



State of Delaware
Department of Transportation

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DOVER, DELAWARE 19903

SHAILEN P. BHATT
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TO: **Edwin Tennefoss, P.E.**
Statewide Support Services Engineer
Transportation Solution –Bridge Design

FROM: **Hany Fekry, P.E.**
Geotechnical Engineer
Material & Research

DATE : **4-23-2012**
PROJECT NUMBER : **T201280104**
PROJECT NAME : **Bridgeville Maintenance Yard Development**
SUBJECT : **Geotechnical Report**

1. Introduction

The Delaware Department of Transportation (DelDOT), with Hillis- Carnes Engineering Associates (HCEA), has completed a subsurface exploration for this project. Included in the field exploration were 12 Standard Penetration Test borings that were scheduled to depths of 37 feet below the existing ground surface, Testing of 7 infiltration test and 4 Shelby tube were collected . Limited laboratory testing was performed on split spoon samples from the borings to characterize general subsurface conditions. The results of the field and laboratory testing are detailed herein.

2. Project Description

The subsurface investigation was completed at the Northeast of the Intersection Newton Road (SR- 404) and Dale Farm road. The site location is shown on the Map figure in Appendix “A”.

3. Area Geology Background

The geological background of this area was found using Delaware Geological Survey Geologic Map of Southern Delaware by Kelvin W. Ramsey and William S. Schenck June 1990. The area is situated in the Light reddish brown, cross- bedded, medium to coarse sand with scattered thin beds of Pebbles and gravel. Discontinuous thin beds of reddish brown clayey silt and fine to medium sand are common.

4. Ground Water Background

According to The Water Table, Surface-Drainage, and Engineering Soils Map of The Greenwood Area, Delaware by Durward H. Boggess and John K. Adam (1964) Atlas HA-99. This area is situated in ground water contour 40 and the nearest well to this site the

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groundwater historically had been measured between the years of 1950 to 1962 appeared from 26 to 31 feet below the existing surface.

5. Hydrologic Background

According to Delaware Geological Survey Geohydrology Sussex County Delaware; Map Series, No. 12, by A. Scott Andres June 2003, the recharge potential for this area is under a good category and is situated in range of 0.17 to 22 inch per hour.

6. Field Exploration

6.1 Field Equipment

The subsurface exploration for this Task was completed on February 21 to March 16, 2012. Hillis- Carnes Engineering Associates (HCEA) of Salisbury Maryland provide full-time supervision of the subsurface exploration activities. HCEA, in accordance with their open-end contract with DelDOT, provided the following drilling equipment and hammer type:

- ATV CME- 45
- Truck-Mounted B-31

6.2 Survey Control

Boring locations were layout by the DelDOT designer.

6.3 SPT Borings

Standard Penetration Testing (SPT) was performed on the borings, with soil samples obtained continuously in the boring. Standard Penetration Testing involves using a 140-pound hammer free falling 30 inches to drive a 2-inch O.D. sleeve to collect soil samples for a total of 24 inches. The number of blows (n) required to drive the sampler was recorded in intervals of 6 inches or for a maximum of 50 blows (n=50). Uncorrected SPT blow counts (N) have been calculated from the borings logs. The total number SPT "N" value blow counts are the sum of the "n" value for the second and third record number to drive the split spoon from the 6 to 18-inch interval. Split spoon samples retrieved from the test borings were delivered to DelDOT's laboratory.

7. Groundcover

The existing surface was Top- soil 8" to 14" inches in thickness for all the borings.

8. Groundwater

The depth to groundwater was noted during the drilling operations and the groundwater levels were measured at the completion of drilling. The groundwater was encountered during

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the borings about 8.0 to 12.0 feet from the surface elevation. This reading and actual levels are likely not higher.

9. Laboratory Testing

All these calculations and approximate values below refer to “N” Value except as noted and at 2 feet for the Road Borings and at 4 feet for the Building Borings below the existing surface.

9.1 Index Testing

Index testing was performed on the samples obtained from the borings to classify the soils. The laboratory testing included the grain size distribution, the natural moisture content, and Atterberg Limits if any of the soil was collected from the split spoon.

9.2 Bearing Capacity

The allowable bearing capacity for this soil is estimated to be approximately:
Road: range of 2000 to 3000 (psf) pound per square foot.
Building: range of 2000 to +5000 (psf) pound per square foot.

9.3 Sub Grade Modulus

The sub grade modulus for this soil is estimated to be approximately:
Road: range of 120 to 300 (psi/in) pound per square inch (psf).
Building: range of 150 to 400 (psi/in) pound per square inch.

9.4 Relative Density

The Relative Density for this soil is estimated to be approximately:
Road: range of 40 to 65 % percent.
Building: range of 50 to 70 % percent.

9.5 Settlement Calculation

The Overconsolidation ratio OCR to be approximately more than 3.0 references to Consolidation test AASHTO T216-07.

9.6 Unconfined Compression Test

The Unconfined Compression for this soil is estimated to be approximately range of 0.196 to 1.24 (tsf) Ton per Square foot, and the Strain Percentage range of 0.9 to 6.0 % reference to Consolidation test AASHTO T216-07.

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10. Infiltration Test

The infiltration test indicates the range of 0.05 to 0.24 inch per hour.

11. Borrow Type

According to the test data analysis form the lab. The soil meet the borrow requirement from the 2 to 10 feet below the existing surface are tabulated below.

Borrow Type	A	D	C	E	B
Percentage %	62	52	44	36	12

12. Recommendations

Our findings indicate that the subsurface condition at this site as the two Categories the Road and the Building:

For the Road: in general is in good condition. For the building is in good condition except the layer of the loose sandy material appeared at 10 to 12 feet below the existing elevation for 6 feet in thickness this layer may to consider at the design.

In general, the N-Value indicates that the subsurface consolidation is increasing according to the overburden pressure, especially from 20 feet below the existing elevation.

13. Limitations

The borings indicate the soil condition only at specific locations and weather conditions and only to the depth penetrated; these samples do not reflect the strata variation that may exist between the test locations.

This report has been prepared for the exclusive use of DelDOT in accordance with generally accepted engineering practice. No warranty, express or implied, is made.

This Report is part of the Boring Log and the soil Description.

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APPENDIX A

- GPS Boring Plan (1 Sheets)

APPENDIX B

- AASHTO Soil Classification System AND Borings Log (13 Files)

APPENDIX C

- Grain Size Distribution Result (12 Files)

APPENDIX D

- Consolidations Lab Result, and Unconfined Compression test (7- Files)

APPENDIX E

- Infiltration test result (8 Sheet)

APPENDIX F

- Summary of the Borings (1- File)

APPENDIX G

- Figures and Chart (1 Sheet)

APPENDIX A



Google earth



APPENDIX B

• **Table B-1 AASHTO SOIL CLASSIFICATION SYSTEM**

The American Association of State Highway and Transportation Officials developed the AASHTO Soil Classification System, and it is used as a guide for the classification of soils and soil-aggregate mixtures for highway construction purposes. AASHTO M-57-2, M-145-7											
General Classification	Granular Materials (35% or less passing the 0.075 mm sieve)							Silt-Clay Materials (>35% passing the 0.075 mm sieve)			
Group Classification	A-1		A-3	A-2				A-4	A-5	A-6	A-7
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6 Note 1
Sieve Analysis, % passing											
2.00 mm (No. 10)	50 max	...	...	...	...	...	...	...	...	...	...
0.425 (No. 40)	30 max	50 max	51 min	...	...	...	...	...	...	...	...
0.075 (No. 200)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min	36 min
Characteristics of fraction passing 0.425 mm (No. 40)											
Liquid Limit	...	...	40 max	41 min	40 max	41 min	40 max	41 min	40 max	41 min	41 min
Plasticity Index	6 max	N.P.	10 max	10 max	11 min	11 min	10 max	10 max	11 min	11 min ¹	
Usual types of significant constituent materials	stone fragments, gravel and sand		fine sand	silty or clayey gravel and sand				silty soils		clayey soils	
General rating as a subgrade	excellent to good							fair to poor			

Note (1): Plasticity index of A-7-5 subgroup is equal to or less than the LL - 30. Plasticity index of A-7-6 subgroup is greater than LL - 30

Note (2): The AASHTO classification include the Group Index (GI) need to be lees 20, more than 20 indicates very poor subgrade.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

BORING PB-1

Project Name: Bridgeville Yard

Location: Bridgeville, DE

State Contract #: T201280104

Federal Contract #:

Station/Offset:

Northing:

Easting:

Boring Surface Elev.:

Reference:

Date Started: 2/23/12

Date Completed: 2/23/12

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

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

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.

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of:
From Depth of: **To:**
To:

Water Level Readings
Date
2/23/12

Depth to Water (ft)
12.0

Caved Depth (ft)

Boring Contractor: Hillis Carnes Engineering Associates Inc.

Equipment/Rig Type:

Driller: Keith Hastings

Logged By: David Van Kavelar

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	1 1 1 2	Moist soft brown fine sandy silt w/some coarse sand and clay, trace of fine gravel.	A-4(0)	Topsoil 8"
			2.0'		9" RECOVERY		
2.53		2	2.0'	2 3 4 4	Wet firm brown clayey fine sandy silt w/trace of coarse sand and fine gravel.	A-4(0)	
			4.0'		16" RECOVERY		
		3	4.0'	1 2 4 5	Wet firm brown clayey fine sandy silt w/trace of coarse sand and fine gravel.	A-4(0)	
5.06			6.0'		20" RECOVERY		
		4	6.0'	2 3 3 2	Wet loose brown silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
7.59			8.0'		20" RECOVERY		
		5	8.0'	3 4 5 5	Wet loose brown fine to coarse sand w/some fine gravel and silt.	A-2-4(0)	
			10.0'		18" RECOVERY		
10.12		6	10.0'	1 2 5 6	Wet loose orange coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			12.0'		16" RECOVERY		
12.65	▽	7	12.0'	3 3 1 2	Wet very loose orange fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
			14.0'		24" RECOVERY		

Remarks:

Addendum No. 4
May 6, 2014

Reviewed By: Hany Fekry

Soils Supervisor: Aaron Wiczorek

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

Project Name: Bridgeville Yard
State Contract:

Boring No.: PB-1

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
15.18		8	14.0'	1 1 3 6	Wet very loose brown fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			16.0'		15" RECOVERY		
17.71		9	16.0'	1 1 1 3	Wet very loose orange coarse sand w/trace of fine sand, fine gravel and silt.	A-1-b	
			18.0'		24" RECOVERY		
20.24		10	18.0'	1 3 3 4	Wet loose gray fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			20.0'		12" RECOVERY		
22.77							
25.3		11	23.0'	2 4 4 5	Wet loose brown fine sand w/some silt, trace of coarse sand and fine gravel.	A-2-4(0)	
			25.0'		24" RECOVERY		
27.83							
30.36		12	28.0'	5 6 6 11	Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			30.0'		24" RECOVERY		
32.89							
35.42		13	33.0'	5 9 13 27	Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
			35.0'		10" RECOVERY		
37.95							

**STATE OF DELAWARE
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BORING PB-2

Project Name: Bridgeville Yard

Location: Bridgeville, DE

State Contract #: T201280104

Federal Contract #:

Station/Offset:

Northing:

Easting:

Boring Surface Elev.:

Reference:

Date Started: 2/24/12

Date Completed: 2/24/12

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

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

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.

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of:
From Depth of: **To:**
To:

Water Level Readings

Date
2/24/12
2/24/12

Depth to Water (ft)
N/A
N/A

Caved Depth (ft)

1.0

Boring Contractor: Hillis Carnes Engineering Associates

Equipment/Rig Type:

Driller: Keith Hastings

Logged By: David Van Kavlur

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	1 2 3 4	Wet firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(1)	Topsoil 14"
			2.0'		14" RECOVERY		
2.53		2	2.0'	2 3 3 2	Wet loose brown silty fine to coarse sand w/ trace of fine gravel.	A-2-4(0)	
			4.0'		20" RECOVERY		
5.06		3	4.0'	3 4 6 4	Wet loose light brown coarse to fine sand w/ some silt, trace of fine gravel.	A-1-b	
			6.0'		16" RECOVERY		
7.59		4	6.0'	2 2 2 5	Saturated very loose orange silty fine to coarse sand w/trace of fine gravel and clay.	A-2-4(0)	
			8.0'		19" RECOVERY		
					End Boring.		
10.12							
12.65							

Remarks:

Addendum No. 4
May 6, 2014

Reviewed By: Hany Fekry

Soils Supervisor: Aaron Wiczorek

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

BORING PB-3

Project Name: Bridgeville Yard

Location: Bridgeville, DE

State Contract #: T201280104

Federal Contract #:

Station/Offset:

Northing:

Easting:

Boring Surface Elev.:

Reference:

Date Started: 2/24/12

Date Completed: 2/24/12

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

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

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.

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of:
From Depth of: **To:**
To:

Water Level Readings

Date
2/24/12
2/24/12

Depth to Water (ft)
N/A
N/A

Caved Depth (ft)

1.0

Boring Contractor: Hillis Carnes Engineering Associates

Equipment/Rig Type:

Driller: Keith Hastings

Logged By: David Van Kavlur

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	1 2 4 3	Moist firm orange fine sandy silt w/some coarse sand, trace of clay.	A-4(0)	Topsoil 14"
			2.0'		18" RECOVERY		
2.53		2	2.0'	2 2 1 2	Moist very loose light brown silty fine sand w/ some coarse sand, trace of fine gravel.	A-2-4(0)	
			4.0'		22" RECOVERY		
		3	4.0'	1 1 2 3	Moist very loose light brown silty fine sand w/ some coarse sand, trace of fine gravel.	A-2-4(0)	
5.06			6.0'		20" RECOVERY		
		4	6.0'	5 3 3 3	Wet loose light brown clayey fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
7.59			8.0'		20" RECOVERY		
					End Boring.		
10.12							
12.65							

Remarks:

Addendum No. 4
May 6, 2014

Reviewed By: Hany Fekry

Soils Supervisor: Aaron Wiczorek

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

BORING R-1

Project Name: Bridgeville Yard
State Contract #: T201280104
Station/Offset:
Boring Surface Elev.:
Date Started: 2/21/12

Location: Bridgeville, DE
Federal Contract #:

Northing:
Reference:
Date Completed: 2/21/12
Easting:

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

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

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.

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 10.0
From Depth of: **To:**

Water Level Readings
Date
 2/21/12
 2/21/12

Depth to Water (ft)
 9.0
 N/A

Caved Depth (ft)
 1.0

Boring Contractor: Hillis Carnes Engineering Associates

Equipment/Rig Type:

Driller: Keith Hastings

Logged By:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	2 2 3 3	Moist firm brown fine sandy silt w/some coarse sand and clay, trace of fine gravel.	A-4(0)	Topsoil 12"
			2.0'		18" RECOVERY		
2.53		2	2.0'	3 4 6 7	Wet loose brown silty fine to coarse sand w/ trace of fine gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	4 5 6 8	Wet medium dense brown silty fine sand w/ some coarse sand, trace of fine gravel.	A-2-4(0)	
5.06			6.0'		20" RECOVERY		
		4	6.0'	2 3 3 5	Wet firm brown fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(0)	
7.59			8.0'		24" RECOVERY		
		5	8.0'	2 5 6 4	Wet medium dense coarse to fine sand w/some fine gravel, trace of fine gravel.	A-1-b	
			10.0'		15" RECOVERY		
10.12					End Boring		
12.65							

Remarks:

Addendum No. 4
 May 6, 2014

Reviewed By: Hany Fekry

Soils Supervisor: Aaron Wiczorek

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

BORING R-2

Project Name: Bridgeville Yard

Location: Bridgeville, DE

State Contract #: T201280104

Federal Contract #:

Station/Offset:

Northing:

Easting:

Boring Surface Elev.:

Reference:

Date Started: 2/21/12

Date Completed: 2/21/12

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

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

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.

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 10.0
From Depth of: **To:**

Water Level Readings

Date **Depth to Water (ft)**
2/21/12 8.0
2/21/12 N/A

Caved Depth (ft)
1.5

Boring Contractor: Hills Carnes Engineering Associates

Equipment/Rig Type:

Driller: Keith Hastings

Logged By:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	2 2 2 3	Moist very loose dark brown clayey fine to coarse sand w/some fine gravel, trace of silt.	A-2-4(0)	Topsoil 10"
			2.0'		15" RECOVERY		
2.53		2	2.0'	4 5 6 6	Moist medium dense light brown fine gravelly coarse sand w/some fine sand and silt.	A-1-b	
			4.0'		18" RECOVERY		
		3	4.0'	3 4 4 5	Moist loose light brown fine gravel and coarse sand w/some fine sand and silt.	A-1-b	
5.06			6.0'		20" RECOVERY		
		4	6.0'	3 5 7 7	Wet medium dense brownish orange coarse sand w/some fine sand, trace of fine gravel and silt.	A-1-b	
7.59			8.0'		20" RECOVERY		
	▽	5	8.0'	3 4 4 7	Wet loose brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			10.0'		18" RECOVERY		
10.12					End Boring		
12.65							

Remarks:

Addendum No. 4
May 6, 2014

Reviewed By: Hany Fekry

Soils Supervisor: Aaron Wiczorek

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

BORING R-3

Project Name: Bridgeville Yard
State Contract #: T201280104
Station/Offset:
Boring Surface Elev.:
Date Started: 2/21/12

Location: Bridgeville, DE
Federal Contract #:

Northing:
Reference:
Date Completed: 2/21/12
Easting:

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

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

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.

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 10.0
From Depth of: **To:**

Water Level Readings
Date
 2/21/12
 2/21/12

Depth to Water (ft)
 8.5
 N/A

Caved Depth (ft)
 1.0

Boring Contractor: Hillis Carnes Engineering Associates

Equipment/Rig Type:

Driller: Keith Hastings

Logged By:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	1 2 2	Wet very loose dark brown clayey fine to coarse sand w/trace of silt and fine gravel.	A-2-4(0)	Topsoil 12"
			2.0'		18" RECOVERY		
2.53		2	2.0'	2 2 3	Wet very loose light brown fine sand w/some coarse sand and silt, trace of fine gravel.	A-2-4(0)	
			4.0'		18" RECOVERY		
		3	4.0'	2 2 3 2	Wet loose brown silty fine sand w/some coarse sand, trace of fine gravel.	A-2-4(0)	
5.06			6.0'		24" RECOVERY		
		4	6.0'	3 3 2 4	Wet loose brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
7.59			8.0'		20" RECOVERY		
	▽	5	8.0'	2 3 3 2	Wet loose brown coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
10.12			10.0'		16" RECOVERY		
					End Boring		
12.65							

Remarks:

Addendum No. 4
 May 6, 2014

Reviewed By: Hany Fekry

Soils Supervisor: Aaron Wiczorek

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

BORING SB-1

Project Name: Bridgeville Yard
State Contract #: T201280104
Station/Offset:
Boring Surface Elev.:
Date Started: 2/22/12

Location: Bridgeville, DE
Federal Contract #:

Northing:
Reference:
Date Completed: 2/22/12
Easting:

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

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

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.

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 30.0
From Depth of: **To:**

Water Level Readings
Date
 2/22/12
 2/22/12

Depth to Water (ft)
 9.5
 N/A

Caved Depth (ft)
 2.0

Boring Contractor: Hillis Carnes Engineering Associates

Equipment/Rig Type:

Driller: Keith Hastings

Logged By:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	2 3 3 2	Moist firm dark brown fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(0)	Topsoil 11"
			2.0'		18" RECOVERY		
2.53		2	2.0'	2 3 2 4	Moist firm brown fine sandy silt w/trace of coarse sand.	A-4(0)	
			4.0'		20" RECOVERY		
		3	4.0'	2 4 3 6	Moist firm light brown fine sandy silt w/trace of coarse sand.	A-4(0)	
5.06			6.0'		24" RECOVERY		
		4	6.0'	9 10 8 7	Moist medium dense grayish brown coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
7.59			8.0'		19" RECOVERY		
		5	8.0'	4 5 5 6	Moist loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
	▽		10.0'		21" RECOVERY		
10.12		6	10.0'	1 3 5 6	Wet loose brown silty fine to coarse sand w/ trace of fine gravel.	A-2-4(0)	
			12.0'		17" RECOVERY		
		7	12.0'	1 2 2 3	Wet very loose brown fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
12.65			14.0'		21" RECOVERY		

Remarks:

Addendum No. 4
 May 6, 2014

Reviewed By: Hany Fekry

Soils Supervisor: Aaron Wiczorek

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

Project Name: Bridgeville Yard
State Contract:

Boring No.: SB-1

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
15.18		8	14.0'	3 5 5	Wet loose brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			16.0'		24" RECOVERY		
17.71		9	16.0'	5 5 4	Wet loose brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			18.0'		24" RECOVERY		
20.24		10	18.0'	2 3 3 5	Wet loose brown coarse sand w/some fine sand and fine gravel, trace of silt.	A-1-b	
			20.0'		24" RECOVERY		
22.77							
25.3		11	25.0'	1 3 5 6	Wet loose grayish brown fine to coarse sand w/ trace of silt and fine gravel.	A-3	
			27.0'		11" RECOVERY		
27.83							
30.36		12	28.0'	6 11 12 15	Wet medium dense grayish brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			30.0'		12" RECOVERY		
32.89					End Boring		
35.42							
37.95							

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

BORING SB-2

Project Name: Bridgeville Yard

Location: Bridgeville, DE

State Contract #: T201280104

Federal Contract #:

Station/Offset:

Northing:

Easting:

Boring Surface Elev.:

Reference:

Date Started:

Date Completed:

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.

Hollow Stem Auger Diameter:

Inches

From Depth of:

To:

Mud Rotary:

From Depth of:

To:

**Water Level Readings
Date**

Depth to Water (ft)

Caved Depth (ft)

Boring Contractor:

Equipment/Rig Type:

Driller:

Logged By:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	1 2 3 7	Wet firm brown clayey fine to coarse sandy silt w/trace of fine gravel.	A-4(0)	
			2.0'		14" RECOVERY		
2.53		2A	2.0'	4 7	Wet medium dense brown clayey coarse to fine sand w/some fine gravel, trace of silt.	A-2-6(0)	Shelby Tube - Press Sample
			3.0'		10" RECOVERY		
		2B	3.0'	7 8	No sieve analysis - Indication of wet stiff red clay.		
			4.0'		12" RECOVERY		
		U-1	4.0'		24" RECOVERY		
5.06			6.0'				
		4	6.0'	3 4 4 5	Wet loose light brown silty fine sand w/trace of coarse sand and fine gravel.	A-2-4(0)	
7.59			8.0'		22" RECOVERY		
		5	8.0'	2 3 2 3	No sieve analysis - Indication of wet loose brown fine to coarse sand w/some silt.		
			10.0'		18" RECOVERY		
10.12		6	10.0'	1 2 2 2	No sieve analysis - Indication of wet very loose brown fine to coarse sand w/some silt.		
			12.0'		8" RECOVERY		
12.65		7	12.0'	4 6 9 10	Wet medium dense orange fine to coarse sand w/some silt and fine gravel.	A-2-4(0)	
			14.0'		14" RECOVERY		

Remarks:

Reviewed By: _____

Soils Supervisor: _____

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

Project Name: Bridgeville Yard
State Contract:

Boring No.: SB-2

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
15.18		8	14.0'	4 3 0 1	No Recovery		
			16.0'		NR" RECOVERY		
17.71		9	16.0'	3 3 3 3	Wet loose orange coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
			18.0'		12" RECOVERY		
20.24		10	18.0'	2 4 7 7	Wet medium dense orange coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
			20.0'		12" RECOVERY		
22.77							
		11	23.0'	3 6 8 9	Wet medium dense orange coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
25.3			25.0'		16" RECOVERY		
27.83							
30.36		12	28.0'	3 4 4 5	Wet loose brown fine to coarse sand w/trace of fine gravel and silt.	A-3	
			30.0'		24" RECOVERY		
32.89					End Boring		
35.42							
37.95							

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

BORING SB-3

Project Name: Bridgeville Yard

Location: Bridgeville, DE

State Contract #: T201280104

Federal Contract #:

Station/Offset:

Northing:

Easting:

Boring Surface Elev.:

Reference:

Date Started: 2/22/12

Date Completed: 2/22/12

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

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

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.

