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REFERENCE: R-5311A

PROJECT: 45449

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY HERTFORD
PROJECT DESCRIPTION US 13/NC 11 FROM THE NC 11/
NC 561 INTERSECTION NEAR AHOSKIE TO THE US
13/158/NC 45 INTERSECTION NEAR WINTON
SITE DESCRIPTION BR NO. 154, STA. 50 + 99.00 -Y2-
= 16 + 90.62 -L2-

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE SHEET
5-7	BORING LOGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5311A	1	7

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME, ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

C. JONES

B. THOMPSON

B. KEANEY

B. HOWEY

D. TIGNOR

INVESTIGATED BY F&R, INC.

DRAWN BY CBJ

CHECKED BY ECH

SUBMITTED BY HDR ENGINEERING

DATE 8/2016

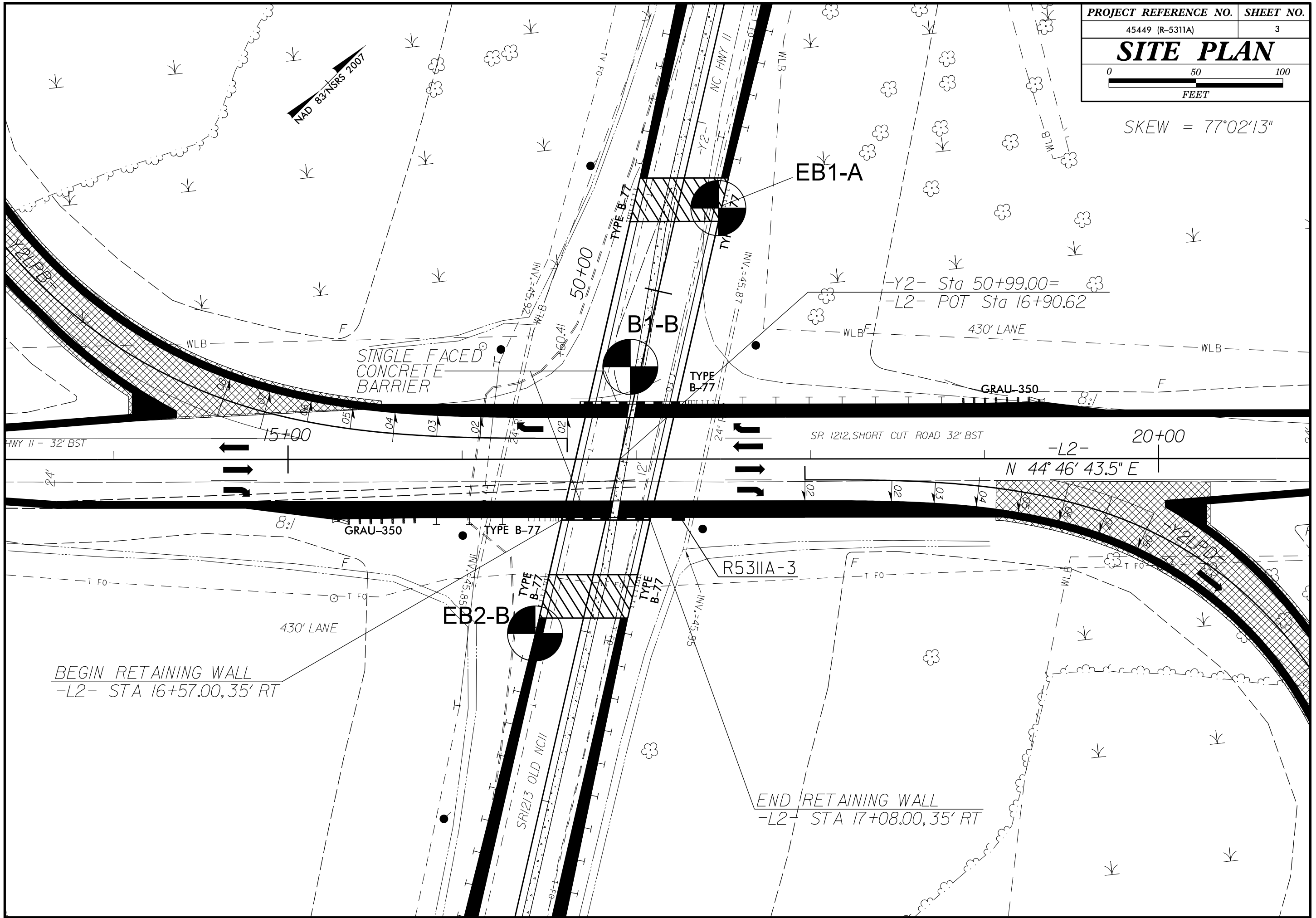


DocuSigned by:
Christopher B. Jones 10/9/2016

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SIGNATURE DATE

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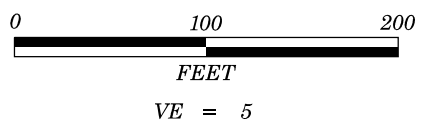
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 PENTABLE: \$PENTBL\$
 TIME: \$TIME\$

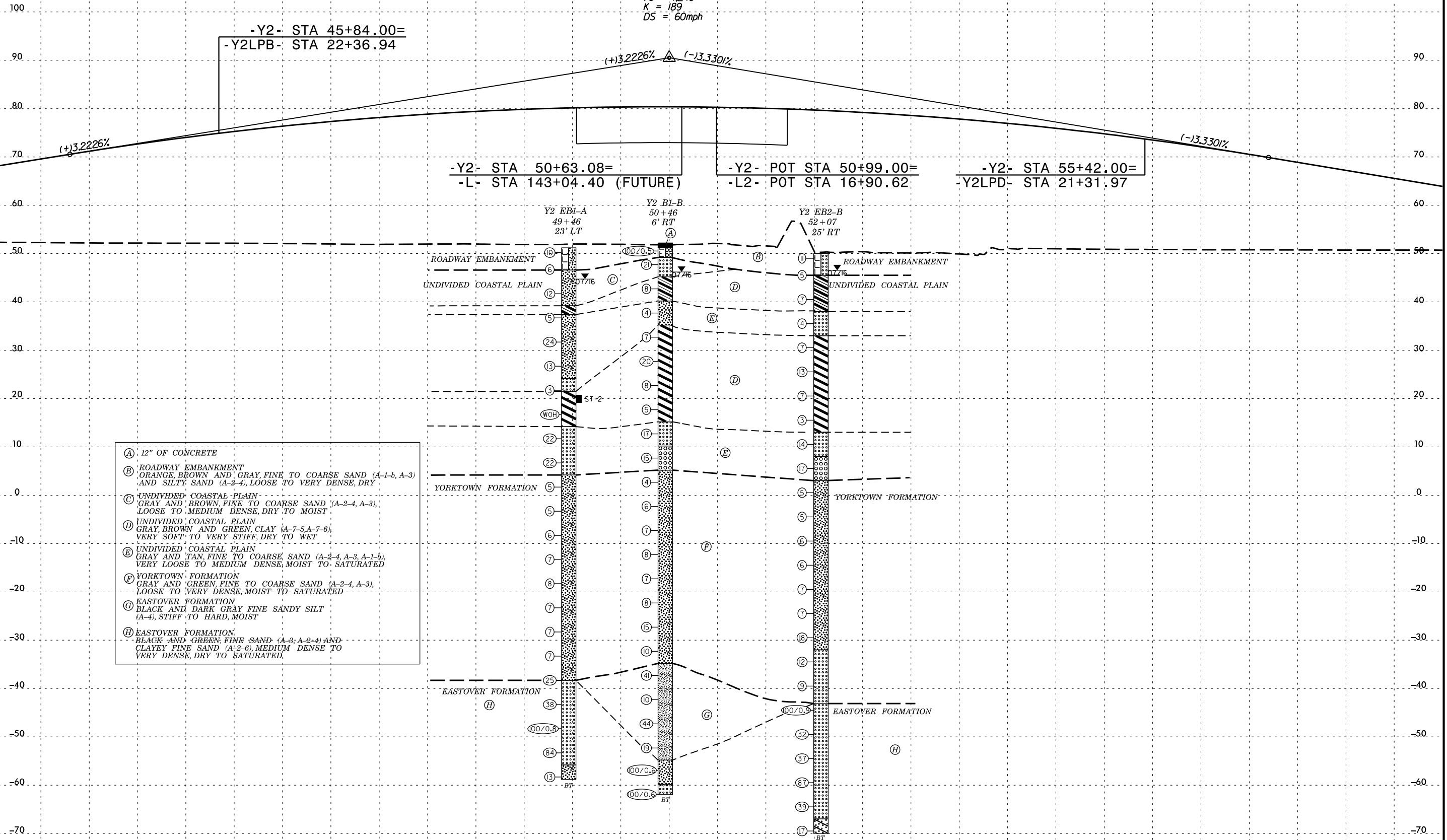
5/14/99

-Y2-



SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.	% BY WEIGHT				% PASSING (SIEVES)			MOISTURE %	ORGANIC %
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
ST-2	23' LT	49+46	30.0'-32.0'	(A-7-5)(47)	79	35	0.4	0.5	17.7	81.4	100.0	99.8	99.2	91.0	
ST-1	27' RT	52+07	28.5'-30.5'	(A-7-6)(52)	72	47	0.4	5.9	35.0	58.7	100.0	99.9	95.5	50.3	

