01

Boring Location: Sta. 138+64.32, at C.L.

Boring Surface Elev.: 69.00

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: 24.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|------------------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 3/6/08 | | 74.8' | | 7.7' | 61.3 69.0 69.0 69.0 |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|-------------|------------------------|------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 74.8 | 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, Sr.
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|------------|
| | | 1 | 0.5' | 6 6 11 | Moist very stiff brown coarse to fine sandy silt w/ some gravel. | A-4(0) | 6" Hot-Mix |
| | | | 2.0' | | 12" RECOVERY | | |
| 2.49 | | 2 | 2.0' | 17 12 17 21 | Wet medium dense brown silty coarse to fine sand w/ some gravel. | A-2-4(0) | |
| | | | 4.0' | | 19" RECOVERY | | |
| 4.98 | | 3 | 4.0' | 4 11 10 8 | Wet medium dense brown silty coarse to fine sand, trace of gravel. | A-2-4(0) | |
| | | | 6.0' | | 20" RECOVERY | | |
| 7.47 | | 4 | 6.0' | 6 5 5 8 | Saturated loose brown and white silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 8.0' | | 21" RECOVERY | | |
| 9.96 | | 5 | 8.0' | 3 2 3 6 | Saturated loose white and brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 10.0' | | 22" RECOVERY | | |
| | | 6 | 10.0' | 2 8 10 13 | Saturated medium dense light brown and orange silty fine sand w/ some coarse sand and gravel. | A-2-4(0) | |
| | | | 12.0' | | 17" RECOVERY | | |
| 12.45 | | 7 | 12.0' | 2 5 7 10 | Saturated medium dense light brown and white silty coarse to fine sand, trace of gravel. | A-1-b | |
| | | | 14.0' | | 20" RECOVERY | | |
| | | 8 | 14.0' | W/H 1 | Saturated very loose orange fine to coarse | A-2-4(0) | |

Remarks: Mud Rotary @ 24.0'

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.: BR3-1-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|------|--------------|----------------------|--|-------------|-----------------------------|
| 14.94 | | | | 2 4 | sand w/ some silt, trace of gravel. | | |
| | | | 16.0' | | 21" RECOVERY | | |
| | | 9 | 16.0' | 5 7 10 10 | Saturated medium dense orange coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 17.43 | | | 18.0' | | 20" RECOVERY | | |
| | | 10 | 18.0' | 4 3 3 11 | Saturated loose orange silty fine sand w/ some gravel and coarse sand. | A-2-4(0) | |
| 19.92 | | | 20.0' | | 19" RECOVERY | | |
| 22.41 | | | | | | | |
| | | 11 | 24.0' | 4 4 7 8 | Saturated medium dense orange fine to coarse sand w/ some silt and gravel. | A-2-4(0) | |
| 24.9 | | | 26.0' | | 22" RECOVERY | | |
| 27.39 | | | | | | | |
| | | U-1a | 29.0' | | Saturated firm gray and orange clay, trace fine sand. | A-7-6(23) | Press Sample - Shelby Tube. |
| 29.88 | | U-1 | 29.0' | | Saturated firm gray and orange clay, trace fine sand. | A-7-6(23) | Press Sample - Shelby Tube. |
| | | | 31.0' | | 22" RECOVERY | | |
| | | | 31.0' | | 22" RECOVERY | | |
| 32.37 | | | | | | | |
| | | 13 | 34.0' | 15 18 23 18 | Saturated dense brown coarse to fine sand and gravel, trace of silt. | A-1-b | |
| 34.86 | | | 36.0' | | 23" 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.: BR3-1-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-------------|
| 39.84 | | 14 | 39.0' | 7 9 7 9 | Saturated medium dense brown coarse to fine sand and gravel, trace of silt. | A-1-b | |
| 42.33 | | | 41.0' | | 20" RECOVERY | | |
| 44.82 | | 15 | 44.0' | 9 10 17 17 | Saturated medium dense brown silty coarse sand w/ some fine sand and gravel. | A-1-b | |
| 47.31 | | | 46.0' | | 16" RECOVERY | | |
| 49.8 | | 16 | 49.0' | 32 50/3" | Saturated very dense green and dark brown gravel and coarse sand w/ some fine sand, trace of silt. | A-1-a | |
| 52.29 | | | 50.0' | | 9" RECOVERY | | |
| 54.78 | | 17 | 54.0' | 17 22 26 32 | Saturated dense green fine to coarse sand, trace of silt. | A-3 | glaucinitic |
| 57.27 | | | 56.0' | | 23" RECOVERY | | |
| 59.76 | | 18 | 59.0' | 32 50/4" | Saturated very dense green fine to coarse sand w/ some silt. | A-2-4(0) | glaucinitic |
| | | | 60.0' | | 10" 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.: BR3-1-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|-------------|--|-------------|-------------|
| 62.25 | | | | | | | |
| 64.74 | | 19 | 64.0' 65.0' | 56 50/2" | Saturated very dense green fine to coarse sand w/ some silt. 8" RECOVERY | A-2-4(0) | glauconitic |
| 67.23 | | | | | | | |
| 69.72 | | 20 | 69.0' 70.0' | 49 50/5" | Saturated very dense green silty fine to coarse sand. 11" RECOVERY | A-2-4(0) | glauconitic |
| 72.21 | | | | | | | |
| 74.7 | | 21 | 74.0' 75.0' | 51 50/4" | Saturated very dense green fine to coarse sand w/ some silt. 10" RECOVERY | A-2-4(0) | glauconitic |
| 77.19 | | | | | Boring terminated at 74.8 ft. | | |
| 79.68 | | | | | | | |
| 82.17 | | | | | | | |
| 84.66 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Low plasticity
clay



Poorly graded sand



Well graded sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 3/6/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling 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.: BR3-1-03

Contract: 25-113-01

Boring Location: Sta. 139+13.27, 86' Rt. C.L.

Boring Surface Elev.: 69.63

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: | 29.0' |

| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|----------------------|--------|------|---------------|-----------------|----------------|----------------|
| | 3/7/08 | | 69.0' | | 5.9' | 63.7 |
| | | | | | | 69.6 |
| | | | | | | 69.6 |
| | | | | | | 69.6 |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|-------------|-------------------------------|------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 74.8 | 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, Sr.
Helpers: A. Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|------------------------------------|
| | | 1 | 0.0' | 2 | Visual description: Wet loose brown fine sand w/ some silt, trace organics. | | No sieve analysis. Topsoil = 3 in. |
| | | 1A | 0.5' | 4 | 3" RECOVERY | A-4(2) | |
| | | | 0.5' | 4 | | | |
| | | | 0.5' | 6 | Wet stiff gray silt w/ some clay, trace of fine to coarse sand. | | |
| 2.49 | | 2 | 2.0' | 7 | 12" RECOVERY | A-4(0) | |
| | | | 2.0' | 11 | Wet very stiff brown fine to coarse sandy silt w/ some clay, trace of gravel. | | |
| | | | 2.0' | 13 | | | |
| | | | 2.0' | 13 | | | |
| | | | 4.0' | | 14" RECOVERY | | |
| 4.98 | | 3 | 4.0' | 3 | Wet medium dense brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 4.0' | 6 | | | |
| | | | 4.0' | 6 | | | |
| | | | 4.0' | 7 | | | |
| | | | 6.0' | | 16" RECOVERY | | |
| 7.47 | | 4 | 6.0' | 7 | Saturated loose brown silty fine to coarse sand w/ some gravel. | A-2-4(0) | |
| | | | 6.0' | 5 | | | |
| | | | 6.0' | 5 | | | |
| | | | 8.0' | | 16" RECOVERY | | |
| | | 5 | 8.0' | 2 | Saturated loose gray silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 8.0' | 2 | | | |
| | | | 8.0' | 3 | | | |
| | | | 8.0' | 3 | | | |
| 9.96 | | | 10.0' | | 16" RECOVERY | | |
| | | 6 | 10.0' | 16 | Saturated medium dense orange-brown gravel and coarse sand w/ some fine sand and silt. | A-1-b | |
| | | | 10.0' | 17 | | | |
| | | | 10.0' | 13 | | | |
| | | | 10.0' | 18 | | | |
| 12.45 | | | 12.0' | | 13" RECOVERY | | |
| | | 7 | 12.0' | 3 | Saturated medium dense orange-brown gravel and coarse sand w/ some silt and fine sand. | A-1-b | |
| | | | 12.0' | 10 | | | |
| | | | 12.0' | 11 | | | |
| | | | 12.0' | 12 | | | |

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
Contract: 25-113-01

Boring No.: BR3-1-03

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|----------------------|---|-------------|--|
| 14.94 | | 8 | 14.0' 14.0' | W/R 2 3 | 16" RECOVERY Saturated very loose orange-brown silty coarse to fine sand w/ some gravel. | A-2-4(0) | |
| 17.43 | | 9 | 16.0' 16.0' | 5 4 5 11 | 18" RECOVERY Saturated loose orange-brown coarse sand w/ some fine sand, trace of silt and gravel. | A-1-b | |
| 19.92 | | 10 | 18.0' 18.0' | 5 6 3 4 | 15" RECOVERY Saturated loose orange-brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| 22.41 | | | 20.0' | | 13" RECOVERY | | |
| 24.9 | | 11 | 24.0' | 2 4 11 9 | Saturated stiff brown to dark brown clayey fine sandy silt, trace of coarse sand and gravel. | A-4(3) | |
| 27.39 | | | 26.0' | | 15" RECOVERY | | |
| 29.88 | | U-1 | 27.0' | | Saturated stiff light brown clay, trace of fine sand. | A-7-6(40) | Press Sample - Shelby Tube. Pocket Penetrometer = 1.0 T.S.F. |
| 32.37 | | | 29.0' | | 24" RECOVERY | | |
| 34.86 | | 12 | 29.0' 29.0' | 7 10 13 17 | Saturated very stiff brown clayey silt, trace of coarse to fine sand and gravel. | A-7-6(26) | Pocket Penetrometer = 0.25 T.S.F. |
| 37.35 | | | 31.0' | | 24" RECOVERY | | |
| | | 13 | 34.0' | 13 11 11 11 | Saturated medium dense brown coarse sand w/ some gravel, trace of fine sand and silt. | A-1-b | |
| | | | 36.0' | | 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.: BR3-1-03

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|--------------|
| 39.84 | | 14 | 39.0' | 18 19 16 14 | Saturated dense brown coarse to fine sand and gravel, trace of silt. | A-1-b | |
| | | | 41.0' | | 13" RECOVERY | | |
| 42.33 | | | | | | | |
| 44.82 | | 15 | 44.0' | 7 9 10 11 | Saturated medium dense brown coarse sand w/ some fine sand, trace of silt and gravel. | A-1-b | |
| | | | 46.0' | | 16" RECOVERY | | |
| 47.31 | | | | | | | |
| 49.8 | | 16 | 49.0' | 16 16 | Saturated very dense orange-brown coarse to fine sand, trace of silt and gravel. | A-1-b | iron rich |
| | | | 50.0' | | 3" RECOVERY | | |
| | | 16A | 50.0' | 18 27 | Saturated dense green coarse to fine sand and gravel w/ some silt. | A-1-b | glauconitic |
| | | | 51.0' | | 10" RECOVERY | | |
| 52.29 | | | | | | | |
| 54.78 | | 17 | 54.0' | 18 45 50/4" | Saturated very dense green coarse to fine sand, trace of silt and gravel. | A-1-b | glauconitic. |
| | | | 55.5' | | 17" RECOVERY | | |
| 57.27 | | | | | | | |
| 59.76 | | 18 | 59.0' | 32 50/4" | Saturated very dense green fine to coarse sand, trace of silt and gravel. | A-3 | glauconitic |
| | | | 60.0' | | 10" 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.: BR3-1-03


| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|-------------|--|-------------|---------------------------------------|
| 62.25 | | | | | | | |
| 64.74 | | 19 | 64.0' 65.0' | 37 50/3" | Saturated very dense green fine to coarse sand, trace of silt and gravel. 8" RECOVERY | A-3 | glaucanitic |
| 67.23 | | 20 | 66.0' 67.0' | 37 50/3" | Visual description: Saturated very dense green fine sand w/ some silt. 6" RECOVERY | | Sample brought to GTA for pH testing. |
| 69.72 | | 21 | 69.0' 70.0' | 62 50/4" | Saturated very dense green fine to coarse sand, trace of gravel. 9" RECOVERY | A-3 | glaucanitic |
| 72.21 | | | | | | | |
| 74.7 | | 22 | 74.0' 75.0' | 47 50/3" | Saturated very dense green fine to coarse sand w/ some silt, trace of gravel. 8" RECOVERY | A-2-4(0) | glaucanitic |
| 77.19 | | | | | Boring terminated at 74.8 ft. | | |
| 79.68 | | | | | | | |
| 82.17 | | | | | | | |


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
KEY TO SYMBOLS


Symbol Description

Strata symbols


 Silty low plasticity clay


 Poorly graded clayey silty sand


 Silty sand

 Well graded sand with silt

 Silt

 High plasticity clay

 Well graded sand

 Poorly graded sand with silt

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Notes:

1. Exploratory borings were drilled on 3/7/2008 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.: BR3-1-04

Contract: 25-113-01

Boring Location: Sta. 138+64.85, 87' Rt. C.L.

Boring Surface Elev.: 69.44

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 | | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date | 3/12/08 | | 49.0' | | 5.2' | 64.2 |
| | | | | | | 69.4 |
| | | | | | | 69.4 |
| | | | | | | 69.4 |

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 74.5 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: Gary Truver, Sr.
Helpers: A. Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------|---|-------------|---------|
| | | 1 | 1.0' | 15 | Moist medium dense orange-brown gravel and coarse sand w/ some fine sand and silt. 6" RECOVERY | A-1-b | |
| | | 1A | 1.5' | 12 | | A-4(0) | |
| 2.49 | | 2 | 2.0' | 7 | Wet stiff gray silt w/ some fine to coarse sand, gravel, and clay. 6" RECOVERY | A-4(1) | |
| | | | 2.0' | 7 9 11 | | | |
| | | 3 | 4.0' | 3 | Wet very stiff gray silt w/ some fine sand and clay, trace of coarse sand and gravel. 12" RECOVERY | A-2-4(0) | |
| 4.98 | | | 4.0' | 8 8 9 | | | |
| | | 4 | 6.0' | 13 | Saturated medium dense gray silty coarse to fine sand, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| 7.47 | | | 6.0' | 11 7 7 | | | |
| | | 5 | 8.0' | 4 | Saturated loose gray fine to coarse sand w/ some silt, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| | | | 8.0' | 4 5 8 | | | |
| 9.96 | | 6 | 10.0' | 5 | Saturated medium dense gray coarse to fine sand w/ some silt and gravel. 17" RECOVERY | A-1-b | |
| | | | 10.0' | 6 11 27 | | | |
| 12.45 | | 7 | 12.0' | 14 | Saturated dense orange and brown coarse to fine sand and gravel w/ some silt. 15" RECOVERY | A-1-b | |
| | | | 12.0' | 21 18 12 | | | |
| | | 8 | 14.0' | 3 | Saturated medium dense orange and brown coarse to fine sand w/ some gravel and silt. 10" RECOVERY | A-1-b | |
| | | | 14.0' | 12 11 6 | | | |

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.: BR3-1-04

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-------------|-------------------------|----------------------|--|------------------------|--|
| | | | 16.0' | | 16" RECOVERY | | |
| 17.43 | | 9 | 16.0' | 6 9 12 21 | Saturated medium dense orange and brown coarse to fine sand w/ some gravel, trace of silt. | A-1-b | |
| | | | 18.0' | | 20" RECOVERY | | |
| 19.92 | | 10 | 18.0' | 11 13 11 13 | Saturated medium dense orange-brown silty coarse sand w/ some fine sand and gravel. | A-1-b | |
| | | | 20.0' | | 20" RECOVERY | | |
| 22.41 | | | | | | | |
| 24.9 | | 11 | 24.0' | 7 2 6 14 | Saturated firm orange and brown fine sandy silt, trace of coarse sand and gravel. | A-4(0) | |
| | | | 26.0' | | 15" RECOVERY | | |
| 27.39 | | | | | | | |
| 29.88 | | 12 | 29.0' | 4 7 9 14 | Saturated very stiff light brown w/ mottles of orange, brown, and gray silty clay, trace of coarse to fine sand. | A-7-6(32) | |
| | | | 31.0' | | 24" RECOVERY | | |
| 32.37 | | U-1a U-1 | 32.0' 32.0' | | Saturated very stiff dark gray clay, trace of fine sand. Saturated very stiff dark gray clay, trace of fine sand. | A-7-6(21) A-7-6(21) | Press Sample - Shelby Tube. Press Sample - Shelby Tube. |
| 34.86 | | 13 | 34.0' 34.0' 34.0' | 8 11 18 26 | 20" RECOVERY 20" RECOVERY Saturated very stiff brown clay, trace of coarse to fine sand and gravel. | A-7-6(27) | |
| | | | 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

Boring No.: BR3-1-04

Contract: 25-113-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|--------------------|--|-------------|-------------|
| 39.84 | | 14 | 39.0' | 6 9 16 11 | Saturated medium dense brown coarse sand w/ some fine sand, gravel, and silt. | A-1-b | |
| | | | 41.0' | | 17" RECOVERY | | |
| 42.33 | | | | | | | |
| 44.82 | | 15 | 44.0' | 7 6 8 11 | Saturated medium dense brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 46.0' | | 16" RECOVERY | | |
| 47.31 | | | | | | | |
| 49.8 | | 16 | 49.0' 49.5' | 50/5" | Saturated very dense orange-brown gravel and coarse sand w/ some fine sand, trace of silt. | A-1-b | |
| | | | | | 4" RECOVERY | | |
| 52.29 | | | | | | | |
| 54.78 | | 17 | 54.0' | 20 34 57 | Saturated very dense dark green fine to coarse sand w/ some silt. | A-2-4(0) | glaucanitic |
| | | | 55.5' | | 17" RECOVERY | | |
| 57.27 | | | | | | | |
| 59.76 | | 18 | 59.0' | 27 57 | Saturated very dense dark green coarse to fine sand w/ some silt. | A-2-4(0) | glaucanitic |
| | | | 60.0' | | 11" 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.: BR3-1-04








| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|----------|---|-------------|-------------|
| 62.25 | | | | | | | |
| 64.74 | | 19 | 64.0' 65.0' | 34 57 | Saturated very dense dark green fine to coarse sand w/ some silt. 11" RECOVERY | A-2-4(0) | glaucinitic |
| 67.23 | | | | | | | |
| 69.72 | | 20 | 69.0' 70.0' | 34 56 | Saturated very dense dark green fine to coarse sand, trace of silt. 11" RECOVERY | A-3 | glaucinitic |
| 72.21 | | | | | | | |
| 74.7 | | 21 | 74.0' 74.5' | 58 | Saturated very dense dark green fine to coarse sand w/ some silt. 5" RECOVERY | A-2-4(0) | glaucinitic |
| 77.19 | | | | | Boring terminated at 74.5 ft. | | |
| 79.68 | | | | | | | |
| 82.17 | | | | | | | |
| 84.66 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols

| | |
|--|---------------------------------|
|  | Silty sand |
|  | Silt |
|  | Silty low plasticity clay |
|  | Poorly graded clayey silty sand |
|  | Poorly graded sand with silt |
|  | Well graded sand with silt |
|  | High plasticity clay |

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Notes:

1. Exploratory borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century Engineering.
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.: BR3-1-05

Contract: 25-113-01

Boring Location: Sta. 138+66.22, 86' Lt. C.L.

Boring Surface Elev.: 69.00

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: | 26.0' |

| | | | | | | |
|-----------------------------|--|-------------|----------------------|------------------------|-----------------------|------------------------------|
| Water Level Readings | | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date 3/5/08 | | | 73.8 | | 6.3' | 62.7 69.0 69.0 69.0 |

Pay Quantities:

| | | | | | | |
|--|-------------|--|---|-------------------------------|-------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: 73.8 | 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: Gary Truver, Sr.
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-----------------------|
| | | 1 | 1.0' | 5 5 | Moist stiff light brown and gray clay silt, trace of fine to coarse sand and gravel. 12" RECOVERY | A-4(7) | 8" Asphalt - 4" Stone |
| 2.49 | | 2 | 2.0' | 14 14 14 12 | Moist medium dense brown coarse to fine sand w/ some gravel and silt. 20" RECOVERY | A-1-b | |
| 4.98 | | 3 | 4.0' | 4 7 9 13 | Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel. 21" RECOVERY | A-1-b | |
| 7.47 | | 4 | 6.0' | 4 9 8 7 | Saturated medium dense light brown silty fine to coarse sand, trace of gravel. 20" RECOVERY | A-2-4(0) | |
| 9.96 | | 5 | 8.0' | 2 4 4 6 | Saturated loose white silty fine to coarse sand, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| 12.45 | | 6 | 10.0' | 3 4 5 5 | Saturated loose white coarse to fine sand w/ some silt, trace of gravel. 23" RECOVERY | A-2-4(0) | |
| | | 7 | 12.0' | 2 2 3 7 | Saturated loose light brown silty fine sand, trace of coarse sand and gravel. 19" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 9 14 17 20 | Saturated dense brown gravel and coarse sand w/ some fine sand and silt. | | |

Remarks: Mud Rotary @ 26.0'

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.: BR3-1-05

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-----------------------------|
| | | | 16.0' | | 17" RECOVERY | | |
| | | 9 | 16.0' | 7 10 14 17 | Saturated medium dense light brown fine to coarse sand w/ some silt and gravel. | A-2-4(0) | |
| 17.43 | | | 18.0' | | 19" RECOVERY | | |
| | | 10 | 18.0' | 5 9 10 11 | Saturated medium dense brown gravel and coarse to fine sand w/ some silt. | A-1-b | |
| | | | 20.0' | | 17" RECOVERY | | |
| 19.92 | | | | | | | |
| | | | | | | | |
| 22.41 | | | | | | | |
| | | | | | | | |
| | | 11 | 24.0' | 5 9 11 14 | Saturated very stiff orange and gray silty clay, trace of coarse to fine sand and gravel. | A-7-6(26) | |
| 24.9 | | | 26.0' | | 23" RECOVERY | | |
| | | | | | | | |
| 27.39 | | | | | | | |
| | | | | | | | |
| | | U-1 | 29.0' | | Saturated very stiff orange and gray clay, trace of fine sand. | A-6(18) | Press Sample - Shelby Tube. |
| 29.88 | | | 31.0' | | 24" RECOVERY | | |
| | | | | | | | |
| 32.37 | | | | | | | |
| | | | | | | | |
| | | 13 | 34.0' | 11 50/3" | Saturated hard gray and orange w/ some coarse sand, trace of gravel and fine sand. | A-7-6(14) | |
| 34.86 | | | 35.0' | | 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.: BR3-1-05

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-------------|
| 39.84 | | 14 | 39.0' | 4 8 11 12 | Saturated medium dense orange and gray coarse to fine sand w/ some gravel, trace of silt. | A-1-b | |
| | | | 41.0' | | 17" RECOVERY | | |
| 42.33 | | | | | | | |
| 44.82 | | 15 | 44.0' | 13 26 21 17 | Saturated dense brown coarse sand w/ some fine sand and gravel, trace of silt. | A-1-b | |
| | | | 46.0' | | 20" RECOVERY | | |
| 47.31 | | | | | | | |
| 49.8 | | 16 | 49.0' | 38 48 50/2" | Saturated very dense brown coarse to fine sand and gravel, trace of silt. | A-1-b | |
| | | | 50.5' | | 14" RECOVERY | | |
| 52.29 | | | | | | | |
| 54.78 | | 17 | 54.0' | 30 47 50/5" | Saturated very dense green fine to coarse sand w/ some silt. | A-2-4(0) | glauconitic |
| | | | 55.5' | | 16" RECOVERY | | |
| 57.27 | | | | | | | |
| 59.76 | | 18 | 59.0' | 42 50/3" | Saturated very dense green fine to coarse sand, trace of silt and gravel. | A-3 | glauconitic |
| | | | 60.0' | | 9" 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.: BR3-1-05

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|-------------|--|-------------|-------------|
| 62.25 | | | | | | | |
| 64.74 | | 19 | 64.0' 65.0' | 42 50/4" | Saturated very dense green fine to coarse sand, trace of silt. 10" RECOVERY | A-3 | glaucinitic |
| 67.23 | | | | | | | |
| 69.72 | | 20 | 69.0' 70.0' | 48 50/4" | Saturated very dense green fine to coarse sand w/ some silt. 10" RECOVERY | A-2-4(0) | glaucinitic |
| 72.21 | | | | | | | |
| 74.7 | | 21 | 73.0' 74.0' | 62 50/2" | Saturated very dense green silty fine to coarse sand. 8" RECOVERY | A-2-4(0) | glaucinitic |
| 77.19 | | | | | Boring terminated at 73.8 ft. | | |
| 79.68 | | | | | | | |
| 82.17 | | | | | | | |
| 84.66 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



High plasticity
clay



Well graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 3/5/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a Truck CME 55.
2. Groundwater levels recorded at time of drilling 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.: BR3-1-06

Contract: 25-113-01

Boring Location: Sta. 112+40, 15.00' Lt. C.L.

Boring Surface Elev.: + 68.40'

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: |
| | | | | | 41.0' |

| | | | | | |
|----------------------|-----------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date | Time | | | | |
| 12/10/2008 | 9:00 a.m. | 12.0' | 10.0' | 8.4' | |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 98.5 | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|--|-------------|---------------|
| | 12/10/08 | 1 | 0.5' | 8 9 7 | Moist very stiff gray silt w/some clay, trace of fine to coarse sand and gravel. | A-4(3) | Topsoil - 6". |
| | | | 2.0' | | 15" RECOVERY | | |
| 2.5 | | 2 | 2.0' | 6 8 13 13 | Moist very stiff gray clayey silt w/some fine sand, trace of coarse sand and gravel. | A-4(3) | |
| | | | 4.0' | | 16" RECOVERY | | |
| | | 3 | 4.0' | 4 6 5 7 | Moist medium dense brownish gray fine to coarse sand w/trace of silt and gravel. | A-2-4(0) | |
| 5 | | | 6.0' | | 17" RECOVERY | | |
| | | 4 | 6.0' | 5 10 7 6 | Moist medium dense gray coarse to fine sand w/some gravel and silt. | A-1-b | |
| 7.5 | | | 8.0' | | 12" RECOVERY | | |
| | | 5 | 8.0' | 5 5 5 5 | Wet loose orange coarse sand w/some gravel, silt and fine sand. | A-1-b | |
| | | | 10.0' | | 17" RECOVERY | | |
| 10 | | 6 | 10.0' | 4 5 6 5 | Wet medium dense orange coarse to fine sand w/some gravel and silt. | A-1-b | |
| | | | 12.0' | | 15" RECOVERY | | |
| 12.5 | | 7 | 12.0' | 2 6 9 10 | Wet medium dense orange gravel and coarse to fine sand w/some silt. | A-1-b | |
| | | | 14.0' | | 14" RECOVERY | | |
| | | 8 | 14.0' | 4 9 | Wet medium dense orange coarse to fine sand | A-1-b | |

Remarks: Mud Rotary at 41.0'

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.: BR3-1-06

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| 15 | | | | 8 8 | and gravel w/trace of silt. | | |
| | | | 16.0' | | 15" RECOVERY | | |
| | | 9 | 16.0' | 14 22 13 6 | Wet dense orange gravel and coarse sand w/ some fine sand and silt. | A-1-b | |
| 17.5 | | | 18.0' | | 15" RECOVERY | | |
| | | 10 | 18.0' | 2 6 5 2 | No Sample Recovery | | |
| 20 | | | 20.0' | | 0" RECOVERY | | |
| 22.5 | | | | | | | |
| | | 11 | 24.0' | 4 9 5 10 | No Sample Recovery | | |
| 25 | | | 26.0' | | 0" RECOVERY | | |
| 27.5 | | | | | | | |
| | | 12 | 29.0' | 4 9 10 12 | Saturated very stiff gray silty clay w/trace of coarse to fine sand and gravel. | A-7-6(17) | |
| 30 | | | 31.0' | | 22" RECOVERY | | |
| 32.5 | | | | | | | |
| | | 13 | 34.0' | 10 20 26 23 | Saturated hard brown coarse sandy clay w/ some gravel, trace of fine sand. | A-7-6(3) | |
| 35 | | | 36.0' | | 23" 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 I-95
Contract: 25-113-01

Boring No.: BR3-1-06

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|----------------------|--|-------------|---------------------|
| 40 | | 14 | 39.0' | 2 4 6 4 | Saturated loose brown coarse to fine sand w/ trace of silt and gravel. 6" RECOVERY | A-1-b | Mud Rotary @ 41.0'. |
| 42.5 | | | 41.0' | | | | |
| 45 | | 15 | 44.0' | 5 8 10 | Saturated medium dense light brown coarse to fine sand w/trace of silt and gravel. 17" RECOVERY | A-1-b | |
| 47.5 | | | 46.0' | | | | |
| 50 | | 16 | 49.0' 49.5' | 50/5" | Saturated very dense light brown gravel and coarse to fine sand w/trace of silt. 4" RECOVERY | A-1-b | |
| 52.5 | | | | | | | |
| 55 | 12/12/08 | 17 | 54.0' | 13 23 30 36 | Saturated very dense brownish green fine to coarse sand w/some silt, trace of gravel. 21" RECOVERY | A-2-4(0) | |
| 57.5 | | | 56.0' | | | | |
| 60 | | 18 | 59.0' | 18 24 41 50 | Saturated very dense brownish green fine to coarse sand w/some silt. 20" RECOVERY | A-2-4(0) | |
| | | | 61.0' | | | | |

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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.: BR3-1-06

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|-------------|--|-------------|---------|
| 62.5 | | | | | | | |
| 65 | | 19 | 64.0' 65.0' | 26 50/5" | Saturated very dense brownish green fine to coarse sand w/trace of silt. 11" RECOVERY | A-3 | |
| 67.5 | | | | | | | |
| 70 | | 20 | 69.0' 70.0' | 41 50/4" | Saturated very dense brownish green fine to coarse sand w/trace of silt. 9" RECOVERY | A-3 | |
| 72.5 | | | | | | | |
| 75 | | 21 | 74.0' 75.0' | 36 50/4" | Saturated very dense brownish green fine to coarse sand w/trace of silt. 10" RECOVERY | A-3 | |
| 77.5 | | | | | | | |
| 80 | | 22 | 79.0' 80.0' | 30 50/4" | Saturated very dense brownish green fine to coarse sand w/trace of silt. 7" RECOVERY | A-3 | |
| 82.5 | | | | | | | |
| 85 | | 23 | 84.0' 85.0' | 40 50/4" | Saturated very dense brownish green fine to coarse sand w/trace of silt. 10" RECOVERY | 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.: BR3-1-06

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|-------------|---|-------------|---------|
| 87.5 | | | | | | | |
| 90 | | 24 | 89.0' 90.0' | 32 50/5" | Saturated very dense brownish green fine to coarse sand w/trace of silt. 10" RECOVERY | A-3 | |
| 92.5 | | | | | | | |
| 95 | | 25 | 94.0' 95.0' | 31 50/5" | Saturated very dense brownish green fine to coarse sand w/trace of silt. 10" RECOVERY | A-3 | |
| 97.5 | | | | | | | |
| | | 26 | 98.0' 98.5' | 50/3" | Saturated very dense brownish green fine sand w/some silt and coarse sand. 3" RECOVERY | A-2-4(0) | |
| 100 | | | | | End of Boring | | |
| 102.5 | | | | | | | |
| 105 | | | | | | | |
| 107.5 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt



Silt



Clayey sand



Poorly graded sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12-10-2008 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.: BR3-1-07

Contract: 25-113-01

Boring Location: Sta. 112+40, 15.00' Rt. C.L.

Boring Surface Elev.: + 67.70'

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: 40.0' | |

| | | | | | |
|-----------------------------|------------------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date: 12/9/2008 | Time: 9:00 a.m. | 12.0' | 10.0' | 8.2' | |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|-------------|-------------------------------|------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 98.5 | Ft.; | 3 | Dia. U-Sample Boring: | Ft. |
| No. of 2 in. Dia. Shelby Tubes: | | Ft.; | 3" | U-Samples: 1 | 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 |
|-------------|----------------|-----|--------------|--------------------|--|-------------|------------------------|
| | 12/9/08 | 1 | 1.0' | 7 4 | Wet stiff gray clayey silt w/trace of fine to coarse sand. 9" RECOVERY | A-4(6) | Roadway Subgrade - 9". |
| 2.5 | | 2 | 2.0' | 8 9 10 14 | Wet very stiff gray clayey silt w/some fine sand, trace of coarse sand and gravel. 17" RECOVERY | A-4(3) | |
| 5 | | 3 | 4.0' | 4 7 9 | Wet medium dense orange fine to coarse sand w/some silt, trace of gravel. 19" RECOVERY | A-2-4(0) | |
| 7.5 | | 4 | 6.0' | 6 8 8 10 | Wet medium dense orange coarse sand and gravel w/some fine sand and silt. 19" RECOVERY | A-1-b | |
| 10 | | 5 | 8.0' | 5 3 4 4 | Wet loose orange coarse sand and gravel w/ trace of silt and fine sand. 14" RECOVERY | A-1-b | |
| 12.5 | | 6 | 10.0' | 3 7 7 8 | Wet medium dense orange coarse to fine sand w/some gravel and silt. 20" RECOVERY | A-1-b | |
| | | 7 | 12.0' | 4 7 9 6 | Wet medium dense orange gravel and fine sand w/some coarse sand and silt. 14" RECOVERY | A-2-4(0) | |
| | | 8 | 14.0' | 1 4 6 6 | Saturated loose orange fine to coarse sand w/ some silt, trace of gravel. | | |

Remarks: Mud Rotary @ 40.0'

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.: BR3-1-07

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-----------------------------|
| | | | 16.0' | | 14" RECOVERY | | |
| | | 9 | 16.0' | 32 41 50/4" | Saturated very dense brown coarse to fine sand and gravel w/some silt. | A-1-b | |
| 17.5 | | | 17.5' | | 13" RECOVERY | | |
| | | 10 | 18.0' | 3 4 5 6 | Saturated loose orange fine sand w/some silt and gravel, trace of coarse sand. | A-2-4(0) | |
| 20 | | | 20.0' | | 17" RECOVERY | | |
| | | | | | | | |
| 22.5 | | | | | | | |
| | | 11 | 24.0' | 1 4 4 5 | Saturated firm gray clay w/trace of gravel and fine to coarse sand. | A-7-6(29) | |
| 25 | | | 26.0' | | 7" RECOVERY | | |
| | | U-1 | 26.0' | | Saturated gray silty clay w/trace of fine to coarse sand and gravel. | A-7-5(23) | Press Sample - Shelby Tube. |
| 27.5 | | | 28.0' | | 24" RECOVERY | | |
| | | 12 | 28.0' | 4 7 11 13 | Saturated very stiff gray silty clay w/trace of coarse to fine sand and gravel. | A-7-6(27) | |
| 30 | | | 30.0' | | 22" RECOVERY | | |
| | | | | | | | |
| 32.5 | | | | | | | |
| | | 13 | 34.0' | 11 12 14 13 | Saturated medium dense brownish gray coarse sand w/some silt and fine sand, trace of gravel. | A-1-b | |
| 35 | | | 36.0' | | 22" 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 I-95
Contract: 25-113-01

Boring No.: BR3-1-07

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---------------------|
| 40 | | 14 | 39.0' | 11 12 9 10 | Saturated medium dense brown coarse to fine sand w/some gravel, trace of silt. | A-1-b | Mud Rotary @ 40.0'. |
| | | | 41.0' | | 11" RECOVERY | | |
| 42.5 | | | | | | | |
| 45 | | 15 | 44.0' | 6 9 12 12 | Saturated medium dense brown coarse to fine sand w/trace of silt and gravel. | A-1-b | |
| | | | 46.0' | | 13" RECOVERY | | |
| 47.5 | | | | | | | |
| 50 | | 16 | 49.0' | 9 12 13 14 | Saturated medium dense green coarse to fine sand w/trace of silt and gravel. | A-1-b | |
| | | | 51.0' | | 14" RECOVERY | | |
| 52.5 | | | | | | | |
| 55 | | 17 | 54.0' | 13 31 50 | Saturated very dense green fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 55.5' | | 10" RECOVERY | | |
| 57.5 | | | | | | | |
| 60 | | 18 | 59.0' | 21 30 50 | Saturated very dense greenish brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 60.5' | | 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.: BR3-1-07

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|-------------|--|-------------|---------|
| 62.5 | | | | | | | |
| 65 | | 19 | 64.0' 65.0' | 46 50/2" | Saturated very dense greenish brown fine to coarse sand w/trace of silt. 8" RECOVERY | A-3 | |
| 67.5 | | | | | | | |
| 70 | | 20 | 69.0' 69.5' | 50 | Saturated very dense greenish brown fine to coarse sand w/trace of silt. 5" RECOVERY | A-3 | |
| 72.5 | | | | | | | |
| 75 | | 21 | 74.0' 74.5' | 50/4" | Saturated very dense greenish brown fine to coarse sand w/trace of silt. 4" RECOVERY | A-3 | |
| 77.5 | | | | | | | |
| 80 | | 22 | 79.0' 79.5' | 50/4" | Saturated very dense greenish brown fine to coarse sand w/trace of silt. 4" RECOVERY | A-3 | |
| 82.5 | | | | | | | |
| 85 | 12/10/08 | 23 | 84.0' 85.0' | 39 50/4" | Saturated very dense greenish brown fine to coarse sand w/trace of silt. 10" RECOVERY | 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.: BR3-1-07

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|-------------|--|-------------|---------|
| 87.5 | | | | | | | |
| 90 | | 24 | 89.0' 90.0' | 33 50/4" | Saturated very dense greenish brown fine to coarse sand w/trace of silt. 9" RECOVERY | A-3 | |
| 92.5 | | | | | | | |
| 95 | | 25 | 94.0' 95.0' | 32 50/5" | Saturated very dense greenish brown fine to coarse sand w/trace of silt. 10" RECOVERY | A-3 | |
| 97.5 | | | | | | | |
| | | 26 | 98.0' 98.5' | 50/3" | Saturated very dense greenish brown fine to coarse sand w/trace of gravel and silt. 2" RECOVERY | A-3 | |
| 100 | | | | | End of Boring | | |
| 102.5 | | | | | | | |
| 105 | | | | | | | |
| 107.5 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt



High plasticity
clay



Elastic silt



Well graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 12-9-2008 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.: C3-1-01

Contract: 25-113-01

Boring Location: Sta. 126+00, 60.00' Rt. C.L.

Boring Surface Elev.: + 65.84

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: |
| | | | | | 20.0 |

| | | | | | | | |
|----------------------|--|----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | | 12/15/08 | | 12.0 | | 8.7 | |
| | | 12/15/08 | | 10.9 | | 9.9 | |

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: Gary Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|---|-------------|--|
| | | 1 | 1.0' | 7 5 | Indication of moist medium dense brown sand. | | No sieve analysis. Topsoil - 12" FILL. |
| 2 | | | 2.0' | | 12" RECOVERY | | |
| | | 2 | 2.0' | 4 3 4 3 | Wet loose brown fine sand and gravel w/ some clay and coarse sand. | A-2-4(0) | FILL. |
| 4 | | | 4.0' | | 12" RECOVERY | | |
| | | 3 | 4.0' | 3 4 4 3 | Indication of wet loose brown fine sand and gravel w/ some coarse sand. | | FILL. |
| 6 | | | 6.0' | | 6" RECOVERY | | |
| | | 4 | 6.0' | 3 3 | Wet loose brown and black fine to coarse sand w/ some clay and gravel. | A-2-4(0) | |
| | | 4A | 7.0' | 7 6 | 8" RECOVERY | | |
| 8 | | | 8.0' | | 8" RECOVERY | | |
| | | 5 | 8.0' | 7 6 11 12 | Wet medium dense gray gravel and coarse to fine sand w/ some silt. | A-1-b | |
| 10 | | | 10.0' | | 4" RECOVERY | | |
| | | 6 | 10.0' | 16 9 6 11 | Wet medium dense gray silty coarse to fine sand w/ some gravel. | A-2-4(0) | |
| 12 | | | 12.0' | | 20" 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 S.R. 1
Contract: 25-113-01

Boring No.: C3-1-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| | | 7 | 12.0' | 5 8 8 | Saturated medium dense gray to brown coarse to fine sand w/ some gravel and silt. | A-1-b | |
| 14 | | | 14.0' | | 18" RECOVERY | | |
| | | 8 | 14.0' | 12 12 9 8 | Saturated medium dense brown fine to coarse sand w/ some silt and gravel. | A-2-4(0) | |
| 16 | | | 16.0' | | 15" RECOVERY | | |
| | | 9 | 16.0' | 3 7 8 11 | Saturated medium dense brown coarse sand w/ some fine sand, trace of silt and gravel. | A-1-b | |
| 18 | | | 18.0' | | 20" RECOVERY | | |
| | | 10 | 18.0' | 10 15 17 18 | Saturated dense brown coarse sand, trace of fine sand, gravel, and silt. | A-1-b | |
| 20 | | | 20.0' | | 21" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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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

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Notes:

1. Exploratory borings were drilled on 12/15/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-1-02

Contract: 25-113-01

Boring Location: Sta. 127+50, 60.00' Lt. C.L.

Boring Surface Elev.: + 61.06

Reference:

| | | | | | |
|--|--|-------------|----------------------------|--|------------|
| Wt. of Casing Hammer: | | Lbs. | Average Fall: | | IN. |
| Wt. of Sample Hammer: 140 | | Lbs. | Average Fall: 30 | | IN. |
| Type of: D-Sampler: Split 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: 20.0 | |

| Water Level Readings | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|
| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| 12/15/08 | | 8.0 | 10.0 | 4.3 | |
| 12/15/08 | | 2.9 | | 2.5 | |

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: | | | 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 | 0.5' | 4 4 5 | Wet stiff brown, gray, and orange mottled clayey silt w/ some fine sand, trace of coarse sand and gravel. | A-4(4) | Forest Duff - 6". |
| 2 | | | 2.0' | | 16" RECOVERY | | |
| | | 2 | 2.0' | 6 11 9 11 | Wet medium dense gray coarse to fine sand w/ some gravel and silt. | A-1-b | |
| 4 | | | 4.0' | | 16" RECOVERY | | |
| | | 3 | 4.0' | 4 4 6 9 | Saturated loose gray to brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 6 | | | 6.0' | | 15" RECOVERY | | |
| | | 4 | 6.0' | 4 6 5 7 | Saturated medium dense orange fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 8 | | | 8.0' | | 18" RECOVERY | | |
| | | 5 | 8.0' | 3 9 9 13 | Saturated medium dense orange fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 10 | | | 10.0' | | 20" RECOVERY | | |
| | | 6 | 10.0' | 11 7 7 7 | Saturated medium dense orange coarse to fine sand w/ some gravel, trace of silt. | 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.: C3-1-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---------|
| 12 | | | 12.0' | | 16" RECOVERY | | |
| | | 7 | 12.0' | 3 6 10 12 | Saturated very stiff brown, gray, and black mottled clay, trace of fine to coarse sand and gravel. | A-7-5(29) | |
| 14 | | | 14.0' | | 16" RECOVERY | | |
| | | 8 | 14.0' | 3 6 9 1 | Saturated stiff brown, gray, and black mottled clay w/ some coarse to fine sand. | A-7-5(18) | |
| 16 | | | 16.0' | | 24" RECOVERY | | |
| | | 9 | 16.0' | 9 12 12 11 | Saturated very stiff brown, gray, and black mottled silty clay, trace of fine sand. | A-7-6(19) | |
| 18 | | | 18.0' | | 24" RECOVERY | | |
| | | 10 | 18.0' | 9 17 23 19 | Saturated dense brown, gray, black mottled silty coarse to fine sand. | A-2-4(0) | |
| 20 | | | 20.0' | | 24" RECOVERY End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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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



Elastic silt



Silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/15/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-2-01

Contract: 25-113-01

Boring Location: Sta. 102+10, 15.00' Lt. C.L.

Boring Surface Elev.: + 67.27

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: 20.0 |

| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|----------------------|----------|------|---------------|-----------------|----------------|----------------|
| | 12/15/08 | | 12.0 | 10.0 | 8.0 | |
| | 12/15/08 | | 7.2 | | 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: Jason Truver
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|----------------------------------|
| | | 1 | 0.0' | | Augered to 2 feet. | | Asphalt - 6". Crusher Run - 18". |
| 2 | | 2 | 2.0' | | 0" RECOVERY | | |
| | | | 2.0' | 4 8 8 10 | Moist very stiff gray clay, trace of fine to coarse sand and gravel. | A-6(9) | |
| 4 | | 3 | 4.0' | | 17" RECOVERY | | |
| | | | 4.0' | 5 8 8 7 | Moist medium dense gray coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 6 | | 4 | 6.0' | | 13" RECOVERY | | |
| | | | 6.0' | 7 5 6 6 | Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 8 | | 5 | 8.0' | | 16" RECOVERY | | |
| | | | 8.0' | 6 5 6 7 | Saturated medium dense orange coarse sand w/ some fine sand, trace of silt and gravel. | A-1-b | |
| 10 | | 6 | 10.0' | | 14" RECOVERY | | |
| | | | 10.0' | 6 12 13 13 | Saturated medium dense orange coarse sand and gravel w/ some fine sand, trace of 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.: C3-2-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|--|-------------|--------------------|
| 12 | | | 12.0' | | 8" RECOVERY | | |
| | | 7 | 12.0' | 8 7 5 8 | Saturated medium dense orange coarse sand and gravel w/ some coarse sand, trace of silt. | A-1-b | |
| 14 | | | 14.0' | | 12" RECOVERY | | |
| | | 8 | 14.0' | 1 2 6 5 | Saturated loose orange fine to coarse sand and gravel w/ some silt. | A-1-b | |
| 16 | | | 16.0' | | 11" RECOVERY | | |
| | | 9 | 16.0' | 4 6 8 8 | Saturated stiff orange silty clay, trace of fine to coarse sand and gravel. | A-7-6(33) | |
| 18 | | | 18.0' | | 12" RECOVERY | | |
| | | 10 | 18.0' | 7 7 14 14 | Indication of saturated very stiff orange clay, trace of sand. | | No sieve analysis. |
| 20 | | | 20.0' | | 13" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt



High plasticity
clay

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Notes:

1. Exploratory borings were drilled on 12/15/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-3-01

Contract: 25-113-01

Boring Location: Sta. 119+50, 15.00' Lt. C.L.

Boring Surface Elev.: + 65.47

Reference:

| | | | | | |
|--|--|-------------|----------------------------|--|------------|
| Wt. of Casing Hammer: | | Lbs. | Average Fall: | | IN. |
| Wt. of Sample Hammer: 140 | | Lbs. | Average Fall: 30 | | IN. |
| Type of: D-Sampler: Split 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: 20.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 12/15/08 | | 10.0 | 8.0 | 7.2 | |
| | 12/15/08 | | 6.5 | | 6.4 | |

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: Jason Truver
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------|
| | | 1 | 0.5' | 2 2 3 | Wet soft gray clay, trace of fine to coarse sand and gravel. | A-6(8) | Leaf Litter - 2". |
| 2 | | | 2.0' | | 12" RECOVERY | | |
| | | 2 | 2.0' | 4 11 14 16 | Wet very stiff gray silt w/ some fine to coarse sand and clay, trace of gravel. | A-4(1) | |
| 4 | | | 4.0' | | 17" RECOVERY | | |
| | | 3 | 4.0' | 2 2 3 4 | Wet loose gray mottled silty fine sand, trace of coarse sand. | A-2-4(0) | |
| 6 | | | 6.0' | | 17" RECOVERY | | |
| | | 4 | 6.0' | 10 8 9 8 | Wet medium dense orange coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 8 | | | 8.0' | | 18" RECOVERY | | |
| | | 5 | 8.0' | 3 5 4 4 | Saturated loose orange fine to coarse sand w/ some silt, trace of gravel. | A-1-b | |
| 10 | | | 10.0' | | 16" RECOVERY | | |
| | | 6 | 10.0' | 4 6 8 8 | Saturated medium dense orange coarse to fine sand, trace of gravel and silt. | 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.: C3-3-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---------|
| 12 | | | 12.0' | | 14" RECOVERY | | |
| | | 7 | 12.0' | 10 12 15 7 | Saturated medium dense orange gravel and coarse sand w/ some fine sand, trace of silt. | A-1-b | |
| 14 | | | 14.0' | | 12" RECOVERY | | |
| | | 8 | 14.0' | 4 4 4 3 | Saturated loose light brown coarse sand w/ some fine sand and gravel, trace of silt. | A-1-b | |
| 16 | | | 16.0' | | 12" RECOVERY | | |
| | | 9 | 16.0' | 5 8 18 26 | Saturated medium dense light brown fine to coarse sand w/ some gravel and silt. | A-2-4(0) | |
| 18 | | | 18.0' | | 18" RECOVERY | | |
| | | 10 | 18.0' | 10 9 17 20 | Saturated medium dense brown coarse sand and gravel w/ some fine sand, trace of silt. | A-1-b | |
| 20 | | | 20.0' | | 6" RECOVERY End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



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 12/15/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-4-02

Contract: 25-113-01

Boring Location: Sta. 142+20, 90.00' Rt. C.L.

Boring Surface Elev.: + 69.48

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: |
| | | | | | 20.0 |

| | | | | | | |
|----------------------|----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 12/15/08 | | 12.0 | 10.0 | 8.6 | |
| | 12/15/08 | | 8.2 | | 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: Gary Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------------|
| | | 1 | 0.5' | 7 7 10 | Wet medium dense gray and orange mottled clayey silt, trace of fine to coarse sand and gravel. | A-4(9) | Topsoil - 7". |
| 2 | | | 2.0' | | 17" RECOVERY | | |
| | | 2 | 2.0' | 17 17 17 21 | Wet hard gray and orange mottled clayey fine sandy silt w/ some coarse sand, trace of gravel. | A-4(1) | |
| 4 | | | 4.0' | | 19" RECOVERY | | |
| | | 3 | 4.0' | 5 7 11 9 | Wet medium dense orange silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 17" RECOVERY | | |
| | | 4 | 6.0' | 10 11 10 9 | Wet medium dense orange silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| 8 | | | 8.0' | | 23" RECOVERY | | |
| | | 5 | 8.0' | 3 5 7 7 | Wet medium dense orange fine to coarse sand w/ some silt and gravel. | A-2-4(0) | |
| 10 | | | 10.0' | | 16" RECOVERY | | |
| | | 6 | 10.0' | 2 2 3 4 | Saturated loose orange silty fine sand, trace of coarse sand. | 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

Boring No.: C3-4-02

Contract: 25-113-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---------|
| 12 | | | 12.0' | | 17" RECOVERY | | |
| | | 7 | 12.0' | 1 2 3 2 | Saturated loose orange silty fine sand, trace of coarse sand. | A-2-4(0) | |
| 14 | | | 14.0' | | 24" RECOVERY | | |
| | | 8 | 14.0' | 2 8 24 15 | Saturated dense orange fine sand and gravel w/ some coarse sand and silt. | A-2-4(0) | |
| 16 | | | 16.0' | | 21" RECOVERY | | |
| | | 9 | 16.0' | 8 12 17 17 | Saturated medium dense orange coarse to fine sand w/ some gravel, trace of silt. | A-1-b | |
| 18 | | | 18.0' | | 20" RECOVERY | | |
| | | 10 | 18.0' | 9 13 18 19 | Saturated dense orange coarse sand and gravel w/ some fine sand and silt. | A-1-b | |
| 20 | | | 20.0' | | 24" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/15/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-4-03

Contract: 25-113-01

Boring Location: Sta. 141+40, 320.00' Rt. C.L.

Boring Surface Elev.: + 70.40

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: 20.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 1/15/09 | | 14.0 | 12.0 | 11.0 | |
| | 1/15/09 | | 2.4 | | 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 |
|-------------|----------------|-----|--------------|--------------------|--|-------------|---------|
| | 1/15/09 | 1 | 0.0' | 8 13 16 9 | Moist medium dense brown gravel w/ some coarse sand and organic matter, trace of fine sand and silt. | A-1-a | FILL. |
| 2 | | | 2.0' | | 16" RECOVERY | | |
| | | 2 | 2.0' | 4 6 7 7 | Wet stiff brown gravelly silt w/ some clay and fine to coarse sand. | A-4(0) | |
| 4 | | | 4.0' | | 19" RECOVERY | | |
| | | 3 | 4.0' | 1 2 | Wet soft gray silt, trace of fine to coarse sand and gravel. | A-4(0) | |
| | | | 5.0' | | 10" RECOVERY | | |
| | | 3A | 5.0' | 5 10 | Wet medium dense brown silty coarse to fine sand w/ some gravel. | A-1-b | |
| 6 | | | 6.0' | | 10" RECOVERY | | |
| | | 4 | 6.0' | 8 9 10 13 | Wet medium dense brown to gray silty coarse to fine sand, trace of gravel. | A-1-b | |
| 8 | | | 8.0' | | 17" RECOVERY | | |
| | | 5 | 8.0' | 4 4 5 5 | Wet loose gray silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| 10 | | | 10.0' | | 19" RECOVERY | | |
| | | 6 | 10.0' | 3 4 5 5 | Wet loose gray fine to coarse 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 S.R. 1
Contract: 25-113-01

Boring No.: C3-4-03

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|---|-------------|---------|
| 12 | | | 12.0' | | 22" RECOVERY | | |
| | | 7 | 12.0' | 3 3 3 | Wet loose light brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 14 | | | 14.0' | | 20" RECOVERY | | |
| | | 8 | 14.0' | 1 2 3 3 | Wet loose light brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 16 | | | 16.0' | | 17" RECOVERY | | |
| | | 9 | 16.0' | 1 2 5 6 | Wet loose light brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 18 | | | 18.0' | | 17" RECOVERY | | |
| | | 10 | 18.0' | 6 8 6 7 | Wet medium dense light brown gravel and fine sand w/ some coarse sand and silt. | A-1-b | |
| 20 | | | 20.0' | | 15" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Well graded gravel
with silt



Poorly graded clayey
silty sand



Silt



Silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/15/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-5-03

Contract: 25-113-01

Boring Location: Sta. 151+80, 230.00' Rt. C.L.

Boring Surface Elev.: + 68.94

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: 20.0 |

| | | | | | | |
|----------------------|--|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date | | | | | | |
| 1/15/09 | | | 10.0 | 8.0 | 7.7 | |
| 1/15/09 | | | 8.5 | | 5.3 | |

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 |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-------------------|
| | 1/15/09 | 1 | 0.5' | 1 5 | Wet firm gray clayey silt w/ some fine to coarse sand, trace of gravel. | A-4(3) | Leaf Litter - 3". |
| 2 | | 2 | 2.0' | 13 11 12 15 | 12" RECOVERY Wet medium dense orange silty coarse to fine sand w/ some gravel. | A-1-b | |
| 4 | | 3 | 4.0' | 3 6 7 8 | 18" RECOVERY Wet medium dense orange fine to coarse sand and gravel w/ some silt. | A-1-b | |
| 6 | | 4 | 6.0' | 8 5 5 5 | 17" RECOVERY Wet loose orange silty fine sand, trace of coarse sand and gravel. | A-2-4(0) | |
| 8 | | 5 | 8.0' | 2 1 5 5 | 18" RECOVERY Wet loose brown fine to coarse sand w/ some gravel and silt. | A-2-4(0) | |
| 10 | | 6 | 10.0' | 1 2 2 4 | 16" RECOVERY Saturated very loose brown silty fine sand, trace of coarse sand. | 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.: C3-5-03

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|---------|
| 12 | | | 12.0' | | 20" RECOVERY | | |
| | | 7 | 12.0' | 1 1 2 6 | Saturated very loose brown fine sand w/ some silt, trace of coarse sand and gravel. | A-2-4(0) | |
| 14 | | | 14.0' | | 15" RECOVERY | | |
| | | 8 | 14.0' | 6 6 7 10 | Saturated medium dense brown fine sand and gravel w/ some coarse sand and silt. | A-1-b | |
| 16 | | | 16.0' | | 18" RECOVERY | | |
| | | 9 | 16.0' | 8 11 13 12 | Saturated medium dense brown coarse to fine sand w/ some gravel and silt. | A-1-b | |
| 18 | | | 18.0' | | 17" RECOVERY | | |
| | | 10 | 18.0' | 8 8 8 8 | Saturated medium dense brown coarse to fine sand w/ some gravel, trace of silt. | A-1-b | |
| 20 | | | 20.0' | | 16" RECOVERY End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

DRAFT
NOT FOR BIDDING
AUGUST 2015

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 1/15/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-6-03

Contract: 25-113-01

Boring Location: Sta. 165+20, 170.00' Rt. C.L.

