

STATE	STATE PROJECT REFERENCE NO.	REPORT NO.	DATE
N.C.	U-3459 (34951.1.1)	1	20

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

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PROJ. REFERENCE NO. U-3459 (34951.1.1) F.A. PROJ. N/A  
 COUNTY Rowan  
 PROJECT DESCRIPTION SR 2541 Grade Separation with the  
NC Railroad/Norfolk Southern Corp. Railline  
 \_\_\_\_\_  
 SITE DESCRIPTION \_\_\_\_\_  
 \_\_\_\_\_

**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) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 (ON-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 THIS 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.

**PROJECT: 34951.1.1 ID: U-3459**

**PERSONNEL**

R. DeLost

M. Gragg

F. Woodard

S. Gower

INVESTIGATED BY R. DeLost

CHECKED BY J. Provanca

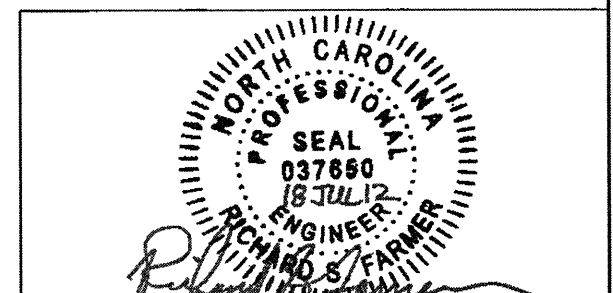
SUBMITTED BY R. Farmer

DATE 6/20/12

DRAWN BY: Tom Rideout

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

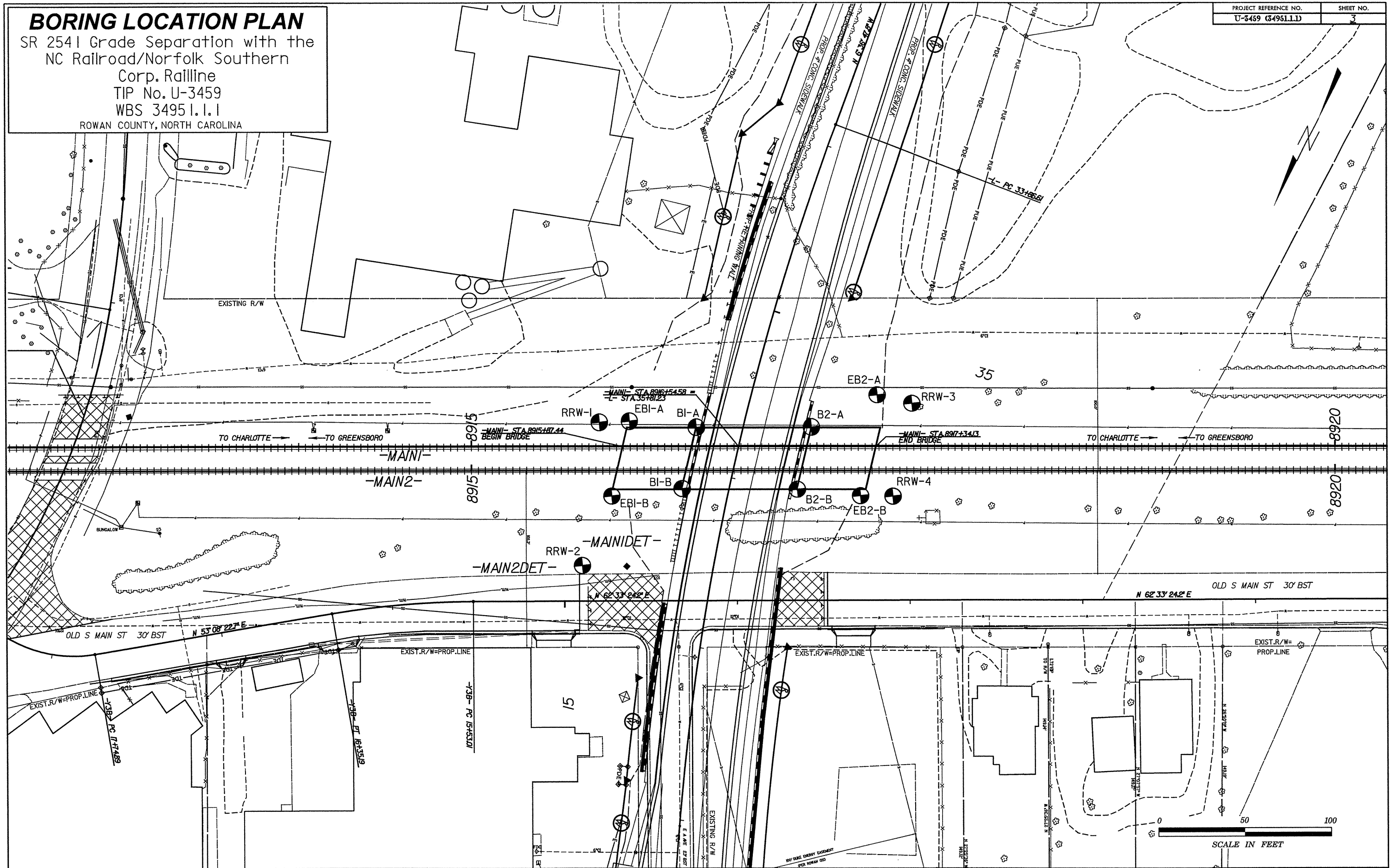
PROJECT REFERENCE NO. U-3459 SHEET NO. 2