PI = 50+50.00
 EL = 90.50'
 VC = 1,240'
 K = 189
 DS = 60mph



- (A) 12" OF CONCRETE
- (B) ROADWAY EMBANKMENT, ORANGE, BROWN AND GRAY, FINE TO COARSE SAND (A-1-b, A-3) AND SILTY SAND (A-2-4), LOOSE TO VERY DENSE, DRY
- (C) UNDIVIDED COASTAL PLAIN, GRAY AND BROWN, FINE TO COARSE SAND (A-2-4, A-3), LOOSE TO MEDIUM DENSE, DRY TO MOIST
- (D) UNDIVIDED COASTAL PLAIN, GRAY, BROWN AND GREEN, CLAY (A-7-5, A-7-6), VERY SOFT TO VERY STIFF, DRY TO WET
- (E) UNDIVIDED COASTAL PLAIN, GRAY AND TAN, FINE TO COARSE SAND (A-2-4, A-3, A-1-b), VERY LOOSE TO MEDIUM DENSE, MOIST TO SATURATED
- (F) YORKTOWN FORMATION, GRAY AND GREEN, FINE TO COARSE SAND (A-2-4, A-3), LOOSE TO VERY DENSE, MOIST TO SATURATED
- (G) EASTOVER FORMATION, BLACK AND DARK GRAY FINE SANDY SILT (A-4), STIFF TO HARD, MOIST
- (H) EASTOVER FORMATION, BLACK AND GREEN, FINE SAND (A-3, A-2-4) AND CLAYEY FINE SAND (A-2-6), MEDIUM DENSE TO VERY DENSE, DRY TO SATURATED

-Y2- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NC DEPARTMENT OF TRANSPORTATION DATED 12/18/15. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ON THE PROFILE.

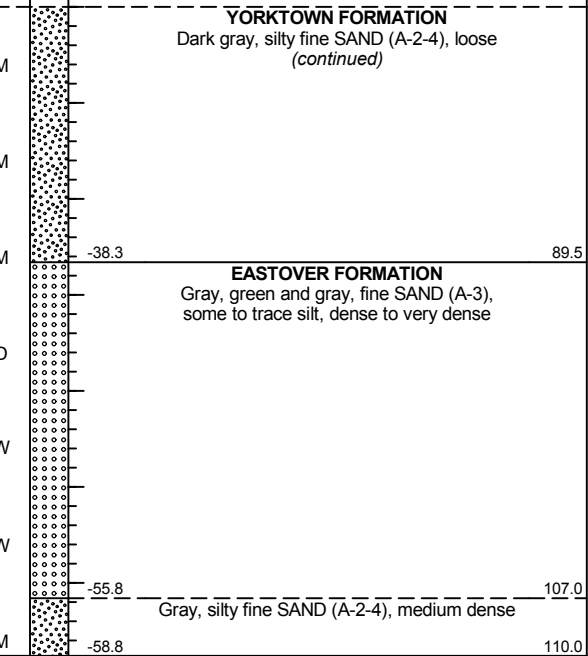
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson									
SITE DESCRIPTION Bridge No. 154 on -Y2- (SR 1213) over -L2- (NC 11/US 13)							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 49+46		OFFSET 23 ft LT		ALIGNMENT -Y2-									
COLLAR ELEV. 51.2 ft		TOTAL DEPTH 110.0 ft		NORTHING 945,108		EASTING 2,591,511									
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 85% 2/17/2016				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER D. Tignor		START DATE 07/27/16		COMP. DATE 07/28/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
55															
	51.2	0.0	2	5	5										51.2
50	47.7	3.5	4	4	2										46.6
45	42.7	8.5	4	5	7										39.2
40	37.7	13.5	1	2	3										37.4
35	32.7	18.5	6	10	14										24.2
30	27.7	23.5	4	5	8										21.5
25	22.7	28.5	1	2	1										14.2
20	17.7	33.5	WOH	WOH	WOH										4.2
15	12.7	38.5	5	9	13										
10	7.7	43.5	9	10	12										
5	2.7	48.5	1	2	3										
0	-2.3	53.5	2	2	3										
-5	-7.3	58.5	2	3	3										
-10	-12.3	63.5	2	3	4										
-15	-17.3	68.5	2	4	4										
-20	-22.3	73.5	3	3	4										
-25															

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson									
SITE DESCRIPTION Bridge No. 154 on -Y2- (SR 1213) over -L2- (NC 11/US 13)							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 49+46		OFFSET 23 ft LT		ALIGNMENT -Y2-									
COLLAR ELEV. 51.2 ft		TOTAL DEPTH 110.0 ft		NORTHING 945,108		EASTING 2,591,511									
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 85% 2/17/2016				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER D. Tignor		START DATE 07/27/16		COMP. DATE 07/28/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-25															
	-27.3	78.5	2	3	4										
-30	-32.3	83.5	3	3	4										
-35	-37.3	88.5	3	7	18										
-40	-42.3	93.5	11	17	21										
-45	-47.3	98.5	16	54	46/0.3										
-50	-52.3	103.5	11	25	59										
-55	-57.3	108.5	4	5	8										

NCDOT BORE DOUBLE R-5311A_GEO_BRDG154.GPJ NC_DOT.GDT 8/26/16



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson								
SITE DESCRIPTION Bridge No. 154 on -Y2- (SR 1213) over -L2- (NC 11/US 13)							GROUND WTR (ft)							
BORING NO. B1-B		STATION 50+46		OFFSET 6 ft RT		ALIGNMENT -Y2-								
COLLAR ELEV. 52.2 ft		TOTAL DEPTH 114.1 ft		NORTHING 945,008		EASTING 2,591,540								
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic								
DRILLER D. Tignor		START DATE 07/21/16		COMP. DATE 07/22/16		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
55														
	51.2	1.0	100/0.5											52.2 GROUND SURFACE 0.0
50	48.7	3.5	12	10	11									51.2 12 inches of Concrete 1.0
45	43.7	8.5	2	3	5									49.2 ROADWAY EMBANKMENT 3.0 Black, gray and brown, fine to coarse SAND (A-1-b) and fine gravel, some tar, very dense Light brown, fine to coarse SAND (A-3), trace silt, medium dense
40	38.7	13.5	2	2	2									45.2 UNDIVIDED COASTAL PLAIN 7.0 Gray, CLAY (A-6), medium stiff
35	33.7	18.5	1	3	4									40.2 Gray, silty fine to coarse SAND (A-2-4), loose 12.0
30	28.7	23.5	5	9	11									35.2 Gray, green and orange, CLAY (A-7-6), trace fine sand, medium stiff to very stiff 17.0
25	23.7	28.5	3	4	4									40.2 Gray, silty fine to coarse SAND (A-2-4), loose 12.0
20	18.7	33.5	1	2	3									35.2 Gray, green and orange, CLAY (A-7-6), trace fine sand, medium stiff to very stiff 17.0
15	13.7	38.5	4	7	10									40.2 Gray, silty fine to coarse SAND (A-2-4), loose 12.0
10	8.7	43.5	4	6	9									35.2 Gray, green and orange, CLAY (A-7-6), trace fine sand, medium stiff to very stiff 17.0
5	3.7	48.5	1	2	2									40.2 Gray, silty fine to coarse SAND (A-2-4), loose 12.0
0	-1.3	53.5	2	3	3									35.2 Gray, green and orange, CLAY (A-7-6), trace fine sand, medium stiff to very stiff 17.0
-5	-6.3	58.5	2	3	4									40.2 Gray, silty fine to coarse SAND (A-2-4), loose 12.0
-10	-11.3	63.5	2	3	5									35.2 Gray, green and orange, CLAY (A-7-6), trace fine sand, medium stiff to very stiff 17.0
-15	-16.3	68.5	2	3	4									40.2 Gray, silty fine to coarse SAND (A-2-4), loose 12.0
-20	-21.3	73.5	3	3	5									35.2 Gray, green and orange, CLAY (A-7-6), trace fine sand, medium stiff to very stiff 17.0
-25														40.2 Gray, silty fine to coarse SAND (A-2-4), loose 12.0

