

REFERENCE: W-5600

PROJECT: 50056

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY JOHNSTON
 PROJECT DESCRIPTION US 70 IMPROVEMENTS FROM
EAST OF US 70 BUSINESS TO WEST OF THE
NEUSE RIVER
 SITE DESCRIPTION DUAL BRIDGES ON US 70 (-L-) OVER
WILSON'S MILL ROAD (-Y9-, SR 1913) BETWEEN
SR 1501 AND SR 1915

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	W-5600	1	11

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:
- 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.
 - 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

M. DURWAY

S. DAVIS

D. AIELLO

T. SHARPE

A. STURCHIO

M. ARNOLD

INVESTIGATED BY F&R, Inc.

DRAWN BY T.T. WALKER

CHECKED BY C. WANG

SUBMITTED BY P. ALTON

DATE MARCH 2018

SINCE **Prepared in the Office of:**
F&R FROEHLING & ROBERTSON, INC.
 Engineering Stability Since 1881
 310 Hubert Street
 Raleigh, North Carolina 27603-2302 | USA
 T 919.828.3441 | F 919.828.5751
 www.fandr.com



SIGNATURE DATE

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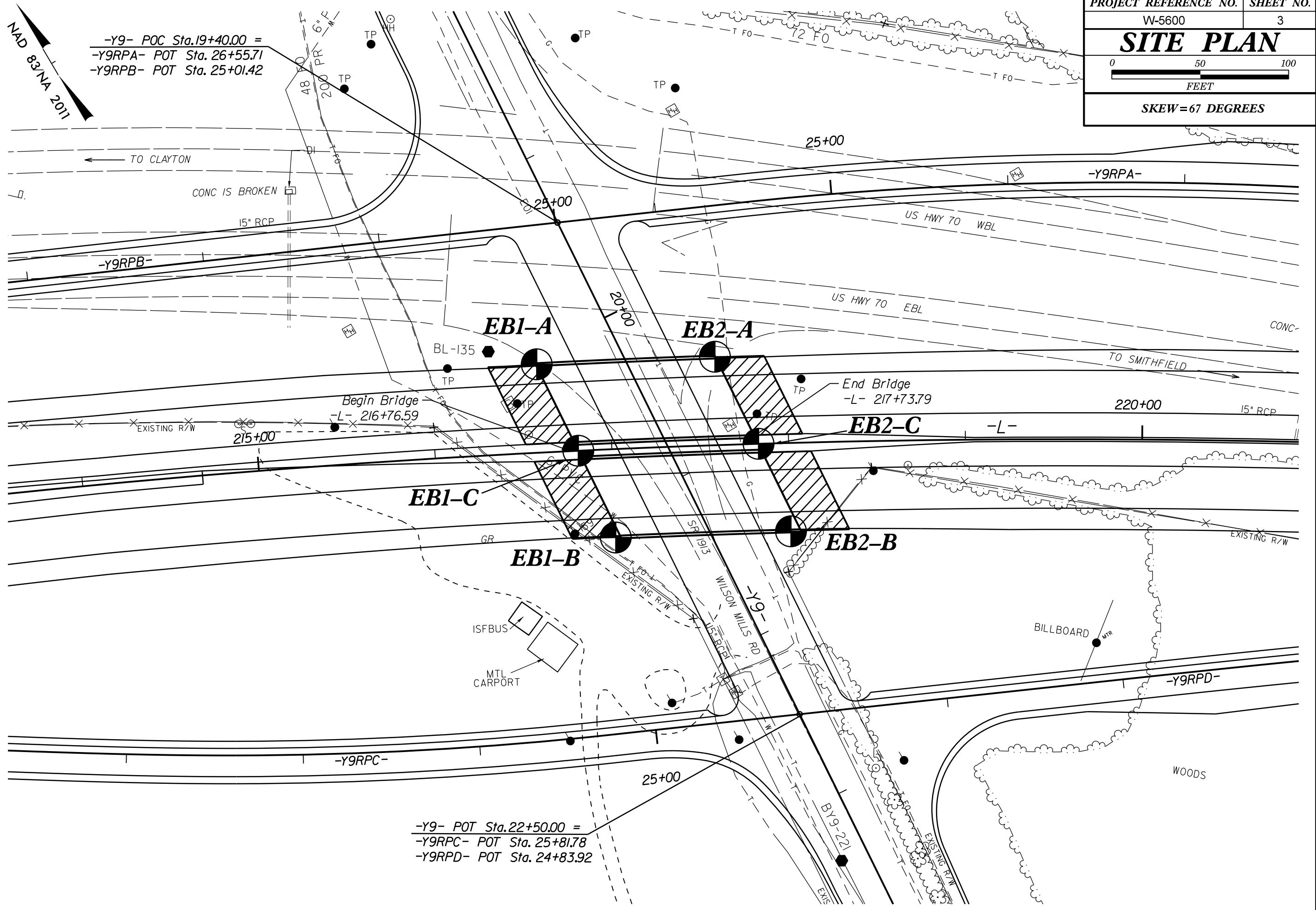
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. Includes sub-sections like SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, and COLOR.

