

DELAWARE DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS AND RESEARCH SECTION

PAGE 1 OF 2

F.A. Project:
Contract: 23-106-05 S.R. 141 - U.S. 202 EAST SIDE IMPROVEMENTS
Boring Loc.: 39+10 7' Rt. BASELINE BRIDGE G1

Boring No.: B # 1

Boring Surface Elev: + 167.1'

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: 0.0'	To: 13.5'
HOLLOW STEM AUGER		From Depth of:	To:

Water Level Readings:

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
12/21/04	—	15'0	15'0	N/A	—
/ /					
/ /					
/ /					

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	14.4	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: SITE-BLAUVELT
Driller: ROBERT MOYER
Helpers: DAMON SMITH

Remarks: INSPECTOR - K. GIBNEY

Reviewed By: RANDY FERGUSON

Soils Supervisor: MAUREEN KELLEY

NOTES:

1. Make a separate log of each boring & each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelly tube samples S, undisturbed samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sample per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata classifications.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock cores in feet and inches and percent of run, and any unusual occurrences.

| BORING NUMBER: B # 1

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

BORING NO. B # 1

CONTRACT: 23-106-05 S.R. 141 - U.S. 202 EAST SIDE IMPROVEMENTS
BORING LOCATION: 39+10 7' Rt. BASELINE BRIDGE G1

DAILY		SAMPLE				
PROGRESS	NO.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	CLASS/G.I.	REMARKS
12/21/04	1	3.5'	4	Saturated firm reddish brown silt w/some fine to coarse sand and clay, trace of gravel.	A-4 (2)	
			5			
		5.0'	4			
18" Recovery						
	2	8.5'	8	Saturated stiff reddish brown fine sandy silt w/some coarse sand.	A-5 (2)	
			7			
		10.0'	8			
14" Recovery						
	3	13.5'	25	Saturated very dense reddish brown silty fine sand and gravel w/some coarse sand.	A-2-4 (0)	
		14.4'	50/5"			
10" Recovery						
(END)						

MATERIALS AND RESEARCH DIVISION
 SUMMARY OF SOIL ANALYSIS TESTS
 AASHTO TESTS: T-89, T-90, & T-265

CONTRACT- 23-106-05 NAME--- S.R. 141 - U.S. 202
 DATE----- JANUARY 29, 2005 EAST SIDE IMPROVEMENTS

LOCATION	DEPTH	2.5	2	1	3/8	4	10	40	200	LL	PL	MO	OR	PI	CLASS	GI
B # 1	S#1				***** PERCENT PASSING *****											
STA. 39+10	3.5- 5.0	100	100	100	98	96	93	77	58	28	21	21	--	7	A-4	2
7' Rt.	S#2	100	100	100	100	100	100	87	59	53	--	40	--	NP	A-5	2
BASELINE	S#3	100	100	100	88	82	75	58	28	31	--	18	--	NP	A-2-4	0
BRIDGE	13.5-14.4	100	100	100	88	82	75	58	28	31	--	18	--	NP	A-2-4	0
G1	END															

UNABLE TO CORE - MOVING BORING TO TRY AGAIN

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PAGE 2 OF 2

BORING NO. B # 1A

CONTRACT: 23-106-05 S.R. 141 - U.S. 202 EAST SIDE IMPROVEMENTS
BORING LOCATION: 39+11 7' Rt. BASELINE BRIDGE G1

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DAILY	SAMPLE					
PROGRESS	NO.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	CLASS/G.I.	REMARKS
-----	---	-----	-----	-----	-----	-----
12/21/04	-	0.0'		Unsampled - Unable to core. Moved boring location.	-----	
		4.0'				

=====
(END)

BORING NO. B # 1A
SURFACE ELEV. + 167.1'

MATERIALS AND RESEARCH DIVISION
 SUMMARY OF SOIL ANALYSIS TESTS
 AASHTO TESTS: T-89, T-90, & T-265

CONTRACT- 23-106-05 NAME--- S.R. 141 - U.S. 202
 DATE----- JANUARY 29, 2005 EAST SIDE IMPROVEMENTS

LOCATION	DEPTH	2.5	2	1	3/8	4	10	40	200	LL	PL	MO	OR	PI	CLASS
B # 1A															
STA.	0.0 - 4.0	UNSAMPLED													
39+11															
7' Rt.															
BASELINE															
BRIDGE															
GI															

UNABLE TO CORE - MOVING BORING TO TRY AGAIN

DELAWARE DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 MATERIALS AND RESEARCH SECTION

F.A. Project:
 Contract: 23-106-05 S.R. 141 - U.S. 202 EAST SIDE IMPROVEMENTS
 Boring Loc.: 39+24 7' Rt. BASELINE BRIDGE G1

Boring No.: B # 1B

Boring Surface Elev: + 161.6'

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: 0.0'	To: 8.0'
HOLLOW STEM AUGER		From Depth of:	To:

Water Level Readings:

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
12/21/04	0 HOUR	18.0'	8.0'	6.8'	
12/22/04	24 HOUR			12.1'	
/ /					
/ /					

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	0.0	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: 10.0	Ft.

Boring Contractor: SITE-BLAUVELT
 Driller: ROBERT MOYER
 Helpers: DAMON SMITH

Remarks: INSPECTOR - K. GIBNEY
 UNSAMPLED

Reviewed By: RANDY FERGUSON
 Soils Supervisor: MAUREEN KELLEY

NOTES:

1. Make a separate log of each boring & each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelly tube samples S, undisturbed samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sample per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata classifications.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock cores in feet and inches and percent of run, and any unusual occurrences.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PAGE 2 OF 2

BORING NO. B # 1B

CONTRACT: 23-106-05 S.R. 141 - U.S. 202 EAST SIDE IMPROVEMENTS
BORING LOCATION: 39+24 7' Rt. BASELINE BRIDGE G1

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=====
DAILY          SAMPLE
PROGRESS NO.  DEPTH  BLOWS/6"    SAMPLE DESCRIPTION          CLASS/G.I.    REMARKS
-----
12/21/04  -   0.0'          Unsampled                    -----

          8.0'

=== =====
Run   8.0'   Core   Gneiss, blueish gray, hard to very hard,
# 1  13.0'  Drilling fresh, slightly to highly weathered, no
          apparent banding, medium to closely fractured
          58" Recovery = 96.0%
          RQD = 68 (fair)
          ----- RQD = Rock Quality
          Designation

=== =====
Run   13.0'  Core   Gneiss, blueish gray, hard to very hard,
# 2  18.0'  Drilling fresh, slightly to highly weathered, no
          apparent banding, medium to closely fractured
          52" Recovery = 86.0%
          RQD = 62 (fair)
          ----- RQD = Rock Quality
          Designation

=== =====
( END )
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BORING NO. B # 1B
SURFACE ELEV. + 161.6'

MATERIALS AND RESEARCH DIVISION
 SUMMARY OF SOIL ANALYSIS TESTS
 AASHTO TESTS: T-89, T-90, & T-265

CONTRACT- 23-106-05
 DATE----- JANUARY 29, 2005

NAME---- S.R. 141 - U.S. 202
 EAST SIDE IMPROVEMENTS

LOCATION	DEPTH	2.5	2	1	3/8	4	10	40	200	LL	PL	MO	OR	PI	CLASS	GI
----------	-------	-----	---	---	-----	---	----	----	-----	----	----	----	----	----	-------	----

B # 1B
 STA. 39+24
 7' Rt.
 BASELINE
 BRIDGE
 G1

0.0 - 8.0 UNSAMPLED

START CORE DRILLING

CORE DRILLING
 RUN # 1 8.0' - 13.0' 58" RECOVERY = 96.0%

RUN # 2 13.0' - 18.0' 52" RECOVERY = 86.0%

END CORE DRILLING
 END OF BORING

DELAWARE DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 MATERIALS AND RESEARCH SECTION

PAGE 1 OF 2

F.A. Project:
 Contract: 23-106-05 S.R. 141 - U.S. 202 EAST SIDE IMPROVEMENTS
 Boring Loc.: 39+30 33' Lt. BASELINE BRIDGE G2

Boring No.: B # 2

Boring Surface Elev: + 169.8'

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: 0.0'	To: 7.5'
HOLLOW STEM AUGER		From Depth of:	To:

Water Level Readings:

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
12/15/04	0 HOUR	18.5'	7.5'	16.8'	+ 153'
12/16/04	24 HOUR	18.5'	7.5'	14.4'	+ 150.6
/ /					
/ /					

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 5.0	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: 11.0	Ft.

Boring Contractor: SITE-BLAUVELT
 Driller: ROBERT MOYER
 Helpers: DAMON SMITH

Remarks: INSPECTOR - K. GIBNEY

Reviewed By: RANDY FERGUSON

Soils Supervisor: MAUREEN KELLEY

NOTES:

1. Make a separate log of each boring & each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelly tube samples S, undisturbed samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sample per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata classifications.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock cores in feet and inches and percent of run, and any unusual occurrences.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

BORING NO. B # 2

CONTRACT: 23-106-05 S.R. 141 - U.S. 202 EAST SIDE IMPROVEMENTS
BORING LOCATION: 39+30 33' Lt. BASELINE BRIDGE G2

DAILY		SAMPLE				
PROGRESS	NO.	DEPTH	BLOWS/6"	SAMPLE DESCRIPTION	CLASS/G.I.	REMARKS
12/15/04	1	3.5'	5	Wet stiff reddish brown fine sandy silt	A-4 (0)	
			6	w/some coarse sand, gravel and clay.		
		5.0'	7			
11" Recovery						
Run	7.5'	Core		Gneiss, grayish blue, very hard, fresh, no		RQD = Rock Quality
# 1	10.5'	Drilling		apparent banding, medium to closely fractured.		Designation
				30" Recovery = 83.3%		
				RQD = 50 (fair)		
Run	10.5'	Core		Gneiss, grayish blue, very hard, fresh, no		RQD = Rock Quality
# 2	15.5'	Drilling		apparent banding, medium to closely fractured.		Designation
				53" Recovery = 88.3%		
				RQD = 36 (poor)		
Run	15.5'	Core		Gneiss, grayish blue, very hard, fresh, no		RQD = Rock Quality
# 3	18.5'	Drilling		apparent banding, medium to closely fractured.		Designation
				36" Recovery = 100.0%		
				RQD = 91.7 (excellent)		
		(END)				

100

MATERIALS AND RESEARCH DIVISION
 SUMMARY OF SOIL ANALYSIS TESTS
 AASHTO TESTS: T-89, T-90, & T-265

CONTRACT- 23-106-05
 DATE----- JANUARY 29, 2005

NAME---- S.R. 141 - U.S. 202
 EAST SIDE IMPROVEMENTS

LOCATION	DEPTH	2.5	2	1	3/8	4	10	40	200	LL	PL	MO	OR	PI	CLASS	GI
B # 2	S#1	3.5 - 5.0	100	100	100	99	88	69	42	23	19	18	--	4	A-4	0
STA. 39+30																
33' Lt. BASELINE BRIDGE G2																

END SPLIT-BARREL SAMPLER

START CORE DRILLING

CORE DRILLING	START CORE DRILLING	RECOVERY
RUN # 1	7.5' - 10.5'	30" RECOVERY = 83.3%
RUN # 2	10.5' - 15.5'	53" RECOVERY = 88.3%
RUN # 3	15.5' - 18.5'	36" RECOVERY = 100.0%

END OF BORING

DELAWARE DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 MATERIALS AND RESEARCH SECTION

PAGE 1 OF 2

F.A. Project:
 Contract: 23-106-05 S.R. 141 - U.S. 202, EAST SIDE IMPROVEMENTS
 Boring Loc.: 40+70 28' Lt. BASELINE - BRIDGE G1

Boring No.: B # 3

Boring Surface Elev: + 173.8'

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: 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
12/22/04	0 HOUR	20.0'	10.0'	3.3'	
12/23/04	24 HOUR			6.2	
/ /					
/ /					

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 9.1	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: 10.0	Ft.

Boring Contractor: SITE-BLAUVELT
 Driller: ROBERT MOYER
 Helpers: DAMON SMITH

Remarks: INSPECTOR - K. GIBNEY

Reviewed By: RANDY FERGUSON

Soils Supervisor: MAUREEN KELLEY

NOTES:

1. Make a separate log of each boring & each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
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4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sample per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata classifications.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock cores in feet and inches and percent of run, and any unusual occurrences.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

BORING NO. B # 3

CONTRACT: 23-106-05 S.R. 141 - U.S. 202, EAST SIDE IMPROVEMENTS

BORING LOCATION: 40+70 28' Lt. BASELINE - BRIDGE G1

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DAILY          SAMPLE
PROGRESS NO.  DEPTH  BLOWS/6"    SAMPLE DESCRIPTION          CLASS/G.I.    REMARKS
-----
12/22/04  1    3.5'      4    Saturated very stiff orangish brown clayey  A-4 (6)
                    5    silt w/trace of fine to coarse sand.
                    5.0'     12

                                18" Recovery
===
2    8.5'      8    Saturated hard reddish brown fine sandy silt  A-5 (0)
    9.1'    50/0.1'  w/some coarse sand, trace of gravel.