SOIL DESCRIPTION: SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER... GRADATION: WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE... ROCK DESCRIPTION: HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL... TERMS AND DEFINITIONS: ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER... SOIL LEGEND AND AASHTO CLASSIFICATION: GENERAL CLASS., GRANULAR MATERIALS (<= 35% PASSING #200), SILT-CLAY MATERIALS (> 35% PASSING #200), ORGANIC MATERIALS... COMPRESSIBILITY: SLIGHTLY COMPRESSIBLE, MODERATELY COMPRESSIBLE, HIGHLY COMPRESSIBLE... PERCENTAGE OF MATERIAL: ORGANIC MATERIAL, GRANULAR SOILS, SILT-CLAY SOILS, OTHER MATERIAL... GROUND WATER: WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING... MISCELLANEOUS SYMBOLS: ROADWAY EMBANKMENT (RE), SOIL SYMBOL, ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT... ABBREVIATIONS: 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, HL - HIGHLY... EQUIPMENT USED ON SUBJECT PROJECT: DRILL UNITS: MOBILE B-, BK-51, CME-45C, CME-55B, PORTABLE HOIST; ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING W/ ADVANCER, TRICONE STEEL TEETH, TRICONE TUNG-CARB., CORE BIT; HAMMER TYPE: AUTOMATIC, MANUAL; CORE SIZE: B, N, H; HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST.

# BORING LOCATION PLAN

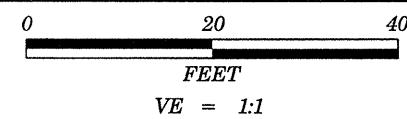
SR 2541 Grade Separation with the  
NC Railroad/Norfolk Southern  
Corp. Railline  
TIP No. U-3459  
WBS 34951.1.1  
ROWAN COUNTY, NORTH CAROLINA