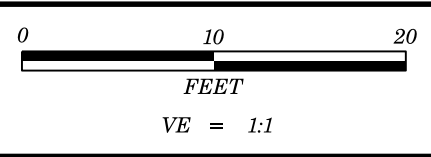
PROJECT REFERENCE NO.	SHEET NO.
W-5600	3
SITE PLAN	
SKEW = 67 DEGREES	

NAD 83/NA 2011

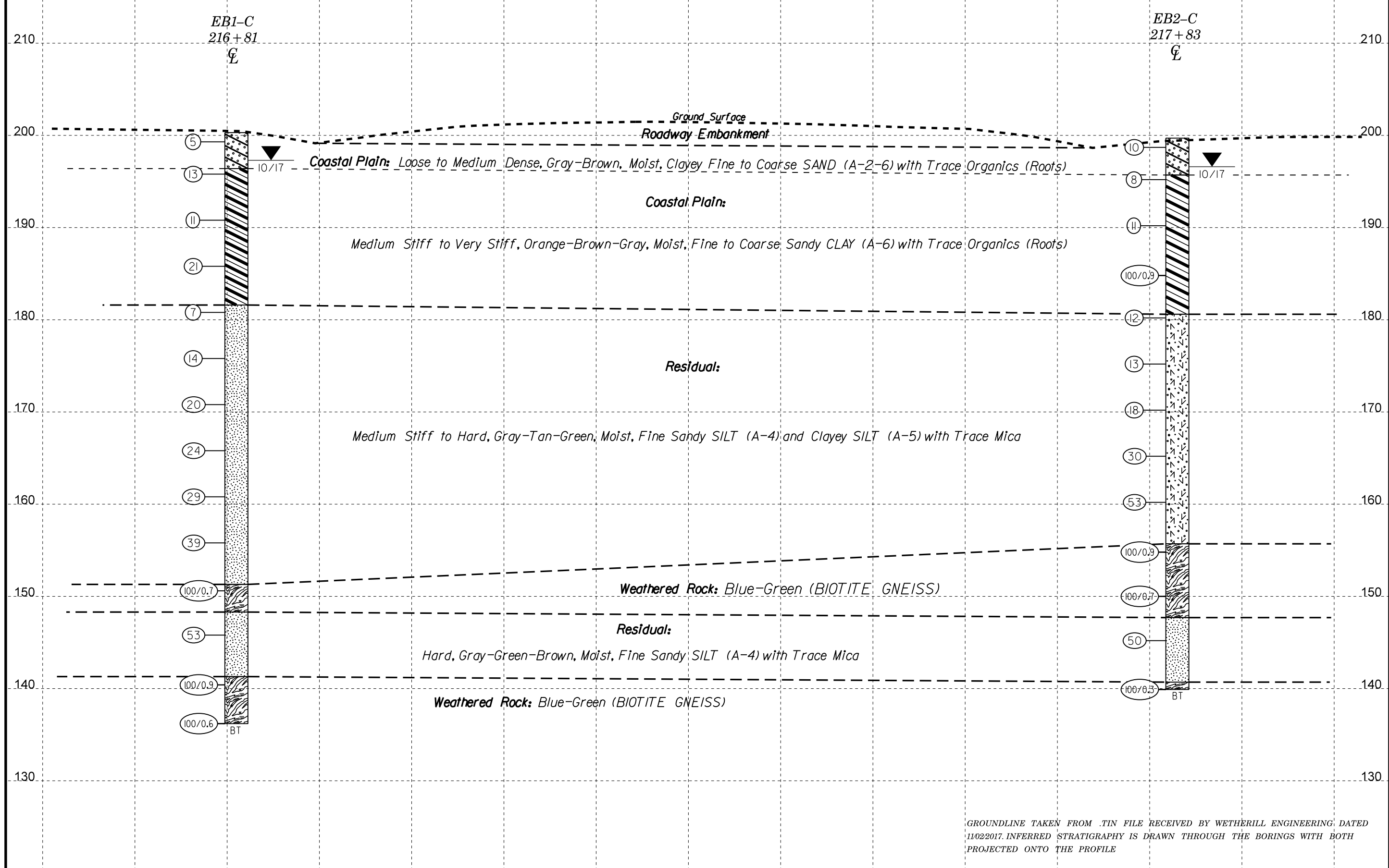
-Y9- POC Sta. 19+40.00 =
 -Y9RPA- POT Sta. 26+55.71
 -Y9RPB- POT Sta. 25+01.42