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson								
SITE DESCRIPTION Bridge No. 154 on -Y2- (SR 1213) over -L2- (NC 11/US 13)							GROUND WTR (ft)							
BORING NO. B1-B		STATION 50+46		OFFSET 6 ft RT		ALIGNMENT -Y2-								
COLLAR ELEV. 52.2 ft		TOTAL DEPTH 114.1 ft		NORTHING 945,008		EASTING 2,591,540								
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic								
DRILLER D. Tignor		START DATE 07/21/16		COMP. DATE 07/22/16		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
-25														
	-26.3	78.5	7	6	9									Match Line
-30	-31.3	83.5	4	5	5									Sat. YORKTOWN FORMATION 87.0 Gray to dark green, silty fine SAND (A-2-4), loose to medium dense (continued)
-35	-36.3	88.5	14	22	19									Sat. EASTOVER FORMATION 87.0 Black, dark gray and green, fine sandy SILT (A-4), stiff to hard
-40	-41.3	93.5	3	4	6									M
-45	-46.3	98.5	12	19	25									M
-50	-51.3	103.5	6	8	11									M
-55	-56.3	108.5	63	37/0.1										M
-60	-61.3	113.5	60	40/0.1										M
														Sat. 107.0 Gray, fine SAND (A-2-4), little silt, very dense
														Sat. 112.0 Gray, fine to coarse SAND (A-3), trace silt, very dense
														Sat. 114.1 Boring Terminated at Elevation -61.9 ft IN SAND (EASTOVER FORMATION)

NCDOT BORE DOUBLE R-5311A_GEO_BRDG154.GPJ NC_DOT.GDT 8/25/16

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson	
SITE DESCRIPTION Bridge No. 154 on -Y2- (SR 1213) over -L2- (NC 11/US 13)							GROUND WTR (ft)
BORING NO. EB2-B		STATION 52+07		OFFSET 25 ft RT		ALIGNMENT -Y2-	
COLLAR ELEV. 50.0 ft		TOTAL DEPTH 120.0 ft		NORTHING 944,861		EASTING 2,591,610	
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 85% 2/17/2016			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER D. Tignor		START DATE 07/25/16		COMP. DATE 07/26/16		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
50	50.0	0.0	3	6	5							D	GROUND SURFACE	50.0
												W	ROADWAY EMBANKMENT Red and brown, fine to coarse SAND (A-3), trace silt and clay, loose to medium dense	4.6
	46.5	3.5	2	3	2							W	UNDIVIDED COASTAL PLAIN Gray, brown, and yellow, fine sandy CLAY (A-6), medium stiff	
45												W		
	41.5	8.5	3	3	4							W		
40												W		
	38.0	12.0										W	Gray, fine to coarse SAND (A-3), trace silt, loose	12.0
35												W		
	36.5	13.5	2	2	2							W		
30												D	Gray and brown, CLAY (A-7-6)(52), soft to medium stiff	17.0
	33.0	17.0										D		
25												D		
	31.5	18.5	2	3	4							D		
20												D		
	26.5	23.5	4	6	7							D		
15												D		
	21.5	28.5	3	3	4							D		
10												W		
	16.5	33.5	WOH	1	2							W		
5												W		
	11.5	38.5	5	6	8							W	Gray, fine SAND (A-3), trace silt, medium dense	37.0
0												W		
	6.5	43.5	7	9	8							W	Gray, fine to coarse SAND (A-1-b), some gravel, trace silt, medium dense	42.0
-5												M		
	1.5	48.5	3	2	3							M	YORKTOWN FORMATION Dark gray, fine silty SAND (A-2-4), trace clay, loose to medium dense	47.0
-10												M		
	-3.5	53.5	2	2	3							M		
-15												M		
	-8.5	58.5	2	3	3							M		
-20												M		
	-13.5	63.5	2	3	3							M		
-25												M		
	-18.5	68.5	2	3	4							M		
-30												M		
	-23.5	73.5	3	3	4							M		
	-28.5	78.5	7	8	10							M		

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson	
SITE DESCRIPTION Bridge No. 154 on -Y2- (SR 1213) over -L2- (NC 11/US 13)							GROUND WTR (ft)
BORING NO. EB2-B		STATION 52+07		OFFSET 25 ft RT		ALIGNMENT -Y2-	
COLLAR ELEV. 50.0 ft		TOTAL DEPTH 120.0 ft		NORTHING 944,861		EASTING 2,591,610	
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 85% 2/17/2016			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER D. Tignor		START DATE 07/25/16		COMP. DATE 07/26/16		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-30															
	-33.5	83.5	4	5	7							W	Black, fine SAND (A-3), little silt, loose to medium dense	82.0	
-35												W			
	-38.5	88.5	3	4	5							M			
-40												D			
	-43.5	93.5	27	36	64/0.4							D	EASTOVER FORMATION Green, gray, and white, fine to coarse SAND (A-2-4) with trace to little silt, dense to very dense	93.0	
-45												D			
	-48.5	98.5	12	15	17							D			
-50												D			
	-53.5	103.5	10	13	24							D			
-55												D			
	-58.5	108.5	20	25	62							W			
-60												W			
	-63.5	113.5	8	16	23							W			
-65												W			
	-68.5	118.5	5	8	9							M	Gray, fine clayey SAND (A-2-6), medium dense	117.0	
-70												M			

Boring Terminated at Elevation -70.0 ft IN SAND (EASTOVER FORMATION)

- 1) Strata break in split spoon at 4.6 feet
- 2) Shelby tube (ST-1) obtained from 28.5 to 30.5 feet below ground surface in offset hole (-Y2- Sta. 52+07, 27' RT)

NCDOT BORE DOUBLE R-5311A_GEO_BRDG154.GPJ NC_DOT.GDT 8/26/16

REFERENCE: R-5311A

PROJECT: 45449

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5311A	1	7

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SHEET NO.	DESCRIPTION
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STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY HERTFORD
PROJECT DESCRIPTION US 13/NC 11, FROM THE NC
I/NC 561 INTERSECTION NEAR AHOSKIE TO THE
US 13/58/NC 45 INTERSECTION NEAR WINTON
SITE DESCRIPTION BR NO. 155, STA. 25 + 47.22 -Y1-
= 314 + 22.22 -EL-

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THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

- C. JONES
B. THOMPSON
B. KEANEY
B. HOWEY
D. TIGNOR

INVESTIGATED BY F&R, Inc.
DRAWN BY CBJ
CHECKED BY ECH
SUBMITTED BY HDR ENGINEERING
DATE 8/2016



DocuSigned by:
Christopher B. Jones 10/9/2016
F6E798212CE54C0
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