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 30.0
From Depth of: **To:**

Water Level Readings
Date

Depth to Water (ft)

Caved Depth (ft)

Boring Contractor: Hillis Carnes Engineering Associates

Equipment/Rig Type:

Driller: Keith Hastings

Logged By:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	2 3 3 4	Moist loose brown clayey fine sandy silt w/ some coarse sand, trace of fine gravel.	A-4(0)	Topsoil 10"
			2.0'		14" RECOVERY		
2.53		2	2.0'	3 4 7 5	Wet stiff brown clayey fine sandy silt w/trace of coarse sand.	A-4(1)	
			4.0'		24" RECOVERY		
		3	4.0'	3 3 5 6	Wet firm brown fine sandy clay w/some coarse sand and silt, trace of fine gravel.	A-6(2)	
5.06			6.0'		24" RECOVERY		
		U-1	6.0'				Shelby Tube - Press Sample
7.59			8.0'		24" RECOVERY		
		5	8.0'	5 7 9 10	Wet medium dense brown silty fine to coarse sand w/trace of fine gravel.	A-2-4(0)	
			10.0'		22" RECOVERY		
10.12		6	10.0'	4 4 5 7	Wet loose grayish brown coarse to fine sand w/ some silt, trace of fine gravel.	A-1-b	
			12.0'		19" RECOVERY		
12.65		7	12.0'	2 3 4 4	Wet loose orangish brown coarse to fine sand w/trace of silt and fine gravel.	A-3	
			14.0'		12" RECOVERY		

Remarks:

Addendum No. 4
May 6, 2014

Reviewed By: Hany Fekry

Soils Supervisor: Aaron Wiczorek

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

Project Name: Bridgeville Yard
State Contract:

Boring No.: SB-3

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
15.18		8	14.0'	2 4 6 7	Wet loose brown coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
			16.0'		12" RECOVERY		
17.71		9	16.0'	3 4 3 4	Wet loose brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			18.0'		20" RECOVERY		
20.24		10	18.0'	4 7 9 13	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	A-2-4(0)	
			20.0'		24" RECOVERY		
22.77							
		11	23.0'	3 9 13 17	Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
			25.0'		20" RECOVERY		
25.3							
27.83							
		12	28.0'	3 5 11 9	Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			30.0'		18" RECOVERY		
30.36					End Boring		
32.89							
35.42							
37.95							

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

BORING SB-4

Project Name: Bridgeville Yard

Location: Bridgeville, DE

State Contract #: T201280104

Federal Contract #:

Station/Offset:

Northing:

Easting:

Boring Surface Elev.:

Reference:

Date Started: 2/23/12

Date Completed: 2/23/12

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

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

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.

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 30.0
From Depth of: **To:**

Water Level Readings

Date **Depth to Water (ft)**
2/23/12 8.0
2/23/12 N/A

Caved Depth (ft)
6.0

Boring Contractor: Hillis Carnes Engineering Associates

Equipment/Rig Type:

Driller: Keith Hastings

Logged By: DVK

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	1 2 4 4	Moist firm brown fine sandy silt w/some coarse sand, trace of fine gravel and clay.	A-4(0)	Topsoil 10"
			2.0'		16" RECOVERY		
2.53		2	2.0'	3 5 7 22	Wet stiff brown fine sandy clay w/some coarse sand, trace of silt.	A-6(2)	
			4.0'		24" RECOVERY		
		3	4.0'	12 12 12 11	Wet medium dense brown silty fine sand w/ some coarse sand, trace of fine gravel.	A-2-4(0)	
5.06			6.0'		20" RECOVERY		
		4	6.0'	4 5 7 9	Wet medium dense grayish brown silty fine sand w/trace of coarse sand.	A-2-4(0)	
7.59			8.0'		18" RECOVERY		
	▽	5	8.0'	3 4 7 7	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	A-1-b	
			10.0'		16" RECOVERY		
10.12		6	10.0'	1 1 3 4	Wet very loose brownish orange coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			12.0'		12" RECOVERY		
		7	12.0'	2 2 4 6	Wet loose brownish orange coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
12.65			14.0'		16" RECOVERY		

Remarks:

Addendum No. 4
May 6, 2014

Reviewed By: Hany Fekry

Soils Supervisor: Aaron Wiczorek

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

Project Name: Bridgeville Yard
State Contract:

Boring No.: SB-4

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
15.18		8	14.0'	3 3 4 7	Wet loose brownish orange coarse sand w/some fine sand, trace of fine gravel and silt.	A-1-b	
			16.0'		24" RECOVERY		
17.71		9	16.0'	3 5 7 9	Wet medium dense brownish orange coarse to fine sand w/trace of silt and fine gravel.	A-1-b	
			18.0'		18" RECOVERY		
20.24		10	18.0'	4 7 9 11	Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
			20.0'		20" RECOVERY		
22.77							
		11	23.0'	3 7 11 13	Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
			25.0'		18" RECOVERY		
25.3							
27.83							
		12	28.0'	4 4 4 7	Wet loose brown coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
			30.0'		18" RECOVERY		
30.36					End Boring		
32.89							
35.42							
37.95							

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

BORING SB-5

Project Name: Bridgeville Yard

Location: Bridgeville, DE

State Contract #: T201280104

Federal Contract #:

Station/Offset:

Northing:

Easting:

Boring Surface Elev.:

Reference:

Date Started: 2/23/12

Date Completed: 2/23/12

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

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

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.

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 30.0
From Depth of: **To:**

Water Level Readings

Date **Depth to Water (ft)**
2/23/12 10.0
2/23/12 N/A

Caved Depth (ft)
2.5

Boring Contractor: Hillis Carnes Engineering Associates

Equipment/Rig Type:

Driller: Keith Hastings

Logged By: DVK

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	1 2 3 5	Wet firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	A-4(3)	Topsoil 12"
			2.0'		22" RECOVERY		Shelby Tube - Press Sample
2.53		U-1	2.0'		24" RECOVERY		
			4.0'		24" RECOVERY		
		2	4.0'	3 6 7 7	Wet stiff tan fine sandy silt w/trace of coarse sand and clay.	A-4(0)	
5.06			6.0'		18" RECOVERY		
		3	6.0'	3 2 6 6	Wet stiff tan fine sandy silt w/some clay, trace of coarse sand.	A-4(0)	
7.59			8.0'		24" RECOVERY		
		4	8.0'	2 4 4 4	Wet loose light brown coarse to fine sand w/ some silt, trace of fine gravel.	A-2-4(0)	
10.12	▽		10.0'		24" RECOVERY		
		5	10.0'	1 2 4 5	Wet loose grayish orange coarse to fine sand w/ some silt, trace of fine gravel.	A-1-b	
			12.0'		14" RECOVERY		
12.65		6	12.0'	4 3 4 2	Wet loose light gray coarse sand w/some fine sand, trace of fine gravel and silt.	A-1-b	
			14.0'		16" RECOVERY		

Remarks:

Addendum No. 4
May 6, 2014

Reviewed By: Hany Fekry

Soils Supervisor: Aaron Wiczorek

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

Project Name: Bridgeville Yard
State Contract:

Boring No.: SB-5

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
15.18		7A	14.0'	3 3	Wet loose light gray coarse to fine sand w/trace of silt and fine gravel. 8" RECOVERY	A-1-b	
		7B	15.0'	4 7	Wet medium dense orange coarse to fine sand w/trace of silt and fine gravel. 8" RECOVERY	A-1-b	
		8	16.0'	3 5 7 7	Wet medium dense reddish brown coarse to fine sand w/trace of silt and fine gravel. 16" RECOVERY	A-1-b	
17.71			18.0'				
		9	18.0'	1 4 7 9	Wet medium dense reddish brown coarse sand w/trace of fine sand, fine gravel and silt. 24" RECOVERY	A-1-b	
20.24			20.0'				
22.77							
		10	23.0'	5 7 9 11	Wet medium dense reddish brown coarse sand w/some fine sand, trace of silt and fine gravel. 20" RECOVERY	A-1-b	
25.3			25.0'				
27.83							
		11	28.0'	4 7 9 10	v 24" RECOVERY	A-1-b	
30.36			30.0'				
32.89							
		12	33.0'	5 11 15 18	Wet medium dense reddish brown coarse sand w/some fine sand, trace of fine gravel and silt.97- 24" RECOVERY	A-1-b	
35.42			35.0'				
					End Boring		
37.95							

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

BORING SB-6

Project Name: Bridgeville Yard
State Contract #: T201280104
Station/Offset:
Boring Surface Elev.:
Date Started: 2/23/12

Location: Bridgeville, DE
Federal Contract #:

Northing:
Reference:
Date Completed: 2/23/12
Easting:

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

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

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.

Hollow Stem Auger Diameter: 3 1/4" **Inches**
Mud Rotary:

From Depth of: 0.0 **To:** 30.0
From Depth of: **To:**

Water Level Readings
Date
 2/23/12
 2/23/12

Depth to Water (ft)
 11.0
 N/A

Caved Depth (ft)
 2.0

Boring Contractor: Hillis Carnes Engineering Associates

Equipment/Rig Type:

Driller: Keith Hastings

Logged By: DVK

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
		1	0.0'	2 3 3 2	Moist firm brown fine sandy silt w/some coarse sand and clay, trace of fine gravel.	A-4(0)	Topsoil 10"
			2.0'		20" RECOVERY		
2.53		2	2.0'	3 4 5 7	Wet stiff brown fine sandy clay w/some silt, trace of fine gravel.	A-6(4)	
			4.0'		20" RECOVERY		
		3	4.0'	4 6 10 8	Wet medium dense light brown coarse sand w/ some fine sand and silt, trace of fine gravel.	A-1-b	
5.06			6.0'		17" RECOVERY		
		4	6.0'	2 4 6 6	Wet loose light brown coarse sand w/some fine sand and silt, trace of fine gravel.	A-1-b	
7.59			8.0'		24" RECOVERY		
		5	8.0'	2 4 5 6	Wet loose light brown coarse to fine sand w/ trace of fine gravel and silt.	A-1-b	
			10.0'		17" RECOVERY		
10.12		6	10.0'	1 1 3 6	Wet very loose orange fine to coarse sand w/ trace of fine gravel and silt.	A-3	
			12.0'		9" RECOVERY		
		7	12.0'	3 5 6 6	Wet medium dense orange coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
12.65			14.0'		15" RECOVERY		

Remarks:

Addendum No. 4
 May 6, 2014

Reviewed By: Hany Fekry

Soils Supervisor: Aaron Wiczorek

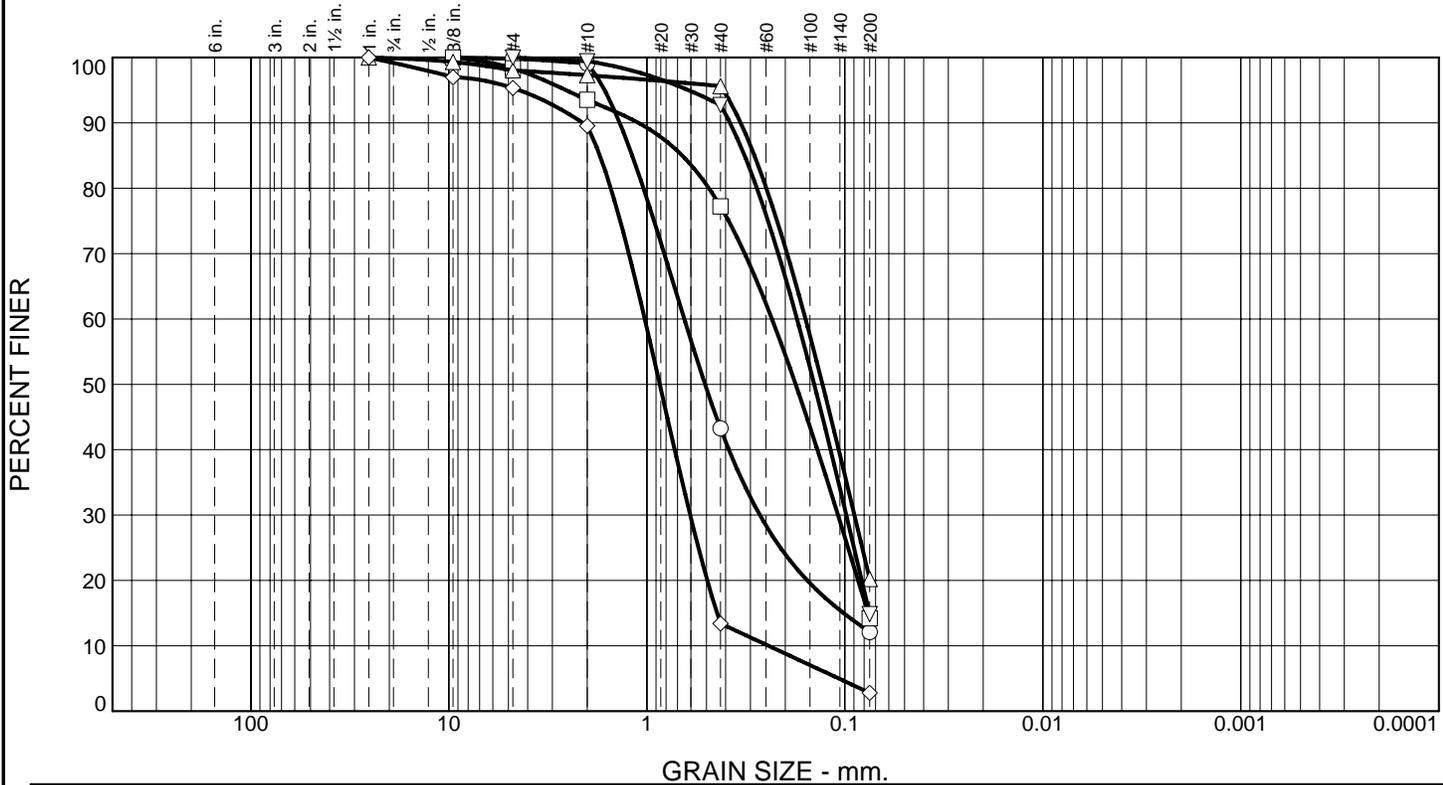
**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH**

Project Name: Bridgeville Yard
State Contract:

Boring No.: SB-6

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	AASHTO Class.	Remarks
15.18		8	14.0'	3 4 6 8	Wet loose brown coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
			16.0'		16" RECOVERY		
17.71		9	16.0'	3 7 8 13	Wet medium dense orange coarse to fine sand w/trace of fine gravel and silt.	A-1-b	
			18.0'		18" RECOVERY		
20.24		10	18.0'	5 7 11 15	Wet medium dense orange coarse sand w/some fine sand, trace of fine gravel and silt.	A-1-b	
			20.0'		19" RECOVERY		
22.77							
25.3		11	23.0'	8 11 13 13	Wet medium dense orange coarse sand w/some fine sand, trace of fine gravel and silt.	A-1-b	
			25.0'		14" RECOVERY		
27.83							
30.36		12	28.0'	1 5 8 11	Wet medium dense orange coarse sand w/some fine sand, trace of silt and fine gravel.	A-1-b	
			30.0'		16" RECOVERY		
32.89					End Boring		
35.42							
37.95							

Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines	
				Coarse	Fine	Silt	Clay
○	0.0	0.9	55.8	31.2	12.1		
□	0.0	6.5	16.3	63.0	14.2		
△	0.0	2.7	1.7	75.4	20.2		
◇	0.0	10.5	76.1	10.6	2.8		
▽	0.0	0.6	6.7	77.9	14.8		

	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○	NV	NP	1.1863	0.6476	0.5087	0.2687	0.1014			
□	NV	NP	0.6629	0.2334	0.1773	0.1083	0.0764			
△	NV	NP	0.2862	0.1581	0.1297	0.0895				
◇	NV	NP	1.7275	1.0251	0.8608	0.6046	0.4423	0.2433	1.47	4.21
▽	NV	NP	0.3211	0.1745	0.1428	0.0984	0.0752			

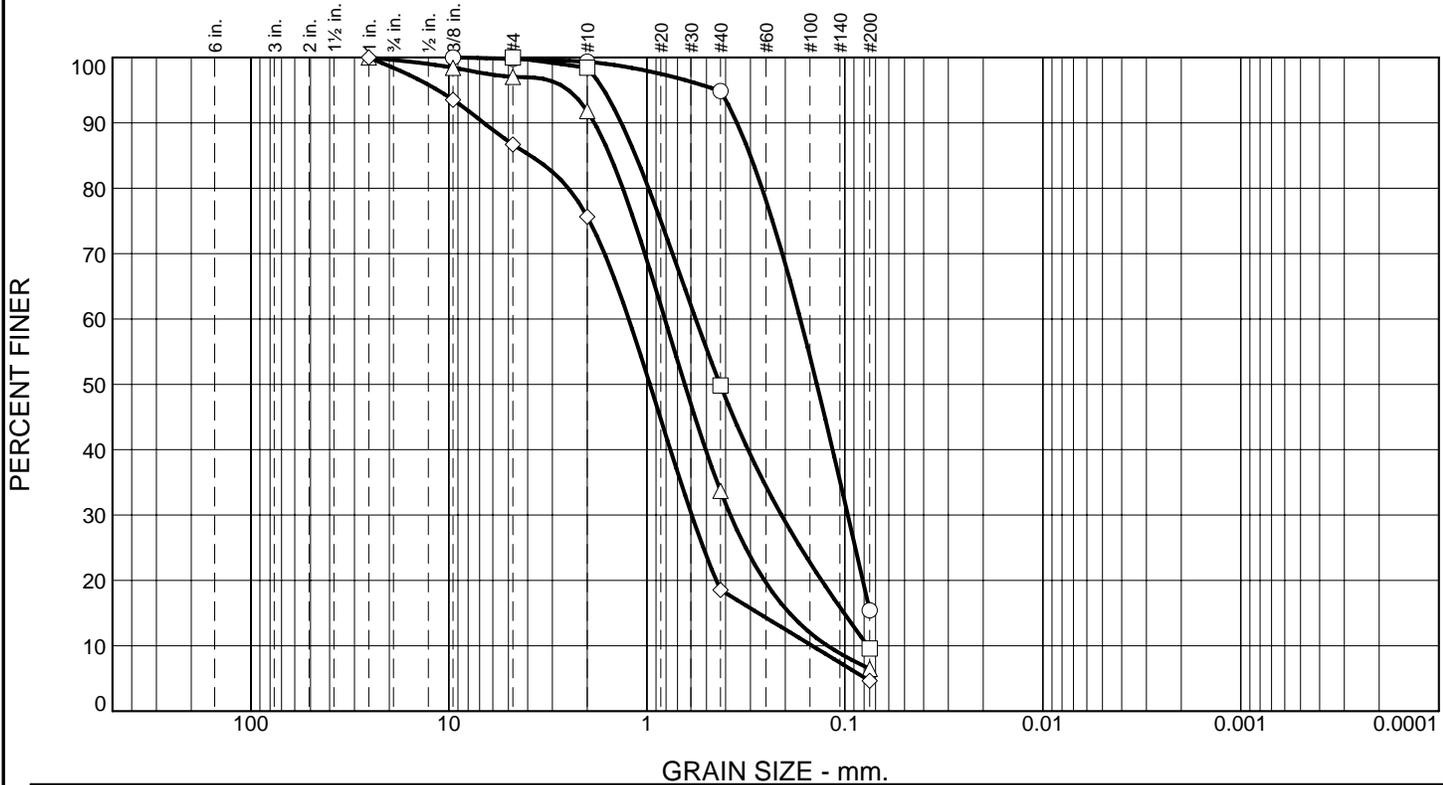
Material Description								USCS	AASHTO
○	Wet loose orange coarse to fine sand w/some silt, trace of fine gravel.							SM	A-1-b
□	Wet very loose orange fine sand w/some coarse sand and silt, trace of fine gravel.							SM	A-2-4(0)
△	Wet very loose brown fine sand w/some silt, trace of coarse sand and fine gravel.							SM	A-2-4(0)
◇	Wet very loose orange coarse sand w/trace of fine sand, fine gravel and silt.							SP	A-1-b
▽	Wet loose gray fine sand w/some silt, trace of coarse sand and fine gravel.							SM	A-2-4(0)

Project No.	Client:
Project: Bridgeville Yard	
○ Source of Sample: PB-1	Depth: 10.0 Sample Number: 6
□ Source of Sample: PB-1	Depth: 12.0 Sample Number: 7
△ Source of Sample: PB-1	Depth: 14.0 Sample Number: 8
◇ Source of Sample: PB-1	Depth: 16.0 Sample Number: 9
▽ Source of Sample: PB-1	Depth: 18.0 Sample Number: 10

Remarks:

**Delaware Department of Transportation
Materials and Research Laboratory**

Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines		C _c	C _u
		Coarse	Fine	Silt	Clay				
○	0.0	0.6	4.5	79.5	15.4				
□	0.0	1.6	48.6	40.2	9.6				
△	0.0	8.2	58.1	27.2	6.5				
◇	0.0	24.4	57.1	13.8	4.7				

	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○	NV	NP	0.3002	0.1680	0.1385	0.0966				
□	NV	NP	1.1395	0.5670	0.4272	0.2091	0.1009	0.0768	1.00	7.38
△	NV	NP	1.5351	0.8111	0.6442	0.3791	0.1905	0.1223	1.45	6.63
◇	NV	NP	3.8832	1.2354	0.9656	0.5939	0.2733	0.1463	1.95	8.44

