

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

Table with multiple columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, EQUIPMENT USED ON SUBJECT PROJECT, ROCK HARDNESS, FRACTURE SPACING, BEDDING, INDURATION.

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**SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
 FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS**

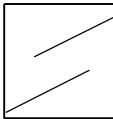
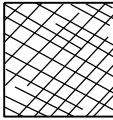


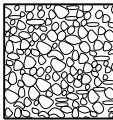
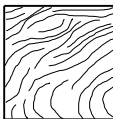
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)

From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.

STRUCTURE

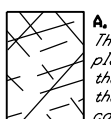
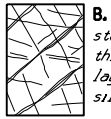

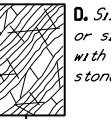
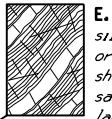
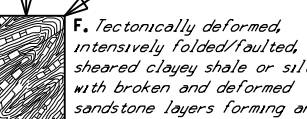
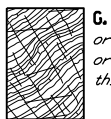
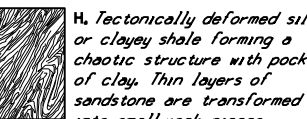
-  INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities
-  BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets
-  VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets
-  BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity
-  DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces
-  LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

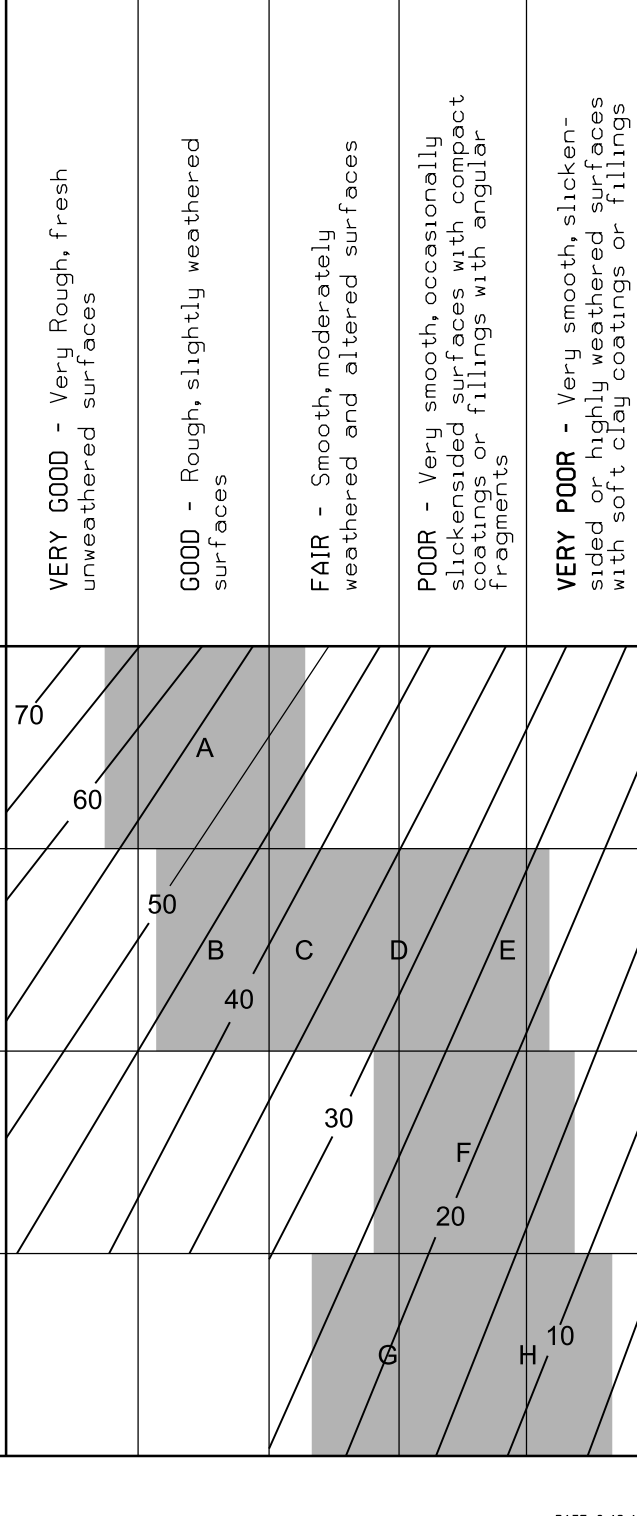
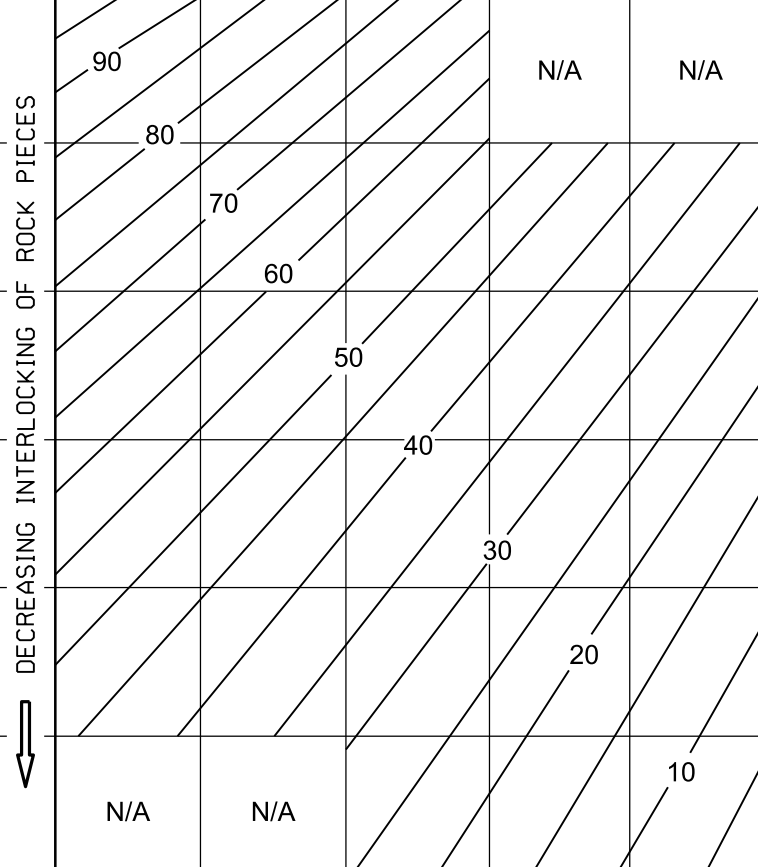
SURFACE CONDITIONS	DECREASING SURFACE QUALITY →				
	VERY GOOD	GOOD	FAIR	POOR	VERY POOR
Very rough, fresh unweathered surfaces					
Rough, slightly weathered, iron stained surfaces					
Smooth, moderately weathered and altered surfaces					
Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments					
Slickensided, highly weathered surfaces with soft clay coatings or fillings					

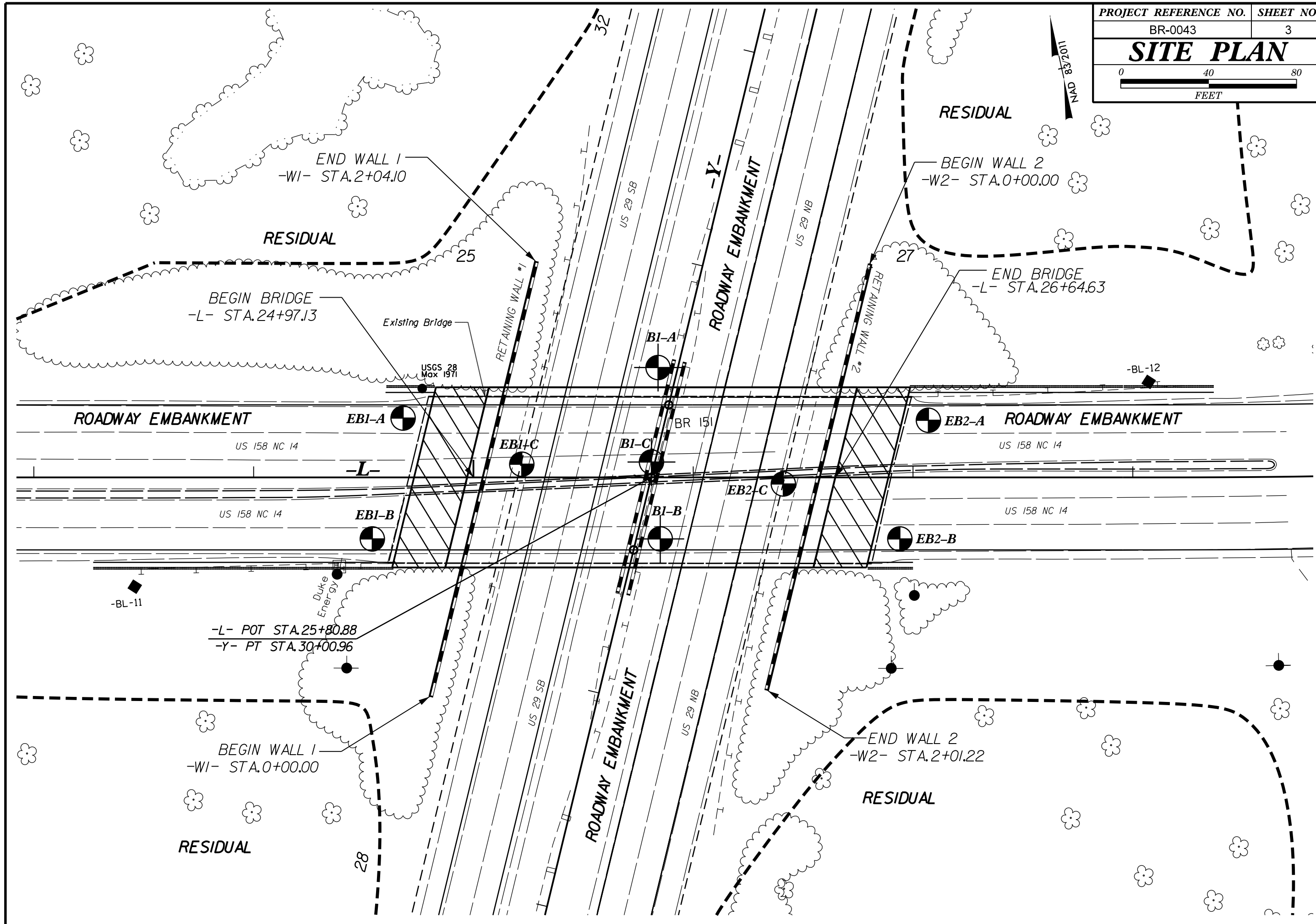
GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)

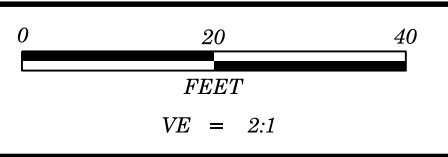
From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