PROJECT REFERENCE NO. U-3459 (34951.1)	SHEET NO. 3
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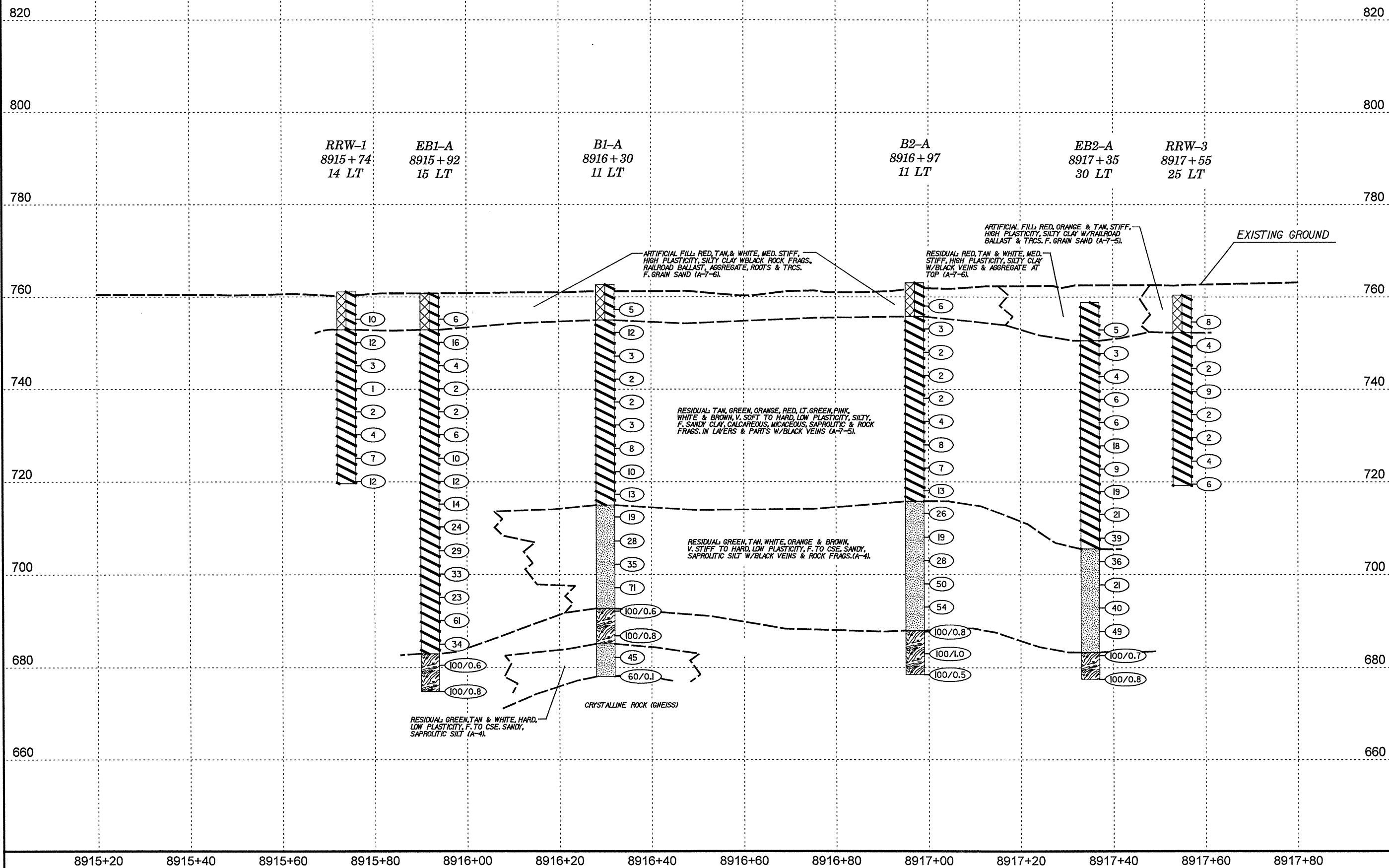