Boring Surface Elev.: + 76.81

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: 20.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 12/16/08 | | 20.0 | | 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: Jason Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|----------------------------|
| | | 1 | 0.0' | | Augered to 2.0'. | | Asphalt - 9". Stone - 15". |
| 2 | | 2 | 2.0' | | 0" RECOVERY | | |
| | | | 2.0' | 4 6 10 12 | Moist very stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel. | A-4(0) | |
| 4 | | 3 | 4.0' | | 18" RECOVERY | | |
| | | | 4.0' | 8 10 13 10 | Moist very stiff brown clayey fine sandy silt w/ some coarse sand and gravel. | A-4(0) | |
| 6 | | 4 | 6.0' | | 18" RECOVERY | | |
| | | | 6.0' | 9 8 6 8 | Wet stiff gray to light brown clayey silt w/ some fine sand, trace of coarse sand. | A-4(6) | |
| 8 | | 5 | 8.0' | | 19" RECOVERY | | |
| | | | 8.0' | 5 6 8 10 | Wet medium dense brown and orange-gray mottled silty fine sand w/ some gravel, trace of coarse sand. | A-2-4(0) | |
| 10 | | 6 | 10.0' | | 21" RECOVERY | | |
| | | | 10.0' | 14 13 13 14 | Wet medium dense brown, orange, and gray mottled silty fine sand w/ some coarse sand. | 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

Boring No.: C3-6-03

Contract: 25-113-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|---|-------------|---------|
| 12 | | | 12.0' | | 22" RECOVERY | | |
| | | 7 | 12.0' | 6 6 6 10 | Wet medium dense orange and gray mottled fine sand w/ some silt, coarse sand, and gravel. | A-2-4(0) | |
| 14 | | | 14.0' | | 22" RECOVERY | | |
| | | 8 | 14.0' | 11 10 8 8 | Wet medium dense orange and gray mottled fine sand w/ some coarse sand and silt, trace of gravel. | A-2-4(0) | |
| 16 | | | 16.0' | | 14" RECOVERY | | |
| | | 9 | 16.0' | 5 5 6 7 | Wet medium dense orange and gray mottled fine sand w/ some silt, trace of coarse sand. | A-2-4(0) | |
| 18 | | | 18.0' | | 22" RECOVERY | | |
| | | 10 | 18.0' | 5 10 8 9 | Wet medium dense orange and gray mottled fine sand w/ some silt and coarse sand, trace of gravel. | A-2-4(0) | |
| 20 | | | 20.0' | | 21" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



High plasticity
clay



Silty sand

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Notes:

1. Exploratory borings were drilled on 12/16/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-7-01

Contract: 25-113-01

Boring Location: Sta. 173+20, 520.00' Lt. C.L.

Boring Surface Elev.: + 70.04

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: 20.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 12/15/08 | | 10.0 | 8.0 | 9.7 | |
| | 12/15/09 | | 9.0 | | 8.7 | |

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: Jason Truver
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-------------------------------|
| | | 1 | 0.0' | | Augered to 2.0'. | | Asphalt - 6". Subgrade - 18". |
| 2 | | 2 | 2.0' | | 0" RECOVERY | | |
| | | | 2.0' | 10 12 13 8 | Moist very stiff gray fine sandy clay w/ some coarse sand, trace of gravel. | A-6(2) | |
| 4 | | 3 | 4.0' | | 16" RECOVERY | | |
| | | | 4.0' | 3 3 3 13 | Wet firm gray clay w/ some fine to coarse sand. | A-6(5) | |
| 6 | | 4 | 6.0' | | 18" RECOVERY | | |
| | | | 6.0' | 17 14 13 13 | Wet medium dense light brown fine sand w/ some clay, trace of coarse sand and gravel. | A-2-4(0) | |
| 8 | | 5 | 8.0' | | 17" RECOVERY | | |
| | | | 8.0' | 4 6 6 10 | Wet medium dense orange silty fine sand, trace of coarse sand. | A-2-4(0) | |
| 10 | | 6 | 10.0' | | 17" RECOVERY | | |
| | | | 10.0' | 7 5 5 11 | Wet loose coarse to fine sand w/ some gravel and silt. | 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.: C3-7-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 12 | | | 12.0' | | 11" RECOVERY | | |
| | | 7 | 12.0' | 7 9 8 | Saturated medium dense brown gravel and coarse to fine sand, trace of silt. | A-1-b | |
| 14 | | | 14.0' | | 9" RECOVERY | | |
| | | 8 | 14.0' | 12 5 7 10 | Saturated medium dense light brown fine to coarse sand, trace of silt and gravel. | A-3 | |
| 16 | | | 16.0' | | 18" RECOVERY | | |
| | | 9 | 16.0' | 12 13 14 12 | Saturated medium dense brown fine to coarse sand w/ some gravel, trace of silt. | A-1-b | |
| 18 | | | 18.0' | | 12" RECOVERY | | |
| | | 10 | 18.0' | 8 7 7 8 | Saturated medium dense brown fine to coarse sand, trace of silt and gravel. | A-3 | |
| 20 | | | 20.0' | | 12" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 12/15/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-8-01

Contract: 25-113-01

Boring Location: Sta. 198+00, 200.00' Lt. C.L.

Boring Surface Elev.: + 60.41

Reference:

| | | | | | |
|-----------------------|-------------------------|------|---------------------|----|-----|
| Wt. of Casing Hammer: | | Lbs. | Average Fall: | | IN. |
| Wt. of Sample Hammer: | 140 | Lbs. | Average Fall: | 30 | IN. |
| Type of: | D-Sampler: Ball Sampler | 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: 18.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 6/30/2009 | | 12.0 | 10.0 | 7.9 | |

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: Jason Truver
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-----------------------|
| | 6/30/09 | 1 | 0.5' | 3 8 10 | Moist medium dense brown fine to coarse sand with gravel and some silt. | A-1-b | Cultivated Soil - 6". |
| 2 | | | 2.0' | | 12" RECOVERY | | |
| | | 2 | 2.0' | 7 7 17 24 | Wet medium dense brown fine to coarse silty sand with gravel. | A-2-4(0) | |
| 4 | | | 4.0' | | 16" RECOVERY | | |
| | | 3 | 4.0' | 7 18 20 16 | Moist medium dense orange fine to coarse sand with gravel and some silt. | A-1-b | |
| 6 | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 10 10 10 10 | Wet medium dense orange fine to coarse sand with trace of silt and gravel. | A-1-b | |
| 8 | | | 8.0' | | 17" RECOVERY | | |
| | | 5 | 8.0' | 8 7 8 9 | Saturated medium dense silty fine to coarse sand with some gravel. | A-1-b | |
| 10 | | | 10.0' | | 16" RECOVERY | | |
| | | 6 | 10.0' | 3 6 8 7 | Saturated medium dense tan fine to coarse sand with some silt trave 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.: C3-8-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|---|-------------|---------|
| 12 | | | 12.0' | | 14" RECOVERY | | |
| | | 7 | 12.0' | 2 3 7 4 | Saturated loose orange fine to coarse sand with some silt and gravel. | A-1-b | |
| 14 | | | 14.0' | | 17" RECOVERY | | |
| | | 8 | 14.0' | 5 4 5 5 | Saturated loose tan fine to coarse sand with some silt and trace gravel. | A-2-4(0) | |
| 16 | | | 16.0' | | 18" RECOVERY | | |
| | | 9 | 16.0' | 5 8 10 9 | Saturated medium dense tan fine to coarse sand with some silt and gravel. | A-3 | |
| 18 | | | 18.0' | | 15" RECOVERY | | |
| | | 10 | 18.0' | 2 3 5 4 | Saturated loose fine to coarse sand with some silt and trace gravel. | A-2-4(0) | |
| 20 | | | 20.0' | | 13" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt



Poorly graded sand

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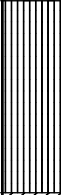

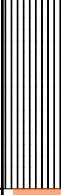
Notes:

1. Exploratory borings were drilled on 6/30/2009 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
Contract: 25-113-01

Boring No.: C3-8-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | 7 | 12.0' | 6 10 12 |  Saturated very stiff brown and orange mottled clay, trace of fine to coarse sand. | A-7-6(25) | |
| 14 | | | 14.0' | | 16" RECOVERY | | |
| | | 8 | 14.0' | 2 4 6 10 |  Saturated stiff brown and orange mottled clay w/ some fine sand, trace of coarse sand. | A-7-5(16) | |
| 16 | | | 16.0' | | 19" RECOVERY | | |
| | | 9 | 16.0' | 10 12 13 7 |  Saturated very stiff gray silty clay w/ some coarse sand, trace of fine sand. | A-7-6(14) | |
| 18 | | | 18.0' | | 20" RECOVERY | | |
| | | 10 | 18.0' | 13 12 13 13 |  Saturated very stiff gray fine to coarse sandy clay. | A-7-6(5) | |
| 20 | | | 20.0' | | 21" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded sand
with silt



Silty sand



Well graded sand
with silt



High plasticity
clay



Silt



Low plasticity
clay

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Notes:

1. Exploratory borings were drilled on 12/15/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-9-01

Contract: 25-113-01

Boring Location: Sta. 179+00, 70.00' Lt. C.L.

Boring Surface Elev.: + 56.19

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: | 20.0 |

| | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | | | | |
| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| 12/12/08 | | 20.0 | 18.0 | 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: Gary Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|---|-------------|------------------------|
| 1 | | 1 | 1.0' | 4 3 | Wet firm brown clayey silt, trace of fine to coarse sand. 12" RECOVERY | A-4(4) | Cultivated Soil - 10". |
| 2 | | 2 | 2.0' | 7 6 7 6 | Wet stiff brown silt w/ some fine to coarse sand, trace of gravel. 16" RECOVERY | A-4(0) | |
| 4 | | 3 | 4.0' | 2 5 7 8 | Wet stiff brown clayey silt w/ some fine to coarse sand, trace of gravel. 20" RECOVERY | A-4(3) | |
| 6 | | 4 | 6.0' | 7 8 9 9 | Wet very stiff brown fine to coarse sandy silt, trace of clay and gravel. 17" RECOVERY | A-4(0) | |
| 8 | | 5 | 8.0' | 1 2 3 2 | Wet firm brown coarse to fine sandy silt, trace of gravel. 20" RECOVERY | A-4(0) | |
| 10 | | 6 | 10.0' | 5 6 3 4 | Wet loose brown silty coarse to fine sand w/ some gravel. 17" RECOVERY | A-2-4(0) | |
| 12 | | | 12.0' | 4 | | | |

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.: C3-9-01


| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|---------|
| | | 7 | 12.0' | 5 5 4 | Wet loose brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| 14 | | | 14.0' | | 21" RECOVERY | | |
| | | 8 | 14.0' | 3 4 9 | Saturated medium dense brown silty fine to coarse sand. | A-2-4(0) | |
| 16 | | | 16.0' | | 20" RECOVERY | | |
| | | 9 | 16.0' | 6 11 15 16 | Saturated medium dense brown silty fine to coarse sand. | A-2-4(0) | |
| 18 | | | 18.0' | | 18" RECOVERY | | |
| | | 10 | 18.0' | 8 15 23 25 | Saturated dense brown silty fine to coarse sand. | A-2-4(0) | |
| 20 | | | 20.0' | | 11" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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
KEY TO SYMBOLS


Symbol Description

Strata symbols

 Silty low plasticity
clay

 Silt

 Low plasticity
clay

 Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/12/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-9-02

Contract: 25-113-01

Boring Location: Sta. 179+40, 70.00' Rt. C.L.

Boring Surface Elev.: + 56.56

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: | 20.0 |

| | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | | | | |
| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| 12/12/08 | | 18.0 | 16.0 | 15.8 | |

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: Gary Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------------|
| | | 1 | 1.0' | 4 4 | Moist firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel. | A-4(1) | Topsoil - 8". |
| 2 | | | 2.0' | | 12" RECOVERY | | |
| | | 2 | 2.0' | 4 11 9 6 | Moist medium dense brown silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 4.0' | | 19" RECOVERY | | |
| 4 | | 3 | 4.0' | 4 11 7 23 | Moist medium dense brown gravel and coarse sand w/ some fine sand, trace of silt. | A-1-a | |
| | | | 6.0' | | 14" RECOVERY | | |
| | | 4 | 6.0' | 7 12 7 9 | Wet medium dense brown, orange, and light tan coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 8.0' | | 20" RECOVERY | | |
| | | 5 | 8.0' | 5 10 10 11 | Wet medium dense orange coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 10.0' | | 17" RECOVERY | | |
| 10 | | 6 | 10.0' | 14 20 16 16 | Wet dense orange silty fine to coarse sand. | A-2-4(0) | |
| | | | 12.0' | | 19" RECOVERY | | |
| 12 | | | | 6 | | | |

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.: C3-9-02

Contract: 25-113-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | 7 | 12.0' | 9 11 12 | Wet medium dense orange and brown silty fine to coarse sand. | A-2-4(0) | |
| 14 | | | 14.0' | | 20" RECOVERY | | |
| | | 8 | 14.0' | 11 25 33 24 | Wet very dense orange and brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 16 | | | 16.0' | | 21" RECOVERY | | |
| | | 9 | 16.0' | 11 16 15 16 | Saturated dense orange and brown silty fine to coarse sand. | A-2-4(0) | |
| 18 | | | 18.0' | | 19" RECOVERY | | |
| | | 10 | 18.0' | 8 13 16 22 | Saturated medium dense orange and brown silty fine to coarse sand. | A-2-4(0) | |
| 20 | | | 20.0' | | 17" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

DRAFT
NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/12/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-9-03

Contract: 25-113-01

Boring Location: Sta. 245+90, 180.00' Lt. C.L.

Boring Surface Elev.: + 57.74

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: |
| | | | | | 20.0 |

| | | | | | | |
|----------------------|----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 12/12/08 | | 18.0 | 16.0 | 15.4 | |

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: Gary Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|------------------------|
| | | 1 | 1.0' | 6 4 | Wet stiff brown silt w/ some clay and fine to coarse sand, trace of gravel. | A-4(1) | Cultivated Soil - 12". |
| 2 | | | 2.0' | | 12" RECOVERY | | |
| | | 2 | 2.0' | 4 5 3 5 | Wet firm brown silt w/ some fine to coarse sand and clay, trace of gravel. | A-4(0) | |
| | | | 4.0' | | 19" RECOVERY | | |
| 4 | | 3 | 4.0' | 2 4 7 5 | Wet stiff brown fine sandy silt w/ some clay and coarse sand w/ some gravel. | A-4(0) | |
| | | | 6.0' | | 12" RECOVERY | | |
| | | 4 | 6.0' | 4 5 8 6 | Wet medium dense brown silty coarse to fine sand. | A-2-4(0) | |
| | | | 8.0' | | 17" RECOVERY | | |
| | | 5 | 8.0' | 5 12 12 11 | Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 10 | | | 10.0' | | 19" RECOVERY | | |
| | | 6 | 10.0' | 10 12 16 19 | Wet medium dense brown coarse to fine sand w/ some silt. | A-1-b | |
| 12 | | | 12.0' | | 20" 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 S.R. 1
Contract: 25-113-01

Boring No.: C3-9-03

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | 7 | 12.0' | 6 11 14 | Wet medium dense orange coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 14 | | | 14.0' | | 19" RECOVERY | | |
| | | 8 | 14.0' | 8 12 15 14 | Wet medium dense orange coarse to fine sand w/ some silt. | A-2-4(0) | |
| 16 | | | 16.0' | | 24" RECOVERY | | |
| | | 9 | 16.0' | 10 12 14 16 | Saturated medium dense orange silty coarse to fine sand. | A-2-4(0) | |
| 18 | | | 18.0' | | 17" RECOVERY | | |
| | | 10 | 18.0' | 8 12 13 16 | Saturated medium dense orange silty fine to coarse sand. | A-2-4(0) | |
| 20 | | | 20.0' | | 19" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

DRAFT
NOT FOR BIDDING
AUGUST 2015

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 12/12/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-9-04

Contract: 25-113-01

Boring Location: Sta. 244+00, 130.00' Rt. C.L.

Boring Surface Elev.: + 59.68

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: 20.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 12/8/08 | | 18.0 | 16.0 | 13.6 | |

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: Gary Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------------|--|-------------|------------------------|
| 1 | | 1 | 1.0' | 3 3 | Moist firm gray fine sandy silt w/ some coarse sand, gravel, and clay. | A-4(0) | Cultivated Soil - 12". |
| 2 | | | 2.0' | | 12" RECOVERY | | |
| 3 | | 2 | 2.0' | 4 5 7 11 | Moist medium dense brown and light brown silty coarse to fine sand w/ some gravel. | A-1-b | |
| 4 | | | 4.0' | | 18" RECOVERY | | |
| 5 | | 3 | 4.0' | 5 11 13 6 | Moist medium dense yellow coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 18" RECOVERY | | |
| 7 | | 4 | 6.0' | 9 12 16 50/3" | Moist medium dense yellow coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 8 | | | 8.0' | | 18" RECOVERY | | |
| 9 | | 5 | 8.0' | 10 29 15 5 | Wet dense orange-brown coarse sand w/ some fine sand, gravel, and silt. | A-1-b | |
| 10 | | | 10.0' | | 18" RECOVERY | | |
| 11 | | 6 | 10.0' | 4 6 11 20 | Wet medium dense brown coarse to fine sand w/ some silt. | A-1-b | |
| 12 | | | 12.0' | | 24" RECOVERY | | |

Remarks:

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

**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.: C3-9-04

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | 7 | 12.0' | 7 11 13 | Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 14 | | | 14.0' | | 20" RECOVERY | | |
| | | 8 | 14.0' | 6 5 8 20 | Saturated medium dense brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 16 | | | 16.0' | | 22" RECOVERY | | |
| | | 9 | 16.0' | 20 30 30 50 | Saturated very dense brown, orange, and light brown mottled coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 18 | | | 18.0' | | 19" RECOVERY | | |
| | | 10 | 18.0' | 30 50 | Saturated very dense brown, orange, and light brown mottled fine to coarse sand w/ some silt. | A-2-4(0) | |
| | | | 19.0' | | 12" RECOVERY | | |
| 20 | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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 12/12/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-10-01

Contract: 25-113-01

Boring Location: Sta. 204+80, 70.00' Lt. C.L.

Boring Surface Elev.: + 52.57

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: |
| | | | | | 20.0 |

| | | | | | | | |
|----------------------|--|----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | | 12/10/08 | | 14.0 | 12.0 | 9.0 | |

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: Gary Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|------------------------|
| | | 1 | 1.0' | 3 3 | Moist firm brown clayey silt w/ some fine to coarse sand, trace of gravel. | A-4(4) | Cultivated Soil - 11". |
| 2 | | | 2.0' | | 8" RECOVERY | | |
| | | 2 | 2.0' | 3 4 4 5 | Moist loose orange silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 4.0' | | 16" RECOVERY | | |
| 4 | | 3 | 4.0' | 3 4 7 8 | Moist medium dense orange fine to coarse sand w/ some silt. | A-2-4(0) | |
| | | | 6.0' | | 15" RECOVERY | | |
| | | 4 | 6.0' | 6 9 7 6 | Moist medium dense orange coarse sand w/ some fine sand, gravel, and silt. | A-1-b | |
| | | | 8.0' | | 17" RECOVERY | | |
| 8 | | 5 | 8.0' | 6 14 12 11 | Wet medium dense orange and brown fine to coarse sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 10.0' | | 20" RECOVERY | | |
| | | 6 | 10.0' | 7 8 14 21 | Saturated medium dense orange and brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 12 | | | 12.0' | | 18" 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 S.R. 1
Contract: 25-113-01

Boring No.: C3-10-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | 7 | 12.0' | 8 9 15 | Saturated medium dense orange and brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 14 | | | 14.0' | | 23" RECOVERY | | |
| | | 8 | 14.0' | 10 17 21 25 | Saturated dense orange and brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 16 | | | 16.0' | | 22" RECOVERY | | |
| | | 9 | 16.0' | 15 22 32 48 | Saturated very dense orange and brown fine to coarse sand, trace of silt. | A-3 | |
| 18 | | | 18.0' | | 18" RECOVERY | | |
| | | 10 | 18.0' | 23 42 36 44 | Saturated very dense orange and brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 20 | | | 20.0' | | 20" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

DRAFT
NOT FOR BIDDING
AUGUST 2015

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 12/10/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: C3-10-02

Contract: 25-113-01

Boring Location: Sta. 205+20, 40.00' Rt. C.L.

Boring Surface Elev.: + 53.72

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: |
| | | | | | 20.0 |

| | | | | | | | |
|----------------------|--|----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | | 12/10/08 | | 16.0 | 14.0 | 11.8 | |

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: Gary Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|------------------------|
| | | 1 | 1.0' | 3 4 | Moist firm brown fine sandy silt w/ some coarse sand. | A-4(0) | Cultivated Soil - 11". |
| 2 | | | 2.0' | | 12" RECOVERY | | |
| | | 2 | 2.0' | 6 5 6 5 | Moist medium dense orange fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 4.0' | | 20" RECOVERY | | |
| 4 | | 3 | 4.0' | 4 5 6 7 | Moist medium dense orange fine to coarse sand w/ some silt. | A-2-4(0) | |
| | | | 6.0' | | 18" RECOVERY | | |
| | | 4 | 6.0' | 6 5 9 12 | Moist medium dense orange fine sand w/ some silt and coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 8.0' | | 19" RECOVERY | | |
| 8 | | 5 | 8.0' | 2 3 8 9 | Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 10.0' | | 18" RECOVERY | | |
| 10 | | 6 | 10.0' | 9 10 15 17 | Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 12.0' | | 20" RECOVERY | | |
| 12 | | | | 15 | | | |

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.: C3-10-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | 7 | 12.0' | 21 31 37 | Saturated very dense brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 14 | | | 14.0' | | 19" RECOVERY | | |
| | | 8 | 14.0' | 2 15 18 19 | Saturated dense brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 16 | | | 16.0' | | 21" RECOVERY | | |
| | | 9 | 16.0' | 13 15 23 34 | Saturated dense brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 18 | | | 18.0' | | 18" RECOVERY | | |
| | | 10 | 18.0' | 24 24 24 50 | Saturated dense brown fine to coarse sand w/ some silt. | A-2-4(0) | |
| 20 | | | 20.0' | | 10" RECOVERY | | |
| | | | | | End of Boring | | |
| 22 | | | | | | | |
| 24 | | | | | | | |
| 26 | | | | | | | |
| 28 | | | | | | | |
| 30 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 12/10/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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 S.R. 1

Boring No.: HML3-1-01

Contract: 25-113-01

Boring Location: Sta. 186+00 C.L.

Boring Surface Elev.: + 69.02

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: 19.0 |

| | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | | | | |
| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| 1/29/10 | | 6 | 4 | 3.7 | |

Pay Quantities:

| | | | | |
|---------------------------------------|------|---|------------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 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: Gary Truver
Helpers: M. Derr/T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|------------------------|
| 3 | 1/29/10 | 1 | 1.0' | 3 4 | Wet firm orange silty clay w/some fine sand, trace of coarse sand and fine gravel. | A-6(9) | Cultivated Soil - 10". |
| | | 2 | 2.0' | 10 13 16 19 | 10" RECOVERY Wet medium dense orange coarse sand w/some fine sand, silt and fine gravel. | A-1-b | |
| 6 | 1/29/10 | 3 | 4.0' | 6 | 22" RECOVERY | | |
| | | 3 | 4.0' | 10 12 10 | Saturated medium dense orange silty fine sand w/some coarse sand. | A-2-4(0) | |
| 9 | 1/29/10 | 4 | 6.0' | 7 8 14 12 | 18" RECOVERY Saturated medium dense orange coarse sand w/some fine sand and fine gravel, trace of silt. | A-2-4(0) | |
| | | 5 | 8.0' | 6 7 5 5 | 24" RECOVERY Saturated medium dense orange coarse sand w/some fine sand and fine gravel, trace of silt. | A-1-b | |
| 12 | 1/29/10 | 6 | 10.0' | 6 21 15 13 | 22" RECOVERY Saturated dense orange fine gravelly coarse to fine sand w/trace of silt. | A-1-b | |
| | | 7 | 12.0' | 23 22 17 18 | No Sample Recovery | | Gravel blocking spoon. |
| 15 | 1/29/10 | 8 | 14.0' | 7 6 7 9 | 0" RECOVERY Saturated dense orangish tan fine to coarse sand w/trace of silt and fine gravel. | A-3 | |
| | | 9 | 16.0' | 4 4 | 15" RECOVERY Saturated medium dense orangish tan coarse to fine sand w/trace of silt and fine gravel. | A-1-b | |
| | | 9A | 17.0' | 4 4 | 12" RECOVERY Saturated firm orange silty clay w/trace of fine to coarse sand and fine gravel. | A-7-6(28) | |

Remarks: Mud Rotary @ 19.0 feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: HML3-1-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|--------------------|---|-------------|---|
| | | U-1 | 18.0' 18.0' | | gravel. 12" RECOVERY Saturated orangish tan silty clay. | A-7-6(36) | Press Sample - Shelby Tube. Mud Rotary @ 19.0'. |
| 21 | | | 20.0' | | 21.5" RECOVERY | | |
| 24 | | 10 | 24.0' 26.0' | 5 8 9 9 | Saturated very stiff gray coarse sandy clay w/some fine sand. 24" RECOVERY | A-7-6(3) | |
| 27 | | | | | | | |
| 30 | | 11 | 29.0' 31.0' | 4 6 7 6 | Saturated stiff gray coarse sandy clay w/some fine sand and silt. 24" RECOVERY | A-7-6(8) | |
| 33 | | | | | | | |
| 36 | 2/1/10 | 12 | 34.0' 36.0' | 5 7 9 14 | Saturated very stiff gray silty clay w/some coarse sand, trace of fine sand. 20" RECOVERY | A-7-6(15) | |
| 39 | | | | | | | |
| 42 | | 13 | 39.0' 41.0' | 5 9 11 13 | Saturated very stiff gray silty clay w/some coarse to fine sand. 23" RECOVERY | A-7-5(15) | |
| 45 | | 14 | 44.0' 46.0' | 40 50/3" | Saturated very dense brown coarse sandy fine gravel w/some fine sand and silt. 3" RECOVERY | A-1-b | |

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

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

Boring No.: HML3-1-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|-------------|---|-------------|---------|
| 48 | | | | | | | |
| 51 | | 15 | 49.0' 51.0' | 28 50/5" | Saturated very dense brown fine to coarse sand w/trace of silt and fine gravel. 11" RECOVERY | A-3 | |
| 54 | | 16 | 54.0' 56.0' | 50/5" | No Sieve Analysis - Indication of saturated very dense brown sand w/ some silt. 3" RECOVERY | | |
| 57 | | | | | | | |
| 60 | | 17 | 59.0' 59.5' | 50 | Saturated very dense brown fine to coarse sand w/trace of silt. 4" RECOVERY | A-3 | |
| 63 | | | | | End of Boring | | |
| 66 | | | | | | | |
| 69 | | | | | | | |
| 72 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



High plasticity
clay



Silt



Elastic silt

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Notes:

1. Exploratory borings were drilled on 1/29/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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 S.R. 1

Boring No.: HML3-2-01

Contract: 25-113-01

Boring Location: Sta. 196+20 C.L.

Boring Surface Elev.: + 64.61

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 2/2/10 | Time | Depth of Hole 10 | Depth of Casing 8 | Depth of Water 6.7 | Elev. of Water |

Pay Quantities:

| | | | | |
|---------------------------------------|------|------------------------|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-----------------------|
| | 2/2/10 | 1 | 0.5' | 5 5 4 5 | Wet stiff brown silty clay w/trace of fine to coarse sand. 8" RECOVERY | A-6(12) | Cultivated Soil - 8". |
| 3 | | 2 | 2.0' | 7 9 9 11 | Wet very stiff brown clayey silt w/trace of fine to coarse sand. 17" RECOVERY | A-4(7) | |
| | | 3 | 4.0' | 5 11 12 18 | Wet medium dense orange silty fine to coarse sand w/some fine gravel. 17" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 10 19 20 16 | Saturated dense orange fine sandy fine gravel w/some coarse sand and silt. 15" RECOVERY | A-1-b | |
| | | 5 | 8.0' | 9 11 11 | Saturated medium dense orange fine to coarse sand w/some silt, trace of fine gravel. 16" RECOVERY | A-2-4(0) | |
| | | 6 | 10.0' | 6 9 11 | Saturated medium dense orange fine to coarse sand w/trace of silt and fine gravel. 18" RECOVERY | A-3 | |
| 12 | | 7 | 12.0' | 6 8 11 10 | Saturated medium dense orange coarse sand w/some fine gravel and fine sand, trace of silt. 15" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 8 9 11 12 | Saturated medium dense orange coarse to fine sand w/trace of silt and fine gravel. 13" RECOVERY | A-1-b | |
| 15 | | 9 | 16.0' | 9 6 6 7 | Saturated stiff orange silty clay w/some fine sand, trace of coarse sand and fine gravel. | A-7-6(12) | |

Remarks: Mud Rotary @ 34.0 feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: HML3-2-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-----------------------|---|-------------|---------------------|
| 18 | | | 18.0' | | 6" RECOVERY | | |
| | | 10 | 18.0' | 3 7 7 10 | Saturated stiff orange silty clay w/some coarse sand, trace of fine sand and fine gravel. | A-7-6(19) | |
| | | | 20.0' | | 21" RECOVERY | | |
| 21 | | | | | | | |
| | | | | | | | |
| 24 | | | | | | | |
| | | 11 | 24.0' | 4 5 8 7 | Saturated stiff gray silty coarse sandy clay w/some fine sand. | A-7-6(9) | |
| | | | 26.0' | | 20" RECOVERY | | |
| 27 | | | | | | | |
| | | | | | | | |
| | | 12 | 29.0' | 6 10 8 | Saturated stiff gray silty clay w/some fine to coarse sand. | A-7-6(13) | |
| 30 | | | 31.0' | | 20" RECOVERY | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | 13 | 34.0' | 7 9 30 50/4" | Saturated hard gray silty clay w/some fine gravel and fine to coarse sand. | A-6(6) | Mud Rotary @ 34.0'. |
| 36 | | | 36.0' | | 20" RECOVERY | | |
| | | | | | | | |
| 39 | | | | | | | |
| | | 14 | 39.0' | 26 50 | Saturated very dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 41.0' | | 10" RECOVERY | | |
| 42 | | | | | | | |
| | | | | | | | |
| 45 | 2/3/10 | 15 | 44.0' | 35 50/3" | Saturated very dense brown fine to coarse sand w/trace of silt and fine gravel. | A-3 | |

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

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

Boring No.: HML3-2-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------------|---|-------------|---------|
| | | | 46.0' | | 8" RECOVERY | | |
| 48 | | | | | | | |
| | | 16 | 49.0' | 21 36 50/5" | Saturated very dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| 51 | | | 51.0' | | 15" RECOVERY | | |
| | | | | | | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | 21 36 45 50/4" | Saturated very dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 56.0' | | 19" RECOVERY | | |
| 57 | | | | | | | |
| | | | | | | | |
| 60 | | 18 | 59.0' | 33 35 50 | Saturated very dense brown fine to coarse sand w/trace of silt and fine gravel. | A-3 | |
| | | | 61.0' | | 16" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



High plasticity
clay



Silt

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Notes:

1. Exploratory borings were drilled on 2/2/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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 S.R. 1

Boring No.: HML3-3-01

Contract: 25-113-01

Boring Location: Sta. 205+50 C.L.

Boring Surface Elev.: +67.95

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: 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: 29 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|------------------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 2/3/10 | | 12 | 10 | 9.3 | 58.7 68.0 68.0 68.0 |

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: Ft.; 3 **Dia. U-Sample Boring:** Ft.
 No. of 2 in. Dia. Shelby Tubes: ; **No. of U-Samples:** 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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-----------------------|
| 3 | 2/3/10 | 1 | 1.0' | 4 4 | Wet firm brown clayey silt w/trace of fine to coarse sand. 8" RECOVERY | A-4(7) | Cultivated Soil - 10" |
| | | 2 | 2.0' | 6 8 13 21 | Wet medium dense orange silty coarse to fine sand w/some fine gravel. 16" RECOVERY | A-1-b | |
| 6 | 2/3/10 | 3 | 4.0' | 12 15 14 13 | Wet medium dense orange fine gravelly coarse sand w/some fine sand and silt. 14" RECOVERY | A-1-b | |
| | | 4 | 6.0' | 11 16 19 29 | Wet dense orange fine gravelly fine to coarse sand w/some silt. 14" RECOVERY | A-1-b | |
| 9 | 2/3/10 | 5 | 8.0' | 11 13 14 11 | Wet medium dense brown fine gravelly coarse sand w/some fine sand, trace of silt. 15" RECOVERY | A-1-b | |
| | | 6 | 10.0' | 7 13 13 13 | Saturated medium dense brown fine gravelly coarse sand w/some fine sand, trace of silt. 15" RECOVERY | A-1-b | |
| 12 | 2/3/10 | 7 | 12.0' | 11 13 15 15 | Saturated medium dense brown coarse sandy fine gravel w/some fine sand, trace of silt. 16" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 17 19 21 26 | Saturated dense brown coarse sandy fine gravel w/some fine sand, trace of silt. 12" RECOVERY | A-1-b | |
| 15 | 2/3/10 | 9 | 16.0' | 11 16 32 21 | Saturated dense brown coarse sand w/some fine gravel and fine sand, trace of silt. | A-1-b | |

Remarks: Mud Rotary @ 29 Feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: HML3-3-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|---------------------|
| | | 10 | 18.0' | | 16" RECOVERY | | |
| | | | 18.0' | 8 8 9 | Saturated medium dense brown coarse to fine sand w/some fine gravel, trace of silt. | A-1-b | |
| 21 | | | 20.0' | | 20" RECOVERY | | |
| | | 11 | 24.0' | 6 8 9 10 | Saturated medium dense orange coarse to fine sand w/trace of silt and fine gravel. | A-1-b | |
| 24 | | | 26.0' | | 17" RECOVERY | | |
| 27 | | | | | | | |
| | | 12 | 29.0' | 9 9 9 | Saturated medium dense orange fine gravelly coarse to fine sand w/trace of silt. | A-1-b | Mud Rotary @ 29.0'. |
| 30 | | | 31.0' | | 18" RECOVERY | | |
| | | 13 | 34.0' | 5 11 12 10 | Saturated medium dense brown coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | |
| 33 | | | 36.0' | | 10" RECOVERY | | |
| 36 | | | | | | | |
| | | 14 | 39.0' | 11 21 50/4" | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| 39 | | | 41.0' | | 15" RECOVERY | | |
| 42 | | | | | | | |
| | 2/4/10 | 15 | 44.0' | 38 50/3" | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| 45 | | | 46.0' | | 8" RECOVERY | | |

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DIVISION OF HIGHWAYS**

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

Boring No.: HML3-3-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|-------------------|---|-------------|---------|
| 48 | | | | | | | |
| 51 | | 16 | 49.0' 51.0' | 35 50/5" | Saturated very dense green fine to coarse sand w/trace of silt. 10" RECOVERY | A-3 | |
| 54 | | | | | | | |
| 57 | | 17 | 54.0' 56.0' | 36 50/5" | Saturated very dense green fine to coarse sand w/trace of silt. 8" RECOVERY | A-3 | |
| 60 | | 18 | 59.0' 60.5' | 19 35 50/4" | Saturated very dense green fine to coarse sand w/some silt, trace of fine gravel. 14" RECOVERY | A-2-4(0) | |
| 63 | | | | | End of Boring | | |
| 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

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Notes:

1. Exploratory borings were drilled on 2/3/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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 S.R. 1

Boring No.: HML3-4-01

Contract: 25-113-01

Boring Location: Sta. 212+60 C.L.

Boring Surface Elev.: +67.19

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: | |
| | Hollow Stem Auger: | | From Depth of: | 14.0 | To: | 14.0 |

| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|----------------------|--------|------|---------------|-----------------|----------------|------------------------------|
| | 2/3/10 | | 14 | 14 | 12.4 | 54.8 67.2 67.2 67.2 |

Pay Quantities:

| | | | | |
|---------------------------------------|------|---|------------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 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: Jason Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|----------------|----------------------|--|-------------|---------------------|
| | 2/3/10 | 1 | 1.0' | 2 1 | Wet soft orange clayey fine sandy silt w/some coarse sand and fine gravel. | A-4(2) | Topsoil - 8". |
| 3 | | 2 | 2.0' | 3 7 10 10 | 6" RECOVERY Wet medium dense orange silty fine gravelly coarse to fine sand. | A-1-b | |
| 6 | | 3 | 4.0' 4.0' | 5 6 6 5 | 16" RECOVERY Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | |
| 9 | | 4 | 6.0' 6.0' | 13 12 11 12 | 17" RECOVERY Saturated medium dense orange fine gravelly coarse to fine sand. | A-1-b | |
| 12 | | 5 | 8.0' 8.0' | 6 6 6 8 | 20" RECOVERY Saturated medium dense orange fine gravelly coarse sand w/some fine sand, trace of silt. | A-1-b | |
| 15 | | 6 | 10.0' 10.0' | 12 9 11 10 | 15" RECOVERY Saturated medium dense orange fine gravelly coarse sand w/some fine sand, trace of silt. | A-1-b | |
| | | 7 | 12.0' 12.0' | 8 9 12 14 | 10" RECOVERY Saturated medium dense tan fine gravelly coarse sand w/some fine sand, trace of silt. | A-1-b | |
| | | 8 | 14.0' 14.0' | 13 11 12 10 | 8" RECOVERY Saturated medium dense tan fine gravel w/some coarse to fine sand, trace of silt. | A-1-a | Mud Rotary @ 14.0'. |
| | | 9 | 16.0' 16.0' | 10 9 10 8 | 10" RECOVERY Saturated medium dense orange coarse sand w/some silt. | A-2-4(0) | |

Remarks: Mud Rotary @ 14 feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: HML3-4-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-----------------------------|
| | | | 18.0' | | 21" RECOVERY | | |
| | | 10 | 18.0' | 9 10 15 11 | Saturated medium dense orangish brown fine gravelly coarse to fine sand w/trace of silt. | A-1-b | |
| | | | 20.0' | | 12" RECOVERY | | |
| 21 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 24 | | 11 | 23.0' | 7 8 9 10 | Saturated medium dense tan fine sand w/some coarse sand and fine gravel, trace of silt. | A-3 | |
| | | | 25.0' | | 13" RECOVERY | | |
| 27 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 30 | | 12 | 28.0' | 4 4 4 5 | Saturated firm grayish brown silty clay w/some fine gravel, trace of fine to coarse sand. | A-7-5(41) | |
| | | | 30.0' | | 4" RECOVERY | | |
| | | U-1 | 30.0' | | Saturated tan silty clay w/some fine gravel, trace of fine to coarse sand. | A-7-6(27) | Press Sample - Shelby Tube. |
| | | | 32.0' | | 24" RECOVERY | | |
| 33 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 36 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 39 | | 14 | 38.0' | 40 50/5" | Saturated very dense green fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 40.0' | | 11" RECOVERY | | |
| 42 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 45 | | 15 | 43.0' | 35 50/4" | Saturated very dense green fine to coarse sand w/trace of silt and fine gravel. | A-3 | |
| | | | 45.0' | | 10" RECOVERY | | |

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

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

Boring No.: HML3-4-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 48 | | 16 | 48.0' | 30 50/5" | Saturated very dense green fine to coarse sand w/some silt. 11" RECOVERY | A-2-4(0) | |
| | | | 50.0' | | | | |
| 51 | | | | | | | |
| 54 | | 17 | 53.0' | 23 35 50/3" | Saturated very dense green fine to coarse sand w/some silt. 14" RECOVERY | A-2-4(0) | |
| | | | 55.0' | | | | |
| 57 | | | | | | | |
| 60 | | 18 | 58.0' | 13 20 25 42 | Saturated dense green fine to coarse sand w/trace of silt. 18" RECOVERY | A-3 | |
| | | | 60.0' | | | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| 66 | | | | | | | |
| 69 | | | | | | | |
| 72 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded gravel
with silt



Poorly graded sand
with silt



High plasticity
clay

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Notes:

1. Exploratory borings were drilled on 2/3/2010 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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 S.R. 1

Boring No.: HML3-5-01

Contract: 25-113-01

Boring Location: Sta. 216+50 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: | 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: |
| | | | | | | 14.0 |

| | | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|--|
| Water Level Readings | | | | | | |
| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water | |
| 2/2/10 | | 14 | 12 | 12 | 54.9 | |
| | | | | | 66.9 | |
| | | | | | 66.9 | |
| | | | | | 66.9 | |

Pay Quantities:

| | | | | |
|---------------------------------------|------|---|------------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 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: Jason Truver
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|---|-------------|---------------------|
| | 2/2/10 | 1 | 1.0' | 4 3 | Wet loose brown silty coarse to fine sand. 6" RECOVERY | A-2-4(0) | Topsoil - 9". |
| | | 2 | 2.0' | 3 4 7 8 | Wet stiff brown clayey silt w/some fine sand, trace of coarse sand and fine gravel. | A-4(4) | |
| 3 | | | 4.0' | | 16" RECOVERY | | |
| | | 3 | 4.0' | 6 6 8 10 | Wet stiff brown silt w/some fine gravel, trace of fine to coarse sand. | A-4(0) | |
| 6 | | | 6.0' | | 14" RECOVERY | | |
| | | 4 | 6.0' | 8 8 6 7 | Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 8.0' | | 16" RECOVERY | | |
| 9 | | 5 | 8.0' | 9 10 9 6 | Wet medium dense brown fine gravelly coarse sand w/some fine sand and silt. | A-1-b | |
| | | | 10.0' | | 12" RECOVERY | | |
| | | 6 | 10.0' | 4 5 7 5 | Wet medium dense fine gravelly coarse sand w/trace of fine sand and silt. | A-1-b | |
| 12 | | | 12.0' | | 16" RECOVERY | | |
| | | 7 | 12.0' | 4 4 4 6 | Wet loose brown coarse to fine sand w/trace of silt and fine gravel. | A-1-b | |
| | | | 14.0' | | 15" RECOVERY | | |
| 15 | | 8 | 14.0' | 3 2 3 4 | Wet loose brown fine sand w/some silt, trace of coarse sand. | A-2-4(0) | Mud Rotary @ 14.0'. |
| | | | 16.0' | | 17" RECOVERY | | |
| | | 9 | 16.0' | 4 4 3 4 | Wet loose brown silty fine sand w/trace of fine gravel and coarse sand. | A-2-4(0) | |

Remarks: Mud Rotary @ 14 feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: HML3-5-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------------|--|-------------|---------|
| | | | 18.0' | | 17" RECOVERY | | |
| | | 10 | 18.0' | 12 11 12 12 | Wet medium dense brown fine gravelly fine to coarse sand w/some silt. | A-1-b | |
| | | | 20.0' | | 18" RECOVERY | | |
| 21 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 24 | | 11 | 23.0' | 7 8 8 8 | Wet medium dense brown coarse to fine sand w/some fine gravel, trace of silt. | A-1-b | |
| | | | 25.0' | | 12" RECOVERY | | |
| 27 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | 12 | 28.0' | 10 8 16 15 | Wet medium dense grayish brown fine gravelly coarse to fine sand w/ some silt. | A-1-b | |
| 30 | | | 30.0' | | 19" RECOVERY | | |
| | | | | | | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | 13 | 33.0' | 9 15 17 24 | Wet dense brown coarse to fine sand w/some silt. | A-2-4(0) | |
| | | | 35.0' | | 24" RECOVERY | | |
| 36 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 39 | | 14 | 38.0' | 22 33 50/3" | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 40.0' | | 15" RECOVERY | | |
| 42 | | | | | | | |
| | | | | | | | |
| | | 15 | 43.0' | 24 33 43 50/3" | Wet very dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| 45 | | | 45.0' | | 18" RECOVERY | | |

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

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

Boring No.: HML3-5-01

Contract: 25-113-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 48.0' | 16 20 31 35 | Wet very dense brown coarse to fine sand w/trace of silt and fine gravel. | A-1-b | |
| | | | 50.0' | | 22" RECOVERY | | |
| 51 | | | | | | | |
| | | 17 | 53.0' | 26 30 50/4" | Wet very dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| 54 | | | 55.0' | | 20" RECOVERY | | |
| 57 | | | | | | | |
| | | 18 | 58.0' | 11 14 23 30 | Wet dense brown fine to coarse sand w/trace of silt and fine gravel. | A-3 | |
| 60 | | | 60.0' | | 24" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| 66 | | | | | | | |
| 69 | | | | | | | |
| 72 | | | | | | | |

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Low plasticity
clay



Silt



Poorly graded sand
with silt



Well graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 2/2/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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 S.R. 1

Boring No.: HML3-6-01

Contract: 25-113-01

Boring Location: Sta. 224+50 C.L.

Boring Surface Elev.: +73.72

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: 14 |

| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|----------------------|---------|------|---------------|-----------------|----------------|------------------------------|
| | 1/29/10 | | 14 | 14 | 14 | 59.7 73.7 73.7 73.7 |

Pay Quantities:

| | | | | |
|---------------------------------------|------|---|------------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-----------------------|
| | 1/29/10 | 1 | 0.5' | 2 3 3 | Wet firm brown clayey silt w/trace of fine to coarse sand. | A-4(9) | Cultivated Soil - 8". |
| | | | 2.0' | | 10" RECOVERY | | |
| 3 | | 2 | 2.0' | 3 4 5 8 | Wet stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. | A-4(2) | |
| | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | 4 3 6 8 | Wet loose orange silty fine sand w/some coarse sand and clay, trace of fine gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 9 8 8 8 | Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 8.0' | | 21" RECOVERY | | |
| 9 | | 5 | 8.0' | 5 4 4 6 | Wet loose orange silty fine to coarse sand w/trace of fine gravel. | A-2-4(0) | |
| | | | 10.0' | | 18" RECOVERY | | |
| | | 6 | 10.0' | 4 8 7 6 | Wet medium dense orange fine gravelly coarse to fine sand w/some silt. | A-1-b | |
| 12 | | | 12.0' | | 18" RECOVERY | | |
| | | 7 | 12.0' | 6 5 4 6 | Wet loose orange fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 14.0' | | 18" RECOVERY | | |
| 15 | | 8 | 14.0' | 7 18 20 22 | Wet dense brown fine sandy fine gravel w/some coarse sand and silt. | A-1-b | Mud Rotary @ 14.0'. |
| | | | 16.0' | | 16" RECOVERY | | |
| | | 9 | 16.0' | 12 13 20 23 | Wet dense brown coarse sandy fine gravel w/some fine sand, trace of silt. | A-1-b | |

Remarks: Mud Rotary @ 14.0 feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

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

Boring No.: HML3-6-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------------|--|-------------|---------|
| 18 | | | 18.0' | | 14" RECOVERY | | |
| | | 10 | 18.0' | 15 15 17 17 | Wet dense brown coarse to fine sandy fine gravel w/trace of silt. | A-1-b | |
| | | | 20.0' | | 10" RECOVERY | | |
| 21 | | | | | | | |
| | | 11 | 23.0' | 7 12 17 14 | Wet medium dense brown fine gravelly fine to coarse sand w/trace of silt. | A-1-b | |
| 24 | | | 25.0' | | 14" RECOVERY | | |
| | | | | | | | |
| 27 | | | | | | | |
| | | 12 | 28.0' | 3 5 6 7 | Wet medium dense greenish brown coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | |
| 30 | | | 30.0' | | 22" RECOVERY | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | 13 | 33.0' | 17 22 22 22 | Wet dense brown coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | |
| | | | 35.0' | | 22" RECOVERY | | |
| 36 | | | | | | | |
| | | 14 | 38.0' | 17 26 36 33 | Wet very dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| 39 | | | 40.0' | | 22" RECOVERY | | |
| | | | | | | | |
| 42 | | | | | | | |
| | | 15 | 43.0' | 23 28 45 50/3" | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| 45 | | | 45.0' | | 20" RECOVERY | | |

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

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

Boring No.: HML3-6-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------------|---|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 48.0' | 18 27 47 50/2" | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 50.0' | | 16" RECOVERY | | |
| 51 | | | | | | | |
| | | 17 | 53.0' | 18 21 34 34 | Wet very dense brown fine to coarse sand w/trace of silt. | A-3 | |
| 54 | | | 55.0' | | 24" RECOVERY | | |
| | | | | | | | |
| 57 | | | | | | | |
| | | 18 | 58.0' | 26 36 45 50/5" | Wet very dense brown fine to coarse sand w/trace of silt. | A-3 | |
| 60 | | | 60.0' | | 16" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/29/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-1

Contract: 25-113-01

Boring Location: Sta. 110+00, 98' Rt. C.L.

Boring Surface Elev.: + 68.4

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 |
| | 6/19/2009 | | 8.0 | | 5.5 | |

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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|---|-------------|------------|
| | 6/19/09 | 1 | 0.5' 1.0' | | Moist brown silt w/some clay and coarse to fine sand, trace of gravel. 6" RECOVERY | A-4(1) | Hand Auger |
| | | 2 | 1.0' | | Moist brown fine sandy silt w/some coarse sand, trace of clay and gravel. 12" RECOVERY | A-4(0) | Hand Auger |
| 2 | | 3 | 2.0' 2.0' | | Moist gray mottled silt w/some clay and fine sand, trace of coarse sand and gravel. 18" RECOVERY | A-4(1) | Hand Auger |
| 4 | | 4 | 3.5' 3.5' | | Moist brown coarse to fine sand and gravel w/some silt. 24" RECOVERY | A-1-b | Hand Auger |
| 6 | | 5 | 5.5' 5.5' | | Moist to wet orange coarse sand w/some silt, gravel and fine sand. 30" RECOVERY | A-1-b | Hand Auger |
| 8 | | | 8.0' | | End of Boring | | |
| 10 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/19/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301, Maryland State Line to S.R. 1

Boring No.: INF3-1A

Contract: 25-113-01

Boring Location: Sta. 115+00, 98' Rt. C.L.

Boring Surface Elev.: + 68.2

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: 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 6/19/2009 | | 10.0 | 8.0 | 7.6 | |

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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|---|-------------|-------------------------------|
| | 6/19/09 | 1 | 0.5' | 3 4 3 | Moist firm tan silt w/ some clay and coarse sand, trace of fine sand. | A-4(2) | Topsoil - 4". |
| 2 | | 2 | 2.0' | 3 6 10 8 | 12" RECOVERY Moist medium dense brown silty coarse to fine sand w/ trace of gravel. | A-2-4(0) | |
| 4 | | 3 | 4.0' | 4 6 10 9 | 14" RECOVERY Moist medium dense orange fine to coarse sand w/ some silt, trace of clay and gravel. | A-2-4(0) | USDA Classifica - Loamy Sand. |
| 6 | | 4 | 6.0' | 4 8 8 7 | 17" RECOVERY Moist medium dense orange coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 8 | | 5 | 8.0' | 4 6 6 5 | 18" RECOVERY Wet medium dense orange coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 10 | | | 10.0' | | 15" 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 6/19/2009 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 re-checked 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.: INF3-2

Contract: 25-113-01

Boring Location: Sta. 110+00, 98' Lt. C.L.

Boring Surface Elev.: + 62.9

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: |
| | | | | | 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 6/16/2009 | | 10.0 | 8.0 | 7.5 | |

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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-------------------------|
| | 6/16/09 | 1 | 0.0' | 3 3 4 5 | Moist firm gray silt w/some fine sand and clay, trace of coarse sand and gravel. | A-4(1) | Topsoil - 2". |
| 2 | | | 2.0' | | 17" RECOVERY | | |
| | | 2 | 2.0' | 3 13 15 12 | Moist very stiff gray clayey silt w/trace of fine to coarse sand and gravel. | A-4(2) | USDA Classifica - Clay. |
| 4 | | | 4.0' | | 20" RECOVERY | | |
| | | 3 | 4.0' | 13 20 16 13 | Moist hard gray fine to coarse sandy silt w/some clay, trace of gravel. | A-4(0) | |
| 6 | | | 6.0' | | 17" RECOVERY | | |
| | | 4 | 6.0' | 11 11 9 10 | Moist to wet very stiff gray fine sandy silt w/some coarse sand, trace of gravel. | A-4(0) | |
| 8 | | | 8.0' | | 16" RECOVERY | | |
| | | 5 | 8.0' | 4 5 5 5 | Wet loose orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 10 | | | 10.0' | | 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



Poorly graded clayey
silty sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/16/2009 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 re-checked 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.: INF3-2A

Contract: 25-113-01

Boring Location: Sta. 114+00, 98' Lt. C.L.

Boring Surface Elev.: + 66.1

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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 6/15/2009 | | 10.0 | 8.0 | 4.5 | |

Pay Quantities:

| | | | | |
|---------------------------------------|----|-------------|-------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 10 | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------------|
| | 6/15/09 | 1 | 0.5' | 4 4 6 | Moist stiff gray clayey silt w/trace of fine to coarse sand and gravel. | A-4(3) | Topsoil - 4". |
| 2 | | 2 | 2.0' 2.0' | 8 12 16 14 | 14" RECOVERY Moist very stiff brown clayey fine to coarse sandy silt w/trace of gravel. | A-4(0) | |
| 4 | | 3 | 4.0' 4.0' | 5 6 8 8 | 20" RECOVERY Moist medium dense orange fine sand w/some coarse sand and silt, trace of clay. | A-2-4(0) | USDA Classifica - Sandy Loam. |
| 6 | | 4 | 6.0' 6.0' | 5 8 9 6 | 17" RECOVERY Wet medium dense orange coarse to fine sand w/trace of silt, clay and gravel. | A-1-b | |
| 8 | | 5 | 8.0' 8.0' | 5 8 5 6 | 17" RECOVERY Wet medium dense orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 10 | | | 10.0' | | 15" 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



Poorly graded sand
with silt

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/15/2009 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 re-checked 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.: INF3-2B

Contract: 25-113-01

Boring Location: Sta. 118+00, 98' Lt. C.L.

Boring Surface Elev.: + 69.93

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: |
| | | | | | 8.0 |

| | | | | | | | |
|----------------------|--|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | | 6/15/2009 | | 10 | 8.0 | 8.9 | |

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: | | ; | | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|---|-------------|------------------------------------|
| | 6/15/09 | 1 | 0.5' | 3 3 4 | No Sieve Analysis - Indication of moist loose brown clayey sand. | | Topsoil - 5". |
| 2 | | 2 | 2.0' | 4 6 8 10 | 10" RECOVERY Moist medium dense brown clayey fine to coarse sand w/trace of silt and gravel. | A-2-4(0) | USDA Classifica - Sandy Clay Loam. |
| 4 | | 3 | 4.0' | 4 6 5 5 | 16" RECOVERY Moist medium dense orange coarse to fine sand w/some silt, trace of gravel. | A-2-4(0) | |
| 6 | | 4 | 6.0' | 8 6 5 5 | 17" RECOVERY Moist medium dense orange coarse to fine sand w/some silt, trace of gravel. | A-1-b | |
| 8 | | 5 | 8.0' | 1 5 7 8 | 15" RECOVERY Wet medium dense orange coarse to fine sand w/some silt, trace of gravel. | A-1-b | |
| 10 | | | 10.0' | | 15" RECOVERY End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/15/2009 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 re-checked 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.: INF3-3

Contract: 25-113-01

Boring Location: Sta. 120+00, 115' Rt. C.L.

Boring Surface Elev.: + 67.2

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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 6/19/2009 | | 10.0 | 8.0 | 7.0 | |

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.;
 Dia. U-Sample Boring: Ft.
 No. of U-Samples: ;
 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 |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-------------------------------|
| | 6/19/09 | 1 | 0.5' | 3 3 3 | Moist firm brown clayey coarse sandy silt w/some fine sand, trace of gravel. | A-4(1) | Topsoil - 7". |
| 2 | | 2 | 2.0' 2.0' | 10 10 10 10 | 10" RECOVERY Moist medium dense brown fine to coarse sand w/trace of silt, clay and gravel. | A-1-b | USDA Classifica - Loamy Sand. |
| 4 | | 3 | 4.0' 4.0' | 5 10 9 9 | 16" RECOVERY Moist medium dense tan silty fine to coarse sand w/some gravel. | A-2-4(0) | |
| 6 | | 4 | 6.0' 6.0' | 8 8 7 6 | 18" RECOVERY Moist medium dense tan fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 8 | | 5 | 8.0' 8.0' | 5 5 5 5 | 20" RECOVERY Wet medium dense tan silty coarse to fine sand w/trace of gravel. | A-2-4(0) | |
| 10 | | | 10.0' | | 17" RECOVERY End of Boring | | |

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 6/19/2009 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 re-checked 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.: INF3-4

Contract: 25-113-01

Boring Location: Sta. 122+00, 101' Lt. C.L.