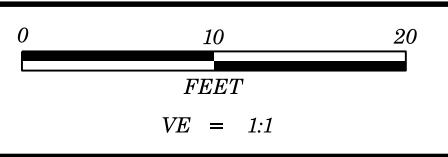
-Y9- POT Sta. 22+50.00 =
 -Y9RPC- POT Sta. 25+81.78
 -Y9RPD- POT Sta. 24+83.92



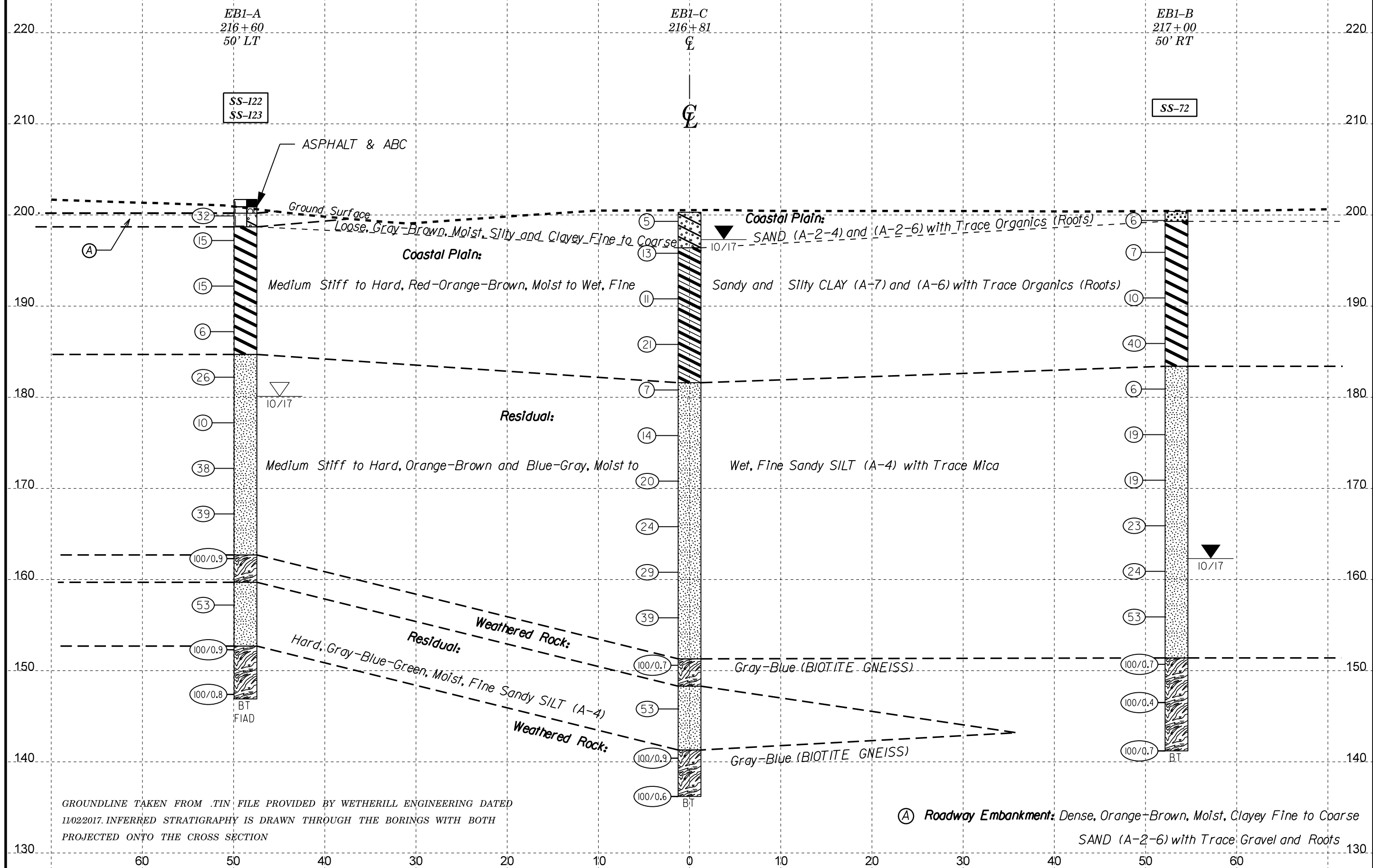
PROJECT REFERENCE NO.	SHEET NO.
W-5600	4
PROFILE BORINGS PROJECTED ALONG THE \mathcal{L} OF -L-	



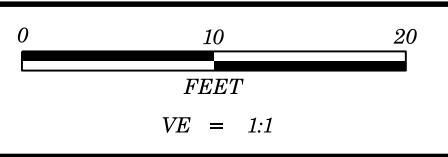
GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY WETHERILL ENGINEERING, DATED 11/02/2017. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE