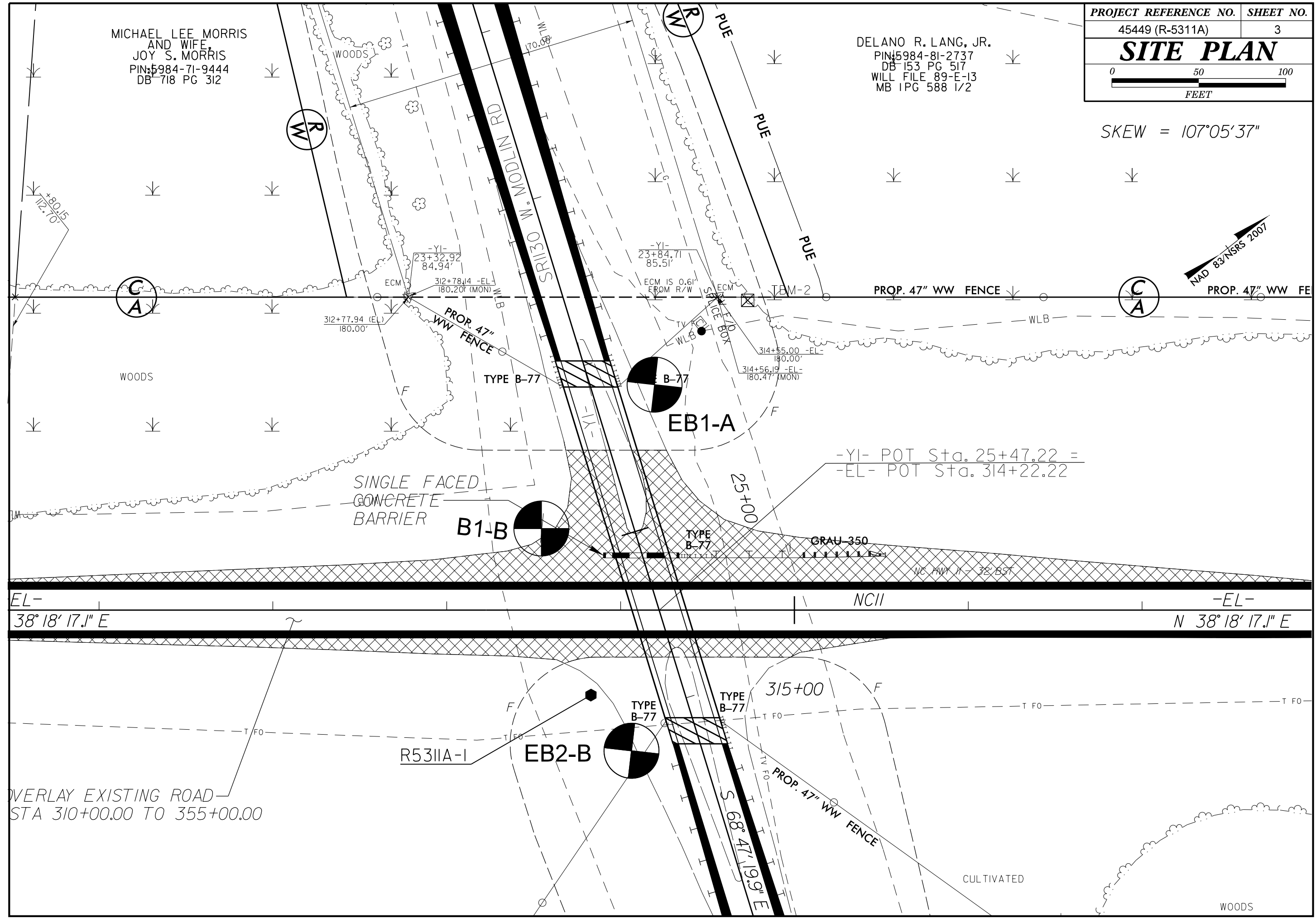
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS									
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:										ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CRYSTALLINE ROCK (CR)									
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.										NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.										FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.									
MINERALOGICAL COMPOSITION										NON-CRYSTALLINE ROCK (NCR)										COASTAL PLAIN SEDIMENTARY ROCK (CP)										WEATHERING									
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.										COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.										FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.									
COMPRESSIONIBILITY										PERCENTAGE OF MATERIAL										VERY SLIGHT (IV SLI.)										SLIGHT (SLI.)									
SLIGHTLY COMPRESSIBLE LL < 31										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL										ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.										ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.									
MODERATELY COMPRESSIBLE LL = 31 - 50										TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE LITTLE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% SOME 20 - 35% MODERATELY ORGANIC 5 - 10% 12 - 20% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE										SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.										MODERATE (MOD.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL									
HIGHLY COMPRESSIBLE LL > 50										GROUND WATER										MODERATELY SEVERE (MOD. SEV.)										SEVERE (SEV.)									
SLIGHTLY COMPRESSIBLE LL < 31										WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING										ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF										ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF									
MODERATELY COMPRESSIBLE LL = 31 - 50										STATIC WATER LEVEL AFTER 24 HOURS										VERY SEVERE (IV SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF										ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.									
HIGHLY COMPRESSIBLE LL > 50										PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA										COMPLETE										ROCK HARDNESS									
SLIGHTLY COMPRESSIBLE LL < 31										SPRING OR SEEP										ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.										CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.									
MISCELLANEOUS SYMBOLS										RECOMMENDATION SYMBOLS										HARD										MODERATELY HARD									
ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION										UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE										CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.										CAN BE GROUVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.									
SOIL SYMBOL										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.										CAN BE GROUVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.									
ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										MODERATELY HARD										MEDIUM HARD									
INFERRED SOIL BOUNDARY										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CAN BE GROUVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.										CAN BE GROUVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.									
INFERRED ROCK LINE										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										SOFT										VERY SOFT									
ALLUVIAL SOIL BOUNDARY										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CAN BE GROUVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.										CAN BE GROUVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.									
DIP & DIP DIRECTION OF ROCK STRUCTURES										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										VERY HARD										HARD									
SPT TEST BORING										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.										CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.									
AUGER BORING										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										MODERATELY HARD										MEDIUM HARD									
CORE BORING										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CAN BE GROUVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.										CAN BE GROUVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.									
MONITORING WELL										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										SOFT										VERY SOFT									
PIEZOMETER INSTALLATION										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CAN BE GROUVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.										CAN BE GROUVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.									
SPT N-VALUE										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										VERY HARD										HARD									
SLOPE INDICATOR INSTALLATION										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										MODERATELY HARD										MEDIUM HARD									
CONE PENETROMETER TEST										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CAN BE GROUVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.										CAN BE GROUVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.									
SOUNDING ROD										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										SOFT										VERY SOFT									
TEST BORING WITH CORE										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										CAN BE GROUVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.										CAN BE GROUVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.									
TEST BORING WITH CORE										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										VERY HARD										HARD									
SPT N-VALUE										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										MODERATELY HARD										MEDIUM HARD									

MICHAEL LEE MORRIS
AND WIFE
JOY S. MORRIS
PIN: 5984-71-9444
DB 718 PG 312

DELANO R. LANG, JR.
PIN: 5984-81-2737
DB 153 PG 517
WILL FILE 89-E-13
MB 1PG 588 1/2

SKEW = 107°05'37"



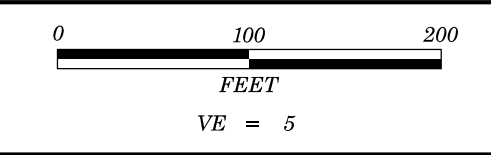
EL- 38° 18' 17.1" E NCII -EL- N 38° 18' 17.1" E

OVERLAY EXISTING ROAD
STA 310+00.00 TO 355+00.00

WOODS

5/14/99

-Y1-



PROJECT REFERENCE NO.	SHEET NO.
R-5311A	4
PROFILE ALONG -Y1- CENTERLINE	

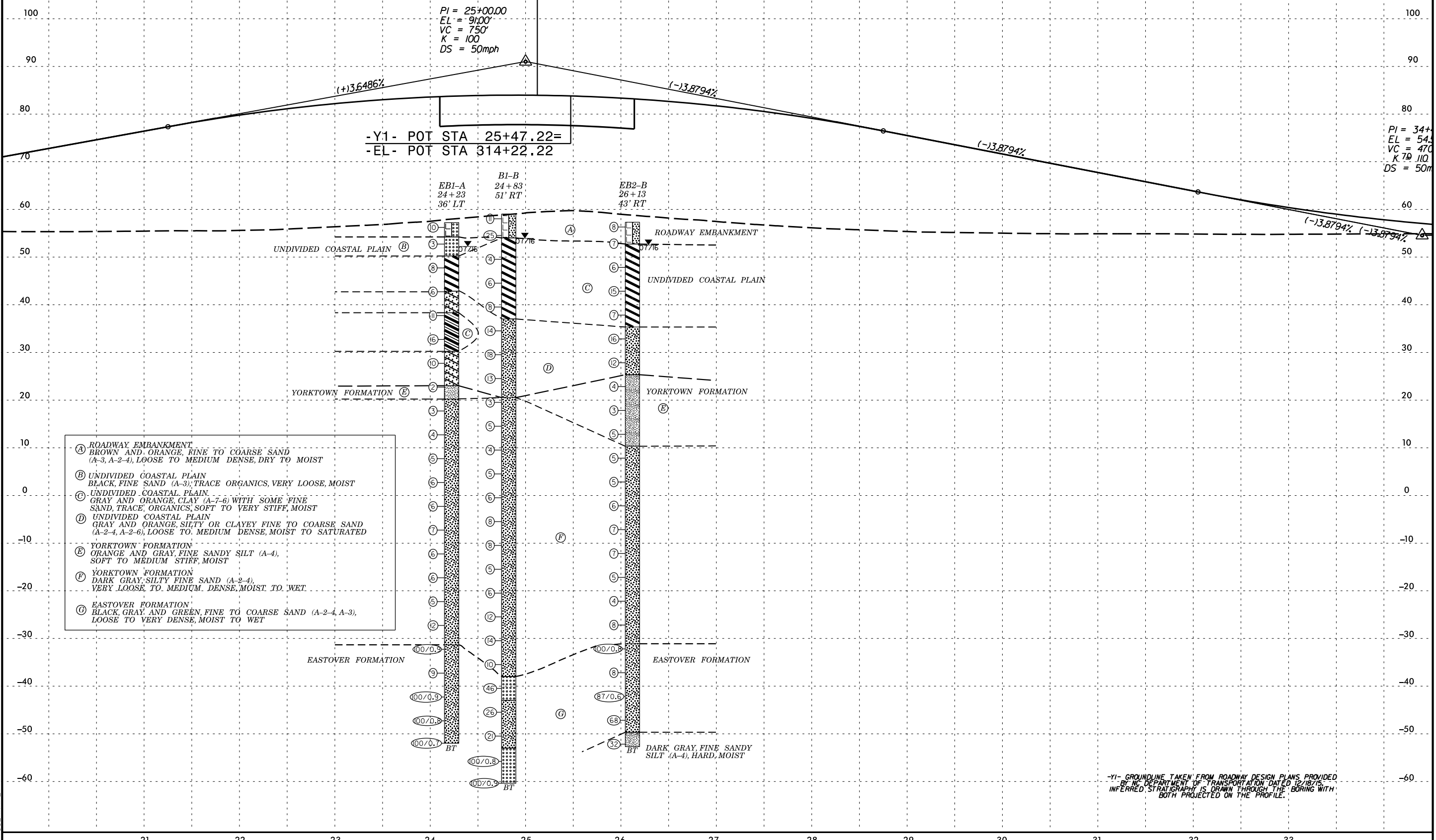
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	LL	PI	% BY WEIGHT				% PASSING (SIEVES)		MOISTURE	ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40		
ST-1	58' RT	24+82	15.0-17.0	(A-7-6)(29)	51	32	2.1	13.0	28.0	56.9	99.9	98.7	87.7	21.6
ST-2	39' RT	26+20	8.0-10.0	(A-7-6)(46)	70	43	0.1	7.8	22.4	69.6	100.0	99.9	93.7	30.2