Boring Surface Elev.: + 66.2

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 |
| | 7/9/2009 | | 10.0 | | 8.0 | |

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: Jason Truver

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|--------------------------|
| | 7/9/09 | 1 | 0.0' | | Moist brown silty fine to coarse sand. | A-2-4(0) | Hand Auger 7.5 YR 3/4 |
| 2 | | | 2.5' | | 30" RECOVERY | | |
| | | 2 | 2.5' | | Moist brown silt w/some clay and fine sand, trace of coarse sand. | A-4(2) | Hand Auger 10 YR 4/6 |
| 4 | | | 3.5' | | 12" RECOVERY | | |
| | | 3 | 3.5' | | Moist orange coarse to fine sandy silt w/some clay, trace of gravel. | A-4(0) | Hand Auger 7.5 YR 4/4 |
| 6 | | | 5.5' | | 24" RECOVERY | | |
| | | 4 | 5.5' | | Moist brown clayey fine sandy silt w/some gravel and coarse sand. | A-4(1) | Hand Auger 10 YR 5/8 |
| 8 | | | 8.0' | | 30" RECOVERY | | |
| | | 5 | 8.0' | | Moist orange fine sand w/some silt and coarse sand, trace of gravel. | A-2-4(0) | Hand Auger 7.5 YR 5/6 |
| 10 | | | 9.5' | | 18" RECOVERY | | |
| | | 6 | 9.5' | | Wet orange fine to coarse sand w/some silt. | A-2-4(0) | Hand Auger 7.5 YR 5/8 |
| | | | 10.0' | | 6" RECOVERY | | |
| | | | | | End of Boring | | Hand Auger 7.5 YR 5/8 |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Silty low plasticity
clay



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/9/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301, Maryland State Line to S.R. 1

Boring No.: INF3-5

Contract: 28-113-01

Boring Location: Sta. 120+00, Rt. C.L.

Boring Surface Elev.: + 64.3

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 |
| | 6/16/2009 | | 8.5 | | 4.4 | |

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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|---|-------------|-----------------------------|
| | 6/16/09 | 1 | 0.5' | | Moist gray mottled clayey silt w/trace of coarse to fine sand. 18" RECOVERY | A-4(5) | Topsoil - 3". Hand Auger |
| 3 | | 2 | 2.0' | | Moist gray mottled silty fine sandy clay w/some coarse sand, trace of gravel. 18" RECOVERY | A-6(5) | Hand Auger |
| | | 3 | 3.5' | | Wet brown silty fine to coarse sand w/trace of gravel. 12" RECOVERY | A-2-4(0) | Hand Auger |
| 6 | | 4 | 4.5' | | Wet gray coarse to fine sand w/some silt, trace of gravel. 48" RECOVERY | A-1-b | Hand Auger |
| 9 | | 5 | 8.5' | | Wet orange coarse sand and gravel w/some silt and fine sand. 18" RECOVERY | A-1-b | Hand Auger |
| | | | 10.0' | | End of Boring | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

Remarks: Hand Auger

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 6/16/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301, Maryland State Line to S.R. 1

Boring No.: INF3-6

Contract: 28-113-01

Boring Location: Sta. 125+00, Lt. C.L.

Boring Surface Elev.: + 75.5

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 |
| | 7/21/2009 | | 60.0 | | 5.6 | |

| | | | | |
|---------------------------------------|--|-------------|-------------------------------|------------|
| Pay Quantities: | | Ft.; | Dia. U-Sample Boring: | Ft. |
| 2 1/2 in. Dia. Dry Sample Boring: | | ; | | |
| 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: John Foley
Helpers:

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|---|-------------|------------------------------|
| | 7/21/09 | 1 | 0.5' 1.0' | | Moist gray silt w/some gravel, trace of fine to coarse sand. 6" RECOVERY | A-4(0) | Topsoil - 6" |
| | | 2 | 1.0' | | Moist brownish gray silt w/some clay, trace of fine to coarse sand. 12" RECOVERY | A-4(5) | Hand Auger |
| 2 | | 3 | 2.0' 2.0' | | Moist grayish brown coarse to fine sand w/some gravel, trace of silt. 12" RECOVERY | A-1-b | Hand Auger |
| | | 4 | 3.0' | | Moist grayish brown silt w/some fine sand, trace of clay and coarse sand. 12" RECOVERY | A-4(0) | Hand Auger |
| 4 | | 5 | 4.0' 4.0' | | Moist grayish brown coarse to fine sand w/some silt, trace of gravel. 12" RECOVERY | A-2-4(0) | USDA Classifica - Silt Loam. |
| | | 6 | 5.0' | | Moist gray fine to coarse sand w/some silt, trace of gravel. 12" RECOVERY | A-2-4(0) | Hand Auger |
| 6 | | 7 | 6.0' 6.0' | | Wet gray fine sand w/some silt and coarse sand, trace of gravel. 12" RECOVERY | A-2-4(0) | Hand Auger |
| | | 8 | 7.0' 7.0' | | Wet brownish gray coarse to fine sand w/some silt, trace of gravel. 12" RECOVERY | A-2-4(0) | Hand Auger |
| 8 | | 9 | 8.0' 8.0' | | Wet brownish gray fine to coarse sand w/some silt, trace of gravel. 12" RECOVERY | A-2-4(0) | Hand Auger |
| | | 10 | 9.0' 9.0' | | Wet brownish gray fine to coarse sand w/some silt, trace of gravel. 12" RECOVERY | A-2-4(0) | Hand Auger |
| 10 | | | 10.0' | | End of Boring | | |

Remarks: Hand Auger

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/16/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-7

Contract: 28-113-01

Boring Location: Sta. 142+00, 101' Lt. C.L.

Boring Surface Elev.: + 69.19

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:** 14.0'

Water Level Readings

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|----------|------------|---------------|-----------------|----------------|----------------|
| 3/6/2009 | 12:00 p.m. | 12.0' | 10.0' | 10.7' | |

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:

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|---------------|
| | 3/6/09 | 1 | 0.5' | 4 5 6 | Wet stiff gray clayey silt w/trace of fine to coarse sand and gravel. | A-4(6) | Topsoil - 4". |
| | | | 2.0' | | 18" RECOVERY | | |
| 3 | | 2 | 2.0' | 8 10 13 14 | Wet medium dense grayish orange silty coarse to fine sand w/trace of gravel. | A-2-4(0) | |
| | | | 4.0' | | 20" RECOVERY | | |
| | | 3 | 4.0' | 4 5 4 4 | Wet loose gray orangish brown coarse to fine sand w/some silt, trace of gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 22" RECOVERY | | |
| | | 4 | 6.0' | 4 3 3 3 | Wet loose brownish gray coarse to fine sand w/some silt, trace of gravel. | A-1-b | |
| | | | 8.0' | | 21" RECOVERY | | |
| 9 | | 5 | 8.0' | 1 1 2 3 | Wet very loose brown silty fine sand w/trace of coarse sand and gravel. | A-2-4(0) | |
| | | | 10.0' | | 20" RECOVERY | | |
| | | 6 | 10.0' | 1 1 1 2 | Saturated very loose brown silty fine sand w/trace of coarse sand. | A-2-4(0) | |
| 12 | | | 12.0' | | 22" RECOVERY | | |
| | | 7 | 12.0' | 1 2 4 4 | Saturated loose brown silty fine sand w/trace of gravel and coarse sand. | A-2-4(0) | |
| | | | 14.0' | | 20" RECOVERY | | |
| 15 | | 8 | 14.0' | 5 7 9 11 | Saturated medium dense brown coarse to fine sand and gravel w/trace of silt. | A-1-b | |
| | | | 16.0' | | 21" 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



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/6/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-8

Contract: 28-113-01

Boring Location: Sta. 152+00, 101' Lt. C.L.

Boring Surface Elev.: + 70.44

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:** 14.0'

Water Level Readings

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|----------|-----------|---------------|-----------------|----------------|----------------|
| 3/6/2009 | 1:00 p.m. | 12.0' | 10.0' | 10.5' | |

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: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---------------|
| | 3/6/09 | 1 | 0.5' | 2 4 5 | Wet stiff grayish orange clayey silt w/trace of fine to coarse sand. | A-6(15) | Topsoil - 4". |
| | | | 2.0' | | 16" RECOVERY | | |
| 3 | | 2 | 2.0' | 5 9 9 11 | Wet very stiff grayish orange clayey silt w/some fine to coarse sand, trace of gravel. | A-4(5) | |
| | | | 4.0' | | 20" RECOVERY | | |
| | | 3 | 4.0' | 8 9 11 12 | Wet medium dense brown silty fine to coarse sand w/trace of gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 20" RECOVERY | | |
| | | 4 | 6.0' | 16 16 10 9 | Wet medium dense brown fine to coarse sand and gravel w/some silt. | A-1-b | |
| | | | 8.0' | | 21" RECOVERY | | |
| 9 | | 5 | 8.0' | 3 4 5 5 | Wet loose brown silty fine sand w/trace of coarse sand. | A-2-4(0) | |
| | | | 10.0' | | 17" RECOVERY | | |
| | | 6 | 10.0' | 4 5 6 7 | Wet medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 12 | | | 12.0' | | 22" RECOVERY | | |
| | | 7 | 12.0' | 6 6 8 10 | Wet medium dense brown coarse to fine sand w/some gravel, trace of silt. | A-1-b | |
| | | | 14.0' | | 22" RECOVERY | | |
| 15 | | 8 | 14.0' | 5 11 10 10 | Wet medium dense brown fine to coarse sand w/some gravel and silt. | A-1-b | |
| | | | 16.0' | | 21" 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

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/6/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-9

Contract: 28-113-01

Boring Location: Sta. 161+50, 101' Lt. C.L.

Boring Surface Elev.: + 76.30

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:** 14.0'

Water Level Readings

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|----------|-----------|---------------|-----------------|----------------|----------------|
| 3/6/2009 | 2:00 p.m. | 14.0' | 12.0' | 12.5' | |

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: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|---|-------------|---------------|
| | 3/6/09 | 1 | 0.5' | 4 3 4 | Wet firm brown clayey silt w/some fine sand, trace of coarse sand and gravel. 16" RECOVERY | A-6(8) | Topsoil - 4". |
| 3 | | 2 | 2.0' | 6 8 9 | Wet very stiff brownish black fine sandy silt w/trace of coarse sand and gravel. 22" RECOVERY | A-4(0) | |
| | | 3 | 4.0' | 3 6 4 6 | Wet stiff brownish black fine sandy silt w/trace of coarse sand. 20" RECOVERY | A-4(0) | |
| 6 | | 4 | 6.0' | 5 5 7 7 | Wet medium dense brownish black silty fine sand w/some coarse sand. 19" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 3 4 5 6 | Wet loose brown coarse to fine sand w/some silt, trace of gravel. 19" RECOVERY | A-2-4(0) | |
| | | 6 | 10.0' | 5 8 6 8 | Wet medium dense brown coarse to fine sand w/some silt, trace of gravel. 20" RECOVERY | A-1-b | |
| 12 | | 7 | 12.0' | 3 5 7 9 | Wet medium dense brown coarse sand and gravel w/some fine sand, trace of silt. 16" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 6 7 9 7 | Wet medium dense brown coarse sand and gravel w/some fine sand, trace of silt. 21" 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



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 3/6/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-10

Contract: 28-113-01

Boring Location: Sta. 168+75, 72' Lt. C.L.

Boring Surface Elev.: + 71.50

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: | 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 |
| | 3/6/2009 | 3:00 p.m. | 10.0' | 8.0' | 9.5' | |

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: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|---------------|
| | 3/6/09 | 1 | 0.5' | 3 3 4 | Moist stiff grayish orange clay w/trace of fine to coarse sand. 14" RECOVERY | A-6(16) | Topsoil - 4". |
| 3 | | 2 | 2.0' | 7 8 11 12 | Moist very stiff grayish orange fine sandy silt w/some coarse sand and clay, trace of gravel. 21" RECOVERY | A-4(0) | |
| | | 3 | 4.0' | 10 9 11 13 | Moist medium dense brown coarse to fine sand w/some gravel and silt. 19" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 5 5 7 7 | Wet medium dense brownish black silty fine sand w/trace of coarse sand and gravel. 20" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 3 8 5 5 | Wet medium dense brownish black fine sand w/some coarse sand and silt. 19" RECOVERY | A-2-4(0) | |
| 9 | | 6 | 10.0' | 4 7 9 10 | Wet medium dense brownish black fine sandy silt w/trace of coarse sand and gravel. 20" RECOVERY | A-2-4(0) | |
| | | 7 | 12.0' | 4 5 7 12 | Wet medium dense brownish black fine to coarse sand w/some gravel and silt. 20" RECOVERY | A-2-4(0) | |
| 12 | | 8 | 14.0' | 4 5 7 10 | Wet medium dense brownish black fine to coarse sand and gravel w/some silt. 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



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/6/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-11

Contract: 28-113-01

Boring Location: Sta. 176+50, 107' Lt. C.L.

Boring Surface Elev.: + 71.38

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 |
| | 3/6/2009 | 4:00 p.m. | 12.0' | 10.0' | 11.1' | |

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: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------|
| | 3/6/09 | 1 | 0.5' | 4 10 11 | Moist very stiff gray clayey silt w/some fine sand, trace of coarse sand and gravel. 17" RECOVERY | A-4(5) | Topsoil - 4". |
| 3 | | 2 | 2.0' | 11 9 9 9 | Moist very stiff grayish brown silt w/some clay and fine sand, trace of coarse sand and gravel. 21" RECOVERY | A-4(2) | |
| | | 3 | 4.0' | 5 14 15 16 | Moist medium dense brown coarse sand and gravel w/some fine sand and silt. 22" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 14 13 13 11 | Moist medium dense brownish black coarse sand w/some fine sand, gravel and silt. 20" RECOVERY | A-1-b | |
| | | 5 | 8.0' | 4 5 4 5 | Wet loose brownish black silty fine sand w/trace of coarse sand. 22" RECOVERY | A-2-4(0) | |
| 9 | | 6 | 10.0' | 4 4 3 7 | Wet loose brownish black silty fine sand w/trace of coarse sand. 22" RECOVERY | A-2-4(0) | |
| | | 7 | 12.0' | 8 11 12 9 | Wet medium dense brown gravel and coarse sand w/some fine sand, trace of silt. 20" RECOVERY | A-1-b | |
| 12 | | 8 | 14.0' | 8 9 11 8 | Wet medium dense brown gravel and coarse to fine sand w/trace of silt. 21" 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 sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/6/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: INF3-12

Contract: 28-113-01

Boring Location: Sta. 155+00, Lt. C.L.

Boring Surface Elev.: + 71.8

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 |
| | 6/25/2009 | | 9.5 | | 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: | |
| 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 |
|-------------|----------------|-----|--------------|----------|--|-------------|---------------|
| | 6/25/09 | 1 | 0.5' | | Moist brown clayey fine sandy silt w/some coarse sand. | A-4(1) | Topsoil - 6". |
| | | | 2.0' | | 18" RECOVERY | | Hand Auger |
| 3 | | 2 | 2.0' | | Moist tan coarse sand and gravel w/some silt, trace of fine sand. | A-1-b | Hand Auger |
| | | | 8.0' | | 72" RECOVERY | | |
| | | 3 | 8.0' | | Moist orange coarse sand w/some fine sand and gravel, trace of silt. | A-1-b | Hand Auger |
| 9 | | | 9.5' | | 18" RECOVERY | | |
| | | | | | End of Boring | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

Remarks: Hand Auger

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/25/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301, Maryland State Line to S.R. 1

Boring No.: INF3-13

Contract: 28-113-01

Boring Location: Sta. 160+00, Lt. C.L.

Boring Surface Elev.: + 64.30

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: | 2.0 | 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: 8.0' |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/29/2009 | | 10.0 | | 8.5 | |

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 |
|-------------|----------------|-----|--------------|----------------------|--|-------------|------------------------------------|
| | 7/29/09 | 1 | 1.0' | 11 9 | Moist very stiff brown clay w/trace of fine to coarse sand and gravel. | A-6(9) | Cultivated Soil - |
| | | | 2.0' | | 5" RECOVERY | | 10" |
| 3 | | 2 | 2.0' | 13 17 21 15 | Moist hard brown clayey fine sandy silt w/trace of coarse sand and gravel. | A-4(1) | 10 YR 5/ 8 |
| | | | 4.0' | | 16" RECOVERY | | 10 YR 5/ 8 |
| | | 3 | 4.0' | 9 18 27 2 | Moist dense brown fine sand and gravel w/some coarse sand and silt, trace of clay. | A-2-4(0) | 8 USDA Classifica - Sandy |
| 6 | | | 6.0' | | 20" RECOVERY | | Loam. 7.5 YR 5/ 8 |
| | | 4 | 6.0' | 16 18 19 17 | Moist dense brown gravel and coarse to fine sand w/some silt. | A-1-b | 7.5 YR 5/ 8 |
| | | | 8.0' | | 22" RECOVERY | | 7.5 YR 5/ 8 |
| 9 | | 5 | 8.0' | 5 5 5 6 | Wet medium dense brown coarse to fine sand w/some gravel, trace of silt. | A-1-b | 8 10 YR 5/ 6 |
| | | | 10.0' | | 16" RECOVERY | | |
| | | | | | End of Boring | | |
| 12 | | | | | | | |
| | | | | | | | |
| 15 | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

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 borings were drilled on 7/29/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: INF3-14

Contract: 28-113-01

Boring Location: Sta. 165+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 Barrel | | O.D. | O.D. of Sampler: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 6/30/2009 | | 10.0 | 8.0 | Dry | |

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: Jason Truver
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------------|
| | 6/30/09 | 1 | 0.5' | 2 2 2 | Moist soft brown clayey silt w/trace of fine to coarse sand. | A-4(5) | Topsoil - 4". |
| | | | 2.0' | | 9" RECOVERY | | USDA |
| 3 | | 2 | 2.0' | 4 3 | Moist firm brown clayey silt w/trace of fine to coarse sand and gravel. | A-4(6) | Classifica |
| | | | 3.0' | | 8" RECOVERY | | - Silt |
| | | 2A | 3.0' | 5 7 | Moist loose brown silty fine to coarse sand w/trace of gravel. | A-2-4(0) | Loam. |
| | | | 4.0' | | 6" RECOVERY | | 10 YR |
| | | 3 | 4.0' | 5 13 17 25 | Moist medium dense brown gravel and coarse sand w/some silt and fine sand. | A-1-b | 4.5/6 |
| | | | 6.0' | | 14" RECOVERY | | 10 YR 5/8 |
| 6 | | 4 | 6.0' | 7 29 20 8 | Moist dense brown gravel and coarse sand w/some fine sand, trace of silt. | A-1-a | 10 YR 4.5/6 |
| | | | 8.0' | | 13" RECOVERY | | 2.5 YR 4/3 |
| | | 5 | 8.0' | 39 23 14 11 | Moist dense brown coarse sand and gravel w/trace of silt and fine sand. | A-1-b | 10 YR 5/6 |
| 9 | | | 10.0' | | 15" RECOVERY | | |
| | | | | | End of Boring | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

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



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/30/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-15

Contract: 28-113-01

Boring Location: Sta. 180+00, Rt. C.L.

Boring Surface Elev.: + 65.5

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: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 6/30/2009 | | 10.0 | 8.0 | Dry | |

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: Jason Truver
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|---|-------------|-------------------------------------|
| | 6/30/09 | 1 | 0.5' | 3 3 3 | Moist firm brown clayey silt w/some fine to coarse sand, trace of gravel. 10" RECOVERY | A-4(5) | Cultivated Soil - 7". 7.5 YR 4/6 |
| 3 | | 2 | 2.0' | 5 7 7 5 | Moist medium dense brown coarse to fine sand w/some silt and gravel, trace of clay. 18" RECOVERY | A-1-b | 6 USDA Classifica - Sandy |
| | | 3 | 4.0' | 5 5 6 8 | Moist medium dense brown coarse to fine sand w/some silt, trace of gravel. 15" RECOVERY | A-1-b | Loam. 5 YR 5.5/ 8 |
| 6 | | 4 | 6.0' | 11 8 9 10 | Moist medium dense brown fine to coarse sand and gravel w/some silt. 15" RECOVERY | A-1-b | 10 YR 6/ 8 |
| | | 5 | 8.0' | 9 7 6 4 | Moist medium dense brown coarse sand and gravel w/some fine sand, trace of silt. 16" RECOVERY | A-1-b | 5 YR 4/3 |
| | | | 10.0' | | End of Boring | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

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 borings were drilled on 6/30/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-16

Contract: 28-113-01

Boring Location: Sta. 185+00, Rt. 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: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/1/2009 | | 10.0 | 8.0 | Dry | |

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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|------------------------|
| 3 | 7/1/09 | 1 | 1.0' | 5 4 | Moist stiff brown clayey silt w/trace of fine to coarse sand. 9" RECOVERY | A-4(8) | Cultivated Soil - 10". |
| | | 2 | 2.0' | 3 5 7 12 | Moist medium dense brown gravel and fine sand w/some clay and coarse sand. 9" RECOVERY | A-1-b | USDA Classifica - Silt |
| | | 3 | 4.0' | 5 12 18 16 | Moist medium dense orange coarse to fine sand w/some silt and gravel. 10" RECOVERY | A-1-b | Loam. 7.5 YR 4/4 |
| 6 | | 4 | 6.0' | 13 10 11 12 | Moist medium dense orange silty fine to coarse sand w/trace of gravel. 20" RECOVERY | A-2-4(0) | 10 YR 5/8 |
| | | 5 | 8.0' | 4 5 8 7 | Moist medium dense brown fine to coarse sand and gravel w/some silt. 13" RECOVERY | A-1-b | 7.5 YR 5/8 |
| 9 | | | 10.0' | | End of Boring | | 10 YR 6/8 4.5/6 |
| 12 | | | | | | | |
| 15 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

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 7/1/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-17

Contract: 28-113-01

Boring Location: Sta. 186+00, Lt. C.L.

Boring Surface Elev.: + 72.0

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 |
| | 6/25/2009 | | 10.0 | | 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: Dave Burt
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|---|
| 2 | 6/25/09 | 1 | 1.0' | | Moist brown clayey silt w/some fine sand, trace of coarse sand and gravel. | A-4(2) | Topsoil - 8". USDA Classifica- - Silt Loam. |
| 4 | | 2 | 3.0' 3.0' | | 24" RECOVERY Moist orange clayey fine sandy silt w/some coarse sand, trace of gravel. | A-4(0) | Hand Auger Hand Auger |
| 6 | | 3 | 5.0' 5.0' | | 24" RECOVERY Moist orange silty coarse to fine sand w/trace of gravel. | A-1-b | Hand Auger |
| 8 | | 4 | 8.0' 8.0' | | 36" RECOVERY Wet orangish white silty fine sand w/trace of coarse sand. | A-2-4(0) | Hand Auger |
| 10 | | | 10.0' | | 24" RECOVERY End of Boring | | |
| 12 | | | | | | | |

Remarks: Hand Auger

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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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/25/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the log3.

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

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

Boring No.: INF3-18

Contract: 28-113-01

Boring Location: Sta. 190+00, Rt. C.L.

Boring Surface Elev.: + 65.7

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: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/1/2009 | | 10.0 | 8.0 | Dry | |

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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|---|-------------|---|
| | 7/1/09 | 1 | 0.5' | 4 3 4 | Moist firm brown clay w/trace of fine to coarse sand. | A-6(10) | Cultivated Soil - 8". 10 YR 5/ 8 |
| 2 | | 2 | 2.0' 2.0' | 3 4 9 10 | 11" RECOVERY Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of gravel. | A-4(4) | USDA Classifica - Loam. 10 YR 4/ 6 |
| 4 | | 3 | 4.0' 4.0' | 5 7 | 13" RECOVERY Moist medium dense dark brown coarse sand w/some silt and fine sand, trace of gravel. | A-1-b | 2.5 YR 3/ 3 |
| 6 | | 3A | 5.0' 5.0' | 8 9 | 11" RECOVERY Moist medium dense orange coarse sand w/some fine sand and silt, trace of gravel. | A-1-b | 10 YR 5/ 6 |
| 8 | | 4 | 6.0' 6.0' | 8 7 6 5 | 10" RECOVERY Moist medium dense orange coarse to fine sand w/some silt, trace of gravel. | A-1-b | 10 YR 4/ 6 |
| 10 | | 5 | 8.0' 8.0' | 7 5 6 6 | 16" RECOVERY Moist medium dense orange silty fine to coarse sand w/trace of gravel. | A-2-4(0) | 7.5 YR 5/ 8 |
| | | | 10.0' | | 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 sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/1/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-19

Contract: 28-113-01

Boring Location: Sta. 191+00, Lt. C.L.

Boring Surface Elev.: + 62.7

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: 2.0 | | 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 | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 6/30/2009 | | 0.0 | 8.0 | 7.0 | |

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: | | | 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 |
|-------------|----------------|-----|--------------|----------------------|--|-------------|--|
| | 6/30/09 | 1 | 0.5' | 3 3 3 | Moist firm brown clayey fine sandy silt w/some coarse sand, trace of gravel. | A-4(3) | Topsoil - 5". 7.5 YR 5/6 |
| 2 | | 2 | 2.0' | 13 17 19 28 | 10" RECOVERY Moist dense brown gravel and coarse to fine sand w/trace of silt and clay. | A-1-b | USDA Classifica - Sand. 10 YR 6.5/6 |
| 4 | | 3 | 4.0' | 11 8 9 14 | 15" RECOVERY Moist medium dense brown clayey gravel and coarse to fine sand. | A-1-b | 10 YR 5/6 |
| 6 | | 4 | 6.0' | 13 14 14 16 | 14" RECOVERY Wet medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 7.5 YR 6/8 |
| 8 | | 5 | 8.0' | 9 14 14 11 | 19" RECOVERY Wet medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 5 YR 4.5/6 |
| 10 | | | 10.0' | | 16" 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 sand
with silt



Poorly graded clayey
silty sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/30/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-20

Contract: 28-113-01

Boring Location: Sta. 195+00, Rt. C.L.

Boring Surface Elev.: + 69.0

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: 2.0
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: **To:**
From Depth of: 0.0' **To:** 8.0'

Water Level Readings

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|-----------|------|---------------|-----------------|----------------|----------------|
| 6/30/2009 | | 10.0 | 8.0 | Dry | |

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: Jason Truver

Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---|
| | 6/30/09 | 1 | 0.5' | 3 2 3 | Moist firm brown clayey silt w/trace of fine to coarse sand and gravel. | A-4(8) | Cultivated Soil - 7". 7.5 YR 4/6 |
| 2 | | 2 | 2.0' 2.0' | 6 7 7 | 12" RECOVERY Moist stiff brown fine sandy clay w/some coarse sand, trace of gravel. | A-6(2) | 10 YR 5/6 |
| 4 | | 3 | 4.0' 4.0' | 3 4 14 17 | 16" RECOVERY Moist medium dense orange gravel and coarse to fine sand w/trace of silt and clay. | A-1-b | USDA Classifica- - Loamy Sand. 5 YR 6/8 |
| 6 | | 4 | 6.0' 6.0' | 8 8 8 9 | 9" RECOVERY Moist medium dense brown coarse to fine sand w/some silt, trace of gravel. | A-1-b | 7.5 YR 5/8 |
| 8 | | 5 | 8.0' 8.0' | 9 22 19 19 | 17" RECOVERY Moist dense brown gravel and coarse to fine sand w/some silt. | A-1-b | 7.5 YR 5/8 |
| 10 | | | 10.0' | | 15" RECOVERY End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Clayey sand



Poorly graded sand
with silt



Silty sand

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Notes:

1. Exploratory borings were drilled on 6/30/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-21

Contract: 28-113-01

Boring Location: Sta. 196+00, Lt. C.L.

Boring Surface Elev.: + 70.6

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 |
| | 8/4/2009 | | 10.0 | | Dry | |

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

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers:

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------------------------------|
| | 8/4/09 | 1 | 0.0' | 3 5 6 10 | Moist stiff brown clayey silt w/some fine sand, trace of coarse sand. | A-4(3) | USDA Classifica - Silt Loam. |
| 2 | | 2 | 2.0' 2.0' | 7 8 8 7 | 10" RECOVERY Moist very stiff orange clayey fine sandy silt w/some coarse sand, trace of gravel. | A-4(0) | |
| 4 | | 3 | 4.0' 4.0' | 5 4 6 14 | 14" RECOVERY Moist stiff orange clayey fine sandy silt w/trace of gravel. | A-4(0) | |
| 6 | | 4 | 6.0' 6.0' | 22 17 13 15 | 18" RECOVERY Moist medium dense orange coarse to fine sand w/some gravel and silt. | A-1-b | |
| 8 | | 5 | 8.0' 8.0' | 8 7 6 7 | 19" RECOVERY Moist medium dense orange silty fine to coarse sand w/some gravel. | A-2-4(0) | |
| 10 | | | 10.0' | | 16" RECOVERY End of Boring | | |

Remarks: Hand Auger

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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Notes:

1. Exploratory borings were drilled on 8/4/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-22

Contract: 28-113-01

Boring Location: Sta. 201+00, Lt. C.L.

Boring Surface Elev.: + 71.07

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 |
| | | | 10.0 | | 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: Dave Burt
Helpers: J. Ilfferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|--------------------------|
| 2 | 6/25/09 | 1 | 0.5' | | Moist brown clayey silt w/trace of fine to coarse sand. | A-4(3) | Topsoil - 6". Hand Auger |
| 4 | | 2 | 4.0' | | 42" RECOVERY | | |
| | | | 4.0' | | Moist brown clayey silt w/some fine sand, trace of coarse sand and gravel. | A-4(7) | Hand Auger |
| | | | 5.0' | | 12" RECOVERY | | |
| 6 | | 3 | 5.0' | | Moist brown coarse to fine sand w/some silt, trace of gravel. | A-1-b | Hand Auger |
| 8 | | | 8.0' | | 36" RECOVERY | | |
| | | 4 | 8.0' | | Moist brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | Hand Auger |
| 10 | | | 10.0' | | 24" RECOVERY | | |
| | | | | | End of Boring | | |

Remarks: Hand Auger

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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Notes:

1. Exploratory borings were drilled on 6/25/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the log3.

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

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

Boring No.: INF3-23

Contract: 28-113-01

Boring Location: Sta. 205+00, Rt. C.L.

Boring Surface Elev.: + 63.6

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: | 2.0 | 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: |
| | | | | | 8.0' |

| | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date | Time | | | | |
| 7/1/2009 | | 10.0 | 8.0 | Dry | |

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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|----------------------------------|
| | 7/1/09 | 1 | 0.5' | 6 5 7 | Moist stiff brown clayey gravelly silt w/some coarse to fine sand. | A-4(2) | Topsoil - 5". USDA Classifica |
| 2 | | 2 | 2.0' | 4 5 | 14" RECOVERY Moist stiff brown clayey silt w/some fine sand, trace of coarse sand and gravel. | A-4(3) | - Loam. 10 YR 5/ 6 |
| | | 2A | 3.0' | 8 10 | 10" RECOVERY Moist medium dense brown silty fine to coarse sand w/some gravel. | A-2-4(0) | 10 YR 5/ 6 |
| 4 | | 3 | 4.0' | 8 10 14 16 | 7" RECOVERY Moist medium dense orange silty fine to coarse sand w/trace of gravel. | A-2-4(0) | 7.5 YR 4.5/6 10 YR 6/ 8 |
| | | 4 | 6.0' | 10 9 7 7 | 18" RECOVERY Moist medium dense orange coarse to fine sand w/some silt, trace of gravel. | A-1-b | 7.5 YR 5.5/8 |
| 8 | | 5 | 8.0' | 6 5 5 8 | 19" RECOVERY Moist loose orange coarse to fine sand w/some silt and gravel. | A-1-b | 7.5 YR 5/ 8 |
| 10 | | | 10.0' | | 16" RECOVERY End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty low plasticity
clay



Silty sand

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Notes:

1. Exploratory borings were drilled on 7/1/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-24

Contract: 28-113-01

Boring Location: Sta. 206+00, Lt. C.L.

Boring Surface Elev.: + 65.6

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: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/24/2009 | | 10.0 | 8.0 | Dry | |

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: Cecil Velazco
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---|
| | 7/24/09 | 1 | 0.5' | 6 8 8 | Moist very stiff brown fine to coarse sandy silt w/some clay, trace of gravel. | A-4(0) | Topsoil - 5". 7.5 YR 5/4 |
| 2 | | 2 | 2.0' 2.0' | 6 6 6 | 16" RECOVERY Moist medium dense brown silty fine to coarse sand w/trace of gravel. | A-2-4(0) | 7.5 YR 4/4 |
| 4 | | 3 | 4.0' 4.0' | 11 16 12 12 | 20" RECOVERY Moist medium dense brown coarse to fine sand w/some silt, trace of gravel and clay. | A-2-4(0) | USDA Classifica - Loamy Sand. 10 YR 4/6 |
| 6 | | 4 | 6.0' 6.0' | 6 9 8 7 | 20" RECOVERY Moist medium dense tanish orange silty coarse to fine sand w/trace of gravel. | A-1-b | 10 YR 6/3 |
| 8 | | 5 | 8.0' 8.0' | 6 7 6 8 | 19" RECOVERY Moist medium dense brown coarse to fine sand w/some silt and gravel. | A-1-b | 10 YR 5/4 |
| 10 | | | 10.0' | | 20" RECOVERY End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

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 borings were drilled on 7/24/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: INF3-25

Contract: 28-113-01

Boring Location: Sta. 210+00, Rt. C.L.

Boring Surface Elev.: + 64.30

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: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/23/2009 | | 10.0 | 8.0 | Dry | |

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: Cecil Velazco
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|--|-------------|--|
| | 7/24/09 | 1 | 0.5' | 9 9 | Moist very stiff brown fine to coarse sandy silt w/some clay, trace of gravel. | A-4(0) | Topsoil - 7". 7.5 YR 5/6 |
| 2 | | 2 | 2.0' 2.0' | 8 8 11 9 | 14" RECOVERY Moist very stiff brown fine sandy silt w/some coarse sand, trace of gravel. | A-4(0) | 10 YR 5/6 |
| 4 | | 3 | 4.0' 4.0' | 5 8 14 9 | 16" RECOVERY Moist medium dense brown silty fine to coarse sand w/trace of clay and gravel. | A-2-4(0) | USDA Classifica- - Sandy Loam. 10 YR 5/6 |
| 6 | | 4 | 6.0' 6.0' | 8 6 8 6 | 18" RECOVERY Moist medium dense brown coarse to fine sand w/some silt and gravel. | A-1-b | 10 YR 6/8 |
| 8 | | 5 | 8.0' 8.0' | 5 6 5 5 | 21" RECOVERY Moist medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 10 YR 6/8 |
| 10 | | | 10.0' | | 20" RECOVERY End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/23/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-28

Contract: 28-113-01

Boring Location: Sta. 216+00, Lt. C.L.

Boring Surface Elev.: + 65.30

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: | 2.0 | 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: |
| | | | | | 8.0' |

| | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date | Time | | | | |
| 7/24/2009 | | 10.0 | 8.0 | Dry | |

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: Cecil Velazco
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---|
| | 7/24/09 | 1 | 0.5' | 7 7 8 | Moist stiff brown clayey fine and silt w/some coarse sand, trace of gravel. | A-4(0) | Topsoil - 5". 2.5 YR 6/4 |
| 2 | | 2 | 2.0' | 8 8 11 14 | 16" RECOVERY Moist very stiff brown fine sandy silt w/some coarse sand, trace of gravel. | A-4(0) | 10 YR 5/6 |
| 4 | | 3 | 4.0' | 9 11 12 12 | 20" RECOVERY Moist medium dense tan silty coarse to fine sand w/trace of gravel. | A-1-b | 10 YR 7/6 |
| 6 | | 4 | 6.0' | 7 11 8 7 | 21" RECOVERY Moist medium dense orange coarse to fine sand w/some silt, trace of clay and gravel. | A-2-4(0) | USDA Classifica- - Sandy Loam. 7.5 YR 5/8 |
| 8 | | 5 | 8.0' | 6 5 8 8 | 22" RECOVERY Moist medium dense orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 7.5 YR 5/8 |
| 10 | | | 10.0' | | 21" RECOVERY End of Boring | | |

Remarks:

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

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 7/24/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-29

Contract: 28-113-01

Boring Location: Sta. 221+00, Lt. C.L.

Boring Surface Elev.: + 58.30

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: 2.0 | | 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 | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/24/2009 | | 10.0 | 8.0 | Dry | |

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: | | | Core Drilling in Rock: | Ft. |

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

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-------------------------------------|
| | 7/24/09 | 1 | 0.5' | 10 12 17 | Moist very stiff brown silty fine to coarse sandy clay. | A-6(3) | Topsoil - 7". USDA Classifica |
| 2 | | 2 | 2.0' | 13 12 10 12 | 6" RECOVERY Moist medium dense brown silty fine to coarse sand w/trace of gravel. | A-2-4(0) | - Sandy Loam. 7.5 YR 6/ 8 |
| 4 | | 3 | 4.0' | 9 9 66 | 16" RECOVERY Moist medium dense brown coarse to fine sand w/some silt, trace of gravel. | A-2-4(0) | 7.5 YR 5/ 8 |
| 6 | | 4 | 6.0' | 3 7 9 10 | 15" RECOVERY Moist medium dense brown silty fine to coarse sand w/trace of gravel. | A-2-4(0) | 10 YR 6/ 8 |
| 8 | | 5 | 8.0' | 6 8 6 5 | 17" RECOVERY Moist medium dense brown fine to coarse sand w/some silt. | A-2-4(0) | 10 YR 6/ 8 |
| 10 | | | 10.0' | | 16" 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

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/24/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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 7/24/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-31

Contract: 28-113-01

Boring Location: Sta. 226+00, Lt. C.L.

Boring Surface Elev.: + 59.1

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: | 2.0 | 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 | | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | | 7/24/2009 | | 10.0 | 8.0 | 8.2 | |

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

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

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|--|-------------|--------------------------------------|
| | 7/24/09 | 1 | 0.5' | 12 14 16 | Moist very stiff brown clayey fine sandy silt w/some coarse sand, trace of gravel. | A-4(2) | Topsoil - 8". USDA Classification |
| 2 | | 2 | 2.0' | 12 12 8 8 | 7" RECOVERY Moist very stiff brown fine sandy silt w/trace of coarse sand. | A-4(0) | - Loam. 10 YR 6/6 7.5 YR 6/8 |
| 4 | | 3 | 4.0' | 5 7 6 5 | 17" RECOVERY Moist stiff brown fine sandy silt w/trace of coarse sand. | A-4(0) | 10 YR 6/8 |
| 6 | | 4 | 6.0' | 4 4 4 4 | 18" RECOVERY Wet loose brown silty fine sand w/trace of coarse sand. | A-2-4(0) | 10 YR 6/8 |
| 8 | | 5 | 8.0' | 1 3 3 3 | 19" RECOVERY Wet loose brown silty fine sand w/trace of coarse sand and gravel. | A-2-4(0) | 10 YR 6/8 |
| 10 | | | 10.0' | | 16" 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 7/24/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-32

Contract: 28-113-01

Boring Location: Sta. 231+00, Lt. C.L.

Boring Surface Elev.: + 71.23

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 |
| | 7/24/2009 | | 10.0 | | 7.9 | |

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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|---|-------------|--|
| | 7/24/09 | 1 | 0.5' | | Moist brown silt w/some clay and fine to coarse sand, trace of gravel. | A-4(1) | Forrest Duff - 3". USDA Classifica |
| 2 | | 2 | 2.0' | | 18" RECOVERY Moist brown fine to coarse sandy silt w/some clay, trace of gravel. | A-4(0) | - Silt Loam. 2.5 YR 6/ 6 Hand Auger |
| 4 | | 3 | 3.5' | | 18" RECOVERY Moist brown coarse sand w/some fine sand, silt and gravel. | A-1-b | 10 YR 5/ 8 Hand Auger |
| 6 | | 4 | 5.0' | | 18" RECOVERY Moist brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 10 YR 5/ 8 Hand Auger |
| 8 | | 5 | 7.0' | | 24" RECOVERY Moist to wet tan fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 7.5 YR 6/ 8 Hand Auger |
| 10 | | | 10.0' | | 36" RECOVERY End of Boring | | 2.5 YR 6/ 4 Hand Auger |

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 7/24/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the log3.

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

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

Boring No.: INF3-33

Contract: 28-113-01

Boring Location: Sta. 236+00, Lt. C.L.

Boring Surface Elev.: + 72.38

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: 2.0 | | 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: 8.0' | |

| | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date 7/20/2009 | Time | 10.0 | 8.0 | 8.8 | |

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: | | | 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 |
|-------------|----------------|-----|--------------|---------------------|---|-------------|---|
| | 7/20/09 | 1 | 0.5' | 7 9 9 | Moist very stiff gray silt w/some clay, trace of fine to coarse sand. | A-4(0) | Topsoil - 4". |
| 2 | | | 2.0' | | 14" RECOVERY | | USDA |
| | | 2 | 2.0' | 6 12 14 21 | Moist very stiff gray fine sandy silt w/trace of coarse sand and clay. | A-4(0) | Classifica - Silt Loam. 2.5 YR 5/ 2 2.5 YR 6/ 2 |
| 4 | | | 4.0' | | 21" RECOVERY | | |
| | | 3 | 4.0' | 4 6 7 7 | Moist medium dense orange mottled silty fine to coarse sand. | A-2-4(0) | 10 YR 6/ 8 |
| 6 | | | 6.0' | | 17" RECOVERY | | |
| | | 4 | 6.0' | 4 5 7 8 | Wet medium dense orange mottled silty fine sand w/trace of coarse sand. | A-2-4(0) | 10 YR 6/ 8 |
| 8 | | | 8.0' | | 18" RECOVERY | | |
| | | 5 | 8.0' | 2 6 7 7 | Wet medium dense brown silty fine to coarse sand. | A-2-4(0) | 10 YR 6.5/6 |
| 10 | | | 10.0' | | 16" RECOVERY | | |
| | | | | | End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/20/2009 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 re-checked 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.: INF3-34

Contract: 28-113-01

Boring Location: Sta. 236+00, 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: | 2.0 | 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: 8.0' |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/17/2009 | | 10.0 | 8.0 | 8.6 | |

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: Cecil Velazco
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---|
| | 7/17/09 | 1 | 0.0' | 10 10 10 9 | Moist very stiff orange clayey fine sandy silt w/some coarse sand, trace of gravel. | A-4(2) | Topsoil - 2". 7.5 YR 7/6 |
| 2 | | 2 | 2.0' 2.0' | 4 6 | 19" RECOVERY Moist stiff orange fine sandy silt w/trace of clay and coarse sand. | A-4(0) | USDA Classification - Sandy Loam. 7.5 YR 5/8 |
| 4 | | 3 | 4.0' 4.0' | 6 8 9 9 | 16" RECOVERY Moist medium dense orange coarse to fine sand and gravel w/some silt. | A-1-b | 7.5 YR 6/6 |
| 6 | | 4 | 6.0' 6.0' | 6 8 7 6 | 18" RECOVERY Moist medium dense orange coarse sand w/some fine sand, silt and gravel. | A-1-b | 10 YR 5/8 |
| 8 | | 5 | 8.0' 8.0' | 2 4 7 7 | 20" RECOVERY Wet medium dense brown coarse to fine sand and gravel w/some silt. | A-1-b | 10 YR 4/6 |
| 10 | | | 10.0' | | 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

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/17/2009 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 re-checked 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.: INF3-35

Contract: 28-113-01

Boring Location: Sta. 241+00, Rt. C.L.

Boring Surface Elev.: + 70.70

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 |
| | 7/21/2009 | | 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: John Foley
Helpers:

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|-----------------------|
| | 7/21/09 | 1 | 0.9' | | Moist brown silt w/some clay, trace of fine to coarse sand. | A-4(4) | Topsoil - 10.8". USDA |
| 2 | | | 2.0' | | 13.2" RECOVERY | | |
| | | 2 | 2.0' | | Moist light grayish brown clayey silt w/some fine to coarse sand, trace of gravel. | A-4(4) | Classifica - Silt |
| | | | 3.0' | | 12" RECOVERY | | Loam. |
| | | 3 | 3.0' | | Moist light grayish brown silt w/some fine to coarse sand and clay, trace of gravel. | A-4(1) | Hand Auger |
| 4 | | | 4.0' | | 12" RECOVERY | | Hand Auger |
| | | 4 | 4.0' | | Moist orangish brown gravelly silt w/trace of coarse to fine sand. | A-4(0) | Hand Auger |
| | | | 5.0' | | 12" RECOVERY | | Hand Auger |
| | | 5 | 5.0' | | Moist brown silty coarse sand and gravel w/some fine sand. | A-1-b | Hand Auger |
| 6 | | | 6.0' | | 12" RECOVERY | | Hand Auger |
| | | 6 | 6.0' | | Moist brown gravel and coarse to fine sand w/some silt. | A-1-b | Hand Auger |
| | | | 7.0' | | 12" RECOVERY | | Hand Auger |
| | | 7 | 7.0' | | Moist brown silty fine sand w/trace of coarse sand and gravel. | A-2-4(0) | Hand Auger |
| 8 | | | 8.0' | | 12" RECOVERY | | Hand Auger |
| | | 8 | 8.0' | | Moist brown fine to coarse sand and gravel w/some silt. | A-1-b | Hand Auger |
| | | | 9.0' | | 12" RECOVERY | | Hand Auger |
| | | 9 | 9.0' | | Wet brown coarse sand and gravel w/trace of silt and fine sand. | A-1-b | Hand Auger |
| 10 | | | 10.0' | | 12" RECOVERY | | Hand Auger |
| | | | | | End of Boring | | |
| 12 | | | | | | | |

Remarks: Hand Auger

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



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 7/21/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the log3.

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

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

Boring No.: INF3-36

Contract: 28-113-01

Boring Location: Sta. 246+00, Lt. C.L.

Boring Surface Elev.: + 64.60

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: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/23/2009 | | 10.0' | 8.0' | Dry | |

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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-------------------------------|
| | 7/23/09 | 1 | 1.0' | 4 5 | Moist stiff brown silt w/some clay and fine sand, trace of coarse sand and gravel. 7" RECOVERY | A-4(5) | Cultivated Soil - 9". USDA |
| 2 | | 2 | 2.0' 2.5' | 6 | Moist very stiff brown clayey gravelly silt w/some fine to coarse sand. 6" RECOVERY | A-4(0) | Classifica - Silt |
| | | 2A | 2.5' | 10 18 21 | Moist medium dense brown coarse sand w/some fine sand and silt, trace of gravel. 10" RECOVERY | A-1-b | Loam. 2.5 YR 5/ 4 |
| 4 | | 3 | 4.0' | 11 18 19 13 | Moist dense brown coarse to fine sand w/some gravel and silt. 17" RECOVERY | A-1-b | 2.5 YR 5/ 4 |
| | | 4 | 6.0' | 10 25 26 20 | Moist very dense brown gravel and coarse sand w/some fine sand and silt. 17" RECOVERY | A-1-b | 10 YR 5/ 6 |
| 6 | | 5 | 8.0' | 5 9 6 3 | Moist medium dense brown fine to coarse sand w/some gravel and silt. 16" RECOVERY | A-1-b | 7.5 YR 5/ 8 |
| 8 | | | | | | | 10 YR 6/ 8 |
| 10 | | | 10.0' | | End of Boring | | |
| 12 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/23/2009 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 re-checked 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.: INF3-37

Contract: 28-113-01

Boring Location: Sta. 246+00, Rt. C.L.

Boring Surface Elev.: + 70.90

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: 2.0 | | 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 | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/23/2009 | | 10.0 | 8.0 | Dry | |

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: | | | Core Drilling in Rock: | Ft. |

Boring Contractor: Walton Croperation
Driller: Gary Truver
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------------|
| | 7/23/09 | 1 | 0.5' | 9 9 10 | Moist very stiff brown clayey silt w/trace of fine to coarse sand. | A-4(6) | Cultivate Soil - 6" 10 YR 6/8 |
| 2 | | 2 | 2.0' | 11 9 17 16 | 6" RECOVERY Moist very stiff brown fine to coarse sandy silt w/trace of clay and gravel. | A-4(0) | 7.5 YR 5/6 |
| 4 | | 3 | 4.0' | 8 11 15 11 | 16" RECOVERY Moist medium dense brown silty coarse to fine sand w/trace of gravel. | A-1-b | 10 YR 6/8 |
| 6 | | 4 | 6.0' | 5 7 13 13 | 18" RECOVERY Moist medium dense brown silty coarse to fine sand w/some gravel. | A-2-4(0) | 10 YR 6/6 |
| 8 | | 5 | 8.0' | 6 7 9 10 | 17" RECOVERY Moist medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 2.5 YR 7/8 |
| 10 | | | 10.0' | | 20" 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

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/23/2009 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 re-checked 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.: INF3-38

Contract: 28-113-01

Boring Location: Sta. 251+00, Lt. C.L.

Boring Surface Elev.: + 71.70

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: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/23/2009 | | 10.0 | 8.0 | Dry | |

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 |
|-------------|----------------|-----|--------------|-------------------|---|-------------|---------------------------------------|
| | 7/23/09 | 1 | 0.5' | 8 10 9 | Moist very stiff brown clayey silt w/trace of fine to coarse sand. | A-4(6) | Cultivated Soil - 8". USDA Classifica |
| 2 | | 2 | 2.0' | | 8" RECOVERY | | - Silt |
| | | 2 | 2.0' | 8 12 | Moist very stiff brown clayey silt w/some fine sand, trace of coarse sand and gravel. | A-4(6) | Loam. 2.5 YR 6/6 |
| | | | 3.0' | | 8" RECOVERY | | |
| | | 2A | 3.0' | 12 13 | Moist medium dense brown clayey fine to coarse sand w/trace of gravel. | A-2-4(0) | 10 YR 5/6 |
| 4 | | | 4.0' | | 8" RECOVERY | | 10 YR 5/8 |
| | | 3 | 4.0' | 4 7 8 13 | Moist medium dense tan silty coarse to fine sand w/trace of gravel. | A-2-4(0) | 10 YR 7/8 |
| | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 7 7 7 9 | Moist medium dense tan silty fine to coarse sand w/trace of gravel. | A-2-4(0) | 10 YR 7/8 |
| | | | 8.0' | | 18" RECOVERY | | |
| 8 | | 5 | 8.0' | 4 8 8 7 | Moist medium dense tan silty fine to coarse sand w/some gravel. | A-2-4(0) | 10 YR 7/8 |
| | | | 10.0' | | 14" RECOVERY | | |
| 10 | | | 10.0' | | 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



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/23/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-39

Contract: 28-113-01

Boring Location: Sta. 251+00, Rt. C.L.

Boring Surface Elev.: + 67.10

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: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/23/2009 | | 10.0 | 8.0 | Dry | |

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: Cecil Velazco
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---|
| | 7/23/09 | 1 | 0.5' | 11 10 12 | Moist very stiff brown fine sandy silt w/some clay and coarse sand, trace of gravel. | A-4(1) | Topsoil - 5". USDA Classifica |
| 2 | | 2 | 2.0' 2.0' | 8 7 8 7 | 15" RECOVERY Moist medium dense brown silty fine sand w/some coarse sand, trace of gravel. | A-2-4(0) | - Loam. 10 YR 6/ 8 10 YR 4/ 6 |
| 4 | | 3 | 4.0' 4.0' | 4 4 8 8 | 17" RECOVERY Moist medium dense brown silty fine to coarse sand w/some gravel. | A-2-4(0) | 10 YR 5/ 8 |
| 6 | | 4 | 6.0' 6.0' | 11 10 12 11 | 17" RECOVERY Moist medium dense brown coarse to fine sand w/some silt, trace of gravel. | A-1-b | 7.5 YR 5/ 8 |
| 8 | | 5 | 8.0' 8.0' | 7 7 9 8 | 20" RECOVERY Moist medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 10 YR 5/ 6 |
| 10 | | | 10.0' | | 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



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/23/2009 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 re-checked 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.: INF3-40

Contract: 28-113-01

Boring Location: Sta. 256+00, Lt. C.L.

Boring Surface Elev.: + 62.0

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: 2.0
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:** 8.0'

Water Level Readings

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|-----------|------|---------------|-----------------|----------------|----------------|
| 7/29/2009 | | 10.0 | 8.0 | Dry | |

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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------------------------------|
| | 7/29/09 | 1 | 0.5' | 10 17 18 | Moist hard brown clayey silt w/some fine sand, trace of coarse sand. | A-4(4) | Cultivated Soil - 5". USDA Classifica |
| 2 | | 2 | 2.0' | 10 12 19 15 | 10" RECOVERY Moist hard brown fine sandy silt w/some coarse sand. | A-4(0) | - Loam. 10 YR 6/8 10 YR 5/6 |
| 4 | | 3 | 4.0' | 4 14 23 29 | 19" RECOVERY Moist dense brown coarse to fine sand w/some silt, trace of gravel. | A-1-b | 7.5 YR 7/8 |
| 6 | | 4 | 6.0' | 16 16 14 20 | 16" RECOVERY Moist medium dense brown silty fine to coarse sand w/trace of gravel. | A-2-4(0) | 5 YR 5/8 |
| 8 | | 5 | 8.0' | 10 14 14 14 | 18" RECOVERY Moist medium dense brown silty fine to coarse sand and gravel. | A-2-4(0) | 2.5 YR 4/8 |
| 10 | | | 10.0' | | 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 sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/29/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-41

Contract: 28-113-01

Boring Location: Sta. 256+00, Rt. C.L.

Boring Surface Elev.: + 62.60

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: | 2.0 | 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: |
| | | | | | 8.0' |

| | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date | Time | | | | |
| 7/29/2009 | | 10.0 | 8.0 | Dry | |

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: | | ; | 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 |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---|
| | 7/29/09 | 1 | 0.5' | 10 12 14 | Moist very stiff brown silty clay w/some gravel, trace of fine to coarse sand. | A-6(7) | Cultivated Soil - 8". USDA Classifica |
| 2 | | 2 | 2.0' | 11 18 22 26 | 9" RECOVERY Moist hard brown fine sandy silt w/some gravel, trace of coarse sand. | A-4(0) | - Silt Loam. 10 YR 7/ 8 10 YR 6/ 4 |
| 4 | | 3 | 4.0' | 8 14 18 17 | 16" RECOVERY Moist dense brown coarse to fine sand w/some gravel and silt. | A-1-b | 10 YR 6/ 6 |
| 6 | | 4 | 6.0' | 9 12 14 16 | 17" RECOVERY Moist medium dense orange silty fine to coarse sand. | A-2-4(0) | 7.5 YR 6/ 8 |
| 8 | | 5 | 8.0' | 5 10 11 9 | 18" RECOVERY Moist medium dense tan coarse to fine sand w/some silt, trace of gravel. | A-1-b | 10 YR 8/ 6 |
| 10 | | | 10.0' | | 16" 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

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/29/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-42

Contract: 28-113-01

Boring Location: Sta. 10+00, Rt. C.L.

Boring Surface Elev.: + 68.30

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: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/16/2009 | | 10.0 | 8.0 | 5.4 | |

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: Cecil Velazco
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------------------|
| | 7/16/09 | 1 | 0.5' | 6 7 8 | Moist stiff gray silt w/some clay, trace of fine to coarse sand. | A-4(0) | Topsoil - 4". USDA Classifica |
| 2 | | 2 | 2.0' | | 15" RECOVERY | | - Silt |
| | | 2A | 2.0' | 5 | Moist very stiff gray silt w/some clay, trace of fine to coarse sand. | A-4(2) | Loam. |
| | | | 2.5' | 8 | 6" RECOVERY | | 7.5 YR 6/ 1 |
| | | | 2.5' | 11 13 | Moist medium dense brownish gray silty fine to coarse sand w/some gravel. | A-2-4(0) | 7.5 YR 6/ 1 |
| 4 | | 3 | 4.0' | | 13" RECOVERY | | 7.5 YR 5/ 2 |
| | | | 4.0' | 9 10 11 12 | Moist medium dense gray coarse to fine sand w/trace of silt and gravel. | A-1-b | 5 YR 5/1 |
| 6 | | 4 | 6.0' | | 16" RECOVERY | | |
| | | | 6.0' | 7 7 8 8 | Wet medium dense gray fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 5 YR 7/1 |
| 8 | | 5 | 8.0' | | 18" RECOVERY | | |
| | | | 8.0' | 2 3 3 5 | Wet loose gray coarse to fine sand and gravel w/some silt. | A-1-b | 10 YR 6/ 1 |
| 10 | | | 10.0' | | 14" RECOVERY | | |
| | | | | | End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/16/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-43

Contract: 28-113-01

Boring Location: Sta. 18+00, Rt. C.L.