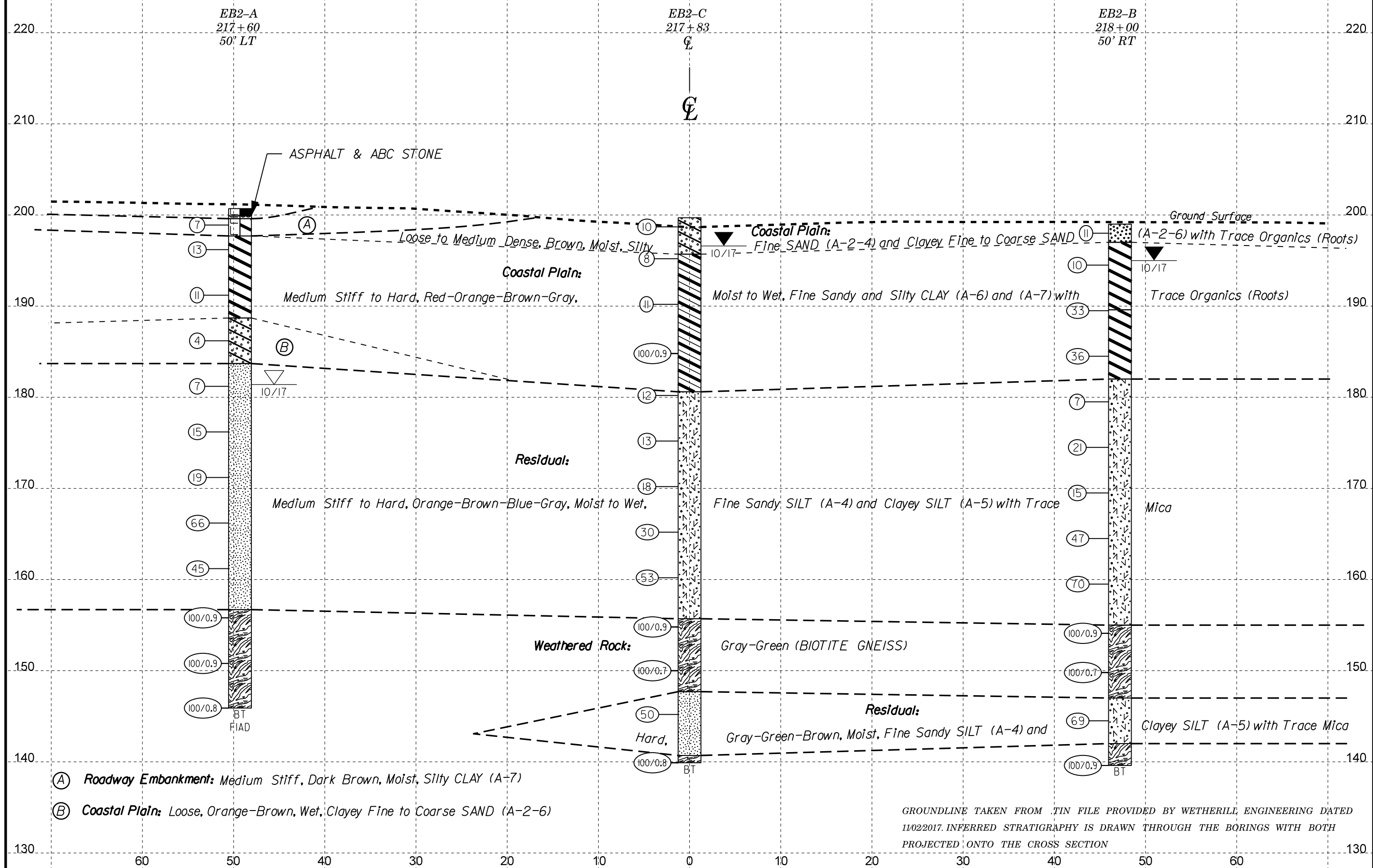
PROJECT REFERENCE NO.	SHEET NO.
W-5600	5
CROSS SECTION THROUGH END BENT 1	
STA. 216 + 76.59.00	
SKEW = 66.5 DEGREES	



GROUNDLINE TAKEN FROM .TIN FILE PROVIDED BY WETHERILL ENGINEERING DATED 11/02/2017. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION



PROJECT REFERENCE NO.	SHEET NO.
W-5600	6
CROSS SECTION THROUGH END BENT 2	
STA. 217+73.79	
SKEW=65.6 DEGREES	



- (A) **Roadway Embankment:** Medium Stiff, Dark Brown, Moist, Silty CLAY (A-7)
- (B) **Coastal Plain:** Loose, Orange-Brown, Wet, Clayey Fine to Coarse SAND (A-2-6)