                                4" Recovery
===
Run  10.0'   Core   Gneiss, grayish blue, hard to very hard,  ----- RQD = Rock Quality
# 1  15.0'   Drilling fresh to slightly weathered, very thinly  Designation
                    banded, closely fractured.                Solution activity at
                    50.4" Recovery = 84.0%
                    RQD = 50% (fair)
===
Run  15.0'   Core   Gneiss, grayish blue, hard to very hard,  ----- RQD = Rock Quality
# 2  20.0'   Drilling fresh, very thinly banded, medium to  Designation
                    closely fractured.
                    60" Recovery = 100.0%
                    RQD = 98 (excellent)
=====
( END )

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MATERIALS AND RESEARCH DIVISION
 SUMMARY OF SOIL ANALYSIS TESTS
 AASHTO TESTS: T-89, T-90, & T-265

PAGE 1

CONTRACT- 23-106-05
 DATE----- JULY 10, 2005

NAME---- S.R. 141 - U.S. 202
 EAST SIDE IMPROVEMENTS

LOCATION	DEPTH	2.5	2	1	3/8	4	10	40	200	IL	PL	MO	OR	PI	CLASS	GI	
B # 3	S#1	3.5- 5.0	100	100	100	100	100	97	93	30	23	23	--	7	A-4	6	
STA. 40+70	S#2	8.5- 9.1	100	100	100	99	96	96	78	46	41	--	29	--	NP	A-5	0
281 Lt. BASELINE BRIDGE	END SPLIT-BARREL SAMPLER																
G1	START CORE DRILLING																

CORE DRILLING
 RUN # 1 10.0' - 15.0' 50.4" RECOVERY = 84.0 %
 RUN # 2 15.0' - 20.0' 60" RECOVERY = 100.0 %
 END CORE DRILLING

END OF BORING

DELAWARE DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 MATERIALS AND RESEARCH SECTION

F.A. Project:
 Contract: 23-106-05 S.R. 141 - U.S. 202, EAST SIDE IMPROVEMENTS
 Boring Loc.: 40+32.4' Lt. BASELINE - BRIDGE G1

Boring No.: B # 4

Boring Surface Elev: + 172.4'

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: 6.0'
HOLLOW STEM AUGER		From Depth of:	To:

Water Level Readings:

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
12/22/04	0 HOUR	16.0'	6.0'	3.7	
12/23/04	24 HR	16.0'	6.0	5.3	
/ /					
/ /					

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 6.0	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: 10.0	Ft.

Boring Contractor: SITE-BLAUVELT
 Driller: ROBERT MOYER
 Helpers: DAMON SMITH

Remarks: INSPECTOR - K. GIBNEY

Reviewed By: RANDY FERGUSON

Soils Supervisor: MAUREEN KELLEY

NOTES:

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7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock cores in feet and inches and percent of run, and any unusual occurrences.

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CONTRACT: 23-106-05 S.R. 141 - U.S. 202, EAST SIDE IMPROVEMENTS
BORING LOCATION: 40+32 4' Lt. BASELINE - BRIDGE G1

BORING NO. B # 4

DAILY		SAMPLE		SAMPLE DESCRIPTION	CLASS/G.I.	REMARKS
PROGRESS	NO.	DEPTH	BLOWS/6"			
12/22/04	1	3.5'	24	Saturated hard orangish brown clayey fine to coarse sandy silt w/trace of gravel.	A-5 (1)	
			11			
		4.9'	50/0.4'			
6" Recovery						
Run	6.0'	Core		Gneiss, grayish blue, hard, fresh with		RQD = Rock Quality
# 1	11.0'	Drilling		highly weathered fractures, very thinly banded, closely fractured.		Designation
				60" Recovery = 100.0%		
				RQD = 48% (poor)		
Run	11.0'	Core		Gneiss, grayish blue, very hard, fresh,		RQD = Rock Quality
# 2	16.0'	Drilling		very thinly banded, closely fractured.		Designation
				60" Recovery = 100.0%		
				RQD = 88% (good)		
(END)						

MATERIALS AND RESEARCH DIVISION
 SUMMARY OF SOIL ANALYSIS TESTS
 AASHTO TESTS: T-89, T-90, & T-265

PAGE 1

CONTRACT- 23-106-05
 DATE----- JULY 17, 2005

NAME---- S.R. 141 - U.S. 202
 EAST SIDE IMPROVEMENTS

LOCATION	DEPTH	2.5	2	1	3/8	4	10	40	200	LL	PL	MO	OR	PI	CLASS	GI
B # 4	S#1															
STA. 40+32	3.5- 4.9	100	100	100	96	95	95	74	45	41	33	32	--	8	A-5	1
4' Lt.	END SPLIT-BARREL SAMPLER															
BASELINE BRIDGE																
G1																

START CORE DRILLING

CORE DRILLING
 RUN # 1 6.0' - 11.0' 60" RECOVERY = 100.0%

RUN # 2 11.0' - 16.0' 60" RECOVERY = 100.0%

END CORE DRILLING
 END OF BORING

DELAWARE DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 MATERIALS AND RESEARCH SECTION

PAGE 1 OF 2

F.A. Project:
 Contract: 23-106-05 S.R. 141 - U.S. 202, EAST SIDE IMPROVEMENTS
 Boring Loc.: 40+28 41' Rt. BASELINE - BRIDGE G1

Boring No.: B # 5

Boring Surface Elev: + 171.8'

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: 0.0' To: 12.0'
 HOLLOW STEM AUGER From Depth of: To:

Water Level Readings:

Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
12/21/04	0 HOUR	22.0'	12.0'	5.8'	
12/22/04	24HR	22.0	12.0	5.6'	
/ /					
/ /					

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 12.0	Ft.;	Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:	;	No. of U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:	Ft.;	Core Drilling in Rock: 10.0	Ft.

Boring Contractor: SITE-BLAUVELT

Driller: ROBERT MOYER

Helpers: DAMON SMITH

Remarks: INSPECTOR - K. GIBNEY

Reviewed By: RANDY FERGUSON

Soils Supervisor: MAUREEN KELLEY

NOTES:

1. Make a separate log of each boring & each unsuccessful attempt. Keep a copy of all logs in the field.
2. In daily progress column indicate depth at beginning and end of work day, calendar date, time at beginning and end of work day and weather conditions.
3. All samples shall be numbered in consecutive order regardless of type; dry samples D, wash samples W, shelly tube samples S, undisturbed samples U. Do not assign numbers to lost samples but record blows and reasons for lack of recovery.
4. Mark each U-sample with boring number, sample number, depth, recovery and job number.
5. Record blows on sample per six inches of penetration. Note all blows and penetrations when taken at less than six inch intervals. Indicate method by which penetration of tube sampler was obtained.
6. Indicate changes of material in strata column and list generalized strata classifications.
7. List under remarks the manner by which changes in material were detected, all obstructions, any loss or gain of wash water including amount, the recovery of rock cores in feet and inches and percent of run, and any unusual occurrences.

BORING NUMBER: B # 5

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

BORING NO. B # 5

CONTRACT: 23-106-05 S.R. 141 - U.S. 202, EAST SIDE IMPROVEMENTS
BORING LOCATION: 40+28 41' Rt. BASELINE - BRIDGE G1

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=====
DAILY          SAMPLE
PROGRESS NO.  DEPTH  BLOWS/6"  SAMPLE DESCRIPTION          CLASS/G.I.  REMARKS
-----
12/21/04  1    3.5'      4    Saturated very stiff reddish brown clayey
                        7    silt w/some fine sand, trace of coarse
                        5.0'     13    sand.

                                12" Recovery
===  =====
2    8.5'     26    Saturated dense light gray silty gravel      A-2-4 (0)
                        24    w/some fine to coarse sand.
10.0'    20