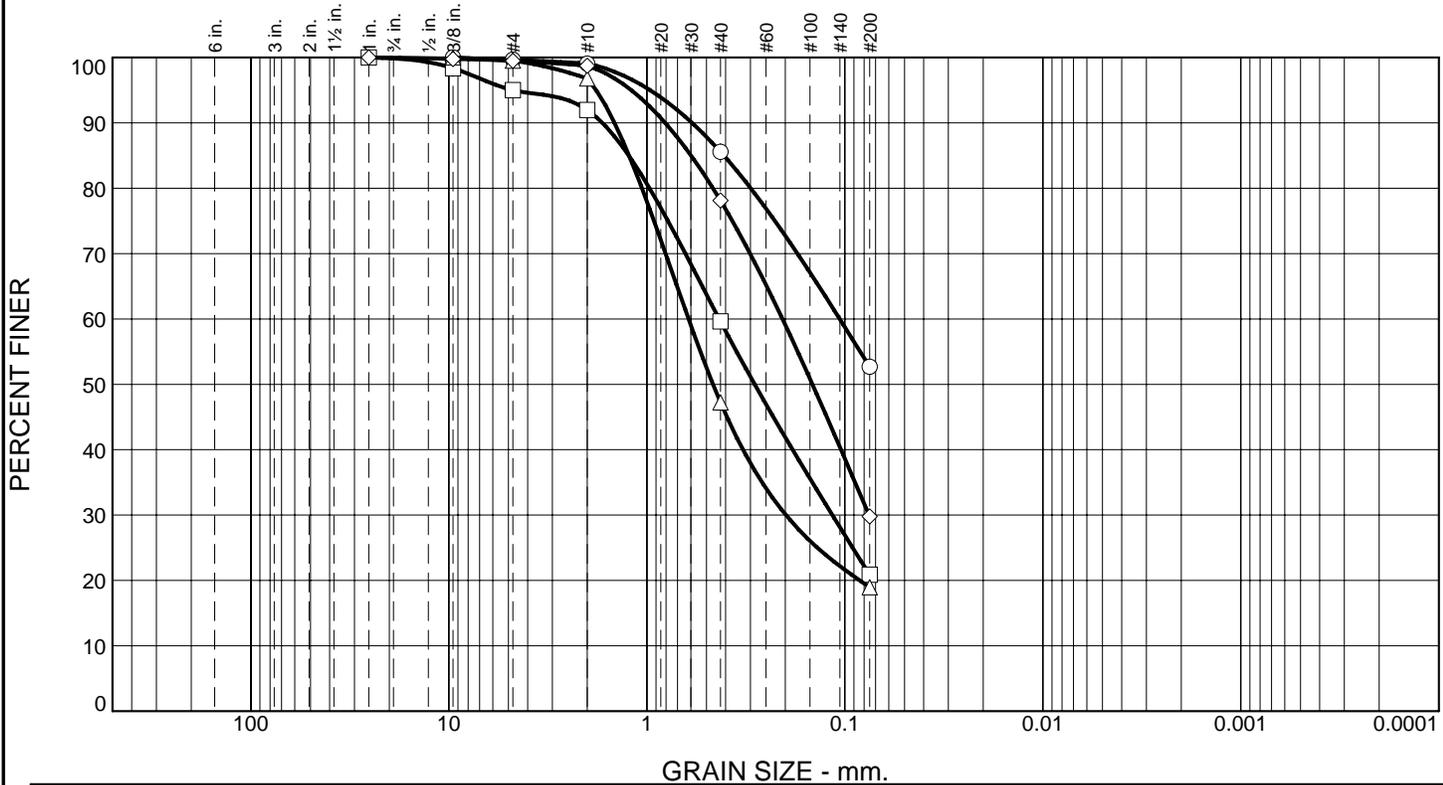
Material Description	USCS	AASHTO
○ Wet loose brown fine sand w/some silt, trace of coarse sand and fine gravel.	SM	A-2-4(0)
□ Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel.	SW-SM	A-1-b
△ Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt.	SW-SM	A-1-b
◇ Wet dense reddish brown fine gravelly coarse sand w/some fine sand, trace of silt.	SW	A-1-b

Project No.	Client:	Remarks:	
Project: Bridgeville Yard			
○ Source of Sample: PB-1	Depth: 23.0		Sample Number: 11
□ Source of Sample: PB-1	Depth: 28.0		Sample Number: 12
△ Source of Sample: PB-1	Depth: 33.0		Sample Number: 13
◇ Source of Sample: PB-1	Depth: 38.0	Sample Number: 14	

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Figure BY-3

Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines		C _c	C _u
				Coarse	Fine	Silt	Clay		
○	0.0	0.9		13.5	32.9	52.7			
□	0.0	8.0		32.4	38.7	20.9			
△	0.0	3.2		49.6	28.2	19.0			
◇	0.0	1.3		20.6	48.3	29.8			

	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○	23.0	16.6	0.4086	0.1061						
□	NV	NP	1.2340	0.4315	0.2854	0.1156				
△	NV	NP	1.2304	0.6160	0.4635	0.1984				
◇	22.7	20.1	0.5985	0.2066	0.1458	0.0755				

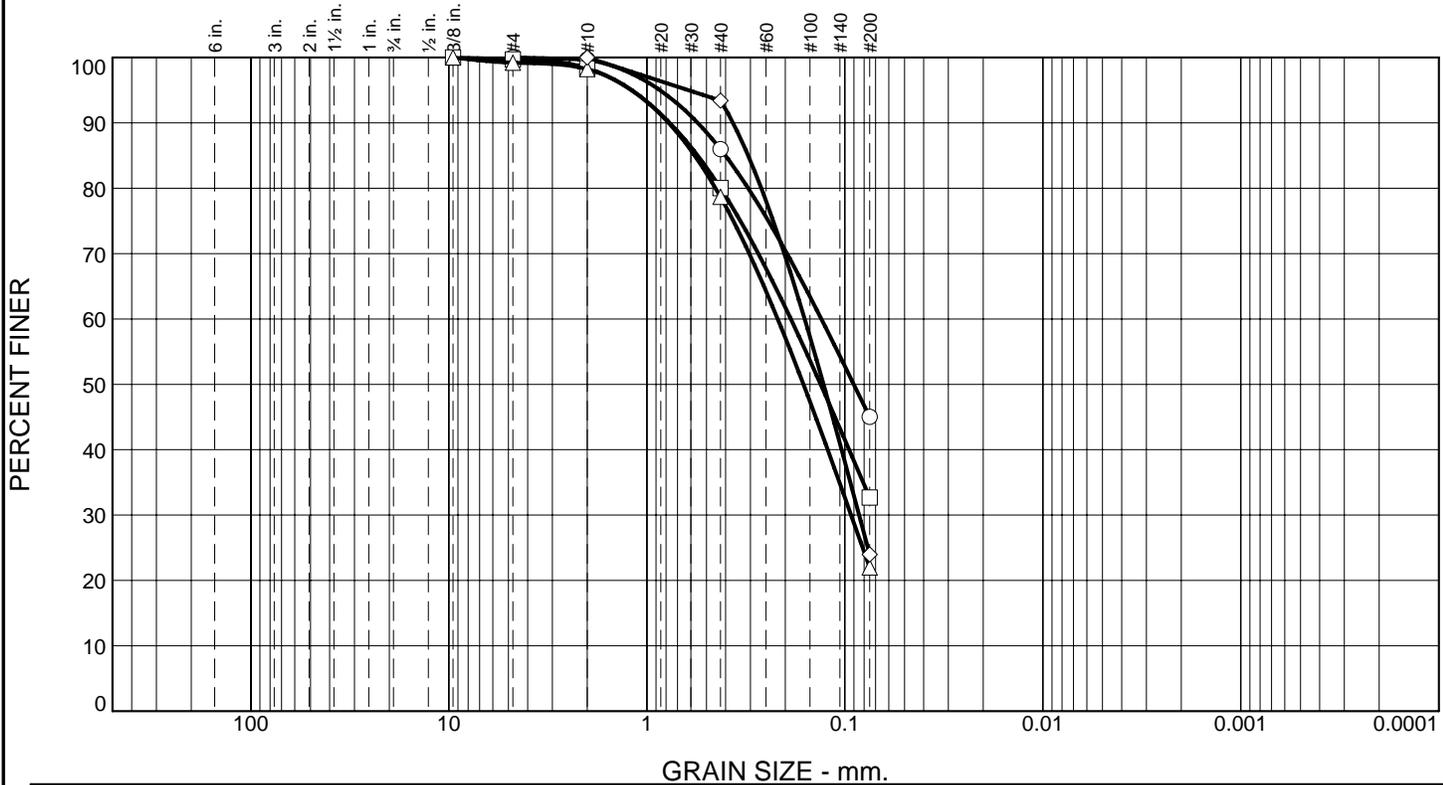
Material Description								USCS	AASHTO
○ Wet firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.								CL-ML	A-4(1)
□ Wet loose brown silty fine to coarse sand w/trace of fine gravel.								SM	A-2-4(0)
△ Wet loose light brown coarse to fine sand w/some silt, trace of fine gravel.								SM	A-1-b
◇ Saturated very loose orange silty fine to coarse sand w/trace of fine gravel and clay.								SM	A-2-4(0)

Project No.	Client:	Remarks:
Project: Bridgeville Yard		
○ Source of Sample: PB-2	Depth: 0.0	Sample Number: 1
□ Source of Sample: PB-2	Depth: 2.0	Sample Number: 2
△ Source of Sample: PB-2	Depth: 4.0	Sample Number: 3
◇ Source of Sample: PB-2	Depth: 6.0	Sample Number: 4

**Delaware Department of Transportation
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Figure BY-4

Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines		C _c	C _u
				Coarse	Fine	Silt	Clay		
○	0.0	0.3	13.7	41.0	45.0				
□	0.0	1.6	18.4	47.3	32.7				
△	0.0	1.8	19.5	56.7	22.0				
◇	0.0	0.0	6.6	69.4	24.0				

	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀
○	14.1	13.5	0.4013	0.1314	0.0902			
□	15.7	NP	0.5541	0.1876	0.1326			
△	19.8	NP	0.5737	0.2184	0.1619	0.0930		
◇	27.0	20.3	0.3079	0.1597	0.1282	0.0847		

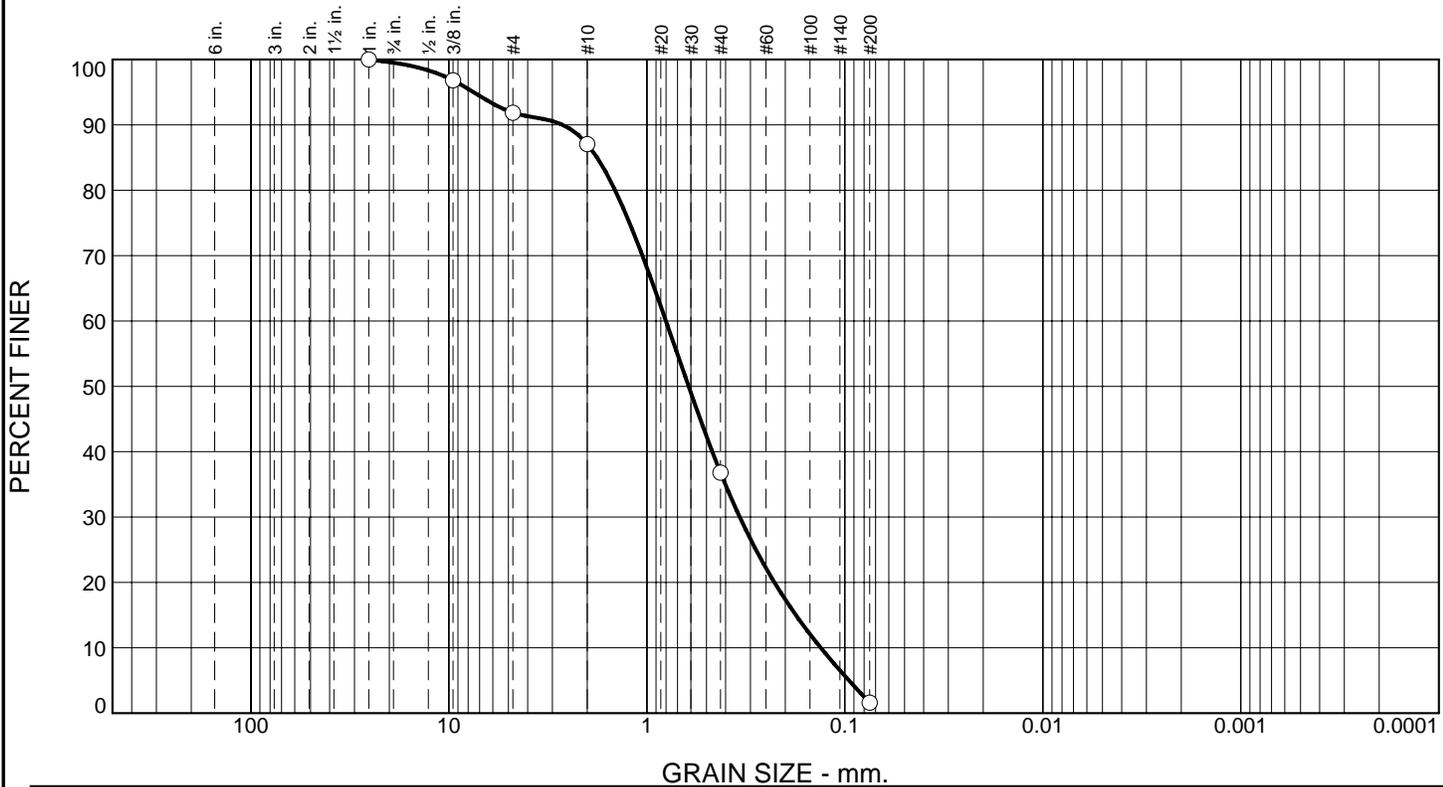
Material Description	USCS	AASHTO
○ Moist firm orange fine sandy silt w/some coarse sand, trace of clay.	SM	A-4(0)
□ Moist very loose light brown silty fine sand w/some coarse sand, trace of fine gravel.	SM	A-2-4(0)
△ Moist very loose light brown silty fine sand w/some coarse sand, trace of fine gravel.	SM	A-2-4(0)
◇ Wet loose light brown clayey fine sand w/some silt, trace of coarse sand.	SC-SM	A-2-4(0)

Project No.	Client:
Project: Bridgeville Yard	
○ Source of Sample: PB-3	Depth: 0.0 Sample Number: 1
□ Source of Sample: PB-3	Depth: 2.0 Sample Number: 2
△ Source of Sample: PB-3	Depth: 4.0 Sample Number: 3
◇ Source of Sample: PB-3	Depth: 6.0 Sample Number: 4

Remarks:

**Delaware Department of Transportation
Materials and Research Laboratory**

Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines		C _c	C _u
		Coarse	Fine	Silt	Clay				
<input type="radio"/>	0.0	12.9	50.3	35.2	1.6				
<input type="checkbox"/>									
<input type="checkbox"/>									
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	
<input type="radio"/>	NV	NP	1.7832	0.8012	0.6156	0.3398	0.1768	0.1324	1.09
<input type="checkbox"/>									
<input type="checkbox"/>									

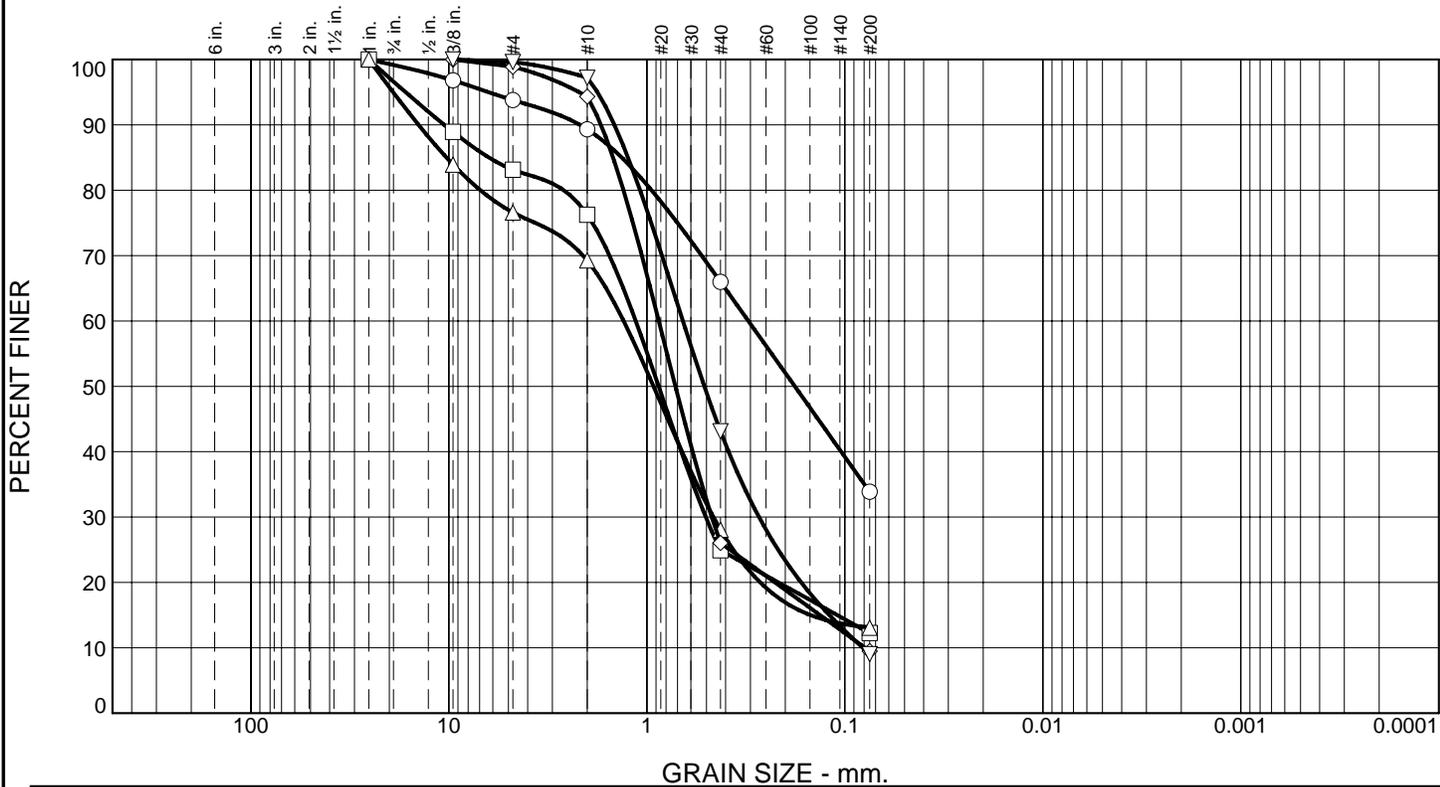
Material Description	USCS	AASHTO
<input type="radio"/> Wet medium dense coarse to fine sand w/some fine gravel, trace of fine gravel.	SW	A-1-b
<input type="checkbox"/>		

Project No.	Client:	
Project: Bridgeville Yard		
<input type="radio"/> Source of Sample: R-1	Depth: 8.0	Sample Number: 5
<input type="checkbox"/> Source of Sample: R-1		

Remarks:

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Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines	
				Coarse	Fine	Silt	Clay
○	0.0	10.7	23.3	32.1	33.9		
□	0.0	23.8	51.3	12.7	12.2		
△	0.0	30.7	41.2	15.0	13.1		
◇	0.0	5.7	68.3	16.5	9.5		
▽	0.0	2.8	54.1	34.1	9.0		

	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○	23.3	17.6	1.3398	0.3073	0.1790					
□	NV	NP	6.2724	1.1386	0.8721	0.5043	0.1093			
△	NV	NP	10.2834	1.3104	0.9253	0.4615	0.1495			
◇	NV	NP	1.4822	0.8707	0.7178	0.4704	0.1336	0.0791	3.21	11.00
▽	27.2	NP	1.2457	0.6582	0.5128	0.2715	0.1198	0.0812	1.38	8.11

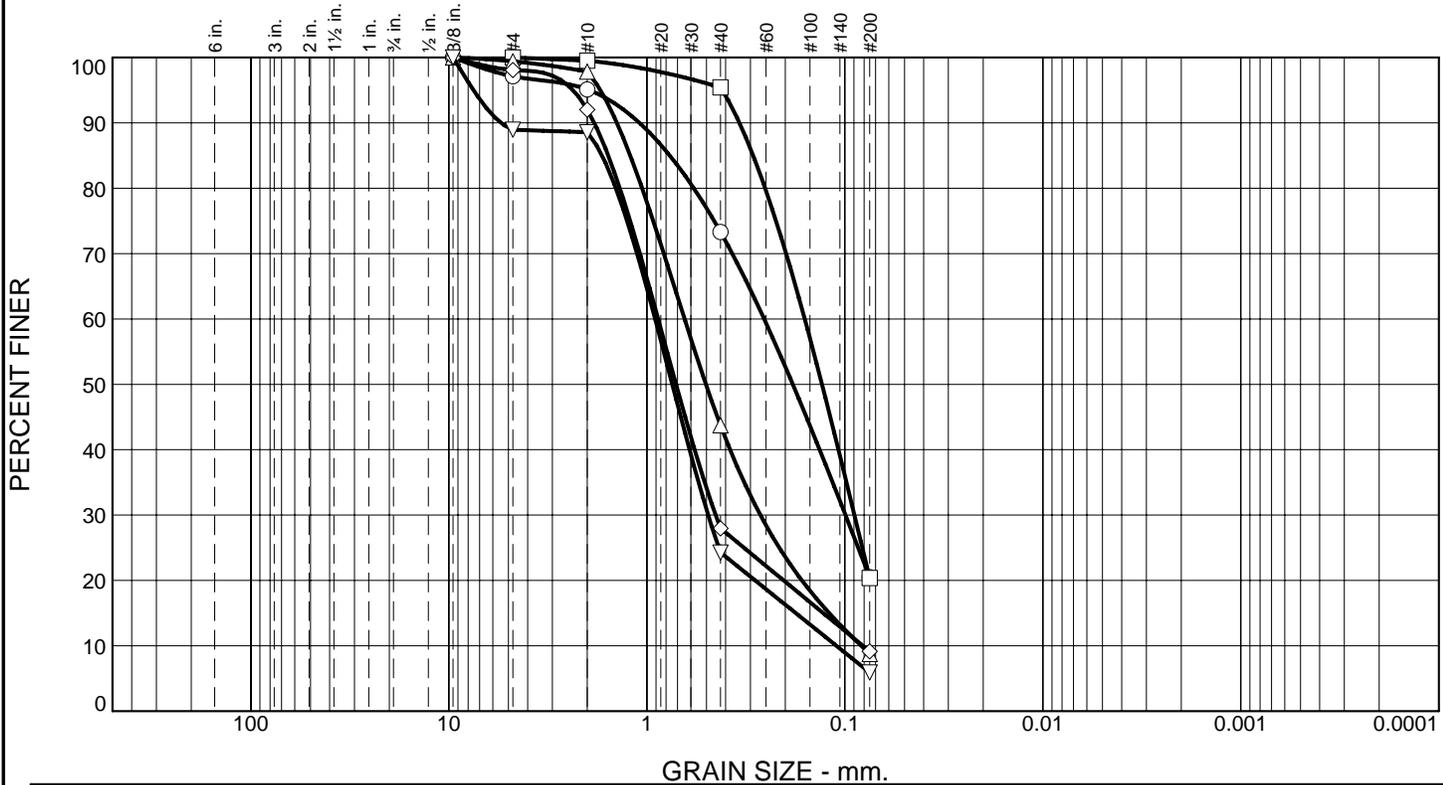
Material Description								USCS	AASHTO
○ Moist very loose dark brown clayey fine to coarse sand w/some fine gravel, trace of silt.								SC-SM	A-2-4(0)
□ Moist medium dense light brown fine gravelly coarse sand w/some fine sand and silt.								SM	A-1-b
△ Moist loose light brown fine gravel and coarse sand w/some fine sand and silt.								SM	A-1-b
◇ Wet medium dense brownish orange coarse sand w/some fine sand, trace of fine gravel and silt.								SP-SM	A-1-b
▽ Wet loose brown coarse to fine sand w/trace of silt and fine gravel.								SW-SM	A-1-b