GROUNDLINE TAKEN FROM .TIN FILE PROVIDED BY WETHERILL ENGINEERING DATED 11/02/2017. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 50056.1.1		TIP W-5600		COUNTY JOHNSTON		GEOLOGIST M. Durway									
SITE DESCRIPTION Dual Bridges on US 70 over Wilson's Mill Road -Y9- (SR 1913) Between SR 1501 and SR 1915							GROUND WTR (ft)								
BORING NO. B-130(EB1-A)		STATION 216+60		OFFSET 50 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 201.7 ft		TOTAL DEPTH 54.8 ft		NORTHING 663,335		EASTING 2,194,631									
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 02/11/2017				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER D. Aiello		START DATE 10/24/17		COMP. DATE 10/24/17		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
205															
200	200.9	0.8	4	16	16										
	198.2	3.5	5	7	8										
195	193.2	8.5	4	7	8										
190	188.2	13.5	3	3	3										
185	183.2	18.5	9	13	13										
180	178.2	23.5	2	5	5										
175	173.2	28.5	7	14	24										
170	168.2	33.5	5	15	24										
165	163.2	38.5	17	40	60/0.4										
160	158.2	43.5	12	22	31										
155	153.2	48.5	11	47	53/0.4										
150	148.2	53.5	19	65	35/0.3										

WBS 50056.1.1		TIP W-5600		COUNTY JOHNSTON		GEOLOGIST M. Durway									
SITE DESCRIPTION Dual Bridges on US 70 over Wilson's Mill Road -Y9- (SR 1913) Between SR 1501 and SR 1915							GROUND WTR (ft)								
BORING NO. B-181(EB1-C)		STATION 216+81		OFFSET CL		ALIGNMENT -L-									
COLLAR ELEV. 200.3 ft		TOTAL DEPTH 64.1 ft		NORTHING 663,281		EASTING 2,194,626									
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 88% 02/11/2017				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER S. Davis		START DATE 10/19/17		COMP. DATE 10/19/17		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
205															
200	200.3	0.0	1	2	3										
195	196.8	3.5	4	6	7										
190	191.8	8.5	3	5	6										
185	186.8	13.5	7	11	10										
180	181.8	18.5	3	2	5										
175	176.8	23.5	3	6	8										
170	171.8	28.5	4	9	11										
165	166.8	33.5	5	9	15										
160	161.8	38.5	7	11	18										
155	156.8	43.5	8	20	19										
150	151.8	48.5	44	56	44/0.2										
145	146.8	53.5	14	33	20										
140	141.8	58.5	20	43	56/0.4										
	136.8	63.5	73	27/0.1											

NCDOT BORE DOUBLE W5600_GEO_BH_BRDG&CULV.GPJ NC_DOT.GDT 3/2/18

Notes:
1. Surficial Organics Soil=0.0'-0.1'

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 50056.1.1		TIP W-5600		COUNTY JOHNSTON		GEOLOGIST M. Arnold										
SITE DESCRIPTION Dual Bridges on US 70 over Wilson's Mill Road -Y9- (SR 1913) Between SR 1501 and SR 1915							GROUND WTR (ft)									
BORING NO. B-131(EB1-B)		STATION 217+00		OFFSET 50 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 200.4 ft		TOTAL DEPTH 59.2 ft		NORTHING 663,228		EASTING 2,194,619										
DRILL RIG/HAMMER EFF./DATE F&P5785 CME-55 80% 02/11/2017				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER D. Aiello		START DATE 10/10/17		COMP. DATE 10/10/17		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
205																
200	200.4	0.0	1	3	3									200.4	GROUND SURFACE	0.0
														199.3	COASTAL PLAIN	1.1
	196.9	3.5	4	4	3	6									Gray-Brown, Silty Fine SAND (A-2-4) with Trace Organics (Roots)	
195															Red-Orange-Brown, Fine to Coarse Sandy Silty CLAY (A-7)	
	191.9	8.5	1	5	5	10										
190																
	186.9	13.5	10	17	23	40										
185																
	181.9	18.5	2	3	3	6								183.4	RESIDUAL	17.0
180															Blue-Gray, Fine Sandy SILT (A-4) with Trace Mica	
	176.9	23.5	4	7	12	19										
175																
	171.9	28.5	4	9	10	19										
170																
	166.9	33.5	4	10	13	23										
165																
	161.9	38.5	5	11	13	24										
160																
	156.9	43.5	11	22	31	53										
155																
	151.9	48.5	17	47	53/0.2	100/0.7								151.4	WEATHERED ROCK	49.0
150															Blue-Gray (BIOTITE GNEISS)	
	146.9	53.5	100/0.4			100/0.4										
145																
	141.9	58.5	50	50/0.2		100/0.7								141.2	Boring Terminated at Elevation 141.2 ft in Weathered Rock (BIOTITE GNEISS)	59.2
															Notes: 1. Surficial Organics Soil=0.0'-0.1'	