===  =====
Run  12.0'   Core   Gneiss, grayish blue, very hard, fresh with
# 1  17.0'   Drilling highly weathered fractures, no apparent
                        banding, closely to very closely fractured.
                        45.6" Recovery = 76.0%
                        RQD = 36% (poor)
=====
Run  17.0'   Core   Gneiss, grayish blue, very hard, fresh with
# 2  22.0'   Drilling highly weathered fractures, no apparent
                        banding, closely to very closely fractured.
                        54" Recovery = 90.0%
                        RQD = 58% (fair)
=====
( END )

```

MATERIALS AND RESEARCH DIVISION
 SUMMARY OF SOIL ANALYSIS TESTS
 AASHTO TESTS: T-89, T-90, & T-265

PAGE 1

CONTRACT- 23-106-05
 DATE----- JULY 17, 2005

NAME---- S.R. 141 - U.S. 202
 EAST SIDE IMPROVEMENTS

LOCATION	DEPTH	2.5	2	1	3/8	4	10	40	200	LL	PL	MO	OR	PI	CLASS	GI
B # 5	S#1				***** PERCENT PASSING *****											
STA. 40+28	3.5- 5.0	100	100	100	100	100	100	94	83	29	23	20	--	6	A-4	4
41' Rt. BASELINE BRIDGE	S#2															
	8.5-10.0	100	100	80	58	56	55	43	26	23	--	10	--	NP	A-2-4	0
	END SPLIT-BARREL SAMPLER															
G1																

START CORE DRILLING

CORE DRILLING
 RUN # 1 12.0' - 17.0' 45.6" RECOVERY = 76.0%

END CORE DRILLING

END OF BORING

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>1</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>0.5</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-21</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/12/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	32.53	21.47	588.50	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	29.36	19.24	492.70	
WT. OF WATER LOST:	3.17	2.23	95.80	POST-IGNITION
WT. OF BOTTLE:	21.63	12.97	87.16	DISH & SOIL:
WT. OF DRY SOIL:	7.73	6.27	405.54	
PERCENT OF WATER:	41.00	35.60	23.60	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	41.0			LOSS %: _____

WT PASSING #10 SIEVE: 302

WT. OF TOTAL SAMPLE: 405.5		WT. OF WASH SAMPLE: 122.5		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	22.4	22.4	5.5	94.5
#4	46.7	24.3	6.0	88.5
#10	103.3	56.6	14.0	74.5
#40	36.1	36.1	22.0	52.6
#200	72.1	36.0	21.9	30.7
PASS #200		50.4	30.7	

SUMMARY	
LIQUID LIMIT:	41.0
PLASTIC LIMIT:	35.6
PLASTICITY INDEX:	5.4
% SAND AND GRAVEL:	69.3
% SILT:	
% CLAY:	
CLASSIFICATION:	A-2-5(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-21

Contract: 25-106-02

Boring Location: Sta. 38+61.00, 38.50' Rt. Ramp 5

Boring Surface Elev.: 179.28

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:		IN.
Wt. of Sample Hammer: 140	Lbs.	Average Fall: 30		IN.
Type of: D-Sampler: Split-Barrel	O.D.	O.D. of Sampler: 2		IN.
S-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
Core Bit: NQ2	O.D.	O.D. of Rock Core: 3		IN.

Casing Size: 3 1/4"	Inches	From Depth of: 0.0'	To:	8.0'
Hollow Stem Auger:		From Depth of:		To:

Water Level Readings					
Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
9/4/2009				6.5	172.8
					179.3
					179.3
					179.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	7.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		Ft.;	No. of:	U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	10.0	Ft.

Boring Contractor: Walton Corporation
Driller: Billy Holden
Helpers:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks			
		1	0.5'	6 13 50/4"		A-2-5(0)	Topsoil - 3". Rock Fragments			
2.25		2	2.0'	6 26 36 33		16" RECOVERY		No Sieve Analysis - Indication of moist hard brown sandy clay w/rock fragments.		
		3	4.0'	7 13 23 30		15" RECOVERY			No Sieve Analysis - Indication of moist dense orange silty sand w/rock fragments.	
4.5		4	6.0'	26 50/4"		8" RECOVERY				No Sieve Analysis - Indication of moist very dense orange silty sand w/rock fragments.
6.75	▽	R-1	8.0'			13" RECOVERY				
9					35" RECOVERY	Gniness, gray and white, coarse grained, unweathered, hard 35" Recovery = 58.33% RQD = 13.3% (very poor)				
11.25										
			13.0'							

Remarks: GTA Inspector - J. Lafferty - Boring offset to bottom of slope.

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Frac rock

Misc. Symbols



Water table during
drilling

Notes:

1. Exploratory borings were drilled on 9-4-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 0.0

Elevation: _____ Source: BRG1B-22

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/12/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	40.07		678.90	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	36.10		611.78	
WT. OF WATER LOST:	3.97		67.12	POST-IGNITION
WT. OF BOTTLE:	20.92		80.32	DISH & SOIL:
WT. OF DRY SOIL:	15.18		531.46	
PERCENT OF WATER:	26.20		12.60	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	26.2			LOSS %: _____

WT PASSING #10 SIEVE: 456

WT. OF TOTAL SAMPLE: 531.5		WT. OF WASH SAMPLE: 114.1		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	7.3	7.3	1.4	98.6
#4	18.0	10.7	2.0	96.6
#10	75.7	57.7	10.9	85.8
#40	33.5	33.5	25.2	60.6
#200	74.3	40.8	30.7	29.9
PASS #200		39.8	29.9	

SUMMARY

LIQUID LIMIT:	26.2
PLASTIC LIMIT:	NP
PLASTICITY INDEX:	NP
% SAND AND GRAVEL:	70.1
% SILT:	
% CLAY:	
CLASSIFICATION:	A-2-4(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 2.0

Elevation: _____ Source: BRG1B-22

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/12/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	31.27	24.53	635.80	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	28.25	23.09	550.15	
WT. OF WATER LOST:	3.02	1.44	85.65	POST-IGNITION
WT. OF BOTTLE:	19.37	16.52	87.19	DISH & SOIL:
WT. OF DRY SOIL:	8.88	6.57	462.96	
PERCENT OF WATER:	34.00	21.90	18.50	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	34.0			LOSS %: _____

WT PASSING #10 SIEVE: 349

WT. OF TOTAL SAMPLE: 463.0		WT. OF WASH SAMPLE: 108.7		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	23.2	23.2	5.0	95.0
#4	48.5	25.3	5.5	89.5
#10	113.8	65.3	14.1	75.4
#40	10.2	10.2	7.1	68.3
#200	21.8	11.6	8.0	60.3
PASS #200		86.9	60.3	

SUMMARY

LIQUID LIMIT:	34.0
PLASTIC LIMIT:	21.9
PLASTICITY INDEX:	12.1
% SAND AND GRAVEL:	39.7
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(5)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>3</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>4.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-22</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/12/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	35.47	20.86	786.00	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.93	19.42	656.13	
WT. OF WATER LOST:	3.54	1.44	129.87	POST-IGNITION
WT. OF BOTTLE:	21.07	12.71	80.23	DISH & SOIL:
WT. OF DRY SOIL:	10.86	6.71	575.90	
PERCENT OF WATER:	32.60	21.50	22.60	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	32.6			LOSS %: _____

WT PASSING #10 SIEVE: 537

WT. OF TOTAL SAMPLE: 575.9		WT. OF WASH SAMPLE: 109.7		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	5.1	5.1	0.9	99.1
#4	8.7	3.6	0.6	98.5
#10	38.5	29.8	5.2	93.3
#40	3.4	3.4	2.9	90.4
#200	9.3	5.9	5.0	85.4
PASS #200		100.4	85.4	

SUMMARY	
LIQUID LIMIT:	32.6
PLASTIC LIMIT:	21.5
PLASTICITY INDEX:	11.1
% SAND AND GRAVEL:	14.6
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(9)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>4</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>6.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-22</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/12/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	39.53	22.91	798.50	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	34.86	21.52	682.05	
WT. OF WATER LOST:	4.67	1.39	116.45	POST-IGNITION
WT. OF BOTTLE:	21.27	14.81	77.25	DISH & SOIL:
WT. OF DRY SOIL:	13.59	6.71	604.80	
PERCENT OF WATER:	34.40	20.70	19.30	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	34.4			LOSS %: _____

WT PASSING #10 SIEVE: 474

WT. OF TOTAL SAMPLE: 604.8		WT. OF WASH SAMPLE: 102.6		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	23.3	23.3	3.9	96.1
#4	42.7	19.4	3.2	92.9
#10	130.4	87.7	14.5	78.4
#40	7.2	7.2	5.5	72.9
#200	17.1	9.9	7.6	65.4
PASS #200		85.5	65.4	

SUMMARY	
LIQUID LIMIT:	34.4
PLASTIC LIMIT:	20.7
PLASTICITY INDEX:	13.7
% SAND AND GRAVEL:	34.6
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(7)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>5</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>8.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-22</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/12/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	35.95	21.62	727.50	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.74	20.16	609.14	
WT. OF WATER LOST:	4.21	1.46	118.36	POST-IGNITION
WT. OF BOTTLE:	19.38	13.10	80.76	DISH & SOIL:
WT. OF DRY SOIL:	12.36	7.06	528.38	
PERCENT OF WATER:	34.10	20.70	22.40	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	34.1			LOSS %: _____

WT PASSING #10 SIEVE: 455

WT. OF TOTAL SAMPLE: 528.4		WT. OF WASH SAMPLE: 119.6		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	9.5	9.5	1.8	98.2
#4	19.6	10.1	1.9	96.3
#10	73.5	53.9	10.2	86.1
#40	10.6	10.6	7.6	78.5
#200	24.3	13.7	9.9	68.6
PASS #200		95.3	68.6	

SUMMARY	
LIQUID LIMIT:	34.1
PLASTIC LIMIT:	20.7
PLASTICITY INDEX:	13.4
% SAND AND GRAVEL:	31.4
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(7)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 6

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 10.0

Elevation: _____ Source: BRG1B-22

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/12/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	35.50	31.17	844.20	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.41	29.61	703.41	
WT. OF WATER LOST:	4.09	1.56	140.79	POST-IGNITION
WT. OF BOTTLE:	21.89	22.13	78.06	DISH & SOIL:
WT. OF DRY SOIL:	9.52	7.48	625.35	
PERCENT OF WATER:	43.00	20.90	22.50	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	43.0			LOSS %: _____

WT PASSING #10 SIEVE: 590

WT. OF TOTAL SAMPLE: 625.4		WT. OF WASH SAMPLE: 123.6		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	6.4	6.4	1.0	99.0
#4	10.1	3.7	0.6	98.4
#10	35.2	25.1	4.0	94.4
#40	1.7	1.7	1.3	93.1
#200	5.5	3.8	2.9	90.2
PASS #200		118.1	90.2	

SUMMARY

LIQUID LIMIT:	43.0
PLASTIC LIMIT:	20.9
PLASTICITY INDEX:	22.1
% SAND AND GRAVEL:	9.8
% SILT:	
% CLAY:	
CLASSIFICATION:	A-7-6(21)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>8</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>14.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-22</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/12/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	33.28	20.87	672.00	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.23	19.56	605.58	
WT. OF WATER LOST:	2.05	1.31	66.42	POST-IGNITION
WT. OF BOTTLE:	22.87	12.59	77.43	DISH & SOIL:
WT. OF DRY SOIL:	8.36	6.97	528.15	
PERCENT OF WATER:	24.50	18.80	12.60	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	24.5			LOSS %: _____

WT PASSING #10 SIEVE: 320

WT. OF TOTAL SAMPLE: 528.1		WT. OF WASH SAMPLE: 103.2		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
2"	0.0	0.0	0.0	100.0
1"	45.0	45.0	8.5	91.5
3/8"	73.2	28.2	5.3	86.1
# 4	109.9	36.7	6.9	79.2
#10	208.1	98.2	18.6	60.6
#40	20.4	20.4	12.0	48.6
#200	43.6	23.2	13.6	35.0
PASS #200		59.6	35.0	

SUMMARY	
LIQUID LIMIT:	24.5
PLASTIC LIMIT:	18.8
PLASTICITY INDEX:	5.7
% SAND AND GRAVEL:	65.0
% SILT:	
% CLAY:	
CLASSIFICATION:	A-2-4(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>9</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>16.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-22</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/12/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	41.45	23.51	1109.20	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	36.57	22.04	950.59	
WT. OF WATER LOST:	4.88	1.47	158.61	POST-IGNITION
WT. OF BOTTLE:	19.24	15.10	87.11	DISH & SOIL:
WT. OF DRY SOIL:	17.33	6.94	863.48	
PERCENT OF WATER:	28.20	21.20	18.40	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	28.2			LOSS %: _____

WT PASSING #10 SIEVE: 774

WT. OF TOTAL SAMPLE: 863.5		WT. OF WASH SAMPLE: 106.4		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	4.7	4.7	0.5	99.5
#4	17.1	12.4	1.4	98.0
#10	89.3	72.2	8.4	89.7
#40	21.0	21.0	17.7	72.0
#200	43.6	22.6	19.0	52.9
PASS #200		62.8	52.9	

SUMMARY	
LIQUID LIMIT:	28.2
PLASTIC LIMIT:	21.2
PLASTICITY INDEX:	7.0
% SAND AND GRAVEL:	47.1
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(1)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>10</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>18.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-22</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Date Sampled: _____
	Sampled By: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/12/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	33.19	19.75	807.90	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	29.66	18.25	649.90	
WT. OF WATER LOST:	3.53	1.50	158.00	POST-IGNITION
WT. OF BOTTLE:	22.09	12.97	86.64	DISH & SOIL:
WT. OF DRY SOIL:	7.57	5.28	563.26	
PERCENT OF WATER:	46.60	28.40	28.10	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	46.6			LOSS %: _____

WT PASSING #10 SIEVE: 414

WT. OF TOTAL SAMPLE: 563.3		WT. OF WASH SAMPLE: 104.7		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	40.6	40.6	7.2	92.8
#4	79.0	38.4	6.8	86.0