Boring Surface Elev.: + 67.80

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 |
| | 8/3/2009 | | 9 | | 4.7 | |

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: Dave Burt
Helpers:

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|---------------|
| | 8/3/09 | 1 | 1.0' | | Moist gray clayey silt w/trace of fine to coarse sand and gravel. | A-4(5) | Topsoil - 4". |
| 2 | | | 2.0' | | 12" RECOVERY | | USDA |
| | | 2 | 2.0' | | Moist grayish orange silt w/some fine sand, trace of clay, coarse sand and gravel. | A-4(0) | Classifica |
| | | | 3.0' | | 12" RECOVERY | | - Silt |
| | | 3 | 3.0' | | Moist tan coarse to fine sand and gravel w/trace of silt. | A-1-b | Loam |
| 4 | | | 4.0' | | 12" RECOVERY | | Hand |
| | | 4 | 4.0' | | Moist tan coarse to fine sand and gravel w/trace of silt. | A-1-b | Auger |
| | | | 5.0' | | 12" RECOVERY | | Hand |
| | | 5 | 5.0' | | Wet tan coarse to fine sand w/some silt, trace of gravel. | A-1-b | Auger |
| 6 | | | 6.0' | | 12" RECOVERY | | Hand |
| | | 6 | 6.0' | | Wet tan coarse to fine sand w/some silt, trace of gravel. | A-2-4(0) | Auger |
| | | | 7.0' | | 12" RECOVERY | | Hand |
| | | 7 | 7.0' | | Wet tan coarse to fine sand and gravel w/some silt. | A-1-b | Auger |
| 8 | | | 8.0' | | 12" RECOVERY | | Hand |
| | | 8 | 8.0' | | Wet tan coarse to fine sand and gravel w/some silt. | A-1-b | Auger |
| | | | 9.0' | | 12" RECOVERY | | Hand |
| 10 | | | | | End of Boring | | |
| 12 | | | | | | | |

Remarks:


Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson


KEY TO SYMBOLS


Symbol Description


Strata symbols

 Silty low plasticity
clay

 Silt

 Poorly graded sand
with silt

 Well graded sand

 Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 8/3/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301, Maryland State Line to S.R. 1

Boring No.: INF3-44

Contract: 28-113-01

Boring Location: Sta. 22+00, Rt. C.L.

Boring Surface Elev.: + 67.30

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: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/16/2009 | | 10.0 | 8.0 | 7.0 | |

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: | | | Core Drilling in Rock: | Ft. |

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

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------------|--|-------------|----------------------------------|
| | 7/16/09 | 1 | 0.5' | 4 6 7 | Moist stiff brown clayey fine to coarse sandy silt. | A-4(1) | Topsoil - 4" USDA Classification |
| 2 | | 2 | 2.0' 2.0' | 8 8 8 8 8 8 | 14" RECOVERY Moist medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | - Loam. 2.5 YR 6/6 10 YR 5/6 |
| 4 | | 3 | 4.0' 4.0' | 4 8 9 6 | 19" RECOVERY Moist medium dense brown coarse to fine sand w/some silt, trace of gravel. | A-2-4(0) | 10 YR 5.5/6 |
| 6 | | 4 | 6.0' 6.0' | 6 6 4 4 | 15" RECOVERY Wet stiff orange fine sandy silt w/some coarse sand. | A-4(0) | 7.5 YR 6/8 |
| 8 | | 5 | 8.0' 8.0' | 1 2 2 2 | 16" RECOVERY Wet very loose orange silty fine sand w/trace of coarse sand. | A-2-4(0) | 7.5 YR 5.5/8 |
| 10 | | | 10.0' | | 21" 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

 Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/16/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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 7/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-46

Contract: 28-113-01

Boring Location: Sta. 105+00, Rt. C.L.

Boring Surface Elev.: + 69.8

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: 2.0 | 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: 8.0' |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/6/2009 | | 10.0 | 8.0 | 6.0 | |

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: | | ; | 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: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---|
| | 10/6/09 | 1 | 0.0' | 4 4 4 5 | Wet firm gray clayey silt w/trace of coarse to fine sand and fine gravel. | A-4(6) | Forrest Duff - 3". USDA Classifica - Silt Loam |
| 2 | | 2 | 2.0' 2.0' | 14 18 21 24 | 19" RECOVERY Wet hard gray silt w/some clay, trace of fine to coarse sand. | A-4(3) | |
| 4 | | 3 | 4.0' 4.0' | 4 8 9 11 | 18" RECOVERY Wet medium dense tan silty coarse to fine sand w/trace of fine gravel. | A-2-4(0) | 2.5 YR - 6/6 |
| 6 | | 4 | 6.0' 6.0' | 10 8 8 10 | 15" RECOVERY Wet medium dense orange silty fine to coarse sand w/trace of fine gravel. | A-2-4(0) | 5 YR - 6/8 |
| 8 | | 5 | 8.0' 8.0' | 8 8 10 9 | 17" RECOVERY Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | 5 YR - 6/8 |
| 10 | | | 10.0' | | 16" 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 10/6/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-47

Contract: 28-113-01

Boring Location: Sta. 110+00, 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: 2.0 | 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: 8.0' |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/6/2009 | | 10.0 | 8.0 | 6.1 | |

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: | | ; | 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 |
|-------------|----------------|-----|--------------|---------------------|--|-------------|--|
| | 10/6/09 | 1 | 0.0' | 3 4 4 5 | Wet firm gray silt w/ some clay, trace of fine to coarse sand. | A-4(3) | Forrest Duff - 3". USDA Classifica - Silt Loam |
| 2 | | 2 | 2.0' 2.0' | 8 10 11 13 | 12" RECOVERY Wet very stiff gray silt w/ some fine sand and clay, trace of coarse sand and fine gravel. | A-4(2) | |
| 4 | | 3 | 4.0' 4.0' | 8 10 10 8 | 22" RECOVERY Wet medium dense gray fine to coarse sand w/ some silt and fine gravel. | A-2-4(0) | 7.5 YR - 5/8 |
| 6 | | 4 | 6.0' 6.0' | 4 7 7 6 | 16" RECOVERY Wet very dense tan coarse to fine sand w/ some silt, trace of fine gravel. | A-1-b | 10 YR - 8/4 |
| 8 | | 5 | 8.0' 8.0' | 6 7 8 8 | 17" RECOVERY Wet medium dense tan coarse to fine sand w/ some silt, trace of fine gravel. | A-2-4(0) | 10 YR - 8/4 |
| 10 | | | 10.0' | | 15" 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 10/6/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-48

Contract: 28-113-01

Boring Location: Sta. 115+00, Lt. C.L.

Boring Surface Elev.: + 61.80

Reference:

| | | | | | |
|---|--|-------------|-----------------------------|--|------------|
| Wt. of Casing Hammer: | | Lbs. | Average Fall: | | IN. |
| Wt. of Sample Hammer: 140 | | Lbs. | Average Fall: 30 | | IN. |
| Type of: D-Sampler: Split Barrel | | O.D. | O.D. of Sampler: 2.0 | | 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: 8.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/8/2009 | | 10.0 | 8.0 | Dry | |

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: Jason Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|--|
| 1 | 10/8/09 | 1 | 1.0' | 2 1 | Wet soft brown clayey silt w/some fine to coarse sand. 6" RECOVERY | A-4(4) | Cultivated Soil - 10". |
| 2 | | 2 | 2.0' | 3 4 4 4 | Wet loose tan silty fine to coarse sand w/some clay, trace of fine gravel. 22" RECOVERY | A-2-4(0) | 2.5 YR - 4/6 USDA Classifica - Sandy Loam |
| 4 | | 3 | 4.0' | 3 9 9 8 | Wet medium dense orange silty coarse to fine sand w/trace of fine gravel. 16" RECOVERY | A-2-4(0) | 5 YR - 5/6 5 YR - 6/8 |
| 6 | | 4 | 6.0' | 5 7 6 3 | Wet medium dense orange silty fine to coarse sand w/trace of fine gravel. 19" RECOVERY | A-2-4(0) | 5 YR - 6/8 |
| 8 | | 5 | 8.0' | 10 11 11 7 | Wet medium dense orange fine to coarse sand w/some silt and fine gravel. 20" RECOVERY | A-2-4(0) | 5 YR - 6/8 |
| 10 | | | 10.0' | | End of Boring | | |
| 12 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand

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Notes:

1. Exploratory borings were drilled on 10/8/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: INF3-49

Contract: 28-113-01

Boring Location: Sta. 120+00, Lt. C.L.

Boring Surface Elev.: + 57.20

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: | 2.0 | 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: 8.0' |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/8/2009 | | 10.0 | 8.0 | Dry | |

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: | | ; | 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: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|--|-------------|-------------------------------------|
| | 10/8/09 | 1 | 1.0' | 4 3 | Wet firm brown clayey fine sandy silt w/trace of coarse sand and fine gravel. | A-4(1) | Cultivated Soil - 10". |
| 2 | | | 2.0' | | 12" RECOVERY | | |
| | | 2 | 2.0' | 3 4 4 5 | Wet firm tan clayey fine sandy silt w/some coarse sand, trace of gravel. | A-4(0) | USDA Classifica - Loam 2.5 YR - 4/6 |
| 4 | | | 4.0' | | 24" RECOVERY | | 5 YR - 5/6 |
| | | 3 | 4.0' | 4 5 6 6 | Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | 5 YR - 6/8 |
| 6 | | | 6.0' | | 18" RECOVERY | | |
| | | 4 | 6.0' | 6 6 6 6 | Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | 5 YR - 6/8 |
| 8 | | | 8.0' | | 19" RECOVERY | | |
| | | 5 | 8.0' | 6 5 7 7 | Wet medium dense orange coarse to fine sand w/some silt, trace of gravel. | A-1-b | 5 YR - 6/8 |
| 10 | | | 10.0' | | 18" RECOVERY | | |
| | | | | | End of Boring | | |
| 12 | | | | | | | |

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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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/8/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

Road Name: RT 301 PROJECT

Direction: NB SB EB WB
 County: K S NC Maint. #.

Limits:

| Core # | Location Description | Lane | | Offset (ft.) | | HMA | PCC | ST | ATB | CTB | SC | CR | Stone | Sand | Select | Other |
|--------|-------------------------------|----------------|---------|--------------|---------|-------|-----|----|-----|-----|----|----|-------|------|--------|-------|
| | | Lt. Rt. | Lt. Rt. | Lt. Rt. | Lt. Rt. | | | | | | | | | | | |
| 11 | PC-3-9 OE STRAWBERRY LANE | Turn Trav Shld | Dist. 4 | CL EL | CL EL | 1 | | 2 | 2 | | | | | | | 4 |
| 12 | PC-3-10 MD STRAWBERRY LANE | Turn Trav Shld | Dist. 4 | CL EL | CL EL | 4 | | 2 | | | | | | | | 3 |
| 13 | PC-3-17 RT 299 | Turn Trav Shld | Dist. 4 | CL EL | CL EL | 5 1/2 | | 2 | | | | | | | | 3 |
| 14 | PC-3-16 | Turn Trav Shld | Dist. 4 | CL EL | CL EL | 4 | | 2 | | | | | | | | 3 |
| | | Turn Trav Shld | Dist. | CL EL | CL EL | | | | | | | | | | | 3 |
| | | Turn Trav Shld | Dist. | CL EL | CL EL | | | | | | | | | | | 3 |
| | | Turn Trav Shld | Dist. | CL EL | CL EL | | | | | | | | | | | 3 |
| | | Turn Trav Shld | Dist. | CL EL | CL EL | | | | | | | | | | | 3 |
| | | Turn Trav Shld | Dist. | CL EL | CL EL | | | | | | | | | | | 3 |
| | | Turn Trav Shld | Dist. | CL EL | CL EL | | | | | | | | | | | 3 |

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NOT FOR BIDDING

AUGUST 2015

* HMA - Hot Mix Asphalt, PCC - Portland Cement Concrete, ST - Surface Treatment, ATB - Asphalt Treated Base, CTB - Cement Treated Base, SC - Soil Cement, CR - Crusher Run

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

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

Boring No.: R2-001

Contract: 25-113-01

Boring Location: Sta. 245+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 58.74'

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 | |
| 3/18/2008 | | 10.0' | 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: | | | Core Drilling in Rock: | | |

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|--|-------------|------------------------|
| | 3/18/08 | 1 | 0.5' | 3 4 4 | Wet firm dark brown silt w/ some fine sand, trace of coarse sand and gravel. 18" RECOVERY | A-4(0) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 4 4 4 5 | Wet firm dark brown silt w/ some fine to coarse sand and clay, trace of gravel. 20" RECOVERY | A-4(0) | |
| | | 3 | 4.0' | 1 2 2 3 | Wet soft dark brown fine sandy silt w/ some coarse sand and clay, trace of gravel. 18" RECOVERY | A-4(0) | |
| 6 | | 4 | 6.0' | 3 4 4 5 | Wet firm dark brown fine sandy silt w/ some coarse sand and clay, trace of gravel. 6" RECOVERY | A-4(4) | |
| | | 5 | 8.0' | 1 3 4 4 | Wet firm brown fine sandy clay w/ some coarse sand. 15" RECOVERY | A-7-6(7) | |
| | | | 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



Silt



Silty low plasticity
clay



Low plasticity
clay

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-002

Contract: 25-113-01

Boring Location: Sta. 250+00.08, 45' Rt. C.L.

Boring Surface Elev.: + 63.12'

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: 10.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 3/18/2008 | | 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: ;
 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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|-------------------------|
| | 3/18/08 | 1 | 1.0' | 3 | Wet loose brown silty coarse to fine sand. | A-2-4(0) | 12" of cultivated soil. |
| | | | 2.0' | 3 | 12" RECOVERY | | |
| 3 | | 2 | 2.0' | 3 | Wet firm brown clayey fine sandy silt w/ some coarse sand. | A-4(0) | |
| | | | 4.0' | 3 | 20" RECOVERY | | |
| 6 | | 3 | 4.0' | 3 | Wet stiff brown fine to coarse sandy silt, trace of clay. | A-4(0) | |
| | | | 6.0' | 4 | 17" RECOVERY | | |
| 9 | | 4 | 6.0' | 8 | Wet medium dense brown silty fine to coarse sand w/ some gravel. | A-2-4(0) | |
| | | | 8.0' | 7 | 18" RECOVERY | | |
| 12 | | 5 | 8.0' | 3 | Wet loose brown fine to coarse sand w/ some gravel, trace of silt. | A-1-b | |
| | | | 10.0' | 6 | 14" RECOVERY | | |
| 15 | | | | | Boring terminated at 10.0 feet. | | |
| | | | | | | | |

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-003

Contract: 25-113-01

Boring Location: Sta.255+00.00, 45' lt. C.L.

Boring Surface Elev.: + 58.26'

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 3/18/2008 | 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: | | 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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|--|-------------|------------------------|
| | 3/18/08 | 1 | 0.5' | 2 2 2 | Moist soft red-brown clayey fine to coarse sandy silt, trace of gravel. 17" RECOVERY | A-4(0) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 4 4 4 | Moist loose light brown fine to coarse sand w/ some silt, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 3 4 7 10 | Moist medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. 15" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 7 6 5 4 | Moist medium dense orange-brown silty fine to coarse sand w/ some gravel. 20" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 8 10 9 9 | Moist medium dense orange-brown coarse to fine sand w/ some silt and gravel. 17" RECOVERY | A-1-b | |
| | | | 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



Poorly graded clayey
silty sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-004

Contract: 25-113-01

Boring Location: Sta. 260+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 50.54'

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: 10.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 3/18/2008 | | 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: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 No. of U-Sample Boring: 3 Ft.
 U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|------------------------|
| | 3/18/08 | 1 | 0.8' | 4 3 4 | Wet firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 15" RECOVERY | A-4(1) | 9" of cultivated soil. |
| 3 | | 2 | 2.0' | 3 4 4 11 | Wet firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 17" RECOVERY | A-4(3) | |
| | | 3 | 4.0' | 6 7 10 11 | Wet medium dense brown fine to coarse sand w/ some gravel and silt. 16" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 12 14 17 15 | Wet dense orange-brown fine to coarse sand and gravel w/ some silt. 16" RECOVERY | A-1-b | |
| | | 5 | 8.0' | 16 25 29 33 | Wet very dense orange-brown silty fine to coarse sand, trace of gravel. 9" 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



Silty low plasticity
clay



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-005

Contract: 25-113-01

Boring Location: Sta. 268+25.31, 105' Lt. C.L.

Boring Surface Elev.: + 51.15'

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 3/18/2008 | Time | Depth of Hole 14.0' | Depth of Casing 12.0' | Depth of Water 12.3' | 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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|------------------------|
| | 3/18/08 | 1 | 0.8' | 3 4 6 | Moist stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 15" RECOVERY | A-4(3) | 9" of cultivated soil. |
| 3 | | 2 | 2.0' | 5 16 20 17 | Moist dense orange-brown coarse to fine sand and gravel, trace of silt. 15" RECOVERY | A-1-b | |
| | | 3 | 4.0' | 18 22 15 11 | Moist dense orange-brown gravel and fine sand w/ some coarse sand and silt. 16" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 6 7 8 9 | Wet medium dense orange-brown fine to coarse sand w/ some silt, trace of gravel. 19" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 10 7 8 8 | Wet medium dense orange-brown fine to coarse sand w/ some silt and gravel, trace of clay. 17" RECOVERY | A-2-4(0) | |
| 9 | | 6 | 10.0' | 8 7 8 10 | Wet medium dense orange-brown and green-brown fine to coarse sand w/ some silt. 20" RECOVERY | A-2-4(0) | Glauconitic |
| 12 | | 7 | 12.0' | 13 14 15 15 | Saturated medium dense orange-brown and green-brown fine to coarse sand w/ some silt. 14" RECOVERY | A-2-4(0) | Glauconitic |
| | | 8 | 14.0' | 6 9 11 11 | Saturated medium dense orange-brown and green fine to coarse sand w/ some silt. 17" RECOVERY | A-2-4(0) | Glauconitic |
| 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 sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-006

Contract: 25-113-01

Boring Location: Sta. 279+93.08, 129' Lt. C.L.

Boring Surface Elev.: + 54.64'

Reference:

| | | | | | |
|---|--|-------------|------------------------------|--|------------|
| Wt. of Casing Hammer: | | 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 3/18/2008 | Time | 14.0' | 12.0' | 11.3' | |

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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|------------------------|
| | 3/18/08 | 1 | 0.5' | 6 8 9 | Moist very stiff brown clayey fine to coarse sandy silt, trace of gravel. 17" RECOVERY | A-4(1) | 7" of cultivated soil. |
| 3 | | 2 | 2.0' | 6 7 6 3 | Moist medium dense brown fine to coarse sand w/ some clay, trace of gravel. 19" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 5 9 7 13 | Moist medium dense brown silty coarse to fine sand, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 14 16 14 14 | Moist medium dense light brown coarse to fine sand w/ some silt and gravel. 16" RECOVERY | A-1-b | |
| 9 | | 5 | 8.0' | 9 12 10 10 | Moist medium dense light brown coarse to fine sand w/ some gravel and silt. 19" RECOVERY | A-1-b | |
| | | 6 | 10.0' | 9 6 5 6 | Wet medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. 19" RECOVERY | A-1-b | |
| 12 | | 7 | 12.0' | 5 6 7 5 | Saturated medium dense orange-brown coarse sand w/ some gravel, trace of fine sand and silt. 19" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 3 4 5 6 | Saturated loose orange-brown coarse to fine sand w/ some gravel, trace of silt. 22" 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



Clayey sand



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-007

Contract: 25-113-01

Boring Location: Sta. 285+00.00, 122' Lt. C.L.

Boring Surface Elev.: + 56.98'

Reference:

| | | | | | |
|---|--|-------------|------------------------------|--|------------|
| Wt. of Casing Hammer: | | 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 3/18/2008 | Time | Depth of Hole 14.0' | Depth of Casing 12.0' | Depth of Water 12.4' | 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: | ; | | | 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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|---|-------------|-------------------------|
| | 3/18/08 | 1 | 1.0' | 2 | Moist soft brown clayey silt w/ some coarse to fine sand, trace of gravel. | A-4(2) | 11" of cultivated soil. |
| | | | 2.0' | 2 | | | |
| 3 | | 2 | 2.0' | 3 | 12" RECOVERY Moist loose brown silty coarse sand w/ some fine sand, trace of gravel. | A-1-b | |
| | | | 4.0' | 3 | | | |
| | | | 4.0' | 3 | 16" RECOVERY Moist loose brown silty coarse to fine sand, trace of gravel. | A-1-b | |
| | | | 6.0' | 2 | | | |
| 6 | | 3 | 4.0' | 3 | 17" RECOVERY Moist loose brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 6.0' | 3 | | | |
| | | | 6.0' | 2 | | | |
| | | | 8.0' | 3 | 19" RECOVERY Moist loose brown coarse sand w/ some fine sand, gravel, and silt. | A-1-b | |
| 9 | | 5 | 8.0' | 3 | | | |
| | | | 10.0' | 3 | | | |
| | | | 10.0' | 3 | 16" RECOVERY Wet loose brown coarse sand w/ some fine sand and silt, trace of gravel. | A-1-b | |
| | | | 12.0' | 1 | | | |
| 12 | | 6 | 10.0' | 3 | 18" RECOVERY Saturated very loose orange-brown silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 12.0' | 1 | | | |
| | | | 14.0' | 1 | | | |
| | | | 14.0' | 2 | 17" RECOVERY Saturated loose orange-brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 15 | | 8 | 14.0' | 3 | | | |
| | | | 16.0' | 3 | 19" 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



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-008

Contract: 25-113-01

Boring Location: Sta. 290+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 59.29'

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: | 10.0' |

| | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | | | | |
| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| 3/18/2008 | | 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: | | | Core Drilling in Rock: | | |

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|---|-------------|-------------------------|
| | 3/18/08 | 1 | 1.0' | 2 3 | Wet firm brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 12" RECOVERY | A-4(2) | 10" of cultivated soil. |
| 3 | | 2 | 2.0' | 6 10 9 8 | Wet medium dense orange-brown silty fine sand w/ some coarse sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 4 5 7 10 | Wet medium dense orange-brown silty fine sand w/ some coarse sand, trace of gravel. 19" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 9 9 9 7 | Wet medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| 9 | | 5 | 8.0' | 4 5 5 7 | Wet loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 20" 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 sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/18/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-009

Contract: 25-113-01

Boring Location: Sta. 295+00.00, 45'Lt. C.L.

Boring Surface Elev.: + 65.88'

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: 10.0' | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 3/17/2008 | | 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: ;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.;
 3 Dia. U-Sample Boring: Ft.
 No. of U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|--|-------------|------------------------|
| | 3/17/08 | 1 | 0.8' | 3 4 4 | Moist loose brown clayey fine sand and gravel w/ some coarse sand. 15" RECOVERY | A-2-4(0) | 9" of cultivated soil. |
| 3 | | 2 | 2.0' | 3 5 4 3 | Moist loose red-brown silty fine to coarse sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 2 1 1 2 | Moist very loose orange-brown fine to coarse sand w/ some silt, trace of gravel. 15" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 2 3 2 4 | Moist loose orange-brown silty coarse to fine sand, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 3 2 2 3 | Moist very loose orange-brown fine to coarse sand w/ some silt, trace of gravel. 16" 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



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-010

Contract: 25-113-01

Boring Location: Sta. 300+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 66.03'

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 3/17/2008 | Time | Depth of Hole 10.0' | Depth of Casing 8.0' | Depth of Water Dry | Elev. of Water |

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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|-------------------------|
| | 3/17/08 | 1 | 1.0' | 2 | Moist soft brown clayey fine sandy silt w/ some coarse sand, trace of gravel. | A-4(1) | 10" of cultivated soil. |
| | | | 2.0' | | | | |
| 3 | | 2 | 2.0' | 3 | 12" RECOVERY | A-2-4(0) | |
| | | | | 4 | Moist loose orange-brown silty coarse to fine sand, trace of gravel. | | |
| | | | | 5 | | | |
| | | | 4.0' | | 16" RECOVERY | | |
| 6 | | 3 | 4.0' | 2 | Moist loose orange-brown silty coarse to fine sand, trace of gravel. | A-1-b | |
| | | | | 4 | | | |
| | | | | 6 | | | |
| | | | | 7 | | | |
| | | | 6.0' | | 18" RECOVERY | | |
| 6 | | 4 | 6.0' | 6 | Moist medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | | 7 | | | |
| | | | | 6 | | | |
| | | | 8.0' | | 20" RECOVERY | | |
| 9 | | 5 | 8.0' | 3 | Moist loose orange-brown coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | | 2 | | | |
| | | | | 3 | | | |
| | | | | 4 | | | |
| | | | 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 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-011

Contract: 25-113-01

Boring Location: Sta. 305+00.00, 119' Lt. C.L.

Boring Surface Elev.: + 61.58'

Reference:

| | | | | | |
|---|--|-------------|----------------------------|--|------------|
| Wt. of Casing Hammer: | | 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: | | 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 3/17/2008 | Time | Depth of Hole 12.0' | Depth of Casing 10.0' | Depth of Water 10.0' | Elev. of Water |

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: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|------------------------|
| | 3/17/08 | 1 | 0.8' | 5 3 3 | Moist firm brown clayey silt w/ some fine to coarse sand, trace of gravel. 15" RECOVERY | A-4(4) | 9" of cultivated soil. |
| 3 | | 2 | 2.0' | 7 15 15 15 | Moist medium dense orange-brown gravel and coarse sand w/ some fine sand and gravel. 16" RECOVERY | A-1-b | |
| | | 3 | 4.0' | 6 7 7 7 | Wet medium dense orange-brown silty coarse to fine sand. 17" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 8 8 9 7 | Wet medium dense orange-brown silty coarse to fine sand, trace of gravel. 19" RECOVERY | A-1-b | |
| | | 5 | 8.0' | 9 5 5 6 | Wet loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY | A-1-b | |
| 9 | | 6 | 10.0' | 5 5 5 4 | Saturated loose orange-brown silty coarse to fine sand. 17" RECOVERY | A-2-4(0) | |
| | | 7 | 12.0' | 2 4 8 8 | Saturated medium dense orange-brown coarse to fine sand and gravel w/ some silt. 16" RECOVERY | A-1-b | |
| 12 | | 8 | 14.0' | 3 5 5 5 | Saturated loose orange-brown coarse sand and gravel w/ some fine sand, trace of silt. 17" 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



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-012

Contract: 25-113-01

Boring Location: Sta. 310+00.00, 119' Rt. C.L.

Boring Surface Elev.: + 66.09'

Reference:

| | | | | | |
|-----------------------|-------------------------|------|---------------------|----|-----|
| Wt. of Casing Hammer: | | 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: | |
| | Hollow Stem Auger: | | From Depth of: | | To: | 16.0' |

| | | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|--|
| Water Level Readings | | | | | | |
| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water | |
| 3/17/2008 | | 16.0' | 14.0' | 12.7' | | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|------|------------------------|---|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 16.0 | 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: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|---|-------------|-------------------------|
| | 3/17/08 | 1 | 1.0' | 2 | Moist soft brown clayey fine sandy silt w/ some coarse sand. | A-4(3) | 10" of cultivated soil. |
| | | | 2.0' | 2 | | | |
| 3 | | 2 | 2.0' | 6 | 12" RECOVERY | A-2-4(0) | |
| | | | | 10 | Moist medium dense brown silty coarse to fine sand, trace of gravel. | | |
| | | | | 10 | | | |
| | | | | 11 | | | |
| | | | 4.0' | | 15" RECOVERY | | |
| | | 3 | 4.0' | 5 | Moist medium dense brown silty coarse to fine sand, trace of gravel. | A-1-b | |
| | | | | 9 | | | |
| | | | | 12 | | | |
| | | | | 12 | | | |
| 6 | | | 6.0' | | 17" RECOVERY | | |
| | | 4 | 6.0' | 11 | Moist medium dense light brown fine sand w/ some coarse sand and clay. | A-2-4(0) | |
| | | | | 10 | | | |
| | | | | 13 | | | |
| | | | | 12 | | | |
| | | | 8.0' | | 16" RECOVERY | | |
| 9 | | 5 | 8.0' | 6 | Moist loose light brown silty fine to coarse sand. | A-2-4(0) | |
| | | | | 4 | | | |
| | | | | 4 | | | |
| | | | | 6 | | | |
| | | | 10.0' | | 18" RECOVERY | | |
| | | 6 | 10.0' | 3 | Wet loose light brown silty coarse to fine sand, trace of gravel. | A-2-4(0) | |
| | | | | 3 | | | |
| | | | | 3 | | | |
| 12 | | | 12.0' | | 19" RECOVERY | | |
| | | 7 | 12.0' | 2 | Wet very loose light brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | | 2 | | | |
| | | | | 1 | | | |
| | | | | 1 | | | |
| | | | 14.0' | | 17" RECOVERY | | |
| 15 | | 8 | 14.0' | 2 | Wet very loose light brown fine to coarse sand w/ some gravel and silt. | A-1-b | |
| | | | | 1 | | | |
| | | | | 1 | | | |
| | | | | 3 | | | |
| | | | 16.0' | | 17" 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



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-013

Contract: 25-113-01

Boring Location: Sta. 315+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 65.11'

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 |
| | 3/17/2008 | | 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: | | | | Core Drilling in Rock: | Ft. |

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|------------------------|
| | 3/17/08 | 1 | 0.8' | 1 3 3 | Moist firm brown fine to coarse sandy clay, trace of gravel. 15" RECOVERY | A-4(1) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 2 3 4 5 | Moist loose red-brown clayey coarse to fine sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| 6 | | 3 | 4.0' | 9 9 13 14 | Moist medium dense red-brown silty coarse to fine sand, trace of gravel. 18" RECOVERY | A-1-b | |
| 9 | | 4 | 6.0' | 12 11 10 8 | Moist medium dense orange-brown fine to coarse sand w/ some silt and gravel. 19" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 5 4 3 3 | Moist loose light brown coarse to fine sand w/ some silt. 17" RECOVERY | A-1-b | |
| 12 | | | 10.0' | | Boring terminated at 10.0 feet. | | |
| 15 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-014

Contract: 25-113-01

Boring Location: Sta. 320+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 56.72'

Reference:

| | | | |
|---|-------------|------------------------------|------------|
| Wt. of Casing Hammer: | 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 |
| | 3/17/2008 | | 4.0' | 2.0' | 1.0' | |

Pay Quantities:

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|--|-------------|---------|
| | 3/17/08 | 1 | 0.0' | 1 1 1 2 | Wet very loose orange-brown coarse to fine sand w/ some silt. | A-1-b | |
| | | | 2.0' | | 18" RECOVERY | | |
| 3 | | 2 | 2.0' | 2 2 2 3 | Saturated very loose orange-brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | 3 2 4 4 | Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 6 | | | 6.0' | | 20" RECOVERY | | |
| | | 4 | 6.0' | 3 4 6 6 | Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 8.0' | | 17" RECOVERY | | |
| 9 | | 5 | 8.0' | 4 6 8 6 | Saturated medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 10.0' | | 17" 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 sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-015

Contract: 25-113-01

Boring Location: Sta. 325+00.00, 135' Lt. C.L.

Boring Surface Elev.: + 60.16'

Reference:

| | | | | | |
|------------------------------|--------------------------------|-------------|----------------------------|----|------------|
| Wt. of Casing Hammer: | | 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 |
| 3/17/2008 | | 8.0' | 6.0' | 5.4' | |

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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---------|
| | 3/17/08 | 1 | 0.0' | 3 3 3 6 | Wet firm gray clay, trace of fine to coarse sand and gravel. | A-6(10) | |
| | | | 2.0' | | 18" RECOVERY | | |
| 3 | | 2 | 2.0' | 7 11 14 15 | Wet very stiff gray silty clay, trace of fine to coarse sand and gravel. | A-6(12) | |
| | | | 4.0' | | 19" RECOVERY | | |
| | | 3 | 4.0' | 9 21 15 16 | Saturated dense orange-brown and gray coarse sand and gravel w/ some fine sand and silt. | A-1-b | |
| 6 | | 4 | 6.0' | 7 8 7 7 | Saturated medium dense light brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 8.0' | | 15" RECOVERY | | |
| | | 5 | 8.0' | 5 4 3 3 | Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 10.0' | | 17" RECOVERY | | |
| | | 6 | 10.0' | 5 3 3 4 | Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 12 | | | 12.0' | | 15" RECOVERY | | |
| | | 7 | 12.0' | 3 3 5 7 | Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 14.0' | | 24" RECOVERY | | |
| 15 | | 8 | 14.0' | 7 5 6 6 | Saturated medium dense orange-brown coarse to fine sand w/ some gravel, trace of silt. | A-1-b | |
| | | | 16.0' | | 15" 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



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/17/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-016

Contract: 25-113-01

Boring Location: Sta. 330+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 61.64'

Reference:

| | | | | | |
|---|--|-------------|------------------------------|--|------------|
| Wt. of Casing Hammer: | | 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 |
| | 3/14/2008 | | 8.0' | 6.0' | 4.9' | |

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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|------------------------|
| | 3/14/08 | 1 | 0.8' | 2 4 5 | Wet loose brown silty fine to coarse sand, trace of gravel. 15" RECOVERY | A-2-4(0) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 4 11 12 13 | Wet medium dense orange-brown coarse to fine sand w/ some silt and gravel. 16" RECOVERY | A-1-b | |
| | | 3 | 4.0' | 9 9 9 8 | Wet to saturated medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 5 4 4 4 | Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 14" RECOVERY | A-1-b | |
| | | 5 | 8.0' | 4 3 3 5 | Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 19" RECOVERY | A-1-b | |
| 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



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-017

Contract: 25-113-01

Boring Location: Sta. 335+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 65.29'

Reference:

| | | | | | |
|------------------------------|--------------------------------|-------------|----------------------------|----|------------|
| Wt. of Casing Hammer: | | 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 |
| 3/14/2008 | | 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: | | | Core Drilling in Rock: | | |

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|------------------------|
| | 3/14/08 | 1 | 0.8' | 2 3 4 | Wet firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 15" RECOVERY | A-4(6) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 4 5 7 7 | Wet stiff brown fine to coarse sandy silt w/ some clay, trace of gravel. 18" RECOVERY | A-4(0) | |
| | | 3 | 4.0' | 5 6 7 11 | Wet medium dense gray silty fine to coarse sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 11 11 10 7 | Wet medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY | A-1-b | |
| 9 | | 5 | 8.0' | 5 7 5 5 | Wet medium dense light brown coarse sand w/ some gravel, fine sand, and silt. 15" RECOVERY | A-1-b | |
| 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



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 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-018

Contract: 25-113-01

Boring Location: Sta. 340+00.00, 121' Rt. C.L.

Boring Surface Elev.: + 60.87'

Reference:

| | | | | | |
|------------------------------|--------------------------------|-------------|----------------------------|----|------------|
| Wt. of Casing Hammer: | | 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 |
| 3/14/2008 | | 8.0' | 6.0' | 5.1' | |

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

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|--|-------------|----------------------------|
| | 3/14/08 | 1 | 0.5' | 1 1 2 | Wet soft brown coarse to fine sandy silt w/ some clay, trace of gravel. 15" RECOVERY | A-4(0) | 7" of leaf litter/topsoil. |
| 3 | | 2 | 2.0' | 2 2 7 16 | Wet stiff gray clayey fine sandy silt w/ some coarse sand, trace of gravel. 19" RECOVERY | A-4(2) | |
| | | 3 | 4.0' | 8 12 11 9 | Wet medium dense orange-brown silty coarse to fine sand, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 4 4 5 6 | Saturated loose orange-brown and gray coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 4 5 4 4 | Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY | A-1-b | |
| 9 | | 6 | 10.0' | 5 3 3 4 | Saturated loose orange-brown coarse sand w/ some fine sand and silt, trace of gravel. 17" RECOVERY | A-1-b | |
| | | 7 | 12.0' | 4 2 4 3 | Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY | A-2-4(0) | |
| 12 | | 8 | 14.0' | 5 5 8 9 | Saturated medium dense orange-brown silty fine to coarse sand, trace of gravel. 16" 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



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-019

Contract: 25-113-01

Boring Location: Sta. 345+35.76, 119' Lt. C.L.

Boring Surface Elev.: + 60.00'

Reference:

| | | | | | |
|---|--|-------------|------------------------------|--|------------|
| Wt. of Casing Hammer: | | 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: 14.0' | |

| | | | | | |
|-----------------------------|-------------|---------------------------|-----------------------------|----------------------------|-----------------------|
| Water Level Readings | | | | | |
| Date 3/14/2008 | Time | Depth of Hole 6.0' | Depth of Casing 4.0' | Depth of Water 2.0' | Elev. of Water |

Pay Quantities:

| | | | | | |
|--|-------------|--|-------------------------------|------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: 14.0 | 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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|--|-------------|-------------------------|
| | 3/14/08 | 1 | 0.8' | 4 3 5 | Wet firm gray clay w/ some coarse to fine sand, trace of gravel. 15" RECOVERY | A-6(7) | 10" of cultivated soil. |
| | | 2 | 2.0' | 6 9 | Wet stiff gray clayey coarse sandy silt w/ some fine sand, trace of gravel. 12" RECOVERY | A-4(3) | |
| 3 | | 2A | 3.0' | 12 23 | Saturated dense gray coarse sand w/ some silt, trace of gravel and fine sand. 9" RECOVERY | A-1-b | |
| | | 3 | 4.0' | 6 8 10 7 | Saturated medium dense orange-brown coarse sand w/ some silt, trace of fine sand and gravel. 17" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 3 3 3 3 | Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY | A-1-b | |
| | | 5 | 8.0' | 2 3 3 5 | Saturated loose orange-brown coarse sand w/ some fine sand and silt, trace of gravel. 15" RECOVERY | A-1-b | |
| 9 | | 6 | 10.0' | 5 4 6 5 | Saturated loose orange-brown coarse sand w/ some fine sand and silt, trace of gravel. 16" RECOVERY | A-1-b | |
| | | 7 | 12.0' | 7 7 6 7 | Saturated medium dense orange-brown coarse sand w/ some fine sand, trace of silt and gravel. 18" RECOVERY | A-1-b | |
| 15 | | | 14.0' | | Boring terminated at 14.0 feet (due to excessive heave). | | |

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



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-020

Contract: 25-113-01

Boring Location: Sta. 349+99.87, 33' Rt. C.L.

Boring Surface Elev.: + 62.97'

Reference:

| | | | | | |
|---|--|-------------|------------------------------|--|------------|
| Wt. of Casing Hammer: | | 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 |
| | 3/14/2008 | | 8.0' | 6.0' | 4.8' | |

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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|---|-------------|------------------------|
| | 3/14/08 | 1 | 0.8' | 1 2 3 | Wet soft brown clayey coarse to fine sandy silt, trace of gravel. 15" RECOVERY | A-4(0) | 9" of cultivated soil. |
| 3 | | 2 | 2.0' | 1 2 2 2 | Wet very loose brown coarse sand w/ some silt and fine sand, trace of gravel. 15" RECOVERY | A-1-b | |
| | | 3 | 4.0' | 6 7 10 9 | Wet medium dense brown coarse sand w/ some gravel, silt, and fine sand. 17" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 6 4 5 6 | Saturated loose orange-brown coarse sand w/ some silt and fine sand, trace of gravel. 17" RECOVERY | A-1-b | |
| | | 5 | 8.0' | 4 4 4 4 | Saturated loose orange-brown coarse sand w/ some silt and fine sand, trace of gravel. 18" RECOVERY | A-1-b | |
| 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



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-021

Contract: 25-113-01

Boring Location: Sta. 355+00.00, 119' Lt. C.L.

Boring Surface Elev.: + 63.74'

Reference:

| | | | |
|---|-------------|------------------------------|------------|
| Wt. of Casing Hammer: | 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 |
| | 3/14/2008 | | 10.0' | 8.0' | 7.0' | |

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: | | | Core Drilling in Rock: | | |

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|---|-------------|------------------------|
| | 3/14/08 | 1 | 0.8' | 2 3 2 | Moist loose brown silty fine to coarse sand, trace of gravel. 15" RECOVERY | A-2-4(0) | 9" of cultivated soil. |
| 3 | | 2 | 2.0' | 1 2 2 2 | Moist very loose brown silty fine to coarse sand, trace of gravel. 19" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 1 2 1 1 | Wet very loose brown silty fine to coarse sand, trace of gravel. 13" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 1 1/12" 1 | Wet very loose gray fine to coarse sand w/ some silt, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 1 1 3 3 | Saturated soft orange fine to coarse sandy silt, trace of gravel. 16" RECOVERY | A-4(0) | |
| 9 | | 6 | 10.0' | 3 3 2 3 | Saturated loose orange-brown coarse sand, trace of fine sand, gravel, and silt. 17" RECOVERY | A-1-b | |
| 12 | | 7 | 12.0' | 2 4 3 4 | Saturated loose orange-brown coarse to fine sand w/ some silt, trace of gravel. 15" RECOVERY | A-2-4(0) | |
| | | 8 | 14.0' | 3 4 2 6 | Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. 18" 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



Silty sand



Silt



Poorly graded sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/14/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and rechecked the following day.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-022

Contract: 25-113-01

Boring Location: Sta. 375+00.00, 45' Lt. C.L.

Boring Surface Elev.: + 66.04'

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 |
| | 3/13/2008 | | 8.0' | 6.0' | 5.1' | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|------|------------------------|---|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 10.0 | 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: Dan Taylor
Helpers: Dan Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|---------------------------------|-------------|-------------------------|
| | 3/13/08 | 1 | 1.0' | 1 | 12" RECOVERY | A-4(0) | 11" of cultivated soil. |
| | | | 2.0' | 1 | | | |
| | | | 2.0' | 3 | | | |
| 3 | | 2 | 2.0' | 3 | 16" RECOVERY | A-2-4(0) | |
| | | | | 5 | | | |
| | | | | 6 | | | |
| | | 3 | 4.0' | 5 | 17" RECOVERY | A-1-b | |
| | | | 4.0' | 6 | | | |
| | | | | 6 | | | |
| 6 | | 4 | 6.0' | 5 | 18" RECOVERY | A-1-b | |
| | | | 6.0' | 7 | | | |
| | | | | 5 | | | |
| | | 5 | 8.0' | 5 | 11" RECOVERY | A-1-b | |
| 9 | | | 8.0' | 5 | | | |
| | | | | 5 | | | |
| | | | 10.0' | | | | |
| 12 | | | | | Boring terminated at 10.0 feet. | | |
| 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 borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-023

Contract: 25-113-01

Boring Location: Sta. 380+55.51, 265' Rt. C.L.

Boring Surface Elev.: + 67.00'

Reference:

| | | | | | |
|------------------------------|--------------------------------|-------------|----------------------------|----|------------|
| Wt. of Casing Hammer: | | 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 |
| 4/1/2008 | | 10.0' | 8.0' | 7.0' | |

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: | | | Core Drilling in Rock: | | |

Boring Contractor: Walton Corporation
Driller: Gary Truver Sr.
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|------------------------|
| | 4/1/08 | 1 | 0.5' | 3 3 3 | Wet firm brown clayey silt w/ some fine to coarse sand, trace of gravel. 16" RECOVERY | A-4(3) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 8 12 15 12 | Wet very stiff orange-brown clayey fine sandy silt, trace of coarse sand. 23" RECOVERY | A-4(0) | |
| | | 3 | 4.0' | 4 4 5 8 | Wet loose orange-brown silty fine sand w/ some coarse sand, trace of gravel. 15" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 9 10 9 10 | Wet medium dense orange-brown silty fine to coarse sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 3 6 6 6 | Saturated medium dense orange-brown coarse sand w/ some silt and fine sand, trace of gravel. 13" RECOVERY | A-1-b | |
| 9 | | 6 | 10.0' | 7 8 7 10 | Saturated medium dense orange-brown coarse sand w/ some silt, gravel, and fine sand. 16" RECOVERY | A-1-b | |
| 12 | | 7 | 12.0' | 3 4 5 5 | Saturated loose light brown coarse sand w/ some silt and fine sand, trace of gravel. 18" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 6 6 9 9 | Saturated medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 15" 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

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 4/1/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a CME 55.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-024

Contract: 25-113-01

Boring Location: Sta. 385+60.44, 2' Lt. C.L.

Boring Surface Elev.: + 68.76'

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 |
| | 3/13/2008 | | 10.0' | 8.0' | 7.0' | |

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: Dan Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------|
| | 3/13/08 | 1 | 1.0' | 2 4 | Wet firm brown clayey silt w/ some fine to coarse sand, trace of gravel. 12" RECOVERY | A-4(5) | 10" of cultivated soil. |
| 3 | | 2 | 2.0' | 9 14 14 10 | Wet medium dense brown silty fine to coarse sand, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 5 5 6 7 | Wet medium dense brown silty fine to coarse sand. 19" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 5 6 7 7 | Wet to saturated medium dense brown silty fine sand, trace of coarse sand. 19" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 5 6 6 7 | Saturated medium dense light brown fine to coarse sand w/ some silt, trace of gravel. 18" 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



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-025

Contract: 25-113-01

Boring Location: Sta. 390+00.00, 123' Rt. C.L.

Boring Surface Elev.: + 65.11'

Reference:

| | | | | | |
|---|--|-------------|------------------------------|--|------------|
| Wt. of Casing Hammer: | | 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 3/13/2008 | Time | 4.0' | 2.0' | 1.9' | |

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.;

3 Dia. U-Sample Boring: Ft.
 No. of U-Samples: ;
 Core Drilling in Rock: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Dan Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|-------------------------|
| | 3/13/08 | 1 | 1.0' | 3 | Wet firm brown clayey silt w/ some fine to coarse sand and gravel. 12" RECOVERY | A-4(0) | 12" of cultivated soil. |
| | | | 2.0' | 4 | | | |
| 3 | | 2 | 2.0' | 9 | Wet medium dense gray and brown fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| | | | 4.0' | 15 | | | |
| 6 | | 3 | 4.0' | 8 | Wet to saturated medium dense orange silty fine to coarse sand, trace of gravel. 15" RECOVERY | A-2-4(0) | |
| | | | 6.0' | 12 | | | |
| 9 | | 4 | 6.0' | 8 | Saturated medium dense orange fine to coarse sand w/ some silt, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| | | | 8.0' | 8 | | | |
| 12 | | 5 | 8.0' | 4 | Saturated loose orange coarse to fine sand w/ some silt, trace of gravel. 16" RECOVERY | A-1-b | |
| | | | 10.0' | 3 | | | |
| 15 | | 6 | 10.0' | 4 | Saturated loose orange coarse to fine sand w/ some silt, trace of gravel. 19" RECOVERY | A-2-4(0) | |
| | | | 12.0' | 3 | | | |
| | | 7 | 12.0' | 2 | Saturated very loose orange fine to coarse sand w/ some silt, trace of gravel. 20" RECOVERY | A-2-4(0) | |
| | | | 14.0' | 2 | | | |
| | | 8 | 14.0' | 3 | Saturated medium dense orange fine to coarse sand w/ some silt, trace of gravel. 22" RECOVERY | A-2-4(0) | |
| | | | 16.0' | 10 | | | |
| | | | | | 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

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-026

Contract: 25-113-01

Boring Location: Sta. 395+00.00, 124' Lt. C.L.

Boring Surface Elev.: + 63.43'

Reference:

| | | | | | |
|---|--|-------------|------------------------------|--|------------|
| Wt. of Casing Hammer: | | 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 |
| | 3/13/2008 | | 4.0' | 2.0' | 0.6' | |

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: Dan Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|--------------|
| | | 1 | 0.0' | WOH 1 1 1 | Wet soft brown fine to coarse sandy clay w/ some organic matter, trace of gravel. | A-6(3) | |
| | | | 2.0' | | 12" RECOVERY | | |
| 3 | | 2 | 2.0' | 9 12 11 9 | Wet medium dense gray clayey coarse to fine sand, trace of gravel. | A-2-4(0) | |
| | | | 4.0' | | 15" RECOVERY | | |
| | | 3 | 4.0' | 4 4 4 8 | Saturated loose gray to orange silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 3 5 8 8 | Saturated 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' | 3 4 3 2 | Saturated loose orange coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 10.0' | | 18" RECOVERY | | |
| | | 6 | 10.0' | 4 4 5 6 | Saturated loose orange coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 12 | | | 12.0' | | 21" RECOVERY | | |
| | | 7 | 12.0' | 7 11 16 13 | Saturated medium dense orange fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 14.0' | | 18" RECOVERY | | |
| 15 | | 8 | 14.0' | 8 6 5 7 | Saturated medium dense green fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | Glauconitic. |
| | | | 16.0' | | 15" RECOVERY | | |
| | | | | | Boring terminated at 16.0 feet. | | |

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-027

Contract: 25-113-01

Boring Location: Sta. 400+00.00, 45' Rt. C.L.

Boring Surface Elev.: + 67.23'

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 |
| | | 3/13/2008 | | 8.0' | 6.0' | 4.4' | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|------|--|------------------------|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 10.0 | Ft.; | | No. of: 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: Dan Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|----------------|
| | 3/13/08 | 1 | 0.5' | 2 4 7 | Wet stiff brown and gray mottled clayey silt, trace of fine to coarse sand. 15" RECOVERY | A-4(3) | 8" of topsoil. |
| 3 | | 2 | 2.0' | 7 14 17 16 | Wet dense brown silty fine to coarse sand, trace of gravel. 14" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 8 8 11 17 | Wet very stiff gray and brown fine to coarse sandy silt w/ some clay, trace of gravel. 18" RECOVERY | A-4(0) | |
| 6 | | 4 | 6.0' | 16 12 11 10 | Saturated medium dense brown and light brown silty fine to coarse sand, trace of gravel. 20" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 4 6 4 4 | Saturated stiff brown and light brown fine to coarse sandy silt, trace of gravel. 24" RECOVERY | A-4(0) | |
| 9 | | | 10.0' | | Boring terminated at 10.0'. | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelly

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-028

Contract: 25-113-01

Boring Location: Sta. 405+00.00, 138' Lt. C.L.

Boring Surface Elev.: + 66.17'

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: | | 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 |
| | 3/13/2008 | | 6.0' | 4.0' | 2.1' | |

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.;
 No. of U-Sample Boring: 3 Ft.
 Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Dan Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| | | 1 | 0.0' | WOH 2 4 | Wet soft gray and brown clayey silt, trace of gravel and fine to coarse sand. | A-4(6) | |
| | | | 2.0' | | 16" RECOVERY | | |
| 3 | | 2 | 2.0' | 12 16 13 15 | Wet medium dense gray fine to coarse sand w/ some clay and gravel. | A-2-4(0) | |
| | | | 4.0' | | 17" RECOVERY | | |
| | | 3 | 4.0' | 8 9 10 10 | Saturated medium dense gray coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 24" RECOVERY | | |
| | | 4 | 6.0' | 2 6 6 5 | Saturated medium dense gray silty coarse to fine sand, trace of gravel. | A-2-4(0) | |
| | | | 8.0' | | 16" RECOVERY | | |
| 9 | | 5 | 8.0' | 2 1 2 2 | Saturated very loose brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 10.0' | | 21" RECOVERY | | |
| | | 6 | 10.0' | 1 1 1 2 | Saturated very loose brown silty fine sand w/ some coarse sand. | A-2-4(0) | |
| 12 | | | 12.0' | | 19" RECOVERY | | |
| | | 7 | 12.0' | 2 2 2 2 | Saturated very loose brown silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 14.0' | | 20" RECOVERY | | |
| 15 | | 8 | 14.0' | 2 4 11 14 | Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 16.0' | | 24" 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 borings were drilled on 3/13/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-029

Contract: 25-113-01

Boring Location: Sta. 415+00.00, 164' Rt. C.L.

Boring Surface Elev.: + 69.00'

Reference:

| | | | | | |
|-----------------------|-------------------------|------|---------------------|----|-----|
| Wt. of Casing Hammer: | | 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 |
| | | 3/12/2008 | | 10.0' | 8.0' | 6.3' | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|------|------------------------|---|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 16.0 | Ft.; | No. of: | 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: Tom Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|---|-------------|-------------------------|
| | 3/12/08 | 1 | 1.0' | 2 | Wet soft light brown clayey silt, trace of fine to coarse sand and gravel. | A-4(5) | 12" of cultivated soil. |
| | | | 2.0' | 2 | | | |
| 3 | | 2 | 2.0' | 3 | 9" RECOVERY | A-2-4(0) | |
| | | | | 9 | Wet medium dense brown silty fine to coarse sand w/ some gravel. | | |
| | | | | 12 | | | |
| | | | | 14 | | | |
| | | | 4.0' | | 13" RECOVERY | | |
| | | 3 | 4.0' | 6 | Wet medium dense orange silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| | | | | 9 | | | |
| | | | | 9 | | | |
| | | | | 10 | | | |
| 6 | | | 6.0' | | 13" RECOVERY | | |
| | | 4 | 6.0' | 6 | Saturated medium dense orange silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| | | | | 7 | | | |
| | | | | 6 | | | |
| | | | | 6 | | | |
| | | | 8.0' | | 18" RECOVERY | | |
| 9 | | 5 | 8.0' | 2 | Saturated very loose orange coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | | 2 | | | |
| | | | | 2 | | | |
| | | | | 3 | | | |
| | | | 10.0' | | 22" RECOVERY | | |
| | | 6 | 10.0' | 3 | Saturated loose orange coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | | 2 | | | |
| | | | | 3 | | | |
| | | | | 3 | | | |
| 12 | | | 12.0' | | 14" RECOVERY | | |
| | | 7 | 12.0' | 3 | Saturated loose orange silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| | | | | 2 | | | |
| | | | | 3 | | | |
| | | | | 3 | | | |
| | | | | 4 | | | |
| | | | 14.0' | | 18" RECOVERY | | |
| 15 | | 8 | 14.0' | 2 | Saturated loose light brown fine to coarse sand, trace of silt and gravel. | A-3 | |
| | | | | 3 | | | |
| | | | | 4 | | | |
| | | | | 4 | | | |
| | | | 16.0' | | 16" 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



Poorly 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. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R2-030

Contract: 25-113-01

Boring Location: Sta. 420+00.00, 43' Lt. C.L.

Boring Surface Elev.: + 70.90'

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 3/12/2008 | Time | Depth of Hole 8.0' | Depth of Casing 6.0' | Depth of Water 4.6' | Elev. of Water |

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: Tom Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-------------------------|
| | 3/12/08 | 1 | 1.0' | 2 1 | Wet soft brown fine to coarse sandy silt w/ some clay, trace of gravel. 10" RECOVERY | A-4(0) | 10" of cultivated soil. |
| 3 | | 2 | 2.0' | 3 5 6 6 | Wet stiff gray fine sandy clay w/ some coarse sand, trace of gravel. 19" RECOVERY | A-6(2) | |
| | | 3 | 4.0' | 2 7 12 14 | Saturated medium dense gray clayey coarse to fine sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 15 16 17 12 | Saturated dense light brown silty coarse to fine sand w/ some gravel. 21" RECOVERY | A-1-b | |
| 9 | | 5 | 8.0' | 5 5 5 | Saturated loose light brown coarse sand w/ some silt and fine sand, trace of gravel. 17" RECOVERY | A-1-b | |
| | | | 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



Poorly graded clayey
silty sand



Clayey sand



Silty sand

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. Borings Backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R2-031

Contract: 25-113-01

Boring Location: Sta. 425+00.00, 130' Rt. C.L.

Boring Surface Elev.: + 73.30'

Reference:

| | | | | | |
|---|--|-------------|------------------------------|--|------------|
| Wt. of Casing Hammer: | | 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 |
| | 3/12/2008 | | 12.0' | 10.0' | 9.5' | |

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: Tom Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|-------------------------|
| | 3/12/08 | 1 | 1.0' | 2 3 | Moist firm brown clayey fine sandy silt w/ some coarse sand. | A-4(2) | 10" of cultivated soil. |
| | | 2 | 2.0' | 3 5 7 4 | 8" RECOVERY Moist stiff brown fine sandy silt w/ some coarse sand, trace of gravel. | A-4(0) | |
| 3 | | 3 | 4.0' | 4 5 7 7 | 18" RECOVERY Moist medium dense light brown clayey fine to coarse sand, trace of gravel. | A-2-4(0) | |
| 6 | | 4 | 6.0' | 8 10 12 15 | 15" RECOVERY Wet very stiff gray fine to coarse sandy clay, trace of gravel. | A-6(2) | |
| 9 | | 5 | 8.0' | 5 9 9 7 | 21" RECOVERY Wet medium dense light brown fine to coarse sand w/ some clay and gravel. | A-2-4(0) | |
| 12 | | 6 | 10.0' | 3 3 3 4 | 19" RECOVERY Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 15 | | 7 | 12.0' | 3 3 3 4 | 15" RECOVERY Saturated loose light brown fine sand w/ some silt and coarse sand, trace of gravel. | A-2-4(0) | |
| | | 8 | 14.0' | 2 1 1 4 | 15" RECOVERY Saturated very loose light brown fine sand w/ some silt and coarse sand. | A-2-4(0) | |
| | | | 16.0' | | 20" 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



Poorly graded clayey
silty sand



Clayey sand

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.: R2-032

Contract: 25-113-01

Boring Location: Sta. 430+00.00, 152' Lt. C.L.