NCDOT BORE DOUBLE W5600_GEO_BH_BRDG&CULV.GPJ NC_DOT.GDT 3/2/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 50056.1.1		TIP W-5600		COUNTY JOHNSTON		GEOLOGIST M. Durway	
SITE DESCRIPTION Dual Bridges on US 70 over Wilson's Mill Road -Y9- (SR 1913) Between SR 1501 and SR 1915							GROUND WTR (ft)
BORING NO. B-132(EB2-A)		STATION 217+60		OFFSET 50 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 200.7 ft		TOTAL DEPTH 54.8 ft		NORTHING 663,287		EASTING 2,194,720	
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 02/11/2017			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic	
DRILLER D. Aiello		START DATE 10/24/17		COMP. DATE 10/24/17		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					
205															
200	199.9	0.8	1	3	4										
195	197.2	3.5	4	6	7										
190	192.2	8.5	3	5	6										
185	187.2	13.5	1	2	2										
180	182.2	18.5	2	2	5										
175	177.2	23.5	2	7	8										
170	172.2	28.5	3	8	11										
165	167.2	33.5	13	22	44										
160	162.2	38.5	9	22	23										
155	157.2	43.5	32	50	50/0.4										
150	152.2	48.5	14	27	73/0.4										
	147.2	53.5	16	42	58/0.3										

WBS 50056.1.1		TIP W-5600		COUNTY JOHNSTON		GEOLOGIST M. Durway	
SITE DESCRIPTION Dual Bridges on US 70 over Wilson's Mill Road -Y9- (SR 1913) Between SR 1501 and SR 1915							GROUND WTR (ft)
BORING NO. B-182(EB2-C)		STATION 217+83		OFFSET CL		ALIGNMENT -L-	
COLLAR ELEV. 199.7 ft		TOTAL DEPTH 59.8 ft		NORTHING 663,232		EASTING 2,194,716	
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 02/11/2017			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic	
DRILLER D. Aiello		START DATE 10/25/17		COMP. DATE 10/25/17		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					
200	199.7	0.0	2	4	6										
195	196.2	3.5	1	3	5										
190	191.2	8.5	4	5	6										
185	186.2	13.5	20	22	78/0.4										
180	181.2	18.5	4	6	6										
175	176.2	23.5	3	6	7										
170	171.2	28.5	3	5	13										
165	166.2	33.5	5	11	19										
160	161.2	38.5	13	22	31										
155	156.2	43.5	13	41	59/0.4										
150	151.2	48.5	27	60	40/0.2										
145	146.2	53.5	8	15	35										
140	141.2	58.5	20	45	55/0.3										

NCDOT BORE DOUBLE W5600_GEO_BH_BRDG&CULV.GPJ NC_DOT.GDT 3/21/18

Notes:
1. Surficial Organics Soil=0.0'-0.1'