-Y1- STA 25+12.22=
-L- STA 95+14.45 (FUTURE)

PI = 25+00.00
EL = 91.00'
VC = 750'
K = 100
DS = 50mph

-Y1- POT STA 25+47.22=
-EL- POT STA 314+22.22

PI = 34+
EL = 54.2
VC = 470
K = 79.110
DS = 50m



- (A) ROADWAY EMBANKMENT
BROWN AND ORANGE, FINE TO COARSE SAND (A-3, A-2-4), LOOSE TO MEDIUM DENSE, DRY TO MOIST
- (B) UNDIVIDED COASTAL PLAIN
BLACK, FINE SAND (A-3), TRACE ORGANICS, VERY LOOSE, MOIST
- (C) UNDIVIDED COASTAL PLAIN
GRAY AND ORANGE CLAY (A-7-6) WITH SOME FINE SAND, TRACE, ORGANICS, SOFT TO VERY STIFF, MOIST
- (D) UNDIVIDED COASTAL PLAIN
GRAY AND ORANGE, SILTY OR CLAYEY FINE TO COARSE SAND (A-2-4, A-2-6), LOOSE TO MEDIUM DENSE, MOIST TO SATURATED
- (E) YORKTOWN FORMATION
ORANGE AND GRAY, FINE SANDY SILT (A-4), SOFT TO MEDIUM STIFF, MOIST
- (F) YORKTOWN FORMATION
DARK GRAY, SILTY FINE SAND (A-2-4), VERY LOOSE TO MEDIUM DENSE, MOIST TO WET
- (G) EASTOVER FORMATION
BLACK, GRAY AND GREEN, FINE TO COARSE SAND (A-2-4, A-3), LOOSE TO VERY DENSE, MOIST TO WET

-Y1- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NC DEPARTMENT OF TRANSPORTATION DATED 12/18/15. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ON THE PROFILE.

\$\$\$\$\$\$SYTIME\$\$\$\$\$\$
 \$\$\$\$\$\$UNGN\$\$\$\$\$\$
 \$\$\$\$\$\$PRHNE\$\$\$\$\$\$
 \$\$\$\$\$\$SE\$\$\$\$\$\$

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson										
SITE DESCRIPTION Bridge No. 155 on -Y1- (SR 1130) over -EL- (NC 11/US 13)							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 24+23		OFFSET 36 ft LT		ALIGNMENT -Y1-										
COLLAR ELEV. 56.8 ft		TOTAL DEPTH 109.2 ft		NORTHING 941,484		EASTING 2,588,308										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER D. Tignor		START DATE 07/18/16		COMP. DATE 07/19/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
60																
	56.8	0.0	2	5	5									56.8	GROUND SURFACE	0.0
55	53.3	3.5	3	2	1									53.8	ROADWAY EMBANKMENT Brown, fine to coarse SAND (A-3), trace silt and gravel, medium dense	3.0
50	48.3	8.5	2	3	5									49.8	UNDIVIDED COASTAL PLAIN Black, fine SAND (A-3), trace organics, very loose	7.0
45	43.3	13.5	1	1	5									42.4	Gray and orange, CLAY (A-7-6) with some fine sand, trace organics, medium stiff to stiff	14.4
40	38.3	18.5	5	4	7									37.9	Gray and orange, clayey fine SAND (A-2-6), loose	18.9
35	33.3	23.5	4	7	9									29.8	Gray and orange, fine sandy CLAY (A-6), stiff to very stiff	27.0
30	28.3	28.5	5	3	7									22.6	Gray, clayey fine SAND (A-2-6), loose to medium dense	34.2
25	23.3	33.5	2	1	1									19.8	YORKTOWN FORMATION Dark gray, fine sandy SILT (A-4), some clay, soft	37.0
20	18.3	38.5	WOH	1	2										Dark gray, silty fine SAND (A-2-4) with some clay, very loose to medium dense	
15	13.3	43.5	1	2	2											
10	8.3	48.5	2	2	3											
5	3.3	53.5	2	2	4											
0	-1.7	58.5	2	3	3											
-5	-6.7	63.5	2	3	4											
-10	-11.7	68.5	2	3	3											
-15	-16.7	73.5	2	3	3											
-20																

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson									
SITE DESCRIPTION Bridge No. 155 on -Y1- (SR 1130) over -EL- (NC 11/US 13)							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 24+23		OFFSET 36 ft LT		ALIGNMENT -Y1-									
COLLAR ELEV. 56.8 ft		TOTAL DEPTH 109.2 ft		NORTHING 941,484		EASTING 2,588,308									
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER D. Tignor		START DATE 07/18/16		COMP. DATE 07/19/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-20															
	-21.7	78.5	1	2	3										
-25	-26.7	83.5	6	4	8										
-30	-31.7	88.5	15	85/0.4											
-35	-36.7	93.5	3	4	5										
-40	-41.7	98.5	7	26	74/0.4										
-45	-46.7	103.5	17	48	52/0.3										
-50	-51.7	108.5	57	43/0.2											

NCDOT BORE DOUBLE R-5311A_GEO_BRDG155.GPJ NC_DOT.GDT 8/25/16

Dark gray, silty fine SAND (A-2-4) with some clay, very loose to medium dense (continued)

EASTOVER FORMATION
Black, green and gray, fine SAND (A-2-4) with some silt, loose to very dense

Boring Terminated at Elevation -52.4 ft IN SAND (EASTOVER FORMATION)
1) Strata break in split spoon at 14.4, 18.9 and 34.2 feet