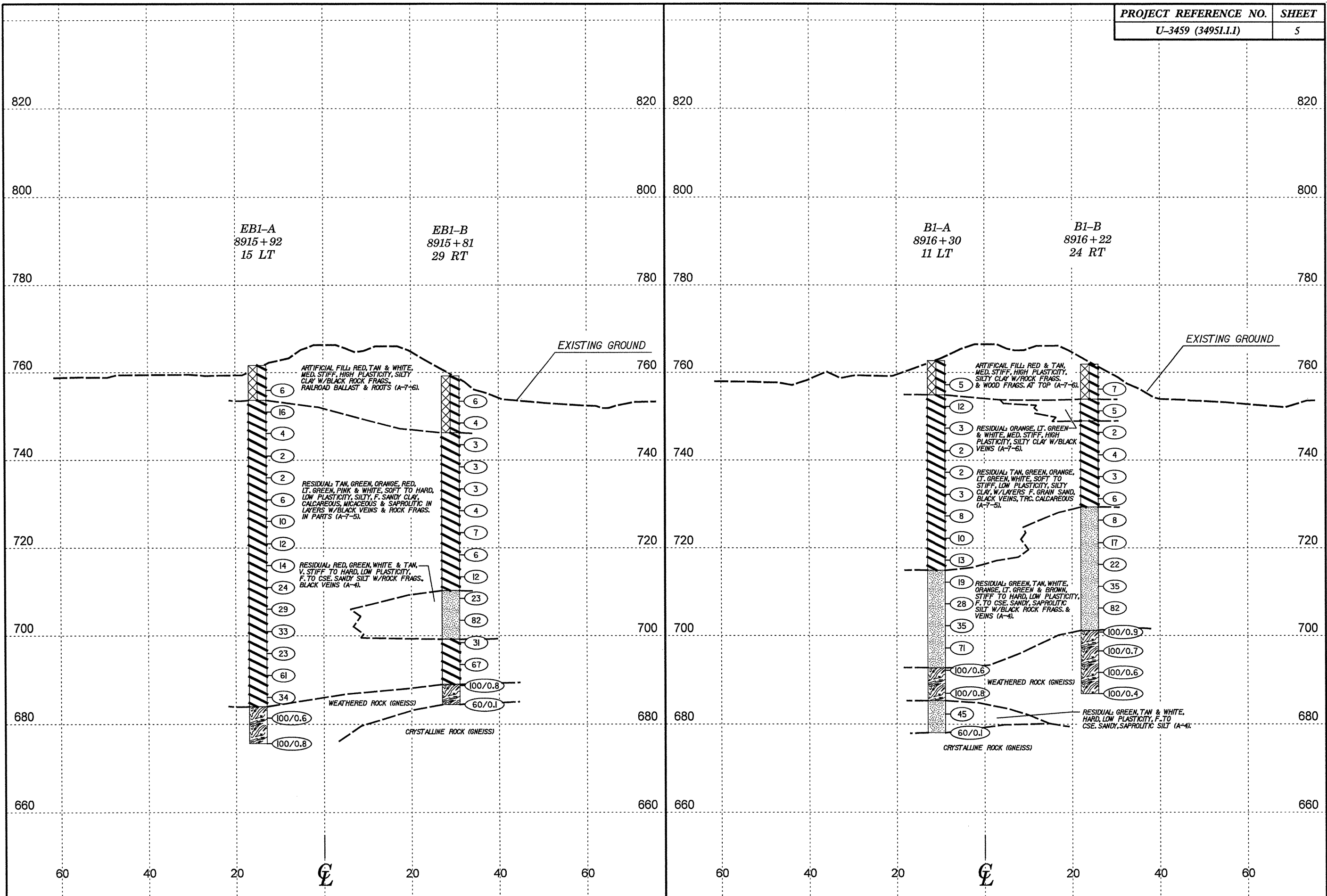
# GENERALIZED SUBSURFACE PROFILE 15' Lt. of - MAIN 1 -

GROUNDLINE PROFILE OBTAINED FROM DTM PROVIDED BY OTHERS  
 INFERRED STRATIGRAPHY IS DRAWN AT THE PROFILE OFFSET WITH THE BORINGS PROJECTED ONTO THE PROFILE



PROJECT REFERENCE NO.	SHEET
U-3459 (34951.1.1)	4
PROFILE	





HORIZ. SCALE 0 20 40 (FEET)