Boring Surface Elev.: + 68.00'

Reference:

| | | | | | |
|------------------------------|--------------------------------|-------------|----------------------------|----|------------|
| Wt. of Casing Hammer: | | 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 |
| 3/12/2008 | | 10.0' | 8.0' | 7.6' | |

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: Tom Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------|
| | 3/12/08 | 1 | 1.0' | 2 3 | Wet firm brown clay, trace of fine to coarse sand and gravel. | A-6(10) | 10" of cultivated soil. |
| | | | 2.0' | | 10" RECOVERY | | |
| 3 | | 2 | 2.0' | 4 12 14 16 | Wet medium dense light brown silty fine to coarse sand w/ some gravel. | A-2-4(0) | |
| | | | 4.0' | | 15" RECOVERY | | |
| | | 3 | 4.0' | 4 5 10 10 | Wet medium dense light brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 6 | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 5 7 6 6 | Saturated medium dense light brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 8.0' | | 17" RECOVERY | | |
| 9 | | 5 | 8.0' | 2 2 3 3 | Saturated very loose light brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 10.0' | | 17" RECOVERY | | |
| | | 6 | 10.0' | 2 3 3 5 | Saturated loose light brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 12 | | | 12.0' | | 15" RECOVERY | | |
| | | 7 | 12.0' | 2 2 1 1 | Saturated very loose light brown coarse to fine sand w/ some silt and gravel. | A-1-b | |
| | | | 14.0' | | 12" RECOVERY | | |
| 15 | | 8 | 14.0' | 8 13 13 11 | Saturated medium dense light brown fine sand and gravel w/ some silt and coarse sand. | A-2-4(0) | |
| | | | 16.0' | | 8" 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 borings were drilled on 3/12/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-033

Contract: 25-113-01

Boring Location: Sta. 433+21.61, 12' Lt. C.L.

Boring Surface Elev.: + 72.00'

Reference:

| | | | | | |
|------------------------------|--------------------------------|-------------|----------------------------|----|------------|
| Wt. of Casing Hammer: | | 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 |
| 3/31/2008 | | 12.0' | 10.0' | 9.0' | |

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: | | | Core Drilling in Rock: | | |

Boring Contractor: Walton Corporation
Driller: Gary Truver Sr.
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|------------------------|
| | 3/31/08 | 1 | 0.5' | 4 4 6 | Moist stiff brown clayey silt w/ some fine to coarse sand, trace of gravel. 18" RECOVERY | A-4(4) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 5 6 8 6 | Moist medium dense orange-brown clayey coarse to fine sand w/ some gravel. 15" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 5 6 10 13 | Moist medium dense light brown coarse to fine sand w/ some silt and gravel. 16" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 15 13 12 9 | Moist medium dense light brown coarse sand and gravel w/ some silt and fine sand. 17" RECOVERY | A-1-b | |
| | | 5 | 8.0' | 4 2 4 4 | Wet loose light brown coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY | A-1-b | |
| 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



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/31/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-034

Contract: 25-113-01

Boring Location: Sta. 439+68.81, 29' Lt. C.L.

Boring Surface Elev.: + 67.00'

Reference:

| | | | | | |
|------------------------------|--------------------------------|-------------|----------------------------|----|------------|
| Wt. of Casing Hammer: | | 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 |
| 3/12/2008 | | 10.0' | 8.0' | 7.7' | |

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: Dan Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|--|-------------|----------------|
| | 3/12/08 | 1 | 0.5' | 1 2 | Moist soft brown clay, trace of fine to coarse sand. 16" RECOVERY | A-6(11) | 8" of topsoil. |
| 3 | | 2 | 2.0' | 3 7 10 11 | Moist medium dense light brown coarse sand w/ some clay, fine sand, and gravel. 10" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 5 6 5 7 | Wet medium dense orange and light brown clayey coarse sand w/ some fine sand and gravel. 15" RECOVERY | A-2-6(0) | |
| 6 | | 4 | 6.0' | 5 6 8 7 | Wet medium dense orange and light brown silty fine to coarse sand w/ some gravel. 20" RECOVERY | A-2-4(0) | |
| 9 | | 5 | 8.0' | 4 7 9 6 | Wet medium dense orange and light brown silty coarse sand w/ some organic matter, fine sand, and gravel. 17" RECOVERY | A-1-b | |
| | | | 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



Clayey sand



Silty sand

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. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R2-035

Contract: 25-113-01

Boring Location: Sta. 444+00.00, 80' Lt. C.L.

Boring Surface Elev.: + 56.45'

Reference:

| | | | | | |
|---|--|-------------|------------------------------|--|------------|
| Wt. of Casing Hammer: | | 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 3/12/2008 | Time | Depth of Hole 6.0' | Depth of Casing 4.0' | Depth of Water 3.0' | Elev. of Water |

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: Dan Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|---------|
| | 3/12/08 | 1 | 0.0' | 1 2 5 5 | Wet loose black clayey gravel and coarse sand w/ some organic matter and fine sand. | A-2-4(0) | |
| | | | 2.0' | | 16" RECOVERY | | |
| 3 | | 2 | 2.0' | 2 4 3 4 | Saturated loose black clayey organic gravel and fine sand w/ some coarse sand. | A-2-7(1) | |
| | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | 1 2 4 7 | Saturated loose green silty fine sand w/ some coarse sand. | A-2-4(0) | |
| 6 | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 2 7 7 10 | Saturated medium dense green clayey fine sand, trace of coarse sand. | A-2-6(0) | |
| | | | 8.0' | | 17" RECOVERY | | |
| 9 | | 5 | 8.0' | 2 10 10 13 | Saturated medium dense green clayey fine sand w/ some coarse sand, trace of gravel. | A-2-6(1) | |
| | | | 10.0' | | 21" 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 sand



Clayey sand

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. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report
5. Results of tests conducted on samples recovered are reported on the logs.
6. All 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.: R2-036

Contract: 25-113-01

Boring Location: Sta. 423+98.47, 528' Rt. C.L.

Boring Surface Elev.: + 72.64'

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 |
| 3/24/2008 | | 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: | | | Core Drilling in Rock: | | |

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|------------------------|
| | 3/24/08 | 1 | 0.5' | 2 2 3 | Moist firm brown clay w/ some fine to coarse sand. | A-6(9) | 6" of cultivated soil. |
| | | | 2.0' | | 13" RECOVERY | | |
| 3 | | 2 | 2.0' | 8 17 14 12 | Moist dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 4.0' | | 16" RECOVERY | | |
| | | 3 | 4.0' | 5 9 13 15 | Moist medium dense light brown coarse sand w/ some fine sand and gravel, trace of clay. | A-1-b | |
| 6 | | | 6.0' | | 17" RECOVERY | | |
| | | 4 | 6.0' | 12 13 13 12 | Moist medium dense light brown coarse sand w/ some fine sand and silt, trace of gravel. | A-1-b | |
| | | | 8.0' | | 19" RECOVERY | | |
| 9 | | 5 | 8.0' | 6 7 6 8 | Wet medium dense light brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | | 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

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/24/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-037

Contract: 25-113-01

Boring Location: Sta. 262+97.95, 360' Lt. C.L.

Boring Surface Elev.: + 54.19'

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 | |
| 3/24/2008 | | | | | | |

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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|---|-------------|------------------------|
| | 3/24/08 | 1 | 0.5' | 2 3 5 | Moist firm brown clayey silt w/ some coarse to fine sand, trace of gravel. 18" RECOVERY | A-4(2) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 9 9 8 8 | Moist medium dense orange-brown silty fine to coarse sand, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 4 6 7 11 | Moist medium dense orange-brown silty fine to coarse sand, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 9 9 9 9 | Moist medium dense orange-brown silty fine to coarse sand, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| 9 | | 5 | 8.0' | 7 5 6 4 | Wet medium dense orange-brown silty fine sand w/ some coarse sand, trace of gravel. 20" RECOVERY | A-2-4(0) | |
| 12 | | | 10.0' | | Boring terminated at 10.0 feet. | | |
| 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 3/24/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-038

Contract: 25-113-01

Boring Location: Sta. 262+76.25, 515 Rt. C.L.

Boring Surface Elev.: + 38.96'

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: | 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 |
| 3/24/2008 | | 4.0' | 2.0' | 1.0' | |

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: | | | Core Drilling in Rock: | | |

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|-------------------|
| | 3/24/08 | 1 | 0.0' | 1 1 1 | Wet soft brown organic silt w/ some fine to coarse sand, trace of gravel. 18" RECOVERY | A-5(5) | 1" of leaf litter |
| | | 1A | 1.5' | 1 | Saturated very loose gray coarse to fine sand w/ some silt, trace of gravel. 6" RECOVERY | A-2-4(0) | |
| 3 | | 2 | 2.0' | 3 6 2 1 | Saturated loose gray coarse to fine sand, trace of silt and gravel. 14" RECOVERY | A-1-b | |
| | | 3 | 4.0' | 2 1 1 1 | Saturated very loose gray coarse to fine sand, trace of silt and gravel. 4" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 1 1 2 2 | Saturated very loose black fine to coarse sand w/ some silt and gravel, trace of organic matter. 16" RECOVERY | A-1-b | |
| | | 5 | 8.0' | 5 12 6 5 | Saturated medium dense green and brown fine to coarse sand w/ some silt. 9" RECOVERY | A-2-4(0) | Glauconitic. |
| 9 | | 6 | 10.0' | 5 6 6 8 | Saturated medium dense green and brown fine to coarse sand w/ some silt. 18" RECOVERY | A-2-4(0) | Glauconitic. |
| 12 | | 7 | 12.0' | 7 9 13 15 | Saturated medium dense green and brown fine to coarse sand w/ some silt. 17" RECOVERY | A-2-4(0) | Glauconitic. |
| | | 8 | 14.0' | 7 10 18 24 | Saturated medium dense green and brown fine to coarse sand w/ some silt. 16" RECOVERY | A-2-4(0) | Glauconitic. |
| 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 3/24/2008 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.: R2-039

Contract: 25-113-01

Boring Location: Sta. 253+06.03, 395' Lt. C.L.

Boring Surface Elev.: + 63.36'

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 |
| 3/24/2008 | | 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: | | | Core Drilling in Rock: | | |

Boring Contractor: Walton Corporation
Driller: Dan Taylor
Helpers: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|------------------------|
| | 3/24/08 | 1 | 0.5' | 1 2 3 | Moist firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 18" RECOVERY | A-4(3) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 2 3 4 9 | Moist loose orange-brown clayey coarse to fine sand, trace of gravel. 18" RECOVERY | A-2-6(0) | |
| | | 3 | 4.0' | 7 8 12 14 | Moist medium dense orange-brown clayey fine sand w/ some coarse sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 11 12 11 11 | Moist medium dense orange-brown silty fine sand, trace of coarse sand and gravel. 18" RECOVERY | A-2-4(0) | |
| 9 | | 5 | 8.0' | 6 7 6 3 | Moist medium dense light brown fine to coarse sand w/ some silt, trace of gravel. 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



Silty low plasticity
clay



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/24/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling. Borings backfilled upon completion.
3. Surveyed boring locations and elevations were provided by Century engineering.
4. These logs are subject to the limitations, conclusions, and 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.: R2-040

Contract: 25-113-01

Boring Location: Sta. 251+45.23, 409' Rt. C.L.

Boring Surface Elev.: + 62.15'

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 |
| | 3/24/2008 | | 16.0' | 14.0' | 14.3' | |

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: Amber Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|--|-------------|------------------------|
| | 3/24/08 | 1 | 0.5' | 2 2 2 | Wet very loose brown fine sand w/ some coarse sand and clay, trace of gravel. 18" RECOVERY | A-2-4(0) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 2 2 3 3 | Wet firm brown clayey fine sandy silt, trace of coarse sand and gravel. 19" RECOVERY | A-4(0) | |
| | | 3 | 4.0' | 3 3 4 4 | Wet firm orange-brown fine sandy silt, trace of coarse sand. 15" RECOVERY | A-4(0) | |
| 6 | | 4 | 6.0' | 3 2 3 3 | Wet firm orange-brown fine sandy silt, trace of coarse sand and gravel. 20" RECOVERY | A-4(0) | |
| 9 | | 5 | 8.0' | 3 3 4 6 | Wet loose orange-brown silty fine to coarse sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| | | 6 | 10.0' | 4 4 4 3 | Wet loose orange-brown silty fine to coarse sand, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| 12 | | 7 | 12.0' | 5 6 5 5 | Wet medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. 19" RECOVERY | A-1-b | |
| 15 | | 8 | 14.0' | 4 4 3 4 | Wet loose light brown coarse to fine sand w/ some silt, trace of gravel. 16" 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



Poorly graded clayey
silty sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/24/2008 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 S.R.1

Boring No.: R3-S-01

Contract: 25-113-01

Boring Location: Sta. 106+00, C.L.

Boring Surface Elev.: + 68.47

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: | 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 |
| | | 12/15/2008 | | 12.0' | 10.0' | 8.0' | |

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: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|----------------------------------|
| | 12/15/08 | 1 | 0.0' | | No Sample | | Asphalt - 6". Crusher Run - 18". |
| | | | 2.0' | | 0" RECOVERY | | |
| | | 2 | 2.0' | 7 5 7 10 | Moist stiff gray silt w/some clay and fine to coarse sand, trace of gravel. | A-4(2) | |
| 3.5 | | | 4.0' | | 16" RECOVERY | | |
| | | 3 | 4.0' | 4 7 8 10 | Moist stiff gray fine to coarse sandy silt w/ some clay, trace of gravel. | A-4(0) | |
| | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 11 11 12 12 | Wet medium dense light brown coarse to fine sand w/some silt, trace of gravel. | A-1-b | |
| 7 | | | 8.0' | | 20" RECOVERY | | |
| | | 5 | 8.0' | 4 8 7 9 | Saturated medium dense orange coarse sand and gravel w/some fine sand and silt. | A-1-b | |
| | | | 10.0' | | 14" RECOVERY | | |
| 10.5 | | 6 | 10.0' | 6 7 9 10 | Saturated medium dense orange coarse to fine sand and gravel w/trace of silt. | A-1-b | |
| | | | 12.0' | | 15" RECOVERY | | |
| | | 7 | 12.0' | 7 8 7 7 | Saturated medium dense orange coarse to fine sand w/some gravel, trace of silt. | A-1-b | |
| 14 | | | 14.0' | | 15" RECOVERY | | |
| | | 8 | 14.0' | 7 6 7 12 | Saturated medium dense orange coarse to fine sand w/trace of silt and gravel. | A-1-b | |
| | | | 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



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 12/15/2008 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.: R3-S-02

Contract: 25-113-01

Boring Location: Sta. 159+00, 410.00' Rt. C.L.

Boring Surface Elev.: + 73.46

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 |
| | 1/15/2009 | | 12.0' | 10.0' | 11.2' | |

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: | | Ft.; | Core Drilling in Rock: | Ft. |

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

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|---|-------------|----------------|
| | 1/15/09 | 1 | 1.0' | 3 4 | Wet firm brown clayey silt w/some fine sand, trace of coarse sand and gravel. | A-4(3) | Topsoil - 12". |
| | | 2 | 2.0' | 6 8 10 9 | 10" RECOVERY Wet very stiff brown fine to coarse sandy silt w/trace of gravel. | A-4(0) | |
| 3.5 | | 3 | 4.0' | 3 4 7 6 | 20" RECOVERY Wet medium dense orange fine to coarse sand w/some silt. | A-2-4(0) | |
| | | 4 | 6.0' | 6 8 8 9 | 16" RECOVERY Wet medium dense orange fine to coarse sand w/some silt. | A-2-4(0) | |
| 7 | | 5 | 8.0' | 2 2 3 4 | 22" RECOVERY Wet loose brown silty fine to coarse sand w/trace of gravel. | A-2-4(0) | |
| | | 6 | 10.0' | 2 4 5 5 | 19" RECOVERY Wet loose brown coarse to fine sand w/some gravel, trace of silt. | A-1-b | |
| 10.5 | | 7 | 12.0' | 4 5 4 5 | 13" RECOVERY Wet loose brown coarse to fine sand w/some silt, trace of gravel. | A-1-b | |
| 14 | | 8 | 14.0' | 3 3 4 5 | 17" RECOVERY Wet loose brown fine to coarse sand w/some gravel, trace of silt. | A-3 | |
| | | | 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



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/15/2009 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 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.: R3-S-03

Contract: 25-113-01

Boring Location: Sta. 218+00, C.L.

Boring Surface Elev.: + 69.09

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 12/15/2008

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.;

Dia. U-Sample Boring:

No. of:

Core Drilling in Rock:

U-Samples:

Ft.

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 |
|-------------|----------------|-----|--------------|----------|---|-------------|------------------------|
| | 12/15/08 | 1 | 1.0' | 4 | Moist loose brown clayey coarse to fine sand w/some gravel. | A-2-4(0) | Cultivated Soil - 10". |
| | | 2 | 2.0' | 7 | 12" RECOVERY | A-1-b | |
| 3.5 | | | 2.0' | 7 | Moist medium dense orange coarse sand w/ some fine sand, silt and gravel. | | |
| | | | 4.0' | 5 | 20" RECOVERY | | |
| | | 3 | 4.0' | 7 | Moist medium dense orange coarse sand w/ some fine sand and silt, trace of gravel. | A-1-b | |
| | | | 4.0' | 5 | 15" RECOVERY | | |
| | | | 6.0' | 8 | Moist medium dense orange coarse to fine sand w/some silt, trace of gravel. | A-1-b | |
| 7 | | | 6.0' | 9 | 20" RECOVERY | | |
| | | | 8.0' | 3 | Moist very loose orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| | | | 8.0' | 2 | 22" RECOVERY | | |
| | | | 10.0' | 4 | Moist loose orangish brown coarse sand w/ some fine sand, trace of silt and gravel. | A-1-b | |
| 10.5 | | | 10.0' | 5 | 20" RECOVERY | | |
| | | | 12.0' | 4 | Moist medium dense orangish brown coarse sand w/some fine sand and silt, trace of gravel. | A-1-b | |
| | | | 12.0' | 6 | 17" RECOVERY | | |
| | | | 14.0' | 7 | Wet loose orange silty fine sand w/trace of coarse sand and gravel. | A-2-4(0) | |
| 14 | | | 14.0' | 4 | 14" RECOVERY | | |
| | | | 16.0' | 7 | End of Boring | | |
| | | | 16.0' | 4 | | | |
| | | | 16.0' | 5 | | | |
| 17.5 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



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 12/15/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: R3-S-04

Contract: 25-113-01

Boring Location: Sta. 211+00, C.L.

Boring Surface Elev.: + 59.32

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 |
|------------|------|---------------|-----------------|----------------|----------------|
| 12/10/2008 | | 12.0' | 10.0' | 11.9' | |

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: Gary Truver

Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|---|-------------|------------------------|
| | 12/10/08 | 1 | 1.0' | | Wet soft orangish brown clayey fine to coarse sandy silt w/trace of gravel. | A-4(0) | Cultivated Soil - 11". |
| | | 2 | 2.0' | 4 3 3 5 | 12" RECOVERY Wet loose orange silty fine to coarse sand. | A-2-4(0) | |
| 3.5 | | | 4.0' | | 17" RECOVERY | | |
| | | 3 | 4.0' | 2 4 3 5 | Wet loose orange silty fine sand w/trace of coarse sand. | A-2-4(0) | |
| | | | 6.0' | | 19" RECOVERY | | |
| 7 | | 4 | 6.0' | 4 5 4 5 | Wet loose orange silty fine sand w/trace of coarse sand. | A-2-4(0) | |
| | | | 8.0' | | 22" RECOVERY | | |
| | | 5 | 8.0' | 4 3 3 4 | Wet loose orange silty fine sand w/trace of coarse sand. | A-2-4(0) | |
| | | | 10.0' | | 24" RECOVERY | | |
| 10.5 | | 6 | 10.0' | 4 4 5 5 | Wet loose orange fine sand w/some silt and coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 12.0' | | 17" RECOVERY | | |
| | | 7 | 12.0' | 3 4 4 3 | Wet loose orangish brown coarse to fine sand w/some gravel, trace of silt. | A-1-b | |
| 14 | | | 14.0' | | 18" RECOVERY | | |
| | | 8 | 14.0' | 3 4 3 | Wet loose orangish brown coarse to fine sand w/some silt, trace of gravel. | A-1-b | |
| | | | 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



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/10/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 45B.
2. Groundwater levels recorded at the time of drilling and re-checked 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.: R3-004

Contract: 25-113-01

Boring Location: Sta. 120+47.89, 14' Lt. C.L.

Boring Surface Elev.: + 67.73'

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 3/21/08 | Time | Depth of Hole 10.0' | Depth of Casing 8.0' | Depth of Water 6.2' | Elev. of Water |

Pay Quantities:

| | | | | | |
|--|-------------|--|---|--------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: 10.0 | Ft.; | | 3 | Dia. U-Sample Boring: 3 | 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: Danny Taylor
Helpers: A. Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|------------------------|
| | 3/21/08 | 1 | 0.5' | 3 2 3 | Moist firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 16" RECOVERY | A-4(3) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 5 8 9 10 | Moist very stiff orange-brown fine to coarse sandy silt, trace of gravel. 17" RECOVERY | A-4(0) | |
| | | 3 | 4.0' | 10 11 10 8 | Wet medium dense orange-brown silty fine to coarse sand, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 8 7 8 5 | Saturated medium dense orange-brown silty fine to coarse sand, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 2 3 5 8 | Saturated firm orange-brown silty coarse to fine sand, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| 9 | | | 10.0' | | Boring Terminated at 10.0' | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

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 3/21/2008 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.: R3-005

Contract: 25-113-01

Boring Location: Sta. 125+23.73, 125' Rt. C.L.

Boring Surface Elev.: + 66.64'

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 |
| 3/21/08 | | 12.0' | 10.0' | 8.6' | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|-------------|-------------------------------|------------------------------|---|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 16.0 | Ft.; | 3 | Dia. U-Sample Boring: | 3 | 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 |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------------|
| | 3/21/08 | 1 | 0.5' | 6 7 5 | Moist medium dense orange-brown silty fine sand w/ some coarse sand and gravel. 18" RECOVERY | A-2-4(0) | 3" of topsoil; fill material. |
| 3 | | 2 | 2.0' | 4 8 7 4 | Moist medium dense orange-brown silty fine sand w/ some gravel and coarse sand. 16" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 4 3 | Moist loose orange-brown silty coarse to fine sand w/ some gravel. 8" RECOVERY | A-2-4(0) | |
| 6 | | 3A | 5.0' | 4 10 | Wet stiff orange-brown fine sand w/ some coarse sand and clay, trace of gravel. 12" RECOVERY | A-4(0) | |
| | | 4 | 6.0' | 8 7 | Wet stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 9" RECOVERY | A-4(1) | |
| | | 4A | 7.3' | 6 6 | Wet stiff black organic fine to coarse sandy silt, trace of gravel. 9" RECOVERY | A-4(0) | |
| 9 | | 5 | 8.0' | 2 6 6 5 | Saturated stiff gray fine sandy silt w/ some coarse sand, trace of clay and gravel. 20" RECOVERY | A-4(0) | |
| | | 6 | 10.0' | 8 8 7 7 | Saturated medium dense gray coarse to fine sand w/ some silt, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| 12 | | 7 | 12.0' | 6 11 13 13 | Saturated medium dense brown silty gravel and fine to coarse sand. 17" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 11 7 13 10 | Saturated medium dense brown fine to coarse sand and gravel w/ some silt. 17" RECOVERY | A-1-b | |
| 15 | | | 16.0' | | Boring terminated at 16.0' | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Silt



Silty low plasticity
clay



Low plasticity
organic silts

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/21/2008 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.: R3-006

Contract: 25-113-01

Boring Location: Sta. 130+50.00, 117' Lt. C.L.

Boring Surface Elev.: + 74.06'

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: | 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 | |
| 3/21/08 | | 6.0' | 4.0' | 3.8' | | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|---|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 16.0 | Ft.; | 3 | Dia. U-Sample Boring: | 3 | 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 |
|-------------|----------------|-----|--------------|---------------------|--|-------------|----------------------------|
| | 3/21/08 | 1 | 0.5' | 3 5 12 | Wet very stiff gray clayey silt w/ some fine to coarse sand, trace of gravel. | A-4(2) | 5" of leaf litter topsoil. |
| | | | 2.0' | | 18" RECOVERY | | |
| 3 | | 2 | 2.0' | 6 11 16 17 | Wet medium dense gray silty fine to coarse sand and gravel. | A-2-4(0) | |
| | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | 9 12 10 10 | Saturated medium dense gray silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 17" RECOVERY | | |
| | | 4 | 6.0' | 3 5 5 3 | Saturated loose gray silty fine sand w/ some coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 8.0' | | 15" RECOVERY | | |
| 9 | | 5 | 8.0' | 2 3 4 6 | Saturated loose orange-brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 10.0' | | 21" RECOVERY | | |
| | | 6 | 10.0' | 5 8 11 10 | Saturated medium dense orange-brown fine to coarse sand and gravel w/ some silt. | A-1-b | |
| 12 | | | 12.0' | | 15" RECOVERY | | |
| | | 7 | 12.0' | 8 8 7 9 | Saturated medium dense orange-brown coarse to fine sand and gravel w/ some silt. | A-1-b | |
| | | | 14.0' | | 10" RECOVERY | | |
| 15 | | 8 | 14.0' | 9 11 5 5 | Saturated medium dense orange-brown fine to coarse sand and gravel, trace of silt. | A-1-b | |
| | | | 16.0' | | 8" RECOVERY | | |
| | | | | | Boring terminated at 16.0' | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/21/2008 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.: R3-007

Contract: 25-113-01

Boring Location: Sta. 135+51.74, 73' Lt. C.L.

Boring Surface Elev.: + 67.03'

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 |
| 3/21/08 | | 6.0' | 4.0' | 2.0' | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|-------------|-------------------------------|------------------------------|---|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 10.0 | Ft.; | 3 | Dia. U-Sample Boring: | 3 | 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: Danny Taylor
Helpers: A. Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|----------------|
| | 3/21/08 | 1 | 0.5' | 6 6 9 | Wet stiff gray clayey silt w/ fine to coarse sand, trace of gravel. 17" RECOVERY | A-4(4) | 5" of topsoil. |
| 3 | | 2 | 2.0' | 11 12 16 20 | Saturated medium dense gray silty fine to coarse sand w/ some gravel. 18" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 8 14 16 13 | Saturated medium dense gray silty fine to coarse sand w/ some gravel. 15" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 8 10 8 7 | Saturated medium dense gray silty fine to coarse sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 3 5 5 | Saturated loose gray silty coarse to fine sand, trace of gravel. 24" RECOVERY | A-2-4(0) | |
| 9 | | | 10.0' | | Boring terminated at 10.0' | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

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 3/21/2008 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.: R3-009

Contract: 25-113-01

Boring Location: Sta. 145+44.04, 111' Rt. C.L.

Boring Surface Elev.: + 72.76'

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 |
| | 3/21/08 | | 10.0' | 8.0' | 6.0' | |

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.;

3 Dia. U-Sample Boring: 3 Ft.
 No. of U-Samples: ;
 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 |
|-------------|----------------|-----|--------------|--------------------|--|-------------|----------------|
| | 3/21/08 | 1 | 0.5' | 3 3 5 | Wet firm brown clayey silt w/ some coarse to fine sand, trace of gravel. 16" RECOVERY | A-4(3) | 4" of topsoil. |
| 3 | | 2 | 2.0' | 5 7 7 10 | Wet medium dense brown silty coarse to fine sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 5 9 11 11 | Wet medium dense light brown silty fine to coarse sand. 15" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 6 8 8 6 | Saturated medium dense light brown silty fine to coarse sand. 18" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 2 5 6 5 | Saturated medium dense light brown silty fine sand w/ some coarse sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| 9 | | 6 | 10.0' | 3 4 5 7 | Saturated loose gray silty fine to coarse sand, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| | | 7 | 12.0' | 2 4 6 8 | Saturated loose gray silty fine to coarse sand, trace of gravel. 19" RECOVERY | A-2-4(0) | |
| 12 | | 8 | 14.0' | 6 7 10 10 | Saturated medium dense gray coarse to fine sand and gravel w/ some silt. 18" RECOVERY | A-1-b | |
| 15 | | | 16.0' | | Boring terminated at 16.0' | | |

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 3/21/2008 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.: R3-010

Contract: 25-113-01

Boring Location: Sta. 150+50.23, 45' Lt. C.L.

Boring Surface Elev.: + 63.59'

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 |
| 3/21/08 | | 10.0' | 8.0' | 6.1' | |

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: 3 Ft.
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: 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 |
|-------------|----------------|-----|--------------|---------------------|---|-------------|----------------------------|
| | 3/21/08 | 1 | 0.5' | 1 2 | Wet soft brown clayey silt w/ some fine sand, trace of coarse sand. 18" RECOVERY | A-4(4) | 4" of leaf litter/topsoil. |
| 3 | | 2 | 2.0' | 3 6 8 8 | Wet medium dense brown silty fine to coarse sand, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 4 5 9 10 | Wet medium dense brown fine sand w/ some clay and coarse sand, trace of gravel. 20" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 11 9 10 10 | Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel. 19" RECOVERY | A-2-4(0) | |
| 9 | | 5 | 8.0' | 6 8 7 9 | Wet medium dense brown coarse to fine sand w/ some gravel and silt. 19" RECOVERY | A-1-b | |
| | | | 10.0' | | Boring terminated at 10.0' | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/21/2008 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.: R3-011

Contract: 25-113-01

Boring Location: Sta. 155+49.71, 58' Rt. C.L.

Boring Surface Elev.: +74.25

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: | 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 |
| 3/20/08 | | 10.0' | 10.0' | 9.9' | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|-------------|------------------------|------------------------------|---|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 10.0 | Ft.; | 3 | Dia. U-Sample Boring: | 3 | 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 |
|-------------|----------------|-----|--------------|--------------------|---|-------------|----------------------------|
| | 3/20/08 | 1 | 0.5' | 2 2 3 | Wet firm brown silt w/ some clay and fine sand, trace of coarse sand. 17" RECOVERY | A-4(2) | 4" of leaf litter/topsoil. |
| 3 | | 2 | 2.0' | 2 4 8 10 | Wet stiff brown clayey fine sandy silt w/ some coarse sand. 17" RECOVERY | A-4(2) | |
| | | 3 | 4.0' | 5 12 8 9 | Wet medium dense brown silty coarse to fine sand, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 10 9 10 7 | Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| 9 | | 5 | 8.0' | 7 7 7 | Wet medium dense brown coarse to fine sand w/ some silt and gravel. 17" RECOVERY | A-1-b | |
| | | | 10.0' | | Boring terminated at 10.0' | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

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 3/20/2008 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.: R3-012

Contract: 25-113-01

Boring Location: Sta. 161+05.71, 62' Rt. C.L.

Boring Surface Elev.: +77.00'

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: | 16.0 |

| | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date 3/20/08 | Time | 14.0' | 12.0' | 11.5' | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|---|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 16.0 | Ft.; | 3 | Dia. U-Sample Boring: | 3 | 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 |
|-------------|----------------|-----|--------------|-------------------|--|-------------|------------------------|
| | 3/20/08 | 1 | 1.0' | 6 5 | Wet stiff brown clayey silt w/ some fine to coarse sand, trace of gravel. | A-4(3) | 9" of cultivated soil. |
| | | 2 | 2.0' | 4 4 5 6 | 12" RECOVERY Wet loose brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| 3 | | 3 | 4.0' | 6 7 7 8 | 15" RECOVERY Wet medium dense brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| | | 4 | 6.0' | 5 5 5 6 | 19" RECOVERY Wet loose orange-brown and gray silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| 6 | | 5 | 8.0' | 6 7 8 8 | 19" RECOVERY Wet medium dense orange-brown and gray silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| | | 6 | 10.0' | 5 6 6 6 | 18" RECOVERY Wet medium dense orange-brown coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 9 | | 7 | 12.0' | 7 7 10 6 | 16" RECOVERY Saturated medium dense orange-brown fine to coarse sand w/ some gravel and silt. | A-1-b | |
| | | 8 | 14.0' | 2 2 4 4 | 16" RECOVERY Saturated loose orange-brown silty fine sand w/ some coarse sand. | A-2-4(0) | |
| 15 | | | 16.0' | | 18" RECOVERY Boring terminated at 16.0' | | |

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 3/20/2008 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.: R3-013

Contract: 25-113-01

Boring Location: Sta. 165+61.92, 54' Rt. C.L.

Boring Surface Elev.: + 72.10'

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: | 0.0' | To: | 10.0' |
| | Hollow Stem Auger: | | From Depth of: | | To: | |

| | | | | | | |
|----------------------|---------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 3/20/08 | | 10.0' | 10.0' | 9.8' | |

Pay Quantities:

| | | | | | | | |
|---------------------------------------|------|------|------------------------|---|-----------------------|---|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 10.0 | Ft.; | No. of: | 3 | Dia. U-Sample Boring: | 3 | Ft. |
| No. of 2 in. Dia. Shelby Tubes: | | Ft.; | U-Samples: | | | | Ft. |
| 2 1/2 in. Dia. Contin. Sample Boring: | | | Core Drilling in Rock: | | | | |

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 |
|-------------|----------------|-----|--------------|----------|--|-------------|----------------------------|
| | 3/20/08 | 1 | 1.0' | 2 | Wet soft gray clayey silt w/ some fine sand, trace of coarse sand. 12" RECOVERY | A-4(4) | 9" of leaf litter/topsoil. |
| | | | 2.0' | 2 | | | |
| 3 | | 2 | 2.0' | 4 | Wet stiff gray silt w/ some clay and fine sand, trace of coarse sand and gravel. 18" RECOVERY | A-4(2) | |
| | | | 4.0' | 6 | | | |
| | | | 4.0' | 9 | Wet medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 17" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 11 | | | |
| 6 | | | 6.0' | 8 | Wet dense orange-brown fine to coarse sand w/ some silt, trace of gravel. 19" RECOVERY | A-2-4(0) | |
| | | | 6.0' | 15 | | | |
| | | | 8.0' | 17 | Saturated medium dense brown silty fine sand w/ some coarse sand. 23" RECOVERY | A-2-4(0) | |
| 9 | | 5 | 8.0' | 18 | | | |
| | | | 10.0' | 8 | | | |
| 12 | | | | | Boring terminated at 10.0' | | |
| 15 | | | | | | | |

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 3/20/2008 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.: R3-014

Contract: 25-113-01

Boring Location: Sta. 170+67.78, 43' Rt. C.L.

Boring Surface Elev.: + 70.91'

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 |
| | 3/20/08 | | 10.0' | 8.0' | 8.1' | |

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.;

3 Dia. U-Sample Boring: 3 Ft.
 No. of U-Samples: ;
 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 |
|-------------|----------------|-----|--------------|----------------------|--|-------------|----------------|
| | 3/20/08 | 1 | 0.5' | 2 3 6 | Moist stiff gray clay, trace of fine sand. 18" RECOVERY | A-6(18) | 8" of topsoil. |
| 3 | | 2 | 2.0' | 9 9 15 | Moist very stiff gray silt w/ some fine sand, trace of coarse sand and gravel. 18" RECOVERY | A-4(0) | |
| | | 3 | 4.0' | 12 17 17 14 | Moist dense brown coarse to fine sand w/ some silt, trace of gravel. 16" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 13 11 10 13 | Wet medium dense brown silty fine sand w/ some coarse sand. 17" RECOVERY | A-2-4(0) | |
| 9 | | 5 | 8.0' | 5 5 8 7 | Saturated medium dense brown fine to coarse sand w/ some silt. 17" RECOVERY | A-2-4(0) | |
| 12 | | | 10.0' | | Boring terminated at 10.0' | | |
| 15 | | | | | | | |

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 3/20/2008 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.: R3-015

Contract: 25-113-01

Boring Location: Sta. 175+53.40, 146' Rt. C.L.

Boring Surface Elev.: + 71.93'

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 3/20/08 | Time | Depth of Hole 14.0' | Depth of Casing 12.0' | Depth of Water 9.8' | Elev. of Water |

Pay Quantities:

| | | | | | |
|--|-------------|--|-------------------------------|--------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: 16.0 | Ft.; | | 3 | Dia. U-Sample Boring: 3 | 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 |
|-------------|----------------|-----|--------------|----------------------|--|-------------|------------------------|
| | 3/20/08 | 1 | 1.0' | 2 4 | Moist firm brown clayey silt, trace of fine to coarse sand. | A-4(8) | 9" of cultivated soil. |
| | | 2 | 2.0' | 4 11 12 14 | 12" RECOVERY Moist medium dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 3 | | 3 | 4.0' | 13 23 22 18 | 15" RECOVERY Moist dense light brown silty fine to coarse sand. | A-2-4(0) | |
| | | 4 | 6.0' | 11 12 14 14 | 15" RECOVERY Moist medium dense orange-brown coarse to fine sand w/ some gravel and silt. | A-1-b | |
| | | 5 | 8.0' | 6 8 8 8 | 17" RECOVERY Wet medium dense orange-brown coarse to fine sand and gravel w/ some silt. | A-1-b | |
| 6 | | 6 | 10.0' | 4 4 5 6 | 15" RECOVERY Wet loose brown coarse to fine sand, trace of gravel and silt. | A-1-b | |
| | | 7 | 12.0' | 3 4 6 | 16" RECOVERY Saturated loose brown coarse to fine sand w/ some gravel, trace of silt. | A-1-b | |
| | | 7A | 13.5' | 4 | 18" RECOVERY Saturated soft brown fine sandy silt. | A-4(0) | |
| | | 8 | 14.0' | 2 | 6" RECOVERY Saturated medium dense brown gravel and fine sand w/ some silt and coarse sand. | A-1-b | |
| 15 | | | 14.0' | 8 14 13 | | | |
| | | | 16.0' | | 8" RECOVERY Boring terminated at 16.0' | | |

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 3/20/2008 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.: R3-016

Contract: 25-113-01

Boring Location: Sta. 180+50.00, 109' Lt. C.L.

Boring Surface Elev.: + 74.56'

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 |
| | 3/7/08 | | 16.0' | 14.0' | 12.8' | |

Pay Quantities:

| | | | | | | | |
|---------------------------------------|------|-------------|--|-------------------------------|------------------------------|---|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 16.0 | Ft.; | | 3 | Dia. U-Sample Boring: | 3 | 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: Danny Taylor
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-------------------------|
| | 3/7/08 | 1 | 1.0' | 2 4 | Moist firm brown silt w/ some clay, trace of fine to coarse sand. | A-4(4) | 12" of cultivated soil. |
| | | | 2.0' | | 11" RECOVERY | | |
| 3 | | 2 | 2.0' | 4 7 8 7 | Moist stiff brown fine sandy silt w/ some coarse sand, trace of clay and gravel. | A-4(0) | |
| | | | 4.0' | | 24" RECOVERY | | |
| | | 3 | 4.0' | 4 10 11 7 | Moist medium dense brown fine to coarse sand w/ some clay, trace of gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 18" RECOVERY | | |
| | | 4 | 6.0' | 4 11 14 15 | Moist medium dense light brown silty coarse to fine sand w/ some gravel. | A-1-b | |
| | | | 8.0' | | 20" RECOVERY | | |
| 9 | | 5 | 8.0' | 11 15 12 12 | Moist medium dense orange coarse to fine sand and gravel w/ some silt. | A-1-b | |
| | | | 10.0' | | 19" RECOVERY | | |
| | | 6 | 10.0' | 11 12 12 11 | Moist medium dense orange coarse to fine sand and gravel, trace of silt and clay. | A-1-b | |
| 12 | | | 12.0' | | 19" RECOVERY | | |
| | | 7 | 12.0' | 11 11 11 12 | Wet medium dense orange coarse to fine sand w/ some gravel, trace of silt. | A-1-b | |
| | | | 14.0' | | 21" RECOVERY | | |
| 15 | | 8 | 14.0' | 7 7 11 12 | Wet medium dense orange fine to coarse sand w/ some gravel and silt. | A-2-4(0) | |
| | | | 16.0' | | 18" RECOVERY | | |
| | | | | | Boring terminated at 16.0' | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silt



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 3/7/2008 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.: R3-017

Contract: 25-113-01

Boring Location: Sta. 185+50.00, 51' Rt. C.L.

Boring Surface Elev.: + 68.51'

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 |
| | 3/7/08 | | 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: ;
 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: Danny Taylor
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-------------------------|
| | 3/7/08 | 1 | 1.0' | 3 4 | Wet firm gray clayey silt, trace of coarse to fine sand. | A-4(8) | 10" of cultivated soil. |
| | | 2 | 2.0' | 3 5 7 10 | 12" RECOVERY Wet stiff gray clayey silt, trace of fine to coarse sand. | A-4(4) | |
| 3 | | 3 | 4.0' | 14 23 19 16 | 18" RECOVERY Wet dense brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| | | 4 | 6.0' | 12 12 15 13 | 17" RECOVERY Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 6 | | 5 | 8.0' | 6 6 7 8 | 21" RECOVERY Wet medium dense brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 10.0' | | 18" RECOVERY Boring terminated at 10.0' | | |
| 9 | | | | | | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

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 3/7/2008 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.: R3-018

Contract: 25-113-01

Boring Location: Sta. 190+50.00, 45' Lt. C.L.

Boring Surface Elev.: + 64.78'

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: 10.0' | |

| | | | | | |
|-----------------------------|-------------|----------------------------|-----------------------------|----------------------------|-----------------------|
| Water Level Readings | | | | | |
| Date 3/7/08 | Time | Depth of Hole 10.0' | Depth of Casing 8.0' | Depth of Water 7.6' | Elev. of Water |

Pay Quantities:

| | | | | | |
|--|-------------|--|---|--------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: 10.0 | Ft.; | | 3 | Dia. U-Sample Boring: 3 | 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: Danny Taylor
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-------------------------|
| | 3/7/08 | 1 | 1.0' | 2 4 | Moist firm brown and gray clayey silt w/ some fine sand, trace of coarse sand and gravel. | A-4(6) | 11" of cultivated soil. |
| | | | 2.0' | | | | |
| 3 | | 2 | 2.0' | 4 7 10 13 | 12" RECOVERY | A-4(9) | |
| | | | 4.0' | | Moist very stiff gray and brown mottled clayey silt, trace of coarse to fine sand. | | |
| | | 3 | 4.0' | 4 6 8 11 | Moist stiff gray and brown mottled clayey silt, trace of fine to coarse sand. | A-4(9) | |
| 6 | | | 6.0' | | 24" RECOVERY | | |
| | | 4 | 6.0' | 15 20 13 12 | Moist dense orange gravel and coarse sand w/ some fine sand and silt. | A-1-b | |
| | | | 8.0' | | 12" RECOVERY | | |
| 9 | | 5 | 8.0' | 9 10 12 13 | Wet very stiff orange coarse sandy silt w/ some gravel, trace of fine sand. | A-4(0) | |
| | | | 10.0' | | 18" RECOVERY | | |
| 12 | | | | | Boring terminated at 10.0' | | |
| 15 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/7/2008 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.: R3-019

Contract: 25-113-01

Boring Location: Sta. 195+50.00, 233' Lt. C.L.

Boring Surface Elev.: + 62.23'

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 |
| | 3/7/08 | | 12.0' | 10.0' | 8.1' | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|---|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 16.0 | Ft.; | 3 | Dia. U-Sample Boring: | 3 | 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: Danny Taylor
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------|
| | 3/7/08 | 1 | 1.0' | 5 10 | Moist stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel. 12" RECOVERY | A-4(1) | 10" of cultivated soil. |
| 3 | | 2 | 2.0' | 8 8 8 10 | Moist very stiff brown fine sandy silt w/ some coarse sand, gravel, and clay. 21" RECOVERY | A-4(0) | |
| | | 3 | 4.0' | 2 5 8 12 | Moist medium dense gray and orange gravel and coarse to fine sand w/ some silt. 13" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 11 11 11 8 | Wet medium dense orange coarse to fine sand, trace of silt and gravel. 21" RECOVERY | A-1-b | |
| | | 5 | 8.0' | 5 7 7 8 | Saturated stiff orange fine to coarse sandy silt, trace of gravel. 16" RECOVERY | A-4(0) | |
| | | 6 | 10.0' | 3 4 6 7 | Saturated loose orange coarse to fine sand, trace of silt and gravel. 21" RECOVERY | A-1-b | |
| 12 | | 7 | 12.0' | 4 7 10 11 | Saturated medium dense brown coarse to fine sand w/ some silt, trace of gravel. 21" RECOVERY | A-1-b | |
| | | 8 | 14.0' | WOH 2 3 5 | Saturated loose brown silty fine to coarse sand, trace of gravel. 23" RECOVERY | A-2-4(0) | |
| 15 | | | 16.0' | | Boring terminated at 16.0' | | |

Remarks:

Reviewed By: Maureen Kelley

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



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/7/2008 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.: R3-020

Contract: 25-113-01

Boring Location: Sta. 200+50.00, 168' Rt. C.L.

Boring Surface Elev.: + 63.92'

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 3/7/08 | Time | 12.0' | 10.0' | 8.6' | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|-------------|-------------------------------|------------------------------|---|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 16.0 | Ft.; | 3 | Dia. U-Sample Boring: | 3 | 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: Danny Taylor
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-------------------------|
| | 3/7/08 | 1 | 1.0' | 4 4 | Moist firm brown and gray mottled clay, trace of fine to coarse sand and gravel. | A-6(14) | 12" of cultivated soil. |
| | | | 2.0' | | 11" RECOVERY | | |
| 3 | | 2 | 2.0' | 7 12 13 10 | Moist medium dense brown fine to coarse sand w/ some clay and gravel. | A-2-4(0) | |
| | | | 4.0' | | 15" RECOVERY | | |
| | | 3 | 4.0' | 4 6 12 15 | Moist medium dense light brown clayey fine sand w/ some coarse sand, trace of gravel. | A-2-6(0) | |
| 6 | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 13 17 13 11 | Moist medium dense light brown and orange coarse to fine sand, trace of silt and gravel. | A-1-b | |
| | | | 8.0' | | 21" RECOVERY | | |
| 9 | | 5 | 8.0' | 6 4 5 4 | Wet loose brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 10.0' | | 21" RECOVERY | | |
| | | 6 | 10.0' | 4 4 | Saturated loose brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 11.0' | | 9" RECOVERY | | |
| 12 | | 6A | 11.0' | 2 10 | Saturated stiff gray silt w/ some coarse to fine sand and gravel. | A-4(0) | |
| | | | 12.0' | | 5" RECOVERY | | |
| | | 7 | 12.0' | 8 10 8 10 | Saturated medium dense orange silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 14.0' | | 23" RECOVERY | | |
| 15 | | 8 | 14.0' | 1 2 4 3 | Saturated loose orange silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| | | | 16.0' | | 15" RECOVERY | | |
| | | | | | Boring terminated at 16.0' | | |

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



Poorly graded sand
with silt



Silty sand



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/7/2008 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.: R3-021

Contract: 25-113-01

Boring Location: Sta. 205+50.00, 45' Lt. C.L.

Boring Surface Elev.: + 67.48'

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 3/7/08 | Time | Depth of Hole 10.0' | Depth of Casing 8.0' | Depth of Water Dry | Elev. of Water |

Pay Quantities:

| | | | | | |
|--|-------------|--|---|--------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: 10.0 | Ft.; | | 3 | Dia. U-Sample Boring: 3 | 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: Danny Taylor
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-------------------------|
| | 3/7/08 | 1 | 1.0' | 2 3 | Moist firm brown clayey silt, trace of fine to coarse sand. 12" RECOVERY | A-4(6) | 10" of cultivated soil. |
| 3 | | 2 | 2.0' | 3 4 6 10 | Moist stiff brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 24" RECOVERY | A-4(5) | |
| | | 3 | 4.0' | 4 10 10 10 | Moist medium dense brown fine to coarse sand w/ some silt and gravel. 18" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 9 10 44 42 | Moist very dense brown silty coarse sand and gravel w/ some fine sand. 14" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 15 15 15 13 | Moist medium dense light brown and brown gravel and coarse sand w/ some silt, trace of fine sand. 19" RECOVERY | A-1-a | |
| 9 | | | 10.0' | | Boring terminated at 10.0' | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

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 sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/7/2008 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.: R3-022

Contract: 25-113-01

Boring Location: Sta. 210+50.00, 99' Rt. C.L.

Boring Surface Elev.: + 68.89'

Reference:

| | | | | | |
|------------------------------|--------------------------------|-------------|----------------------------|----|------------|
| Wt. of Casing Hammer: | | Lbs. | Average Fall: | | IN. |
| Wt. of Sample Hammer: | 140 | Lbs. | Average Fall: | 30 | IN. |
| Type of: | D-Sampler: Split 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 |
| 3/7/08 | | 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: 3 Ft.;
 2 1/2 in. Dia. Contin. Sample Boring: Ft.; Core Drilling in Rock: U-Samples: Ft.

Boring Contractor: Walton Corporation
Driller: Danny Taylor
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------|
| | 3/7/08 | 1 | 1.0' | 3 4 | Moist firm brown clay w/ some fine sand, trace of coarse sand. | A-6(7) | 10" of cultivated soil. |
| | | 2 | 2.0' | 3 4 7 9 | 11" RECOVERY Moist medium dense brown silty fine to coarse sand w/ some gravel. | A-2-4(0) | |
| 3 | | 3 | 4.0' | 8 19 19 12 | 17" RECOVERY Moist dense brown gravel and coarse to fine sand w/ some silt. | A-1-b | |
| 6 | | 4 | 6.0' | 9 9 11 21 | 18" RECOVERY Moist medium dense brown silty coarse to fine sand w/ some gravel. | A-2-4(0) | |
| 9 | | 5 | 8.0' | 9 11 9 9 | 17" RECOVERY Moist medium dense brown coarse sand and gravel w/ some silt and fine sand. | A-1-b | |
| 12 | | | 10.0' | | 20" RECOVERY Boring terminated at 10.0' | | |
| 15 | | | | | | | |

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 3/7/2008 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.: R3-023

Contract: 25-113-01

Boring Location: Sta. 215+50.00, 336' Lt. C.L.

Boring Surface Elev.: + 67.66'

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 |
| | 3/7/08 | | 16.0' | 14.0' | 13.0' | |

Pay Quantities:

| | | | | | | | |
|---------------------------------------|------|------|------------------------|---|-----------------------|---|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 16.0 | Ft.; | No. of: | 3 | Dia. U-Sample Boring: | 3 | 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: Danny Taylor
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-------------------------|
| | 3/7/08 | 1 | 1.0' | 4 4 | Moist firm light brown clay, trace of fine to coarse sand. 10" RECOVERY | A-6(11) | 12" of cultivated soil. |
| | | 2 | 2.0' | 3 6 | Moist loose light brown silty coarse to fine sand w/ some gravel. 12" RECOVERY | A-1-b | |
| 3 | | 2A | 3.0' | 12 12 | Moist very stiff brown clay w/ some fine sand, trace of coarse sand and gravel. 10" RECOVERY | A-6(10) | |
| | | 3 | 4.0' | 4 8 9 8 | Moist medium dense orange silty coarse to fine sand, trace of gravel. 20" RECOVERY | A-2-4(0) | |
| | | 4 | 6.0' | 10 8 9 15 | Moist medium dense orange coarse sand w/ some silt, fine sand, and gravel. 23" RECOVERY | A-1-b | |
| 6 | | 5 | 8.0' | 16 21 23 18 | Moist dense brown and light brown gravel w/ some coarse to fine sand, trace of silt. 14" RECOVERY | A-1-a | |
| | | 6 | 10.0' | 12 23 9 10 | Moist dense brown and light brown coarse to fine sand and gravel, trace of silt. 20" RECOVERY | A-1-b | |
| 9 | | 7 | 12.0' | 7 7 7 7 | Wet medium dense light brown coarse to fine sand w/ some silt, trace of gravel. 15" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 6 6 8 | Wet medium dense light brown coarse to fine sand, trace of silt and gravel. 19" RECOVERY | A-1-b | |
| 12 | | | 16.0' | | Boring terminated at 16.0' | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded gravel
with silt



Description not given for:
" :=DG3"



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 3/7/2008 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.: R3-024

Contract: 25-113-01

Boring Location: Sta. 220+51.62, 169' Rt. C.L.

Boring Surface Elev.: + 71.04'

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 |
| | 3/7/08 | | 16.0' | 14.0' | 15.9' | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|---|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 16.0 | Ft.; | 3 | Dia. U-Sample Boring: | 3 | 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: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-------------------------|
| | 3/7/08 | 1 | 1.0' | 2 3 | Moist firm brown clayey silt, trace of fine to coarse sand. | A-4(8) | 10" of cultivated soil. |
| | | 2 | 2.0' | 2 3 | 10" RECOVERY | A-4(5) | |
| 3 | | 2A | 3.0' | 7 9 | Moist firm brown clayey silt w/ some fine to coarse sand. | A-1-b | |
| | | 3 | 4.0' | 4 11 11 11 | 12" RECOVERY Moist medium dense brown coarse to fine sand w/ some gravel and silt. | A-2-4(0) | |
| 6 | | 4 | 6.0' | 14 19 16 15 | 7" RECOVERY Moist medium dense brown silty coarse to fine sand, trace of gravel. | A-1-b | |
| | | 5 | 8.0' | 9 14 12 10 | 19" RECOVERY Moist dense orange and light brown gravel and fine to coarse sand w/ some silt. | A-2-4(0) | |
| 9 | | 6 | 10.0' | 5 7 7 6 | 19" RECOVERY Moist medium dense orange and light brown silty fine sand and gravel w/ some coarse sand. | A-1-b | |
| | | 7 | 12.0' | 8 19 11 11 | 15" RECOVERY Moist medium dense light brown silty coarse to fine sand w/ some gravel. | A-1-b | |
| 12 | | 8 | 14.0' | 4 7 7 6 | 22" RECOVERY Moist medium dense orange coarse sand and gravel w/ some fine sand, trace of gravel. | A-1-b | |
| | | | 16.0' | | 17" RECOVERY Wet medium dense orange coarse sand w/ some silt and fine sand, trace of gravel. | A-1-b | |
| | | | | | 20" RECOVERY Boring terminated at 16.0' | | |

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 3/7/2008 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.: R3-025

Contract: 25-113-01

Boring Location: Sta. 225+49.55, 45' Lt. C.L.

Boring Surface Elev.: + 73.88'

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: 10.0' | |

| | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date 3/6/08 | Time | 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: ;
 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: Danny Taylor
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|------------------------|
| | 3/6/08 | 1 | 0.5' | 2 2 3 | Wet firm brown clayey silt, trace of fine to coarse sand. 15" RECOVERY | A-4(7) | 8" of cultivated soil. |
| 3 | | 2 | 2.0' | 3 3 4 7 | Wet firm brown clayey fine sandy silt, trace of coarse sand. 24" RECOVERY | A-4(5) | |
| | | 3 | 4.0' | 4 5 10 9 | Wet medium dense brown silty fine to coarse sand, trace of gravel. 16" RECOVERY | A-2-4(0) | |
| 6 | | 4 | 6.0' | 5 8 10 11 | Wet medium dense brown silty fine to coarse sand, trace of gravel. 13" RECOVERY | A-2-4(0) | |
| | | 5 | 8.0' | 8 11 10 12 | Wet medium dense brown fine sand w/ some silt and coarse sand, trace of gravel. 18" RECOVERY | A-2-4(0) | |
| | | | 10.0' | | Boring terminated at 10.0' | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

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 3/7/2008 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.: R3-026

Contract: 25-113-01

Boring Location: Sta. 230+51.62, 169' Rt. C.L.

Boring Surface Elev.: + 71.31'

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 |
| | 3/4/08 | | 16.0' | 14.0' | Dry | |

Pay Quantities:

| | | | | | | | |
|---------------------------------------|------|------|------------------------|---|-----------------------|---|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 16.0 | Ft.; | No. of: | 3 | Dia. U-Sample Boring: | 3 | 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: Cesar Velasco
Helpers: A. Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------|
| | 3/4/08 | 1 | 1.0' | 5 5 | Moist stiff brown silt w/ some clay, trace of fine to coarse sand and gravel. | A-4(3) | 14" of cultivated soil. |
| | | 2 | 2.0' | 3 4 5 5 | 12" RECOVERY Moist stiff brown clayey silt, trace of fine to coarse sand and gravel. | A-4(8) | |
| 3 | | 3 | 4.0' | 3 11 14 13 | 17" RECOVERY Moist medium dense light brown gravel and coarse sand w/ some silt and fine sand. | A-1-b | |
| | | 4 | 6.0' | 8 8 7 6 | 15" RECOVERY Moist medium dense light brown silty coarse to fine sand w/ some gravel. | A-1-b | |
| 6 | | 5 | 8.0' | 4 6 7 7 | 18" RECOVERY Moist medium dense light brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | 6 | 10.0' | 5 6 6 6 | 22" RECOVERY Moist medium dense light brown coarse to fine sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 9 | | 7 | 12.0' | 3 4 4 5 | 20" RECOVERY Wet loose light brown silty fine sand, trace of coarse sand and gravel. | A-2-4(0) | |
| | | 8 | 14.0' | 5 5 6 8 | 20" RECOVERY Wet medium dense light brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| 12 | | | 16.0' | | 19" RECOVERY Boring terminated at 16.0' | | |

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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Notes:

1. Exploratory borings were drilled on 3/4/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at 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.: R3-027

Contract: 25-113-01

Boring Location: Sta. 235+47.60, 252' Lt. C.L.