#10	148.8	69.8	12.4	73.6
#40	18.7	18.7	13.1	60.4
#200	48.7	30.0	21.1	39.4
PASS #200		56.0	39.4	

SUMMARY	
LIQUID LIMIT:	46.6
PLASTIC LIMIT:	28.4
PLASTICITY INDEX:	18.2
% SAND AND GRAVEL:	60.6
% SILT:	
% CLAY:	
CLASSIFICATION:	A-7-6(3)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-22

Contract: 25-106-02

Boring Location: Sta. 38+71.00,8' Rt. Ramp 5

Boring Surface Elev.: 179.05

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		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:	18.0'
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/8/2009				Dry	179.1
						179.1
						179.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	20.0	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of	U-Samples:	Ft.
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:		Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	3 4 5 4	Moist loose brown silty fine to coarse sand w/ some gravel.	A-2-4(0)	Topsoil - 2"
			2.0'		15" RECOVERY		
2.53		2	2.0'	7 9 10 8	Moist very stiff brown gravelly clay w/trace of fine to coarse sand.	A-6(5)	
			4.0'		14" RECOVERY		
		3	4.0'	2 2 5 5	Moist firm gray clay w/trace of gravel and fine to coarse sand.	A-6(9)	
5.06			6.0'		18" RECOVERY		
		4	6.0'	9 9 11 11	Moist very stiff brown gravelly clay w/trace of fine to coarse sand.	A-6(7)	
7.59			8.0'		17" RECOVERY		
		5	8.0'	2 3 4 8	Moist firm brown clay w/some gravel, trace of fine to coarse sand.	A-6(7)	
			10.0'		18" RECOVERY		
10.12		6	10.0'	8 7 10 13	Moist very stiff brown clay w/trace of gravel and fine to coarse sand.	A-7-6(21)	
			12.0'		21" RECOVERY		
		7	12.0'	3 10 14 15	Moist very stiff brown clayey gravelly (rock fragments) silt w/trace of fine to coarse sand.	A-4(4)	
12.65			14.0'		15" RECOVERY		

Remarks: GTA Inspector - T. Kane

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: I-95 & U.S. 202 Interchange
Contract: 25-106-02

Boring No.: BRG1B-22

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
15.18		8	14.0'	13 17 14 23	Moist dense brown clayey gravel (rock fragments) w/some fine to coarse sand.	A-2-4(0)	
			16.0'		9" RECOVERY		
17.71		9	16.0'	13 11 11 10	Moist very stiff brown clayey silt w/some fine to coarse sand, trace of gravel.	A-4(1)	
			18.0'		23" RECOVERY		
20.24		10	18.0'	11 9 8 9	Wet very stiff brown gravelly coarse to fine sandy clay.	A-7-6(3)	
			20.0'		21" RECOVERY		
22.77					End of Boring		
25.3							
27.83							
30.36							
32.89							
35.42							
37.95							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Low plasticity
clay



Poorly graded clayey
silty sand



Silty low plasticity
clay

Notes:

1. Exploratory borings were drilled on 9-8-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a Trailer Rig CME 45.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

MATERIALS AND RESEARCH LABORATORY SOIL ANALYSIS REPORT TEST NO.: 4 REPORTED BY: _____ REVIEWED BY: _____	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400 Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange Contractor: _____ Road: _____ Location: _____ Depth: 6.0 Elevation: _____ Source: BRG1B-23 Type and Use of Material: _____ Type of Sample: _____ Method Placed: _____ Remarks: _____ Date Sampled: _____ Sampled By: _____
FOR LABORATORY USE ONLY Location of Lab: DOVER Date Received: _____ Date Tested: _____ Date Reported: 11/12/2009	

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	32.98	30.03	685.30	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	30.27	28.62	584.52	
WT. OF WATER LOST:	2.71	1.41	100.78	POST-IGNITION
WT. OF BOTTLE:	22.02	21.71	87.30	DISH & SOIL:
WT. OF DRY SOIL:	8.25	6.91	497.22	
PERCENT OF WATER:	32.80	20.40	20.30	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	32.8			LOSS %: _____

WT PASSING #10 SIEVE: 404

WT. OF TOTAL SAMPLE: 497.2		WT. OF WASH SAMPLE: 111.1		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	12.8	12.8	2.6	97.4
#4	24.9	12.1	2.4	95.0
#10	92.8	67.9	13.7	81.3
#40	4.6	4.6	3.4	78.0
#200	11.0	6.4	4.7	73.3
PASS #200		100.1	73.3	

SUMMARY	
LIQUID LIMIT:	32.8
PLASTIC LIMIT:	20.4
PLASTICITY INDEX:	12.4
% SAND AND GRAVEL:	26.7
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(8)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY SOIL ANALYSIS REPORT TEST NO.: <u>7</u> REPORTED BY: _____ REVIEWED BY: _____	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400 Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u> Contractor: _____ Road: _____ Location: _____ Depth: <u>12.0</u> Elevation: _____ Source: <u>BRG1B-23</u> Type and Use of Material: _____ Type of Sample: _____ Method Placed: _____ Remarks: _____ Date Sampled: _____ Sampled By: _____ FOR LABORATORY USE ONLY Location of Lab: <u>DOVER</u> Date Received: _____ Date Tested: _____ Date Reported: <u>11/12/2009</u>
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PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	35.63	27.88	780.10	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	33.04	26.54	691.67	
WT. OF WATER LOST:	2.59	1.34	88.43	POST-IGNITION
WT. OF BOTTLE:	23.25	19.57	87.20	DISH & SOIL:
WT. OF DRY SOIL:	9.79	6.97	604.47	
PERCENT OF WATER:	26.50	19.20	14.60	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	26.5			LOSS %: _____

WT PASSING #10 SIEVE: 474

WT. OF TOTAL SAMPLE: 604.5		WT. OF WASH SAMPLE: 122.2		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	24.9	24.9	4.1	95.9
#4	52.1	27.2	4.5	91.4
#10	130.1	78.0	12.9	78.5
#40	27.2	27.2	17.5	61.0
#200	62.4	35.2	22.6	38.4
PASS #200		59.8	38.4	

SUMMARY	
LIQUID LIMIT:	26.5
PLASTIC LIMIT:	19.2
PLASTICITY INDEX:	7.3
% SAND AND GRAVEL:	61.6
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>8</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>14.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-23</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/12/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	31.39	29.13	1036.40	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	28.33	27.82	888.47	
WT. OF WATER LOST:	3.06	1.31	147.93	POST-IGNITION
WT. OF BOTTLE:	19.13	21.35	87.61	DISH & SOIL:
WT. OF DRY SOIL:	9.20	6.47	800.86	
PERCENT OF WATER:	33.30	20.20	18.50	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	33.3			LOSS %: _____

WT PASSING #10 SIEVE: 707

WT. OF TOTAL SAMPLE: 800.9		WT. OF WASH SAMPLE: 107.9		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	16.7	16.7	2.1	97.9
#4	34.3	17.6	2.2	95.7
#10	93.4	59.1	7.4	88.3
#40	18.5	18.5	15.1	73.2
#200	45.1	26.6	21.8	51.4
PASS #200		62.8	51.4	

SUMMARY	
LIQUID LIMIT:	33.3
PLASTIC LIMIT:	20.2
PLASTICITY INDEX:	13.1
% SAND AND GRAVEL:	48.6
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(4)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 10

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 18.0

Elevation: _____ Source: BRG1B-23

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____

Sampled By: _____ Date Sampled: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/12/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	32.80	27.84	887.70	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	29.07	26.16	691.83	
WT. OF WATER LOST:	3.73	1.68	195.87	POST-IGNITION
WT. OF BOTTLE:	21.62	20.94	86.40	DISH & SOIL:
WT. OF DRY SOIL:	7.45	5.22	605.43	
PERCENT OF WATER:	50.10	32.20	32.40	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	50.1			LOSS %: _____

WT PASSING #10 SIEVE: 451

WT. OF TOTAL SAMPLE: 605.4		WT. OF WASH SAMPLE: 107.0		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	32.1	32.1	5.3	94.7
#4	60.6	28.5	4.7	90.0
#10	154.4	93.8	15.5	74.5
#40	16.0	16.0	11.1	63.4
#200	42.5	26.5	18.5	44.9
PASS #200		64.5	44.9	

SUMMARY

LIQUID LIMIT:	50.1
PLASTIC LIMIT:	32.2
PLASTICITY INDEX:	17.9
% SAND AND GRAVEL:	55.1
% SILT:	
% CLAY:	
CLASSIFICATION:	A-7-5(5)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-23

Contract: 25-106-02

Boring Location: Sta. 38+93.00, 6.5' Rt. Ramp 5

Boring Surface Elev.: 176.55

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:	3 1/4"	Inches	From Depth of:	0.0'	To:	18.0'
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/4/2009				Dry	176.6
						176.6
						176.6

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: J. Truver
Helpers:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	2 3 2	Moist firm brown gravelly clay w/trace of fine to coarse sand.	A-6(7)	Topsoil - 5".
			2.0'		13" RECOVERY		
2.43		2	2.0'	16 24 11 8	Moist hard brown clay w/some gravel and fine to coarse sand.	A-6(4)	
			4.0'		19" RECOVERY		
4.86		3	4.0'	2 2 4 9	Moist firm brown clay w/some gravel, trace of fine to coarse sand.	A-6(8)	
			6.0'		22" RECOVERY		
7.29		4	6.0'	8 10 10 11	Moist firm brown clay w/trace of gravel and fine to coarse sand.	A-6(8)	
			8.0'		19" RECOVERY		
9.72		5	8.0'	2 3 4 5	Moist very stiff brown silt w/trace of gravel and fine to coarse sand.	A-7-6(20)	
			10.0'		19" RECOVERY		
		6	10.0'	8 8 11 10	Moist very stiff brown silt w/trace of gravel and fine to coarse sand.	A-4(0)	
			12.0'		24" RECOVERY		
12.15		7	12.0'	4 6 12 14	Moist very stiff brown clayey fine sandy gravelly silt w/some coarse sand.	A-4(0)	
			14.0'		21" RECOVERY		

Remarks: GTA Inspector - J. Williams

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: I-95 & U.S. 202 Interchange
Contract: 25-106-02

Boring No.: BRG1B-23

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.58		8	14.0'	8 9 9 9	Moist very stiff brown fine sandy clay w/some coarse sand and gravel.	A-6(4)	
			16.0'		24" RECOVERY		
17.01		9	16.0'	8 10 10 11	Wet very stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(13)	
			18.0'		24" RECOVERY		
19.44		10	18.0'	9 14 12 15	Wet hard brown gravelly clay w/some fine to coarse sand.	A-7-5(5)	
			20.0'		24" RECOVERY		
					End of Boring		
21.87							
24.3							
26.73							
29.16							
31.59							
34.02							
36.45							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Poorly graded clayey
silty sand



Elastic silt



Silty sand

Notes:

1. Exploratory borings were drilled on 9-4-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a Trailer Rig CME 45.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 2

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 2.0

Elevation: _____ Source: BRG1B-24

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	34.88	23.36	592.70	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.46	22.05	527.03	
WT. OF WATER LOST:	3.42	1.31	65.67	POST-IGNITION
WT. OF BOTTLE:	19.58	15.42	87.62	DISH & SOIL:
WT. OF DRY SOIL:	11.88	6.63	439.41	
PERCENT OF WATER:	28.80	19.80	14.90	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	28.8			LOSS %: _____

WT PASSING #10 SIEVE: 353

WT. OF TOTAL SAMPLE: 439.4		WT. OF WASH SAMPLE: 103.5		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	15.8	15.8	3.6	96.4
#4	30.5	14.7	3.3	93.1
#10	86.3	55.8	12.7	80.4
#40	5.6	5.6	4.3	76.0
#200	13.3	7.7	6.0	70.0
PASS #200		90.2	70.0	

SUMMARY

LIQUID LIMIT:	28.8
PLASTIC LIMIT:	19.8
PLASTICITY INDEX:	9.0
% SAND AND GRAVEL:	30.0
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(5)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 5

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 8.0

Elevation: _____ Source: BRG1B-24

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	37.01	20.27	876.70	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	33.85	18.90	750.45	
WT. OF WATER LOST:	3.16	1.37	126.25	POST-IGNITION
WT. OF BOTTLE:	23.25	12.71	86.65	DISH & SOIL:
WT. OF DRY SOIL:	10.60	6.19	663.80	
PERCENT OF WATER:	29.80	22.10	19.00	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	29.8			LOSS %: _____

WT PASSING #10 SIEVE: 588

WT. OF TOTAL SAMPLE: 663.8		WT. OF WASH SAMPLE: 105.7		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	7.3	7.3	1.1	98.9
#4	13.7	6.4	1.0	97.9
#10	76.0	62.3	9.4	88.6
#40	15.3	15.3	12.8	75.7
#200	36.5	21.2	17.8	58.0
PASS #200		69.2	58.0	

SUMMARY

LIQUID LIMIT:	29.8
PLASTIC LIMIT:	22.1
PLASTICITY INDEX:	7.7
% SAND AND GRAVEL:	42.0
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(3)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY SOIL ANALYSIS REPORT TEST NO.: <u>6</u> REPORTED BY: _____ REVIEWED BY: _____	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400 Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u> Contractor: _____ Road: _____ Location: _____ Depth: <u>10.0</u> Elevation: _____ Source: <u>BRG1B-24</u> Type and Use of Material: _____ Type of Sample: _____ Method Placed: _____ Remarks: _____ Date Sampled: _____ Sampled By: _____ FOR LABORATORY USE ONLY Location of Lab: <u>DOVER</u> Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>
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PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	35.87	21.10	892.70	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.83	19.69	768.44	
WT. OF WATER LOST:	4.04	1.41	124.26	POST-IGNITION
WT. OF BOTTLE:	19.43	12.73	86.56	DISH & SOIL:
WT. OF DRY SOIL:	12.40	6.96	681.88	
PERCENT OF WATER:	32.60	20.30	18.20	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	32.6			LOSS %: _____

WT PASSING #10 SIEVE: 564

WT. OF TOTAL SAMPLE: 681.9		WT. OF WASH SAMPLE: 106.0		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	14.3	14.3	2.1	97.9
#4	44.3	30.0	4.4	93.5
#10	118.0	73.7	10.8	82.7
#40	23.5	23.5	18.3	64.4