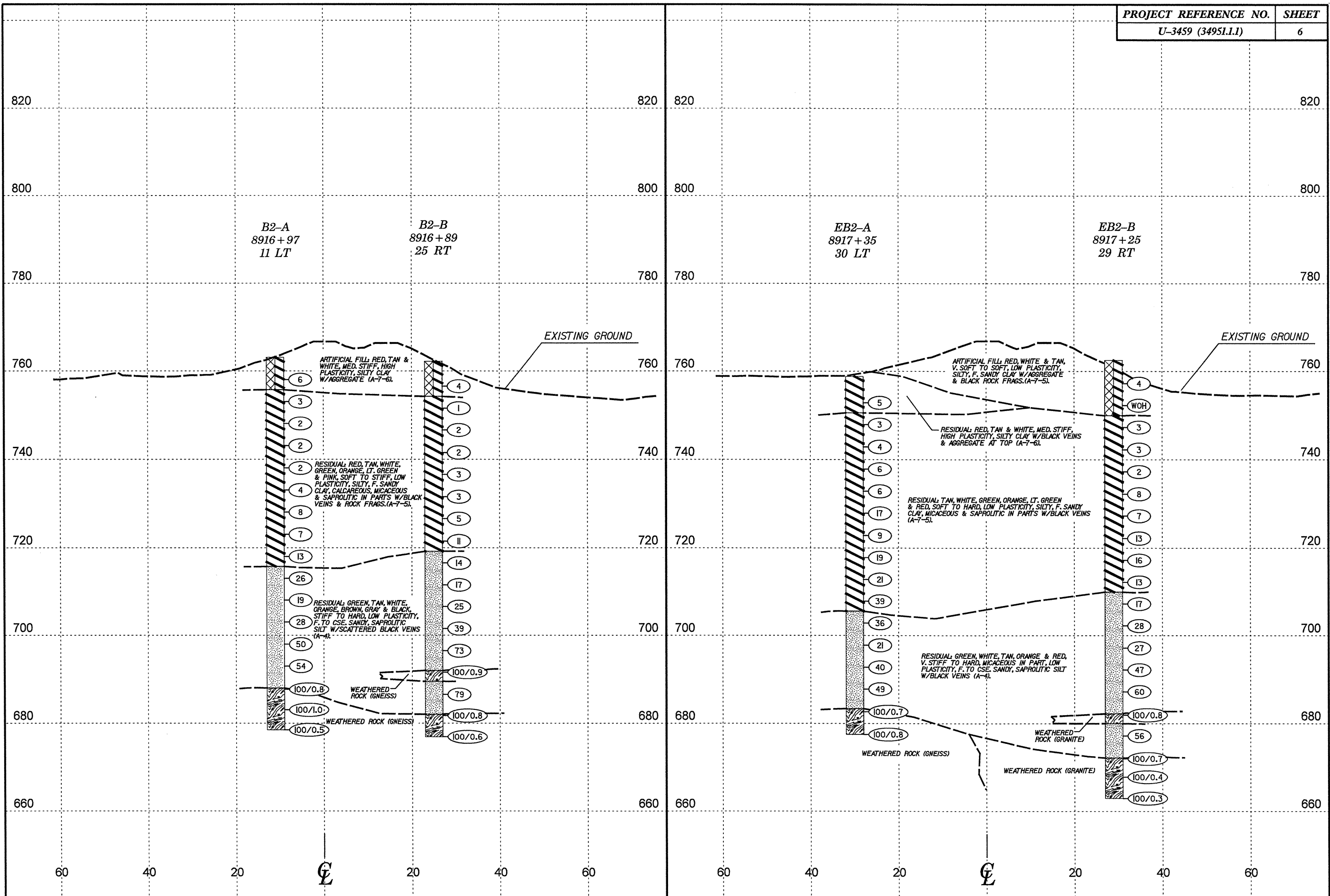
VE = 1:1

END BENT 1 CROSS SECTION

HORIZ. SCALE 0 20 40 (FEET)

VE = 1:1

BENT 1 CROSS SECTION



HORIZ. SCALE 0 20 40 (FEET)

VE = 1:1

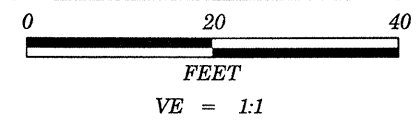
**BENT 2 CROSS SECTION**

HORIZ. SCALE 0 20 40 (FEET)