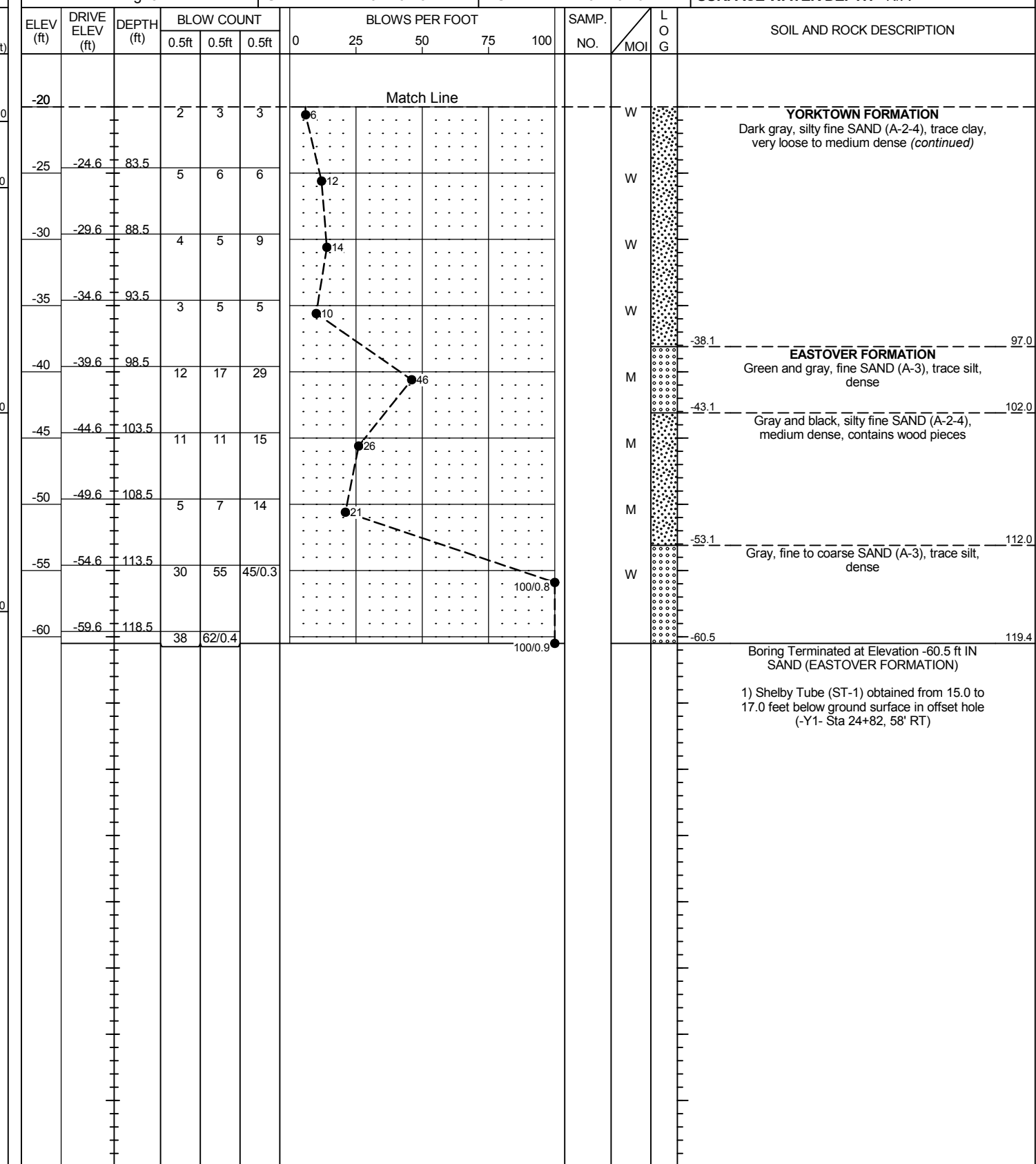
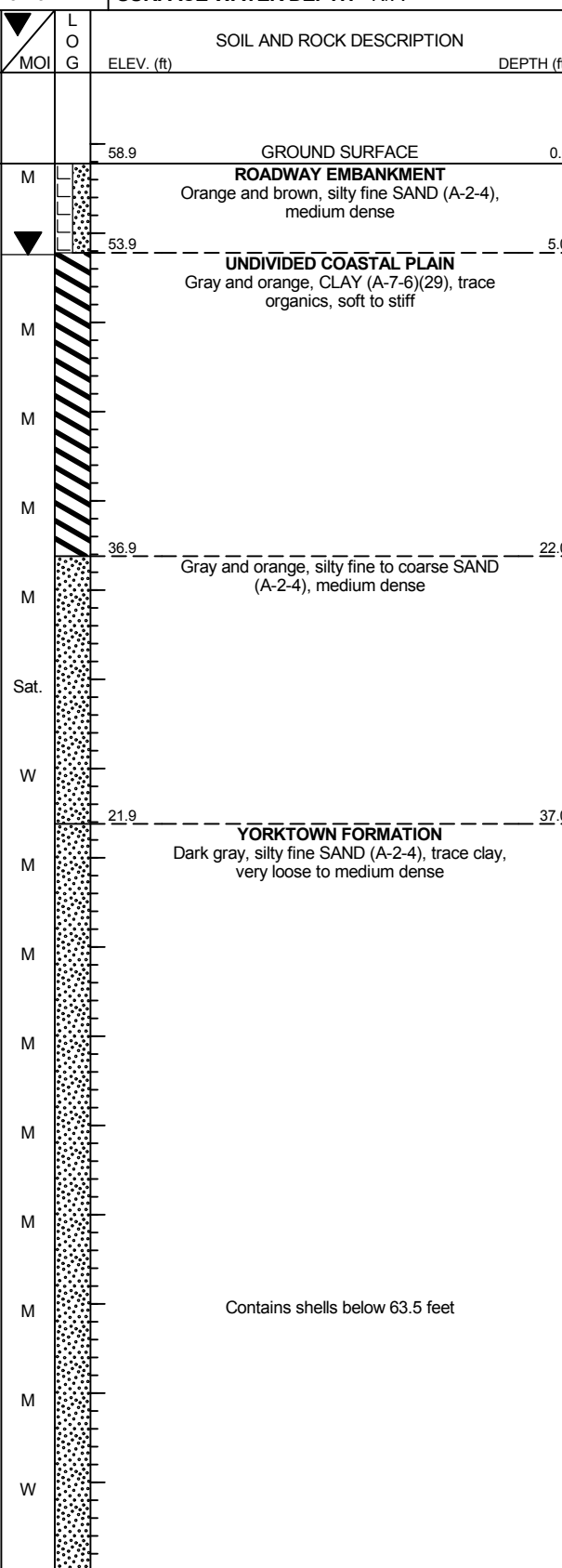
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson										
SITE DESCRIPTION Bridge No. 155 on -Y1- (SR 1130) over -EL- (NC 11/US 13)							GROUND WTR (ft)									
BORING NO. B1-B		STATION 24+83		OFFSET 51 ft RT		ALIGNMENT -Y1-										
COLLAR ELEV. 58.9 ft		TOTAL DEPTH 119.4 ft		NORTHING 941,381		EASTING 2,588,333										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER D. Tignor		START DATE 07/19/16		COMP. DATE 07/20/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
60	58.9	0.0	2	5	6									58.9	GROUND SURFACE	0.0
															ROADWAY EMBANKMENT	
															Orange and brown, silty fine SAND (A-2-4), medium dense	
55	55.4	3.5	7	12	13									53.9	UNDIVIDED COASTAL PLAIN	5.0
															Gray and orange, CLAY (A-7-6)(29), trace organics, soft to stiff	
50	50.4	8.5	WOH	2	2											
45	45.4	13.5		2	2	4										
40	40.4	18.5		2	3	5										
35	35.4	23.5		3	7	7										
30	30.4	28.5		3	7	11										
25	25.4	33.5		5	7	6										
20	20.4	38.5		1	1	2										
15	15.4	43.5		1	2	3										
10	10.4	48.5		2	1	3										
5	5.4	53.5		2	2	3										
0	0.4	58.5		2	3	3										
-5	-4.6	63.5		2	3	5										
-10	-9.6	68.5		2	3	5										
-15	-14.6	73.5		2	2	3										
-20	-19.6	78.5														

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson									
SITE DESCRIPTION Bridge No. 155 on -Y1- (SR 1130) over -EL- (NC 11/US 13)							GROUND WTR (ft)								
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DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER D. Tignor		START DATE 07/19/16		COMP. DATE 07/20/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
-20			2	3	3										
-25	-24.6	83.5	5	6	6										
-30	-29.6	88.5	4	5	9										
-35	-34.6	93.5	3	5	5										
-40	-39.6	98.5	12	17	29										
-45	-44.6	103.5	11	11	15										
-50	-49.6	108.5	5	7	14										
-55	-54.6	113.5	30	55	45/0.3										
-60	-59.6	118.5	38	62/0.4											