Project No.	Client:	
Project: Bridgeville Yard		
○ Source of Sample: R-2	Depth: 0.0	Sample Number: 1
□ Source of Sample: R-2	Depth: 2.0	Sample Number: 2
△ Source of Sample: R-2	Depth: 4.0	Sample Number: 3
◇ Source of Sample: R-2	Depth: 6.0	Sample Number: 4
▽ Source of Sample: R-2	Depth: 8.0	Sample Number: 5

Remarks:

Delaware Department of Transportation
Materials and Research Laboratory

Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines				
				Coarse	Fine	Silt	Clay			
○	0.0	4.9		21.8	52.8		20.5			
□	0.0	0.5		4.1	75.0		20.4			
△	0.0	2.2		54.1	35.0		8.7			
◇	0.0	8.0		64.0	18.8		9.2			
▽	0.0	11.4		64.3	18.4		5.9			
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○	NV	NP	0.7657	0.2557	0.1832	0.0993				
□	NV	NP	0.2905	0.1595	0.1305	0.0895				
△	NV	NP	1.2138	0.6454	0.5035	0.2672	0.1200	0.0827	1.34	7.80
◇	NV	NP	1.5673	0.8772	0.7125	0.4498	0.1286	0.0811	2.84	10.82
▽	NV	NP	1.6847	0.9081	0.7445	0.4903	0.1770	0.1104	2.40	8.23

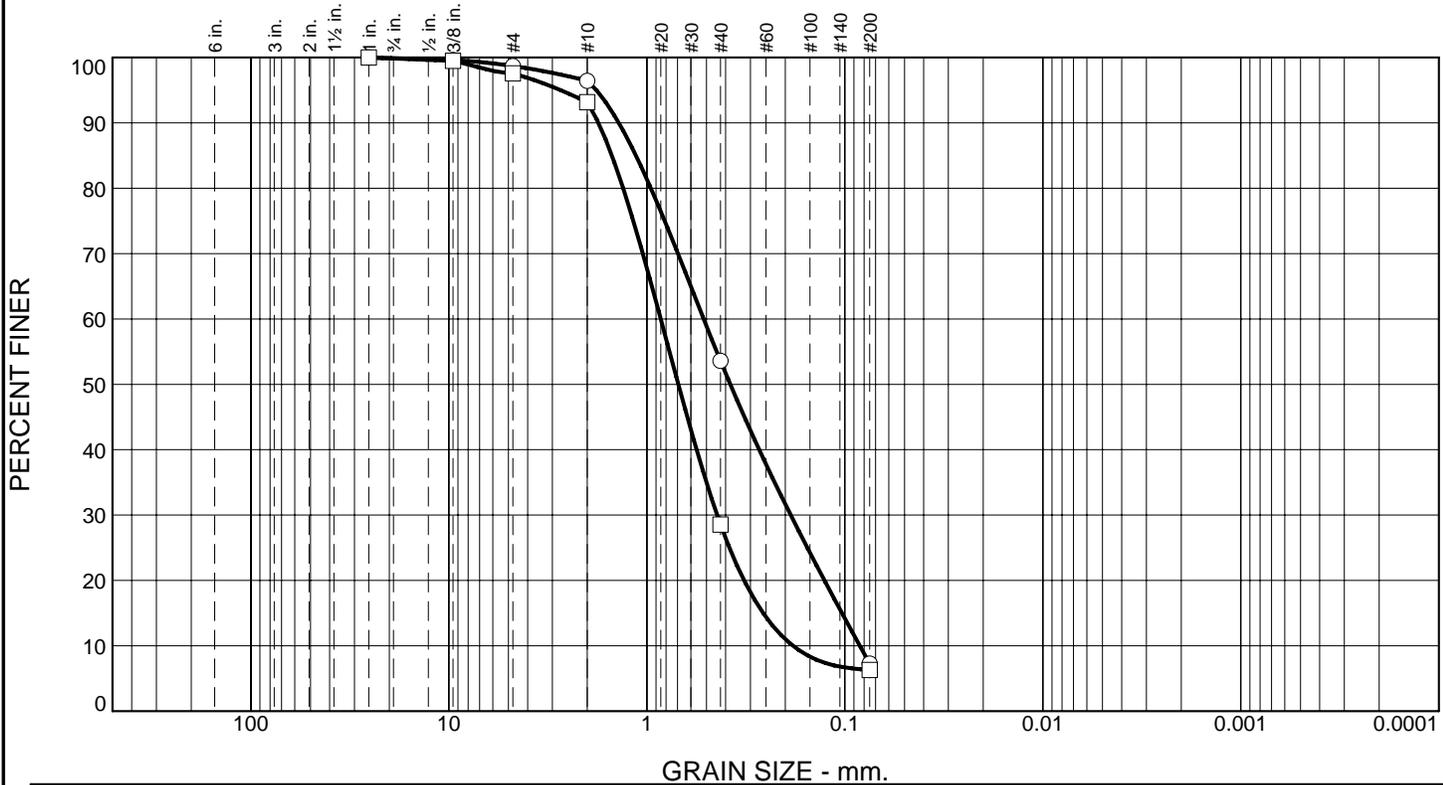
Material Description								USCS	AASHTO
○	Wet loose brown silty fine to coarse sand w/trace of fine gravel.							SM	A-2-4(0)
□	Wet very loose brown fine sand w/some silt, trace of coarse sand.							SM	A-2-4(0)
△	Wet loose brown coarse to fine sand w/trace of silt and fine gravel.							SW-SM	A-1-b
◇	Wet loose brown coarse to fine sand w/trace of silt and fine gravel.							SW-SM	A-1-b
▽	Wet loose brown coarse sand w/some fine sand and fine gravel, trace of silt.							SW-SM	A-1-b

Project No.	Client:
Project: Bridgeville Yard	
○ Source of Sample: SB-1	Depth: 10.0 Sample Number: 6
□ Source of Sample: SB-1	Depth: 12.0 Sample Number: 7
△ Source of Sample: SB-1	Depth: 14.0 Sample Number: 8
◇ Source of Sample: SB-1	Depth: 16.0 Sample Number: 9
▽ Source of Sample: SB-1	Depth: 18.0 Sample Number: 10

Remarks:

**Delaware Department of Transportation
Materials and Research Laboratory**

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines					
			Coarse	Fine	Silt	Clay				
○	0.0	3.6	42.8	46.3	7.3					
□	0.0	6.8	64.6	22.3	6.3					
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○	NV	NP	1.1358	0.5167	0.3792	0.1877	0.1034	0.0841	0.81	6.15
□	NV	NP	1.5028	0.8510	0.6937	0.4419	0.2585	0.1830	1.25	4.65

Material Description	USCS	AASHTO
○ Wet loose grayish brown fine to coarse sand w/trace of silt and fine gravel.	SP-SM	A-3
□ Wet medium dense grayish brown coarse to fine sand w/trace of silt and fine gravel.	SP-SM	A-1-b

Project No. _____ **Client:** _____

Project: Bridgeville Yard

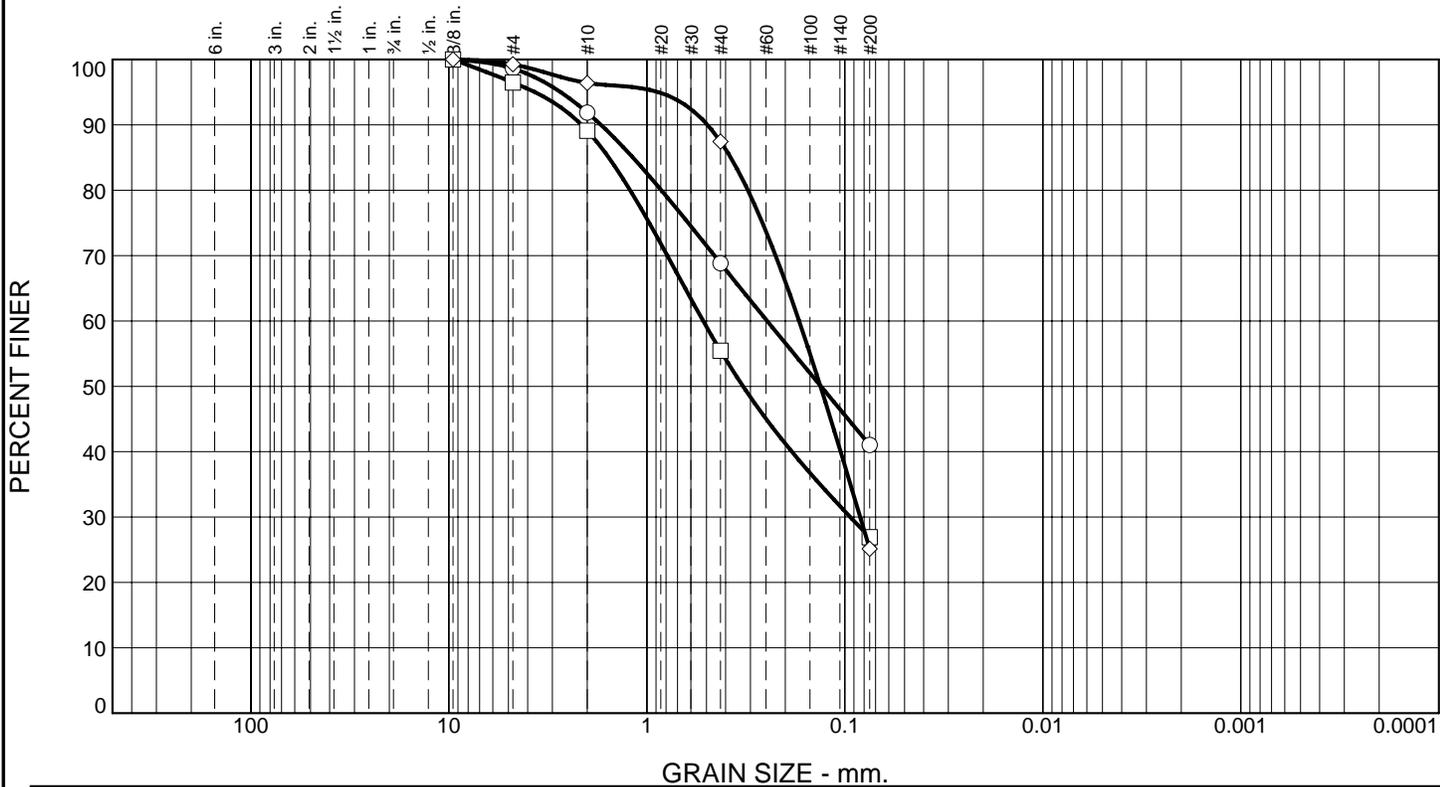
○ **Source of Sample:** SB-1 **Depth:** 25.0 **Sample Number:** 11

□ **Source of Sample:** SB-1 **Depth:** 28.0 **Sample Number:** 12

Remarks:

**Delaware Department of Transportation
Materials and Research Laboratory**

Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines		C _c	C _u
				Coarse	Fine	Silt	Clay		
○	0.0	8.1	23.1	27.8	41.0				
□	0.0	10.9	33.7	28.5	26.9				
△									
◇	0.0	3.6	8.9	62.4	25.1				
▽									
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	
○	24.0	15.6	1.1763	0.2470	0.1321				
□	27.6	16.9	1.5586	0.5198	0.3268	0.0939			
△	34.4	24.4							
◇	NV	NP	0.3774	0.1703	0.1329	0.0837			
▽	NV	NP							

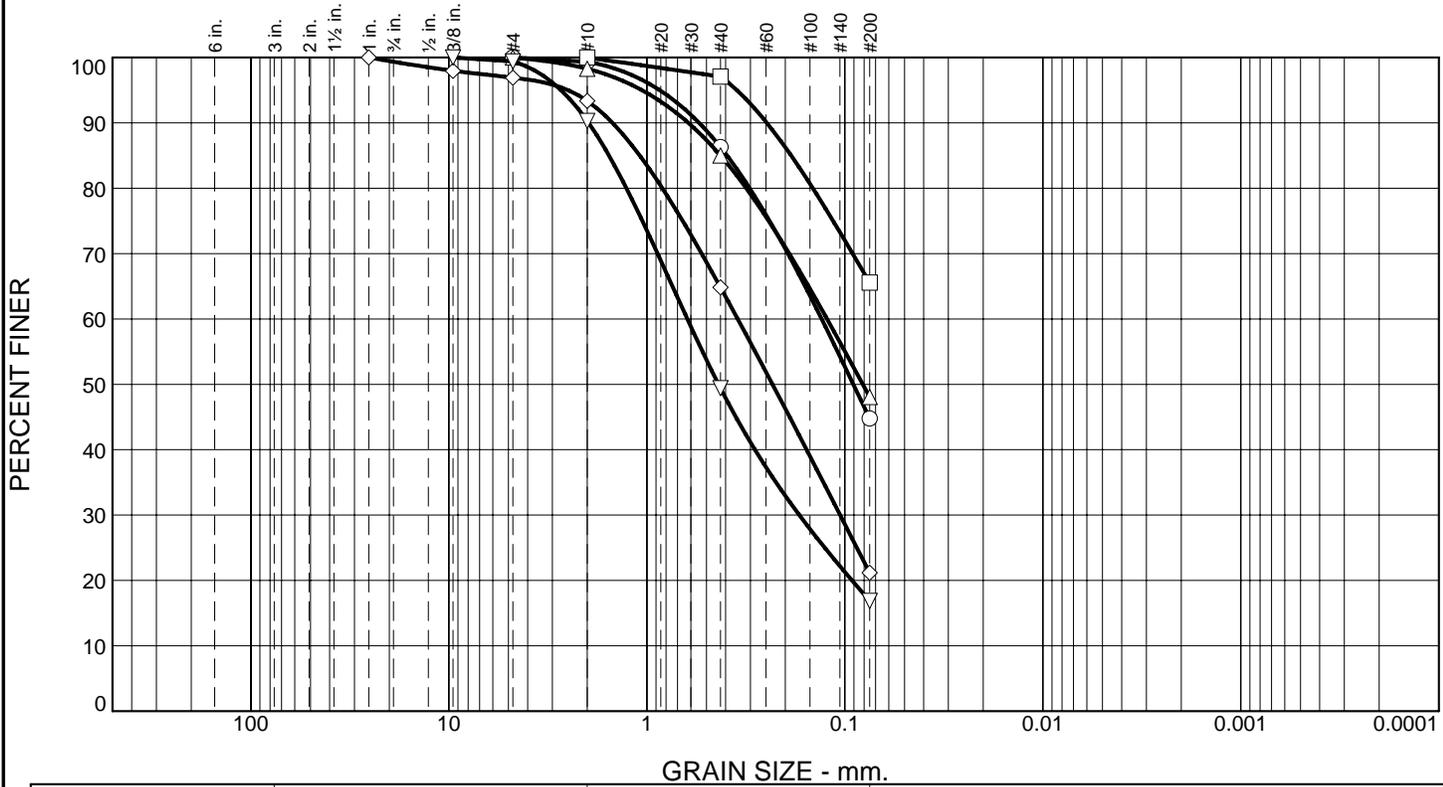
Material Description	USCS	AASHTO
○ Wet firm brown clayey fine to coarse sandy silt w/trace of fine gravel.	SC	A-4(0)
□ Wet medium dense brown clayey coarse to fine sand w/some fine gravel, trace of silt.	SC	A-2-6(0)
△ No sieve analysis - Indication of wet stiff red clay.		
◇ Wet loose light brown silty fine sand w/trace of coarse sand and fine gravel.	SM	A-2-4(0)
▽ No sieve analysis - Indication of wet loose brown fine to coarse sand w/some silt.		

Project No.	Client:
Project: Bridgeville Yard	
○ Source of Sample: SB-2	Depth: 0.0 Sample Number: 1
□ Source of Sample: SB-2	Depth: 2.0 Sample Number: 2A
△ Source of Sample: SB-2	Depth: 3.0 Sample Number: 2B
◇ Source of Sample: SB-2	Depth: 6.0 Sample Number: 4
▽ Source of Sample: SB-2	Depth: 8.0 Sample Number: 5

Remarks:

**Delaware Department of Transportation
Materials and Research Laboratory**

Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines	
				Coarse	Fine	Silt	Clay
○	0.0	0.6	13.1	41.5	44.8		
□	0.0	0.0	2.9	31.5	65.6		
△	0.0	1.7	13.3	36.9	48.1		
◇	0.0	6.6	28.6	43.6	21.2		
▽	0.0	9.7	40.9	32.5	16.9		

	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○	22.4	15.4	0.3937	0.1310	0.0906					
□	21.3	15.7	0.1868							
△	26.6	15.9	0.4245	0.1231	0.0812					
◇	NV	NP	1.0861	0.3479	0.2320	0.1056				
▽	NV	NP	1.5534	0.6249	0.4349	0.1699				

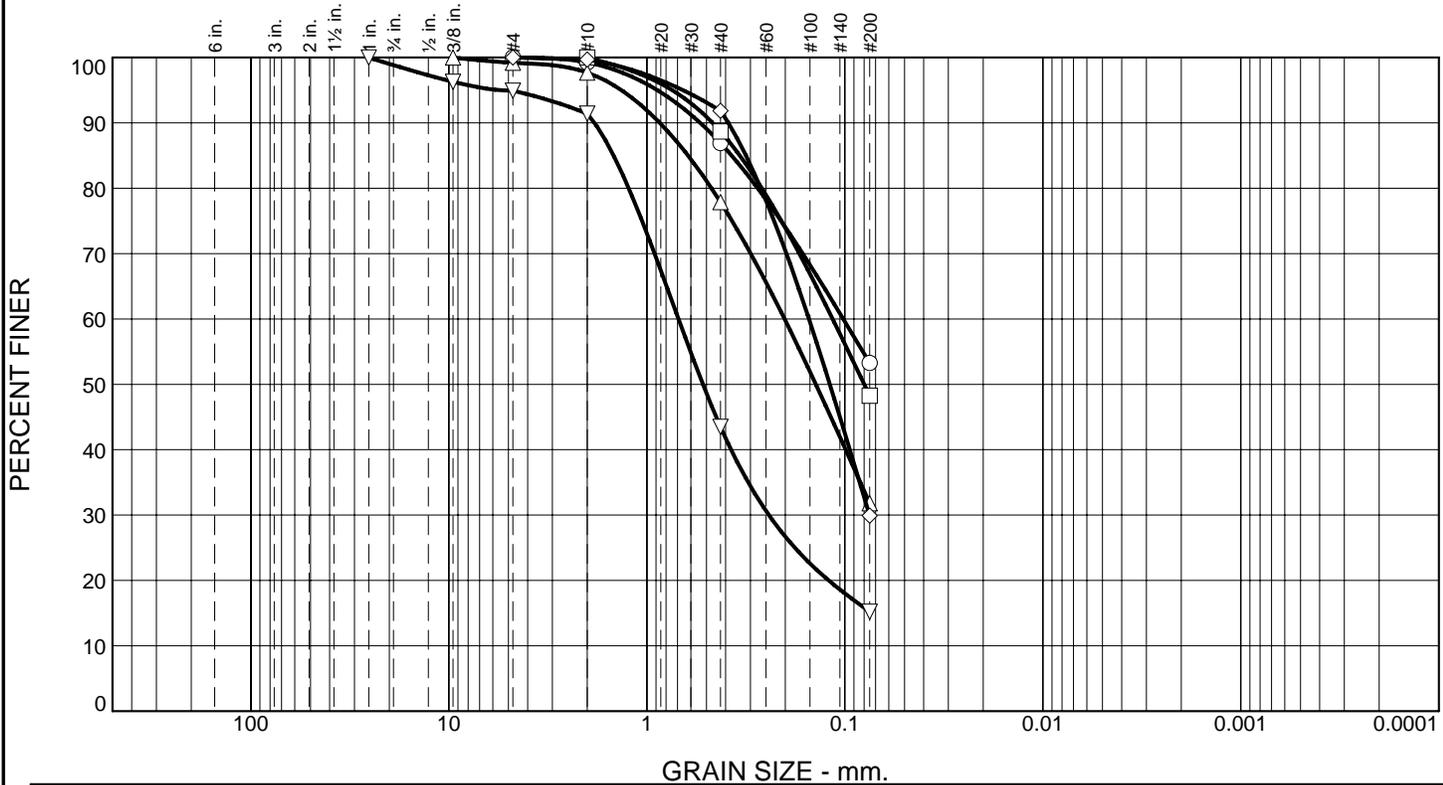
Material Description								USCS	AASHTO
○ Moist loose brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.								SC-SM	A-4(0)
□ Wet stiff brown clayey fine sandy silt w/trace of coarse sand.								CL-ML	A-4(1)
△ Wet firm brown fine sandy clay w/some coarse sand and silt, trace of fine gravel.								SC	A-6(2)
◇ Wet medium dense brown silty fine to coarse sand w/trace of fine gravel.								SM	A-2-4(0)
▽ Wet loose grayish brown coarse to fine sand w/some silt, trace of fine gravel.								SM	A-1-b

Project No.	Client:
Project: Bridgeville Yard	
○ Source of Sample: SB-3 Depth: 0.0 Sample Number: 1	
□ Source of Sample: SB-3 Depth: 2.0 Sample Number: 2	
△ Source of Sample: SB-3 Depth: 4.0 Sample Number: 3	
◇ Source of Sample: SB-3 Depth: 8.0 Sample Number: 5	
▽ Source of Sample: SB-3 Depth: 10.0 Sample Number: 6	

Remarks:

**Delaware Department of Transportation
Materials and Research Laboratory**

Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines		C _c	C _u	
				Coarse	Fine	Silt	Clay			
○	0.0	0.8		12.3	33.6		53.3			
□	0.0	0.0		11.3	40.4		48.3			
△	0.0	2.3		19.8	46.1		31.8			
◇	0.0	0.3		7.9	61.9		29.9			
▽	0.0	8.6		47.9	28.3		15.2			
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀		
○	16.8	14.2	0.3731	0.1019						
□	27.4	16.0	0.3393	0.1153	0.0799					
△	NV	NP	0.6200	0.2015	0.1402					
◇	NV	NP	0.3159	0.1519	0.1191	0.0752				
▽	NV	NP	1.4727	0.6926	0.5213	0.2419				