Boring Surface Elev.: + 70.00'

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: | |
| | Hollow Stem Auger: | | From Depth of: | | To: | 15.4' |

| | | | | | | |
|----------------------|--------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 3/4/08 | | 15.4' | 14.0' | Dry | |

Pay Quantities:

| | | | | | | | |
|---------------------------------------|------|------|------------------------|---|-----------------------|---|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 15.4 | Ft.; | No. of: | 3 | Dia. U-Sample Boring: | 3 | 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: Cesar Velasco
Helpers: A. Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|--|-------------|-----------------------------|
| | 3/4/08 | 1 | 0.5' | 2 4 2 | Moist loose brown clayey coarse to fine sand, trace of gravel. | A-2-6(0) | 7" of cultivated soil. |
| | | | 2.0' | | 17" RECOVERY | | |
| 3 | | 2 | 2.0' | 8 8 9 8 | Moist medium dense brown silty coarse sand w/ some fine sand, trace of gravel. | A-1-b | |
| | | | 4.0' | | 17" RECOVERY | | |
| | | 3 | 4.0' | 3 4 4 6 | Moist loose brown silty fine to coarse sand, trace of gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 18" RECOVERY | | |
| | | 4 | 6.0' | 4 4 2 3 | Moist loose brown fine to coarse sand w/ some silt, trace of gravel. | A-2-4(0) | |
| | | | 8.0' | | 19" RECOVERY | | |
| 9 | | 5 | 8.0' | 2 2 3 3 | Moist loose light brown coarse to fine sand w/ some silt and gravel. | A-1-b | |
| | | | 10.0' | | 16" RECOVERY | | |
| | | 6 | 10.0' | 4 3 4 3 | Moist loose light brown coarse to fine sand w/ some silt, trace of gravel. | A-1-b | |
| 12 | | | 12.0' | | 19" RECOVERY | | |
| | | 7 | 12.0' | 2 3 4 4 | Moist loose light brown silty fine to coarse sand w/ some gravel. | A-2-4(0) | |
| | | | 14.0' | | 20" RECOVERY | | |
| 15 | | 8 | 14.0' | 6 7 50/5" | Moist very dense light brown coarse to fine sand and gravel w/ some silt. | A-1-b | Boring terminated at 16.0'. |
| | | | 16.0' | | 12" RECOVERY | | |
| | | | | | Boring terminated at 16.0' | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 3/4/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at 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.: R3-028

Contract: 25-113-01

Boring Location: Sta. 240+50.00, 45' Rt. C.L.

Boring Surface Elev.: + 63.40'

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 | |
| 3/4/08 | | | | | | |

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: Cesar Velasco
Helpers: A. Joseph

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|------------------------|
| | 3/4/08 | 1 | 0.5' | 3 2 4 | Moist firm brown clayey silt w/ some fine sand, trace of coarse sand and gravel. 16" RECOVERY | A-4(3) | 6" of cultivated soil. |
| 3 | | 2 | 2.0' | 9 11 14 20 | Moist medium dense brown silty coarse to fine sand, trace of gravel. 17" RECOVERY | A-1-b | |
| | | 3 | 4.0' | 4 9 10 9 | Wet medium dense brown coarse to fine sand w/ some silt, trace of gravel. 19" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 9 9 7 8 | Wet medium dense brown silty fine sand w/ some gravel and coarse sand. 17" RECOVERY | A-2-4(0) | |
| 9 | | 5 | 8.0' | 3 5 7 15 | Wet medium dense brown fine to coarse sand and gravel w/ some silt. 17" RECOVERY | A-2-4(0) | |
| | | | 10.0' | | Boring terminated at 10.0' | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand

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Notes:

1. Exploratory borings were drilled on 3/4/2008 using a 3 1/4-inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at 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 S.R. 1

Boring No.: SS3-1-01

Contract: 28-113-01

Boring Location: Sta. 133+00, 7' Rt. C.L.

Boring Surface Elev.: + 67.09

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: 24.0

Water Level Readings

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|-----------|------|---------------|-----------------|----------------|----------------|
| 10/6/2009 | | 12.0 | 10.0 | 8.5 | |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 61.0 | 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: Gary Truver

Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| | 10/6/09 | 1 | 0.0' | 11 18 36 36 | Moist very dense gray silty coarse to fine sand. | A-2-4(0) | |
| | | | 2.0' | | 6" RECOVERY | | |
| 3 | | 2 | 2.0' | 9 11 12 | Moist very stiff gray clayey silt w/some fine sand, trace of coarse sand. | A-4(4) | |
| | | 2A | 3.5' | | 13" RECOVERY | | |
| | | 3 | 4.0' | 10 20 | Moist medium dense brown fine gravelly silty fine sand w/some coarse sand. | A-2-4(0) | |
| | | | 4.0' | 11 12 | 6" RECOVERY | A-2-4(0) | |
| 6 | | | 6.0' | | Moist dense brownish gray fine gravelly fine to coarse sand w/some silt. | | |
| | | 4 | 6.0' | 16 13 10 8 | Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 8.0' | | 23" RECOVERY | | |
| 9 | | 5 | 8.0' | 2 2 3 4 | Saturated loose gray silty fine sand w/trace of coarse sand. | A-2-4(0) | |
| | | | 10.0' | | 17" RECOVERY | | |
| | | 6 | 10.0' | 2 3 7 8 | Saturated loose gray coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | |
| 12 | | | 12.0' | | 18" RECOVERY | | |
| | | 7 | 12.0' | 4 4 2 7 | Saturated loose brown silty fine to coarse sand w/trace of fine gravel. | A-2-4(0) | |
| | | | 14.0' | | 17" RECOVERY | | |
| 15 | | 8 | 14.0' | 4 7 11 13 | Saturated medium dense brown fine gravelly coarse to fine sand w/some silt. | A-1-b | |
| | | | 16.0' | | 15" RECOVERY | | |
| | | 9 | 16.0' | 11 13 27 | Saturated dense brown fine to coarse sand w/some silt. | A-2-4(0) | |

Remarks: Mud Rotary @ 24 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: 28-113-01

Boring No.: SS3-1-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 18 | | | 18.0' | 21 | 13" RECOVERY | | |
| | | 10 | 18.0' | 4 7 13 15 | Saturated medium dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 20.0' | | 19" RECOVERY | | |
| 21 | | | | | | | |
| 24 | | | | | | | |
| | | 11 | 24.0' | 4 6 10 16 | Saturated very stiff brown silty clay w/trace of coarse to fine sand. | A-7-6(38) | |
| | | | 26.0' | | 17" RECOVERY | | |
| 27 | | | | | | | |
| | | 12 | 29.0' | 11 14 17 22 | Saturated hard gray silty coarse sandy clay w/some fine sand. | A-7-6(9) | |
| 30 | | | 31.0' | | 24" RECOVERY | | |
| 33 | | | | | | | |
| | | 13 | 34.0' | 10 10 10 11 | Saturated medium dense brown fine gravelly coarse sand w/some silt, trace of fine sand. | A-1-b | |
| 36 | | | 36.0' | | 21" RECOVERY | | |
| 39 | | | | | | | |
| | | 14 | 39.0' | 10 12 14 15 | Saturated medium dense brown coarse to fine sand w/some fine gravel, trace of silt. | A-1-b | |
| | | | 41.0' | | 17" RECOVERY | | |
| 42 | | | | | | | |
| | | 15 | 44.0' | 4 10 12 14 | Saturated medium dense brown coarse sand w/some fine sand, trace of fine gravel and silt. | A-1-b | |
| 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: 28-113-01

Boring No.: SS3-1-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------------|---|-------------|---------|
| | | | 46.0' | | 16" RECOVERY | | |
| 48 | | | | | | | |
| | | 16 | 49.0' | 24 69 10 12 | Saturated very dense brown fine gravelly coarse to fine sand w/trace of silt. | A-1-b | |
| 51 | | | 51.0' | | 10" RECOVERY | | |
| | | | | | | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | 16 20 27 35 | Saturated dense green coarse to fine sand w/trace of silt. | A-3 | |
| | | | 56.0' | | 14" RECOVERY | | |
| 57 | | | | | | | |
| | | | | | | | |
| 60 | | 18 | 59.0' | 25 31 43 50/5 | Saturated very dense brown coarse to fine sand w/trace of silt. | A-3 | |
| | | | 61.0' | | 10" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Silty low plasticity
clay



High plasticity
clay



Low plasticity
clay



Well graded sand
with silt



Well graded sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/6/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-1-02

Contract: 28-113-01

Boring Location: Sta. 133+00, 71' Rt. C.L.

Boring Surface Elev.: + 66.88

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: 24.0

Water Level Readings

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|-----------|------|---------------|-----------------|----------------|----------------|
| 10/5/2009 | | 10.0 | 8.0 | 7.5 | |

Pay Quantities:

| | | | | |
|---------------------------------------|----|------|------------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 61 | 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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------|
| 3 | 10/5/09 | 1 | 0.5' | 5 7 7 | Moist medium dense orange fine gravelly coarse sand w/some fine sand and silt. 8" RECOVERY | A-1-b | Topsoil - 6". |
| | | 2 | 2.0' | 3 3 5 6 | Moist loose brown fine gravelly silty coarse sand w/some fine sand. 9" RECOVERY | A-1-b | |
| 6 | | 3 | 4.0' | 2 4 11 11 | Moist medium dense gray silty fine gravelly fine to coarse sand. 15" RECOVERY | A-1-b | |
| | | 4 | 6.0' | 10 11 13 11 | Wet medium dense gray coarse to fine sand w/some silt, trace of fine gravel. 23" RECOVERY | A-1-b | |
| 9 | | 5 | 8.0' | 5 6 6 4 | Saturated medium dense gray coarse to fine sand w/some silt, trace of fine gravel. 9" RECOVERY | A-1-b | |
| | | 6 | 10.0' | 5 6 8 7 | Saturated medium dense gray coarse to fine sand w/some silt and fine gravel. 14" RECOVERY | A-1-b | |
| 12 | | 7 | 12.0' | 5 6 8 8 | Saturated medium dense gray coarse to fine sand w/some fine gravel and silt. 14" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 12 7 4 5 | Saturated medium dense gray fine to coarse sand w/some silt and fine gravel. 16" RECOVERY | A-2-4(0) | |
| 15 | | 9 | 16.0' | 5 8 11 16 | Saturated medium dense gray coarse sand w/trace of silt, fine sand and fine gravel. | A-1-b | |

Remarks: Mud Rotary @ 24 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: 28-113-01

Boring No.: SS3-1-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------------|
| 18 | | | 18.0' | | 15" RECOVERY | | |
| | | 10 | 18.0' | 3 11 11 13 | Saturated medium dense orange coarse sand w/trace of silt, fine sand and fine gravel. | A-1-b | |
| | | | 20.0' | | 11" RECOVERY | | |
| 21 | | | | | | | |
| | | | | | | | |
| 24 | | | | | | | |
| | | 11 | 24.0' | 6 9 10 11 | Saturated very stiff brown silty clay w/trace of fine to coarse sand. | A-7-6(34) | Mud Rotary @ 24.0'. |
| | | | 26.0' | | 17" RECOVERY | | |
| 27 | | | | | | | |
| | | | | | | | |
| 30 | | 12 | 29.0' | 10 14 14 14 | Saturated very stiff gray silty clay w/some coarse to fine sand. | A-7-6(14) | |
| | | | 31.0' | | 21" RECOVERY | | |
| 33 | | | | | | | |
| | | | | | | | |
| 36 | | 13 | 34.0' | 11 13 15 20 | Saturated medium dense brown coarse sand w/some fine gravel and silt, trace of fine sand. | A-1-b | |
| | | | 36.0' | | 22" RECOVERY | | |
| 39 | | | | | | | |
| | | | | | | | |
| 42 | | 14 | 39.0' | 6 8 9 10 | Saturated medium dense brown coarse to fine sand w/trace of fine gravel and silt. | A-1-b | |
| | | | 41.0' | | 16" RECOVERY | | |
| 45 | | 15 | 44.0' | 8 9 11 11 | Saturated medium dense brown coarse to fine sand w/trace of fine gravel and silt. | A-1-b | |

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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.: SS3-1-02

Contract: 28-113-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | | 46.0' | | 16" RECOVERY | | |
| 48 | | | | | | | |
| | | 16 | 49.0' | 11 13 24 21 | Saturated dense brown coarse to fine sand w/some fine gravel, trace of silt. | A-1-b | |
| 51 | | | 51.0' | | 16" RECOVERY | | |
| | | | | | | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | 10 20 28 29 | Saturated dense brown coarse to fine sand w/trace of silt. | A-1-b | |
| | | | 56.0' | | 22" RECOVERY | | |
| 57 | | | | | | | |
| | | | | | | | |
| 60 | | 18 | 59.0' | 31 50 50/3" | Saturated very dense brown fine to coarse sand w/trace of silt. | A-3 | |
| | | | 61.0' | | 14" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded clayey
silty sand



Poorly graded sand
with silt



High plasticity
clay



Low plasticity
clay



Well graded sand
with silt



Poorly graded sand

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Notes:

1. Exploratory borings were drilled on 10/5/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-3-01

Contract: 28-113-01

Boring Location: Sta. 192+00, 7' Rt. C.L.

Boring Surface Elev.: + 65.32

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: 39.0 |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/13/2009 | | 39.0 | 39.0 | Dry | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|----|-------------|--|---|-------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 61 | Ft.; | | 3 | Dia. U-Sample Boring: | Ft. |
| No. of 2 in. Dia. Shelby Tubes: | | Ft.; | | | 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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-----------------------------|
| | 10/13/09 | 1 | 0.5' | 4 3 5 | Wet firm brown silty clay w/trace fine to coarse sand and fine gravel. | A-6(10) | Topsoil - 7". |
| | | | 2.0' | | 9" RECOVERY | | |
| 3 | | 2 | 2.0' | 7 8 12 12 | Wet very stiff tan clayey silt w/trace of fine to coarse sand and fine gravel. | A-4(6) | |
| | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | 5 10 | Wet stiff tan clayey silt w/trace of fine to coarse sand and fine gravel. | A-4(8) | |
| | | | 5.0' | | 8" RECOVERY | | |
| 6 | | 3A | 5.0' | 20 19 | Wet dense orange fine gravelly coarse to fine sand w/some silt. | A-1-b | |
| | | | 6.0' | | 10" RECOVERY | | |
| | | 4 | 6.0' | 20 29 20 19 | Wet dense orange coarse sand w/some fine sand and silt, trace of fine gravel. | A-1-b | |
| | | | 8.0' | | 17" RECOVERY | | |
| 9 | | 5 | 8.0' | 6 10 11 13 | Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt. | A-1-b | |
| | | | 10.0' | | 18" RECOVERY | | |
| | | 6 | 10.0' | 7 13 11 5 | Wet medium dense brown coarse to fine sand w/some fine gravel, trace of silt. | A-1-b | |
| 12 | | | 12.0' | | 19" RECOVERY | | |
| | | 7 | 12.0' | 3 5 8 11 | Wet stiff orange silty clay w/trace of fine to coarse sand. | A-7-6(27) | |
| | | | 14.0' | | 20" RECOVERY | | |
| 15 | | U-1 | 14.0' | | Saturated orange silty clay w/some fine sand, trace of coarse sand and fine gravel. | A-7-6(18) | Press Sample - Shelby Tube. |
| | | | 16.0' | | 24" RECOVERY | | |
| | | 8 | 16.0' | 7 8 10 10 | Saturated stiff orange silty clay w/some fine sand, trace of coarse sand. | A-6(10) | |

Remarks: Mud Rotary @ 39.0 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: 28-113-01

Boring No.: SS3-3-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-----------------------|---|-------------|-----------------------------|
| 18 | | | 18.0' | | 18" RECOVERY | | |
| | | U-2 | 18.0' | | Saturated gray silty clay w/some fine sand, trace of coarse sand. | A-6(8) | Press Sample - Shelby Tube. |
| | | | 20.0' | | 24" RECOVERY | | |
| 21 | | | | | | | |
| | | | | | | | |
| 24 | | | | | | | |
| | | 9 | 24.0' | 3 3 3 5 | Saturated very stiff orange silty clay w/some coarse to fine sand. | A-6(8) | |
| | | | 26.0' | | 15" RECOVERY | | |
| 27 | | | | | | | |
| | | | | | | | |
| 30 | 10/14/09 | 10 | 29.0' | 3 3 3 4 6 | Saturated firm gray silty clay w/some fine sand, trace of coarse sand. | A-7-6(14) | |
| | | | 31.0' | | 15" RECOVERY | | |
| 33 | | | | | | | |
| | | | | | | | |
| 36 | | 11 | 34.0' | 4 5 8 9 | Saturated firm gray silty clay w/some coarse to fine sand and organic matter. | A-7-6(12) | |
| | | | 36.0' | | 22" RECOVERY | | |
| 39 | | | | | | | |
| | | 12 | 39.0' | 11 24 29 33 | Saturated loose gray coarse to fine sand w/some silt and fine gravel. | A-1-b | Mud Rotary @ 39.0'. |
| | | | 41.0' | | 20" RECOVERY | | |
| 42 | | | | | | | |
| | | | | | | | |
| 45 | | 13 | 44.0' | 20 25 36 36 | Saturated medium dense gray fine to coarse sand w/some 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
Contract: 28-113-01

Boring No.: SS3-3-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| | | | 46.0' | | 21" RECOVERY | | |
| 48 | | | | | | | |
| | | 14 | 49.0' | 15 20 35 50 | Saturated very dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| 51 | | | 51.0' | | 21" RECOVERY | | |
| | | | | | | | |
| 54 | | | | | | | |
| | | 15 | 54.0' | 21 21 27 44 | Saturated very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 56.0' | | 22" RECOVERY | | |
| 57 | | | | | | | |
| | | | | | | | |
| 60 | | 16 | 59.0' | 15 17 24 30 | Saturated very dense brown fine to coarse sand w/trace of silt and fine gravel. | A-3 | |
| | | | 61.0' | | 19" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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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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Notes:

1. Exploratory borings were drilled on 10/13/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-3-02

Contract: 28-113-01

Boring Location: Sta. 192+00, 83' Rt. C.L.

Boring Surface Elev.: + 66.20

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: |
| | | | | | 39.0 |

| | | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|--|
| Water Level Readings | | | | | | |
| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water | |
| 10/19/2009 | | 14.0 | 12.0 | 10.1 | | |

Pay Quantities:

| | | | | | | | |
|---------------------------------------|------|-------------|--|-------------------------------|------------------------------|--|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 61.0 | Ft.; | | No. of: 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|----------------------|
| | 10/19/09 | 1 | 0.5' | 3 3 6 | Wet firm tan clayey silt w/trace of fine to coarse sand. | A-4(5) | Topsoil - 4". |
| | | | 2.0' | | 12" RECOVERY | | |
| 3 | | 2 | 2.0' | 6 8 11 16 | Wet very stiff tan silt w/some clay, trace of fine to coarse sand. | A-4(4) | |
| | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | 9 11 8 13 | Wet very stiff brown fine sandy silt w/trace of coarse sand and fine gravel. | A-4(0) | |
| 6 | | | 6.0' | | 17" RECOVERY | | |
| | | 4 | 6.0' | 20 24 28 25 | Wet very dense brown gravelly coarse sand w/some fine sand and silt. | A-1-b | |
| | | | 8.0' | | 14" RECOVERY | | |
| 9 | | 5 | 8.0' | 5 13 20 22 | No Sample Recovery | | |
| | | | 10.0' | | 0" RECOVERY | | |
| | | 6 | 10.0' | 25 20 23 20 | Wet dense brown gravelly coarse sand w/some fine sand, trace of silt. | A-1-b | |
| 12 | | | 12.0' | | 4" RECOVERY | | |
| | | 7 | 12.0' | 6 11 3 4 | No Sample Recovery | | Gravel blocking tip. |
| | | | 14.0' | | 0" RECOVERY | | |
| 15 | | 8 | 14.0' | 2 5 6 9 | Wet stiff brown silty clay w/trace of gravel and fine to coarse sand. | A-7-6(20) | |
| | | | 16.0' | | 18" RECOVERY | | |
| | | 9 | 16.0' | 6 6 8 8 | Wet stiff brown silty clay w/some fine gravel and coarse sand, trace of fine sand. | A-7-6(10) | |

Remarks: Mud Rotary @ 39.0 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: 28-113-01

Boring No.: SS3-3-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|-----------------------------|
| 18 | | | 18.0' | | 20" RECOVERY | | |
| | | 10 | 18.0' | 2 4 5 7 | Wet stiff gray fine to coarse sandy clay w/some silt. | A-6(5) | |
| | | | 20.0' | | 21" RECOVERY | | |
| 21 | | | | | | | |
| | | U-1 | 22.0' | | Wet gray silty clay w/trace of fine to coarse sand. | A-6(13) | Press Sample - Shelby Tube. |
| | | | 24.0' | | 24" RECOVERY | | |
| 24 | | 11 | 24.0' | 4 5 6 12 | Wet stiff gray coarse sandy clay w/some silt and fine sand. | A-7-6(8) | |
| | | | 26.0' | | 19" RECOVERY | | |
| 27 | | U-2 | 27.0' | | Wet gray silty clay w/some fine sand, trace of coarse sand. | A-6(12) | Press Sample - Shelby Tube. |
| | | | 29.0' | | 24" RECOVERY | | |
| | | 12 | 29.0' | 4 6 11 13 | Wet very stiff gray coarse sandy clay w/some fine sand and silt. | A-7-6(7) | |
| 30 | | | 31.0' | | 24" RECOVERY | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | 13 | 34.0' | 4 8 11 11 | Wet very stiff gray silty coarse sandy clay w/trace of fine sand. | A-7-6(11) | |
| | | | 36.0' | | 24" RECOVERY | | |
| 36 | | | | | | | |
| | | | | | | | |
| 39 | | 14 | 39.0' | 6 10 10 11 | Wet very stiff gray coarse sandy clay w/some silt and fine sand. | A-7-6(8) | Mud Rotary @ 39.0'. |
| | | | 41.0' | | 24" RECOVERY | | |
| 42 | | | | | | | |
| | | | | | | | |
| 45 | | 15 | 44.0' | 7 19 28 29 | Wet dense brown fine to coarse sand w/some silt, trace of fine 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: 28-113-01

Boring No.: SS3-3-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| | | | 46.0' | | 17" RECOVERY | | |
| 48 | | | | | | | |
| | | 16 | 49.0' | 17 29 36 43 | Wet very dense brown fine to coarse sand w/trace of silt. | A-3 | |
| 51 | | | 51.0' | | 19" RECOVERY | | |
| | | | | | | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | 21 22 44 52 | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 56.0' | | 24" RECOVERY | | |
| 57 | | | | | | | |
| | | | | | | | |
| 60 | | 18 | 59.0' | 18 28 20 34 | Wet dense brown fine to coarse sand w/some fine gravel and silt. | A-2-4(0) | |
| | | | 61.0' | | 18" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/19/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-4-01

Contract: 28-113-01

Boring Location: Sta. 202+70, 67' Rt. C.L.

Boring Surface Elev.: + 67.64

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: 32.0 |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 11/30/2009 | | 16.0 | 14.0 | 12.0 | |

Pay Quantities:

| | | | | | | |
|---------------------------------------|------|-------------|--|-------------------------------|------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 60.0 | Ft.; | | No. of: 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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|--------------------|
| | 11/30/09 | 1 | 0.5' | 1 2 | Wet soft brown silty clay w/trace of fine to coarse sand. | A-6(10) | Topsoil - 8". |
| | | | 2.0' | | 6" RECOVERY | | |
| 3 | | 2 | 2.0' | 3 5 8 8 | Wet stiff brown silty clay w/some fine to coarse sand, trace of fine gravel. | A-6(7) | |
| | | | 4.0' | | 20" RECOVERY | | |
| | | 3 | 4.0' | 4 7 8 9 | Wet medium dense orange silty fine to coarse sand w/trace of fine gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 14" RECOVERY | | |
| | | 4 | 6.0' | 4 7 8 13 | Wet medium dense orange silty fine sand w/some coarse sand, trace of fine gravel. | A-2-4(0) | |
| | | | 8.0' | | 21" RECOVERY | | |
| 9 | | 5 | 8.0' | 5 10 11 12 | Wet medium dense orange fine gravelly coarse sand w/some fine sand and silt. | A-1-b | Mud Rotary @ 9.0'. |
| | | | 10.0' | | 13" RECOVERY | | |
| | | 6 | 10.0' | 11 12 9 8 | Wet medium dense orange coarse sandy fine gravel w/some silt and fine sand. | A-1-b | |
| 12 | | | 12.0' | | 12" RECOVERY | | |
| | | 7 | 12.0' | 6 8 8 8 | Wet medium dense orange fine to coarse sand w/some fine gravel and silt. | A-2-4(0) | |
| | | | 14.0' | | 18" RECOVERY | | |
| 15 | 12/1/09 | 8 | 14.0' | 7 8 11 11 | Wet medium dense blackish orange coarse sand w/some fine sand and fine gravel, trace of silt. | A-1-b | |
| | | | 16.0' | | 14" RECOVERY | | |
| | | 9 | 16.0' | 27 21 14 12 | Wet dense orange coarse to fine sand w/some silt and fine gravel. | A-1-b | |

Remarks: Mud Rotary @ 32.0 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: 28-113-01

Boring No.: SS3-4-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|---|-------------|-----------------------------|
| 18 | | | 18.0' | | 12" RECOVERY | | |
| | | 10 | 18.0' | 6 9 8 11 | Wet medium dense orange fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 20.0' | | 14" RECOVERY | | |
| 21 | | | | | | | |
| | | 11 | 23.0' | 8 8 10 10 | Wet medium dense brown fine sand w/some coarse sand and silt, trace of fine gravel. | A-2-4(0) | |
| 24 | | | 25.0' | | 12" RECOVERY | | |
| | | | | | | | |
| 27 | | | | | | | |
| | | 12 | 28.0' | 4 4 5 6 | Saturated stiff orange silty clay w/trace of fine to coarse sand and fine gravel. | A-7-6(43) | |
| 30 | | U-1 | 30.0' | | 15" RECOVERY | | |
| | | | 30.0' | | Saturated gray silty clay w/trace of coarse to fine sand and fine gravel. | A-7-6(30) | Press Sample - Shelby Tube. |
| | | | 32.0' | | 18" RECOVERY | | |
| 33 | | | | | | | |
| | | 13 | 33.0' | 3 5 9 13 | Saturated stiff gray silty clay w/some fine to coarse sand, trace of fine gravel. | A-7-5(9) | |
| | | | 35.0' | | 18" RECOVERY | | |
| 36 | | | | | | | |
| | | 14 | 38.0' | 4 12 | Saturated medium dense gray clayey fine gravelly coarse sand w/some fine sand, trace of silt. | A-2-6(1) | |
| 39 | | | 39.0' | | 6" RECOVERY | | |
| | | 14A | 39.0' | 11 16 | Saturated medium dense brown silty fine to coarse sand. | A-2-4(0) | |
| | | | 40.0' | | 12" RECOVERY | | |
| 42 | | | | | | | |
| | | 15 | 43.0' | 30 50/3" | Saturated very dense green fine to coarse sand w/trace of silt and fine gravel. | A-3 | |
| | | | 45.0' | | 7" RECOVERY | | |
| 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: 28-113-01

Boring No.: SS3-4-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 48.0' | 21 50 | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| | | | 50.0' | | 11" RECOVERY | | |
| 51 | | | | | | | |
| | | 17 | 53.0' | 26 50/5" | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| 54 | | | 55.0' | | 10" RECOVERY | | |
| | | | | | | | |
| 57 | | | | | | | |
| | | 18 | 58.0' | 14 26 26 25 | Saturated very dense green fine to coarse sand w/some silt, trace of fine gravel and organic matter. | A-2-4(0) | |
| 60 | | | 60.0' | | 23" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt



High plasticity
clay



Silt



Clayey sand

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Notes:

1. Exploratory borings were drilled on 11/30/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-4-02

Contract: 28-113-01

Boring Location: Sta. 202+70, 136' Rt. C.L.

Boring Surface Elev.: + 68.03

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: 58.0 |

| | | | | | |
|-----------------------------|-------------|---------------------------|-----------------------------|----------------------------|-----------------------|
| Water Level Readings | | | | | |
| Date 11/20/2009 | Time | Depth of Hole 16.0 | Depth of Casing 14.0 | Depth of Water 12.8 | Elev. of Water |

Pay Quantities:

| | | | | | |
|--|-------------|--|---|-------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: 60.0 | 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: Dave Burt/Jason Truver
Helpers: D. Zmijewski/T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|--|-------------|---------|
| | 11/20/09 | 1 | 0.0' | 1 1 2 2 | Wet soft brown clayey silt w/some fine sand, trace of coarse sand. | A-4(6) | |
| | | | 2.0' | | 19" RECOVERY | | |
| 3 | | 2 | 2.0' | 3 3 8 8 | Wet stiff brown clayey silt w/some fine to coarse sand and fine gravel. | A-4(1) | |
| | | | 4.0' | | 24" RECOVERY | | |
| | | 3 | 4.0' | 6 7 10 11 | Wet medium dense orange silty coarse to fine sand w/some fine gravel. | A-1-b | |
| 6 | | | 6.0' | | 24" RECOVERY | | |
| | | 4 | 6.0' | 13 10 7 7 | Wet medium dense orange fine gravelly coarse sand w/some fine and silt. | A-1-b | |
| | | | 8.0' | | 24" RECOVERY | | |
| 9 | | 5 | 8.0' | 4 4 4 4 | Wet loose orange fine sand w/some coarse sand, fine gravel and silt. | A-2-4(0) | |
| | | | 10.0' | | 19" RECOVERY | | |
| | | 6 | 10.0' | 5 5 6 4 | Wet medium dense orange fine to coarse sand w/trace of silt and fine gravel. | A-3 | |
| 12 | | | 12.0' | | 20" RECOVERY | | |
| | | 7 | 12.0' | 3 4 5 4 | Saturated loose orange coarse to fine sand w/trace of silt and fine gravel. | A-1-b | |
| | | | 14.0' | | 17" RECOVERY | | |
| 15 | | 8 | 14.0' | 5 8 10 11 | Saturated medium dense orange coarse to fine sand w/trace of silt and fine gravel. | A-1-b | |
| | | | 16.0' | | 21" RECOVERY | | |
| | | 9 | 16.0' | 7 10 11 | Saturated medium dense brown coarse sand w/some fine gravel, trace of | 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 S.R. 1
Contract: 28-113-01

Boring No.: SS3-4-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|--|-------------|-----------------------------|
| 18 | | | 18.0' | 11 | fine sand and silt. 23" RECOVERY | | |
| | | 10 | 18.0' | 2 6 10 9 | Saturated medium dense orange fine to coarse sand w/trace of silt and fine gravel. 21" RECOVERY | A-3 | |
| 21 | | | 20.0' | | | | |
| 24 | | | | | | | |
| | 11/25/09 | 11 | 24.0' | 4 4 4 5 | Saturated loose orange fine sand w/some coarse sand, trace of silt and fine gravel. 15" RECOVERY | A-3 | |
| | | | 26.0' | | | | |
| 27 | | | | | | | |
| | | 12 | 29.0' | | Saturated firm orange silty clay w/some fine gravel, trace of coarse to fine sand. 17" RECOVERY | A-7-5(27) | |
| 30 | | | 31.0' | | | | |
| | | U-1 | 31.0' | | Saturated gray silty clay w/trace of fine to coarse sand and fine gravel. 14" RECOVERY | A-7-6(34) | Press Sample - Shelby Tube. |
| 33 | | | 33.0' | | | | |
| | | 13 | 34.0' | 2 4 6 8 | Saturated stiff gray silty clay w/some fine sand and organic matter, trace of coarse sand. 20" RECOVERY | A-7-6(13) | |
| 36 | | | 36.0' | | | | |
| 39 | | | | | | | |
| | 11/30/09 | 14 | 39.0' | 6 6 9 16 | Saturated medium dense brown fine to coarse sand w/some silt. 17" RECOVERY | A-2-4(0) | |
| | | | 41.0' | | | | |
| 42 | | | | | | | |
| | | 15 | 44.0' | 32 50/4" | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| 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: 28-113-01

Boring No.: SS3-4-02








| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|---|-------------|---------|
| | | | 46.0' | | 7" RECOVERY | | |
| 48 | | | | | | | |
| | | 16 | 49.0' | 18 50/5" | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| 51 | | | 51.0' | | 11" RECOVERY | | |
| | | | | | | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | 19 34 50 | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| | | | 56.0' | | 16" RECOVERY | | |
| 57 | | | | | | | |
| | | 18 | 58.0' | 18 31 50/5" | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| 60 | | | 60.0' | | 16" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols

| | |
|--|---------------------------------|
|  | Low plasticity clay |
|  | Silty low plasticity clay |
|  | Silty sand |
|  | Poorly graded sand with silt |
|  | Well graded sand with silt |
|  | Poorly graded sand |
|  | High plasticity clay |

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Notes:

1. Exploratory borings were drilled on 11/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-5-01

Contract: 28-113-01

Boring Location: Sta. 242+55, 83' Rt. C.L.

Boring Surface Elev.: + 69.82

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 |
| | 10/20/2009 | | 14.0 | 12.0 | 12.0 | |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 60.0 | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------------|
| | 10/20/09 | 1 | 0.5' | 1 3 6 | Moist soft brown fine sandy silt w/some coarse sand, trace of fine gravel. | A-4(0) | Topsoil - 4". |
| | | | 2.0' | | 12" RECOVERY | | |
| 3 | | 2 | 2.0' | 4 5 3 3 | Wet firm brown fine sandy silt w/some coarse sand and clay, trace of fine gravel. | A-4(0) | |
| | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | 1 2 3 6 | Wet firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. | A-4(2) | |
| 6 | | | 6.0' | | 18" RECOVERY | | |
| | | 4 | 6.0' | 8 9 7 13 | Wet medium dense brown fine gravelly fine sand w/some silt and coarse sand. | A-2-4(0) | |
| | | | 8.0' | | 14" RECOVERY | | |
| 9 | | 5 | 8.0' | 13 6 13 14 | Wet medium dense brown silty coarse to fine sand w/trace of fine gravel. | A-2-4(0) | |
| | | | 10.0' | | 11" RECOVERY | | |
| | | 6 | 10.0' | 9 6 6 10 | Wet medium dense brownish green coarse to fine sand w/some silt. | A-2-4(0) | |
| 12 | | | 12.0' | | 21" RECOVERY | | |
| | | 7 | 12.0' | 10 11 18 18 | Wet medium dense brown coarse to fine sand w/some silt. | A-2-4(0) | |
| | | | 14.0' | | 21" RECOVERY | | |
| 15 | | 8 | 14.0' | 5 9 10 14 | Wet medium dense brown coarse to fine sand w/some silt. | A-1-b | Mud Rotary @ 14.0'. |
| | | | 16.0' | | 19" RECOVERY | | |
| | | 9 | 16.0' | 14 18 30 36 | Wet dense brown coarse to fine sand w/some silt. | A-2-4(0) | |

Remarks: Mud Rotary @ 14.0 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: 28-113-01

Boring No.: SS3-5-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 18 | | | 18.0' | | 16" RECOVERY | | |
| | | 10 | 18.0' | 15 16 20 23 | Wet dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 20.0' | | 22" RECOVERY | | |
| 21 | | | | | | | |
| | | | | | | | |
| 24 | | 11 | 23.0' | 8 13 32 41 | Wet dense brown silty fine to coarse sand. | A-2-4(0) | |
| | | | 25.0' | | 23" RECOVERY | | |
| 27 | | | | | | | |
| | | 12 | 28.0' | 13 20 38 36 | Wet very dense brown silty fine to coarse sand. | A-2-4(0) | |
| 30 | | | 30.0' | | 22" RECOVERY | | |
| | | | | | | | |
| 33 | | 13 | 33.0' | 30 45 50/5" | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 35.0' | | 14" RECOVERY | | |
| 36 | | | | | | | |
| | | | | | | | |
| 39 | 10/21/09 | 14 | 38.0' | 25 50/5" | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 40.0' | | 10" RECOVERY | | |
| 42 | | | | | | | |
| | | 15 | 43.0' | 10 20 25 28 | Wet dense green fine to coarse sand w/some silt. | A-2-4(0) | |
| 45 | | | 45.0' | | 23" 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: 28-113-01

Boring No.: SS3-5-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 48.0' | 11 22 32 33 | Wet very dense green fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 50.0' | | 19" RECOVERY | | |
| 51 | | | | | | | |
| | | 17 | 53.0' | 10 20 31 35 | Wet very dense green fine sand w/some silt and coarse sand. | A-2-4(0) | |
| 54 | | | 55.0' | | 19" RECOVERY | | |
| | | | | | | | |
| 57 | | | | | | | |
| | | 18 | 58.0' | 10 15 18 24 | Wet dense green fine sand w/some coarse sand and silt. | A-2-4(0) | |
| 60 | | | 60.0' | | 19" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-6-01

Contract: 28-113-01

Boring Location: Sta. 239+00, 7' 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: 18.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/20/2009 | | 23.0 | 23.0 | 19.1 | |

Pay Quantities:

| | | | | |
|---------------------------------------|------|-------------|-------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 60.0 | 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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|------------------------|
| 3 | 10/20/09 | 1 | 1.0' | 3 4 | Moist firm brown silt w/some fine to coarse sand and clay. 12" RECOVERY | A-4(2) | Cultivated Soil - 12". |
| | | 2 | 2.0' | 8 9 10 12 | Moist medium dense orange clayey fine gravelly fine to coarse sand w/ trace of silt. | A-2-4(0) | |
| 6 | 10/20/09 | 3 | 4.0' | 10 11 12 14 | Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel. 16" RECOVERY | A-2-4(0) | |
| | | 4 | 6.0' | 12 13 10 5 | Moist medium dense yellowish orange coarse to fine sand w/some silt, trace of fine gravel. 20" RECOVERY | A-2-4(0) | |
| 9 | 10/20/09 | 5 | 8.0' | 3 5 6 5 | Moist medium dense orange fine to coarse sand w/some silt, trace of fine gravel. 22" RECOVERY | A-2-4(0) | |
| | | 6 | 10.0' | 8 9 10 9 | Moist medium dense yellowish orange coarse to fine sand w/some silt, trace of fine gravel. 18" RECOVERY | A-1-b | |
| 12 | 10/20/09 | 7 | 12.0' | 8 7 8 9 | Moist medium dense yellowish orange fine to coarse sand w/some silt, trace of fine gravel. 19" RECOVERY | A-2-4(0) | |
| | | 8 | 14.0' | 8 8 9 9 | Moist medium dense yellowish orange fine gravelly coarse to fine sand w/ some silt. 21" RECOVERY | A-1-b | |
| 15 | 10/20/09 | 9 | 16.0' | 8 9 17 10 | Moist medium dense orange fine gravelly coarse to fine sand w/some silt, trace of organic matter. 20" RECOVERY | A-1-b | |

Remarks: 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: 28-113-01

Boring No.: SS3-6-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| | | 10 | 18.0' | | 16" RECOVERY | A-2-4(0) | |
| | | | 18.0' | 1 2 4 2 | Wet loose grayish green silty coarse to fine sand w/trace of organic matter. | | |
| 21 | | | 20.0' | | 21" RECOVERY | | |
| | | 11 | 23.0' | 10 15 16 17 | Wet dense orangeish brown coarse to fine sand w/some silt, trace of organic matter. | A-1-b | |
| 24 | | | 25.0' | | 19" RECOVERY | | |
| 27 | | | | | | | |
| | | 12 | 28.0' | 10 16 27 40 | Wet dense orangish brown organic fine to coarse sand w/some silt. | A-2-4(0) | |
| 30 | | | 30.0' | | 19" RECOVERY | | |
| 33 | | | | | | | |
| | | 13 | 33.0' | 19 32 31 50 | Wet very dense orange organic fine to coarse sand w/some silt. | A-2-4(0) | |
| 36 | | | 35.0' | | 20" RECOVERY | | |
| 39 | 10/21/09 | 14 | 38.0' | 28 37 50/4" | Wet very dense orange fine to coarse sand w/some silt and organic matter. | A-2-4(0) | |
| 42 | | | 40.0' | | 16" RECOVERY | | |
| 45 | | 15 | 43.0' | 16 41 50 | Wet very dense orange fine to coarse sand w/some silt, trace of organic matter. | A-2-4(0) | |
| | | | 45.0' | | 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 S.R. 1
Contract: 28-113-01

Boring No.: SS3-6-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 48.0' | 14 31 38 42 | Wet very dense orange fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 50.0' | | 20" RECOVERY | | |
| 51 | | | | | | | |
| | | 17 | 53.0' | 13 23 35 46 | Wet very dense orange fine to coarse sand w/some silt. | A-2-4(0) | |
| 54 | | | 55.0' | | 20" RECOVERY | | |
| | | | | | | | |
| 57 | | | | | | | |
| | | 18 | 58.0' | 12 18 26 33 | Wet dense orange fine to coarse sand w/some silt. | A-2-4(0) | |
| 60 | | | 60.0' | | 19" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |
| | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 10/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-6-02

Contract: 28-113-01

Boring Location: Sta. 239+00, 83' Lt. C.L.

Boring Surface Elev.: + 67.13

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: | | 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: 18.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/20/2009 | | 19.0 | 19.0 | 18.2 | |

Pay Quantities:

| | | | | |
|---------------------------------------|------|-------------|-------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 61.0 | 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: Gary Truver
Helpers: K. Kershaw

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|----------------|
| 3 | 10/20/09 | 1 | 1.0' | 2 3 | Moist firm brown silt w/some clay and fine sand, trace of coarse sand. 12" RECOVERY | A-4(2) | Topsoil - 12". |
| | | 2 | 2.0' | 4 2 5 3 | Moist firm brown clayey silt w/some fine sand, trace of coarse sand. | A-4(4) | |
| 6 | 10/20/09 | 3 | 4.0' | 6 | 24" RECOVERY | | |
| | | 3 | 4.0' | 7 10 11 | Moist medium dense orange fine to coarse sand w/some silt and fine gravel. | A-2-4(0) | |
| 9 | 10/20/09 | 4 | 6.0' | 10 8 9 11 | 18" RECOVERY Moist medium dense orange fine to coarse sand w/some silt and fine gravel. | A-2-4(0) | |
| | | 5 | 8.0' | 6 9 8 | 24" RECOVERY Moist medium dense orange coarse sand w/some fine sand and fine gravel, trace of silt. | A-1-b | |
| 12 | 10/20/09 | 6 | 10.0' | 10 8 10 8 | 18" RECOVERY Moist medium dense orange coarse sand w/some fine sand, silt and fine gravel. | A-1-b | |
| | | 7 | 12.0' | 7 8 8 6 | 20" RECOVERY Moist medium dense orange coarse to fine sand w/some fine gravel and silt. | A-1-b | |
| 15 | 10/20/09 | 8 | 14.0' | 5 5 7 11 | 24" RECOVERY Moist medium dense orange fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | 9 | 16.0' | 14 18 14 14 | 24" RECOVERY No Sieve Analysis - Indication of moist dense orangish brown silty sand w/trace of fine gravel. | | |

Remarks: Mud Rotary @ 19.0 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: 28-113-01

Boring No.: SS3-6-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|--------------|---------------------|
| | | 10 | 18.0' | 7 5 6 8 | 5" RECOVERY | A-1-b | Mud Rotary @ 18.0'. |
| | | | 18.0' | | Wet medium dense tan coarse to fine sand w/some silt, trace of fine gravel. | | |
| 21 | | | 20.0' | | | 24" RECOVERY | |
| | | 11 | 24.0' | 14 18 24 29 | Wet dense brownish orange coarse to fine sand w/some silt and fine gravel. | A-1-b | |
| | | | 26.0' | | | | |
| 27 | | | | | | | |
| | | 12 | 29.0' | 15 17 20 27 | Wet dense brownish orange coarse to fine sand w/trace of silt and fine gravel. | A-1-b | |
| 30 | | | 31.0' | | | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | 13 | 34.0' | 14 19 26 35 | Wet dense orangish brown fine to coarse sand w/some silt. | A-2-4(0) | |
| 36 | | | 36.0' | | | | |
| | | | | | | | |
| 39 | | | | | | | |
| | | 14 | 39.0' | 15 21 28 34 | Wet dense orangish brown fine to coarse sand w/trace of silt. | A-3 | |
| 42 | | | 41.0' | | | | |
| | | | | | | | |
| 45 | | 15 | 44.0' | 16 21 26 30 | Wet dense orangish brown fine to coarse sand w/trace of silt. | A-3 | |
| | | | 46.0' | | | | |

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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.: SS3-6-02

Contract: 28-113-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 49.0' | 13 19 28 32 | Wet dense orangish brown fine to coarse sand w/trace of silt. | A-3 | |
| 51 | | | 51.0' | | 24" RECOVERY | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | 17 21 25 23 | Wet dense orangish brown fine to coarse sand w/trace of silt. | A-3 | |
| | | | 56.0' | | 24" RECOVERY | | |
| 57 | | | | | | | |
| | | 18 | 59.0' | 16 18 30 30 | Wet dense orangish brown fine sand w/some coarse sand, trace of silt. | A-3 | |
| 60 | | | 61.0' | | 24" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| 66 | | | | | | | |
| 69 | | | | | | | |
| 72 | | | | | | | |

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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

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Notes:

1. Exploratory borings were drilled on 10/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-7-01

Contract: 28-113-01

Boring Location: Sta. 231+00, 7' LT. C.L.

Boring Surface Elev.: +70.85

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
10/9/2009

Time

Depth of Hole

14

Depth of Casing

14

Depth of Water

Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 60.0

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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---------------------|
| 3 | 10/9/09 | 1 | 0.5' | 3 4 4 | Moist firm brown clayey silt w/trace of fine to coarse sand. 6" RECOVERY | A-4(8) | |
| | | 2 | 2.0' | 3 4 4 5 | Moist firm brown clayey fine to coarse sandy silt w/trace of fine gravel. 17" RECOVERY | A-4(0) | |
| 6 | | 3 | 4.0' | 3 6 6 8 | Moist medium dense brown silty coarse to fine sand w/trace of fine gravel. 16" RECOVERY | A-2-4(0) | |
| | | 4 | 6.0' | 8 10 10 14 | Moist medium dense brown fine to coarse sand w/some silt and fine gravel. 18" RECOVERY | A-2-4(0) | |
| 9 | | 5 | 8.0' | 3 5 6 5 | Moist medium dense orange fine sand w/some silt and fine gravel. 16" RECOVERY | A-2-4(0) | |
| | | 6 | 10.0' | 4 5 5 6 | Moist loose orange silty fine sand w/trace of coarse sand. 19" RECOVERY | A-2-4(0) | |
| 12 | | 7 | 12.0' | 7 6 6 7 | Moist medium dense orange fine sand w/some silt and coarse sand. 20" RECOVERY | A-2-4(0) | |
| | | 8 | 14.0' | 8 7 8 9 | No Sieve Analysis - Indication of wet medium dense green sandy clay. 2" RECOVERY | | Mud Rotary @ 14.0'. |
| 15 | | 9 | 16.0' | 6 5 6 8 | No Sample Recovery | | |

Remarks: Mud Rotary @ 14 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: 28-113-01

Boring No.: SS3-7-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------------|---|-------------|---------|
| 18 | | | 18.0' | | 0" RECOVERY | | |
| | | 10 | 18.0' | 11 24 35 44 | Saturated hard greenish brown fine sandy clay w/some fine gravel, coarse sand and silt. | A-7-5(2) | |
| | | | 20.0' | | 7" RECOVERY | | |
| 21 | | | | | | | |
| | | | | | | | |
| 24 | | 11 | 23.0' | 3 5 6 9 | Saturated loose green coarse to fine sand w/some silt. | A-2-4(0) | |
| | | | 25.0' | | 22" RECOVERY | | |
| 27 | | | | | | | |
| | | 12 | 28.0' | 11 22 27 38 | Saturated dense greenish brown coarse to fine sand w/some silt. | A-2-4(0) | |
| 30 | | | 30.0' | | 16" RECOVERY | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | 13 | 33.0' | 17 24 45 50/4" | Saturated very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 35.0' | | 24" RECOVERY | | |
| 36 | | | | | | | |
| | | | | | | | |
| 39 | | 14 | 38.0' | 17 30 50 | Saturated very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 40.0' | | 18" RECOVERY | | |
| 42 | | | | | | | |
| | | | | | | | |
| | | 15 | 43.0' | 23 29 40 46 | Saturated very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| 45 | | | 45.0' | | 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: 28-113-01

Boring No.: SS3-7-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 48.0' | 27 32 50 | Saturated very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 50.0' | | 18" RECOVERY | | |
| 51 | | | | | | | |
| | | 17 | 53.0' | 14 19 24 25 | Saturated dense brown fine to coarse sand w/trace of silt. | A-3 | |
| 54 | | | 55.0' | | 23" RECOVERY | | |
| | | | | | | | |
| 57 | | | | | | | |
| | | 18 | 58.0' | 8 12 16 19 | Saturated medium dense brown fine to coarse sand w/trace of silt. | A-3 | |
| 60 | | | 60.0' | | 21" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 10/9/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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
Contract: 28-113-01

Boring No.: SS3-7-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------------------|
| | | 10 | 18.0' | 7 | 18" RECOVERY | A-2-7(1) | Mud Rotary @ 19.0'. |
| | | | 18.0' | 16 16 | Wet dense green silty fine sand w/some coarse sand, trace of fine gravel. | | |
| 21 | | | 20.0' | | 20" RECOVERY | | |
| 24 | | 11 | 24.0' | 10 13 17 25 | Wet medium dense greenish red coarse to fine sand w/trace of silt. | A-3 | |
| | | | 26.0' | | 17" RECOVERY | | |
| 27 | | | | | | | |
| 30 | | 12 | 29.0' | 18 23 37 34 | Wet very dense greenish red coarse to fine sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 31.0' | | 24" RECOVERY | | |
| 33 | | | | | | | |
| 36 | | 13 | 34.0' | 20 50 | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 36.0' | | 10" RECOVERY | | |
| 39 | | | | | | | |
| 42 | | 14 | 39.0' | 20 24 29 30 | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 41.0' | | 23" RECOVERY | | |
| 45 | 10/8/09 | 15 | 44.0' | 22 32 50 | Wet very dense brown fine to coarse sand w/trace of silt. | A-3 | |
| | | | 46.0' | | 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 S.R. 1
Contract: 28-113-01

Boring No.: SS3-7-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 49.0' | 18 30 35 50 | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| 51 | | | 51.0' | | 24" RECOVERY | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | 16 28 35 37 | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 56.0' | | 24" RECOVERY | | |
| 57 | | | | | | | |
| | | 18 | 59.0' | 21 24 36 47 | Wet very dense brown fine to coarse sand w/trace of silt. | A-3 | |
| 60 | | | 61.0' | | 22" RECOVERY | | |
| | | | | | 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



Silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/7/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-8-01

Contract: 28-113-01

Boring Location: Sta. 221+20, 7' LT. C.L.

Boring Surface Elev.: + 71.13

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: | 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: 19.0 |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/19/2009 | | 19.0 | 19.0 | 14.9 | |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 60.0 | 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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------|
| | 10/19/09 | 1 | 0.5' | 1 2 4 | Moist soft brown clayey silt w/some coarse to fine sand. | A-4(5) | Topsoil - 6". |
| | | | 2.0' | | 17" RECOVERY | | |
| 3 | | 2 | 2.0' | 4 4 9 4 | No Sieve Analysis - Indication of moist stiff brown clayey silt. | | |
| | | | 4.0' | | 19" RECOVERY | | |
| | | 3 | 4.0' | 6 8 9 6 | Moist medium dense tan silty fine sand w/some coarse sand, trace of fine gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 22" RECOVERY | | |
| | | 4 | 6.0' | 7 5 9 10 | Moist medium dense orange coarse to fine sand w/trace of silt and fine gravel. | A-1-b | |
| | | | 8.0' | | 20" RECOVERY | | |
| 9 | | 5 | 8.0' | 10 14 14 18 | Moist medium dense orange fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 10.0' | | 17" RECOVERY | | |
| | | 6 | 10.0' | 8 13 13 17 | Moist medium dense brown coarse sandy fine gravel w/some fine sand, trace of silt. | A-1-a | |
| 12 | | | 12.0' | | 19" RECOVERY | | |
| | | 7 | 12.0' | 16 17 17 15 | Moist dense brown coarse sandy fine gravel w/trace of silt and fine sand. | A-1-a | |
| | | | 14.0' | | 18" RECOVERY | | |
| 15 | | 8 | 14.0' | 7 6 8 17 | No Sieve Analysis - Indication of moist medium dense brown silty sand w/some fine gravel. | | |
| | | | 16.0' | | 14" RECOVERY | | |
| | | 9 | 16.0' | 8 11 13 8 | Moist medium dense brown coarse to fine sandy fine gravel w/some silt. | A-1-b | |

Remarks: Mud Rotary @ 19 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: 28-113-01

Boring No.: SS3-8-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|--|-------------|---------------------|
| 18 | | | 18.0' | | 19" RECOVERY | | |
| | | 10 | 18.0' | 8 17 8 9 | Moist medium dense brown fine gravelly coarse to fine sand w/trace of silt. | A-1-b | Mud Rotary @ 20.0'. |
| | | | 20.0' | | 16" RECOVERY | | |
| 21 | | | | | | | |
| | | | | | | | |
| 24 | | | | | | | |
| | | 11 | 24.0' | 4 6 12 12 | Moist medium dense tan fine gravelly coarse sand w/some fine sand, trace of silt. | A-1-b | |
| | | | 26.0' | | 4" RECOVERY | | |
| 27 | | | | | | | |
| | | | | | | | |
| 30 | | 12 | 29.0' | 9 10 14 | Wet medium dense greenish brown coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | |
| | | | 31.0' | | 21" RECOVERY | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | | | | | | |
| 36 | | 13 | 34.0' | 18 39 50/5" | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 36.0' | | 16" RECOVERY | | |
| | | | | | | | |
| 39 | | | | | | | |
| | | 14 | 39.0' | 21 30 50/5" | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 41.0' | | 16" RECOVERY | | |
| 42 | | | | | | | |
| | | | | | | | |
| 45 | | 15 | 44.0' | 23 43 50/5" | Wet very dense brown fine to coarse sand w/some 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
Contract: 28-113-01

Boring No.: SS3-8-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| | | | 46.0' | | 16" RECOVERY | | |
| 48 | | | | | | | |
| | | 16 | 49.0' | 16 24 26 38 | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| 51 | | | 51.0' | | 21" RECOVERY | | |
| | | | | | | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | 15 24 40 40 | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 56.0' | | 21" RECOVERY | | |
| 57 | | | | | | | |
| | | | | | | | |
| 60 | | 18 | 59.0' | 17 28 50 | Wet very dense brown fine to coarse sand w/trace of silt. | A-3 | |
| | | | 61.0' | | 18" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 10/19/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-8-02

Contract: 28-113-01

Boring Location: Sta. 221+20, 83' LT C.L.