COMPOSITION AND STRUCTURE

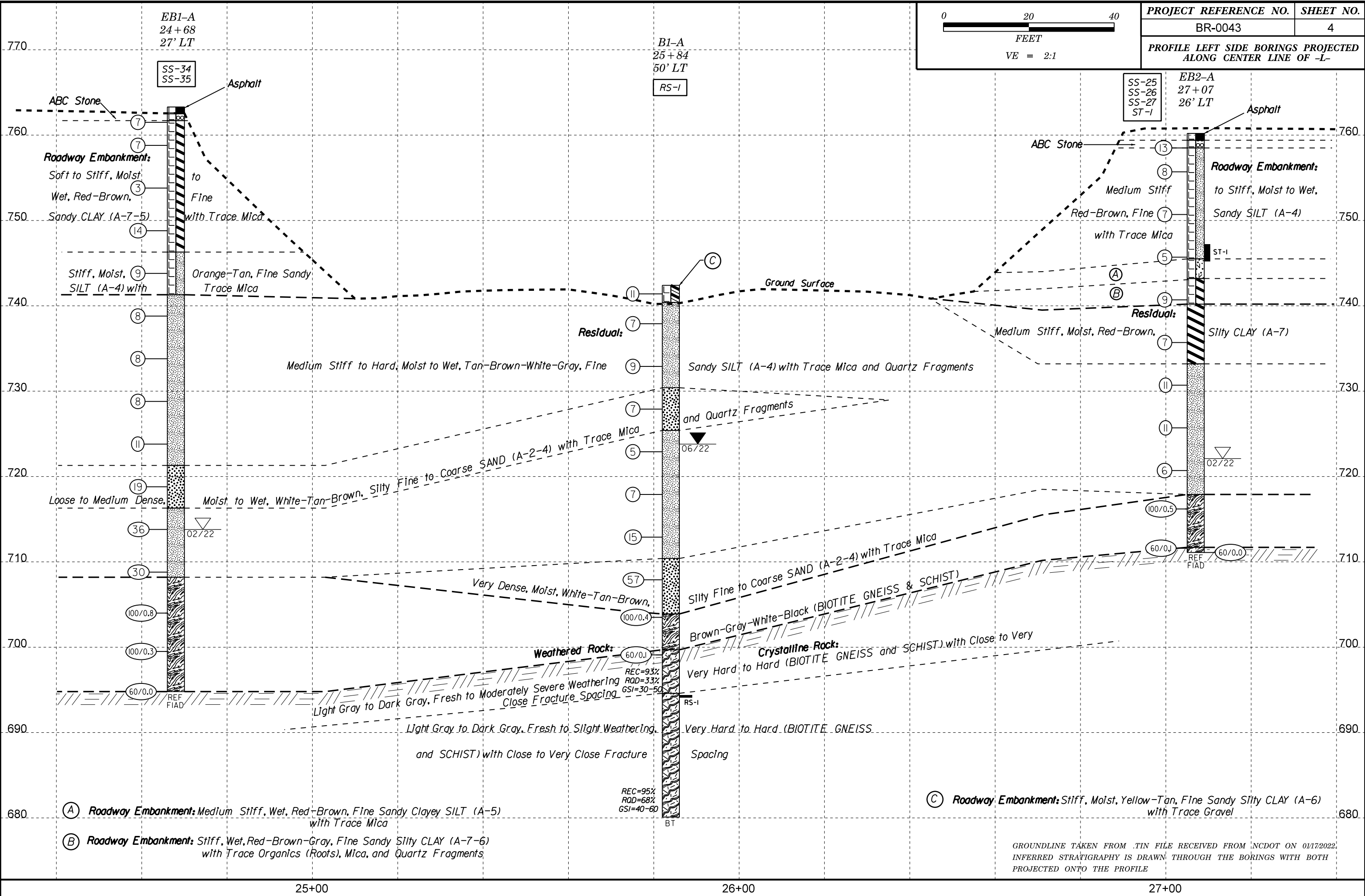
-  **A.** Thick bedded, very blocky sandstone. The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.
 -  **B.** Sandstone with thin inter-layers of siltstone
 -  **C.** Sandstone and siltstone in similar amounts
 -  **D.** Siltstone or silty shale with sandstone layers
 -  **E.** Weak siltstone or clayey shale with sandstone layers
 -  **F.** Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure
 -  **G.** Undisturbed silty or clayey shale with or without a few very thin sandstone layers
 -  **H.** Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.
- Means deformation after tectonic disturbance







PROJECT REFERENCE NO.	SHEET NO.
BR-0043	4
PROFILE LEFT SIDE BORINGS PROJECTED ALONG CENTER LINE OF -L-	



(A) Roadway Embankment: Medium Stiff, Wet, Red-Brown, Fine Sandy Clayey SILT (A-5) with Trace Mica

(B) Roadway Embankment: Stiff, Wet, Red-Brown-Gray, Fine Sandy Silty CLAY (A-7-6) with Trace Organics (Roots), Mica, and Quartz Fragments

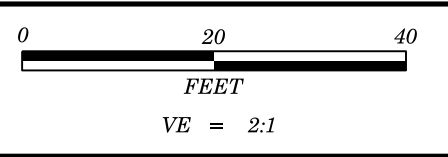
(C) Roadway Embankment: Stiff, Moist, Yellow-Tan, Fine Sandy Silty CLAY (A-6) with Trace Gravel

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED FROM NCDOT ON 01/17/2022. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