NCDOT BORE DOUBLE R-5311A_GEO_BRDG155.GPJ NC_DOT.GDT 8/25/16



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson										
SITE DESCRIPTION Bridge No. 155 on -Y1- (SR 1130) over -EL- (NC 11/US 13)							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 26+13		OFFSET 43 ft RT		ALIGNMENT -Y1-										
COLLAR ELEV. 57.3 ft		TOTAL DEPTH 110.0 ft		NORTHING 941,342		EASTING 2,588,457										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER D. Tignor		START DATE 07/14/16		COMP. DATE 07/15/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
60																
	57.3	0.0	2	4	4										57.3	GROUND SURFACE
55	53.8	3.5	3	4	3										52.7	ROADWAY EMBANKMENT Light brown and orange, silty fine SAND (A-2-4), trace gravel, loose
50	48.8	8.5	2	3	3											UNDIVIDED COASTAL PLAIN Red and brown, fine sandy CLAY (A-7-6)(46), medium stiff to stiff
45	43.8	13.5	4	7	8											
40	38.8	18.5	2	3	4											
35	33.8	23.5	6	9	7											
30	28.8	28.5	4	5	7											
25	23.8	33.5	6	2	2											
20	18.8	38.5	WOH	2	1											
15	13.8	43.5	1	2	3											
10	8.8	48.5	1	3	2											
5	3.8	53.5	2	2	3											
0	-1.2	58.5	2	3	3											
-5	-6.2	63.5	3	3	4											
-10	-11.2	68.5	2	3	4											
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WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson										
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DRILLER D. Tignor		START DATE 07/14/16		COMP. DATE 07/15/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
-20																
	-21.2	78.5	2	2	2											
-25	-26.2	83.5	3	4	4											
-30	-31.2	88.5	7	18	82/0.3											
-35	-36.2	93.5	3	3	5											
-40	-41.2	98.5	13	60	27/0.1											
-45	-46.2	103.5	5	25	43											
-50	-51.2	108.5	13	16	16											

NCDOT BORE DOUBLE R-5311A_GEO_BRDG155.GPJ NC_DOT.GDT 8/26/16

Dark gray and black, silty fine SAND (A-2-4), loose (continued)

Match Line

29.7

87.0

EASTOVER FORMATION
Dark gray with green and white, fine SAND (A-2-4) with silt and trace gravel, loose to very dense

100/0.8

87/0.6

49.7

107.0

Dark gray, fine sandy SILT (A-4), hard

52.7

110.0

Boring Terminated at Elevation -52.7 ft IN SILT (EASTOVER FORMATION)

1) Strata break in split spoon at 4.6 and 34.8 feet.

2) Shelby tube (ST-2) obtained from 8.0 to 10.0 feet below ground surface in offset hole (-Y1- Sta 26+20, 39' RT)

REFERENCE: R-5311A

PROJECT: 45449

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5311A	1	5

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5	BORING LOGS

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY HERTFORD
 PROJECT DESCRIPTION US 13/NC 11, FROM THE NC
I/NC 561 INTERSECTION NEAR AHOSKIE TO THE
US 13/58/NC 45 INTERSECTION NEAR WINTON
 SITE DESCRIPTION RETAINING WALL AT STA. 50+99.00 -Y2-

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME, ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

- C. JONES
- B. THOMPSON
- B. KEANEY
- B. HOWEY
- D. TIGNOR

INVESTIGATED BY F&R, Inc.
 DRAWN BY CBJ
 CHECKED BY ECH
 SUBMITTED BY HDR ENGINEERING
 DATE 8/2016



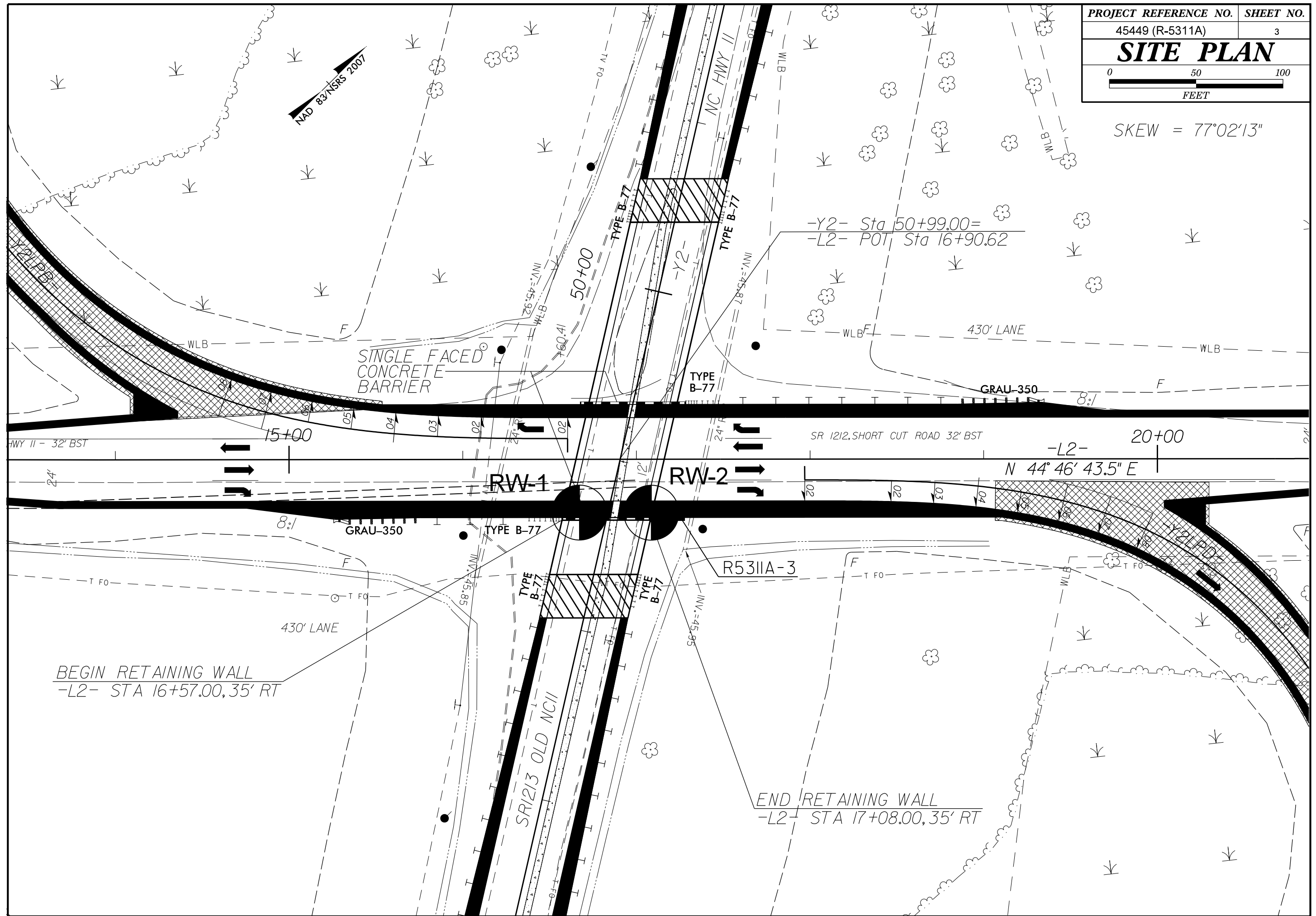
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Christopher B. Jones 10/11/2016
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DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

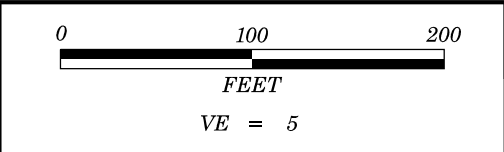
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																			
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>										<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																			
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CRYSTALLINE ROCK (CR)																			
<p>GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS</p>										<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>										<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p>										<p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>																			
MINERALOGICAL COMPOSITION										NON-CRYSTALLINE ROCK (NCR)										COASTAL PLAIN SEDIMENTARY ROCK (CP)										WEATHERING																			
<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p>										<p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>										<p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p>																			
COMPRESSIBILITY										PERCENTAGE OF MATERIAL										VERY SLIGHT (V SL.)										SLIGHT (SL.)																			
<p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p>										<p>ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE</p>										<p>ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p>										<p>ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p>																			
GROUND WATER										MISCELLANEOUS SYMBOLS										MODERATE (MOD.)										MODERATELY SEVERE (MOD. SEV.)																			
<p>WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP</p>										<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY</p>										<p>ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p>										<p>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL</p>																			
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS										SEVERE (SEV.)										VERY SEVERE (V SEV.)																			
<p>U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053</p>										<p>UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p>										<p>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</p>										<p>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</p>																			
SOIL MOISTURE - CORRELATION OF TERMS										ABBREVIATIONS										VERY HARD										HARD																			
<p>SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION</p>										<p>AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY</p>										<p>MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY</p>										<p>VST - VANE SHEAR TEST WEA. - WEATHERED U - UNIT WEIGHT U_g - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p>										<p>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p>									
PLASTICITY										EQUIPMENT USED ON SUBJECT PROJECT										MODERATELY HARD										MEDIUM HARD																			
<p>NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH</p>										<p>DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE 2 15/16" STEEL TEETH TRICONE TUNG-CARB. CORE BIT HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B H N HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST</p>										<p>CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p>										<p>CAN BE GROUDED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p>																			
FRACATURE SPACING										BEDDING										SOFT										VERY SOFT																			
<p>TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FOOT VERY CLOSE LESS THAN 0.16 FEET</p>										<p>TERM THICKNESS VERY THICKLY BEDDED 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET</p>										<p>CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p>										<p>CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p>																			
INDURATION										FRACATURE SPACING										MODERATELY INDURATED										INDURATED																			
<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>										<p>FRACATURE SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FOOT VERY CLOSE LESS THAN 0.16 FEET</p>										<p>FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p>										<p>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p>																			
COLOR										EXTREMELY INDURATED										EXTREMELY INDURATED										EXTREMELY INDURATED																			
<p>DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>										<p>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										<p>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p>										<p>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p>																			
NOTES:										BENCH MARK:										ELEVATION: FEET										DATE: 8-15-14																			
<p>BORING AND GROUND SURFACE ELEVATIONS OBTAINED FROM SURVEY GRADE GPS AND IN-FIELD ROD AND LEVEL SURVEY.</p>										<p>FIAD - FILLED IMMEDIATELY AFTER DRILLING</p>										<p></p>										<p></p>																			