#200	53.8	30.3	23.6	40.7
PASS #200		52.2	40.7	

SUMMARY	
LIQUID LIMIT:	32.6
PLASTIC LIMIT:	20.3
PLASTICITY INDEX:	12.3
% SAND AND GRAVEL:	59.3
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(2)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>7</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>12.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-24</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	36.27	20.86	644.70	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.55	18.60	519.98	
WT. OF WATER LOST:	4.72	2.26	124.72	POST-IGNITION
WT. OF BOTTLE:	22.08	13.22	87.32	DISH & SOIL:
WT. OF DRY SOIL:	9.47	5.38	432.66	
PERCENT OF WATER:	49.80	42.00	28.80	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	49.8			LOSS %: _____

WT PASSING #10 SIEVE: 314

WT. OF TOTAL SAMPLE: 432.7		WT. OF WASH SAMPLE: 105.1		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
2"	0.0	0.0	0.0	100.0
1"	34.8	34.8	8.0	92.0
3/8"	59.0	24.2	5.6	86.4
# 4	70.4	11.4	2.6	83.7
#10	118.2	47.8	11.0	72.7
#40	33.1	33.1	22.9	49.8
#200	63.2	30.1	20.8	29.0
PASS #200		41.9	29.0	

SUMMARY	
LIQUID LIMIT:	49.8
PLASTIC LIMIT:	42.0
PLASTICITY INDEX:	7.8
% SAND AND GRAVEL:	71.0
% SILT:	
% CLAY:	
CLASSIFICATION:	A-2-5(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>9</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>16.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-24</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	40.46		669.50	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	33.74		544.19	
WT. OF WATER LOST:	6.72		125.31	POST-IGNITION
WT. OF BOTTLE:	18.93		78.52	DISH & SOIL:
WT. OF DRY SOIL:	14.81		465.67	
PERCENT OF WATER:	45.40		26.90	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	45.4			LOSS %: _____

WT PASSING #10 SIEVE: 394

WT. OF TOTAL SAMPLE: 465.7		WT. OF WASH SAMPLE: 101.8		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
2"	0.0	0.0	0.0	100.0
1"	41.9	41.9	9.0	91.0
3/8"	44.7	2.8	0.6	90.4
# 4	47.7	3.0	0.6	89.8
#10	71.8	24.1	5.2	84.6
#40	21.9	21.9	18.2	66.4
#200	62.9	41.0	34.1	32.3
PASS #200		38.9	32.3	

SUMMARY	
LIQUID LIMIT:	45.4
PLASTIC LIMIT:	NP
PLASTICITY INDEX:	NP
% SAND AND GRAVEL:	67.7
% SILT:	
% CLAY:	
CLASSIFICATION:	A-2-5(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY SOIL ANALYSIS REPORT TEST NO.: <u>10</u> REPORTED BY: _____ REVIEWED BY: _____	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400 Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u> Contractor: _____ Road: _____ Location: _____ Depth: <u>18.0</u> Elevation: _____ Source: <u>BRG1B-24</u> Type and Use of Material: _____ Type of Sample: _____ Method Placed: _____ Remarks: _____ Date Sampled: _____ Sampled By: _____ FOR LABORATORY USE ONLY Location of Lab: <u>DOVER</u> Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>
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PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	37.30		680.00	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	33.09		539.77	
WT. OF WATER LOST:	4.21		140.23	POST-IGNITION
WT. OF BOTTLE:	21.16		77.58	DISH & SOIL:
WT. OF DRY SOIL:	11.93		462.19	
PERCENT OF WATER:	35.30		30.30	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	35.3			LOSS %: _____

WT PASSING #10 SIEVE: 392

WT. OF TOTAL SAMPLE: 462.2		WT. OF WASH SAMPLE: 110.0		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	21.4	21.4	4.6	95.4
#4	31.0	9.6	2.1	93.3
#10	70.0	39.0	8.4	84.9
#40	14.3	14.3	11.0	73.8
#200	46.2	31.9	24.6	49.2
PASS #200		63.8	49.2	

SUMMARY	
LIQUID LIMIT:	35.3
PLASTIC LIMIT:	NP
PLASTICITY INDEX:	NP
% SAND AND GRAVEL:	50.8
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-24

Contract: 25-106-02

Boring Location: Sta. 38+97.00, 9.5' Lt. Ramp 5

Boring Surface Elev.: 174.08

Reference:

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

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

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

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4"
Hollow Stem Auger:

Inches

From Depth of: 0.0'
From Depth of:

To:
To:

18.0'

Water Level Readings
Date 9/4/2009

Time

Depth of Hole

Depth of Casing

Depth of Water
Dry

Elev. of Water

174.1
174.1
174.1

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring: 20.0
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: J. Truver
Helpers:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	12 12 11	No Sieve Analysis - Indication of moist very stiff brown clay w/trace of gravel.		Topsoil - 4".
2.43		2	2.0'	8 16 8 11	11" RECOVERY Moist very stiff brown clayey silt w/some gravel, trace of fine to coarse sand.	A-4(5)	
4.86		3	4.0'	4 5 7 5	17" RECOVERY Moist stiff brown clay w/trace of fine to coarse sand.	A-7-6(21)	
7.29		4	6.0'	8 14 14 16	2" RECOVERY Moist very stiff brown clayey silt w/trace of fine sand.	A-4(10)	
9.72		5	8.0'	4 8 8 11	24" RECOVERY Moist very stiff brown clayey silt w/some fine to coarse sand and gravel.	A-4(3)	
12.15		6	10.0'	16 18 14 16	23" RECOVERY Moist hard brown fine sandy clay w/some coarse sand and gravel.	A-6(2)	
		7	12.0'	6 6 11 10	24" RECOVERY Wet medium dense brown clayey gravel and coarse to fine sand.	A-2-5(0)	
			14.0'		18" RECOVERY		

Remarks: GTA Inspector - J. Williams

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-24

Contract: 25-106-02

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.58		8	14.0'	8 11 13 9	No Sieve Analysis - Indication of wet very stiff brown sandy lean clay w/rock fragments.		
			16.0'		10" RECOVERY		
17.01		9	16.0'	16 14 14 20	Wet medium dense brown silty fine sand w/ some coarse sand and gravel.	A-2-5(0)	
			18.0'		23" RECOVERY		
19.44		10	18.0'	26 29 39 34	Wet hard brownish black fine sandy silt w/some gravel and coarse sand.	A-4(0)	
			20.0'		24" RECOVERY		
					End of Boring		
21.87							
24.3							
26.73							
29.16							
31.59							
34.02							
36.45							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded, silty or clayey
sands and gravel



Clayey sand



Silty sand

Notes:

1. Exploratory borings were drilled on 9-4-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a Trailer Rig CME 45.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 3

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 4.0

Elevation: _____ Source: BRG1B-25

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____

Sampled By: _____ Date Sampled: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	27.66	23.18	697.74	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	24.41	21.72	608.70	
WT. OF WATER LOST:	3.25	1.46	89.04	POST-IGNITION
WT. OF BOTTLE:	15.07	15.42	84.44	DISH & SOIL:
WT. OF DRY SOIL:	9.34	6.30	524.26	
PERCENT OF WATER:	34.80	23.20	17.00	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	34.8			LOSS %: _____

WT PASSING #10 SIEVE: 452

WT. OF TOTAL SAMPLE: 524.3		WT. OF WASH SAMPLE: 112.2		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	13.7	13.7	2.6	97.4
#4	17.1	3.4	0.6	96.7
#10	72.7	55.6	10.6	86.1
#40	3.9	3.9	3.0	83.1
#200	9.7	5.8	4.5	78.7
PASS #200		102.5	78.7	

SUMMARY

LIQUID LIMIT:	34.8
PLASTIC LIMIT:	23.2
PLASTICITY INDEX:	11.6
% SAND AND GRAVEL:	21.3
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(9)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 4

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 6.0

Elevation: _____ Source: BRG1B-25

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	29.67	21.59	768.26	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	26.13	20.07	681.63	
WT. OF WATER LOST:	3.54	1.52	86.63	POST-IGNITION
WT. OF BOTTLE:	12.73	12.62	87.57	DISH & SOIL:
WT. OF DRY SOIL:	13.40	7.45	594.06	
PERCENT OF WATER:	26.40	20.40	14.60	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	26.4			LOSS %: _____

WT PASSING #10 SIEVE: 462

WT. OF TOTAL SAMPLE: 594.1		WT. OF WASH SAMPLE: 115.3		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	21.0	21.0	3.5	96.5
#4	38.8	17.8	3.0	93.5
#10	131.6	92.8	15.6	77.8
#40	20.0	20.0	13.5	64.3
#200	45.3	25.3	17.1	47.3
PASS #200		70.0	47.3	

SUMMARY

LIQUID LIMIT:	26.4
PLASTIC LIMIT:	20.4
PLASTICITY INDEX:	6.0
% SAND AND GRAVEL:	52.7
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-25

Contract: 25-106-02

Boring Location: Sta. 38+98.00, 28.5' Lt. Ramp 5

Boring Surface Elev.: 173.30

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:	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:	14.5'
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/3/2009				11.4'	161.9
						173.3
						173.3
						173.3

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	14.5	Ft.;		Dia. U-Sample Boring:		Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:		
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	5.0		Ft.

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

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'		No Sample - No Spoon Driven		Topsoil - 4".
			2.0'		0" RECOVERY		
2.53		2	2.0'	4 34 6 7	Moist hard brown clay w/trace of fine to coarse sand.	A-6(16)	
			4.0'		9" RECOVERY		
5.06		3	4.0'	6 10 15 21	Moist very stiff brown clay w/some gravel, trace of fine to coarse sand.	A-6(9)	
			6.0'		21" RECOVERY		
7.59		4	6.0'	11 14 16 28	Moist very stiff brown clayey gravelly silt w/ some fine to coarse sand.	A-4(0)	
			8.0'		18" RECOVERY		
		5	8.0'	3 5 7 7	Moist stiff brown fine sandy clay w/some coarse sand and gravel.	A-6(2)	
			10.0'		22" RECOVERY		
10.12		6	10.0'	4 6 10 10	Wet very stiff brown fine sandy clay w/some coarse sand.	A-7-5(9)	
	▽		12.0'		19" RECOVERY		
12.65		7	12.0'	11 11 14 13	Wet medium dense brown clayey gravel w/ some fine to coarse sand.	A-2-5(0)	
			14.0'		13" RECOVERY		

Remarks: GTA Inspector - J. Williams

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: I-95 & U.S. 202 Interchange
Contract: 25-106-02

Boring No.: BRG1B-25

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		8	14.0'	100	 No Sieve Analysis - Indication of wet very stiff brown sandy lean clay. 3" RECOVERY Gniess, gray and white, coarse grained, unweathered, hard 48" Recovery = 80.0% RQD = 60.0% (fair)		RQD = Rock Quality Designation
15.18		R-1	14.5'				
			14.5'				
17.71					48" RECOVERY		
19.5'					End of Boring		
20.24							
22.77							
25.3							
27.83							
30.36							
32.89							
35.42							
37.95							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded, silty or clayey sands and gravel



Poorly graded clayey silty sand



Clayey sand



Well graded gravels and sands



Silty sand



Frac rock

Misc. Symbols



Water table during drilling

Notes:

1. Exploratory borings were drilled on 9-3-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a Trailer Rig CME 45.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 4

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 6.0

Elevation: _____ Source: BRG1B-26

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	36.45	20.51	797.50	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	33.18	19.18	697.16	
WT. OF WATER LOST:	3.27	1.33	100.34	POST-IGNITION
WT. OF BOTTLE:	22.02	12.88	86.06	DISH & SOIL:
WT. OF DRY SOIL:	11.16	6.30	611.10	
PERCENT OF WATER:	29.30	21.10	16.40	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	29.3			LOSS %: _____

WT PASSING #10 SIEVE: 569

WT. OF TOTAL SAMPLE: 611.1		WT. OF WASH SAMPLE: 106.4		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
3/8"	0.0	0.0	0.0	100.0
#4	4.6	4.6	0.8	99.2
#10	41.9	37.3	6.1	93.1
#40	14.2	14.2	12.4	80.7
#200	33.5	19.3	16.9	63.8
PASS #200		72.9	63.8	

SUMMARY

LIQUID LIMIT:	29.3
PLASTIC LIMIT:	21.1
PLASTICITY INDEX:	8.2
% SAND AND GRAVEL:	36.2
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(3)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 6

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 10.0

Elevation: _____ Source: BRG1B-26

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	36.59	27.54	777.70	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.97	25.64	629.39	
WT. OF WATER LOST:	4.62	1.90	148.31	POST-IGNITION
WT. OF BOTTLE:	22.41	19.10	86.77	DISH & SOIL:
WT. OF DRY SOIL:	9.56	6.54	542.62	
PERCENT OF WATER:	48.30	29.10	27.30	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	48.3			LOSS %: _____

WT PASSING #10 SIEVE: 521

WT. OF TOTAL SAMPLE: 542.6		WT. OF WASH SAMPLE: 103.9		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	7.2	7.2	1.3	98.7
#4	7.9	0.7	0.1	98.5
#10	21.7	13.8	2.5	96.0
#40	19.3	19.3	17.8	78.2
#200	51.6	32.3	29.8	48.3
PASS #200		52.3	48.3	

SUMMARY

LIQUID LIMIT:	48.3
PLASTIC LIMIT:	29.1
PLASTICITY INDEX:	19.2
% SAND AND GRAVEL:	51.7
% SILT:	
% CLAY:	
CLASSIFICATION:	A-7-6(6)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>7</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>12.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-26</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	36.56		661.10	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	30.64		532.61	
WT. OF WATER LOST:	5.92		128.49	POST-IGNITION
WT. OF BOTTLE:	19.14		87.33	DISH & SOIL:
WT. OF DRY SOIL:	11.50		445.28	
PERCENT OF WATER:	51.50		28.90	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	51.5			LOSS %: _____

WT PASSING #10 SIEVE: 407

WT. OF TOTAL SAMPLE: 445.3		WT. OF WASH SAMPLE: 110.1		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	12.2	12.2	2.7	97.3