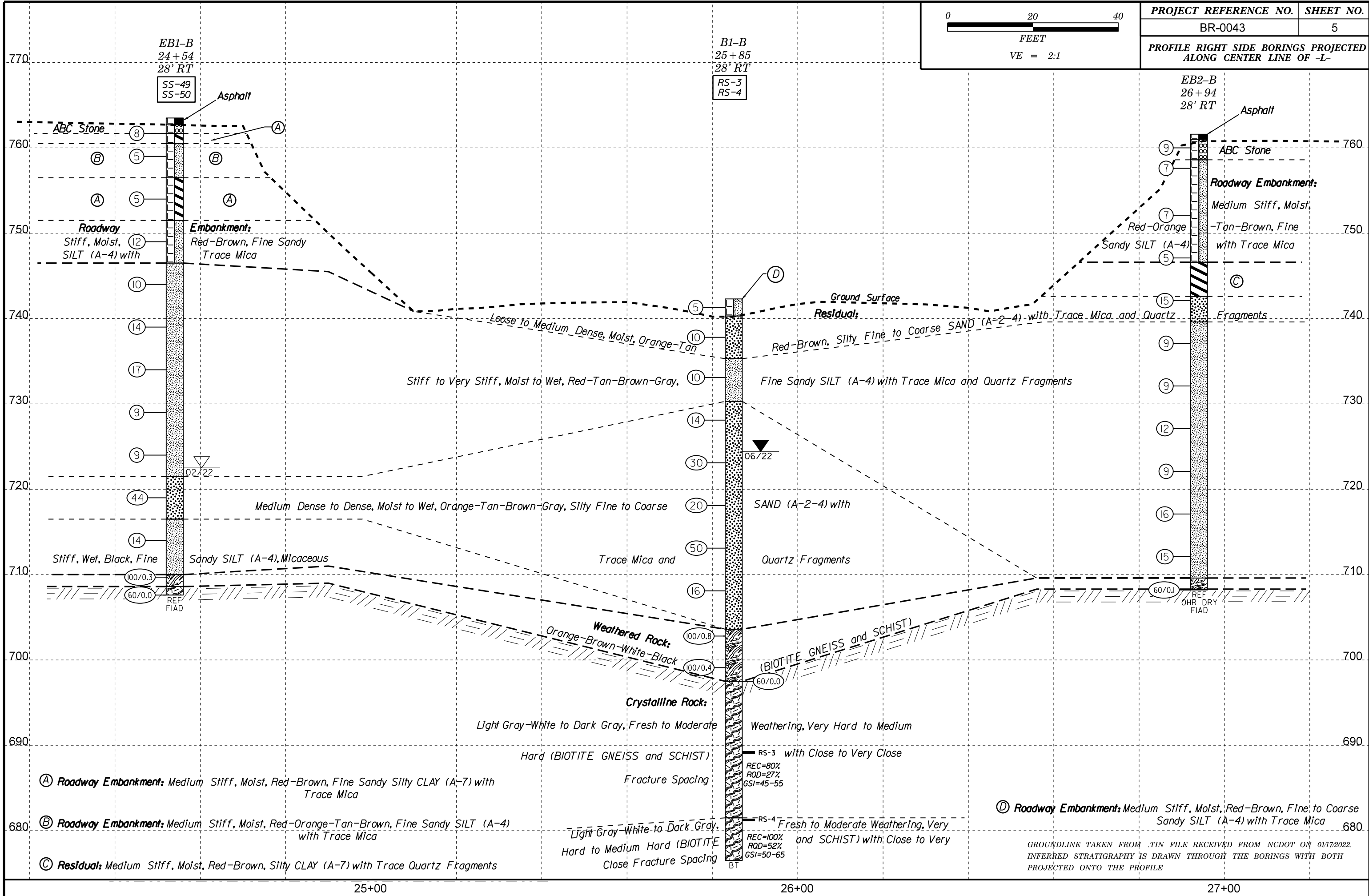
25+00

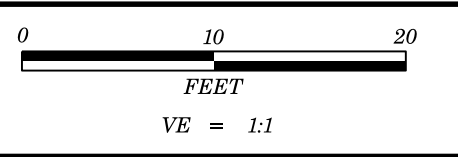
26+00

27+00

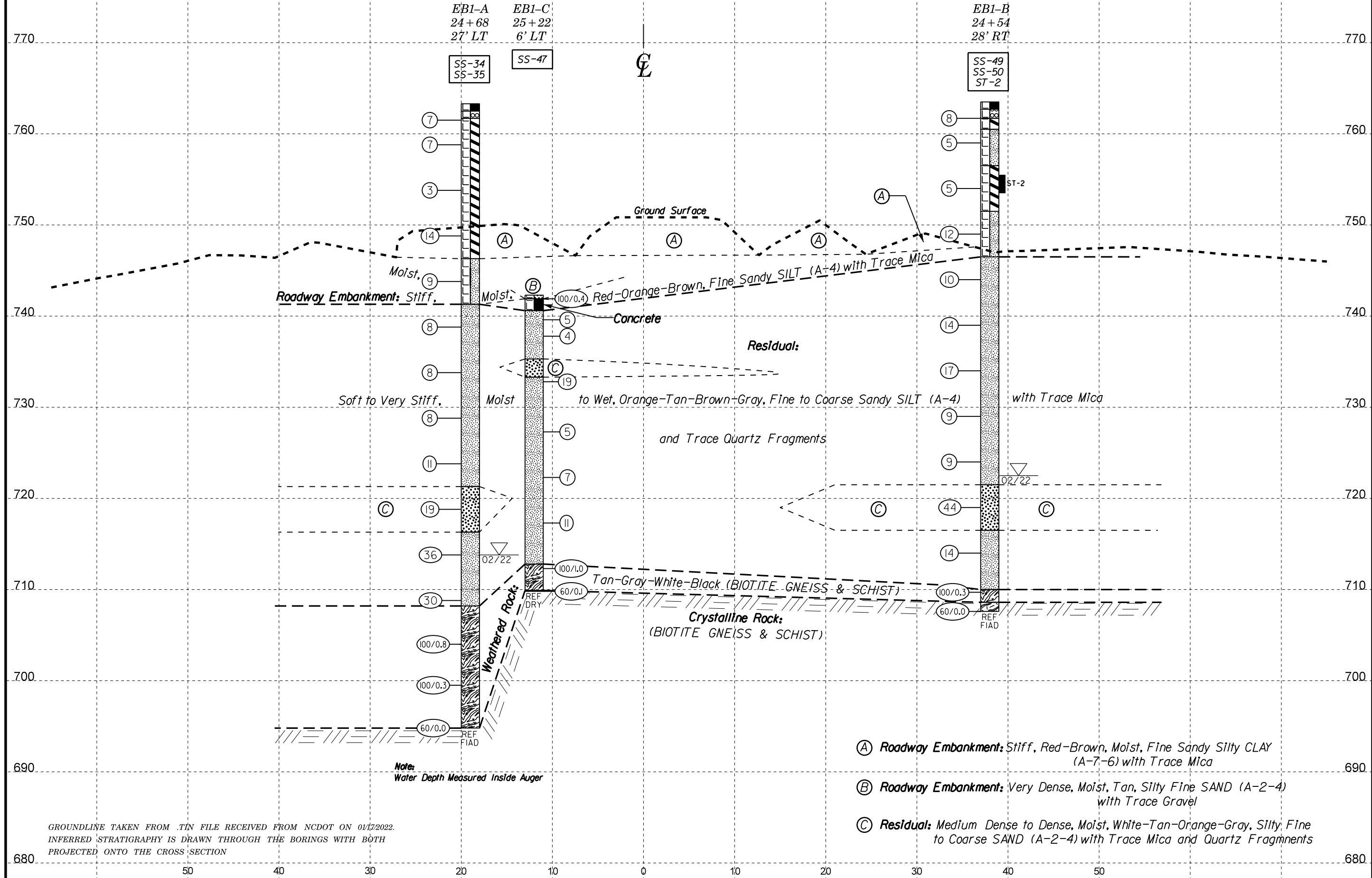


PROJECT REFERENCE NO.	SHEET NO.
BR-0043	5
PROFILE RIGHT SIDE BORINGS PROJECTED ALONG CENTER LINE OF -L-	



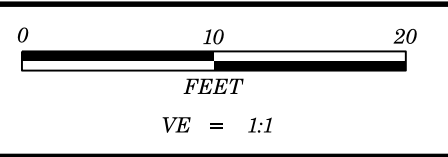


PROJECT REFERENCE NO.	SHEET NO.
BR-0043	6
CROSS SECTION THROUGH END BENT 1	
AT -L- STATION 24+97.13	
SKEW=103.64°	

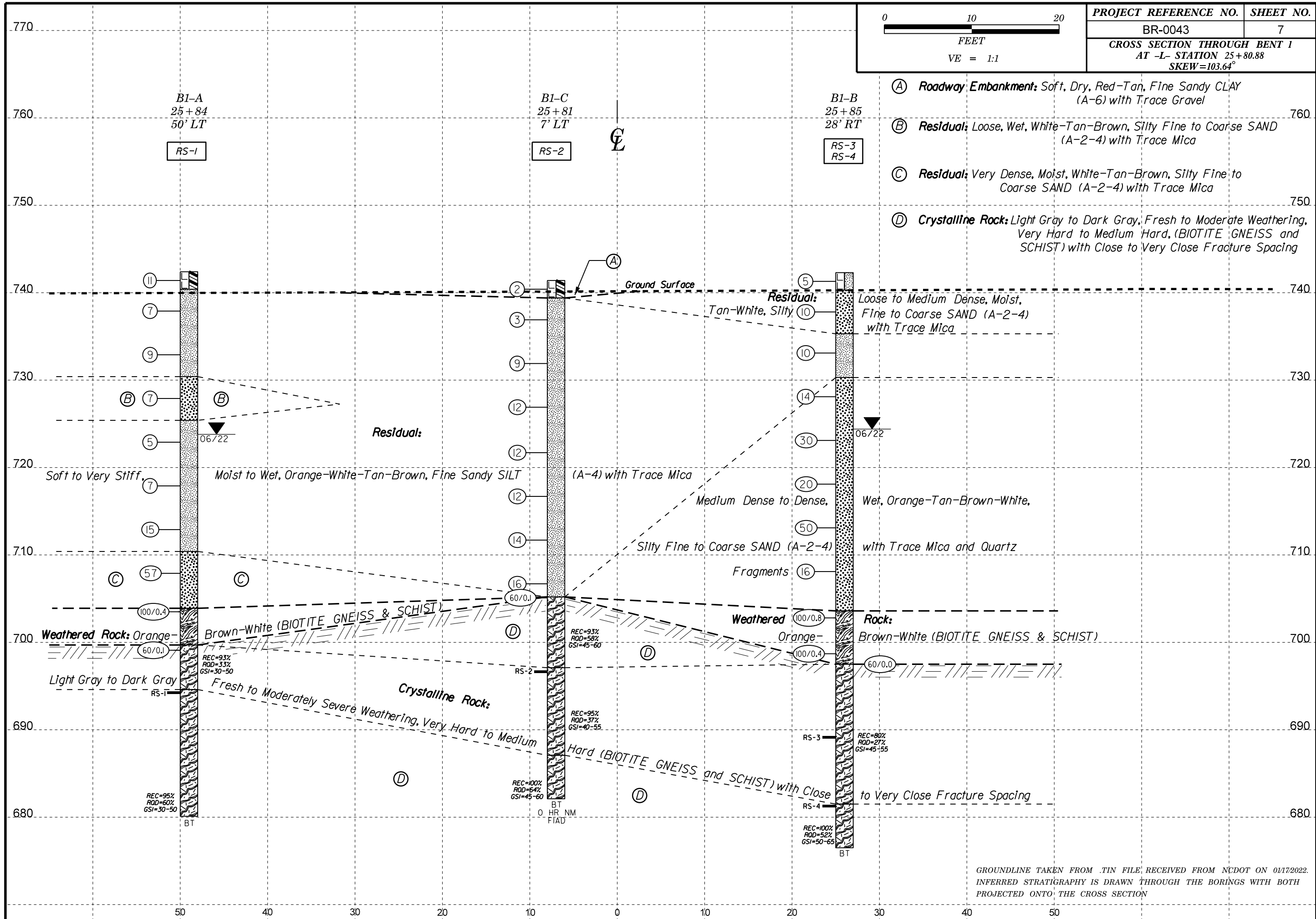


GROUNDLINE TAKEN FROM .TIN FILE RECEIVED FROM NCDOT ON 01/17/2022.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
 PROJECTED ONTO THE CROSS SECTION

- (A) **Roadway Embankment:** Stiff, Red-Brown, Moist, Fine Sandy Silty CLAY (A-7-6) with Trace Mica
- (B) **Roadway Embankment:** Very Dense, Moist, Tan, Silty Fine SAND (A-2-4) with Trace Gravel
- (C) **Residual:** Medium Dense to Dense, Moist, White-Tan-Orange-Gray, Silty, Fine to Coarse SAND (A-2-4) with Trace Mica and Quartz Fragments

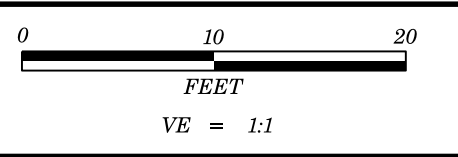


PROJECT REFERENCE NO.	SHEET NO.
BR-0043	7
CROSS SECTION THROUGH BENT 1 AT -L- STATION 25+80.88 SKEW=103.64°	

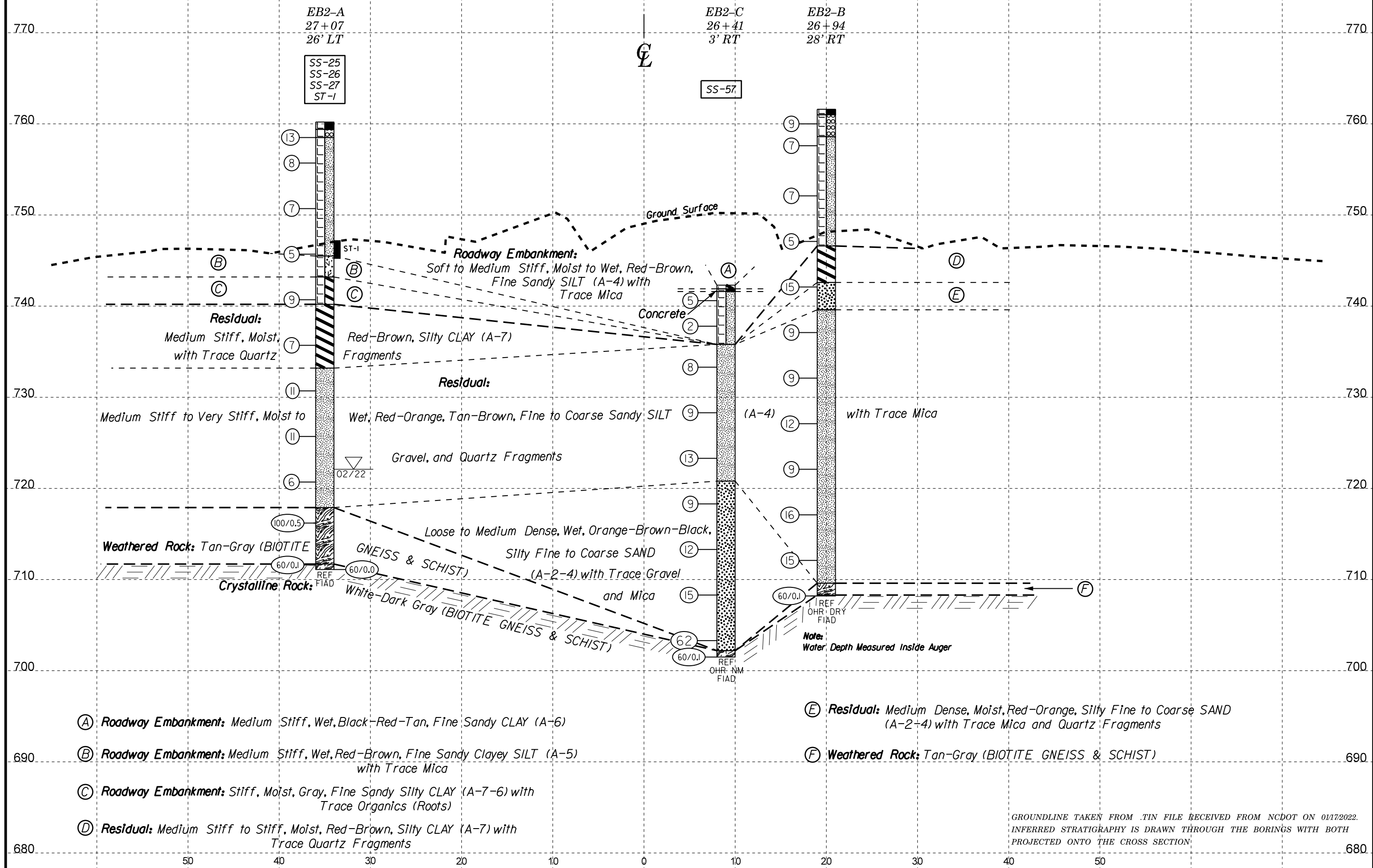


- (A) **Roadway Embankment:** Soft, Dry, Red-Tan, Fine Sandy CLAY (A-6) with Trace Gravel
- (B) **Residual:** Loose, Wet, White-Tan-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Mica
- (C) **Residual:** Very Dense, Moist, White-Tan-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Mica
- (D) **Crystalline Rock:** Light Gray to Dark Gray, Fresh to Moderate Weathering, Very Hard to Medium Hard, (BIOTITE GNEISS and SCHIST) with Close to Very Close Fracture Spacing

GROUNDLINE TAKEN FROM .TIN FILE, RECEIVED FROM NCDOT ON 01/17/2022.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
 PROJECTED ONTO THE CROSS SECTION



PROJECT REFERENCE NO.	SHEET NO.
BR-0043	8
CROSS SECTION THROUGH END BENT 2	
AT -L- STATION 26+64.63	
SKEW=103.64°	



- (A) **Roadway Embankment:** Medium Stiff, Wet, Black-Red-Tan, Fine Sandy CLAY (A-6)
- (B) **Roadway Embankment:** Medium Stiff, Wet, Red-Brown, Fine Sandy Clayey SILT (A-5) with Trace Mica
- (C) **Roadway Embankment:** Stiff, Moist, Gray, Fine Sandy Silty CLAY (A-7-6) with Trace Organics (Roots)
- (D) **Residual:** Medium Stiff to Stiff, Moist, Red-Brown, Silty CLAY (A-7) with Trace Quartz Fragments

- (E) **Residual:** Medium Dense, Moist, Red-Orange, Silty Fine to Coarse SAND (A-2-4) with Trace Mica and Quartz Fragments
- (F) **Weathered Rock:** Tan-Gray (BIOTITE GNEISS & SCHIST)

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED FROM NCDOT ON 01/17/2022.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
 PROJECTED ONTO THE CROSS SECTION