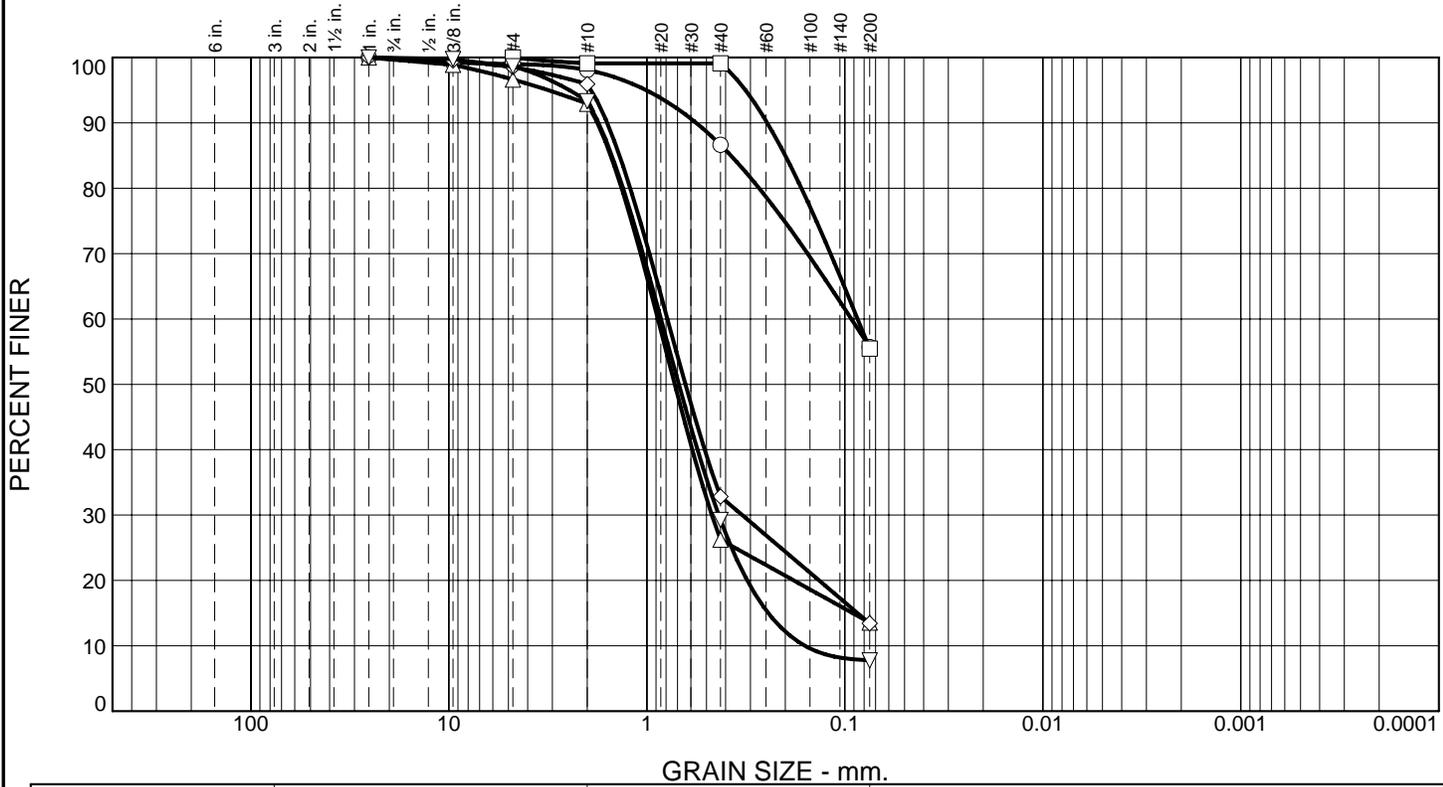
Material Description		USCS	AASHTO
○ Moist firm brown fine sandy silt w/some coarse sand, trace of fine gravel and clay.		ML	A-4(0)
□ Wet stiff brown fine sandy clay w/some coarse sand, trace of silt.		SC	A-6(2)
△ Wet medium dense brown silty fine sand w/some coarse sand, trace of fine gravel.		SM	A-2-4(0)
◇ Wet medium dense grayish brown silty fine sand w/trace of coarse sand.		SM	A-2-4(0)
▽ Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.		SM	A-1-b

Project No.	Client:	
Project: Bridgeville Yard		
○ Source of Sample: SB-4	Depth: 0.0	Sample Number: 1
□ Source of Sample: SB-4	Depth: 2.0	Sample Number: 2
△ Source of Sample: SB-4	Depth: 4.0	Sample Number: 3
◇ Source of Sample: SB-4	Depth: 6.0	Sample Number: 4
▽ Source of Sample: SB-4	Depth: 8.0	Sample Number: 5

Remarks:

**Delaware Department of Transportation
Materials and Research Laboratory**

Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines		C _c	C _u	
				Coarse	Fine	Silt	Clay			
○	0.0	1.9		11.5	30.9	55.7				
□	0.0	0.9		0.0	43.6	55.5				
△	0.0	7.1		66.7	12.6	13.6				
◇	0.0	4.1		63.1	19.4	13.4				
▽	0.0	6.7		64.1	21.4	7.8				
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀		
○	20.1	16.6	0.3765	0.0927						
□	31.1	17.6	0.2000	0.0862						
△	NV	NP	1.5237	0.8800	0.7232	0.4698	0.0914			
◇	NV	NP	1.3752	0.7876	0.6391	0.3299	0.0863			
▽	NV	NP	1.5042	0.8490	0.6898	0.4340	0.2438	0.1594	1.39	5.33

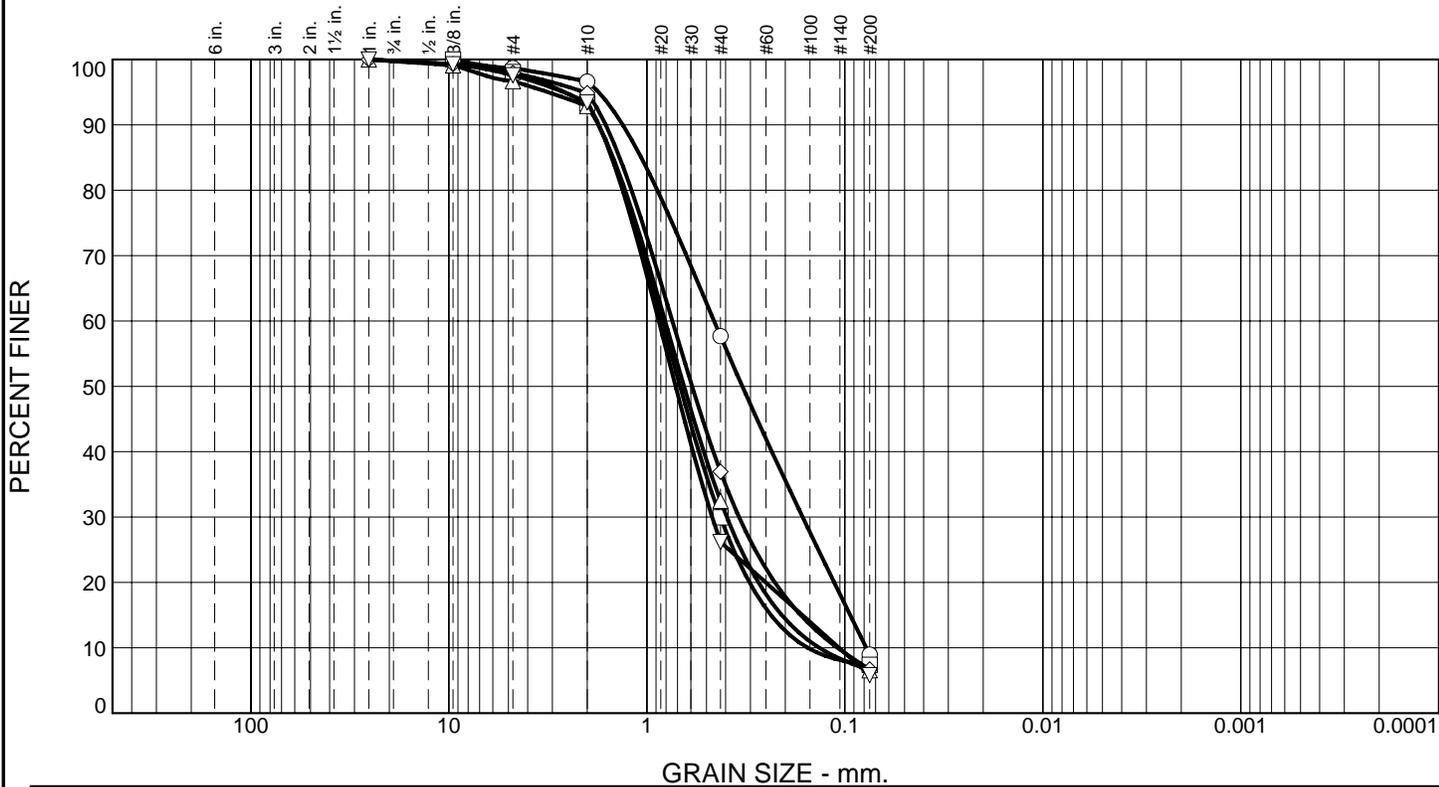
Material Description								USCS	AASHTO
○	Moist firm brown fine sandy silt w/some coarse sand and clay, trace of fine gravel.							ML	A-4(0)
□	Wet stiff brown fine sandy clay w/some silt, trace of fine gravel.							CL	A-6(4)
△	Wet medium dense light brown coarse sand w/some fine sand and silt, trace of fine gravel.							SM	A-1-b
◇	Wet loose light brown coarse sand w/some fine sand and silt, trace of fine gravel.							SM	A-1-b
▽	Wet loose light brown coarse to fine sand w/trace of fine gravel and silt.							SP-SM	A-1-b

Project No.	Client:
Project: Bridgeville Yard	
○ Source of Sample: SB-6 Depth: 0.0 Sample Number: 1	
□ Source of Sample: SB-6 Depth: 2.0 Sample Number: 2	
△ Source of Sample: SB-6 Depth: 4.0 Sample Number: 3	
◇ Source of Sample: SB-6 Depth: 6.0 Sample Number: 4	
▽ Source of Sample: SB-6 Depth: 8.0 Sample Number: 5	

Remarks:

**Delaware Department of Transportation
Materials and Research Laboratory**

Particle Size Distribution Report



	% +3"	% Gravel		% Sand		% Fines	
		Coarse	Fine	Silt	Clay		
○	0.0	3.4	38.9	48.7	9.0		
□	0.0	6.7	63.4	22.5	7.4		
△	0.0	7.1	60.4	25.9	6.6		
◇	0.0	5.1	58.0	30.2	6.7		
▽	0.0	6.6	67.2	20.4	5.8		

	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○	NV	NP	1.0675	0.4580	0.3296	0.1634	0.0940	0.0780	0.75	5.87
□	NV	NP	1.4959	0.8391	0.6805	0.4256	0.2364	0.1542	1.40	5.44
△	NV	NP	1.4811	0.8088	0.6500	0.3951	0.2084	0.1348	1.43	6.00
◇	NV	NP	1.3732	0.7436	0.5914	0.3426	0.1672	0.1090	1.45	6.82
▽	NV	NP	1.5048	0.8708	0.7161	0.4683	0.1640	0.1071	2.35	8.13

Material Description								USCS	AASHTO
○ Wet very loose orange fine to coarse sand w/trace of fine gravel and silt.								SP-SM	A-3
□ Wet medium dense orange coarse to fine sand w/trace of fine gravel and silt.								SP-SM	A-1-b
△ Wet loose brown coarse to fine sand w/trace of fine gravel and silt.								SW-SM	A-1-b
◇ Wet medium dense orange coarse to fine sand w/trace of fine gravel and silt.								SW-SM	A-1-b
▽ Wet medium dense orange coarse sand w/some fine sand, trace of fine gravel and silt.								SW-SM	A-1-b

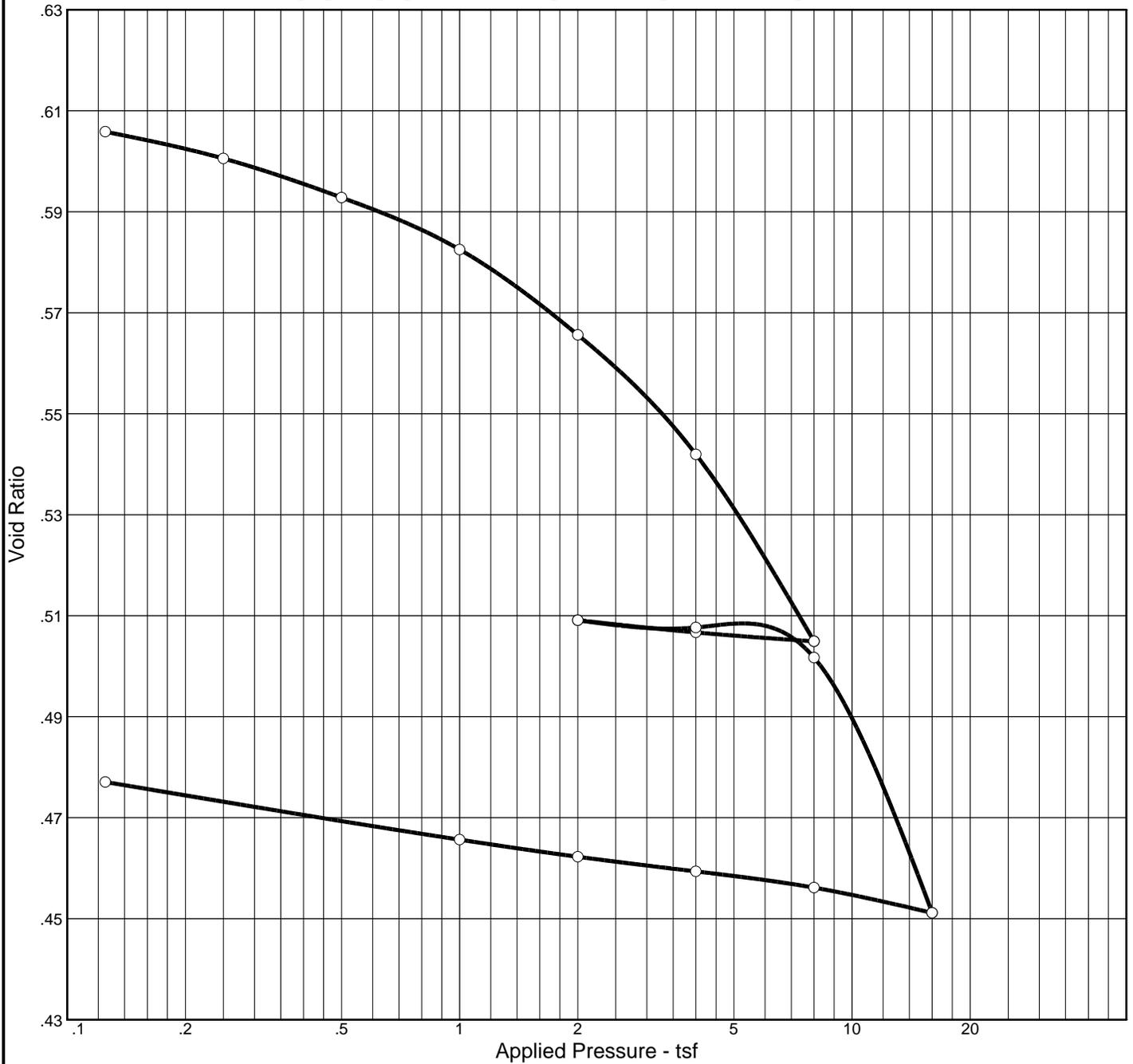
Project No.	Client:
Project: Bridgeville Yard	
○ Source of Sample: SB-6 Depth: 10.0 Sample Number: 6	
□ Source of Sample: SB-6 Depth: 12.0 Sample Number: 7	
△ Source of Sample: SB-6 Depth: 14.0 Sample Number: 8	
◇ Source of Sample: SB-6 Depth: 16.0 Sample Number: 9	
▽ Source of Sample: SB-6 Depth: 18.0 Sample Number: 10	

Remarks:

**Delaware Department of Transportation
Materials and Research Laboratory**

APPENDIX D

CONSOLIDATION TEST REPORT

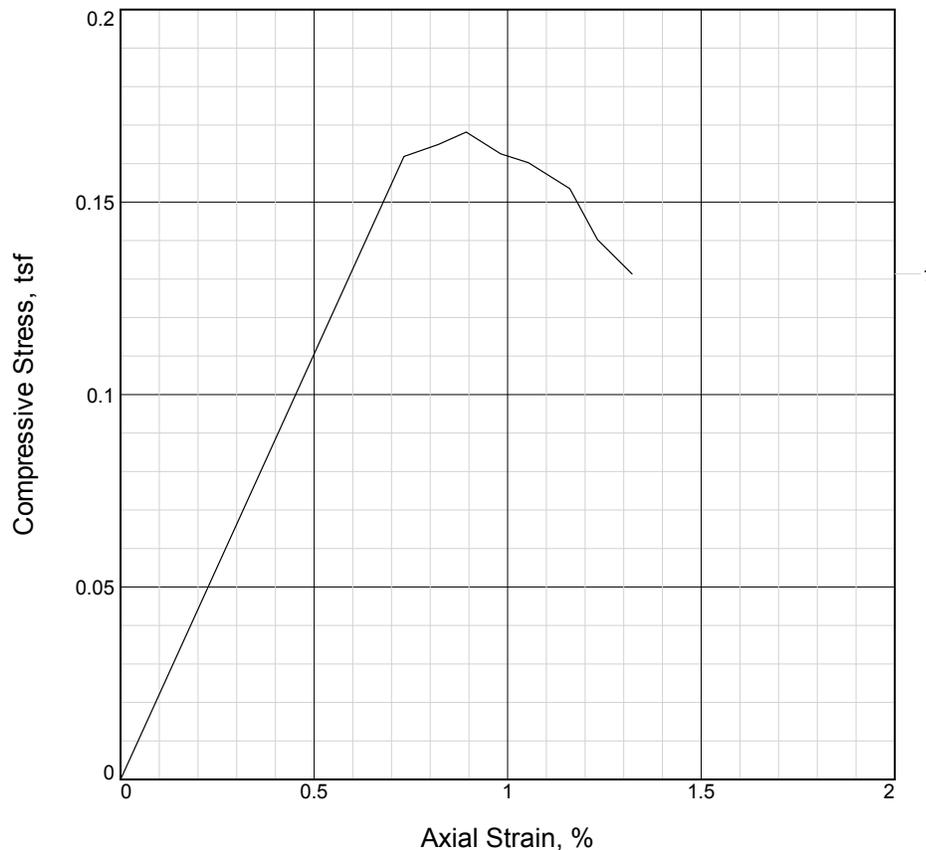


Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P _c (tsf)	C _c	C _r	Swell Press. (tsf)	Swell %	e _o
Sat.	Moist.											
85.8 %	19.7 %	103.1	NV	NP	2.66	0.30	3.61	0.18	0.01			0.610

MATERIAL DESCRIPTION	USCS	AASHTO
Wet loose light brown silty fine sand w/trace of coarse sand and fine gravel.	SM	A-2-4(0)

Project No. Project: Bridgeville Yard Source: SB-2	Client: Sample No.: U-1 Elev./Depth: 4.0	Remarks:
CONSOLIDATION TEST REPORT Delaware Department of Transportation Materials and Research Laboratory		Figure

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	0.168			
Undrained shear strength, tsf	0.084			
Failure strain, %	0.9			
Time to failure, min.	3			
Water content, %	28.7			
Wet density, pcf	107.3			
Dry density, pcf	83.3			
Saturation, %	77.0			
Void ratio	0.9925			
Specimen diameter, in.	2.88			
Specimen height, in.	5.60			
Height/diameter ratio	1.95			

Description: Wet loose light brown silty fine sand w/trace of coarse sand and fine gravel.

LL = NV **PL =** **PI = NP** **GS = 2.66** **Type:**

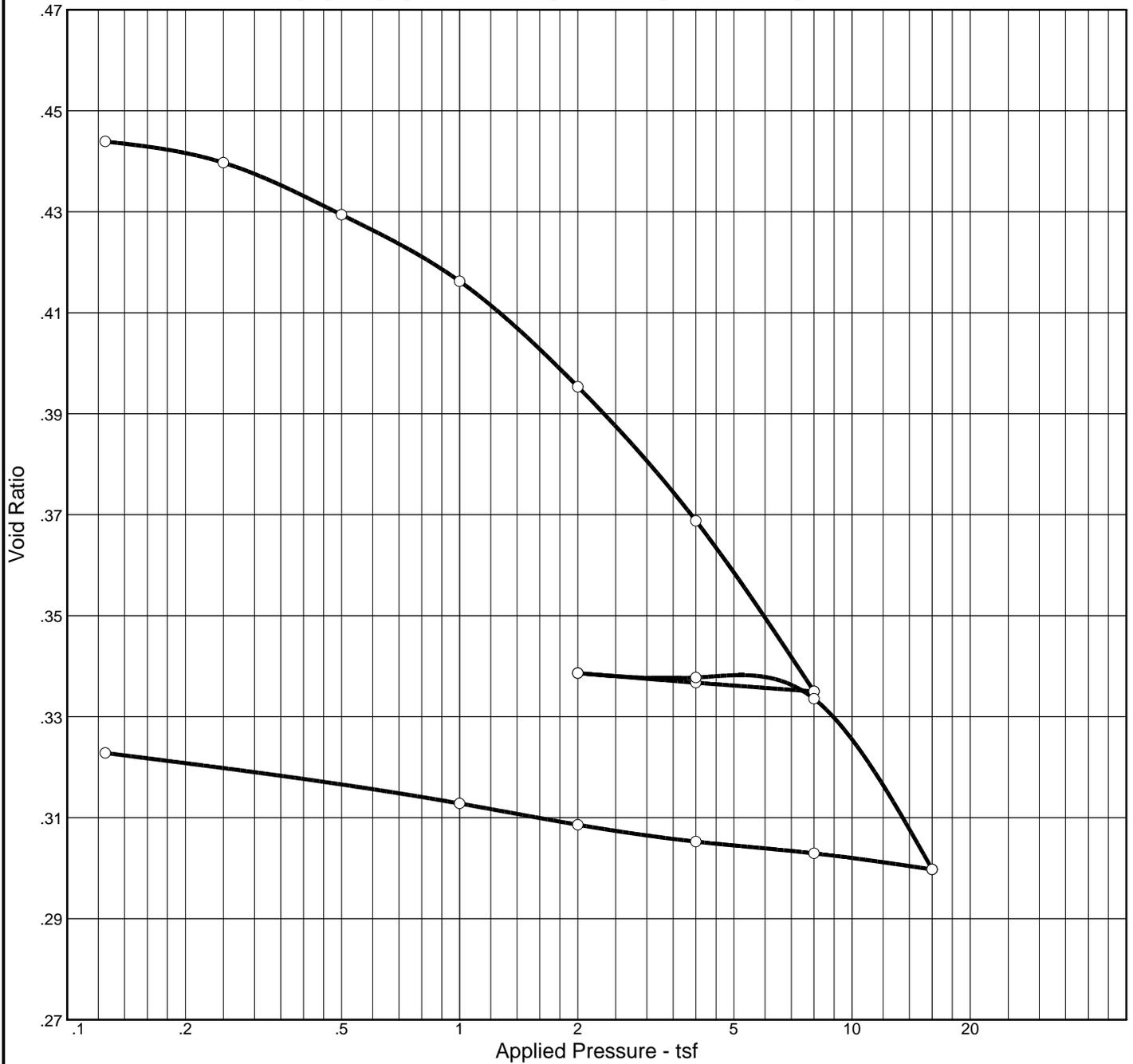
Project No.:
Date Sampled:
Remarks:

Client:
Project: Bridgeville Yard
Source of Sample: SB-2 **Depth:** 4.0
Sample Number: U-1

Figure _____

UNCONFINED COMPRESSION TEST
 Delaware Department of Transportation
 Materials and Research Laboratory

CONSOLIDATION TEST REPORT



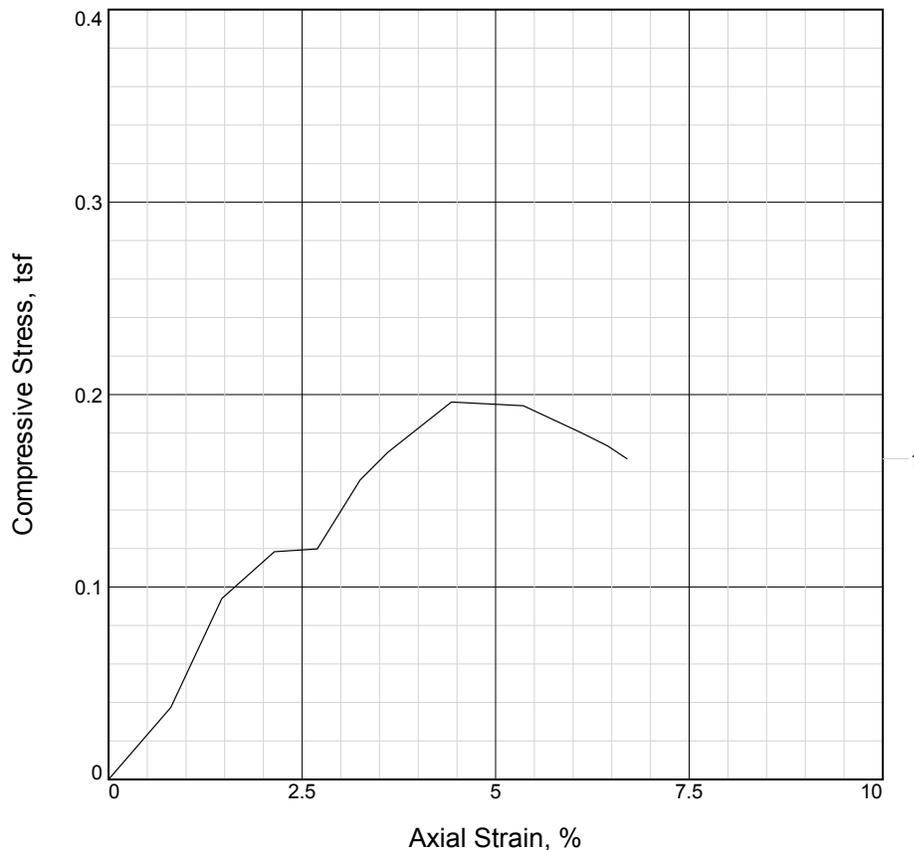
Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P _c (tsf)	C _c	C _r	Swell Press. (tsf)	Swell %	e ₀
Sat.	Moist.											
118.3 %	21.1 %	108.5	26.6	10.7	2.53	0.42	1.37	0.12	0.01			0.450

MATERIAL DESCRIPTION	USCS	AASHTO
Wet firm brown fine sandy clay w/some coarse sand and silt, trace of fine gravel.	SC	A-6(2)

Project No.	Client:	Remarks:
Project: Bridgeville Yard		
Source: SB-3	Sample No.: U-1 Elev./Depth: 6.0	
CONSOLIDATION TEST REPORT Delaware Department of Transportation Materials and Research Laboratory		

Figure

UNCONFINED COMPRESSION TEST



Sample No.	1		
Unconfined strength, tsf	0.196		
Undrained shear strength, tsf	0.098		
Failure strain, %	4.4		
Time to failure, min.	12		
Water content, %	12.7		
Wet density, pcf	138.6		
Dry density, pcf	123.0		
Saturation, %	113.1		
Void ratio	0.2846		
Specimen diameter, in.	2.88		
Specimen height, in.	5.60		
Height/diameter ratio	1.95		

Description: Wet firm brown fine sandy clay w/some coarse sand and silt, trace of fine gravel.

LL = 26.6 PL = 15.9 PI = 10.7 GS = 2.53 Type:

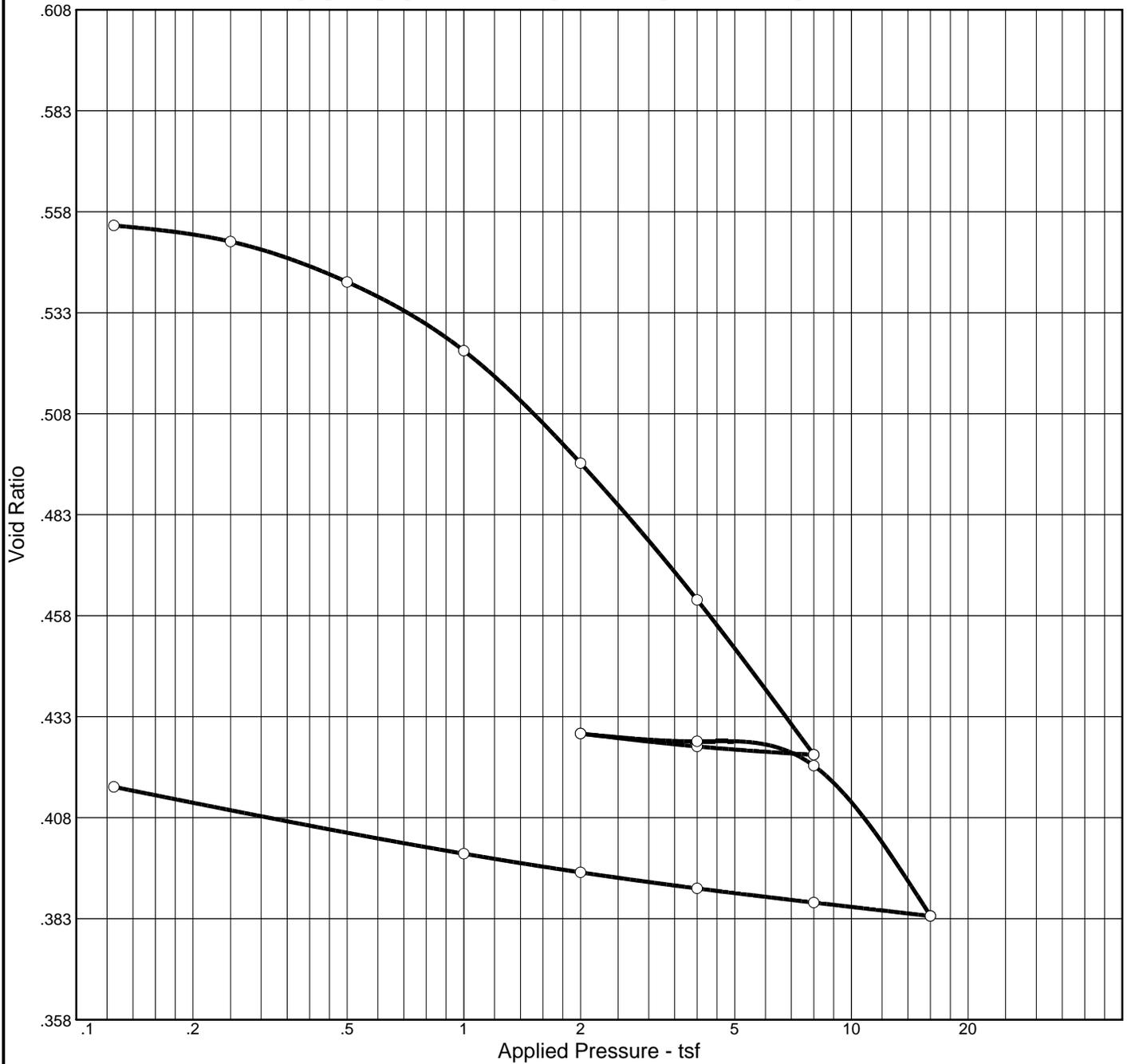
Project No.:
Date Sampled:
Remarks:

Client:
Project: Bridgeville Yard
Source of Sample: SB-3 **Depth:** 6.0
Sample Number: U-1

UNCONFINED COMPRESSION TEST
 Delaware Department of Transportation
 Materials and Research Laboratory

Figure _____

CONSOLIDATION TEST REPORT

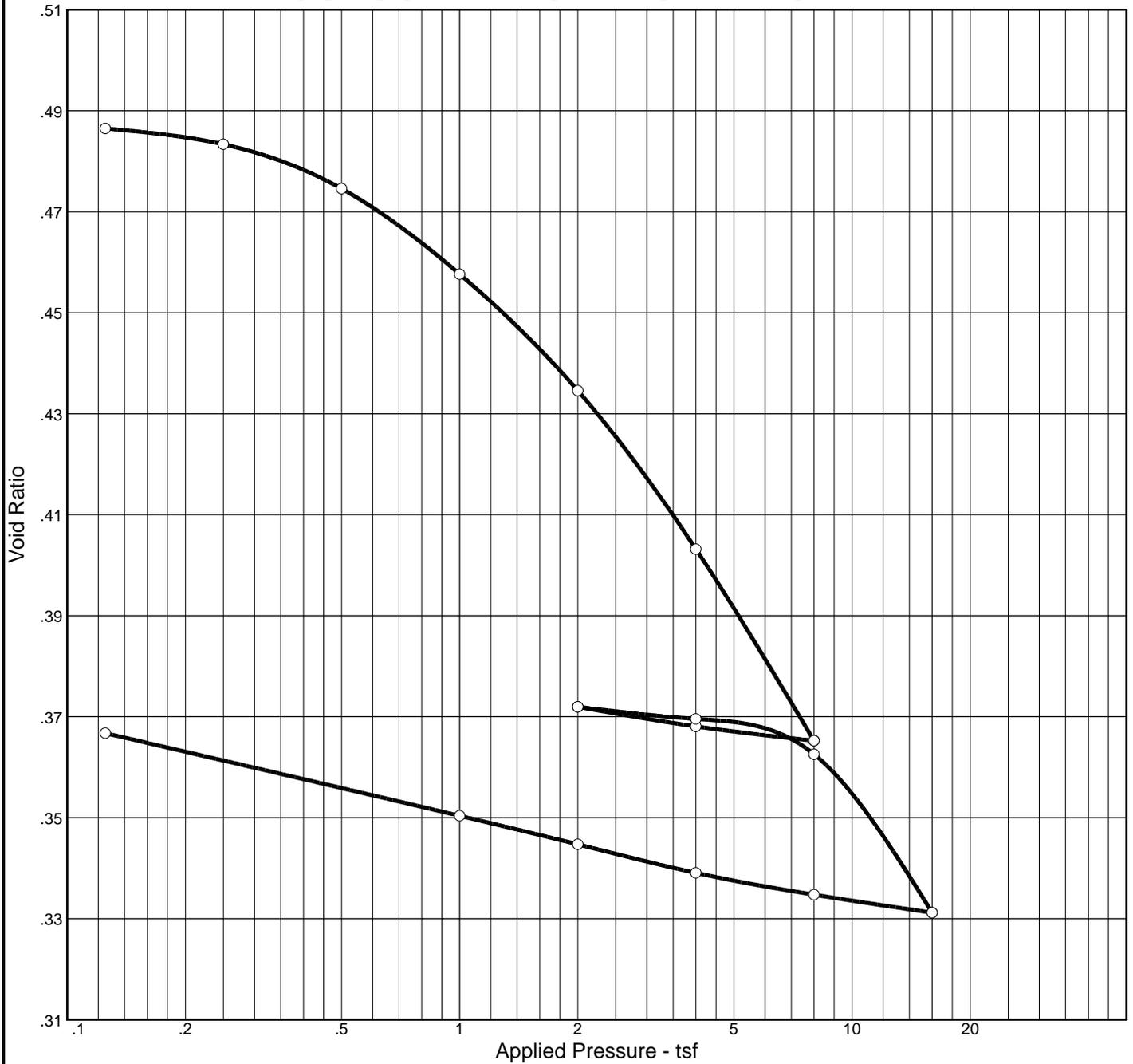


Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Swell %	e_o
Sat.	Moist.											
95.1 %	21.4 %	102.9	26.1	9.5	2.62	0.18	1.15	0.13	0.01			0.590

MATERIAL DESCRIPTION	USCS	AASHTO
Wet firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	CL	A-4(3)

Project No. _____ Client: _____ Project: Bridgeville Yard Source: SB-5 Sample No.: U-1 Elev./Depth: 2.0 <div style="text-align: center;"> CONSOLIDATION TEST REPORT Delaware Department of Transportation Materials and Research Laboratory </div>	Remarks: <div style="text-align: right;">Figure</div>
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CONSOLIDATION TEST REPORT



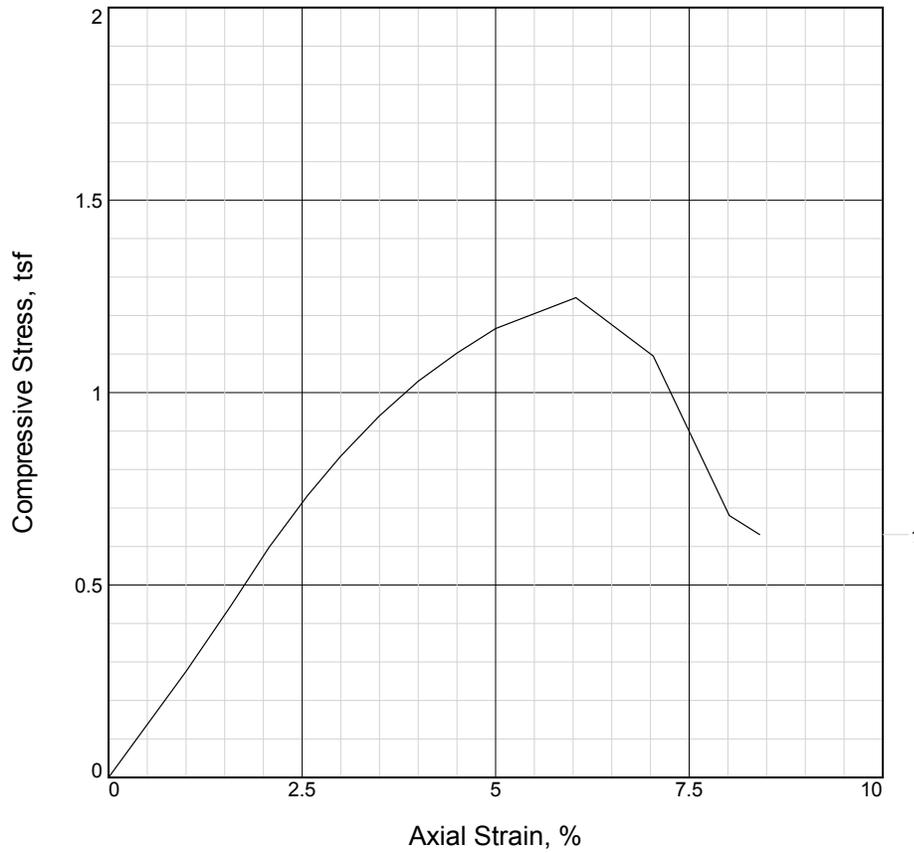
Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P _c (tsf)	C _c	C _r	Swell Press. (tsf)	Swell %	e ₀
Sat.	Moist.											
102.9 %	19.7 %	107.0	31.1	13.5	2.55	0.18	0.96	0.11	0.02			0.488

MATERIAL DESCRIPTION	USCS	AASHTO
Wet stiff brown fine sandy clay w/some silt, trace of fine gravel.	CL	A-6(4)

Project No. Project: Bridgeville Yard Source: SB-6	Client: Sample No.: U-1 Elev./Depth: 2.0	Remarks: <div style="text-align: center;"> CONSOLIDATION TEST REPORT Delaware Department of Transportation Materials and Research Laboratory </div>
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Figure

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	1.246			
Undrained shear strength, tsf	0.623			
Failure strain, %	6.0			
Time to failure, min.	17			
Water content, %	19.1			
Wet density, pcf	126.7			
Dry density, pcf	106.3			
Saturation, %	98.1			
Void ratio	0.4973			
Specimen diameter, in.	2.88			
Specimen height, in.	5.60			
Height/diameter ratio	1.95			

Description: Wet stiff brown fine sandy clay w/some silt, trace of fine gravel.

LL = 31.1 PL = 17.6 PI = 13.5 GS = 2.55 Type:

Project No.:
Date Sampled:
Remarks:

Client:
Project: Bridgeville Yard
Source of Sample: SB-6 **Depth:** 2.0
Sample Number: U-1

Figure _____

UNCONFINED COMPRESSION TEST
 Delaware Department of Transportation
 Materials and Research Laboratory

APPENDIX E

DeIDOT Task 5 Bridgeville, Delaware

<u>Location</u> Test Depth (ft b.e.g.)		<u>I-1</u> 6.5	<u>I-2</u> 6.6	<u>I-3</u> 5.600	<u>I-4</u> 5.400	<u>I-5</u> 6.25	<u>I-6</u> 8.1	<u>I-7</u> 7.000
Elapsed Time (min.)		Head (inch)	Head (inch)	Head (inch)	Head (inch)	Head (inch)	Head (inch)	Head (inch)
Stage 1	0	24.000	24.000	24.000	24.000	24.000	24.000	24.000
	5	23.125	23.750	23.625	23.625	24.000	24.000	23.750
	10	22.750	23.500	23.500	23.125	23.875	23.875	23.500
	15	22.625	23.375	23.375	22.875	23.750	23.875	23.250
	30	21.500	23.125	23.125	22.500	23.625	23.750	22.750
	45	20.750	22.875	22.875	22.000	23.625	23.625	22.500
	60	19.500	22.750	22.750	21.625	23.500	23.625	22.250
	60.1	24.000	24.000	24.000	24.000	24.000	24.000	24.000
	65	23.250	23.875	23.875	23.750	23.875	23.875	23.875
	70	22.625	23.750	23.750	23.000	23.750	23.750	23.625
	75	22.250	23.625	23.625	22.750	23.625	23.750	23.500
	90	21.500	23.375	23.500	22.375	23.625	23.750	23.125
	105	20.500	23.125	23.375	22.000	23.500	23.625	22.750
120	20.250	23.000	23.250	21.875	23.375	23.500	22.250	
Stage 2 (Depth of boring extension: 30.5 cm)	0	24.000	24.000	24.000	24.000	24.000	24.000	24.000
	5	23.000	23.500	23.500	23.625	23.750	23.875	23.625
	10	22.375	23.250	23.375	22.875	23.750	23.875	23.375
	15	22.000	23.125	23.125	22.375	23.750	23.750	23.000
	30	21.000	23.000	22.875	22.000	23.625	23.625	22.750
	45	20.125	22.875	22.750	21.750	23.375	23.500	22.625
	60	19.875	22.625	22.500	21.375	23.125	23.500	22.375
	60.1	24.000	24.000	24.000	24.000	24.000	24.000	24.000
	65	23.125	23.750	23.750	23.750	23.875	23.875	23.625
	70	22.500	23.500	23.625	23.000	23.750	23.750	23.500
	75	22.125	23.375	23.500	22.375	23.750	23.625	23.375
	90	21.125	23.000	23.375	22.125	23.625	23.625	23.125
	105	20.500	22.875	23.000	21.875	23.500	23.500	23.000
120	20.000	22.750	22.875	21.500	23.375	23.500	22.500	

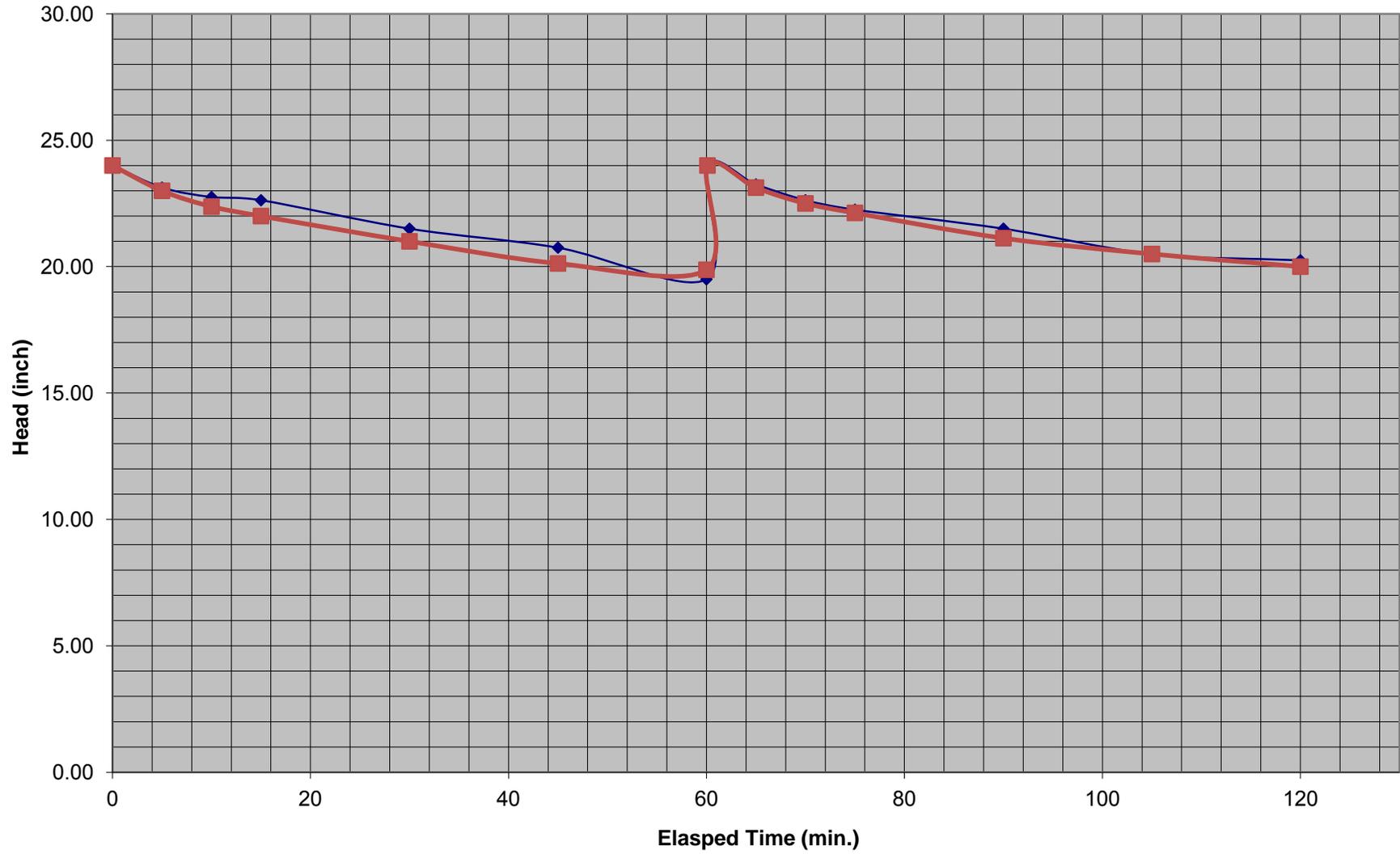
	D, in =	5	5	5	5	6	6	6
Stage 1	T ₁ , min =	60	60	60	60	60	60	60
	T ₂ , min =	120	120	120	120	120	120	120
	H ₁ , in =	24	24	24	24	24	24	24
	H ₂ , in =	20.25	22.75	23.25	21.875	23.375	23.5	22.250
	D, cm =	12.7	12.7	12.7	12.7	15.24	15.24	15.24
	T ₁ , sec =	3600	3600	3600	3600	3600	3600	3600
	T ₂ , sec =	7200	7200	7200	7200	7200	7200	7200
	H ₁ , cm =	60.960	60.960	60.960	60.960	60.960	60.960	60.960
	H ₂ , cm =	51.435	57.785	59.055	55.563	59.373	59.690	56.515