#4	14.8	2.6	0.6	96.7
#10	38.3	23.5	5.3	91.4
#40	27.4	27.4	22.7	68.7
#200	63.9	36.5	30.3	38.4
PASS #200		46.2	38.4	

SUMMARY	
LIQUID LIMIT:	51.5
PLASTIC LIMIT:	NP
PLASTICITY INDEX:	NP
% SAND AND GRAVEL:	61.6
% SILT:	
% CLAY:	
CLASSIFICATION:	A-5(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>8</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>14.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-26</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:			575.30	DISH & SOIL:
WT. DRY SOIL & BOTTLE:			523.05	
WT. OF WATER LOST:			52.25	POST-IGNITION
WT. OF BOTTLE:			87.01	DISH & SOIL:
WT. OF DRY SOIL:			436.04	
PERCENT OF WATER:			12.00	DISH:
BLOWS REQUIRED FOR CLOSURE:				LOSS %: _____
CORRECTED LIQUID LIMIT %:	NV			

WT PASSING #10 SIEVE: 276

WT. OF TOTAL SAMPLE: 436.0		WT. OF WASH SAMPLE: 101.5		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
2"	0.0	0.0	0.0	100.0
1"	28.2	28.2	6.5	93.5
3/8"	102.0	73.8	16.9	76.6
# 4	125.1	23.1	5.3	71.3
#10	160.3	35.2	8.1	63.2
#40	34.8	34.8	21.7	41.6
#200	73.3	38.5	24.0	17.6
PASS #200		28.2	17.6	

SUMMARY	
LIQUID LIMIT:	NV
PLASTIC LIMIT:	NP
PLASTICITY INDEX:	NP
% SAND AND GRAVEL:	82.4
% SILT:	
% CLAY:	
CLASSIFICATION:	A-1-b

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 9

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 16.0

Elevation: _____ Source: BRG1B-26

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	35.28		660.80	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.32		548.61	
WT. OF WATER LOST:	3.96		112.19	POST-IGNITION
WT. OF BOTTLE:	20.97		87.58	DISH & SOIL:
WT. OF DRY SOIL:	10.35		461.03	
PERCENT OF WATER:	38.30		24.30	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	38.3			LOSS %: _____

WT PASSING #10 SIEVE: 370

WT. OF TOTAL SAMPLE: 461.0		WT. OF WASH SAMPLE: 103.6		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	38.9	38.9	8.4	91.6
#4	49.4	10.5	2.3	89.3
#10	91.0	41.6	9.0	80.3
#40	29.5	29.5	22.9	57.4
#200	69.6	40.1	31.1	26.3
PASS #200		34.0	26.3	

SUMMARY

LIQUID LIMIT:	38.3
PLASTIC LIMIT:	NP
PLASTICITY INDEX:	NP
% SAND AND GRAVEL:	73.7
% SILT:	
% CLAY:	
CLASSIFICATION:	A-2-4(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 10

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 18.0

Elevation: _____ Source: BRG1B-26

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____

Sampled By: _____ Date Sampled: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:			628.00	DISH & SOIL:
WT. DRY SOIL & BOTTLE:			517.90	
WT. OF WATER LOST:			110.10	POST-IGNITION
WT. OF BOTTLE:			86.71	DISH & SOIL:
WT. OF DRY SOIL:			431.19	
PERCENT OF WATER:			25.50	DISH:
BLOWS REQUIRED FOR CLOSURE:				LOSS %: _____
CORRECTED LIQUID LIMIT %:	NV			

WT PASSING #10 SIEVE: 391

WT. OF TOTAL SAMPLE: 431.2		WT. OF WASH SAMPLE: 103.7		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	3.5	3.5	0.8	99.2
#4	11.2	7.7	1.8	97.4
#10	40.0	28.8	6.7	90.7
#40	31.9	31.9	27.9	62.8
#200	73.6	41.7	36.5	26.3
PASS #200		30.1	26.3	

SUMMARY

LIQUID LIMIT: NV

PLASTIC LIMIT: NP

PLASTICITY INDEX: NP

% SAND AND GRAVEL: 73.7

% SILT: _____

% CLAY: _____

CLASSIFICATION: A-2-4(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-26

Contract: 25-106-02

Boring Location: Sta. 39+19.00, 48' Lt. Ramp 5

Boring Surface Elev.: 173.99

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		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:	18.0'
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/4/2009				Dry	174.0
						174.0
						174.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	19.5	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: J. Truver
Helpers:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	7 8 10	Moist very stiff brown clayey silt w/trace of gravel and fine to coarse sand.	A-4(9)	Topsoil - 4".
			2.0'		13" RECOVERY		
2.43		2	2.0'	8 11 14 16	Moist very stiff brown clay w/trace of fine sand.	A-6(13)	
			4.0'		18" RECOVERY		
		3	4.0'	6 11 12 13	Moist very stiff brown clayey silt w/trace of fine to coarse sand.	A-4(9)	
4.86			6.0'		20" RECOVERY		
		4	6.0'	22 16 19 25	Moist hard brown clayey silt w/some fine to coarse sand, trace of gravel.	A-4(3)	
7.29			8.0'		20" RECOVERY		
		5	8.0'	16 20 14 6	Moist hard brown clayey fine sandy gravelly silt w/some coarse sand.	A-4(1)	
9.72			10.0'		14" RECOVERY		
		6	10.0'	9 11 13 11	Wet very stiff brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-6(6)	
			12.0'		22" RECOVERY		
12.15		7	12.0'	4 7 12 17	Wet very stiff brown fine to coarse sandy silt w/trace of gravel.	A-5(0)	
			14.0'		21" RECOVERY		

Remarks: GTA Inspector - J. Williams

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: I-95 & U.S. 202 Interchange
Contract: 25-106-02

Boring No.: BRG1B-26

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.58		8	14.0'	12 23 46 25	Wet very dense brown gravel and fine to coarse sand w/some silt. 12" RECOVERY	A-1-b	
			16.0'				
17.01		9	16.0'	17 17 16 18	Wet dense brown silty fine to coarse sand w/ some gravel. 15" RECOVERY	A-2-4(0)	
			18.0'				
19.44		10	18.0'	11 11 52 50/5"	Wet very dense brownish gray silty fine to coarse sand w/trace of gravel. 18" RECOVERY	A-2-4(0)	
			20.0'				
					End of Boring		
21.87							
24.3							
26.73							
29.16							
31.59							
34.02							
36.45							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded, silty or clayey
sands and gravel



Clayey sand



Silty sand

Notes:

1. Exploratory borings were drilled on 9-4-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a Trailer Rig CME 45.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>1</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>0.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-27</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	35.39	20.88	530.60	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	32.18	19.50	480.70	
WT. OF WATER LOST:	3.21	1.38	49.90	POST-IGNITION
WT. OF BOTTLE:	22.27	13.12	77.79	DISH & SOIL:
WT. OF DRY SOIL:	9.91	6.38	402.91	
PERCENT OF WATER:	32.40	21.60	12.40	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	32.4			LOSS %: _____

WT PASSING #10 SIEVE: 366

WT. OF TOTAL SAMPLE: 402.9		WT. OF WASH SAMPLE: 112.0		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	1.7	1.7	0.4	99.6
#4	9.9	8.2	2.0	97.5
#10	36.6	26.7	6.6	90.9
#40	3.1	3.1	2.5	88.4
#200	7.7	4.6	3.7	84.7
PASS #200		104.3	84.7	

SUMMARY	
LIQUID LIMIT:	32.4
PLASTIC LIMIT:	21.6
PLASTICITY INDEX:	10.8
% SAND AND GRAVEL:	15.3
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(8)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>2</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>2.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-27</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	32.77	20.67	375.90	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	29.64	19.15	347.98	
WT. OF WATER LOST:	3.13	1.52	27.92	POST-IGNITION
WT. OF BOTTLE:	20.82	12.72	87.10	DISH & SOIL:
WT. OF DRY SOIL:	8.82	6.43	260.88	
PERCENT OF WATER:	35.50	23.60	10.70	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	35.5			LOSS %: _____

WT PASSING #10 SIEVE: 216

WT. OF TOTAL SAMPLE: 260.9		WT. OF WASH SAMPLE: 107.9		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	38.1	38.1	14.6	85.4
#4	40.9	2.8	1.1	84.3
#10	44.7	3.8	1.5	82.9
#40	3.6	3.6	2.8	80.1
#200	9.2	5.6	4.3	75.8
PASS #200		98.7	75.8	

SUMMARY	
LIQUID LIMIT:	35.5
PLASTIC LIMIT:	23.6
PLASTICITY INDEX:	11.9
% SAND AND GRAVEL:	24.2
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(9)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-27

Contract: 25-106-02

Boring Location: Sta. 40+30.00, 52' Rt. Ramp 5

Boring Surface Elev.: 175.04

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:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit: NQ2	O.D.	O.D. of Rock Core:	3	IN.

Casing Size:	3 1/4"	Inches	From Depth of:	0.0'	To:	7.3'
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/14/2009				11.1'	163.9
						175.0
						175.0
						175.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	6.5	Ft.;		Dia. U-Sample Boring:	Ft.
No. of 2 in. Dia. Shelby Tubes:		;	No. of:	U-Samples:	
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	15.0	Ft.

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

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	7 14 8 8	Moist very stiff brown silt w/trace of gravel and fine to coarse sand.	A-4(8)	
2.2		2	2.0'	11 50/4"	16" RECOVERY Moist hard brown clay w/some gravel, trace of fine to coarse sand.	A-6(9)	
4.4		3	4.0'	9 8 14 22	9" RECOVERY Moist very stiff reddish brown fine sandy clay w/some coarse sand, trace of gravel.	A-6(5)	
6.6		4	6.0'	50/3"	17" RECOVERY No Sieve Analysis - Indication of moist hard red and brown sandy lean clay w/rock fragments.		
8.8		R-1	7.3'		2" RECOVERY Gniess, gray and white, coarse grained, slightly weathered, hard 39" Recovery = 65.0% RQD = 13.3% (very poor)		RQD - Rock Quality Designation
11	▽		12.3'		39" RECOVERY		

Remarks: GTA Inspector - J. Lafferty

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: I-95 & U.S. 202 Interchange
Contract: 25-106-02

Boring No.: BRG1B-27

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
13.2		R-2	12.3'		Gniess, gray and white, coarse grained, unweathered, hard 18" Recovery = 30.0% RQD = 6.6% (very poor)		RQD - Rock Quality Designation
15.4							
17.6							
17.6		R-3	17.3'		18" RECOVERY Gniess, gray and white, coarse grained, unweathered, hard 60" Recovery = 100.0% RQD = 80.0% (good)		RQD - Rock Quality Designation
19.8							
22							
22.3'							
					60" RECOVERY		
					End of Boring		
24.2							
26.4							
28.6							
30.8							
33							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded, silty or clayey
sands and gravel



Frac rock

Misc. Symbols



Water table during
drilling

Notes:

1. Exploratory borings were drilled on 9-14-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>1</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>0.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-28</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	38.89	21.38	441.60	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	35.39	19.91	418.08	
WT. OF WATER LOST:	3.50	1.47	23.52	POST-IGNITION
WT. OF BOTTLE:	22.16	13.01	87.85	DISH & SOIL:
WT. OF DRY SOIL:	13.23	6.90	330.23	
PERCENT OF WATER:	26.50	21.30	7.10	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	26.5			LOSS %: _____

WT PASSING #10 SIEVE: 209

WT. OF TOTAL SAMPLE: 330.2		WT. OF WASH SAMPLE: 53.5		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	67.2	67.2	20.3	79.7
#4	80.7	13.5	4.1	75.6
#10	121.3	40.6	12.3	63.3
#40	4.8	4.8	5.7	57.6
#200	13.9	9.1	10.8	46.8
PASS #200		39.6	46.8	

SUMMARY	
LIQUID LIMIT:	26.5
PLASTIC LIMIT:	21.3
PLASTICITY INDEX:	5.2
% SAND AND GRAVEL:	53.2
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>4</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>6.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-28</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	44.51		644.10	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	39.38		568.88	
WT. OF WATER LOST:	5.13		75.22	POST-IGNITION
WT. OF BOTTLE:	22.80		87.10	DISH & SOIL:
WT. OF DRY SOIL:	16.58		481.78	
PERCENT OF WATER:	30.90		15.60	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	30.9			LOSS %: _____

WT PASSING #10 SIEVE: 323

WT. OF TOTAL SAMPLE: 481.8		WT. OF WASH SAMPLE: 110.2		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	86.4	86.4	17.9	82.1
#4	129.0	42.6	8.8	73.2
#10	159.2	30.2	6.3	67.0
#40	25.8	25.8	15.7	51.3
#200	63.1	37.3	22.7	28.6
PASS #200		47.1	28.6	

SUMMARY	
LIQUID LIMIT:	30.9
PLASTIC LIMIT:	NP
PLASTICITY INDEX:	NP
% SAND AND GRAVEL:	71.4
% SILT:	
% CLAY:	
CLASSIFICATION:	A-2-4(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>5</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>8.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-28</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:			589.00	DISH & SOIL:
WT. DRY SOIL & BOTTLE:			568.39	
WT. OF WATER LOST:			20.61	POST-IGNITION
WT. OF BOTTLE:			86.76	DISH & SOIL:
WT. OF DRY SOIL:			481.63	
PERCENT OF WATER:			4.30	DISH:
BLOWS REQUIRED FOR CLOSURE:				LOSS %: _____
CORRECTED LIQUID LIMIT %:	NV			

WT PASSING #10 SIEVE: 237

WT. OF TOTAL SAMPLE: 481.6		WT. OF WASH SAMPLE: 101.2		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	165.4	165.4	34.3	65.7
#4	206.7	41.3	8.6	57.1
#10	244.6	37.9	7.9	49.2
#40	19.0	19.0	9.2	40.0
#200	72.3	53.3	25.9	14.1
PASS #200		28.9	14.1	

SUMMARY	
LIQUID LIMIT:	NV
PLASTIC LIMIT:	NP
PLASTICITY INDEX:	NP
% SAND AND GRAVEL:	85.9
% SILT:	
% CLAY:	
CLASSIFICATION:	A-1-b

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-28

Contract: 25-106-02

Boring Location: Sta. 40+56.00, 34' Rt. Ramp 5

Boring Surface Elev.: 185.46

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: NQ2		O.D.	O.D. of Rock Core: 3		IN.

Casing Size: 3 1/4"	Inches	From Depth of: 0.0'	To: 10.25'
Hollow Stem Auger:		From Depth of:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/10/2009				Dry	185.5
						185.5
						185.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	10.25	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:	15.0