Boring Surface Elev.: + 71.19

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: 24.0 |

| | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | | | | |
| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| 10/12/2009 | | 24 | 24 | 16.1 | |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 61.0 | 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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------|
| | 10/12/09 | 1 | 0.5' | 3 4 5 | Moist firm brown clayey silt w/some coarse sand, trace of fine sand. 7" RECOVERY | A-6(9) | Topsoil - 6". |
| 3 | | 2 | 2.0' | 4 12 11 | Moist medium dense brown silty fine to coarse sand w/some clay, trace of fine gravel. 15" RECOVERY | A-2-4(0) | |
| | | 3 | 4.0' | 7 12 9 12 | Moist medium dense brown silty coarse to fine sand w/some fine gravel. 19" RECOVERY | A-1-b | |
| 6 | | 4 | 6.0' | 14 16 16 16 | Moist dense orange coarse sand w/some fine sand and silt, trace of fine gravel. 18" RECOVERY | A-1-b | |
| | | 5 | 8.0' | 4 8 10 13 | Moist medium dense orange fine to coarse sand w/some fine gravel and silt. 16" RECOVERY | A-1-b | |
| | | 6 | 10.0' | 14 15 13 13 | Moist medium dense brown coarse sandy fine gravel w/trace of silt and fine sand. 10" RECOVERY | A-1-a | |
| 12 | | 7 | 12.0' | 10 11 11 8 | Moist medium dense brown coarse sandy fine gravel w/some fine sand, trace of silt. 18" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 6 10 11 12 | Moist medium dense brown coarse sandy fine gravel w/some fine sand, trace of silt. 16" RECOVERY | A-1-b | |
| 15 | | 9 | 16.0' | 11 9 10 | Moist medium dense brown coarse to fine sand w/some fine gravel, trace of silt. | A-1-b | |

Remarks: Mud Rotary @ 24.0 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: 28-113-01

Boring No.: SS3-8-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------------------|
| 18 | | | 18.0' | | 18" RECOVERY | | |
| | | 10 | 18.0' | 2 5 7 5 | Wet medium dense brown coarse sand w/some fine sand and fine gravel, trace of silt. | A-1-b | |
| | | | 20.0' | | 10" RECOVERY | | |
| 21 | | | | | | | |
| | | | | | | | |
| 24 | | | | | | | |
| | | 11 | 24.0' | 3 3 3 4 | Wet loose greenish brown silty fine to coarse sand. | A-2-4(0) | Mud Rotary @ 24.0'. |
| | | | 26.0' | | 17" RECOVERY | | |
| 27 | | | | | | | |
| | | | | | | | |
| | | 12 | 29.0' | 5 | Wet medium dense green coarse to fine sand w/trace of fine gravel and | A-1-b | |
| | | 12A | 29.5' | 19 | silt. | A-1-b | |
| 30 | | | 29.5' | 21 22 | 6" RECOVERY | | |
| | | | 31.0' | | Wet dense brown coarse to fine sand w/trace of silt and fine gravel. 12" RECOVERY | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | | | | | | |
| | | 13 | 34.0' | 18 23 22 32 | Wet dense brown coarse to fine sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 36.0' | | 18" RECOVERY | | |
| 36 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 39 | | | | | | | |
| | | 14 | 39.0' | 20 26 50 | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 41.0' | | 18" RECOVERY | | |
| 42 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 45 | | 15 | 44.0' | 16 29 41 50 | Wet very dense brown fine to coarse sand w/some 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
Contract: 28-113-01

Boring No.: SS3-8-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| | | | 46.0' | | 21" RECOVERY | | |
| 48 | | | | | | | |
| | | 16 | 49.0' | 20 23 30 40 | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| 51 | | | 51.0' | | 21" RECOVERY | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | 19 28 40 50 | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| 57 | | | 56.0' | | 20" RECOVERY | | |
| 60 | | 18 | 59.0' | 14 20 38 50 | Wet very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 61.0' | | 18" RECOVERY | | |
| 63 | | | | | End of Boring | | |
| 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



Well graded sand
with silt



Poorly graded sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/12/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-9-01

Contract: 28-113-01

Boring Location: Sta. 208+70, 7' LT C.L.

Boring Surface Elev.: + 66.32

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: 9.0

Water Level Readings

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|-----------|------|---------------|-----------------|----------------|----------------|
| 12/2/2009 | | 9 | 9 | 10.1 | |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 59.0 | 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/Gary Truver
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------------|--------------------|
| 3 | 12/2/09 | 1 | 0.5' | 2 2 | Moist soft brown clayey silt w/trace of fine to coarse sand. 6" RECOVERY | A-4(10) | Topsoil - 8". |
| | | 2 | 2.0' | 3 5 13 | Moist firm brown silty clay w/trace of fine to coarse sand and fine gravel. 14" RECOVERY | A-6(11) | |
| 6 | 2A | 3 | 3.5' | 13 | Moist medium dense brown fine gravelly coarse sand w/some fine sand and silt. 6" RECOVERY | A-1-b A-2-4(0) | |
| | | 3 | 4.0' | 3 8 8 13 | Moist medium dense brown fine to coarse sand w/some silt and fine gravel. 16" RECOVERY | A-1-b | |
| 9 | | 4 | 6.0' | 4 5 11 13 | Moist medium dense brown coarse sandy fine gravel w/some fine sand, trace of silt. 18" RECOVERY | A-1-a | Mud Rotary @ 9.0'. |
| | | 5 | 8.0' | 13 16 15 13 | Moist medium dense brown coarse sandy fine gravel w/some fine sand, trace of silt. 6" RECOVERY | A-1-b | |
| 12 | | 6 | 10.0' | 15 15 10 8 | Moist medium dense brown coarse sandy fine gravel w/some fine sand, trace of silt. 8" RECOVERY | A-1-b | |
| | | 7 | 12.0' | 9 5 4 5 | Wet loose brown fine to coarse sand w/some fine gravel and silt. 15" RECOVERY | A-1-a | |
| 15 | | 8 | 14.0' | 9 4 8 9 | Wet medium dense brown coarse sandy fine gravel w/some fine sand and silt. 9" RECOVERY | A-1-b | |
| | | 9 | 16.0' | 6 7 8 8 | Wet medium dense brown coarse to fine sand w/some fine gravel, trace of silt. | | |

Remarks: Mud Rotary @ 9 feet Mud Rotary @ 9 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: 28-113-01

Boring No.: SS3-9-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|---------|
| 18 | | | 18.0' | | 17" RECOVERY | | |
| | | 10 | 18.0' | 4 5 8 7 | Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt. | A-1-b | |
| | | | 20.0' | | 8" RECOVERY | | |
| 21 | | | | | | | |
| | | 11 | 23.0' | 5 7 7 8 | Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel. | A-1-b | |
| 24 | | | 25.0' | | 10" RECOVERY | | |
| | | | | | | | |
| 27 | | | | | | | |
| | | 12 | 28.0' | 4 6 6 7 | Wet medium dense brown coarse to fine sand w/some fine gravel, trace of silt. | A-1-b | |
| 30 | | | 30.0' | | 9" RECOVERY | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | 13 | 33.0' | 4 15 19 13 | Saturated hard orange silty clay w/some fine to coarse sand. | A-7-5(20) | |
| | | | 35.0' | | 12" RECOVERY | | |
| 36 | | | | | | | |
| | | 14 | 38.0' | 15 30 50 | Saturated very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| 39 | | | 40.0' | | 16" RECOVERY | | |
| | | | | | | | |
| 42 | | | | | | | |
| | 12/3/09 | 15 | 43.0' | 23 38 50/4" | Saturated very dense green fine to coarse sand w/trace of silt and fine gravel. | A-3 | |
| 45 | | | 45.0' | | 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: 28-113-01

Boring No.: SS3-9-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------|---|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 48.0' | 18 50/5" | Saturated very dense green fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 50.0' | | 10" RECOVERY | | |
| 51 | | | | | | | |
| | | 17 | 53.0' | 27 50 | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| 54 | | | 55.0' | | 11" RECOVERY | | |
| | | | | | | | |
| 57 | | | | | | | |
| | | 18 | 58.0' | 21 50 | Saturated very dense green fine to coarse sand w/some silt. | A-3 | |
| | | | 59.0' | | 10" RECOVERY | | |
| 60 | | | | | End of Boring | | |
| | | | | | | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded sand
with silt



Silty sand



Well graded sand
with silt



Elastic silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 12/2/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-9-02

Contract: 28-113-01

Boring Location: Sta 208+70, 136' LT C.L.

Boring Surface Elev.: + 64.78

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: | 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: 9.0 |

| | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date | Time | | | | |
| 12/3/2009 | | 9.0 | 9.0 | 8.2 | |

Pay Quantities:

| | | | | |
|---------------------------------------|----|-------------|-------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 61 | 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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|--------------------|
| 3 | 12/3/09 | 1 | 0.5' | 1 2 3 | Wet soft brown clayey silt w/some fine sand, trace of fine gravel and coarse sand. 6" RECOVERY | A-4(5) | Topsoil - 8". |
| | | 2 | 2.0' | 3 5 5 5 | Wet loose tan silty fine to coarse sand w/trace of fine gravel. 18" RECOVERY | A-2-4(0) | |
| 6 | | 3 | 4.0' | 1 2 6 5 | Wet loose tan clayey fine to coarse sand w/trace of silt and fine gravel. 16" RECOVERY | A-2-4(0) | |
| | | 4 | 6.0' | 16 18 18 17 | Wet dense brown coarse sandy fine gravel w/some fine sand, trace of silt. 10" RECOVERY | A-1-a | |
| 9 | | 5 | 8.0' | 8 15 10 7 | Wet medium dense brown coarse sandy fine gravel w/some fine sand, trace of silt. 12" RECOVERY | A-1-b | Mud Rotary @ 9.0'. |
| | | 6 | 10.0' | 8 9 8 6 | Wet medium dense brown fine gravelly coarse to fine sand w/some silt. 12" RECOVERY | A-1-b | |
| 12 | | 7 | 12.0' | 4 3 2 3 | Wet loose brown coarse sand w/some fine sand, trace of silt and fine gravel. 7" RECOVERY | A-1-b | |
| | | 8 | 14.0' | 9 10 17 14 | Wet medium dense brown coarse to fine sandy fine gravel w/some silt. 10" RECOVERY | A-1-b | |
| 15 | | 9 | 16.0' | 9 8 15 16 | Wet medium dense brown fine to coarse sand w/some fine gravel, trace of silt. | A-1-b | |

Remarks: Mud Rotary @ 9 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: 28-113-01

Boring No.: SS3-9-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-----------------------|--|-------------|---------|
| 18 | | | 18.0' | | 14" RECOVERY | | |
| | | 10 | 18.0' | 7 8 8 9 | Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-3 | |
| | | | 20.0' | | 16" RECOVERY | | |
| 21 | | | | | | | |
| | | | | | | | |
| 24 | | | | | | | |
| | | 11 | 24.0' | 5 6 7 9 | Wet medium dense brown coarse sand w/some fine sand and fine gravel, trace of silt. | A-1-b | |
| | | | 26.0' | | 12" RECOVERY | | |
| 27 | | | | | | | |
| | | | | | | | |
| 30 | | 12 | 29.0' | 3 7 13 23 | Saturated very stiff brown fine gravelly clay w/some silt, trace of fine to coarse sand. | A-7-5(8) | |
| | | | 31.0' | | 15" RECOVERY | | |
| 33 | | | | | | | |
| | | | | | | | |
| 36 | | 13 | 34.0' | 4 7 37 50/4" | Saturated dense green fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 36.0' | | 16" RECOVERY | | |
| 39 | | | | | | | |
| | | | | | | | |
| 42 | | 14 | 39.0' | 27 50/5" | Saturated very dense green fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 41.0' | | 10" RECOVERY | | |
| 45 | | 15 | 44.0' | 29 50/5" | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |

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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 S.R. 1
Contract: 28-113-01

Boring No.: SS3-9-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------|--|-------------|---------|
| | | | 46.0' | | 9" RECOVERY | | |
| 48 | | | | | | | |
| | | 16 | 49.0' | 44 50/4" | Saturated very dense green fine to coarse sand w/some silt. | A-2-4(0) | |
| 51 | | | 51.0' | | 9" RECOVERY | | |
| | | | | | | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | 34 50/5" | Saturated very dense green fine to coarse sand w/some silt, trace of fine gravel and organic matter. | A-2-4(0) | |
| | | | 56.0' | | 9" RECOVERY | | |
| 57 | | | | | | | |
| | | | | | | | |
| 60 | | 18 | 59.0' | 16 29 50 | Saturated very dense green fine to coarse sand w/some silt, trace of organic matter. | A-2-4(0) | |
| | | | 61.0' | | 15" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded clayey
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 12/3/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-10-01

Contract: 28-113-01

Boring Location: Sta. 220+00, 7' RT C.L.

Boring Surface Elev.: + 70.66

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 |
| | 10/14/2009 | | 14.0 | 14.0 | Dry | |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 60.0 | 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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------|
| | 10/19/09 | 1 | 0.5' | 2 2 2 | Moist soft tan clayey silt w/trace of fine to coarse sand and fine gravel. | A-4(5) | Topsoil - 5". |
| | | | 2.0' | | 14" RECOVERY | | |
| 3 | | 2 | 2.0' | 3 3 6 10 | Moist stiff tan fine sandy silt w/some clay and fine sand, trace of fine gravel. | A-4(0) | |
| | | | 4.0' | | 19" RECOVERY | | |
| | | 3 | 4.0' | 6 8 11 | Moist medium dense brown coarse to fine sand w/some silt and fine gravel. | A-1-b | |
| 6 | | | 6.0' | | 14" RECOVERY | | |
| | | 4 | 6.0' | 11 10 13 15 | Moist medium dense tan coarse to fine sand w/some silt and fine gravel. | A-1-b | |
| | | | 8.0' | | 20" RECOVERY | | |
| 9 | | 5 | 8.0' | 2 6 5 6 | Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | |
| | | | 10.0' | | 18" RECOVERY | | |
| | | 6 | 10.0' | 8 8 9 11 | Moist medium dense orange coarse sandy fine gravel w/some fine sand, trace of silt. | A-1-b | |
| 12 | | | 12.0' | | 19" RECOVERY | | |
| | | 7 | 12.0' | 11 24 17 17 | Moist dense orange coarse sandy fine gravel w/trace of fine sand and silt. | A-1-a | |
| | | | 14.0' | | 7" RECOVERY | | |
| 15 | | 8 | 14.0' | 8 5 5 6 | Moist loose brown fine gravelly coarse sand w/some fine sand, trace of silt. | A-1-b | |
| | | | 16.0' | | 13" RECOVERY | | |
| | | 9 | 16.0' | 5 7 7 8 | Wet medium dense brown coarse sandy fine gravel w/some fine sand and silt. | A-1-b | Mud Rotary @ |

Remarks: Mud Rotary @ 14 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: 28-113-01

Boring No.: SS3-10-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|----------------------------------|
| 18 | | | 18.0' | | 21" RECOVERY | | 16.0' |
| | | 10 | 18.0' | 11 21 11 7 | No Sieve Analysis - Indication of wet dense brown sand w/silt and fine gravel. | | Piece of gravel in tip of spoon. |
| | | | 20.0' | | 1" RECOVERY | | |
| 21 | | | | | | | |
| | | 11 | 23.0' | 16 10 8 21 | Wet medium dense brown fine gravelly coarse to fine sand w/some silt. | A-1-b | |
| 24 | | | 25.0' | | 19" RECOVERY | | |
| | | | | | | | |
| 27 | | | | | | | |
| | | 12 | 28.0' | 8 10 16 16 | Wet medium dense brownish orange coarse to fine sand w/some silt. | A-2-4(0) | |
| 30 | | | 30.0' | | 20" RECOVERY | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | 13 | 33.0' | 16 19 26 48 | Wet dense orangish brown coarse to fine sand w/some silt. | A-2-4(0) | |
| | | | 35.0' | | 23" RECOVERY | | |
| 36 | | | | | | | |
| | | 14 | 38.0' | 16 30 50/4" | Wet very dense orangish brown fine to coarse sand w/some silt. | A-2-4(0) | |
| 39 | | | 40.0' | | 10" RECOVERY | | |
| | | | | | | | |
| 42 | | | | | | | |
| | | 15 | 43.0' | 25 50/4" | Wet very dense orangish brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 45.0' | | 10" RECOVERY | | |
| 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: 28-113-01

Boring No.: SS3-10-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|--|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 48.0' | 27 50/3" | Wet very dense orangish brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 50.0' | | 8" RECOVERY | | |
| 51 | | | | | | | |
| | | 17 | 53.0' | 16 28 50/5" | Wet very dense brownish green fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| 54 | | | 55.0' | | 17" RECOVERY | | |
| 57 | | | | | | | |
| | | 18 | 58.0' | 25 50/5" | Wet very dense green fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| 60 | | | 60.0' | | 11" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| 66 | | | | | | | |
| 69 | | | | | | | |
| 72 | | | | | | | |

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/19/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-10-02

Contract: 28-113-01

Boring Location: Sta. 220+00, 83' RT C.L.

Boring Surface Elev.: + 70.77

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 |
| 10/8/2009 | | 14 | 14 | 14.3 | |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|------|------------------------|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 60.0 | 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: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|------------------------|
| | 10/8/09 | 1 | 1.0' | 2 2 | Moist soft brown silty clay w/trace of fine to coarse sand. | A-6(10) | Cultivated Soil - 10". |
| | | | 2.0' | | 12" RECOVERY | | |
| 3 | | 2 | 2.0' | 4 6 7 5 | Moist medium dense brown silty fine to coarse sand w/some clay. | A-2-4(0) | |
| | | 3 | 4.0' | | 24" RECOVERY | | |
| | | | 4.0' | 3 3 4 4 | Moist loose orange clayey fine to coarse sand w/some fine gravel and silt. | A-2-4(0) | |
| 6 | | 4 | 6.0' | 6 11 9 10 | Moist medium dense orange coarse to fine sand w/some silt and fine gravel. | A-1-b | |
| | | 5 | 8.0' | | 18" RECOVERY | | |
| | | | 8.0' | 3 5 6 4 | Moist medium dense yellowish tan fine to coarse sand w/some silt and fine gravel. | A-2-4(0) | |
| | | 6 | 10.0' | | 13" RECOVERY | | |
| | | | 10.0' | 5 5 7 11 | Moist medium dense orange coarse to fine sand w/some fine gravel and silt. | A-1-b | |
| 12 | | 7 | 12.0' | 9 7 9 10 | Moist medium dense orange gravelly coarse sand w/trace of silt and fine sand. | A-1-b | |
| | | 8 | 14.0' | | 19" RECOVERY | | |
| | | | 14.0' | 11 10 10 11 | Moist medium dense tan coarse sandy fine gravel w/trace of fine sand and silt. | A-1-a | Mud Rotary @ 14.0'. |
| | | 9 | 16.0' | 4 5 5 4 | No Sample Recovery | 4" RECOVERY | |

Remarks: Mud rotary @ 14.0 feet

Reviewed By: Hany Fekry

Soils Supervisor: Randy Reguson

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

F.A. Project: U.S. 301, Maryland State Line to S.R. 1
Contract: 28-113-01

Boring No.: SS3-10-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| | | | 18.0' | | 0" RECOVERY | | |
| | | 10 | 18.0' | 3 3 3 | Saturated loose tan silty fine sand w/trace of fine gravel. | A-2-4(0) | |
| | | | 20.0' | | 17" RECOVERY | | |
| 21 | | | | | | | |
| | | | | | | | |
| | | 11 | 23.0' | 4 4 4 7 | Saturated loose tannish brown fine to coarse sand w/trace of silt. | A-3 | |
| 24 | | | 25.0' | | 13" RECOVERY | | |
| | | | | | | | |
| 27 | | | | | | | |
| | | 12 | 28.0' | 50/4" | No Sieve Analysis - Indication of very dense orange silty sand w/some clay. | | |
| 30 | | | 30.0' | | 1" RECOVERY | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | 13 | 33.0' | 10 17 29 34 | Saturated dense orange coarse to fine sand w/some silt. | A-2-4(0) | |
| | | | 35.0' | | 24" RECOVERY | | |
| 36 | | | | | | | |
| | | | | | | | |
| 39 | | 14 | 38.0' | 17 13 19 20 | Saturated dense orange fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 40.0' | | 24" RECOVERY | | |
| 42 | | | | | | | |
| | | | | | | | |
| 45 | | 15 | 43.0' | 23 39 50/4" | Saturated very dense orange fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 45.0' | | 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
Contract: 28-113-01

Boring No.: SS3-10-02

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 48.0' | 19 50 | Saturated very dense orangish brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 50.0' | | 12" RECOVERY | | |
| 51 | | | | | | | |
| | | 17 | 53.0' | 31 45 50/4" | Saturated very dense orange fine to coarse sand w/some silt. | A-2-4(0) | |
| 54 | | | 55.0' | | 14" RECOVERY | | |
| | | | | | | | |
| 57 | | | | | | | |
| | | 18 | 58.0' | 16 24 24 35 | Saturated dense brownish orange fine to coarse sand w/some silt. | A-3 | |
| 60 | | | 60.0' | | 19" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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NOT FOR BIDDING
AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Clayey sand



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/8/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-11-01

Contract: 28-113-01

Boring Location: Sta. 79+50, 69' Rt. C.L.

Boring Surface Elev.: + 60.00

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: 58.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 6/22/2009 | | 58.0 | 58.0 | 13.9 | |

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 59.4 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|----------------|
| | 6/22/09 | 1 | 0.0' | | No Sample | | Asphalt - 6". |
| | | | 2.0' | | 0" RECOVERY | | Subgrade - 6". |
| 3 | | 2 | 2.0' | 10 18 15 9 | Moist hard brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. | A-4(0) | Augered to 2'. |
| | | | 4.0' | | 19" RECOVERY | | |
| 6 | | 3 | 4.0' | 4 5 6 5 | Moist stiff brown fine sandy silt w/some coarse sand and clay, trace of fine gravel. | A-4(0) | |
| | | | 6.0' | | 8" RECOVERY | | |
| | | 4 | 6.0' | 4 4 6 8 | Moist stiff gray fine sandy silt w/some coarse sand, trace of fine gravel and clay. | A-4(0) | |
| | | | 8.0' | | 17" RECOVERY | | |
| 9 | | 5 | 8.0' | 2 2 3 3 | Wet firm gray fine to coarse sandy silt w/some clay, trace of fine gravel. | A-4(0) | |
| | | | 10.0' | | 16" RECOVERY | | |
| | | 6 | 10.0' | 8 9 10 14 | Wet very stiff gray silty clay w/some fine sand, trace of coarse sand. | A-6(9) | |
| 12 | | | 12.0' | | 21" RECOVERY | | |
| | | 7 | 12.0' | 10 25 19 14 | Wet dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 14.0' | | 17" RECOVERY | | |
| 15 | | 8 | 14.0' | 3 10 11 7 | Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 16.0' | | 14" RECOVERY | | |
| | | 9 | 16.0' | 3 6 10 | Saturated very stiff brown silty clay w/some fine sand, trace of coarse | A-7-6(20) | |

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 S.R. 1
Contract: 28-113-01

Boring No.: SS3-11-01


| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---|---|-------------|---------|
| | | | 46.0' | | 11" RECOVERY | | |
| 48 | | | | | | | |
| | | 16 | 49.0' | ³⁹ 50/2" | Saturated very dense gray fine to coarse sand w/some silt. | A-2-4(0) | |
| 51 | | | 51.0' | | 6" RECOVERY | | |
| | | | | | | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | ¹⁷ ²⁷ 50 | Saturated very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 56.0' | | 14" RECOVERY | | |
| 57 | | | | | | | |
| | | 18 | 58.0' | ²⁷ ⁴⁴ 50/5" | Saturated very dense brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 60.0' | | 13" RECOVERY | | |
| 60 | | | | | End of Boring | | |
| | | | | | | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |


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AUGUST 2015


KEY TO SYMBOLS


Symbol Description

Strata symbols

 Poorly graded clayey
silty sand

 Silty sand

 Low plasticity
clay

 High plasticity
clay

 Silt

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Notes:

1. Exploratory borings were drilled on 6/22/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-12-01

Contract: 28-113-01

Boring Location: Sta. 89+50, 72' Rt. C.L.

Boring Surface Elev.: + 56.32

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: 59.0 | |

| | | | | | |
|-----------------------------|-------------|---------------------------|-----------------------------|---------------------------|-----------------------|
| Water Level Readings | | | | | |
| Date 6/22/2009 | Time | Depth of Hole 59.0 | Depth of Casing 59.0 | Depth of Water 7.2 | Elev. of Water |

Pay Quantities:

| | | | | | |
|---------------------------------------|-------|------|------------------------|-----------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 60.25 | 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: Bill Holden
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------------|
| | 6/22/09 | 1 | 0.5' | 6 7 9 | Moist medium dense brown silty fine to coarse sand w/trace of fine gravel. | A-2-4(0) | Topsoil - 6". |
| | | | 2.0' | | 14" RECOVERY | | |
| 3 | | 2 | 2.0' | 9 10 10 12 | Moist medium dense tan silty fine to coarse sand w/trace of fine gravel. | A-2-4(0) | |
| | | | 4.0' | | 19" RECOVERY | | |
| | | 3 | 4.0' | 10 10 14 14 | Moist medium dense gray silty fine to coarse sand w/some clay, trace of fine gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 5 7 6 9 | Moist stiff gray fine to coarse sandy silt w/trace of fine gravel. | A-4(0) | |
| | | | 8.0' | | 14" RECOVERY | | |
| 9 | | 5 | 8.0' | 5 7 14 64 | Wet medium dense gray fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 10.0' | | 15" RECOVERY | | |
| | | 6 | 10.0' | 50/3" | No Sieve Analysis - Indication of wet very dense gray silty sand w/some gravel. | | |
| 12 | | | 12.0' | | 3" RECOVERY | | |
| | | 7 | 12.0' | 3 5 7 9 | Saturated stiff brownish orange silty clay w/some fine sand, trace of coarse sand. | A-6(11) | |
| | | | 14.0' | | 18" RECOVERY | | |
| 15 | | 8 | 14.0' | 3 5 5 6 | Saturated stiff brownish orange fine gravelly clay w/some silt, trace of fine to coarse sand. | A-7-6(8) | |
| | | | 16.0' | | 13" RECOVERY | | |
| | | 9 | 16.0' | 13 7 8 9 | Saturated stiff grayish orange silty clay w/some fine sand, trace of coarse sand. | A-7-6(16) | |

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 S.R. 1
Contract: 28-113-01

Boring No.: SS3-12-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-----------------------------|
| 18 | | | 18.0' | | 19" RECOVERY | | |
| | | 10 | 18.0' | 3 4 3 5 | Saturated firm gray silty clay w/some fine to coarse sand. | A-6(8) | |
| | | | 20.0' | | 22" RECOVERY | | |
| 21 | | | | | | | |
| | | U-1 | 22.0' | | Saturated gray coarse sandy silty clay w/some fine sand, trace of fine gravel. | A-6(7) | Press Sample - Shelby Tube. |
| | | | 24.0' | | 24" RECOVERY | | |
| 24 | | 11 | 24.0' | 3 7 5 5 | Saturated stiff gray coarse to fine sandy clay w/some silt. | A-6(3) | |
| | | | 26.0' | | 18" RECOVERY | | |
| 27 | | | | | | | |
| | | 12 | 29.0' | 9 13 13 41 | Saturated very stiff gray fine to coarse sandy clay w/trace silt and fine gravel. | A-6(1) | |
| 30 | | | 31.0' | | 23" RECOVERY | | |
| | | | | | | | |
| 33 | | | | | | | |
| | | 13 | 34.0' | 13 29 13 7 | Saturated dense brown gravelly coarse sand w/some fine sand, trace of silt. | A-1-b | |
| | | | 36.0' | | 15" RECOVERY | | |
| 36 | | | | | | | |
| | | | | | | | |
| 39 | | | | | | | |
| | | 14 | 39.0' | 13 20 29 52 | Saturated dense green coarse to fine sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 41.0' | | 22" RECOVERY | | |
| 42 | | | | | | | |
| | | | | | | | |
| 45 | | 15 | 44.0' | 42 50/4" | Saturated very dense green fine to coarse sand w/some 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
Contract: 28-113-01

Boring No.: SS3-12-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|---|-------------|---------|
| | | | 46.0' | | 10" RECOVERY | | |
| 48 | | | | | | | |
| | | 16 | 49.0' | 50 50/3" | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| 51 | | | 51.0' | | 8" RECOVERY | | |
| | | | | | | | |
| 54 | | | | | | | |
| | | 17 | 54.0' | 50/4" | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| | | | 56.0' | | 4" RECOVERY | | |
| 57 | | | | | | | |
| | | | | | | | |
| 60 | | 18 | 59.0' | 30 44 50/3" | Saturated very dense green fine to coarse sand w/trace of silt. | A-3 | |
| | | | 61.0' | | 13" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |

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AUGUST 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded clayey
silty sand



Low plasticity
clay



Silt



Clayey sand



Well graded sand
with silt



Poorly graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 6/22/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SS3-13-01

Contract: 28-113-01

Boring Location: Sta. 229+00, 83' Rt. C.L.

Boring Surface Elev.: + 71.9

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 |
|-----------|------|---------------|-----------------|----------------|----------------|
| 1/28/2010 | | 14.0 | 14.0 | 13.8 | |

Pay Quantities:

| | | | | |
|---------------------------------------|------|------|------------------------|-----|
| 2 1/2 in. Dia. Dry Sample Boring: | 60.0 | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|---|-------------|-----------------------|
| 3 | 1/28/10 | 1 | 1.0' | 2 1 | Wet firm brown clayey silt w/some fine sand, trace of coarse sand. 6" RECOVERY | A-4(4) | Cultivated Soil - 10" |
| | | 2 | 2.0' | 1 2 2 4 | Wet firm brown fine sandy silt w/some coarse sand and clay, trace of fine gravel. 10" RECOVERY | A-4(0) | |
| 6 | 1/28/10 | 3 | 4.0' | 3 3 3 | Wet loose orange coarse to fine sand w/some silt, trace of fine gravel. 15" RECOVERY | A-2-4(0) | |
| | | 4 | 6.0' | 3 5 5 5 | Wet loose orange coarse to fine sand w/some silt and fine gravel. 16" RECOVERY | A-1-b | |
| 9 | 1/28/10 | 5 | 8.0' | 3 3 3 3 | Wet loose orange fine to coarse sand w/some silt, trace of fine gravel. 20" RECOVERY | A-2-4(0) | |
| | | 6 | 10.0' | 3 3 4 3 | Wet loose orange fine sand w/some silt, trace of coarse sand. 18" RECOVERY | A-2-4(0) | |
| 12 | 1/28/10 | 7 | 12.0' | 4 2 3 3 | Wet loose orange silty fine sand w/trace of coarse sand. 20" RECOVERY | A-2-4(0) | |
| | | 8 | 14.0' | 2 3 3 3 | Saturated loose brown fine sand w/some silt, trace of coarse sand. 19" RECOVERY | A-2-4(0) | Mud Rotary @ 14.0' |
| 15 | 1/28/10 | 9 | 16.0' | 3 2 4 6 | Saturated loose brown fine sand w/some silt, trace of coarse sand and fine gravel. | A-2-4(0) | |

Remarks: Mud Rotary @ 14 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: 28-113-01

Boring No.: SS3-13-01

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---------|
| 48 | | | | | | | |
| | | 16 | 48.0' | 15 20 27 30 | Saturated dense reddish brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 50.0' | | 23" RECOVERY | | |
| 51 | | | | | | | |
| | | | | | | | |
| 54 | | 17 | 53.0' | 16 21 25 37 | Saturated dense reddish brown fine to coarse sand w/some silt. | A-2-4(0) | |
| | | | 55.0' | | 22" RECOVERY | | |
| 57 | | | | | | | |
| | | | | | | | |
| 60 | | 18 | 58.0' | 16 22 31 33 | Saturated very dense reddish brown fine to coarse sand w/trace of silt and fine gravel. | A-3 | |
| | | | 60.0' | | 24" RECOVERY | | |
| | | | | | End of Boring | | |
| 63 | | | | | | | |
| | | | | | | | |
| 66 | | | | | | | |
| | | | | | | | |
| 69 | | | | | | | |
| | | | | | | | |
| 72 | | | | | | | |
| | | | | | | | |

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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

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Notes:

1. Exploratory borings were drilled on 1/28/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-1-1

Contract: 25-113-01

Boring Location: Sta. 105+91, 145' Rt. C.L.

Boring Surface Elev.: + 63.3

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 |
| | 6/19/2009 | | 10.0 | | 5.5 | |

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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|---------------|
| | 6/19/09 | 1 | 0.5' | | No Sieve Analysis - Indication of moist tan clayey sandy silt. | | Topsoil - 3". |
| | | | 1.5' | | 12" RECOVERY | | Hand Auger |
| 2 | | 2 | 1.5' | | Moist orange clayey silt w/some fine to coarse sand, trace of gravel. | A-4(3) | Hand Auger |
| | | | 2.8' | | 15" RECOVERY | | Hand Auger |
| | | 3 | 2.8' | | Moist brown silty fine to coarse sand w/trace of gravel. | A-2-4(0) | Hand Auger |
| 4 | | | 4.0' | | 15" RECOVERY | | Hand Auger |
| | | 4 | 4.0' | | Moist to wet tan clayey fine sandy silt w/some coarse sand, trace of gravel. | A-4(0) | Hand Auger |
| | | | 5.5' | | 18" RECOVERY | | Hand Auger |
| 6 | | 5 | 5.5' | | Wet orange coarse to fine sand w/some silt, trace of gravel. | A-1-b | Hand Auger |
| 8 | | | | | | | |
| 10 | | | 10.0' | | 54" 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



Clayey sand

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Notes:

1. Exploratory borings were drilled on 6/19/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301 Maryland State Line to S.R. 1

Boring No.: SWM3-1-2

Contract: 25-113-01

Boring Location: Sta. 106+78, 145' Rt. C.L.

Boring Surface Elev.: + 62.9

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 |
| | 6/19/2009 | | 8.0 | | 4.5 | |

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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|------------|
| | 6/19/09 | 1 | 0.0' | | Moist tan silt w/some fine sand and clay, trace of coarse sand and gravel. | A-4(2) | Hand Auger |
| 2 | | 2 | 2.0' | | 24" RECOVERY Moist brown mottled clay w/trace of coarse sand. | A-6(13) | Hand Auger |
| | | 3 | 3.0' | | 12" RECOVERY Moist brown silty coarse to fine sand w/trace of gravel. | A-2-4(0) | Hand Auger |
| 4 | | 4 | 4.5' | | 18" RECOVERY Wet orange silty fine to coarse sand w/trace of gravel. | A-2-4(0) | Hand Auger |
| 6 | | | | | | | |
| 8 | | | 8.0' | | 42" RECOVERY End of Boring | | |
| 10 | | | | | | | |

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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Notes:

1. Exploratory borings were drilled on 6/19/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301 Maryland State Line to S.R. 1

Boring No.: SWM3-1-3

Contract: 25-113-01

Boring Location: Sta. 108+26, 136 Rt. C.L.

Boring Surface Elev.: + 62.9

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 |
| | 6/19/2009 | | 7.0 | | 4.5 | |

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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|---|-------------|-------------------|
| | 6/19/09 | 1 | 0.5' | | Moist tan silt w/some fine to coarse sand, trace of clay and gravel. | A-4(0) | Leaf Litter - 3". |
| 2 | | 2 | 2.0' | | 18" RECOVERY Moist orange clayey fine to coarse sand w/trace of gravel. | A-2-4(0) | Hand Auger |
| 4 | | 3 | 3.5' | | 18" RECOVERY Moist orange silty fine sand w/some coarse sand and gravel. | A-2-4(0) | Hand Auger |
| | | 4 | 5.0' | | 18" RECOVERY No Sieve Analysis - Indication of wet orange mottled silty sand. | | Hand Auger |
| 6 | | 4A | 5.5' | | 6" RECOVERY Wet orange mottled fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | Hand Auger |
| | | | 7.0' | | 18" RECOVERY End of Boring | | |
| 8 | | | | | | | |
| 10 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/19/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301 Maryland State Line to S.R. 1

Boring No.: SWM3-2-01

Contract: 25-113-01

Boring Location: Sta. 110+95, 143 Lt. C.L.

Boring Surface Elev.: + 62.9

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: 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 6/16/2009 | | 10.0 | 8.0 | 6.2 | |

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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------|
| | 6/16/09 | 1 | 0.5' | 4 4 4 | Moist firm gray clayey silt w/trace of fine to coarse sand and gravel. | A-4(3) | Topsoil - 4". |
| 2 | | 2 | 2.0' | 7 9 12 15 | 15" RECOVERY Moist very stiff gray fine sandy silt w/some coarse sand, trace of clay and gravel. | A-4(0) | |
| 4 | | 3 | 4.0' | 8 10 11 11 | 16" RECOVERY Moist very stiff gray clayey fine sandy silt w/trace of coarse sand and gravel. | A-4(0) | USDA Classifica - Loam. |
| 6 | | 4 | 6.0' | 8 9 13 15 | 16" RECOVERY Wet medium dense brown fine to coarse sand w/some silt and gravel. | A-2-4(0) | |
| 8 | | 5 | 8.0' | 5 4 4 5 | 19" RECOVERY Wet loose orange silty fine sand. | A-2-4(0) | |
| 10 | | | 10.0' | | 17" 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 6/16/2009 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 re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

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

Boring No.: SWM3-2-02

Contract: 25-113-01

Boring Location: Sta. 111+41, 142' Lt. C.L.

Boring Surface Elev.: + 63.7

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: 8.0 | |

| | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date 6/15/2009 | Time | 10.0 | 8.0 | 5.8 | |

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: | | | 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 |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------|
| | 6/15/09 | 1 | 0.5' | 2 3 3 | No Sieve Analysis - Indication of moist firm gray clayey sandy silt. | | Topsoil - 4". |
| 2 | | 2 | 2.0' 2.0' | 4 4 4 4 | 14" RECOVERY Moist very stiff gray clay w/trace of fine to coarse sand and gravel. | A-6(12) | |
| 4 | | 3 | 4.0' 4.0' | 4 10 10 11 | 18" RECOVERY Wet very stiff orange clayey fine sandy silt w/some coarse sand. | A-4(1) | USDA Classifica - Loam. |
| 6 | | 4 | 6.0' 6.0' | 10 10 9 9 | 17" RECOVERY Wet loose orange silty fine sand w/trace of coarse sand. | A-2-4(0) | |
| 8 | | 5 | 8.0' 8.0' | 7 6 5 6 | 18" RECOVERY Wet medium dense orange silty fine sand. | A-2-4(0) | |
| 10 | | | 10.0' | | 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

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/15/2009 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 re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

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

Boring No.: SWM3-2-03

Contract: 25-113-01

Boring Location: Sta. 112+22, 137 Lt. C.L.

Boring Surface Elev.: + 63.8

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: 8.0 |

| | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | | | | |
| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| 6/15/2009 | | 10.0 | 8.0 | 3.7 | |

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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|---|-------------|---------------|
| | 6/15/09 | 1 | 0.5' | 2 3 5 | Moist firm gray silt w/some clay, trace of fine to coarse sand. | A-4(4) | Topsoil - 3". |
| 2 | | 2 | 2.0' | 8 9 12 14 | 18" RECOVERY Moist very stiff gray coarse to fine sandy silt w/trace of clay and gravel. | A-4(0) | |
| 4 | | 3 | 4.0' | 6 11 6 6 | 15" RECOVERY Wet medium dense orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 6 | | 4 | 6.0' | 5 4 5 6 | 15" RECOVERY Wet loose orange silty fine sand w/trace of coarse sand. | A-2-4(0) | |
| 8 | | 5 | 8.0' | 5 4 5 6 | 14" RECOVERY Wet loose orange fine sand w/some silt, trace of coarse sand and gravel. | A-2-4(0) | |
| 10 | | | 10.0' | | 13" 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

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/15/2009 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 re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blows are uncorrected.

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

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

Boring No.: SWM3-3-01

Contract: 25-113-01

Boring Location: Sta. 121+65, 145' Rt. C.L.

Boring Surface Elev.: + 62.9

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 |
| | 6/19/2009 | | 10.0 | | 5.0 | |

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: | |
| 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 |
|-------------|----------------|-----|--------------|----------|--|-------------|------------------|
| | 6/19/09 | 1 | 0.5' | | Moist tan fine to coarse sand w/trace of clay. | A-2-4(0) | Leaf Litter - 3" |
| | | | 1.5' | | 12" RECOVERY | | |
| 2 | | 2 | 1.5' | | Moist gray clayey coarse to fine sand. | A-2-4(0) | Hand Auger |
| | | | 2.5' | | 12" RECOVERY | | Hand |
| | | 3 | 2.5' | | Moist to wet tan coarse to fine sand w/some silt, trace of gravel. | A-1-b | Auger |
| | | | | | | | Hand Auger |
| 4 | | | | | | | |
| | | | 5.0' | | 30" RECOVERY | | |
| | | 4 | 5.0' | | Wet orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | Hand Auger |
| 6 | | | | | | | |
| | | | | | | | |
| 8 | | | | | | | |
| | | | | | | | |
| 10 | | | 10.0' | | 60" RECOVERY | | |
| | | | | | End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded sand
with clay



Poorly graded clayey
silty sand



Silty sand

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/19/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301 Maryland State Line to S.R. 1

Boring No.: SWM3-3-02

Contract: 25-113-01

Boring Location: Sta. 122+50, 133' Rt. C.L.

Boring Surface Elev.: + 55.0

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 |
| | 6/19/2009 | | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|---|-------------|------------------------------|
| | 6/19/09 | 1 | 0.5' | | Moist gray mottled clayey silt w/some fine sand, trace of coarse sand and gravel. | A-4(4) | Leaf Litter - 3". Hand Auger |
| 2 | | | 2.5' | | 24" RECOVERY | | |
| | | 2 | 2.5' | | Moist gray mottled coarse to fine sandy silt w/some clay, trace of gravel. | A-4(0) | Hand Auger |
| 4 | | | 5.0' | | 30" RECOVERY | | |
| | | 3 | 5.0' | | Wet gray silty fine to coarse sand w/trace of gravel. | A-2-4(0) | Hand Auger |
| 6 | | | 6.5' | | 18" RECOVERY | | |
| | | 4 | 6.5' | | Wet orange silty fine to coarse sand. | A-2-4(0) | Hand Auger |
| 8 | | | | | | | |
| 10 | | | 10.0' | | 42" 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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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/19/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301 Maryland State Line to S.R. 1

Boring No.: SWM3-3-03

Contract: 25-113-01

Boring Location: Sta. 123+11, 132' Rt. C.L.

Boring Surface Elev.: + 60.3

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 |
| | 6/19/2009 | | 10.0 | | 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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|-----------------------------|
| | 6/19/09 | 1 | 0.5' | | Moist gray mottled clayey silt w/some fine to coarse sand, trace of gravel. | A-4(4) | Topsoil - 4". Hand Auger |
| 2 | | 2 | 2.0' | | 18" RECOVERY Moist gray mottled silt w/some coarse to fine sand, gravel and clay. | A-4(0) | Hand Auger |
| 4 | | 3 | 4.0' | | 24" RECOVERY Wet gray fine to coarse sand w/some gravel, trace of clay. | A-2-4(0) | Hand Auger |
| 6 | | 4 | 6.0' | | 24" RECOVERY Wet brown silty fine sand w/some coarse sand, trace of gravel. | A-2-4(0) | Hand Auger |
| 8 | | | | | | | |
| 10 | | | 10.0' | | 48" 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 6/19/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation 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: U.S. 301 Maryland State Line to S.R. 1

Boring No.: SWM3-4-01

Contract: 25-113-01

Boring Location: Sta. 124+25, 108' Lt. C.L.

Boring Surface Elev.: + 62.6

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 |
| | 6/24/2009 | | 8.0 | | 2.0 | |

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: | |
| 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 |
|-------------|----------------|-----|--------------|----------|---|-------------|--------------------------|
| | 6/24/09 | 1 | 0.5' | | Moist grayish orange mottled clayey silt w/trace of fine to coarse sand, trace of gravel. | A-4(4) | Topsoil - 4". Hand Auger |
| 2 | | 2 | 2.0' | | 18" RECOVERY Wet grayish orange mottled silty coarse to fine sand w/trace of gravel. | A-2-4(0) | Hand Auger |
| 4 | | | | | | | |
| 6 | | | | | | | |
| | | 3 | 7.0' | | 60" RECOVERY Wet orange fine to coarse sand w/some silt and gravel. | A-2-4(0) | Hand Auger |
| 8 | | | 8.0' | | 12" RECOVERY | | |
| | | | | | End of Boring | | |
| 10 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/24/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301 Maryland State Line to S.R. 1

Boring No.: SWM3-4-02

Contract: 25-113-01

Boring Location: Sta. 124+70, 126 Lt. C.L.

Boring Surface Elev.: + 62.3

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 |
| | 6/24/2009 | | 8.0 | | 1.0 | |

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: | |
| 2 1/2 in. Dia. Contin. Sample Boring: | Ft.; | No. of 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 |
|-------------|----------------|-----|--------------|----------|--|-------------|--------------------------|
| | 6/24/09 | 1 | 0.5' | | Moist to wet grayish orange clayey silt w/some fine to coarse sand, trace of gravel. | A-4(2) | Topsoil - 4". Hand Auger |
| 2 | | | 2.5' | | 24" RECOVERY | | |
| | | 2 | 2.5' | | Wet gray silt w/some coarse to fine sand, clay and gravel. | A-4(0) | Hand Auger |
| 4 | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | | Wet orange clayey coarse to fine sand w/trace of gravel. | A-2-4(0) | Hand Auger |
| 6 | | | | | | | |
| 8 | | | 8.0' | | 48" RECOVERY | | |
| | | | | | End of Boring | | |
| 10 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Clayey sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 6/24/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301 Maryland State Line to S.R. 1

Boring No.: SWM3-4-03

Contract: 25-113-01

Boring Location: Sta. 124+92, 143' Lt. C.L.

Boring Surface Elev.: + 62.5

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 |
| | 6/24/2009 | | 6.0 | | 2.3 | |

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: | 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 |
|-------------|----------------|-----|--------------|----------|--|-------------|--------------------------|
| | 6/24/09 | 1 | 0.5' | | Moist grayish orange mottled clayey silt w/some fine to coarse sand and gravel. | A-4(0) | Topsoil - 4". Hand Auger |
| 2 | | 2 | 2.0' 2.0' | | 18" RECOVERY Moist to wet orangish gray mottled clayey coarse to fine sand w/trace of gravel. | A-2-4(0) | Hand Auger |
| 4 | | 3 | 4.0' 4.0' | | 24" RECOVERY Wet orange coarse to fine sand w/some gravel and silt. | A-1-b | Hand Auger |
| 6 | | | 6.0' | | 24" RECOVERY End of Boring | | |
| 8 | | | | | | | |
| 10 | | | | | | | |

Remarks:

Reviewed By: Maureen Kelley

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 borings were drilled on 6/24/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM3-5-01

Contract: 28-113-01

Boring Location: Sta. 126+27, 231' Rt. C.L.

Boring Surface Elev.: + 61.08

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: | 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 |
| | 7/21/2009 | | 4.0 | | 3.5 | |

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: John Foley
Helpers:

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|--------------|
| 2 | 7/21/09 | 1 | 0.5' 1.0' | | Moist brownish gray silt w/some gravel, trace of fine to coarse sand and clay. | A-4(0) | Topsoil - 6" |
| | | 2 | 1.0' | | Moist brownish gray clayey silt w/some fine to coarse sand and gravel. | A-4(2) | Hand Auger |
| | | 3 | 2.0' 2.0' | | Moist gray gravelly fine sandy silt w/some coarse sand and clay. | A-4(0) | Hand Auger |
| | | 4 | 3.0' 3.0' | | Moist grayish brown coarse sand and gravel w/some fine sand, trace of silt. | A-1-b | Hand Auger |
| 4 | | | 4.0' | | End of Boring | | |
| 6 | | | | | | | |
| 8 | | | | | | | |
| 10 | | | | | | | |

Remarks: Hand Auger

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Low plasticity
clay



Poorly graded clayey
silty sand



Poorly graded sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/21/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM3-5-02

Contract: 28-113-01

Boring Location: Sta. 126+75, 175' Rt. C.L.

Boring Surface Elev.: + 61.55

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: | 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 |
| | 7/21/2009 | | 8.2 | | 3.5 | |

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

Boring Contractor: Walton Corporation
Driller: John Foley
Helpers:

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|---|-------------|--------------|
| | 7/21/09 | 1 | 0.5' 1.0' | | Moist gray silt w/trace of clay and fine to coarse sand. | A-4(2) | Topsoil - 6" |
| | | 2 | 1.0' | | Moist gray coarse to fine sandy silt w/some clay. | A-4(0) | Hand Auger |
| 2 | | 3 | 2.0' 2.0' | | Moist brownish gray fine to coarse sandy silt w/some clay, trace of gravel. | A-4(0) | Hand Auger |
| | | 4 | 3.0' 3.0' | | Moist grayish brown coarse sand and gravel w/some fine sand, trace of silt. | A-1-b | Hand Auger |
| 4 | | 5 | 4.0' 4.0' | | Moist grayish brown silty coarse to fine sand w/trace of gravel. | A-2-4(0) | Hand Auger |
| | | 6 | 5.0' 5.0' | | Wet light brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | Hand Auger |
| 6 | | 7 | 6.0' 6.0' | | Wet light brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | Hand Auger |
| | | 8 | 7.0' 7.0' | | Wet light brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | Hand Auger |
| 8 | | 9 | 8.0' 8.0' | | Wet light brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | Hand Auger |
| | | 10 | 9.0' 9.0' | | Wet brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | Hand Auger |
| 10 | | | 10.0' | | End of Boring | | |

Remarks: Hand Auger

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty low plasticity
clay



Poorly graded clayey
silty sand



Well graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/21/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.

STA 128+00.00
 OFFSET 160.00 RT



WALTON CORPORATION

DRILLING CONTRACTOR

P.O. Box 1097, NEWARK, DELAWARE 19715

BORING LOG

NAME: Dot Dot SEC 3 PROJECT NO. 23-113-01
 SUPERVISOR _____

| | | |
|----------------------------|----------------------------|------------------|
| BORING NO. SWM3-5-03-03 | DRILLER John & Cecil | DATE: 7/21/09 |
| WEATHER cloudy | SURFACE ELEVATION 63.56 | DATUM: |

| SAMPLE NO. | SAMPLE DEPTH - FEET | | DEPTH STRATA FEET | | DRILLER'S DESCRIPTION OF MATERIALS | REC | * BLOWS A | |
|------------|---------------------|------|-------------------|-----|------------------------------------|-----|-----------|-------|
| | FROM | TO | FROM | TO | | | | |
| | | | 0.0 | 0.0 | top soil | | | |
| 1 | 0.0 | 1.0 | 0.2 | 1.0 | 2. BR BR silt w/ clay & sand | | | |
| 2 | 1.0 | 2.0 | 1.0 | 2.0 | 4. BR BR silt w/ clay & sand | | | |
| 3 | 2.0 | 3.0 | 2.0 | 3.0 | 2. BR BR silt - little sand | | | |
| 4 | 3.0 | 4.0 | 3.0 | | 1. BR (FTOM) SAND w/ some silt | | | A=4 |
| | | | | | cl. silt (moist) | | | |
| 5 | 4.0 | 5.0 | | | SAME (very moist) | | | |
| + 6 | 5.0 | 6.0 | | | SAME (wet) | | | |
| 7 | 6.0 | 7.0 | 6.0 | | 4. BR (FTOM) SAND w/ little | | | |
| | | | | 7.0 | silt & silt | | | |
| 8 | 7.0 | 8.0 | 7.0 | | 1. GR (FTOM) SAND w/ silt | | | A=2.5 |
| | | | | 8.0 | silt & silt | | | |
| 9 | 8.0 | 9.0 | 8.0 | | 3. BR BR SANDY SILT - | | | A=4 |
| | | | | | little clay & silt | | | |
| 10 | 9.0 | 10.0 | | | 4. BR BR (FTOM) SAND | | | A=2 |
| | | | | | 100 w/ some silt & clay | | | |
| | | | | | END | | | |

| |
|-------------------|
| BLOWS ON CASING B |
| 0-1 |
| 1-2 |
| 2-3 |
| 3-4 |
| 4-5 |
| 5-6 |
| 6-7 |
| 7-8 |
| 8-9 |
| 9-10 |
| 10-11 |
| 11-12 |
| 12-13 |
| 13-14 |
| 14-15 |
| 15-16 |
| 16-17 |
| 17-18 |
| 18-19 |
| 19-20 |
| 20-21 |
| 21-22 |
| 22-23 |
| 23-24 |
| 24-25 |
| 25-26 |
| 26-27 |
| 27-28 |
| 28-29 |
| 29-30 |
| 30-31 |
| 31-32 |
| 32-33 |
| 33-34 |
| 34-35 |
| 35-36 |
| 36-37 |
| 37-38 |
| 38-39 |
| 39-40 |
| 40-41 |
| 41-42 |
| 42-43 |
| 43-44 |
| 44-45 |
| 45-46 |
| 46-47 |
| 47-48 |
| 48-49 |
| 49-50 |
| 50-51 |
| 51-52 |
| 52-53 |
| 53-54 |
| 54-55 |
| 55-56 |
| 56-57 |
| 57-58 |
| 58-59 |
| 59-60 |
| 60-61 |

Number of blows of 140 lb. hammer dropped 30 in. required to drive 2 in. split-spoon sampler for each of three 6 in. increments.
 Number of blows of 300 lb. hammer dropped 18 in. required to drive _____ in casing 12 inches.

REMARKS: Full 5.9' Hole 6.5'

will cut aug - 3.5'

save at aug 9.1'

| GROUNDWATER | |
|-------------|--|
| | |
| | |

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

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

Boring No.: SWM3-6-01

Contract: 28-113-01

Boring Location: Sta. 128+30, 200' Lt. C.L.

Boring Surface Elev.: + 61.98

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: |
| | | | | | 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/20/2009 | | 10.0 | 8.0 | 6.7 | |

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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|--|-------------|-------------------|
| | 7/20/09 | 1 | 0.5' | 5 7 9 | Moist very stiff gray mottled silt w/some clay and fine to coarse sand, trace of gravel. | A-4(1) | Forrest Duff - 4" |
| 2 | | 2 | 2.0' | 6 10 | 16" RECOVERY Moist very stiff gray mottled clayey fine to coarse andy silt w/trace of gravel. | A-4(0) | |
| | | 2A | 3.0' | 11 12 | 8" RECOVERY Moist medium dense gray coarse to fine sand w/some silt, trace of gravel. | A-2-4(0) | |
| 4 | | 3 | 4.0' | 4 7 4 4 | 10" RECOVERY Wet medium dense gray fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 6 | | 4 | 6.0' | 6 6 7 7 | 10" RECOVERY Wet medium dense brown silty fine to coarse sand w/trace of gravel. | A-2-4(0) | |
| 8 | | 5 | 8.0' | 5 8 12 8 | 16" RECOVERY Wet medium dense orange coarse to fine sand and gravel w/trace of silt. | A-1-b | |
| 10 | | | 10.0' | | 17" 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



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-6-02

Contract: 28-113-01

Boring Location: Sta. 128+36, 165' Lt. C.L.

Boring Surface Elev.: + 68.94

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: 8.0

Water Level Readings

| Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
|-----------|------|---------------|-----------------|----------------|----------------|
| 7/20/2009 | | 10.0 | 8.0 | 7.7 | |

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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|--|-------------|---------|
| | 7/20/09 | 1 | 0.0' | 4 6 5 5 | Moist stiff gray mottled silt w/trace of gravel and fine to coarse sand. | A-4(0) | |
| 2 | | 2 | 2.0' 2.0' | 14 11 10 8 | 16" RECOVERY Moist very stiff gray mottled fine sandy silt w/some coarse sand, trace of gravel. | A-4(0) | |
| 4 | | 3 | 4.0' 4.0' | 3 4 7 7 | 16" RECOVERY Wet medium dense gray fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 6 | | 4 | 6.0' 6.0' | 5 5 4 6 | 14" RECOVERY Wet loose brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 8 | | 5 | 8.0' 8.0' | 2 3 3 4 | 14" RECOVERY Wet loose brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 10 | | | 10.0' | | 15" RECOVERY End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-6-03

Contract: 28-113-01

Boring Location: Sta. 128+90, 144' Lt. C.L.

Boring Surface Elev.: + 66.6

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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/20/2009 | | 10.0 | 8.0 | 4.0 | |

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: | | | 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 |
|-------------|----------------|-----|--------------|---------------------|--|-------------|-------------------|
| | 7/20/09 | 1 | 0.0' | 4 4 10 7 | Moist stiff gray mottled silt w/some clay, trace of gravel and fine to coarse sand. | A-4(3) | Forrset Duff - 1" |
| 2 | | 2 | 2.0' 2.0' | 10 10 17 9 | 19" RECOVERY Moist medium dense gray silty coarse to fine sand w/trace of gravel. | A-1-b | |
| 4 | | 3 | 4.0' 4.0' | 4 4 7 7 | 8" RECOVERY Wet medium dense gray silty fine to coarse sand w/trace of gravel. | A-2-4(0) | |
| 6 | | 4 | 6.0' 6.0' | 7 7 5 4 | 15" RECOVERY Wet medium dense tan coarse to fine sand w/some silt, trace of gravel. | A-2-4(0) | |
| 8 | | 5 | 8.0' 8.0' | 1 3 2 3 | 15" RECOVERY Wet loose orange fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 10 | | | 10.0' | | 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



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recomendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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

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

Boring No.: SWM3-7-04

Contract: 28-113-01

Boring Location: Sta. 1004+45, 185' Rt. C.L.