Stage 2	T ₁ , min =	60	60	60	60	60	60	60
	T ₂ , min =	120	120	120	120	120	120	120
	H ₁ , in =	24.000	24.000	24.000	24.000	24.000	24.000	24.000
	H ₂ , in =	20.000	22.750	22.875	21.500	23.375	23.500	22.500
	D, cm =	12.7	12.7	12.7	12.7	15.24	15.24	15.24
	T ₁ , sec =	3600	3600	3600	3600	3600	3600	3600
	T ₂ , sec =	7200	7200	7200	7200	7200	7200	7200
	H ₁ , cm =	60.960	60.960	60.960	60.960	60.960	60.960	60.960
	H ₂ , cm =	50.800	57.785	58.103	54.610	59.373	59.690	57.150

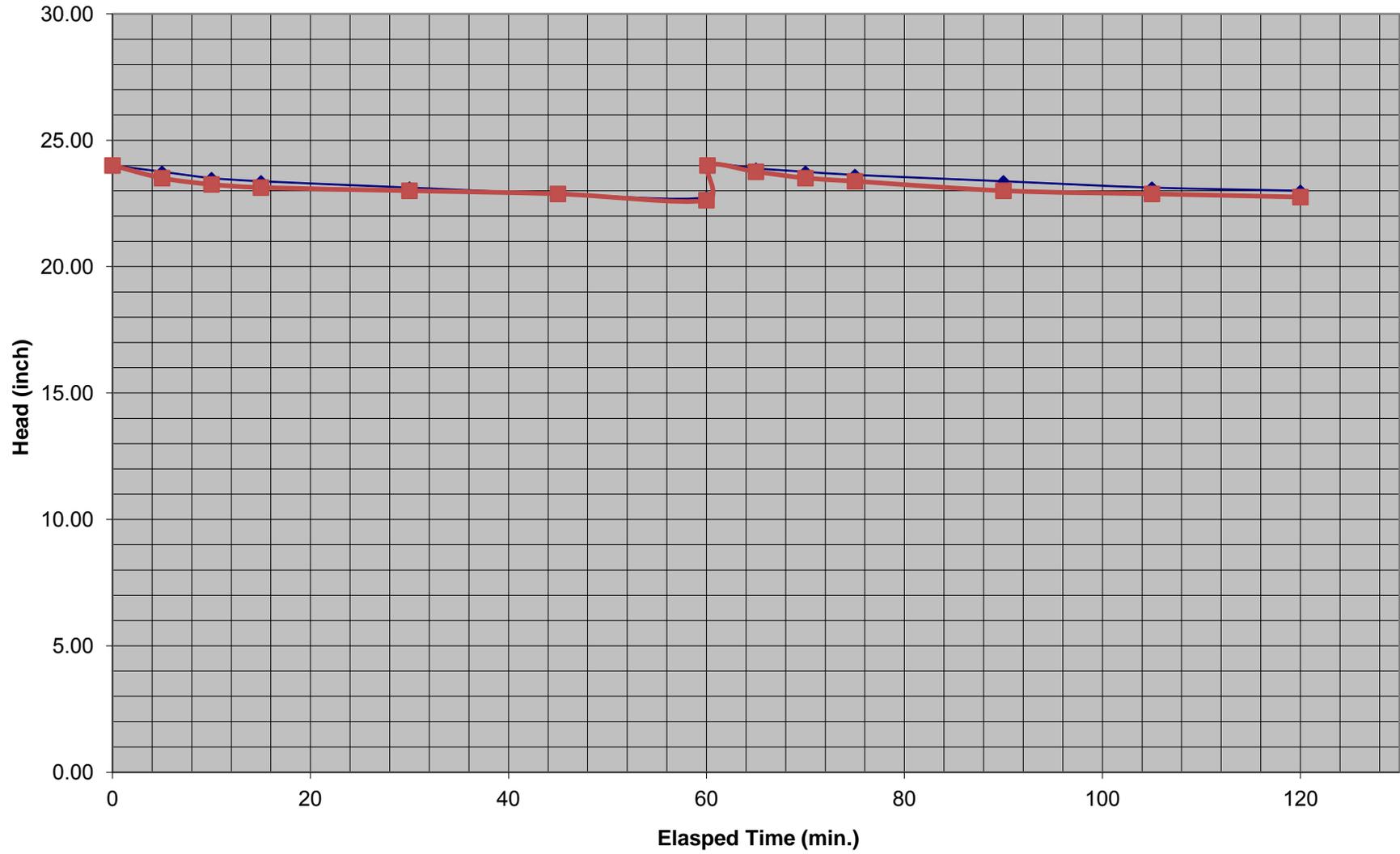
Stage 1	$K_1 = (\pi * D) / (11 * (T_2 - T_1)) * \ln(H_1 / H_2) =$	cm/s	cm/s	cm/s	cm/s	cm/s	cm/s	cm/s
		1.71E-04	5.39E-05	3.20E-05	9.34E-05	3.19E-05	2.55E-05	9.15E-05

Measured Infiltration Rate K ₁ (in/hr)	0.24	0.08	0.05	0.13	0.05	0.04	0.13
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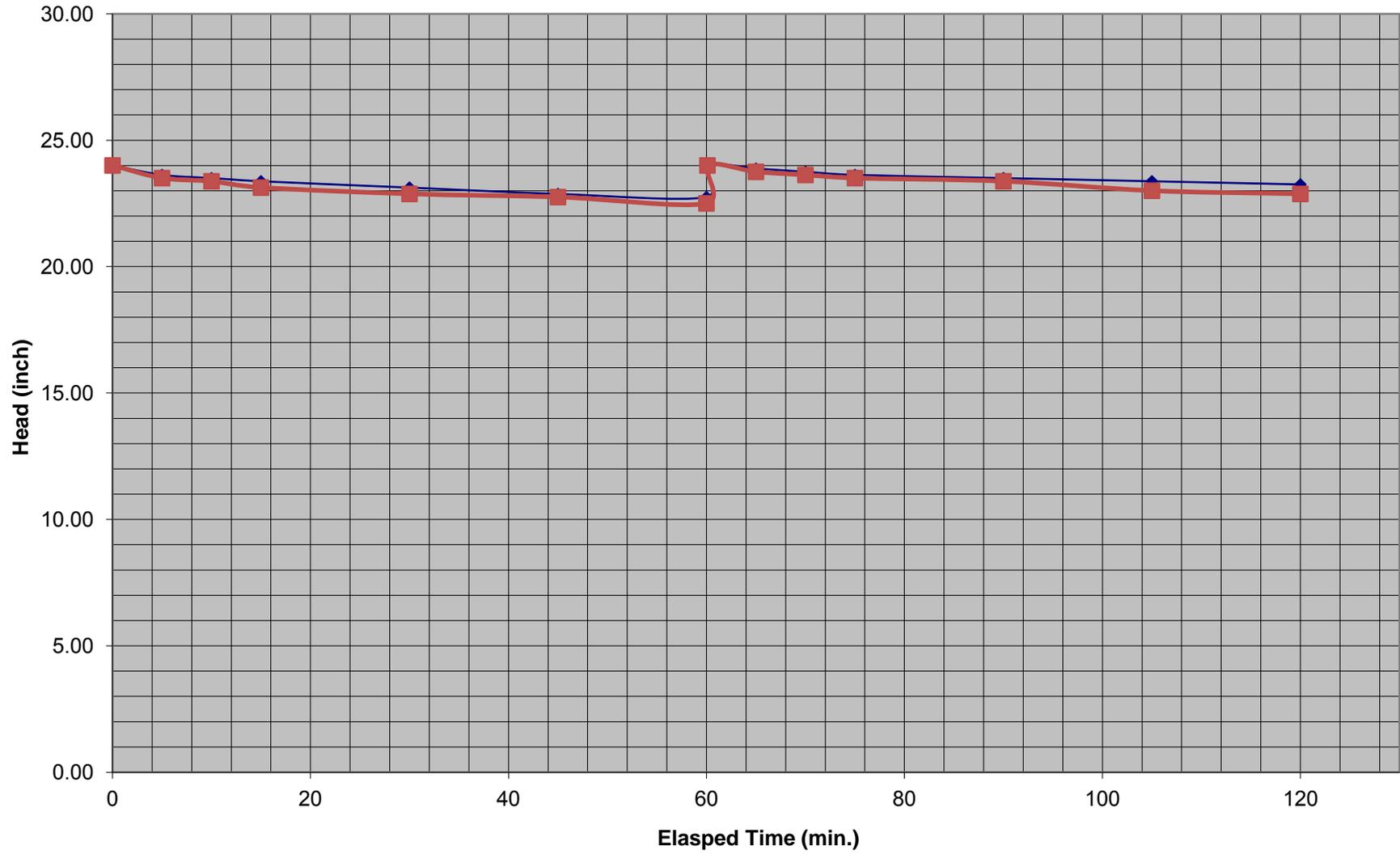
DeIDOT Task 5, I-1, 6.5 feet b.e.g.



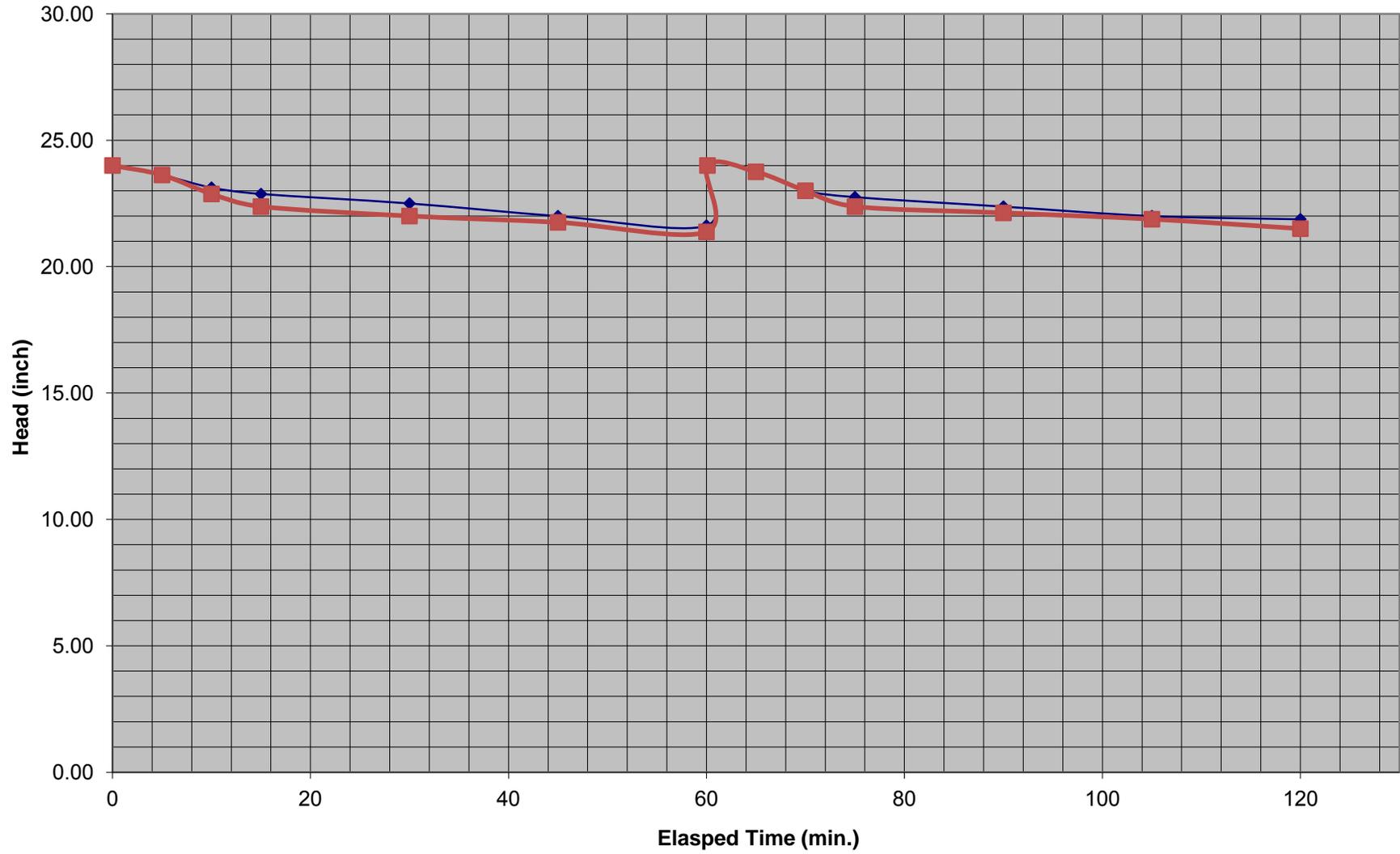
DeIDOT Task 5, I-2, 6.6 feet b.e.g.



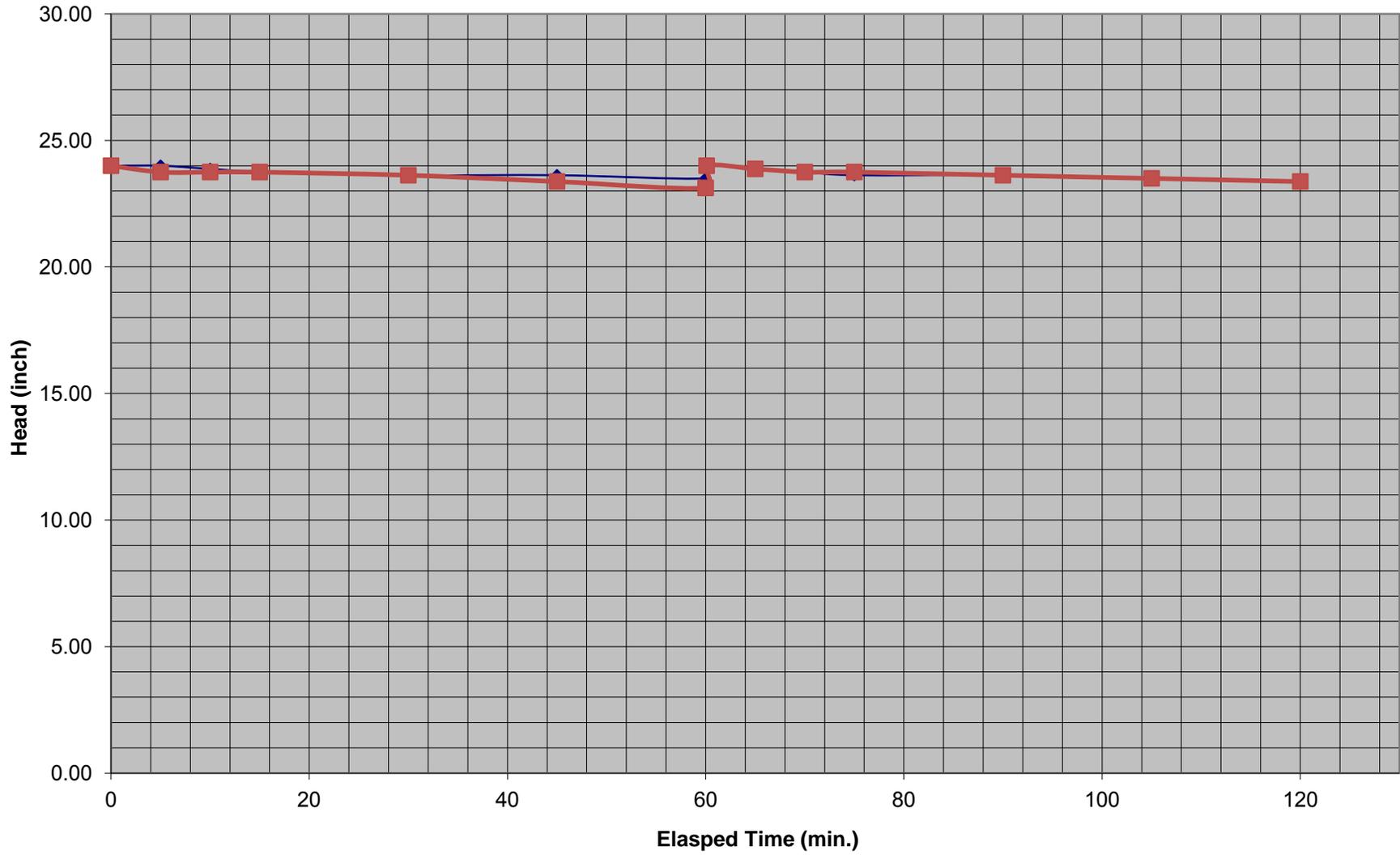
DeIDOT Task 5, I-3, 5.6 feet b.e.g.



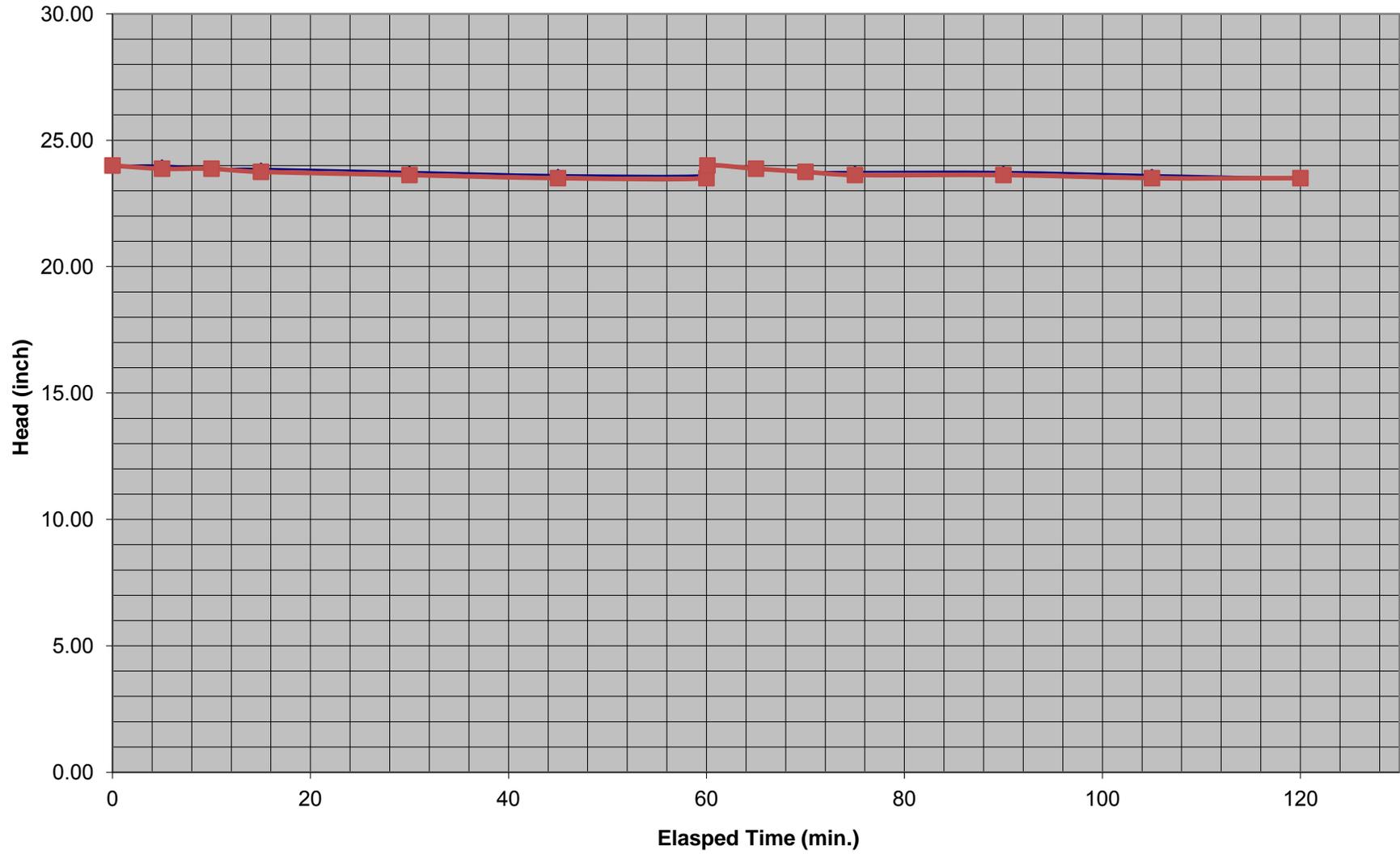
DeIDOT Task 5, I-4, 5.4 feet b.e.g.