GEOTECHNICAL BORING REPORT BORE LOG

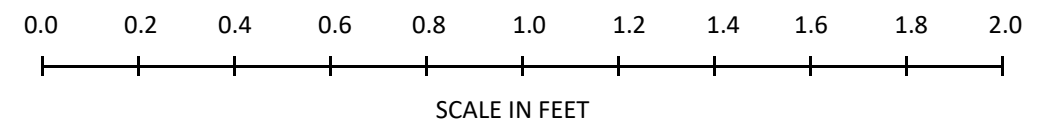
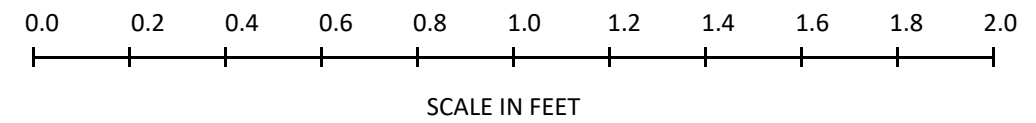
WBS 67043.1.1	TIP BR-0043	COUNTY ROCKINGHAM	GEOLOGIST C. Ranieri
SITE DESCRIPTION Bridge No. 151 on US 158 over US 29			GROUND WTR (ft)
BORING NO. EB1-B	STATION 24+54	OFFSET 28 ft RT	ALIGNMENT -L-
COLLAR ELEV. 763.5 ft	TOTAL DEPTH 55.9 ft	NORTHING 950,629	EASTING 1,815,096
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 02/02/22	COMP. DATE 02/02/22	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				
765														
	762.7	0.8	6	5	3	8							M	763.5 GROUND SURFACE 0.0 762.7 ASPHALT 0.8 761.7 ROADWAY EMBANKMENT 1.8 760.5 ABC Stone 3.0
760	760.0	3.5	2	2	3	5							M	756.5 Red-Brown, Fine Sandy Silty CLAY (A-7) with Trace Mica 7.0 756.5 Red-Brown, Fine to Coarse Sandy SILT (A-4) with Trace Mica 7.0
755	755.0	8.5	3	2	3	5							W	751.5 Red-Brown, Fine to Coarse Sandy Silty CLAY (A-7-5) with Trace Mica 12.0
750	750.0	13.5	4	5	7	12							M	746.5 Red-Brown, Fine Sandy SILT (A-4) with Trace Mica 17.0
745	745.0	18.5	2	5	5	10							M	RESIDUAL Tan-Brown-Gray, Fine Sandy SILT (A-4) with Trace Mica
740	740.0	23.5	3	6	8	14							M	
735	735.0	28.5	6	8	9	17							M	
730	730.0	33.5	4	4	5	9							M	
725	725.0	38.5	3	4	5	9							M	
720	720.0	43.5	16	19	25	44							M	721.5 Tan-Orange-Gray, Silty Fine to Coarse SAND (A-2-4) with Trace Mica and Quartz Fragments 42.0
715	715.0	48.5	5	6	8	14							W	716.5 Black, Fine Sandy SILT (A-4), Micaceous 47.0
710	710.0	53.5	100/0.3			100/0.3								710.0 WEATHERED ROCK 53.5 708.6 Black (BIOTITE GNEISS and SCHIST) 54.9 707.6 CRYSTALLINE ROCK (BIOTITE GNEISS and SCHIST) 55.9
	707.6	55.9	60/0.0			60/0.0								Notes: 1. Harder drilling indicated by driller at 54.9' 2. Auger refusal at 55.9' 3. Shelby Tube (ST-2) Obtained at 24+52, 28' RT Other Samples: ST-2 (8.0 - 10.0)

NCDOT BORE DOUBLE BR0043_GEO_BH_BRDGPJ_NC_DOT_GDT_8/4/22

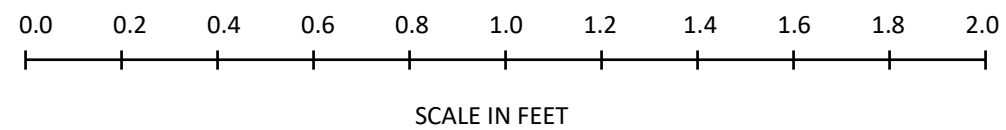
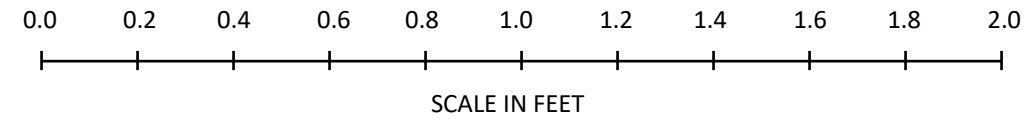
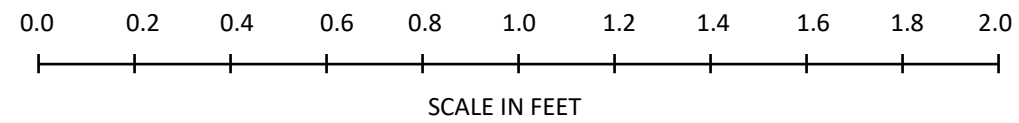


**CORE PHOTOGRAPHS:
BR-0043 | 67043.1.1
B1-A: -L- Station 25+84, 50' LT**



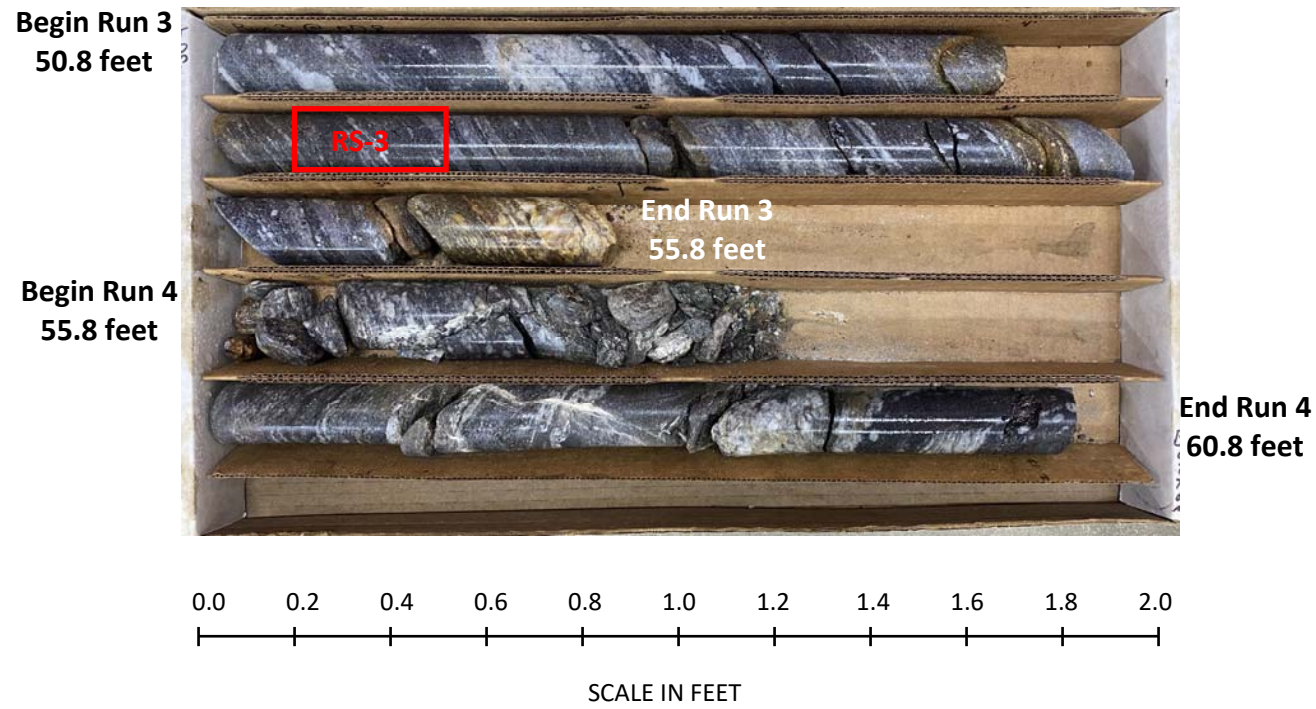
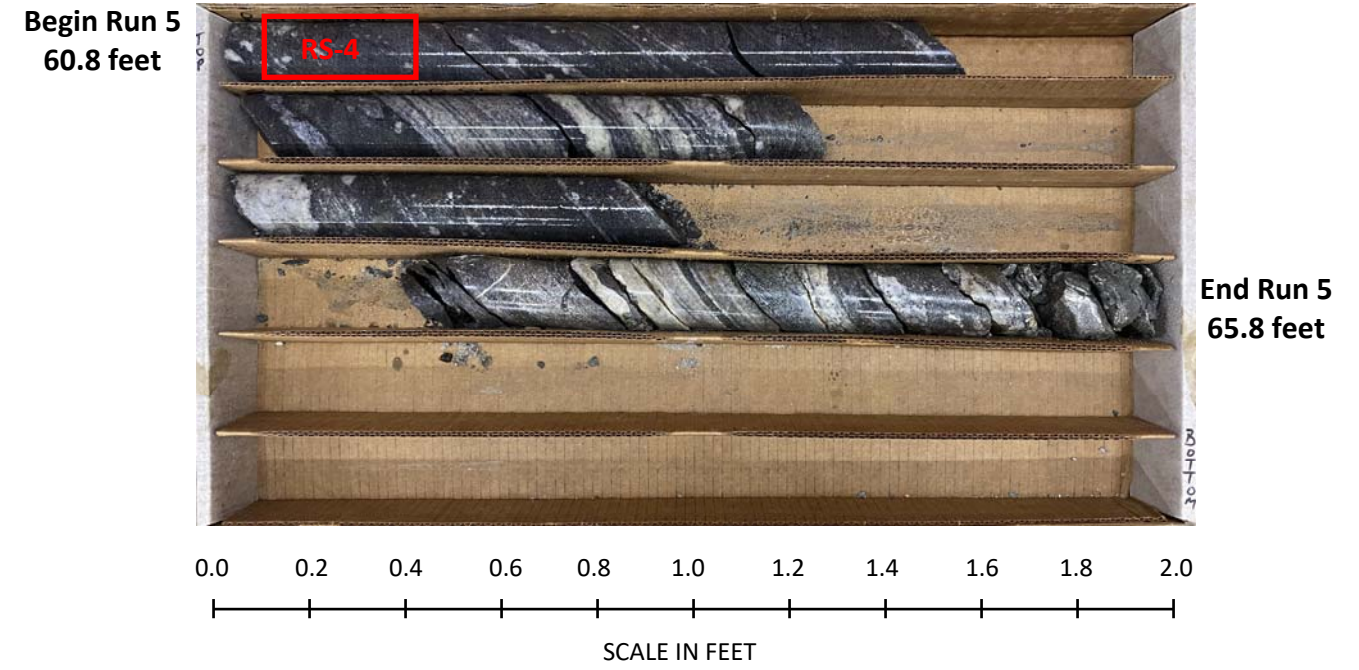
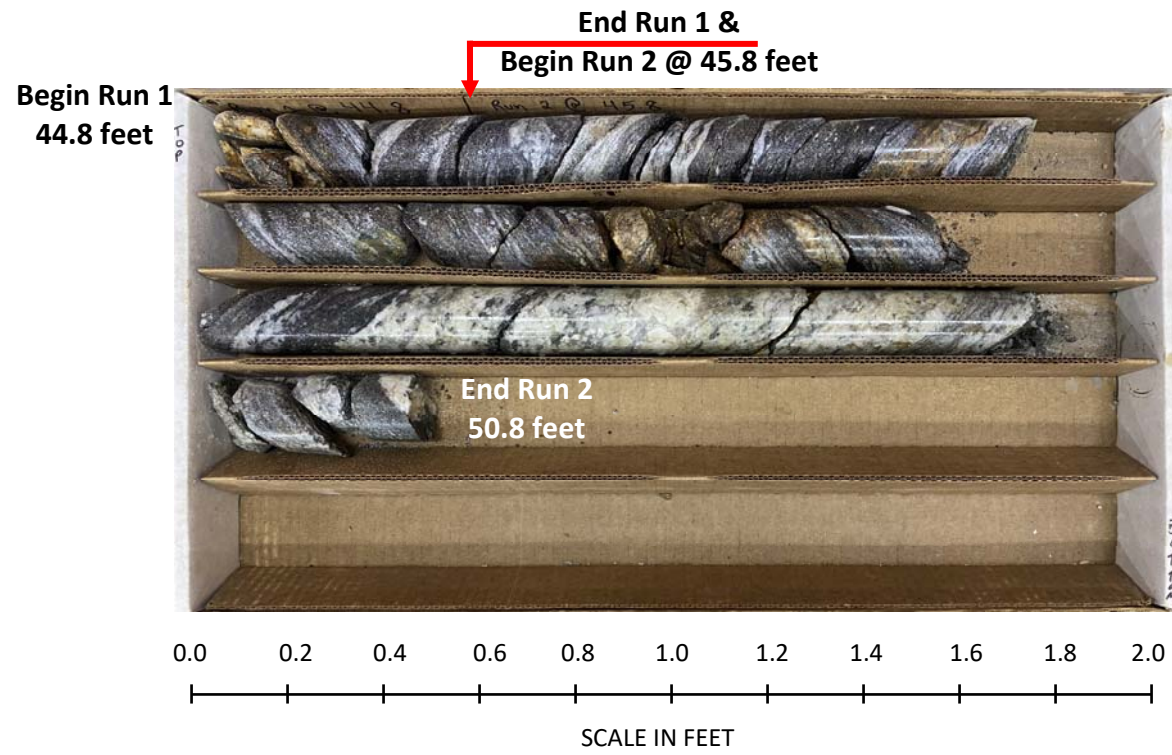