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.0'	16 27 20 31		A-4(0)	Topsoil - 4".
1.8			2.0'				
		2	2.0'	50/3"	12" RECOVERY No Sieve Analysis - Indication of moist hard brown sandy silt.		
3.6			4.0'		3" RECOVERY		
		3	4.0'	7 9 21 19		A-6(3)	
5.4			6.0'				
		4	6.0'	22 31 34 39		A-2-4(0)	Rock Fragments
7.2			8.0'				
		5	8.0'	16 40 41 44		A-1-b	Rock Fragments
9			10.0'				
					15" RECOVERY		

Remarks: GTA Inspector - J. Lafferty - Boring offset 22' South and 10' East due to original location being directly under overpass.

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: I-95 & U.S. 202 Interchange
Contract: 25-106-02

Boring No.: BRG1B-28

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
10.8		6 R-1	10.0' 10.3' 10.3'	50/3"	No Sieve Analysis - Indication of moist very dense tan silty sand w/rock fragments. 3" RECOVERY Gniess, gray and white, coarse grained, unweathered, hard 45" Recovery = 75.0% RQD = 0.0% (very poor)		RQD = Rock Quality Designation
12.6							
14.4							
16.2		R-2	15.3' 15.3'		45" RECOVERY Gniess, gray and white, coarse grained, unweathered, hard 46" Recovery = 76.67% RQD = 54.1% (fair)		RQD = Rock Quality Designation
18							
19.8							
21.6		R-3	20.3' 20.3'		46" RECOVERY Gniess, gray and white, coarse grained, unweathered, hard 60" Recovery = 100.0% RQD = 93.3% (excellent)		RQD = Rock Quality Designation
23.4							
25.2			25.3'		60" RECOVERY		
27					End of Boring		

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Poorly graded, silty or clayey
sands and gravel



Silty sand



Frac rock

Notes:

1. Exploratory borings were drilled on 9-10-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 0.0

Elevation: _____ Source: BRG1B-29

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____

Sampled By: _____ Date Sampled: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	35.00	21.26	637.10	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	32.18	19.75	567.88	
WT. OF WATER LOST:	2.82	1.51	69.22	POST-IGNITION
WT. OF BOTTLE:	22.66	12.98	76.50	DISH & SOIL:
WT. OF DRY SOIL:	9.52	6.77	491.38	
PERCENT OF WATER:	29.60	22.30	14.10	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	29.6			LOSS %: _____

WT PASSING #10 SIEVE: 445

WT. OF TOTAL SAMPLE: 491.4		WT. OF WASH SAMPLE: 116.1		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	12.8	12.8	2.6	97.4
#4	15.2	2.4	0.5	96.9
#10	46.5	31.3	6.4	90.5
#40	19.3	19.3	15.1	75.5
#200	42.3	23.0	17.9	57.6
PASS #200		73.8	57.6	

SUMMARY

LIQUID LIMIT:	29.6
PLASTIC LIMIT:	22.3
PLASTICITY INDEX:	7.3
% SAND AND GRAVEL:	42.4
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(3)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 3

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 4.0

Elevation: _____ Source: BRG1B-29

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	36.06	22.71	554.00	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	32.64	21.24	498.06	
WT. OF WATER LOST:	3.42	1.47	55.94	POST-IGNITION
WT. OF BOTTLE:	22.27	14.81	88.40	DISH & SOIL:
WT. OF DRY SOIL:	10.37	6.43	409.66	
PERCENT OF WATER:	33.00	22.90	13.70	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	33.0			LOSS %: _____

WT PASSING #10 SIEVE: 375

WT. OF TOTAL SAMPLE: 409.7		WT. OF WASH SAMPLE: 109.4		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	11.7	11.7	2.9	97.1
#4	14.3	2.6	0.6	96.5
#10	34.7	20.4	5.0	91.5
#40	11.6	11.6	9.7	81.8
#200	24.0	12.4	10.4	71.4
PASS #200		85.4	71.4	

SUMMARY

LIQUID LIMIT:	33.0
PLASTIC LIMIT:	22.9
PLASTICITY INDEX:	10.1
% SAND AND GRAVEL:	28.6
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(6)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>5</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>8.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-29</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	34.90	21.68	703.60	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.58	19.85	595.88	
WT. OF WATER LOST:	3.32	1.83	107.72	POST-IGNITION
WT. OF BOTTLE:	22.12	12.63	86.40	DISH & SOIL:
WT. OF DRY SOIL:	9.46	7.22	509.48	
PERCENT OF WATER:	35.10	25.30	21.10	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	35.1			LOSS %: _____

WT PASSING #10 SIEVE: 491

WT. OF TOTAL SAMPLE: 509.5		WT. OF WASH SAMPLE: 102.4		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	10.1	10.1	2.0	98.0
#4	10.1	0.0	0.0	98.0
#10	18.6	8.5	1.7	96.3
#40	4.1	4.1	3.9	92.5
#200	11.7	7.6	7.2	85.3
PASS #200		90.7	85.3	

SUMMARY	
LIQUID LIMIT:	35.1
PLASTIC LIMIT:	25.3
PLASTICITY INDEX:	9.8
% SAND AND GRAVEL:	14.7
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(9)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>7</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>12.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-29</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	35.67		407.90	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	32.73		379.98	
WT. OF WATER LOST:	2.94		27.92	POST-IGNITION
WT. OF BOTTLE:	21.60		89.19	DISH & SOIL:
WT. OF DRY SOIL:	11.13		290.79	
PERCENT OF WATER:	26.40		9.60	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	26.4			LOSS %: _____

WT PASSING #10 SIEVE: 179

WT. OF TOTAL SAMPLE: 290.8		WT. OF WASH SAMPLE: 65.0		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
2"	0.0	0.0	0.0	100.0
1"	43.6	43.6	15.0	85.0
3/8"	80.3	36.7	12.6	72.4
# 4	95.7	15.4	5.3	67.1
#10	111.5	15.8	5.4	61.7
#40	18.4	18.4	17.5	44.2
#200	48.1	29.7	28.2	16.0
PASS #200		16.9	16.0	

SUMMARY	
LIQUID LIMIT:	26.4
PLASTIC LIMIT:	NP
PLASTICITY INDEX:	NP
% SAND AND GRAVEL:	84.0
% SILT:	
% CLAY:	
CLASSIFICATION:	A-1-b

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-29

Contract: 25-106-02

Boring Location: Sta. 40+53.00, 1' Rt. Ramp 5

Boring Surface Elev.: 182.47

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: NQ2		O.D.	O.D. of Rock Core: 3		IN.

Casing Size: 3 1/4" **Inches** **From Depth of:** 0.0' **To:** 14.4'
Hollow Stem Auger: **From Depth of:** **To:**

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/16/2009				Dry	182.5
						182.5
						182.5

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: 14.4 **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: **Ft.**
 Core Drilling in Rock: 10.0 **Ft.**

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.8		1	0.0'	3 3 9 12	Moist stiff orange clayey silt w/some fine to coarse sand, trace of gravel.	A-4(3)	
3.6		2	2.0'	15 12 10 19	18" RECOVERY Moist very stiff orange clayey silt w/trace of fine to coarse sand and gravel.	A-4(8)	
5.4		3	4.0'	12 11 19 21	12" RECOVERY Moist very stiff orange clayey silt w/some fine sand, trace of coarse sand and gravel.	A-4(6)	
7.2		4	6.0'	36 22 18 18	14" RECOVERY Moist hard brown clay w/trace of fine to coarse sand and gravel.	A-6(11)	
9		5	8.0'	6 6 8 13	17" RECOVERY Wet stiff brownish gray mottled clayey silt w/ trace of fine to coarse sand and gravel.	A-4(9)	
			10.0'		20" RECOVERY		

Remarks: GTA Inspector - D. Zmijewski - Boring offset 8' North

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: I-95 & U.S. 202 Interchange
Contract: 25-106-02

Boring No.: BRG1B-29

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
10.8		6	10.0'	26 20 18 21	No Sample Recovery		
			12.0'		0" RECOVERY		
12.6		7	12.0'	12 35 50/3"	Wet very dense orangish brown gravel and fine sand w/some coarse sand and silt.	A-1-b	
			14.0'		10" RECOVERY		
14.4		8	14.0'	50/2"	Wet very dense brown silty fine to coarse sand w/trace of gravel.	A-2-4(0)	RQD - Rock Quality Designation
		R-1	14.4'		3" RECOVERY Gniess, blue, coarse grained, unweathered, hard 60" Recovery = 100.0% RQD = 78.3% (good)		
16.2			19.4'		60" RECOVERY		
18			19.4'		Gniess, blue, coarse grained, unweathered, hard 60" Recovery = 100.0% RQD = 100.0% (excellent)		RQD - Rock Quality Designation
19.8		R-2	19.4'				
			24.4'		60" RECOVERY		
21.6							
23.4							
25.2					End of Boring		
27							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded, silty or clayey sands and gravel



Well graded gravels and sands



Silty sand



Frac rock

Notes:

1. Exploratory borings were drilled on 9-16-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>2</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>2.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-30</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	35.29	32.78	633.40	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.22	30.87	562.02	
WT. OF WATER LOST:	4.07	1.91	71.38	POST-IGNITION
WT. OF BOTTLE:	19.57	21.56	78.06	DISH & SOIL:
WT. OF DRY SOIL:	11.65	9.31	483.96	
PERCENT OF WATER:	34.90	20.50	14.70	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	34.9			LOSS %: _____

WT PASSING #10 SIEVE: 459

WT. OF TOTAL SAMPLE: 484.0		WT. OF WASH SAMPLE: 110.5		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	2.1	2.1	0.4	99.6
#4	2.5	0.4	0.1	99.5
#10	24.9	22.4	4.6	94.9
#40	6.4	6.4	5.5	89.4
#200	15.6	9.2	7.9	81.5
PASS #200		94.9	81.5	

SUMMARY	
LIQUID LIMIT:	34.9
PLASTIC LIMIT:	20.5
PLASTICITY INDEX:	14.4
% SAND AND GRAVEL:	18.5
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(12)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>3</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>4.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-30</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Date Sampled: _____
	Sampled By: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	35.46	20.82	670.60	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	31.86	19.23	588.75	
WT. OF WATER LOST:	3.60	1.59	81.85	POST-IGNITION
WT. OF BOTTLE:	22.07	13.24	89.39	DISH & SOIL:
WT. OF DRY SOIL:	9.79	5.99	499.36	
PERCENT OF WATER:	36.80	26.50	16.40	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	36.8			LOSS %: _____

WT PASSING #10 SIEVE: 470

WT. OF TOTAL SAMPLE: 499.4		WT. OF WASH SAMPLE: 124.6		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	14.8	14.8	3.0	97.0
#4	15.9	1.1	0.2	96.8
#10	28.9	13.0	2.6	94.2
#40	17.5	17.5	13.2	81.0
#200	42.3	24.8	18.8	62.2
PASS #200		82.3	62.2	

SUMMARY	
LIQUID LIMIT:	36.8
PLASTIC LIMIT:	26.5
PLASTICITY INDEX:	10.3
% SAND AND GRAVEL:	37.8
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(5)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-30

Contract: 25-106-02

Boring Location: Sta. 40+39.00, 32' Lt. Ramp 5

Boring Surface Elev.: 170.01

Reference:

Wt. of Casing Hammer:	Lbs.	Average Fall:		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: NQ2	O.D.	O.D. of Rock Core: 3		IN.

Casing Size: 3 1/4"	Inches	From Depth of: 0.0'	To:	8.4'
Hollow Stem Auger:		From Depth of:		To:

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/17/2009				Dry	170.0
						170.0
						170.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	8.4		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:	15.0		

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	8 7 8	Moist stiff brown clayey silt w/some fine to coarse sand and gravel.	A-4(2)	Topsoil - 8".
2.35		2	2.0'	6 8 8 12	Moist very stiff brown clay w/trace of fine to coarse sand and gravel.	A-6(12)	
		3	4.0'	9 17 22 38	Moist hard reddish brown clay w/some fine to coarse sand, trace of gravel.	A-6(5)	
4.7		4	6.0'	50/3"	Wet hard reddish brown fine sandy clay w/some coarse sand, trace of gravel.	A-7-5(4)	
7.05		5	8.0'	50/2"	No Sample Recovery		
		R-1	8.4'		Gniess, gray, coarse grained, unweathered, hard 36" Recovery = 60.0% RQD = 30.8% (poor)		RQD - Rock Quality Designation
9.4			8.4'				
11.75			8.4'				
			13.4'				

Remarks: GTA Inspector - J. Lafferty - Boring offset 25' Northeast of stake due to inaccessible location.

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: I-95 & U.S. 202 Interchange
Contract: 25-106-02

Boring No.: BRG1B-30

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
14.1		R-2	13.4'		Gniess, gray, coarse grained, unweathered, hard 56" Recovery = 93.33% RQD = 69.1% (fair)		RQD - Rock Quality Designation
16.45							
18.8		R-3	18.4'		56" RECOVERY Gniess, gray, coarse grained, unweathered, hard 60" Recovery = 100.0% RQD = 86.6% (good)		RQD - Rock Quality Designation
			18.4'				
21.15							
23.5			23.4'		60" RECOVERY		
					End of Boring		
25.85							
28.2							
30.55							
32.9							
35.25							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded, silty or clayey
sands and gravel



Well graded gravels and sands



Frac rock

Notes:

1. Exploratory borings were drilled on 9-17-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV TRAK CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 1

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 0.5

Elevation: _____ Source: BRG1B-31

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	32.76	20.98	534.50	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	29.88	19.55	476.85	
WT. OF WATER LOST:	2.88	1.43	57.65	POST-IGNITION
WT. OF BOTTLE:	21.20	13.12	87.40	DISH & SOIL:
WT. OF DRY SOIL:	8.68	6.43	389.45	
PERCENT OF WATER:	33.20	22.20	14.80	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	33.2			LOSS %: _____

WT PASSING #10 SIEVE: 294

WT. OF TOTAL SAMPLE: 389.4		WT. OF WASH SAMPLE: 109.2		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	4.6	4.6	1.2	98.8
#4	26.6	22.0	5.6	93.2
#10	95.3	68.7	17.6	75.5
#40	17.8	17.8	12.3	63.2
#200	41.4	23.6	16.3	46.9
PASS #200		67.8	46.9	