Boring Surface Elev.: + 67.2

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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/6/2009 | | 10.0 | 8.0 | 6.9 | |

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: Jason Truver
Helpers: D. Zmijewski

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---------------|
| | 10/6/09 | 1 | 0.5' | 3 2 | Wet soft gray clayey silt w/trace of fine to coarse sand and fine gravel. | A-4(4) | Topsoil - 6". |
| 2 | | 2 | 2.0' | 3 3 | 12" RECOVERY Wet firm gray clay w/some fine sand, trace of coarse sand and fine gravel. | A-6(7) | 2.5 YR - 8/1 |
| | | 2A | 3.0' | 5 10 | 9" RECOVERY Wet medium dense tan silty fine sand w/some coarse sand, trace of fine gravel. | A-2-4(0) | 2.5 YR - 8/1 |
| 4 | | 3 | 4.0' | 11 12 13 10 | 9" RECOVERY Wet medium dense orange coarse to fine sand w/some fine gravel. trace of silt. | A-1-b | 5 YR - 5/8 |
| 6 | | 4 | 6.0' | 9 9 10 11 | 14" RECOVERY Wet medium dense orange coarse to fine sand w/some silt, trace of fine gravel. | A-2-4(0) | 5 YR - 5/8 |
| 8 | | 5 | 8.0' | 4 5 4 4 | 21" RECOVERY Wet loose orange fine sand w/some fine gravel, trace of fine sand and silt. | A-1-b | 5 YR - 5/6 |
| 10 | | | 10.0' | | 19" 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



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/6/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-7-05

Contract: 28-113-01

Boring Location: Sta. 136+70, Rt. C.L.

Boring Surface Elev.: + 66.5

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: |
| | | | | | 8.0 |

| | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date | Time | | | | |
| 10/5/2009 | | 10.0 | 8.0 | 4.2 | |

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: | | ; | No. of U-Samples: | | |
| 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 |
|-------------|----------------|-----|--------------|---------------------|---|-------------|-------------------------------|
| | 10/5/09 | 1 | 0.5' | 5 5 8 | Moist stiff tan clayey silt w/some fine to coarse sand, trace of fine gravel. | A-4(2) | Topsoil - 6". 7.5 YR - 5/2 |
| 2 | | 2 | 2.0' | 7 10 13 11 | 12" RECOVERY Moist medium dense tan silty fine to coarse sand w/some clay, trace of fine gravel. | A-2-4(0) | 7.5 YR - 5/2 |
| 4 | | 3 | 4.0' | 3 6 5 7 | 17" RECOVERY Wet medium dense gray silty coarse to fine sand. | A-2-4(0) | 10 YR - 5/1 |
| 6 | | 4 | 6.0' | 4 7 7 5 | 16" RECOVERY Wet medium dense orange coarse to fine sand w/some silt, trace of gravel. | A-1-b | 7.5 YR - 5/6 |
| 8 | | 5 | 8.0' | 3 5 5 | 15" RECOVERY Wet loose orange coarse sand w/some fine sand and silt, trace of fine gravel. | A-1-b | 7.5 YR - 5/6 |
| 10 | | | 10.0' | | 16" 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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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/5/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-9-04

Contract: 28-113-01

Boring Location: Sta. 144+70, 245' Rt. C.L.

Boring Surface Elev.: + 71.4

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: 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 1/27/2010 | | 10.0 | 8.0 | 4.3 | |

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: | | ; | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|---|-------------|---------------|
| | 1/27/10 | 1 | 0.5' | 5 4 4 | Moist stiff brown fine sandy silt w/some coarse sand, trace of fine gravel. | A-4(0) | Topsoil - 4". |
| | | | 2.0' | | 6" RECOVERY | | |
| 3 | | 2 | 2.0' | 3 3 5 | Wet firm brown fine to coarse sandy silt w/trace of fine gravel. | A-4(0) | |
| | | | 4.0' | | 12" RECOVERY | | |
| | | 3 | 4.0' | 4 7 7 7 | Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| 6 | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 5 6 5 6 | Saturated medium dense brown silty fine to coarse sand w/trace of fine gravel. | A-2-4(0) | |
| | | | 8.0' | | 17" RECOVERY | | |
| 9 | | 5 | 8.0' | 7 8 8 | Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 10.0' | | 16" RECOVERY | | |
| | | | | | End of Boring | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/27/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-9-05

Contract: 28-113-01

Boring Location: Sta. 148+25, 265' 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: | | 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: 8.0 | |

| | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date 1/27/2010 | Time | 10.0 | 8.0 | 3.4 | |

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: | ; | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|---|-------------|---------------|
| | 1/27/10 | 1 | 0.5' | 1 1 1 | Saturated soft grayish brown silt w/some fine to coarse sand, trace of fine gravel. | A-4(0) | Topsoil - 3". |
| | | | 2.0' | | 12" RECOVERY | | |
| 3 | | 2 | 2.0' | 2 4 4 4 | Saturated loose brown silty coarse to fine sand w/trace of fine gravel. | A-2-4(0) | |
| | | | 4.0' | | 15" RECOVERY | | |
| | | 3 | 4.0' | 4 8 8 8 | Saturated medium dense brown coarse to fine sand w/some silt and fine gravel. | A-1-b | |
| 6 | | | 6.0' | | 16" RECOVERY | | |
| | | 4 | 6.0' | 8 8 8 9 | Saturated medium dense brown silty fine sand w/some fine gravel and coarse sand. | A-2-4(0) | |
| | | | 8.0' | | 18" RECOVERY | | |
| 9 | | 5 | 8.0' | 6 6 10 11 | Saturated medium dense brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 10.0' | | 10" RECOVERY | | |
| | | | | | End of Boring | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

Remarks:

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/27/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-10-01

Contract: 28-113-01

Boring Location: Sta. 193+00, 280' Lt. C.L.

Boring Surface Elev.: + 63.4

Reference:

| | | | | | |
|-----------------------|------------------------|------|---------------------|----|-----|
| Wt. of Casing Hammer: | | Lbs. | Average Fall: | | IN. |
| Wt. of Sample Hammer: | 140 | Lbs. | Average Fall: | 30 | IN. |
| Type of: | D-Sampler: Slit 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: |
| | | | | | 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/21/2009 | | 10.0 | 8.0 | 8.9 | |

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: | | ; | 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 |
|-------------|----------------|-----|--------------|----------------------|--|-------------|-----------------------------------|
| | 7/21/09 | 1 | 0.5' | 8 17 12 | Moist very stiff brown clayey silt w/some fine sand, trace of coarse sand and gravel. | A-4(5) | Cultivated Soil - 6". |
| 2 | | 2 | 2.0' | 9 9 16 19 | 9" RECOVERY Moist medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | |
| 4 | | 3 | 4.0' | 9 17 16 9 | 14" RECOVERY Moist dense brown gravel and fine to coarse sand w/some silt. | A-1-b | |
| 6 | | 4 | 6.0' | 9 24 25 52 | 14" RECOVERY Moist dense brown gravel and coarse sand w/some fine sand, trace of silt and clay. | A-1-b | USDA Classifica- - Loamy Sand. |
| 8 | | 5 | 8.0' | 16 19 20 17 | 16" RECOVERY No Sample Recovery | | |
| 10 | | | 10.0' | | 0" 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 7/21/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-10-02

Contract: 28-113-01

Boring Location: Sta. 193+85, 440' Lt. C.L.

Boring Surface Elev.: + 62.1

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: |
| | | | | | 8.0 |

| | | | | | | | |
|----------------------|--|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | | 7/21/2009 | | 10.0 | 8.0 | 8.3 | |

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 |
|-------------|----------------|-----|--------------|----------------------|---|-------------|-----------------------------------|
| | 7/21/09 | 1 | 0.5' | 11 14 18 | Moist hard brown clayey gravelly silt w/some coarse to fine sand. | A-4(1) | Cultivated Soil - 5". |
| 2 | | 2 | 2.0' | 17 20 28 20 | 8" RECOVERY Moist dense brown gravel w/some fine to coarse sand and gravel. | A-1-b | |
| 4 | | 3 | 4.0' | 12 24 26 20 | 14" RECOVERY Moist dense brown coarse sand and gravel w/some fine sand, trace of silt. | A-1-b | |
| 6 | | 4 | 6.0' | 21 23 17 14 | 14" RECOVERY Moist dense brown gravel and fine to coarse and w/trace of silt and clay. | A-1-b | USDA Classifica- - LOamy Sand. |
| 8 | | 5 | 8.0' | 6 8 14 17 | 19" RECOVERY Wet medium dense brown gravel and coarse to fine sand w/some silt. | A-1-b | |
| 10 | | | 10.0' | | 6" RECOVERY End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/21/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

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 7/21/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-11-01

Contract: 28-113-01

Boring Location: Sta. 193+40, 160' Rt. C.L.

Boring Surface Elev.: + 66.8

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 | 12.0 | |

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: Gary Truver

Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|----------------------------------|
| 3 | 7/21/09 | 1 | 0.5' | 13 11 10 | Moist very stiff brown clayey silt w/some fine to coarse sand, trace of gravel. 8" RECOVERY | A-4(3) | Cultivated Soil - 8". 10 YR - |
| | | 2 | 2.0' | 6 8 13 8 | Moist medium dense brown clayey fine to coarse sand w/trace of gravel. 14" RECOVERY | A-2-4(0) | 5/8 7.5 YR - 5/6 |
| 6 | 7/21/09 | 3 | 4.0' | 5 7 9 7 | Moist medium dense tan coarse to fine sand w/some silt, trace of gravel. 21" RECOVERY | A-2-4(0) | 2.5 YR - 7/6 |
| | | 4 | 6.0' | 4 6 6 6 | Moist medium dense tan silty fine sand w/some coarse sand, trace of gravel. 19" RECOVERY | A-2-4(0) | 10YR - 7/ 8 |
| 9 | 7/21/09 | 5 | 8.0' | 2 13 25 29 | Moist dense brown gravel w/some fine to coarse sand and silt. 8" RECOVERY | A-1-b | 10 YR - 5/8 |
| | | 6 | 10.0' | 12 17 14 19 | Moist dense brown coarse to fine sand and gravel w/some silt. 16" RECOVERY | A-1-b | 10 YR - 5/8 |
| 12 | 7/21/09 | 7 | 12.0' | 11 10 14 15 | Wet medium dense brown coarse to fine sand w/trace of silt and gravel. 13" RECOVERY | A-1-b | 7.5 YR - 3/3 |
| | | 8 | 14.0' | 9 11 14 11 | Wet medium dense brown coarse to fine sand and gravel w/trace of silt. 16" RECOVERY | A-1-b | 7.5 YR - 5/6 |
| | | | 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 clayey
silty sand



Silty sand



Well 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 continuous flight power auger. Rig is a ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-11-02

Contract: 28-113-01

Boring Location: Sta. 195+00, 170' Rt. C.L.

Boring Surface Elev.: + 66.35

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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/21/2009 | | 10.0 | 8.0 | 8.9 | |

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 |
|-------------|----------------|-----|--------------|----------------------|--|-------------|--------------------------------------|
| | 7/21/09 | 1 | 0.5' | 11 12 7 | Moist medium dense brown clayey fine to coarse sand and gravel. | A-2-4(0) | Cultivated Soil - 5". 10 YR - 6/6 |
| 2 | | 2 | 2.0' 2.0' | 6 8 7 8 | 6" RECOVERY Moist medium dense brown coarse to fine sand w/some silt and gravel. | A-1-b | 10 YR - 6/8 |
| 4 | | 3 | 4.0' 4.0' | 3 9 13 18 | 14" RECOVERY Moist medium dense brown coarse sand and gravel w/some fine sand and silt. | A-1-b | 10 YR - 6/8 |
| 6 | | 4 | 6.0' 6.0' | 36 26 20 13 | 15" RECOVERY No Sample Recovery | | Cobble blocking spoon. |
| 8 | | 5 | 8.0' 8.0' | 4 12 15 13 | 0" RECOVERY Moist to wet medium dense brown coarse to fine sand w/trace of silt and gravel. | A-1-b | 10 YR - 7/8 |
| 10 | | | 10.0' | | 16" RECOVERY | | |
| | | | | | End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



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 7/21/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-11-03

Contract: 28-113-01

Boring Location: Sta. 196+95, 190' Rt. C.L.

Boring Surface Elev.: + 63.7

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 |
| | 10/6/2009 | | 10.0 | | 6.0 | |

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: John Foley
Helpers:

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------|--|-------------|--------------------|
| | 10/6/09 | 1 | | | No Sample Taken | | Topsoil Hand Auger |
| | | 2 | | | Moist brownish orange clayey fine to coarse sandy silt w/trace of fine gravel. | A-4(0) | Hand Auger |
| 2 | | 3 | | | Moist brownish orange fine gravel and fine to coarse sand w/trace of silt. | A-1-b | Hand Auger |
| | | 4 | | | Moist brown coarse to fine sand and fine gravel w/some silt. | A-1-b | Hand Auger |
| 4 | | 5 | | | Moist brown coarse sand and fine gravel w/some fine sand, trace of silt. | A-1-b | Hand Auger |
| | | 6 | | | Moist brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | Hand Auger |
| 6 | | 7 | | | Wet brownish orange fine to coarse sand w/trace of silt and fine gravel. | A-3 | Hand Auger |
| | | 8 | | | Wet brownish orange coarse to fine sand w/trace of silt and fine gravel. | A-1-b | Hand Auger |
| 8 | | 9 | | | Wet brownish orange fine to coarse sand and fine gravel w/trace of silt. | A-1-b | Hand Auger |
| | | 10 | | | Wet brownish orange fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | Hand Auger |
| 10 | | | | | End of Boring | | |

Remarks: Hand Auger

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded sand
with silt



Silty sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/6/2009 using a hand auger.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM3-12-01

Contract: 28-113-01

Boring Location: Sta. 1204+71, 90' Rt. C.L.

Boring Surface Elev.: + 69.9

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: |
| | | | | | 10.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/17/2009 | | 10.0 | 8.0 | 7.0 | |

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: Cecil Velazco
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|---|
| | 7/17/09 | 1 | 0.5' | 5 7 6 | Moist stiff gray silt w/some clay and fine sand, trace of coarse sand and gravel. | A-4(1) | Topsoil - 4". 2.5 YR - 6/2 |
| 2 | | 2 | 2.0' | 7 9 11 | 14" RECOVERY Moist very stiff gray silt w/some fine sand, trace of coarse sand and gravel. | A-4(0) | 10 YR - 7/1 |
| 4 | | 2A | 3.5' | 16 | 15" RECOVERY Moist medium dense orange coarse to fine sand w/some silt and gravel. | A-1-b | 10 YR - 5/6 |
| | | 3 | 4.0' | 9 18 18 10 | 6" RECOVERY Moist dense brown fine to coarse sand w/some silt, trace of gravel and clay. | A-2-4(0) | USDA Classifica- - Loamy Sand 10 YR - 4/6 |
| 6 | | 4 | 6.0' | 9 8 5 7 | 18" RECOVERY Wet medium dense tan silty fine sand w/some coarse sand, trace of gravel. | A-2-4(0) | 2.5 YR - 8/3 |
| 8 | | 5 | 8.0' | 4 5 5 6 | 23" RECOVERY Wet loose tan fine to coarse sand w/some silt. | A-2-4(0) | 2.5 YR - 7/3 |
| 10 | | | 10.0' | | 16" 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



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 continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-12-02

Contract: 28-113-01

Boring Location: Sta. 1204+94, 100' Rt. C.L.

Boring Surface Elev.: + 78.1

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: |
| | | | | | 8.0 |

| | | | | | | | |
|----------------------|--|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | | 7/17/2009 | | 10.0 | 8.0 | 7.9 | |

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: Cecil Velazco
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|--|
| | 7/17/09 | 1 | 0.5' | 4 4 3 | Moist firm gray silt w/some fine sand, trace of coarse sand and gravel. | A-4(0) | Topsoil - 5". 2.5 YR - 6/3 |
| 2 | | 2 | 2.0' 2.0' | 6 7 7 9 | 12" RECOVERY Moist stiff gray mottled silt w/some fine sand and clay, trace of coarse sand and gravel. | A-4(0) | USDA Classifica - Silt Loam 10 YR - 6/3 |
| 4 | | 3 | 4.0' 4.0' | 6 16 18 10 | 21" RECOVERY Moist dense brown fine to coarse sand w/some gravel, trace of silt. | A-1-b | 10 YR - 5/6 |
| 6 | | 4 | 6.0' 6.0' | 7 11 11 11 | 20" RECOVERY Moist to wet medium dense brown silty fine sand w/some coarse sand, trace of gravel. | A-2-4(0) | 7.5 YR - 5/8 |
| 8 | | 5 | 8.0' 8.0' | 2 4 4 5 | 21" RECOVERY Wet loose gray silty fine sand w/trace of coarse sand. | A-2-4(0) | 2.5 YR - 7/1 |
| 10 | | | 10.0' | | 17" RECOVERY End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Poorly graded sand
with silt



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 continues flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-12-03

Contract: 28-113-01

Boring Location: Sta. 196+95, 190' Rt. 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: 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/17/2009 | | 10.0 | 8.0 | 6.6 | |

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

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

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---|
| | 7/17/09 | 1 | 0.5' | 6 6 6 | Moist stiff brown fine sandy silt w/some coarse sand, trace of clay and gravel. | A-4(0) | Topsoil - 4". 10 YR - 5/6 |
| 2 | | 2 | 2.0' | 3 5 4 4 | 4" RECOVERY Moist stiff brown fine sandy silt w/some coarse sand and gravel, trace of clay. | A-4(0) | 2.5 YR - 5/6 |
| 4 | | 3 | 4.0' | 4 8 13 17 | 19" RECOVERY Moist medium dense orange fine to coarse sand w/some silt, trace of gravel and clay. | A-2-4(0) | USDA Classifica - Loamy Sand 7.5 YR - 5/8 |
| 6 | | 4 | 6.0' | 11 13 16 13 | 16" RECOVERY Moist to wet medium dense brown coarse sand w/some fine sand, trace of silt and gravel. | A-1-b | 10 YR - 5/6 |
| 8 | | 5 | 8.0' | 4 6 10 12 | 18" RECOVERY Wet medium dense orange coarse to fine sand w/some silt, trace of gravel. | A-1-b | 10 YR - 6/8 |
| 10 | | | 10.0' | | 14" 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 7/17/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-12-04

Contract: 28-113-01

Boring Location: Sta. 156+85, 525' 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: | 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: 8.0 |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/7/2009 | | 10.0 | 8.0 | Dry | |

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: | | ; | 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 |
|-------------|----------------|-----|--------------|------------------|--|-------------|--|
| | 10/7/09 | 1 | 0.0' | 1 2 3 | Wet brown soft clayey fine to coarse sandy silt w/trace of fine gravel. | A-4(1) | Topsoil - 3". USDA Classifica - Sandy Loam. |
| 2 | | 2 | 2.0' 2.0' | 4 5 6 | 17" RECOVERY Wet brown medium dense silty fine sand w/some coarse sand, trace of fine gravel. | A-2-4(0) | 10 YR - 4/6 10 YR - 5/8 |
| 4 | | 3 | 4.0' 4.0' | 4 5 6 | 19" RECOVERY Wet brown loose silty fine sand w/trace of coarse sand and fine gravel. | A-2-4(0) | 7.5 YR - 5/6 |
| 6 | | 4 | 6.0' 6.0' | 6 6 6 | 20" RECOVERY Wet orange medium dense silty fine to coarse sand w/trace of fine gravel. | A-2-4(0) | 10 YR - 6/8 |
| 8 | | 5 | 8.0' 8.0' | 3 4 4 5 | 19" RECOVERY Wet orange loose fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | 10 YR - 6/8 |
| 10 | | | 10.0' | | 17" RECOVERY End of Boring | | |

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 10/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-12-05

Contract: 28-113-01

Boring Location: Sta. 155+85, 515' 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: | | 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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/7/2009 | | 10.0 | 8.0 | Dry | |

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: Jason Truver
Helpers: J. Laferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|--|-------------|---|
| | 10/7/09 | 1 | 0.0' | 2 2 4 6 | Wet firm gray clayey silt w/trace of fine to coarse sand and fine gravel. | A-4(6) | Topsoil - 3". USDA Classifica - Silt Loam. |
| 2 | | | 2.0' | | 20" RECOVERY | | |
| | | 2 | 2.0' | 7 8 11 11 | Wet medium dense orangish gray silty fine sand w/trace of coarse sand and fine gravel. | A-2-4(0) | 10 YR - 6/3 7.5 YR - 5/8 |
| 4 | | | 4.0' | | 20" RECOVERY | | |
| | | 3 | 4.0' | 5 5 7 6 | Wet stiff orangish gray clayey silt w/trace of fine to coarse sand and fine gravel. | A-4(5) | 7.5 YR - 5/8 |
| 6 | | | 6.0' | | 19" RECOVERY | | |
| | | 4 | 6.0' | 6 6 5 6 | Wet medium dense brown silty fine sand w/some coarse sand, trace of fine gravel. | A-2-4(0) | 7.5 YR - 5/4 |
| 8 | | | 8.0' | | 20" RECOVERY | | |
| | | 5 | 8.0' | 6 8 8 9 | Wet medium dense brown silty fine to coarse sand w/trace of fine gravel. | A-2-4(0) | 7.5 YR - 5/4 |
| 10 | | | 10.0' | | 21" 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



Silty low plasticity
clay

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/7/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-13-01

Contract: 28-113-01

Boring Location: Sta. 1204+11, 92' Lt. C.L.

Boring Surface Elev.: + 67.4

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: | 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/17/2009 | | 10.0 | 8.0 | 6.6 | |

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

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

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---|
| | 7/17/09 | 1 | 0.5' | 6 7 8 | Moist stiff gray fine sandy silt w/some coarse sand and clay, trace of gravel. | A-4(0) | Topsoil - 3". 2.5 YR - 6/2 |
| 2 | | | 2.0' | | 17" RECOVERY | | |
| | | 2 | 2.0' | 14 14 17 16 | Moist dense brown coarse to fine sand w/trace of silt, clay and gravel. | A-1-b | USDA Classifica - Loamy Sand 5 YR - 4/ 6 |
| 4 | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | 6 7 6 7 | Moist medium dense tan silty fine to coarse sand w/trace of gravel. | A-2-4(0) | 2.5 YR - 7/6 |
| 6 | | | 6.0' | | 21" RECOVERY | | |
| | | 4 | 6.0' | 4 5 6 6 | Wet medium dense gray fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 10 YR - 6/2 |
| 8 | | | 8.0' | | 18" RECOVERY | | |
| | | 5 | 8.0' | 3 5 6 6 | Wet medium dense tan coarse to fine sand w/some silt, trace of gravel. | A-1-b | 2.5 YR - 7/4 |
| 10 | | | 10.0' | | 20" RECOVERY | | |
| | | | | | End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



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 continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-13-02

Contract: 28-113-01

Boring Location: Sta. 1204+11, 65' Lt. C.L.

Boring Surface Elev.: + 67.7

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: |
| | | | | | 8.0 |

| | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date | Time | | | | |
| 7/17/2009 | | 10.0 | 8.0 | 8.0 | |

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: | | ; | 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 Velazco
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------|--|-------------|---|
| | 7/17/09 | 1 | 0.5' | 3 6 8 | Moist stiff gray silt w/some fine sand, trace of coarse sand, clay and gravel. | A-4(0) | Topsoil - 3". 7.5 YR - 6/2 |
| 2 | | 2 | 2.0' | 5 6 8 | 16" RECOVERY MOist medium dense brown coarse to fine sand w/trace of silt, clay and gravel. | A-1-b | USDA Classifica - Loamy Sand 7.5 YR - 5/4 |
| 4 | | 3 | 4.0' | 3 6 8 | 16" RECOVERY Moist medium dense grayish brown silty fine to coarse sand w/trace of gravel. | A-2-4(0) | 10 YR - 6/3 |
| 6 | | 4 | 6.0' | 5 7 8 | 18" RECOVERY Wet medium dense gray silty fine sand w/some coarse sand, trace of gravel. | A-2-4(0) | 2.5 YR - 6/3 |
| 8 | | 5 | 8.0' | 3 3 7 | 20" RECOVERY Wet loose brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 2.5 YR - 5/4 |
| 10 | | | 10.0' | | 17" RECOVERY End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



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 continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-13-03

Contract: 28-113-01

Boring Location: Sta. 1204+63, 55' 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: 8.0 |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/17/2009 | | 10.0 | 8.0 | 7.1 | |

Pay Quantities:

| | | | | | |
|---------------------------------------|------|-------------|-------------------------------|------------------------------|------------|
| 2 1/2 in. Dia. Dry Sample Boring: | 10.0 | Ft.; | No. of: | 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: Cecil Velazco
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|--|
| | 7/17/09 | 1 | 0.0' | 4 6 8 7 | Moist stiff gray silt w/some fine sand, trace of clay and coarse sand. | A-4(0) | Topsoil - 2". 10 YR - 6/2 |
| 2 | | 2 | 2.0' | 8 13 | Moist very stiff gray fine sandy silt w/some coarse sand, trace of clay and gravel. | A-4(0) | 10 YR - 6/2 |
| | | 2A | 3.0' | 9 10 | Moist medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 7.5 YR - 5/8 |
| 4 | | 3 | 4.0' | 9 13 10 12 | MOist medium dense brown coarse to fine sand w/some silt and gravel, trace of clay. | A-2-4(0) | USDA Classifica - Loamy Sand 7.5 YR - 5/8 |
| 6 | | 4 | 6.0' | 8 9 9 10 | Moist to wet medium dense brown silty fine to coarse sand w/some gravel. | A-2-4(0) | 10 YR - 5/6 |
| 8 | | 5 | 8.0' | 4 6 6 6 | Wet medium dense brown silty fine sand w/some coarse sand. | A-2-4(0) | 2.5 YR - 7/6 |
| 10 | | | 10.0' | | End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



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 continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-14-01

Contract: 28-113-01

Boring Location: Sta. 198+00, 520' Lt. C.L.

Boring Surface Elev.: + 60.1

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: |
| | | | | | 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/23/2009 | | 10.0 | 8.0 | 8.2 | |

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: | | ; | 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 |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---|
| | 7/23/09 | 1 | 1.0' | 3 4 | Moist firm brown clayey fine sandy silt w/some coarse sand. | A-4(2) | Cultivated Soil - 9" - 10 YR - |
| 2 | | | 2.0' | | 8" RECOVERY | | |
| | | 2 | 2.0' | 4 5 3 3 | Moist loose brown silty coarse to fine sand w/some gravel and clay. | A-2-4(0) | 4/6 USDA Classifica - Sandy Loam 10 YR - |
| 4 | | | 4.0' | | 15" RECOVERY | | |
| | | 3 | 4.0' | 10 30 46 50 | Moist very dense brown gravel and coarse sand w/some fine sand, trace of silt. | A-1-a | 5/8 10 YR - 5/8 |
| 6 | | | 6.0' | | 13" RECOVERY | | |
| | | 4 | 6.0' | 41 30 21 16 | Moist very dense brown gravel and coarse sand w/some fine sand, trace of silt. | A-1-a | 10 YR - 5/4 |
| 8 | | | 8.0' | | 7" RECOVERY | | |
| | | 5 | 8.0' | 6 7 7 9 | Wet medium dense orange coarse to fine sand w/some gravel, trace of silt. | A-1-b | 7.5 YR - 5/8 |
| 10 | | | 10.0' | | 16" RECOVERY | | |
| | | | | | End of Boring | | |
| 12 | | | | | | | |

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



Poorly graded gravel
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/23/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-14-02

Contract: 28-113-01

Boring Location: Sta. 198+40, 425' Lt. C.L.

Boring Surface Elev.: + 61.5

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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/23/2009 | | 10.0 | 8.0 | 9.1 | |

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: | | | Core Drilling in Rock: | Ft. |

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

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---|
| | 7/23/09 | 1 | 0.5' | 3 4 5 | Moist stiff brown clayey silt w/trace of fine to coarse sand. | A-4(7) | Cultivated Soil - 8". 10 YR - 4/6 |
| 2 | | 2 | 2.0' | 4 7 8 11 | 9" RECOVERY Moist stiff brown clay w/some fine to coarse sand, trace of gravel. | A-6(6) | 10 YR - 4/6 |
| 4 | | 3 | 4.0' | 10 17 19 34 | 18" RECOVERY Moist dense brown silty coarse sand and gravel w/some fine sand, trace of clay. | A-2-4(0) | USDA Classifica- - Sandy Loam 10 Yr - 5/ 6 |
| 6 | | 4 | 6.0' | 35 42 21 22 | 17" RECOVERY Moist very dense orange gravel and coarse to fine sand w/some silt. | A-1-b | 10 YR - 6/8 |
| 8 | | 5 | 8.0' | 8 10 10 9 | 11" RECOVERY Moist to wet medium dense orange coarse to fine sand w/trace of silt and gravel. | A-1-b | 2.5 YR - 6/8 |
| 10 | | | 10.0' | | 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 |
|  | Silty sand |
|  | Well graded sand with silt |

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/23/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-14-03

Contract: 28-113-01

Boring Location: Sta. 198+85, 295' Lt. C.L.

Boring Surface Elev.: + 62.9

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: | 0.0 | To: | |
| | Hollow Stem Auger: | | From Depth of: | | To: | 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/21/2009 | | 10.0 | 8.0 | Dry | |

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: | | ; | 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 |
|-------------|----------------|-----|--------------|----------------------|--|-------------|---|
| | 7/21/09 | 1 | 1.0' | 2 3 | Moist firm brown clay w/trace of fine sand. | A-6(10) | Cultivated Soil - 9". |
| 2 | | | 2.0' | | 6" RECOVERY | | 10 YR - |
| | | 2 | 2.0' | 4 4 6 8 | Moist stiff brown clay w/trace of fine sand. | A-6(13) | 5/6 10 YR - 6/8 |
| | | | 4.0' | | 19" RECOVERY | | |
| 4 | | 3 | 4.0' | 5 7 11 24 | Moist very stiff tan clayey gravelly silt w/trace of fine to coarse sand. | A-4(1) | USDA Classifica - Silty Clay Loam 2.5 YR - |
| | | | 6.0' | | 12" RECOVERY | | 6/4 10 YR - 6/8 |
| 6 | | 4 | 6.0' | 17 21 19 16 | Moist dense brown gravel and fine to coarse sand w/some silt. | A-1-b | |
| | | | 8.0' | | 17" RECOVERY | | |
| 8 | | 5 | 8.0' | 4 8 7 9 | Moist medium dense brown coarse to fine sand w/some silt, trace of gravel. | A-2-4(0) | 10 YR - 5/8 |
| | | | 10.0' | | 17" RECOVERY | | |
| 10 | | | | | End of Boring | | |
| | | | | | | | |
| 12 | | | | | | | |

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 7/21/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-15-01

Contract: 28-113-01

Boring Location: Sta. 248+70, 537' Lt. C.L.

Boring Surface Elev.: + 57.9

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: 10.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/23/2009 | | 10.0 | 8.0 | Dry | |

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: | | | Core Drilling in Rock: | Ft. |

Boring Contractor: Walton Corporation
Driller: Cecil Velazco
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|--|
| | 7/23/09 | 1 | 0.5' | 11 12 12 | Moist very stiff brown clayey silt w/some fine to coarse sand, trace of gravel. | A-4(5) | Topsoil - 7". 2.5 YR - 7/6 |
| 2 | | 2 | 2.0' | 22 29 13 14 | 13" RECOVERY Moist dense brown gravel and coarse to fine sand w/trace of silt and clay. | A-1-b | USDA Classifica - Loamy Sand 10 Yr - 5/4 |
| 4 | | 3 | 4.0' | 9 10 10 10 | 21" RECOVERY Moist medium dense brown silty fine to coarse sand and gravel. | A-2-4(0) | 10 YR - 5/6 |
| 6 | | 4 | 6.0' | 20 18 19 18 | 20" RECOVERY Moist dense brown coarse to fine sand and gravel w/some silt. | A-1-b | 10 YR - 4/4 |
| 8 | | 5 | 8.0' | 7 10 10 11 | 19" RECOVERY Moist medium dense brown clayey coarse to fine sand w/trace of gravel. | A-2-7(0) | 10 YR - 3/6 |
| 10 | | | 10.0' | | 20" 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 sand
with silt



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/23/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-15-02

Contract: 28-113-01

Boring Location: Sta. 249+25, 400' Lt. C.L.

Boring Surface Elev.: + 60.7

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: 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/23/2009 | | 10.0 | 8.0 | Dry | |

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: Cecil Velazco
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|---|
| | 7/23/09 | 1 | 0.5' | 9 9 11 | Moist very stiff brown clayey fine sandy silt w/some coarse sand. | A-4(2) | Topsoil - 5". 10 YR - 7/6 |
| 2 | | 2 | 2.0' | 6 6 9 11 | 13" RECOVERY Moist stiff brown fine sandy silt w/some coarse sand, trace of clay and gravel. | A-4(0) | USDA Classifica - Sandy Loam 10 YR - 5/6 |
| 4 | | 3 | 4.0' | 7 14 11 9 | 17" RECOVERY Moist medium dense brown fine to coarse sand w/some gravel and silt. | A-1-b | 7.5 YR - 5/8 |
| 6 | | 4 | 6.0' | 7 18 18 17 | 17" RECOVERY Moist dense brown coarse sand and gravel w/some fine sand and silt. | A-1-b | 10 YR - 6/6 |
| 8 | | 5 | 8.0' | 9 13 10 14 | 20" RECOVERY Moist medium dense brown coarse to fine sand w/some silt and gravel. | A-1-b | 10 YR - 4/6 |
| 10 | | | 10.0' | | 20" 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

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NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/23/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-15-03

Contract: 28-113-01

Boring Location: Sta. 250+40, 525' Lt. C.L.

Boring Surface Elev.: + 61.9

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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/23/2009 | | 10.0 | 8.0 | Dry | |

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: | | | Core Drilling in Rock: | Ft. |

Boring Contractor: Walton Corporation
Driller: Cecil Velazco
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|--|-------------|--|
| | 7/23/09 | 1 | 0.5' | 5 6 4 | Moist stiff brown silt w/some clay, trace of gravel and fine to coarse sand. | A-4(1) | Topsoil - 5". 2.5 YR - 6/6 |
| 2 | | 2 | 2.0' 2.0' | 6 7 7 11 | 14" RECOVERY Moist stiff brown fine sandy silt w/some clay and coarse sand, trace of gravel. | A-4(1) | 10 YR - 4/6 |
| 4 | | 3 | 4.0' 4.0' | 7 11 11 13 | 22" RECOVERY Moist medium dense brownish gray clayey fine sand w/some silt, coarse sand and gravel. | A-2-4(0) | USDA Classifica - Sandy Loam 2.5 Yr - 7/4 |
| 6 | | 4 | 6.0' 6.0' | 9 12 16 19 | 20" RECOVERY Moist medium dense brownish gray clayey fine to coarse sand w/trace of gravel. | A-2-6(0) | 10 YR - 7/6 |
| 8 | | 5 | 8.0' 8.0' | 10 11 12 13 | 21" RECOVERY Moist medium dense brown coarse to fine sand w/some gravel and silt. | A-1-b | 7.5 YR - 5.6 |
| 10 | | | 10.0' | | 17" 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



Clayey sand



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/23/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-16-01

Contract: 28-113-01

Boring Location: Sta. 152+33, 246' Rt. C.L.

Boring Surface Elev.: + 70.7

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: |
| | | | | | 8.0 |

| | | | | | | |
|----------------------|-----------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/17/2009 | | 10.0 | 8.0 | 6.8 | |

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: Cecil Velazco
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|--|
| | 7/17/09 | 1 | 0.0' | 11 6 6 8 | Moist stiff brown fine sandy silt w/some coarse sand, clay and gravel. | A-4(0) | Topsoil - 2". 10 YR - 5/3 |
| 2 | | 2 | 2.0' 2.0' | 6 6 8 | 14" RECOVERY Moist stiff gray clayey fine sandy silt w/some coarse sand, trace of gravel. | A-4(0) | 2.5 Yr - 6/2 |
| 4 | | 3 | 4.0' 4.0' | 8 11 11 10 | 18" RECOVERY Moist medium dense brown coarse to fine sand w/some silt, trace of clay and gravel. | A-1-b | USDA Classifica - Loamy Sand 2.5 YR - 6/4 |
| 6 | | 4 | 6.0' 6.0' | 13 11 11 10 | 20" RECOVERY Moist to wet medium dense brown coarse to fine sand w/some silt, trace of gravel. | A-1-b | 10 YR - 6/6 |
| 8 | | 5 | 8.0' 8.0' | 4 6 4 5 | 18" RECOVERY Wet stiff brown fine sandy silt w/some coarse sand, trace of gravel. | A-4(0) | 7.5 YR - 5/8 |
| 10 | | | 10.0' | | 18" RECOVERY End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Silty low plasticity
clay



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/17/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-16-02

Contract: 28-113-01

Boring Location: Sta. 154+82, 139' Rt. C.L.

Boring Surface Elev.: + 73.9

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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/6/2009 | | 10.0 | 8.0 | 8.2 | |

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: Cecil Velazco
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|---------------------|---|-------------|--|
| | 7/16/09 | 1 | 0.0' | 7 3 4 4 | Moist firm brown clayey silt w/some fine sand, trace of coarse sand and gravel. | A-4(4) | Topsoil - 2". 7.5 YR - 5/8 |
| 2 | | 2 | 2.0' 2.0' | 8 12 11 10 | 15" RECOVERY Moist medium dense brown fine sand w/some silt and coarse sand, trace of clay and gravel. | A-2-4(0) | USDA Classifica - Sandy Loam 5 YR - 5.5 |
| 4 | | 3 | 4.0' 4.0' | 5 7 7 7 | 19" RECOVERY Moist medium dense orange silty fine to coarse sand w/trace of gravel. | A-2-4(0) | 10 YR - 5/8 |
| 6 | | 4 | 6.0' 6.0' | 7 6 5 5 | 19" RECOVERY Moist medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 7.5 YR - 5/8 |
| 8 | | 5 | 8.0' 8.0' | 3 2 3 3 | 17" RECOVERY Wet loose tan coarse to fine sand w/some silt and gravel. | A-1-b | 7.5 YR - 6/6 |
| 10 | | | 10.0' | | 15" 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



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/16/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-16-03

Contract: 28-113-01

Boring Location: Sta. 157+60, 157' Rt. C.L.

Boring Surface Elev.: + 75.7

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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 7/20/2009 | | 10.0 | 8.0 | Dry | |

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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|----------------------|---|-------------|---|
| | 7/20/09 | 1 | 0.0' | 9 4 6 6 | Moist stiff gray silt w/some clay, fine sand and gravel, trace of organic matter and coarse sand. | A-4(1) | Topsoil - 2". 2.5 YR - 5/3 |
| 2 | | 2 | 2.0' 2.0' | 14 8 | 14" RECOVERY Moist stiff brown clay w/some fine sand, trace of coarse sand and gravel. | A-6(9) | 10 YR - 6/6 |
| 4 | | 3 | 4.0' 4.0' | 8 9 13 19 | 19" RECOVERY Moist very stiff brown fine to coarse sandy silt w/some clay, trace of gravel. | A-4(0) | USDA Classifica - Sandy Loam 10 YR - 5/6 |
| 6 | | 4 | 6.0' 6.0' | 14 10 10 10 | 18" RECOVERY Moist very stiff orange fine sandy silt w/trace of gravel and coarse sand. | A-4(0) | 2.5 YR - 6/8 |
| 8 | | 5 | 8.0' 8.0' | 3 5 6 6 | 19" RECOVERY Moist medium dense tan coarse to fine sand w/some silt, trace of gravel. | A-1-b | 10 YR - 7/8 |
| 10 | | | 10.0' | | 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

 Low plasticity clay

 Poorly graded clayey silty sand

 Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 7/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 45.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-17-01

Contract: 28-113-01

Boring Location: Sta. 1016+00, 70' Rt. C.L.

Boring Surface Elev.: + 65.9

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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/6/2009 | | 10.0 | 8.0 | Dry | |

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: | | | 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 |
|-------------|----------------|-----|--------------|------------------|---|-------------|--|
| | 10/6/09 | 1 | 0.5' | 3 4 4 | Wet firm gray clayey silt w/some fine sand, trace of coarse sand and fine gravel. | A-4(4) | Topsoil - 4". USDA Classifica - Silt Loam. |
| 2 | | 2 | 2.0' 2.0' | 4 8 7 | 16" RECOVERY Wet medium dense gray clayey fine to coarse sand w/trace of gravel. | A-2-4(0) | |
| 4 | | 3 | 4.0' 4.0' | 4 8 7 6 | 16" RECOVERY Wet medium dense orange silty coarse to fine sand. | A-2-4(0) | 7.5 YR - 5/8 |
| 6 | | 4 | 6.0' 6.0' | 3 4 3 2 | 14" RECOVERY Wet loose orange fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | 7.5 YR - 5/8 |
| 8 | | 5 | 8.0' 8.0' | 1 1 1 2 | 19" RECOVERY Wet very loose orange silty fine sand w/trace of coarse sand. | A-2-4(0) | 7.5 YR - 5/8 |
| 10 | | | 10.0' | | 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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Notes:

1. Exploratory borings were drilled on 10/6/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-17-02

Contract: 28-113-01

Boring Location: Sta. 1016+70, 65' Rt. C.L.

Boring Surface Elev.: + 65.2

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: 8.0 | |

| | | | | | |
|-----------------------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date 10/6/2009 | Time | 10.0 | 8.0 | 5.9 | |

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: | | | 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 |
|-------------|----------------|-----|--------------|---------------------|--|-------------|--|
| | 10/6/09 | 1 | 0.5' | 5 5 6 | Wet stiff gray clayey silt w/some fine sand, trace of coarse sand and fine gravel. | A-4(6) | Topsoil - 6". USDA Classifica - Silt Loam. |
| 2 | | 2 | 2.0' 2.0' | 10 14 11 9 | 17" RECOVERY Wet very stiff gray clayey fine sandy silt w/some coarse sand, trace of fine gravel. | A-4(0) | |
| 4 | | 3 | 4.0' 4.0' | 5 14 10 7 | 18" RECOVERY Wet medium dense orange silty fine sand w/trace of coarse sand and fine gravel. | A-2-4(0) | 7.5 YR - 5/8 |
| 6 | | 4 | 6.0' 6.0' | 5 7 6 5 | 20" RECOVERY Wet medium dense orange fine to coarse sand w/some silt. | A-2-4(0) | 7.5 YR - 5/8 |
| 8 | | 5 | 8.0' 8.0' | 3 4 3 5 | 16" RECOVERY Wet loose orange coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | 7.5 YR - 5/8 |
| 10 | | | 10.0' | | 16" 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



Silty sand

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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/6/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-18-01

Contract: 28-113-01

Boring Location: Sta. 197+40, 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 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 |
| | 11/20/2009 | | 16.0 | 14.0 | 12.1 | |

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 |
|-------------|----------------|-----|--------------|---------------------|--|-------------|--|
| | 11/20/09 | 1 | 0.0' | 1 2 2 | Moist soft brown clayey silt w/trace of fine to coarse sand. | A-4(7) | 2.5 YR 4/8 |
| | | | 2.0' | | 10" RECOVERY | | |
| | | 2 | 2.0' | 4 7 6 6 | Moist stiff brown fine sandy silt w/some coarse sand, fine gravel and clay. | A-4(0) | 2.5 YR 4/8 |
| 3.5 | | | 4.0' | | 24" RECOVERY | | |
| | | 3 | 4.0' | 5 11 15 16 | Moist medium dense brown coarse to fine sand and fine gravel w/some silt, trace of clay. | A-1-b | 2.5 YR 3/3 USDA Classifica - Sandy Loam. |
| | | | 6.0' | | 21" RECOVERY | | |
| 7 | | 4 | 6.0' | 12 11 10 9 | Moist medium dense orange coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | |
| | | | 8.0' | | 23" RECOVERY | | 2.5 YR 3/3 |
| | | 5 | 8.0' | 5 8 14 13 | Wet medium dense orange coarse to fine sand and fine gravel w/some silt. | A-1-b | 3 2.5 YR 3/3 |
| | | | 10.0' | | 16" RECOVERY | | |
| 10.5 | | 6 | 10.0' | 6 11 6 6 | Wet medium dense orange coarse sand and fine gravel w/some silt, trace of fine sand. | A-1-b | 7.5 YR 6/8 |
| | | | 12.0' | | 16" RECOVERY | | |
| | | 7 | 12.0' | 6 6 6 6 | Wet medium dense orange fine sand w/some coarse sand, trace of silt and fine gravel. | A-3 | 7.5 YR 6/8 |
| 14 | | | 14.0' | | 19" RECOVERY | | |
| | | 8 | 14.0' | 7 8 9 10 | Wet medium dense orange coarse to fine sand w/trace of silt and fine gravel. | A-1-b | 7.5 YR 6/8 |
| | | | 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



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
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AUGUST 2015

Notes:

1. Exploratory borings were drilled on 11/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-18-02

Contract: 28-113-01

Boring Location: Sta. 201+20, 190' Rt. C.L.

Boring Surface Elev.: + 65.5

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 |
|------------|------|---------------|-----------------|----------------|----------------|
| 11/20/2009 | | 16.0 | 14.0 | 8.8 | |

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 |
|-------------|----------------|-----|--------------|--------------------|---|-------------|---|
| | 11/20/09 | 1 | 0.0' | 1 2 3 3 | Moist firm brown silty clay w/trace of fine to coarse sand and fine gravel. 10" RECOVERY | A-6(9) | 2.5 YR 4/8 |
| | | 2 | 2.0' | 3 4 6 7 | Moist stiff brown clayey fine sandy silt w/some coarse sand, trace of fine gravel. 18" RECOVERY | A-4(2) | 2.5 YR 4/8 |
| 3.5 | | 3 | 4.0' | 10 11 9 6 | Moist medium dense gray silty coarse to fine sand and fine gravel w/trace of clay. 16" RECOVERY | A-1-b | 2.5 YR 3/3 USDA Classifica - Sandy Loam |
| | | 4 | 6.0' | 7 7 9 11 | Moist medium dense blackish orange coarse to fine sand w/some fine gravel and silt. 17" RECOVERY | A-1-b | 2.5 YR 3/3 |
| 7 | | 5 | 8.0' | 4 6 7 6 | Moist medium dense orange coarse to fine sand w/trace of silt and fine gravel. 17" RECOVERY | A-3 | 3 2.5 YR 3/3 |
| | | 6 | 10.0' | 4 6 10 12 | Moist medium dense orange coarse to fine sand w/trace of silt and fine gravel. 20" RECOVERY | A-1-b | 7.5 YR 6/8 |
| | | 7 | 12.0' | 6 6 7 10 | Wet medium dense orange coarse to fine sand w/trace of silt and fine gravel. 19" RECOVERY | A-1-b | 7.5 YR 6/8 |
| 14 | | 8 | 14.0' | 7 7 10 11 | Wet medium dense orange coarse to fine sand and fine gravel w/trace of silt. 20" RECOVERY | A-1-b | 7.5 YR 6/8 |
| | | | 16.0' | | 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



Poorly graded sand
with silt



Well graded sand
with silt

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Notes:

1. Exploratory borings were drilled on 11/20/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-19-01

Contract: 28-113-01

Boring Location: Sta. 242+55, 165' Lt. C.L.

Boring Surface Elev.: + 63.8

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: |
| | | | | | 8.0 |

| | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date | Time | | | | |
| 10/20/2009 | | 10.0 | 8.0 | Dry | |

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: | | ; | 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 |
|-------------|----------------|-----|--------------|--------------------|---|-------------|-------------------------------|
| | 10/20/09 | 1 | 0.5' | 2 2 5 | Wet soft brown clay w/some fine sand, trace of coarse sand and fine gravel. | A-6(9) | Topsoil - 7". 7.5 YR - 5/6 |
| 2 | | 2 | 2.0' 2.0' | 6 9 7 10 | 14" RECOVERY Wet very stiff brown clayey fine sandy silt w/trace of fine gravel and coarse sand. | A-4(0) | 7.5 YR - 6/6 |
| 4 | | 3 | 4.0' 4.0' | 6 8 9 11 | 21" RECOVERY Wet medium dense brown silty fine sand w/trace of gravel and coarse sand. | A-2-4(0) | 7.5 YR - 6/8 |
| 6 | | 4 | 6.0' 6.0' | 8 8 10 8 | 17" RECOVERY Wet medium dense brown silty fine sand. | A-2-4(0) | 7.5 YR - 6/8 |
| 8 | | 5 | 8.0' 8.0' | 8 13 9 16 | 21" RECOVERY Wet medium dense brown silty fine sand w/some coarse sand, trace of fine gravel. | A-2-4(0) | 7.5 YR - 6/8 |
| 10 | | | 10.0' | | 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



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/20/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty low plasticity
clay



Silty sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 10/7/2009 using a 3 1/4- inch diameter continuous flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-19-03

Contract: 28-113-01

Boring Location: Sta. 247+60, 310' Lt. C.L.

Boring Surface Elev.: + 57.5

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: 8.0 |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 10/7/2009 | | 10.0 | 8.0 | Dry | |

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: Jason Truver
Helpers: J. Lafferty

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|-------------------|--|-------------|------------------------------|
| | 10/7/09 | 1 | 0.0' | 1 2 3 7 | Moist firm brown fine sandy silt w/some coarse sand, fine gravel and clay. | A-4(0) | Topsoil - 3". 10 YR - 4/5 |
| 2 | | 2 | 2.0' 2.0' | 3 4 4 7 | 12" RECOVERY Wet loose brown clayey fine to coarse sand and gravel. | A-2-6(0) | 10 YR - 3/6 |
| 4 | | 3 | 4.0' 4.0' | 5 5 5 7 | 18" RECOVERY Wet loose brown silty coarse to fine sand. | A-2-4(0) | 10 YR 4/4 |
| 6 | | 4 | 6.0' 6.0' | 7 8 9 14 | 17" RECOVERY Wet medium dense brown silty coarse to fine sand. | A-2-4(0) | 10 YR 4/6 |
| 8 | | 5 | 8.0' 8.0' | 8 9 9 13 | 17" RECOVERY Wet medium dense brown fine to coarse sand w/some silt, trace of gravel. | A-2-4(0) | 10 YR 4/6 |
| 10 | | | 10.0' | | 19" RECOVERY End of Boring | | |

Remarks:

Reviewed By: Maureen Kelley

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 borings were drilled on 10/7/2009 using a 3 1/4- inch diameter continues flight power auger. Rig is an ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
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.: SWM3-20-01

Contract: 28-113-01

Boring Location: Sta. 1307+00, 250' Lt. C.L.

Boring Surface Elev.: + 53.7

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: |
| | | | | | 8.0 |

| | | | | | |
|----------------------|------|---------------|-----------------|----------------|----------------|
| Water Level Readings | | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| Date | Time | | | | |
| 1/27/2010 | | 8.0 | 10.0 | 6.5 | |

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: | | ; | 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: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|------------------|--|-------------|----------------|
| | 1/27/10 | 1 | 1.0' | 3 3 | Wet firm brown clayey fine sandy silt w/trace of coarse sand. | A-4(3) | Topsoil - 12". |
| 3 | | 2 | 2.0' | 4 5 6 8 | 10" RECOVERY Wet stiff brown clayey fine sandy silt w/some fine gravel, trace of coarse sand. | A-4(0) | |
| | | 3 | 4.0' | 6 7 6 | 18" RECOVERY Wet medium dense brown fine sand w/some silt and coarse sand. | A-2-4(0) | |
| 6 | | 4 | 6.0' | 5 4 3 4 | 18" RECOVERY Wet loose brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | 5 | 8.0' | 4 5 6 | 17" RECOVERY Wet loose brown coarse sand w/some fine sand and silt, trace of fine gravel. | A-1-b | |
| 9 | | | 10.0' | | 16" RECOVERY End of Boring | | |
| 12 | | | | | | | |
| 15 | | | | | | | |

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 sand

DRAFT
NOT FOR BIDDING
AUGUST 2015

Notes:

1. Exploratory borings were drilled on 1/27/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and 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.: SWM3-20-02

Contract: 28-113-01

Boring Location: Sta. 1305+25, 355' Lt. C.L.

Boring Surface Elev.: + 50.2

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: 8.0 | |

| | | | | | | |
|-----------------------------|-------------|-------------|----------------------|------------------------|-----------------------|-----------------------|
| Water Level Readings | Date | Time | Depth of Hole | Depth of Casing | Depth of Water | Elev. of Water |
| | 1/27/2010 | | 10.0 | 8.0 | 4.2 | |

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: Dave Burt
Helpers: T. Kane

| Depth (ft.) | Daily Progress | No. | Sample Depth | Blows/6" | Sample Description | Class./G.I. | Remarks |
|-------------|----------------|-----|--------------|--------------------|--|-------------|---------------|
| | 1/27/10 | 1 | 0.5' | 4 4 3 | Moist loose brown coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | Topsoil - 4". |
| | | | 2.0' | | 18" RECOVERY | | |
| 3 | | 2 | 2.0' | 2 3 3 3 | Wet loose brown fine to coarse sand w/some silt, trace of fine gravel. | A-2-4(0) | |
| | | | 4.0' | | 18" RECOVERY | | |
| | | 3 | 4.0' | 5 4 3 5 | Wet loose brown coarse to fine sand w/some silt, trace of fine gravel. | A-1-b | |
| | | | 6.0' | | 16" RECOVERY | | |
| 6 | | 4 | 6.0' | 4 5 5 6 | Wet loose brown coarse to fine sand w/some fine gravel and silt. | A-1-b | |
| | | | 8.0' | | 19" RECOVERY | | |
| | | 5 | 8.0' | 4 6 11 11 | Wet medium dense greenish brown fine sand w/some coarse sand and silt. | A-2-4(0) | |
| 9 | | | 10.0' | | 16" RECOVERY | | |
| | | | | | End of Boring | | |
| 12 | | | | | | | |
| | | | | | | | |
| 15 | | | | | | | |
| | | | | | | | |

Remarks:

Reviewed By: Hany Fekry

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 1/27/2010 using a 3 1/4- inch diameter continuous flight power auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

STA 128+00.00
 OFFSET 160.00 RT



WALTON CORPORATION

DRILLING CONTRACTOR

P.O. Box 1097, NEWARK, DELAWARE 19715

BORING LOG

| BLOWS ON CASING B |
|-------------------|
| 0-1 |
| 1-2 |
| 2-3 |
| 3-4 |
| 4-5 |
| 5-6 |
| 6-7 |
| 7-8 |
| 8-9 |
| 9-10 |
| 10-11 |
| 11-12 |
| 12-13 |
| 13-14 |
| 14-15 |
| 15-16 |
| 16-17 |
| 17-18 |
| 18-19 |
| 19-20 |
| 20-21 |
| 21-22 |
| 22-23 |
| 23-24 |
| 24-25 |
| 25-26 |
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| 54-55 |
| 55-56 |
| 56-57 |
| 57-58 |
| 58-59 |
| 59-60 |
| 60-61 |

NAME: Dot Dot SEC 3 PROJECT NO. 23-113-01
 SUPERVISOR _____

| | | |
|--------------------------------|------------------------------------|-------------------------|
| BORING NO. <u>23-113-01</u> | DRILLER <u>John & Cecil</u> | DATE: <u>7/21/09</u> |
| WEATHER <u>cloudy</u> | SURFACE ELEVATION <u>63.56</u> | DATUM: |

| SAMPLE NO. | SAMPLE DEPTH - FEET | | DEPTH STRATA FEET | | DRILLER'S DESCRIPTION OF MATERIALS | REC | * BLOWS A | |
|------------|---------------------|------|-------------------|-----|--|-----|-----------|-------|
| | FROM | TO | FROM | TO | | | | |
| | | | 0.0 | 0.0 | top soil | | | |
| 1 | 0.0 | 1.0 | 0.2 | 1.0 | 2. BR BR silt w/ clay & sand | | | |
| 2 | 1.0 | 2.0 | 1.0 | 2.0 | 4. BR BR silt w/ clay & sand | | | |
| 3 | 2.0 | 3.0 | 2.0 | 3.0 | 2. BR BR silt - little sand | | | |
| 4 | 3.0 | 4.0 | 3.0 | | 1. BR (FTOM) SAND w/ some silt | | | A=4 |
| | | | | | cl. silt (moist) | | | |
| 5 | 4.0 | 5.0 | | | SAME (very moist) | | | |
| + 6 | 5.0 | 6.0 | | | SAME (wet) | | | |
| 7 | 6.0 | 7.0 | 6.0 | | 4. BR (FTOM) SAND w/ little silt | | | |
| | | | | 7.0 | silt & silt | | | |
| 8 | 7.0 | 8.0 | 7.0 | | 1. GR (FTOM) SAND w/ silt | | | A=2.5 |
| | | | | 8.0 | silt & silt | | | |
| 9 | 8.0 | 9.0 | 8.0 | | 3. BR & BR SANDY SILT - little clay & silt | | | A=4 |
| 10 | 9.0 | 10.0 | | | 4. BR & BR (FTOM) SAND | | | A=2 |
| | | | | | 100 w/ some silt & clay | | | |
| | | | | | END | | | |

Number of blows of 140 lb. hammer dropped 30 in. required to drive 2 in. split-spoon sampler for each of three 6 in. increments.
 Number of blows of 300 lb. hammer dropped 18 in. required to drive _____ in casing 12 inches.

REMARKS: Full 5.9' Hole 6.5'
will cut aug - 3.5'
save at aug 9.1'

| GROUNDWATER | |
|-------------|--|
| | |
| | |