**CORE PHOTOGRAPHS:
BR-0043 | 67043.1.1
B1-C : -L- Station 25+81, 7' LT**





**CORE PHOTOGRAPHS:
BR-0043 | 67043.1.1
B1-B : -L- Station 25+85, 28' RT**



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67043.1.1		TIP BR-0043		COUNTY ROCKINGHAM		GEOLOGIST C. Ranieri									
SITE DESCRIPTION Bridge No. 151 on US 158 over US 29							GROUND WTR (ft)								
BORING NO. EB2-A		STATION 27+07		OFFSET 26 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 760.2 ft		TOTAL DEPTH 49.1 ft		NORTHING 950,628		EASTING 1,815,355									
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER S. Davis		START DATE 02/01/22		COMP. DATE 02/01/22		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					
765															
760	759.5	0.7	15	9	4									760.2	0.0
														759.4	0.8
	756.7	3.5	2	3	5									758.5	1.7
755															
	751.7	8.5	3	3	4										
750															
	746.7	13.5	2	2	3										
745														745.5	14.7
	741.7	18.5	3	4	5									743.2	17.0
740														740.2	20.0
	736.7	23.5	2	3	4										
735															
	731.7	28.5	8	5	6										
730															
	726.7	33.5	3	4	7										
725															
	721.7	38.5	1	2	4										
720															
	716.7	43.5	100/0.5											717.9	42.3
715															
	711.7	48.5												711.7	48.5
	711.1	49.1	60/0.1											711.1	49.1
			60/0.0												

WBS 67043.1.1		TIP BR-0043		COUNTY ROCKINGHAM		GEOLOGIST C. Ranieri									
SITE DESCRIPTION Replace Bridge 780151 on US 158/NC14 over US 29							GROUND WTR (ft)								
BORING NO. EB2-C		STATION 26+41		OFFSET 3 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 742.3 ft		TOTAL DEPTH 40.8 ft		NORTHING 950,613		EASTING 1,815,284									
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER S. Davis		START DATE 06/29/22		COMP. DATE 06/29/22		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					
745															
	741.6	0.7	3	2	3									742.3	0.0
740														741.6	0.7
	738.8	3.5	WOH	1	1										
735															
	734.3	8.0	3	3	5										
730															
	729.3	13.0	4	4	5										
725															
	724.3	18.0	6	5	8										
720															
	719.3	23.0	3	3	6										
715															
	714.3	28.0	4	5	7										
710															
	709.3	33.0	6	5	10										
705															
	704.3	38.0	21	28	34										
	701.6	40.7	60/0.1											702.2	40.1
														701.5	40.8

NCDOT BORE DOUBLE BR0043 GEO_BH_BRDG.GPJ NC_DOT.GDT 8/4/22

Notes:
 1. Harder drilling indicated by driller at 42.3'
 2. Auger refusal at 49.1'
 3. Shelby Tube (ST-1) obtained at 27+09, 26' LT

Other Samples:
 ST-1 (13.0 - 15.0)

Notes:
 1. Hard Drilling Indicated by Driller from 40.1'-40.7'
 2. Tricone Bit Refusal at 40.7'
 3. Casing Advancer was used to Break Through Concrete Near Ground Surface

GEOTECHNICAL BORING REPORT BORE LOG

WBS 67043.1.1	TIP BR-0043	COUNTY ROCKINGHAM	GEOLOGIST C. Ranieri
SITE DESCRIPTION Bridge No. 151 on US 158 over US 29			
BORING NO. EB2-B	STATION 26+94	OFFSET 28 ft RT	ALIGNMENT -L-
COLLAR ELEV. 761.6 ft	TOTAL DEPTH 53.4 ft	NORTHING 950,578	EASTING 1,815,330
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 02/02/22	COMP. DATE 02/02/22	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					
765															
760	761.0	0.6	12	5	4	1								GROUND SURFACE	0.0
														ASPHALT	0.6
	758.6	3.0	2	3	4	1								ROADWAY EMBANKMENT ABC Stone	3.0
755														Red-Brown, Fine Sandy SILT (A-4) with Trace Mica	
	753.1	8.5	2	3	4	1									
750															
	748.1	13.5	1	2	3	1									
745														RESIDUAL Red-Brown, Silty CLAY (A-7) with Trace Quartz Fragments	15.0
	743.1	18.5	3	7	8	1									
740														Red-Orange, Silty Fine to Coarse SAND (A-2-4) with Trace Mica and Quartz Fragments	19.0
	738.1	23.5	2	4	5	1								Red-Orange and Tan-Brown, Fine Sandy SILT (A-4) with Trace Mica and Quartz Fragments	22.0
735															
	733.1	28.5	2	4	5	1									
730															
	728.1	33.5	5	6	6	1									
725															
	723.1	38.5	3	3	6	1									
720															
	718.1	43.5	4	7	9	1									
715															
	713.1	48.5	4	5	10	1									
710															
	708.3	53.3	60/0.1			60/0.1								WEATHERED ROCK (BIOTITE GNEISS and SCHIST)	52.0
														CRYSTALLINE ROCK (BIOTITE GNEISS and SCHIST)	53.3
														Boring Terminated with Standard Penetration Test Refusal at Elevation 708.2 ft in CRYSTALLINE ROCK (BIOTITE GNEISS and SCHIST)	

- Notes:
1. Harder drilling indicated by driller at 52.0'
 2. Auger refusal at 53.3'
 3. Water observed in auger at 45.5' immediately after drilling
 4. Caved at 38.1'

NCDOT BORE DOUBLE BR0043 GEO_BH_BRDG.GPJ NC_DOT.GDT 8/4/22



PROJECT REFERENCE NO.	SHEET NO.
67043.1.1	19

County: Rockingham

Description: Bridge No. 151 on US 158 over US 29

SOIL TEST RESULTS																
SAMPLE NO.	-L- STATION	LOCATION	OFFSET *	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-34	24+68	EB1-A	27' LT	3.5-5.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	24.7	NT
SS-35	24+68	EB1-A	27' LT	8.5-10.0	A-7-5 (13)	61	20	17.7	26.0	18.5	37.8	99.9	95.5	61.6	NT	NT
SS-47	25+22	EB1-C	6' LT	3.5-5.0	A-4 (0)	NP	NP	22.4	30.7	18.6	28.3	94.8	81.7	51.0	37.2	NT
SS-49	24+54	EB1-B	28' RT	3.5-5.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	28.6	NT
SS-50	24+54	EB1-B	28' RT	8.5-10.0	A-7-5 (16)	60	25	16.5	25.1	14.7	43.7	99.7	91.0	62.7	NT	NT
ST-2	24+52	EB1-B	28' RT	8.0-10.0	A-7-5 (13)	61	17	9.9	32.8	20.8	36.5	100.0	95.5	64.0	31.6	NT
SS-25	27+07	EB2-A	26' LT	3.5-5.0	A-4 (0)	NP	NP	15.5	40.9	21.9	21.7	99.2	91.6	51.5	24.9	NT
SS-26	27+07	EB2-A	26' LT	14.7-15.0	ND	55	9	NT	NT	NT	NT	NT	NT	NT	32.9	NT
SS-27	27+07	EB2-A	26' LT	18.5-20.0	A-7-6 (8)	44	21	19.8	30.9	13.0	36.3	96.6	86.3	51.9	26.4	NT
ST-1	27+09	EB2-A	26' LT	13.0-15.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SS-57	26+41	EB2- C	3' RT	3.5-5.0	A-4 (0)	NP	NP	27.7	25.3	19.4	27.6	96.1	77.3	48.9	35.6	NT

NP = Not Plastic
 NT = Not Tested
 ND = Not Determined

D. Council
 Lab Manager, Certification No. 101-02-0603

C.Wang, P.E.
 Soils Engineer



PROJECT REFERENCE NO.	SHEET NO.
67043.1.1	20

County: Rockingham

Description: Bridge No. 151 on US 158 over US 29

ROCK TEST RESULTS														
SAMPLE NO.	BORING NO.	ALIGNMENT	STATION	OFFSET	DEPTH INTERVAL	ROCK TYPE	Geologic Map Unit	Run RQD	Length (in)	Diameter (in)	Unit Weight (pcf)	Unconfined Compressive Strength (psi)	Young's Modulus E (ksi)	GSI
RS-1	B1-A	-L-	25+84	50' Lt.	48.0 - 48.3	Biotite Gneiss and Schist	CZbg	62%	3.94	1.77	172.5	5,015	700	40-60
RS-2	B1-C	-L-	25+81	7' Lt.	44.6 - 44.9	Biotite Gneiss and Schist	CZbg	36%	4.03	1.76	162.4	6,566	1,000	40-55
RS-3	B1-B	-L-	25+85	28' Rt.	53.0 - 53.3	Biotite Gneiss and Schist	CZbg	36%	4.17	1.77	169.5	8,452	850	45-55
RS-4	B-1B	-L-	25+85	28' Rt.	60.9 - 61.2	Biotite Gneiss and Schist	CZbg	52%	3.96	1.77	171.2	6,608	900	50-65

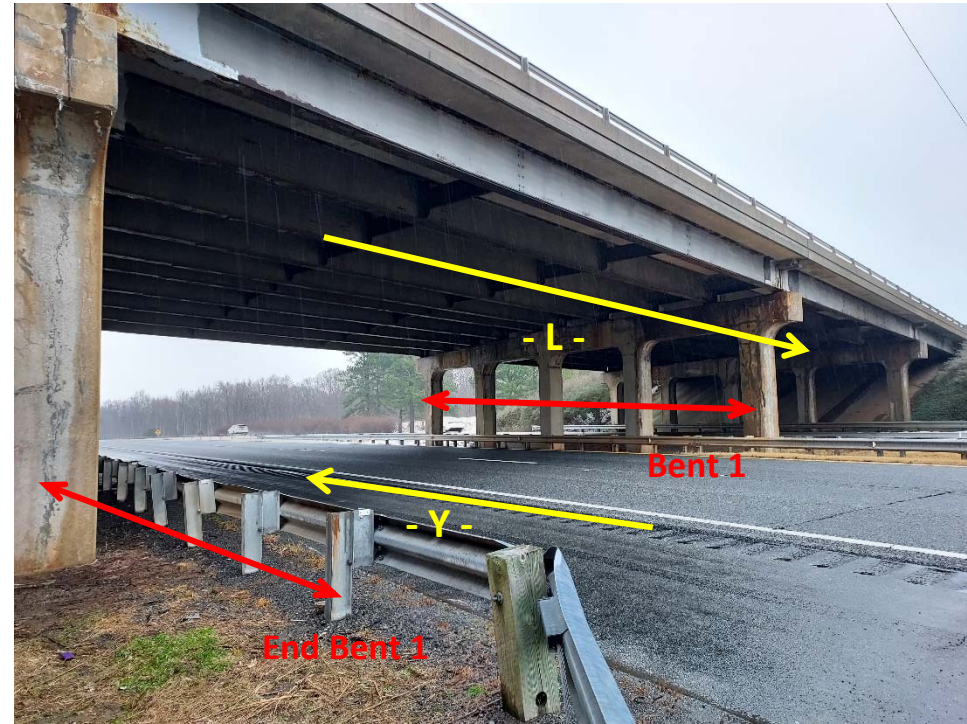
NP = Not Plastic
 NT = Not Tested
 ND = Not Determined