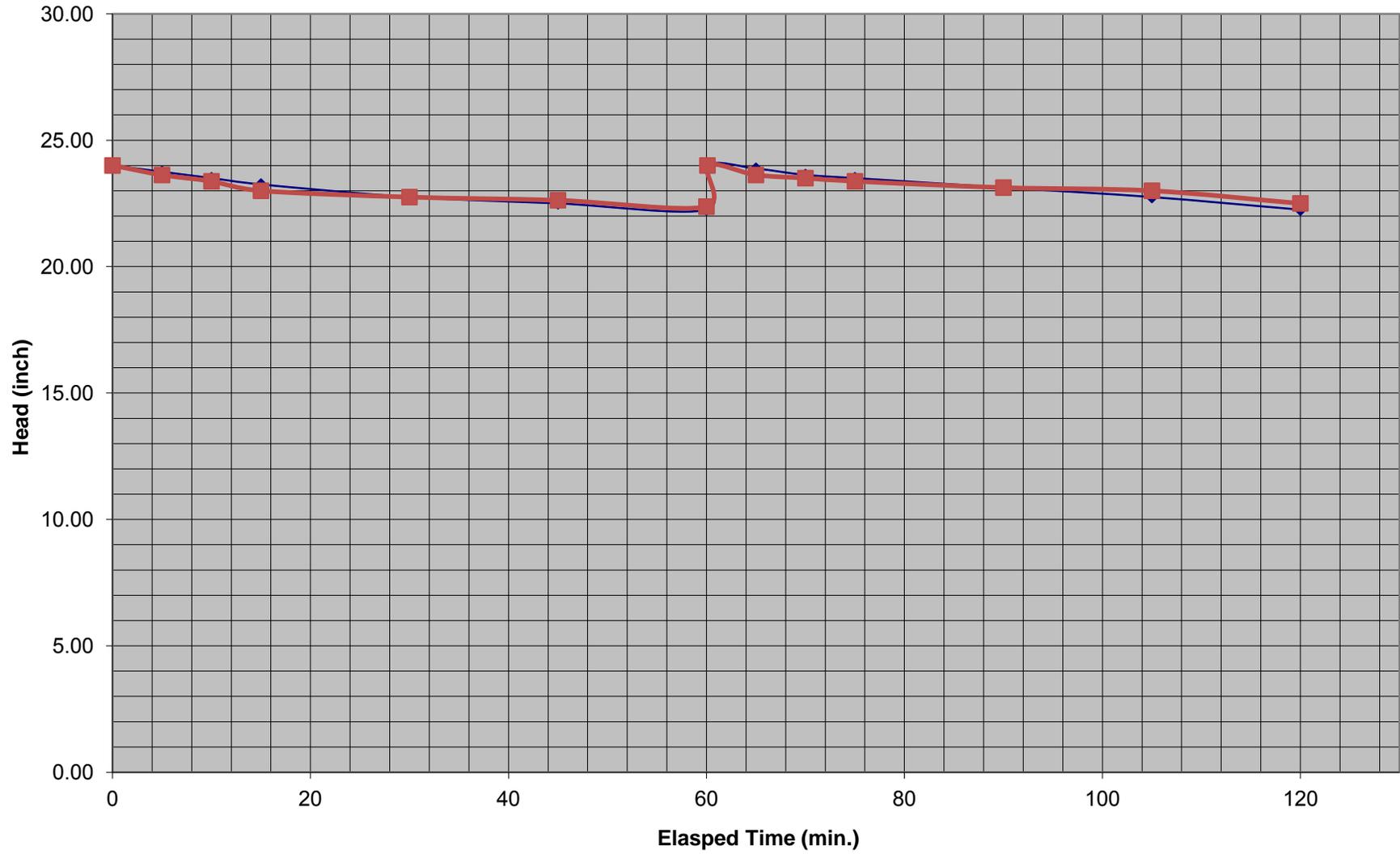
DeIDOT Task 5, I-5, 6.25 feet b.e.g.



DeIDOT Task 5, I-6, 8.1 feet b.e.g.



DeIDOT Task 5, I-7, 7.0 feet b.e.g.



APPENDIX F

Boring Test Number	Sample Number	Depth (feet)	Material description	Liquid limit	Plasticity index	Natural moisture %	USCS	AASHTO classification	Percent < than the #10 sieve	Percent < than the #200 sieve	Blow count #1	Blow count #2	Blow count #3	Blow count #4
PB-1														
	1	0	Moist soft brown fine sandy silt w/some coarse sand and clay, trace of fine gravel.	19.2	3.8	14.3	CL-ML	A-4(0)	98.6	56.2	1	1	1	2
	2	2	Wet firm brown clayey fine sandy silt w/trace of coarse sand and fine gravel.	21.3	5.6	15.6	CL-ML	A-4(0)	99.4	51.9	2	3	4	4
	3	4	Wet firm brown clayey fine sandy silt w/trace of coarse sand and fine gravel.	22.5	7.1	15.9	SC-SM	A-4(0)	99.1	47.8	1	2	4	5
	4	6	Wet loose brown silty fine sand w/some coarse sand, trace of fine gravel.	NV	NP	11.2	SM	A-2-4(0)	97.3	29.4	2	3	3	2
	5	8	Wet loose brown fine to coarse sand w/some fine gravel and silt.	NV	NP	10.2	SM	A-2-4(0)	86.6	17.9	3	4	5	5
	6	10	Wet loose orange coarse to fine sand w/some silt, trace of fine gravel.	NV	NP	16.2	SM	A-1-b	99.1	12.1	1	2	5	6
	7	12	Wet very loose orange fine sand w/some coarse sand and silt, trace of fine gravel.	NV	NP	26	SM	A-2-4(0)	93.5	14.2	3	3	1	2
	8	14	Wet very loose brown fine sand w/some silt, trace of coarse sand and fine gravel.	NV	NP	26.8	SM	A-2-4(0)	97.3	20.2	1	1	3	6
	9	16	Wet very loose orange coarse sand w/trace of fine sand, fine gravel and silt.	NV	NP	17.1	SP	A-1-b	89.5	2.8	1	1	1	3
	10	18	Wet loose gray fine sand w/some silt, trace of coarse sand and fine gravel.	NV	NP	22.7	SM	A-2-4(0)	99.4	14.8	1	3	3	4
	11	23	Wet loose brown fine sand w/some silt, trace of coarse sand and fine gravel.	NV	NP	21.2	SM	A-2-4(0)	99.4	15.4	2	4	4	5
	12	28	Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel.	NV	NP	17.5	SW-SM	A-1-b	98.4	9.6	5	6	6	11
	13	33	Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt.	NV	NP	14	SW-SM	A-1-b	91.8	6.5	5	9	13	27
	14	38	Wet dense reddish brown fine gravelly coarse sand w/some fine sand, trace of silt.	NV	NP	11.9	SW	A-1-b	75.6	4.7	7	16	21	16
		39	End Boring											
PB-2														
	1	0	Wet firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	23	6.4	18.3	CL-ML	A-4(1)	99.1	52.7	1	2	3	4
	2	2	Wet loose brown silty fine to coarse sand w/trace of fine gravel.	NV	NP	14.2	SM	A-2-4(0)	92	20.9	2	3	3	2
	3	4	Wet loose light brown coarse to fine sand w/some silt, trace of fine gravel.	NV	NP	12.6	SM	A-1-b	96.8	19	3	4	6	4
	4	6	Saturated very loose orange silty fine to coarse sand w/trace of fine gravel and clay.	22.7	2.6	53.7	SM	A-2-4(0)	98.7	29.8	2	2	2	5
		8	End Boring.											
PB-3														
	1	0	Moist firm orange fine sandy silt w/some coarse sand, trace of clay.	14.1	0.6	14.1	SM	A-4(0)	99.7	45	1	2	4	3
	2	2	Moist very loose light brown silty fine sand w/some coarse sand, trace of fine gravel.	15.7	NP	12	SM	A-2-4(0)	98.4	32.7	2	2	1	2
	3	4	Moist very loose light brown silty fine sand w/some coarse sand, trace of fine gravel.	19.8	NP	13	SM	A-2-4(0)	98.2	22	1	1	2	3
	4	6	Wet loose light brown clayey fine sand w/some silt, trace of coarse sand.	27	6.7	18.5	SC-SM	A-2-4(0)	100	24	5	3	3	3
		8	End Boring.											
R-1														
	1	0	Moist firm brown fine sandy silt w/some coarse sand and clay, trace of fine gravel.	19.9	4.8	13.3	SC-SM	A-4(0)	99.1	46.8	2	2	3	3
	2	2	Wet loose brown silty fine to coarse sand w/trace of fine gravel.	NV	NP	15.1	SM	A-2-4(0)	99.2	29.6	3	4	6	7
	3	4	Wet medium dense brown silty fine sand w/some coarse sand, trace of fine gravel.	NV	NP	16	SM	A-2-4(0)	99.4	29.2	4	5	6	8
	4	6	Wet firm brown fine sandy silt w/some coarse sand, trace of fine gravel.	21	NP	17.3	ML	A-4(0)	99.2	50.6	2	3	3	5
	5	8	Wet medium dense coarse to fine sand w/some fine gravel, trace of fine gravel.	NV	NP	17.1	SW	A-1-b	87.1	1.6	2	5	6	4
		10	End Boring											
R-2														
	1	0	Moist very loose dark brown clayey fine to coarse sand w/some fine gravel, trace of silt.	23.3	5.7	13.9	SC-SM	A-2-4(0)	89.3	33.9	2	2	2	3
	2	2	Moist medium dense light brown fine gravelly coarse sand w/some fine sand and silt.	NV	NP	9.7	SM	A-1-b	76.2	12.2	4	5	6	6
	3	4	Moist loose light brown fine gravel and coarse sand w/some fine sand and silt.	NV	NP	11.5	SM	A-1-b	69.3	13.1	3	4	4	5
	4	6	Wet medium dense brownish orange coarse sand w/some fine sand, trace of fine gravel and silt.	NV	NP	19	SP-SM	A-1-b	94.3	9.5	3	5	7	7
	5	8	Wet loose brown coarse to fine sand w/trace of silt and fine gravel.	27.2	NP	24.7	SW-SM	A-1-b	97.2	9	3	4	4	7
		10	End Boring											

Boring Test Number	Sample Number	Depth (feet)	Material description	Liquid limit	Plasticity index	Natural moisture %	USCS	AASHTO classification	Percent < than the #10 sieve	Percent < than the #200 sieve	Blow count #1	Blow count #2	Blow count #3	Blow count #4
R-3														
	1	0	Wet very loose dark brown clayey fine to coarse sand w/trace of silt and fine gravel.	23	5.7	15.3	SC-SM	A-2-4(0)	98.7	34.2	1	2	2	2
	2	2	Wet very loose light brown fine sand w/some coarse sand and silt, trace of fine gravel.	NV	NP	11.9	SM	A-2-4(0)	98.4	17	2	2	2	3
	3	4	Wet loose brown silty fine sand w/some coarse sand, trace of fine gravel.	NV	NP	12.9	SM	A-2-4(0)	97.2	21.4	2	2	3	2
	4	6	Wet loose brown coarse to fine sand w/trace of silt and fine gravel.	NV	NP	17.8	SP-SM	A-1-b	91.8	10.2	3	3	2	4
	5	8	Wet loose brown coarse to fine sand w/trace of fine gravel and silt.	NV	NP	22	SP-SM	A-1-b	97.5	6.9	2	3	3	2
		10	End Boring											
SB-1														
	1	0	Moist firm dark brown fine sandy silt w/some coarse sand, trace of fine gravel.	14.4	NP	11.6	SM	A-4(0)	98.6	42	2	3	3	2
	2	2	Moist firm brown fine sandy silt w/trace of coarse sand.	16.6	NP	13.1	SM	A-4(0)	100	48.7	2	3	2	4
	3	4	Moist firm light brown fine sandy silt w/trace of coarse sand.	14.8	NP	12.8	ML	A-4(0)	100	53.4	2	4	3	6
	4	6	Moist medium dense grayish brown coarse sand w/some fine sand and fine gravel, trace of silt.	NV	NP	7.7	SW-SM	A-1-b	87.2	9.6	9	10	8	7
	5	8	Moist loose brown fine to coarse sand w/some silt, trace of fine gravel.	NV	NP	14.8	SM	A-2-4(0)	96.7	20.1	4	5	5	6
	6	10	Wet loose brown silty fine to coarse sand w/trace of fine gravel.	NV	NP	19.5	SM	A-2-4(0)	95.1	20.5	1	3	5	6
	7	12	Wet very loose brown fine sand w/some silt, trace of coarse sand.	NV	NP	28.5	SM	A-2-4(0)	99.5	20.4	1	2	2	3
	8	14	Wet loose brown coarse to fine sand w/trace of silt and fine gravel.	NV	NP	25.1	SW-SM	A-1-b	97.8	8.7	3	5	5	5
	9	16	Wet loose brown coarse to fine sand w/trace of silt and fine gravel.	NV	NP	24.9	SW-SM	A-1-b	92	9.2	5	5	5	4
	10	18	Wet loose brown coarse sand w/some fine sand and fine gravel, trace of silt.	NV	NP	20.6	SW-SM	A-1-b	88.6	5.9	2	3	3	5
	11	25	Wet loose grayish brown fine to coarse sand w/trace of silt and fine gravel.	NV	NP	20	SP-SM	A-3	96.4	7.3	1	3	5	6
	12	28	Wet medium dense grayish brown coarse to fine sand w/trace of silt and fine gravel.	NV	NP	15.3	SP-SM	A-1-b	93.2	6.3	6	11	12	15
		30	End Boring											
SB-2														
	1	0	Wet firm brown clayey fine to coarse sandy silt w/trace of fine gravel.	24	8.4	15.7	SC	A-4(0)	91.9	41	1	2	3	7
	2A	2	Wet medium dense brown clayey coarse to fine sand w/some fine gravel, trace of silt.	27.6	10.7	16.1	SC	A-2-6(0)	89.1	26.9	4	7		
	2B	3	No sieve analysis - Indication of wet stiff red clay.	34.4	10	21.3					7	8		
	U-1	4												
	4	6	Wet loose light brown silty fine sand w/trace of coarse sand and fine gravel.	NV	NP	25	SM	A-2-4(0)	96.4	25.1	3	4	4	5
	5	8	No sieve analysis - Indication of wet loose brown fine to coarse sand w/some silt.	NV	NP	30					2	3	2	3
	6	10	No sieve analysis - Indication of wet very loose brown fine to coarse sand w/some silt.	NV	NP	30.8					1	2	2	2
	7	12	Wet medium dense orange fine to coarse sand w/some silt and fine gravel.	NV	NP	20.3	SP-SM	A-2-4(0)	85.2	11.7	4	6	9	10
	8	14	No Recovery								4	3	0	1
	9	16	Wet loose orange coarse to fine sand w/trace of fine gravel and silt.	NV	NP	24.1	SW-SM	A-1-b	95.9	9.4	3	3	3	3
	10	18	Wet medium dense orange coarse sand w/some fine sand and silt, trace of fine gravel.	NV	NP	25.6	SP-SM	A-1-b	97.2	11.4	2	4	7	7
	11	23	Wet medium dense orange coarse to fine sand w/trace of fine gravel and silt.	NV	NP	21.7	SW-SM	A-1-b	98.7	9.3	3	6	8	9
	12	28	Wet loose brown fine to coarse sand w/trace of fine gravel and silt.	NV	NP	21.8	SP-SM	A-3	95.4	7.9	3	4	4	5
		30	End Boring											
SB-3														
	1	0	Moist loose brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	22.4	7	13.2	SC-SM	A-4(0)	99.4	44.8	2	3	3	4
	2	2	Wet stiff brown clayey fine sandy silt w/trace of coarse sand.	21.3	5.6	16	CL-ML	A-4(1)	100	65.6	3	4	7	5
	3	4	Wet firm brown fine sandy clay w/some coarse sand and silt, trace of fine gravel.	26.6	10.7	18.3	SC	A-6(2)	98.3	48.1	3	3	5	6
	U-1	6												
	5	8	Wet medium dense brown silty fine to coarse sand w/trace of fine gravel.	NV	NP	15.1	SM	A-2-4(0)	93.4	21.2	5	7	9	10

Boring Test Number	Sample Number	Depth (feet)	Material description	Liquid limit	Plasticity index	Natural moisture %	USCS	AASHTO classification	Percent < than the #10 sieve	Percent < than the #200 sieve	Blow count #1	Blow count #2	Blow count #3	Blow count #4
	6	10	Wet loose grayish brown coarse to fine sand w/some silt, trace of fine gravel.	NV	NP	17.4	SM	A-1-b	90.3	16.9	4	4	5	7
	7	12	Wet loose orangish brown coarse to fine sand w/trace of silt and fine gravel.	NV	NP	21.2	SP-SM	A-3	95.9	10.1	2	3	4	4
	8	14	Wet loose brown coarse to fine sand w/trace of fine gravel and silt.	NV	NP	19.9	SW-SM	A-1-b	90.5	9.4	2	4	6	7
	9	16	Wet loose brown fine to coarse sand w/some silt, trace of fine gravel.	NV	NP	22.5	SP-SM	A-2-4(0)	95.3	11.5	3	4	3	4
	10	18	Wet medium dense brown fine to coarse sand w/some silt, trace of fine gravel.	NV	NP	17	SM	A-2-4(0)	93.4	12.7	4	7	9	13
	11	23	Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt.	NV	NP	18.4	SW-SM	A-1-b	96.3	8.7	3	9	13	17
	12	28	Wet medium dense brown coarse to fine sand w/trace of silt and fine gravel.	NV	NP	18.8	SP-SM	A-1-b	93	10.4	3	5	11	9
		30	End Boring											
SB-4														
	1	0	Moist firm brown fine sandy silt w/some coarse sand, trace of fine gravel and clay.	16.8	2.6	14.3	ML	A-4(0)	99.2	53.3	1	2	4	4
	2	2	Wet stiff brown fine sandy clay w/some coarse sand, trace of silt.	27.4	11.4	18.6	SC	A-6(2)	100	48.3	3	5	7	22
	3	4	Wet medium dense brown silty fine sand w/some coarse sand, trace of fine gravel.	NV	NP	11.2	SM	A-2-4(0)	97.7	31.8	12	12	12	11
	4	6	Wet medium dense grayish brown silty fine sand w/trace of coarse sand.	NV	NP	18.4	SM	A-2-4(0)	99.7	29.9	4	5	7	9
	5	8	Wet medium dense brown coarse to fine sand w/some silt, trace of fine gravel.	NV	NP	14.1	SM	A-1-b	91.4	15.2	3	4	7	7
	6	10	Wet very loose brownish orange coarse to fine sand w/trace of silt and fine gravel.	NV	NP	20	SW-SM	A-1-b	95	9.2	1	1	3	4
	7	12	Wet loose brownish orange coarse to fine sand w/trace of silt and fine gravel.	NV	NP	21.8	SW-SM	A-1-b	97.1	7.9	2	2	4	6
	8	14	Wet loose brownish orange coarse sand w/some fine sand, trace of fine gravel and silt.	NV	NP	19.2	SW-SM	A-1-b	94.9	5	3	3	4	7
	9	16	Wet medium dense brownish orange coarse to fine sand w/trace of silt and fine gravel.	NV	NP	20.9	SP-SM	A-1-b	95.8	6.8	3	5	7	9
	10	18	Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt.	NV	NP	17.8	SP-SM	A-1-b	94.6	5	4	7	9	11
	11	23	Wet medium dense brown coarse to fine sand w/trace of fine gravel and silt.	NV	NP	17.8	SP-SM	A-1-b	95.9	5.9	3	7	11	13
	12	28	Wet loose brown coarse to fine sand w/trace of fine gravel and silt.	NV	NP	22	SW-SM	A-1-b	96.5	8.5	4	4	4	7
		30	End Boring											
SB-5														
	1	0	Wet firm brown clayey fine sandy silt w/some coarse sand, trace of fine gravel.	26.1	9.5	15.6	CL	A-4(3)	98.8	58.1	1	2	3	5
	U-1	2												
	2	4	Wet stiff tan fine sandy silt w/trace of coarse sand and clay.	22.7	3.4	18.3	SC-SM	A-4(0)	100	42	3	6	7	7
	3	6	Wet stiff tan fine sandy silt w/some clay, trace of coarse sand.	22.5	3.6	20.3	SM	A-4(0)	99.7	39.7	3	2	6	6
	4	8	Wet loose light brown coarse to fine sand w/some silt, trace of fine gravel.	NV	NP	16.7	SM	A-2-4(0)	98.2	17.4	2	4	4	4
	5	10	Wet loose grayish orange coarse to fine sand w/some silt, trace of fine gravel.	NV	NP	18	SP-SM	A-1-b	91.4	11.7	1	2	4	5
	6	12	Wet loose light gray coarse sand w/some fine sand, trace of fine gravel and silt.	NV	NP	20	SW-SM	A-1-b	92.6	7.6	4	3	4	2
	7A	14	Wet loose light gray coarse to fine sand w/trace of silt and fine gravel.	NV	NP	15.2	SW-SM	A-1-b	96.9	8.2	3	3		
	7B	15	Wet medium dense orange coarse to fine sand w/trace of silt and fine gravel.	NV	NP	21	SW-SM	A-1-b	98.9	9.7	4	7		
	8	16	Wet medium dense reddish brown coarse to fine sand w/trace of silt and fine gravel.	NV	NP	22.5	SW-SM	A-1-b	98.1	8.7	3	5	7	7
	9	18	Wet medium dense reddish brown coarse sand w/trace of fine sand, fine gravel and silt.	NV	NP	22.1	SP-SM	A-1-b	93	5	1	4	7	9
	10	23	Wet medium dense reddish brown coarse sand w/some fine sand, trace of silt and fine gravel.	NV	NP	22.2	SW-SM	A-1-b	97.6	6.7	5	7	9	11
	11	28	v	NV	NP	17.4	SW	A-1-b	93.9	4.8	4	7	9	10
	12	33	Wet medium dense reddish brown coarse sand w/some fine sand, trace of fine gravel and silt.	NV	NP	19.8	SW-SM	A-1-b	95.1	6	5	11	15	18
		35	End Boring											
SB-6														
	1	0	Moist firm brown fine sandy silt w/some coarse sand and clay, trace of fine gravel.	20.1	3.5	13.6	ML	A-4(0)	98.1	55.7	2	3	3	2
	2	2	Wet stiff brown fine sandy clay w/some silt, trace of fine gravel.	31.1	13.5	22.4	CL	A-6(4)	99.1	55.5	3	4	5	7
	3	4	Wet medium dense light brown coarse sand w/some fine sand and silt, trace of fine gravel.	NV	NP	10.8	SM	A-1-b	92.9	13.6	4	6	10	8
	4	6	Wet loose light brown coarse sand w/some fine sand and silt, trace of fine gravel.	NV	NP	11.9	SM	A-1-b	95.9	13.4	2	4	6	6

Boring Test Number	Sample Number	Depth (feet)	Material description	Liquid limit	Plasticity index	Natural moisture %	USCS	AASHTO classification	Percent < than the #10 sieve	Percent < than the #200 sieve	Blow count #1	Blow count #2	Blow count #3	Blow count #4
	5	8	Wet loose light brown coarse to fine sand w/trace of fine gravel and silt.	NV	NP	18.1	SP-SM	A-1-b	93.3	7.8	2	4	5	6
	6	10	Wet very loose orange fine to coarse sand w/trace of fine gravel and silt.	NV	NP	21.5	SP-SM	A-3	96.6	9	1	1	3	6
	7	12	Wet medium dense orange coarse to fine sand w/trace of fine gravel and silt.	NV	NP	18.1	SP-SM	A-1-b	93.3	7.4	3	5	6	6
	8	14	Wet loose brown coarse to fine sand w/trace of fine gravel and silt.	NV	NP	20.3	SW-SM	A-1-b	92.9	6.6	3	4	6	8
	9	16	Wet medium dense orange coarse to fine sand w/trace of fine gravel and silt.	NV	NP	19.2	SW-SM	A-1-b	94.9	6.7	3	7	8	13
	10	18	Wet medium dense orange coarse sand w/some fine sand, trace of fine gravel and silt.	NV	NP	20.9	SW-SM	A-1-b	93.4	5.8	5	7	11	15
	11	23	Wet medium dense orange coarse sand w/some fine sand, trace of fine gravel and silt.	NV	NP	22.6	SW-SM	A-1-b	96.9	7.6	8	11	13	13
	12	28	Wet medium dense orange coarse sand w/some fine sand, trace of silt and fine gravel.	25.3	NP	20.8	SW-SM	A-1-b	96.9	7.2	1	5	8	11
		30	End Boring											