SUMMARY

LIQUID LIMIT:	33.2
PLASTIC LIMIT:	22.2
PLASTICITY INDEX:	11.0
% SAND AND GRAVEL:	53.1
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(2)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY SOIL ANALYSIS REPORT TEST NO.: <u>3</u> REPORTED BY: _____ REVIEWED BY: _____	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400 Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u> Contractor: _____ Road: _____ Location: _____ Depth: <u>4.0</u> Elevation: _____ Source: <u>BRG1B-31</u> Type and Use of Material: _____ Type of Sample: _____ Method Placed: _____ Remarks: _____ Date Sampled: _____ Sampled By: _____
FOR LABORATORY USE ONLY Location of Lab: <u>DOVER</u> Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>	

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	36.87	20.52	453.90	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	33.31	19.02	414.69	
WT. OF WATER LOST:	3.56	1.50	39.21	POST-IGNITION
WT. OF BOTTLE:	22.19	12.64	86.93	DISH & SOIL:
WT. OF DRY SOIL:	11.12	6.38	327.76	
PERCENT OF WATER:	32.00	23.50	12.00	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	32.0			LOSS %: _____

WT PASSING #10 SIEVE: 243

WT. OF TOTAL SAMPLE: 327.8		WT. OF WASH SAMPLE: 103.1		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	35.6	35.6	10.9	89.1
#4	42.9	7.3	2.2	86.9
#10	84.6	41.7	12.7	74.2
#40	20.8	20.8	15.0	59.2
#200	42.1	21.3	15.3	43.9
PASS #200		61.0	43.9	

SUMMARY	
LIQUID LIMIT:	32.0
PLASTIC LIMIT:	23.5
PLASTICITY INDEX:	8.5
% SAND AND GRAVEL:	56.1
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(1)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>4</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>6.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-31</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	39.59	20.43	674.50	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	34.81	18.83	562.65	
WT. OF WATER LOST:	4.78	1.60	111.85	POST-IGNITION
WT. OF BOTTLE:	23.20	13.25	89.18	DISH & SOIL:
WT. OF DRY SOIL:	11.61	5.58	473.47	
PERCENT OF WATER:	41.20	28.70	23.60	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	41.2			LOSS %: _____

WT PASSING #10 SIEVE: 288

WT. OF TOTAL SAMPLE: 473.5		WT. OF WASH SAMPLE: 104.5		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	67.6	67.6	14.3	85.7
#4	103.7	36.1	7.6	78.1
#10	185.5	81.8	17.3	60.8
#40	20.8	20.8	12.1	48.7
#200	49.3	28.5	16.6	32.1
PASS #200		55.2	32.1	

SUMMARY	
LIQUID LIMIT:	41.2
PLASTIC LIMIT:	28.7
PLASTICITY INDEX:	12.5
% SAND AND GRAVEL:	67.9
% SILT:	
% CLAY:	
CLASSIFICATION:	A-2-7(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>5</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>8.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-31</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	38.36		464.80	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	34.12		408.86	
WT. OF WATER LOST:	4.24		55.94	POST-IGNITION
WT. OF BOTTLE:	21.73		73.25	DISH & SOIL:
WT. OF DRY SOIL:	12.39		335.61	
PERCENT OF WATER:	34.20		16.70	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	34.2			LOSS %: _____

WT PASSING #10 SIEVE: 247

WT. OF TOTAL SAMPLE: 335.6		WT. OF WASH SAMPLE: 100.1		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	56.6	56.6	16.9	83.1
#4	64.8	8.2	2.4	80.7
#10	88.7	23.9	7.1	73.6
#40	27.8	27.8	20.4	53.1
#200	66.8	39.0	28.7	24.5
PASS #200		33.3	24.5	

SUMMARY	
LIQUID LIMIT:	34.2
PLASTIC LIMIT:	NP
PLASTICITY INDEX:	NP
% SAND AND GRAVEL:	75.5
% SILT:	
% CLAY:	
CLASSIFICATION:	A-2-4(0)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-31

Contract: 25-106-02

Boring Location: Sta. 40+72.00, 27' Lt. Ramp 5

Boring Surface Elev.: 181.99

Reference:

Wt. of Casing Hammer:		Lbs.	Average Fall:		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: NQ2	O.D.	O.D. of Rock Core:	3	IN.

Casing Size:	3 1/4"	Inches	From Depth of:	0.0'	To:	11.9'
	Hollow Stem Auger:		From Depth of:		To:	

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	9/15/2009				Dry	
						182.0
						182.0
						182.0

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:	11.9	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:	10.0	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
		1	0.5'	4 8 10	Moist very stiff brown gravelly clay w/some fine to coarse sand.	A-6(2)	Topsoil - 5".
2.05			2.0'		16" RECOVERY		
		2	2.0'	9 13 18 21	Moist hard brown clay w/trace of gravel and fine to coarse sand.	A-6(9)	
4.1			4.0'		17" RECOVERY		
		3	4.0'	7 13 25 28	Moist hard reddish brown clayey gravelly silt w/some fine to coarse sand.	A-4(1)	
6.15			6.0'		18" RECOVERY		
		4	6.0'	43 23 22 21	Moist dense reddish brown clayey gravel w/ some fine to coarse sand.	A-2-7(0)	Rock Fragments
8.2			8.0'		19" RECOVERY		
		5	8.0'	31 23 9 9	Moist dense brown silty fine to coarse sand and gravel.	A-2-4(0)	Rock Fragments
10.25			10.0'		16" RECOVERY		
		6	10.0'	20 26 50/4"	Moist very dense brown gravel and fine sand w/ some coarse sand, trace of silt.	A-1-b	
			11.9'		20" RECOVERY		

Remarks: GTA Inspector - J. Lafferty

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: I-95 & U.S. 202 Interchange
Contract: 25-106-02

Boring No.: BRG1B-31

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
12.3		R-1	11.9'		Gniess, gray and white, coarse grained, unweathered, hard 51" Recovery = 85.0% RQD = 70.8% (fair)		RQD = Rock Quality Designation
14.35							
16.4							
16.9							
16.9		R_2	16.9'		51" RECOVERY Gniess, gray and white, coarse grained, unweathered, hard 60" Recovery = 100.0% RQD = 89.1% (good)		RQD = Rock Quality Designation
18.45							
20.5							
21.9							
22.55					60" RECOVERY End of Boring		
24.6							
26.65							
28.7							
30.75							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded, silty or clayey
sands and gravel



Silty sand



Poorly graded sand
with silt



Frac rock

Notes:

1. Exploratory borings were drilled on 9-15-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>1</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>0.5</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-32</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	38.22	32.31	597.40	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	34.15	30.33	530.26	
WT. OF WATER LOST:	4.07	1.98	67.14	POST-IGNITION
WT. OF BOTTLE:	22.02	21.26	87.23	DISH & SOIL:
WT. OF DRY SOIL:	12.13	9.07	443.03	
PERCENT OF WATER:	33.60	21.80	15.20	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	33.6			LOSS %: _____

WT PASSING #10 SIEVE: 408

WT. OF TOTAL SAMPLE: 443.0		WT. OF WASH SAMPLE: 105.1		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	8.9	8.9	2.0	98.0
#4	11.8	2.9	0.7	97.3
#10	35.5	23.7	5.3	92.0
#40	12.1	12.1	10.6	81.4
#200	27.3	15.2	13.3	68.1
PASS #200		77.8	68.1	

SUMMARY	
LIQUID LIMIT:	33.6
PLASTIC LIMIT:	21.8
PLASTICITY INDEX:	11.8
% SAND AND GRAVEL:	31.9
% SILT:	
% CLAY:	
CLASSIFICATION:	A-6(7)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY

SOIL ANALYSIS REPORT

TEST NO.: 3

REPORTED BY: _____

REVIEWED BY: _____

DELAWARE DEPARTMENT OF TRANSPORTATION
DOVER, DELAWARE (302) 760-2400

Contract: 25-106-02 F.A. Project: I-95 & U.S. 202 Interchange

Contractor: _____ Road: _____

Location: _____ Depth: 4.0

Elevation: _____ Source: BRG1B-32

Type and Use of Material: _____ Type of Sample: _____

Method Placed: _____

Remarks: _____ Date Sampled: _____

Sampled By: _____

FOR LABORATORY USE ONLY

Location of Lab: DOVER

Date Received: _____ Date Tested: _____ Date Reported: 11/13/2009

PHYSICAL TEST CONSTANTS	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE	ORGANIC
	T-89	T-90	T-265	T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	31.71	20.25	574.20	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	28.31	18.71	510.80	
WT. OF WATER LOST:	3.40	1.54	63.40	POST-IGNITION
WT. OF BOTTLE:	18.91	12.70	86.76	DISH & SOIL:
WT. OF DRY SOIL:	9.40	6.01	424.04	
PERCENT OF WATER:	36.20	25.60	15.00	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	36.2			LOSS %: _____

WT PASSING #10 SIEVE: 328

WT. OF TOTAL SAMPLE: 424.0		WT. OF WASH SAMPLE: 113.2		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
1"	0.0	0.0	0.0	100.0
3/8"	55.4	55.4	13.1	86.9
#4	65.9	10.5	2.5	84.5
#10	96.2	30.3	7.1	77.3
#40	25.8	25.8	17.6	59.7
#200	51.0	25.2	17.2	42.5
PASS #200		62.2	42.5	

SUMMARY

LIQUID LIMIT:	36.2
PLASTIC LIMIT:	25.6
PLASTICITY INDEX:	10.6
% SAND AND GRAVEL:	57.5
% SILT:	
% CLAY:	
CLASSIFICATION:	A-4(1)

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:

COMPARISON: _____

INDEPENDENT ASSURANCE SUPERVISOR: _____

QUALITY ASSURANCE SUPERVISOR: _____

(FOR INDEPENDENT ASSURANCE EVALUATION)

SOILS SUPERVISOR

GEOTECHNICAL ENGINEER

MATERIALS AND RESEARCH LABORATORY	DELAWARE DEPARTMENT OF TRANSPORTATION DOVER, DELAWARE (302) 760-2400
SOIL ANALYSIS REPORT	Contract: <u>25-106-02</u> F.A. Project: <u>I-95 & U.S. 202 Interchange</u>
TEST NO.: <u>5</u>	Contractor: _____ Road: _____
REPORTED BY: _____	Location: _____ Depth: <u>8.0</u>
REVIEWED BY: _____	Elevation: _____ Source: <u>BRG1B-32</u>
	Type and Use of Material: _____ Type of Sample: _____
	Method Placed: _____
	Remarks: _____
	Sampled By: _____ Date Sampled: _____
	FOR LABORATORY USE ONLY
	Location of Lab: <u>DOVER</u>
	Date Received: _____ Date Tested: _____ Date Reported: <u>11/13/2009</u>

PHYSICAL TEST CONSTANTS	LIQUID LIMIT T-89	PLASTIC LIMIT T-90	MOISTURE T-265	ORGANIC T-267
BOTTLE NO.:				PRE-IGNITION
WT. WET SOIL & BOTTLE:	37.01		403.60	DISH & SOIL:
WT. DRY SOIL & BOTTLE:	33.81		371.46	
WT. OF WATER LOST:	3.20		32.14	POST-IGNITION
WT. OF BOTTLE:	22.35		77.83	DISH & SOIL:
WT. OF DRY SOIL:	11.46		293.63	
PERCENT OF WATER:	27.90		10.90	DISH:
BLOWS REQUIRED FOR CLOSURE:	25			
CORRECTED LIQUID LIMIT %:	27.9			LOSS %: _____

WT PASSING #10 SIEVE: 147

WT. OF TOTAL SAMPLE: 293.6		WT. OF WASH SAMPLE: 50.6		
SIEVE	CUM. RT. WT.	RT. WT.	% RET.	% PASSING
2"	0.0	0.0	0.0	100.0
1"	38.5	38.5	13.1	86.9
3/8"	103.5	65.0	22.1	64.8
# 4	118.4	14.9	5.1	59.7
#10	146.5	28.1	9.6	50.1
#40	15.9	15.9	15.7	34.4
#200	33.6	17.7	17.5	16.8
PASS #200		17.0	16.8	

SUMMARY	
LIQUID LIMIT:	27.9
PLASTIC LIMIT:	NP
PLASTICITY INDEX:	NP
% SAND AND GRAVEL:	83.2
% SILT:	
% CLAY:	
CLASSIFICATION:	A-1-b

This sample _____ conform with the requirements of the specifications. Material represented by this sample has been _____ for use.

REMARKS:	
COMPARISON: _____ INDEPENDENT ASSURANCE SUPERVISOR: _____ QUALITY ASSURANCE SUPERVISOR: _____ (FOR INDEPENDENT ASSURANCE EVALUATION)	_____ SOILS SUPERVISOR _____ GEOTECHNICAL ENGINEER

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

F.A. Project: I-95 & U.S. 202 Interchange

Boring No.: BRG1B-32

Contract: 25-106-02

Boring Location: Sta. 40+86.00, 33' Lt. Ramp 5

Boring Surface Elev.: 180.29

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:		IN.
	U-Sampler:	O.D.	O.D. of Samp. Tube:		IN.
	Core Bit: NQ2	O.D.	O.D. of Rock Core:	3	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
	9/16/2009				Dry	180.3
						180.3
						180.3

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:	
2 1/2 in. Dia. Contin. Sample Boring:		Ft.;	Core Drilling in Rock:	10.0	Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers:

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
1.7		1	0.5'	6 6 9	Moist stiff brown clay w/some fine to coarse sand, trace of gravel.	A-6(7)	Topsoil - 3".
			2.0'		18" RECOVERY		
3.4		2	2.0'	13 19 21 50/3"	Moist hard brown clay w/trace of fine to coarse sand and gravel.	A-6(14)	
			4.0'		17" RECOVERY		
5.1		3	4.0'	13 17 18 24	Moist hard brownish red clayey gravelly silt w/ some fine to coarse sand.	A-4(1)	
			6.0'		15" RECOVERY		
6.8		4	6.0'	15 25 15 9	No Sample Recovery		
			8.0'		0" RECOVERY		
8.5		5	8.0'	13 19 15 16	Moist dense brownish orange gravel w/some silt and fine to coarse sand.	A-1-b	
			10.0'		10" RECOVERY		

Remarks: GTA Inspector - J. Lafferty - Boring offset 15' North due to inaccessible location - Boring offset additional 5' due to boulder at surface.

Reviewed By: Hany Fekry

Soils Supervisor: Randy Ferguson

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

F.A. Project: I-95 & U.S. 202 Interchange
Contract: 25-106-02

Boring No.: BRG1B-32

Depth (ft.)	Water Level	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
10.2		R-1	10.0'		Gniess, gray, coarse grained, unweathered, hard 55" Recovery = 91.67% RQD = 80.0% (good)		RQD - Rock Quality Designation
11.9							
13.6							
15.3							
15.3		R-2	15.0'		55" RECOVERY Gniess, gray, coarse grained, unweathered, hard 59" Recovery = 98.33% RQD = 94.1% (excellent)		RQD - Rock Quality Designation
17							
18.7							
20.4							
20.4			20.0'		59" RECOVERY End of Boring		
22.1							
23.8							
25.5							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded, silty or clayey
sands and gravel



Silty sand



Frac rock

Notes:

1. Exploratory borings were drilled on 9-16-2009 using a 3 1/4 - inch diameter hollow stem auger. Rig is a ATV CME 55.
2. No free water was encountered at the time of drilling or when re-checked the following day, unless recorded on 1st page.
3. Boring locations were taped from existing features and elevations extrapolated from survey unless otherwise reported.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.