D. Council
 Lab Manager, Certification No. 101-02-0603

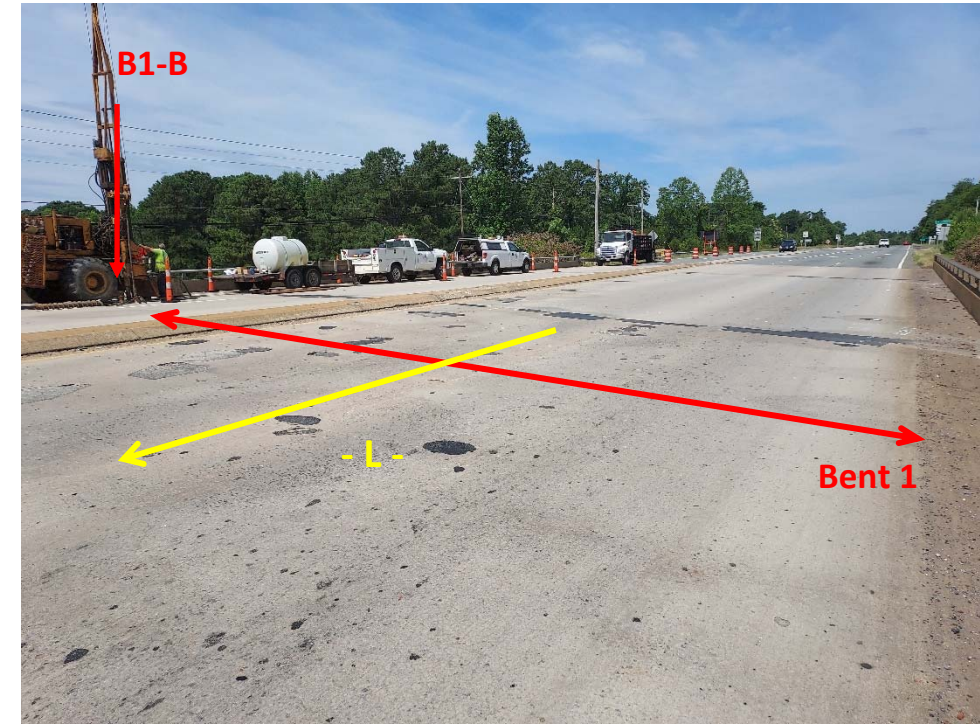
C.Wang, P.E.
 Soils Engineer



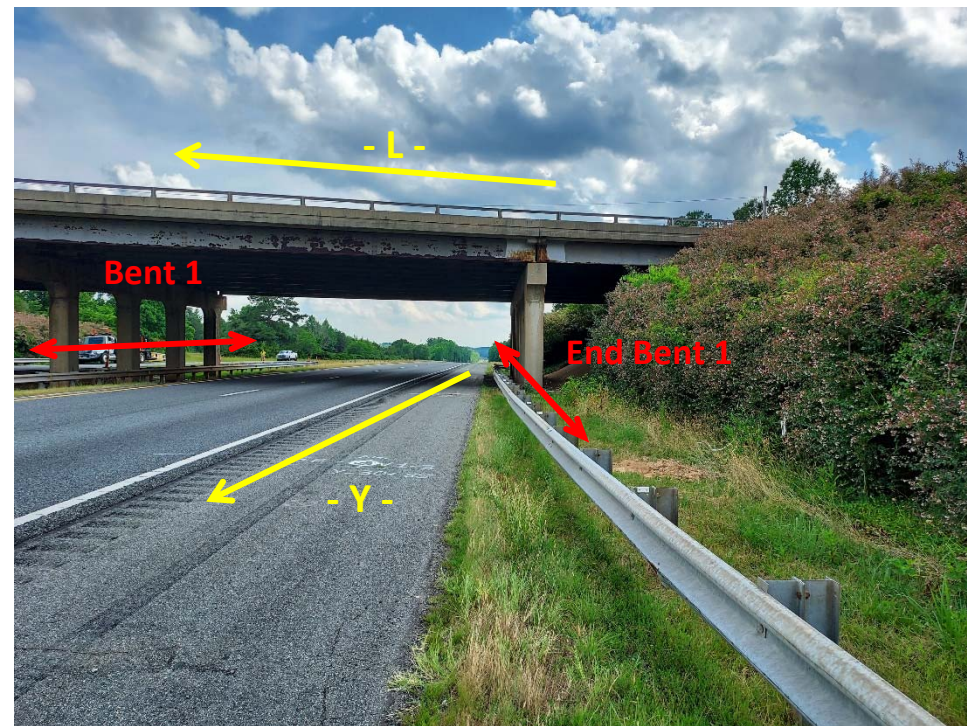
Replace Bridge 780151 on US 158/NC 14 over US 29 SITE PHOTOGRAPHS



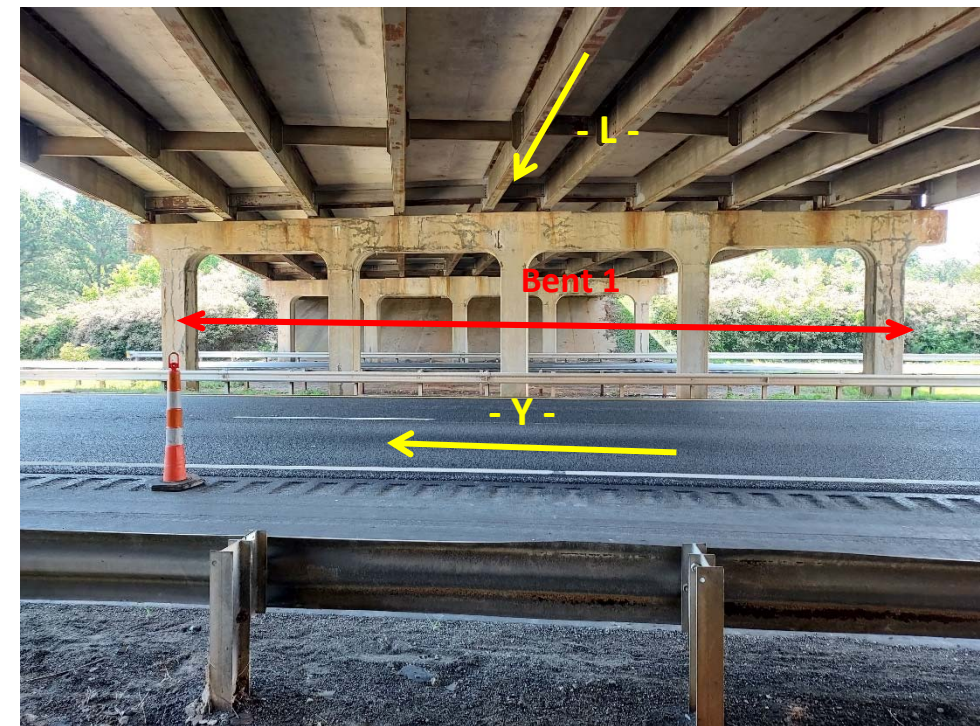
Photograph No. 1: View looking northeast at Bent 1



Photograph No. 3: View looking south-southwest at bent 1 on bridge deck



Photograph No. 2: View looking south along End Bent 1



Photograph No. 4: Below bridge deck, looking at Bent 1

REFERENCE: BR-0043

PROJECT: 67043

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ROCKINGHAM

SITE DESCRIPTION RETAINING WALL NO.1 ON -W1-
FROM 0+00 TO 2+04.14 AND RETAINING WALL
ON -W2- FROM 0+00 TO 2+01.22

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-5	PROFILE(S)
6-9	BORE LOG(S)
10	SOIL TEST RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0043	1	10

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.

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- 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

C. Ranieri, GIT

S. Davis

T. Beard

INVESTIGATED BY F&R, Inc.

DRAWN BY T.T. Walker

CHECKED BY P. Alton P.E.

SUBMITTED BY C. Wang, P.E.

DATE September 2022

SINCE **Prepared in the Office of:**

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DocuSigned by:

Cheng Wang

12/12/2022

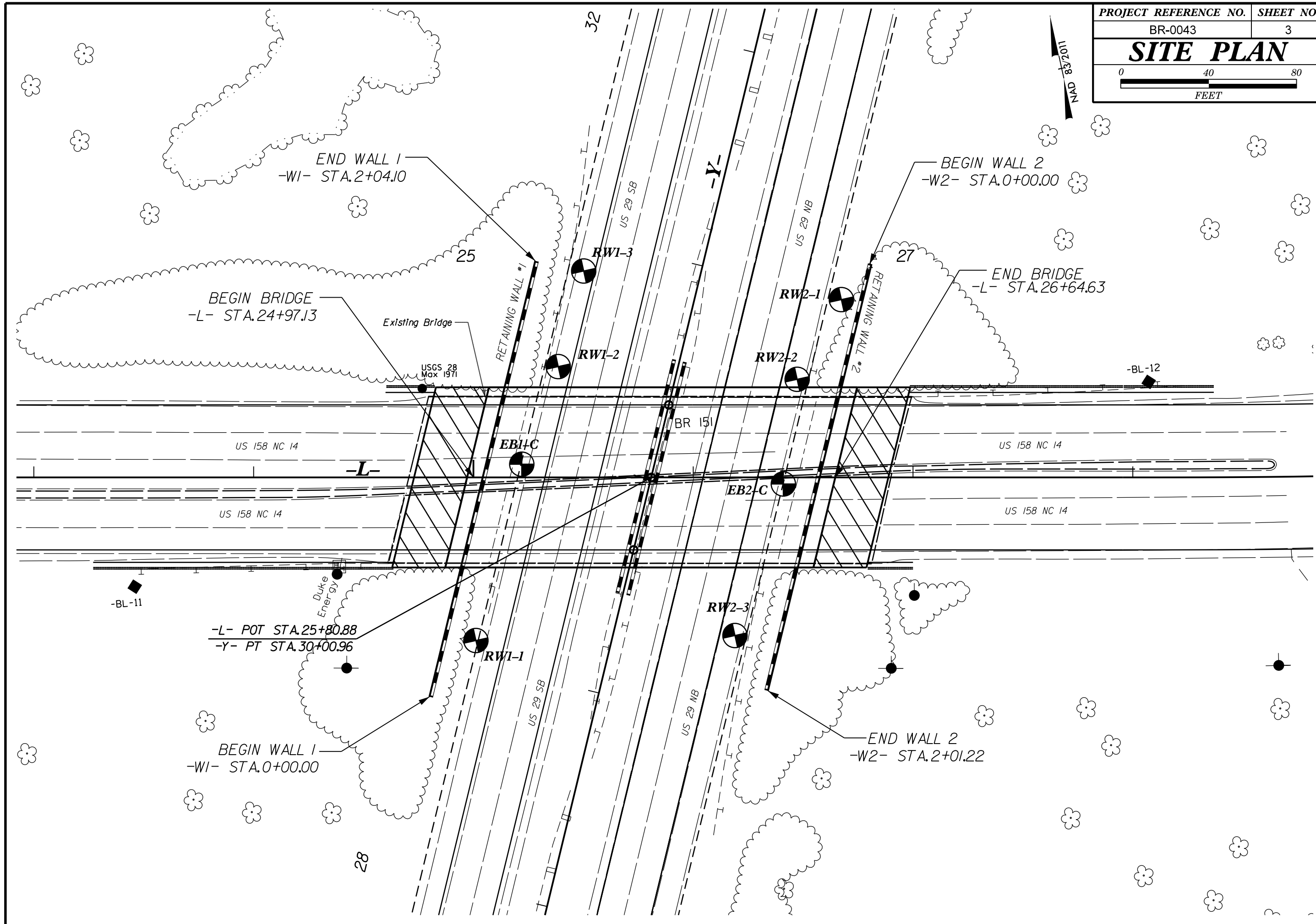
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DATE

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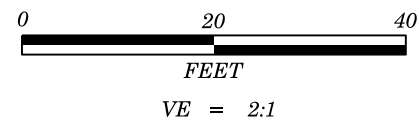
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Main content table with columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, ANGULARITY OF GRAINS, MINERALOGICAL COMPRESSION, COMPRESSIBILITY, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, SOIL MOISTURE - CORRELATION OF TERMS, EQUIPMENT USED ON SUBJECT PROJECT, PLASTICITY, COLOR, FRACTURE SPACING, BEDDING, INDURATION.