SKEW = 77°02'13"

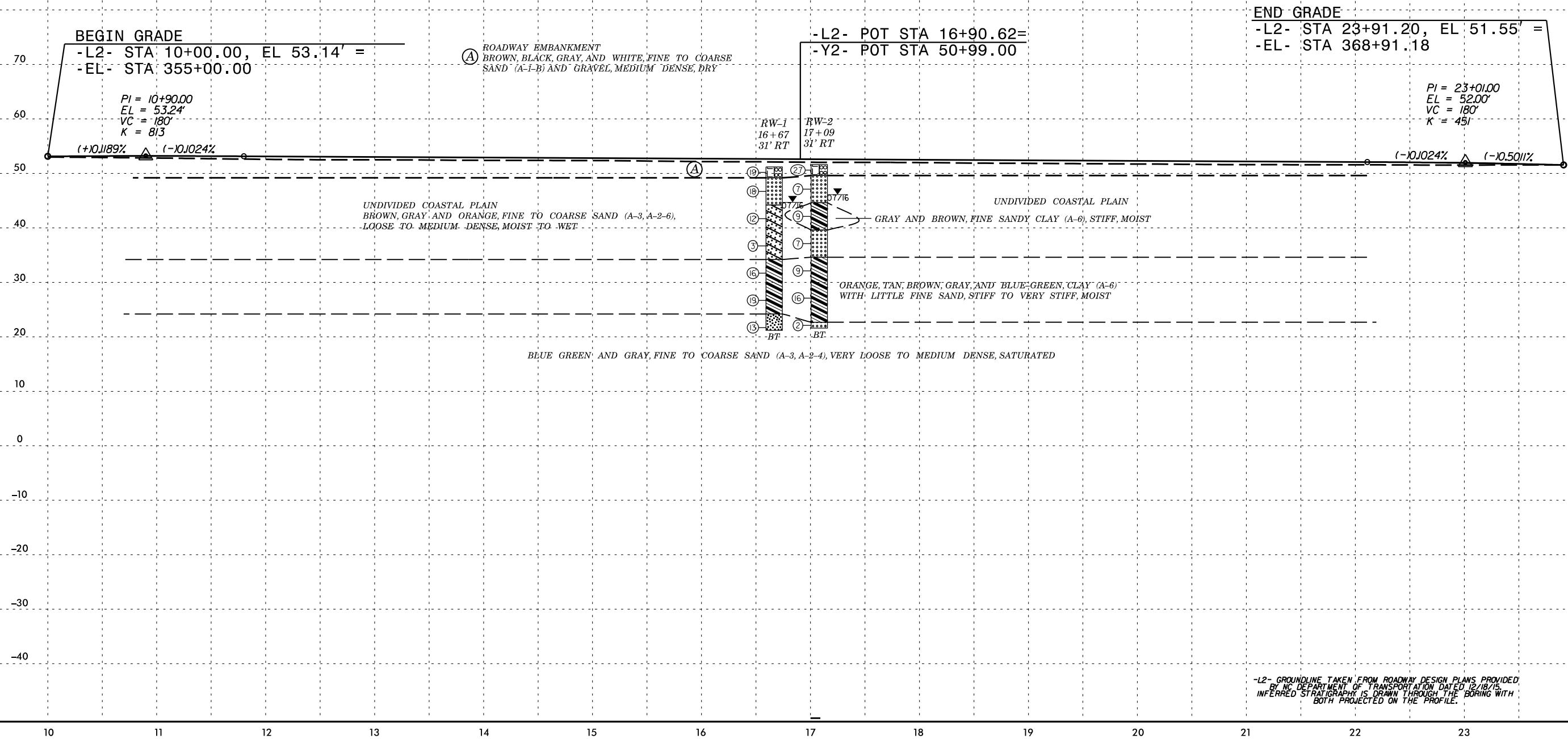


5/14/99

-L2-



PROJECT REFERENCE NO.	SHEET NO.
R-5311A	4
PROFILE ALONG -L2- CENTERLINE	



SYTIME

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson										
SITE DESCRIPTION Retaining Wall at Sta. 50+99.00 -Y2-							GROUND WTR (ft)									
BORING NO. RW-1		STATION 16+67		OFFSET 31 ft RT		ALIGNMENT -L2-										
COLLAR ELEV. 51.5 ft		TOTAL DEPTH 30.0 ft		NORTHING 944,928		EASTING 2,591,579										
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 85% 2/17/2016			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER D. Tignor		START DATE 07/28/16		COMP. DATE 07/28/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
55																
	51.5	0.0												51.5	GROUND SURFACE	0.0
50	48.0	3.5	10	10	9								D	ROADWAY EMBANKMENT Brown, black and gray, fine to coarse SAND (A-1-b) and gravel, medium dense	2.0	
45	43.0	8.5	5	6	12								D	UNDIVIDED COASTAL PLAIN Brown, fine to coarse SAND (A-3), trace silt and organics, medium dense	7.0	
40	38.0	13.5	3	4	8								M	Brown, orange and gray, clayey fine SAND (A-2-6), very loose to medium dense		
35	33.0	18.5	WOR	1	2								M	Orange and tan, CLAY (A-6) with little fine sand, very stiff	17.0	
30	28.0	23.5											M			
25	23.0	28.5											M	Gray, silty fine SAND (A-2-4), medium dense	27.0	
													Sat.	Boring Terminated at Elevation 21.5 ft IN SAND (UNDIVIDED COASTAL PLAIN)	30.0	

WBS 45449.1.2		TIP R-5311A		COUNTY HERTFORD		GEOLOGIST B. Thompson										
SITE DESCRIPTION Retaining Wall at Sta. 50+99.00 -Y2-							GROUND WTR (ft)									
BORING NO. RW-2		STATION 17+09		OFFSET 31 ft RT		ALIGNMENT -L2-										
COLLAR ELEV. 51.7 ft		TOTAL DEPTH 30.0 ft		NORTHING 944,957		EASTING 2,591,608										
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 85% 2/17/2016			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER D. Tignor		START DATE 07/28/16		COMP. DATE 07/28/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
55																
	51.7	0.0												51.7	GROUND SURFACE	0.0
50	48.2	3.5	7	15	12								D	ROADWAY EMBANKMENT White, gray and brown, fine to coarse SAND (A-1-b), medium dense	2.0	
45	43.2	8.5	4	3	4								M	UNDIVIDED COASTAL PLAIN Brown, fine to coarse SAND (A-3), trace silt, loose	7.0	
40	38.2	13.5	2	4	5								M	Gray and brown, fine sandy CLAY (A-6), stiff	12.0	
35	33.2	18.5	WOH	3	4								W	Gray, fine to coarse SAND (A-3), loose	17.0	
30	28.2	23.5											M	Brown, gray and blue green, CLAY (A-6) with little fine sand, stiff to very stiff	17.0	
25	23.2	28.5											M			
													Sat.	Blue green and gray, fine to coarse SAND (A-3), very loose	30.0	
														Boring Terminated at Elevation 21.7 ft IN SAND (UNDIVIDED COASTAL PLAIN)		
														1) Strata break in split spoon at 28.9 feet.		