GEOTECHNICAL BORING REPORT BORE LOG

WBS 50056.1.1	TIP W-5600	COUNTY JOHNSTON	GEOLOGIST M. Arnold
SITE DESCRIPTION Dual Bridges on US 70 over Wilson's Mill Road -Y9- (SR 1913) Between SR 1501 and SR 1915			GROUND WTR (ft)
BORING NO. B-133 (EB2-B)	STATION 218+00	OFFSET 50 ft RT	ALIGNMENT -L-
COLLAR ELEV. 199.0 ft	TOTAL DEPTH 59.4 ft	NORTHING 663,181	EASTING 2,194,706
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 80% 02/11/2017		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER D. Aiello	START DATE 10/11/17	COMP. DATE 10/11/17	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
200	199.0	0.0												GROUND SURFACE	0.0
195	195.5	3.5	3	7	4	11								COASTAL PLAIN Brown, Silty Fine SAND (A-2-4) with Trace Organics (Roots)	2.0
190	190.5	8.5	4	4	6	10								Gray-Orange-Brown, Fine to Coarse Sandy Silty CLAY (A-7)	
185	185.5	13.5	4	23	10	33									
180	180.5	18.5	10	20	16	36								RESIDUAL Blue-Gray, Clayey SILT (A-5) with Trace Mica	17.0
175	175.5	23.5	3	3	4	7									
170	170.5	28.5	5	10	11	21									
165	165.5	33.5	4	5	10	15									
160	160.5	38.5	11	19	28	47									
155	155.5	43.5	14	27	43	70								WEATHERED ROCK Gray-Green-Brown (BIOTITE GNEISS)	44.0
150	150.5	48.5	22	40	60/0.4	100/0.9									
145	145.5	53.5	52	48/0.2		100/0.7								RESIDUAL Gray-Green, Clayey SILT (A-5) with Trace Mica	52.0
140	140.5	58.5	22	26	43	69								WEATHERED ROCK Blue-Gray (BIOTITE GNEISS)	57.0
			36	64/0.4										Boring Terminated at Elevation 139.6 ft in Weathered Rock (BIOTITE GNEISS)	59.4

NCDOT BORE DOUBLE W5600_GEO_BH_BRD&CULV.GPJ NC_DOT_GDT 3/21/18

Notes:
1. Surficial Organics Soil=0.0'-0.1'

**North Carolina Department of Transportation
Division of Highways
Materials and Test Unit
Soils Laboratory**

T.I.P. ID NO.: W-5600
DESCRIPTION: Dual Bridges on US 70 over Wilson's Mill Road -Y9- (SR 1913) between SR 1501 and SR 1915

REPORT ON SAMPLES OF: SOIL FOR QUALITY

F&R PROJECT #: 66U-0197
DATE SAMPLED: 9/17 to 10/17
SAMPLED FROM: Various
SUBMITTED BY: Cheng Wang

COUNTY: Johnston
RECEIVED: 10/17 to 12/17
REPORTED: 10/17 to 12/17
BY: D. Jenks
Cert No. 101-02-0603

TEST RESULTS

PROJ. SAMPLE NO.	SS-122	SS-123	SS-72											
BORING NO.	B-130	B-130	B-131											
	EB1-A	EB1-A	EB1-B											
Retained #4 Sieve %	0.0	0.0	0.0											
Passing #10 Sieve %	99.9	100.0	100.0											
Passing #40 Sieve %	94.1	99.7	99.2											
Passing #200 Sieve %	57.3	68.6	57.8											

SOIL MORTAR - 100%														
Coarse Sand Ret - #60 %	11.8	3.1	6.6											
Fine Sand Ret - #270 %	44.4	40.1	46.0											
Silt 0.053 - 0.010 mm %	29.0	44.5	25.2											
Clay < 0.010 mm %	14.8	12.3	22.2											
L.L.	27	34	38											
P.L.	NP	NP	33											
P.I.	NP	NP	5											
AASHTO Classification	A-4	A-4	A-4(2)											
Station	216+60	216+60	217+00											
Offset	50'Lt	50'Lt	50'Rt											
Depth (ft)	18.5	23.5	18.5											
to	20.0	25.0	20.0											
Alignment	-L-	-L-	-L-											
Moisture Content (%)	27.1	19.7	20.4											
Organic Content (%)	NT	NT	NT											

NP = Not plastic
NT = Not tested
ND = Not Determined
CL = Centerline

W.P. Alton, P.E.
Soils Engineer