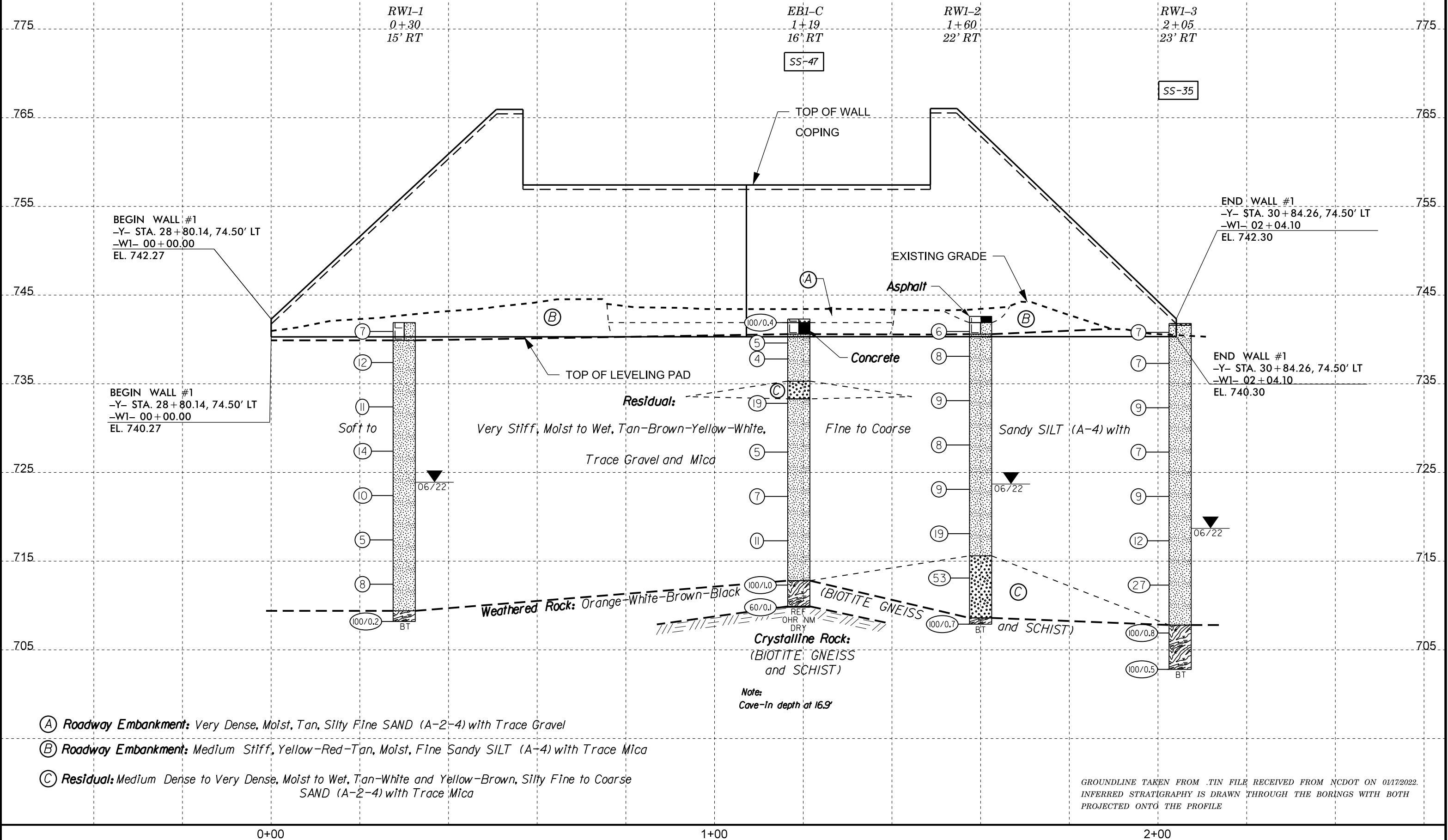


WALL #1 ENVELOPE (AT END BENT 1)

(LOOKING AT FRONT FACE OF WALL)



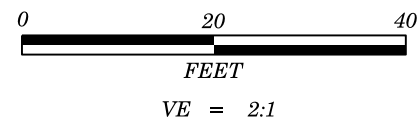
PROJECT REFERENCE NO.	SHEET NO.
BR-0043	4
PROFILE BORINGS PROJECTED ALONG RETAINING WALL 1-W1-	



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED FROM NCDOT ON 01/17/2022.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
 PROJECTED ONTO THE PROFILE

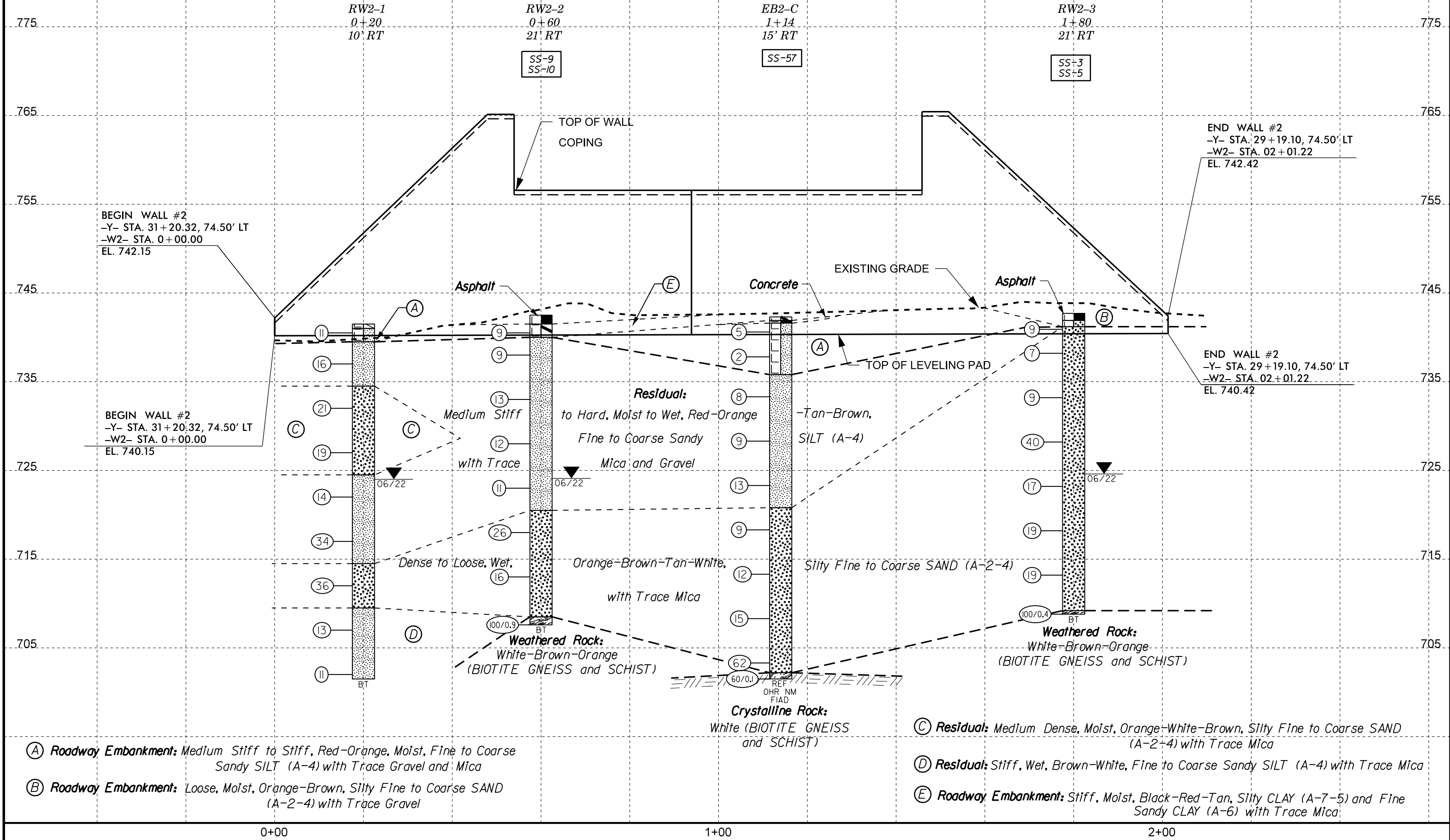
WALL #2 ENVELOPE (AT END BENT 2)

(LOOKING AT FRONT FACE OF WALL)



PROJECT REFERENCE NO.	SHEET NO.
BR-0043	5
PROFILE BORINGS PROJECT ALONG RETAINING WALL 2 -W2-	

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED FROM NCDOT ON 01/17/2022.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH
PROJECTED ONTO THE PROFILE



BEGIN WALL #2
-Y- STA. 31+20.32, 74.50' LT
-W2- STA. 0+00.00
EL. 742.15

BEGIN WALL #2
-Y- STA. 31+20.32, 74.50' LT
-W2- STA. 0+00.00
EL. 740.15

END WALL #2
-Y- STA. 29+19.10, 74.50' LT
-W2- STA. 02+01.22
EL. 742.42

END WALL #2
-Y- STA. 29+19.10, 74.50' LT
-W2- STA. 02+01.22
EL. 740.42

Ⓐ **Roadway Embankment:** Medium Stiff to Stiff, Red-Orange, Moist, Fine to Coarse Sandy SILT (A-4) with Trace Gravel and Mica

Ⓑ **Roadway Embankment:** Loose, Moist, Orange-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Gravel

Ⓒ **Residual:** Medium Dense, Moist, Orange-White-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Mica

Ⓓ **Residual:** Stiff, Wet, Brown-White, Fine to Coarse Sandy SILT (A-4) with Trace Mica

Ⓔ **Roadway Embankment:** Stiff, Moist, Black-Red-Tan, Silty CLAY (A-7-5) and Fine Sandy CLAY (A-6) with Trace Mica

0+00

1+00

2+00

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67043.1.1		TIP BR-0043		COUNTY ROCKINGHAM		GEOLOGIST C. Ranieri										
SITE DESCRIPTION Retaining Wall No. 1 from 0+00 to 2+04.14							GROUND WTR (ft)									
BORING NO. RW1-1		STATION 0+30		OFFSET 15 ft RT		ALIGNMENT -W1-										
COLLAR ELEV. 741.9 ft		TOTAL DEPTH 33.7 ft		NORTHING 950,574		EASTING 1,815,132										
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER S. Davis		START DATE 06/21/22		COMP. DATE 06/21/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
745																
	741.9	0.0	4	3	4										741.9	GROUND SURFACE
740	738.4	3.5	4	5	7										739.9	ROADWAY EMBANKMENT Yellow-Red-Tan, Fine Sandy SILT (A-4) with Trace Organics
735	733.4	8.5	3	4	7											RESIDUAL Tan-Brown-Black, Fine to Coarse Sandy SILT (A-4) with Trace Gravel and Mica
730	728.4	13.5	7	6	8											
725	723.4	18.5	4	5	5											
720	718.4	23.5	2	2	3											
715	713.4	28.5	2	4	4											
710	708.4	33.5	100/0.2												709.4	WEATHERED ROCK Brown-Black (BIOTITE GNEISS & SCHIST) Boring Terminated at Elevation 708.2 ft in Weathered Rock (BIOTITE GNEISS and SCHIST)
															708.2	

Notes:
 1. Surficial Organic Soil: 0.0'-0.3'
 2. Hard Drilling Indicated by Driller at 32.5'

WBS 67043.1.1		TIP BR-0043		COUNTY ROCKINGHAM		GEOLOGIST C. Ranieri										
SITE DESCRIPTION Retaining Wall No. 1 from 0+00 to 2+04.14							GROUND WTR (ft)									
BORING NO. RW1-2		STATION 1+60		OFFSET 22 ft RT		ALIGNMENT -W1-										
COLLAR ELEV. 742.6 ft		TOTAL DEPTH 34.7 ft		NORTHING 950,688		EASTING 1,815,196										
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER S. Davis		START DATE 06/21/22		COMP. DATE 06/21/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
745																
	741.9	0.7	6	3	3										742.6	GROUND SURFACE
740	739.1	3.5	4	4	4										741.9	ROADWAY EMBANKMENT ASPHALT
															740.6	ROADWAY EMBANKMENT Yellow-Red-Tan, Fine Sandy SILT (A-4) with Trace Mica
735	734.1	8.5	4	4	5											RESIDUAL Tan-Brown-White, Fine to Coarse Sandy SILT (A-4) with Trace Gravel and Mica
730	729.1	13.5	4	3	5											
725	724.1	18.5	3	4	5											
720	719.1	23.5	6	7	12											
715	714.1	28.5	12	18	35											
710	709.1	33.5	18	61	39/0.2										715.6	Yellow-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Mica
															708.6	WEATHERED ROCK Orange-Brown-Black (BIOTITE GNEISS & SCHIST) Boring Terminated at Elevation 707.9 ft in Weathered Rock (BIOTITE GNEISS and SCHIST)
															707.9	

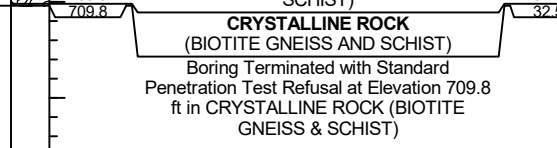
NCDOT BORE DOUBLE BR0043_GEO_BH_WALL.GPJ NC_DOT.GDT 9/21/22

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67043.1.1	TIP BR-0043	COUNTY ROCKINGHAM	GEOLOGIST C. Ranieri
SITE DESCRIPTION Replace Bridge 780151 on US 158/NC14 over US 29			GROUND WTR (ft)
BORING NO. EB1-C	STATION 1+19	OFFSET 16 ft RT	ALIGNMENT -W1-
COLLAR ELEV. 742.3 ft	TOTAL DEPTH 32.5 ft	NORTHING 950,648	EASTING 1,815,170
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 06/27/22	COMP. DATE 06/27/22	SURFACE WATER DEPTH N/A

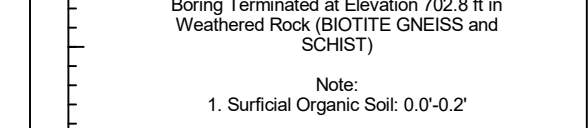
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
745																
	742.3	0.0													742.3	0.0
	740.6	1.7	100/0.4												740.6	1.7
740	738.8	3.5	2	3	2										738.8	3.5
735	733.8	8.5	9	9	10										733.8	8.5
730	728.3	14.0	2	2	3										728.3	14.0
725	723.3	19.0	2	3	4										723.3	19.0
720	718.3	24.0	3	4	7										718.3	24.0
715	713.3	29.0	19	27	73/0.5										713.3	29.0
710	709.9	32.4	60/0.1												709.9	32.4



- Notes:
1. Concrete: 0.4'-1.7'
 2. Hard Drilling Indicated by Driller at 26.5'
 3. Tricone Bit Refusal at 32.4'
 4. Casing Advancer was used to Break Through Concrete Footing Near Ground Surface
 5. Cave-in Depth at 16.9'

WBS 67043.1.1	TIP BR-0043	COUNTY ROCKINGHAM	GEOLOGIST C. Ranieri
SITE DESCRIPTION Retaining Wall No. 1 from 0+00 to 2+04.14			GROUND WTR (ft)
BORING NO. RW1-3	STATION 2+05	OFFSET 23 ft RT	ALIGNMENT -W1-
COLLAR ELEV. 741.8 ft	TOTAL DEPTH 39.0 ft	NORTHING 950,728	EASTING 1,815,216
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER S. Davis	START DATE 06/22/22	COMP. DATE 06/22/22	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
745																
	741.8	0.0													741.8	0.0
740	738.3	3.5	1	3	4										738.3	3.5
735	733.3	8.5	3	3	4										733.3	8.5
730	728.3	13.5	4	4	5										728.3	13.5
725	723.3	18.5	2	3	4										723.3	18.5
720	718.3	23.5	2	3	6										718.3	23.5
715	713.3	28.5	3	5	7										713.3	28.5
710	708.3	33.5	7	12	15										708.3	33.5
705	703.3	38.5	10	40	60/0.3										703.3	38.5



- Note:
1. Surficial Organic Soil: 0.0'-0.2'

NCDOT BORE DOUBLE BR0043 GEO_BH_WALL.GPJ NC_DOT.GDT 9/21/22

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67043.1.1		TIP BR-0043		COUNTY ROCKINGHAM		GEOLOGIST C. Ranieri									
SITE DESCRIPTION Retaining Wall No. 2 from 0+00 to 2+01.22							GROUND WTR (ft)								
BORING NO. RW2-1		STATION 0+20		OFFSET 10 ft RT		ALIGNMENT -W2-									
COLLAR ELEV. 741.5 ft		TOTAL DEPTH 40.0 ft		NORTHING 950,690		EASTING 1,815,328									
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER S. Davis		START DATE 06/20/22		COMP. DATE 06/20/22		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					
745															
740	741.5	0.0	2	5	6								M	GROUND SURFACE ROADWAY EMBANKMENT Red-Brown, Fine to Coarse Sandy CLAY (A-6) with Trace Roots	0.0 2.0
	738.0	3.5	6	7	9								M	Red-Orange, Fine to Coarse Sandy SILT (A-4) with Trace Gravel and Mica	
735	733.0	8.5	12	9	12								M	RESIDUAL Red-Orange, Fine to Coarse Sandy SILT (A-4) with Trace Mica	7.0
730	728.0	13.5	8	9	10								M	Orange-White-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Mica	
725	723.0	18.5	5	6	8								W	Brown-White, Fine to Coarse Sandy SILT (A-4) with Trace Mica	17.0
720	718.0	23.5	14	14	20								W		
715	713.0	28.5	11	14	22								W	Orange-Brown-White, Silty Fine to Coarse SAND (A-2-4) with Trace Mica	27.0
710	708.0	33.5	3	6	7								W	Brown-White, Fine to Coarse Sandy SILT (A-4) with Trace Mica	32.0
705	703.0	38.5	3	3	8								W		40.0
Boring Terminated at Elevation 701.5 ft in Residual (SILT)															
Notes: 1. Surficial Organic Soil: 0.0'-0.2'															

WBS 67043.1.1		TIP BR-0043		COUNTY ROCKINGHAM		GEOLOGIST C. Ranieri										
SITE DESCRIPTION Retaining Wall No. 2 from 0+00 to 2+01.22							GROUND WTR (ft)									
BORING NO. RW2-2		STATION 0+60		OFFSET 21 ft RT		ALIGNMENT -W2-										
COLLAR ELEV. 742.5 ft		TOTAL DEPTH 34.9 ft		NORTHING 950,659		EASTING 1,815,300										
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER S. Davis		START DATE 06/20/22		COMP. DATE 06/20/22		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						
745																
740	741.5	1.0	2	4	5								SS-9	29%	GROUND SURFACE ASPHALT	0.0 1.0
	739.0	3.5	3	4	5								SS-10	30%	ROADWAY EMBANKMENT Red, Fine Sandy Silty CLAY (A-7-5) with Trace Mica	2.5
735	734.0	8.5	4	6	7								W	RESIDUAL Orange-White-Tan, Clayey Fine to Coarse Sandy SILT (A-4) with Trace Mica		
730	729.0	13.5	5	6	6								W			
725	724.0	18.5	3	4	7								W			
720	719.0	23.5	10	13	13								W	Tan-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Mica	22.0	
715	714.0	28.5	4	7	9								W			
710	709.0	33.5	11	35	65/0.4								W			
Boring Terminated at Elevation 707.6 ft in Weathered Rock (BIOTITE GNEISS and SCHIST)																

NCDOT BORE DOUBLE BR0043 GEO_BH_WALL.GPJ NC_DOT.GDT 9/21/22

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67043.1.1		TIP BR-0043		COUNTY ROCKINGHAM		GEOLOGIST C. Ranieri										
SITE DESCRIPTION Retaining Wall No. 2 from 0+00 to 2+01.22							GROUND WTR (ft)									
BORING NO. RW2-3		STATION 1+80		OFFSET 21 ft RT		ALIGNMENT -W2-										
COLLAR ELEV. 742.7 ft		TOTAL DEPTH 33.9 ft		NORTHING 950,551		EASTING 1,815,248										
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER S. Davis		START DATE 06/20/22		COMP. DATE 06/20/22		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						
745																
	741.9	0.8	7	5	4											
740	739.2	3.5	3	3	4											
	734.2	8.5	4	4	5											
735	729.2	13.5	10	11	29											
	724.2	18.5	7	7	10											
730	719.2	23.5	6	8	11											
	714.2	28.5	6	8	11											
725	709.2	33.5	100/0.4													
720																
715																
710																

WBS 67043.1.1		TIP BR-0043		COUNTY ROCKINGHAM		GEOLOGIST C. Ranieri										
SITE DESCRIPTION Replace Bridge 780151 on US 158/NC14 over US 29							GROUND WTR (ft)									
BORING NO. EB2-C		STATION 1+14		OFFSET 15 ft RT		ALIGNMENT -W2-										
COLLAR ELEV. 742.3 ft		TOTAL DEPTH 40.8 ft		NORTHING 950,613		EASTING 1,815,284										
DRILL RIG/HAMMER EFF./DATE F&R2175 CME-55 97% 04/30/2021				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER S. Davis		START DATE 06/29/22		COMP. DATE 06/29/22		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						
745																
	741.6	0.7	3	2	3											
740	738.8	3.5	WOH	1	1											
	734.3	8.0	3	3	5											
735	729.3	13.0	4	4	5											
	724.3	18.0	6	5	8											
730	719.3	23.0	3	3	6											
	714.3	28.0	4	5	7											
725	709.3	33.0	6	5	10											
	704.3	38.0	21	28	34											
720	701.6	40.7	60/0.1													
715																
710																

NCDOT BORE DOUBLE BR0043_GEO_BH_WALL.GPJ NC_DOT.GDT 9/21/22

- Notes:
1. Hard Drilling Indicated by Driller from 40.1'-40.7'
 2. Tricone Bit Refusal at 40.7'
 3. Casing Advancer was used to Break Through Concrete Near Ground Surface



PROJECT REFERENCE NO.	SHEET NO.
67043.1.1	10

County: Rockingham

Description: Retaining Wall No. 1 from 0+00 to 2+04.14 and Retaining Wall No. 2 from 0+00 to 2+01.22

SOIL TEST RESULTS																
SAMPLE NO.	STATION	LOCATION	OFFSET	DEPTH INTERVAL(ft)	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-47	-W1- 1+19	EB1-C	16' RT	3.5-5.0	A-4 (0)	NP	NP	22.4	30.7	18.6	28.3	94.8	81.7	51	37.2	NT
SS-35	-W1- 2+05	RW1-3	23' RT	0.2-0.8	A-4 (0)	NP	NP	28.7	34.8	21.3	15.2	96.3	78.6	42.2	15.3	NT
SS-9	-W2- 0+60	RW2-2	21' RT	1.0-2.5	A-7-5 (18)	67	21	7.8	25.4	21.5	45.3	99.7	95.9	72.1	29.3	NT
SS-10	-W2- 0+60	RW2-2	21' RT	3.5-5.0	A-4 (0)	NP	NP	10.4	51.5	16.3	21.8	99.9	95.3	46.6	30.1	NT
SS-57	-W2- 1+14	EB2- C	15' RT	3.5-5.0	A-4 (0)	NP	NP	27.7	25.3	19.4	27.6	96.1	77.3	48.9	35.6	NT
SS-3	-W2- 1+80	RW2-3	21' RT	3.5-5.0	A-2-4	NP	NP	15.3	63.3	14.4	7.0	100.0	94.6	33.2	15.6	NT
SS-5	-W2- 1+80	RW2-3	21' RT	13.5-15.0	ND	NP	NP	NT	NT	NT	NT	NT	NT	14.3	11.6	NT

NP = Not Plastic
 NT = Not Tested
 ND = Not Determined

D. Council
 Lab Manager, Certification No. 101-02-0603

C.Wang, P.E.
 Soils Engineer