VE = 1:1

**END BENT 2 CROSS SECTION**

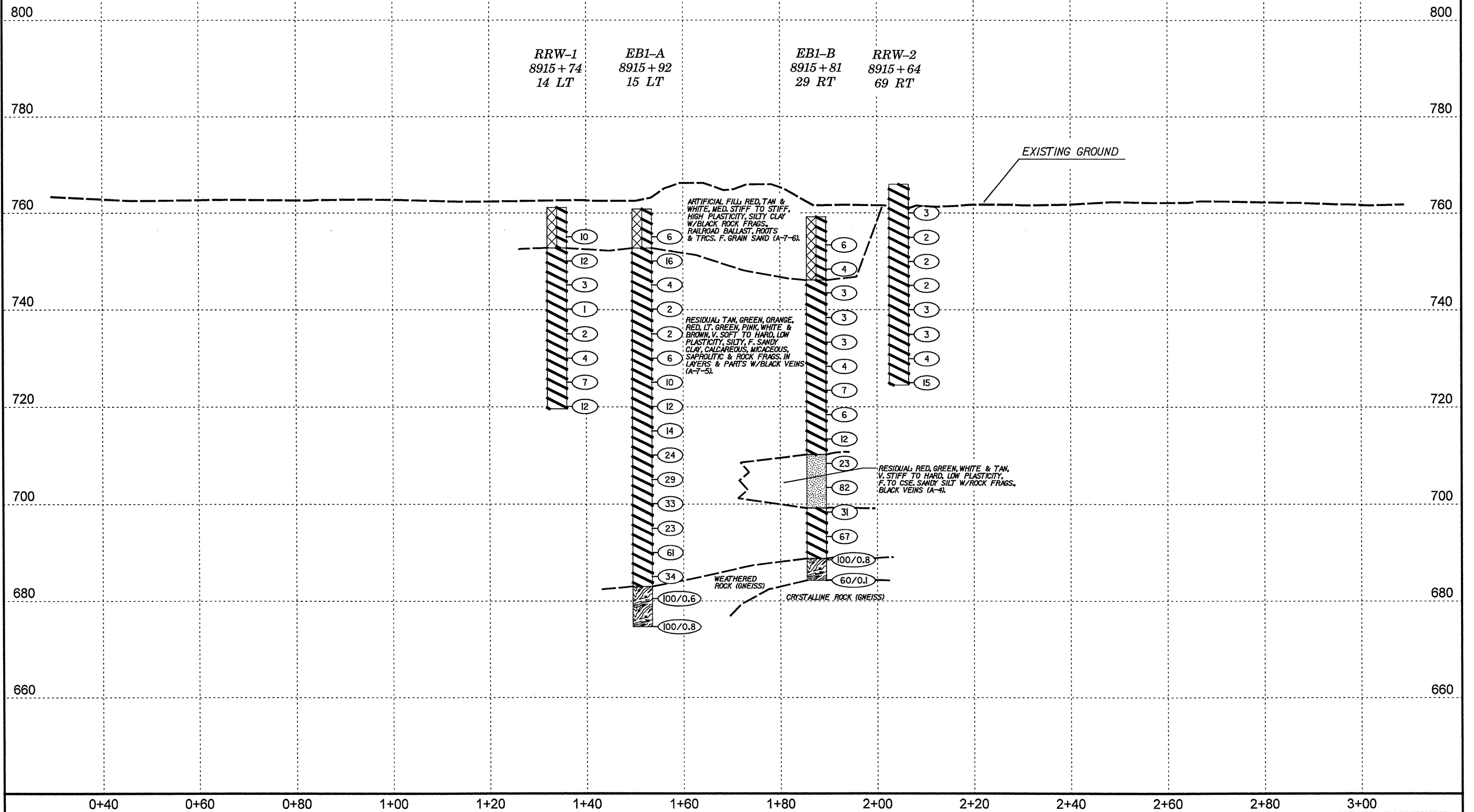
# GENERALIZED SUBSURFACE PROFILE ALONG RETAINING WALL AT BEGIN BRIDGE



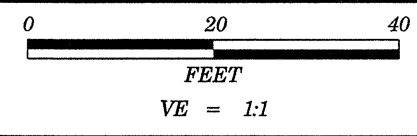
<b>PROJECT REFERENCE NO.</b>	<b>SHEET</b>
U-3459 (34951.1.1)	7
<b>PROFILE</b>	

GROUNDLINE PROFILE OBTAINED FROM DTM PROVIDED BY OTHERS

820      INFERRED STRATIGRAPHY IS DRAWN ALONG RETAINING WALL PROFILE WITH THE BORINGS PROJECTED ONTO THE PROFILE      820



# GENERALIZED SUBSURFACE PROFILE ALONG RETAINING WALL AT END BRIDGE



PROJECT REFERENCE NO.	SHEET
U-3459 (34951.1.1)	8
PROFILE	

GROUNDLINE PROFILE OBTAINED FROM DTM PROVIDED BY OTHERS

820    INFERRED STRATIGRAPHY IS DRAWN ALONG RETAINING WALL PROFILE WITH THE BORINGS PROJECTED ONTO THE PROFILE    820

800    800

780    780

760    760

740    740

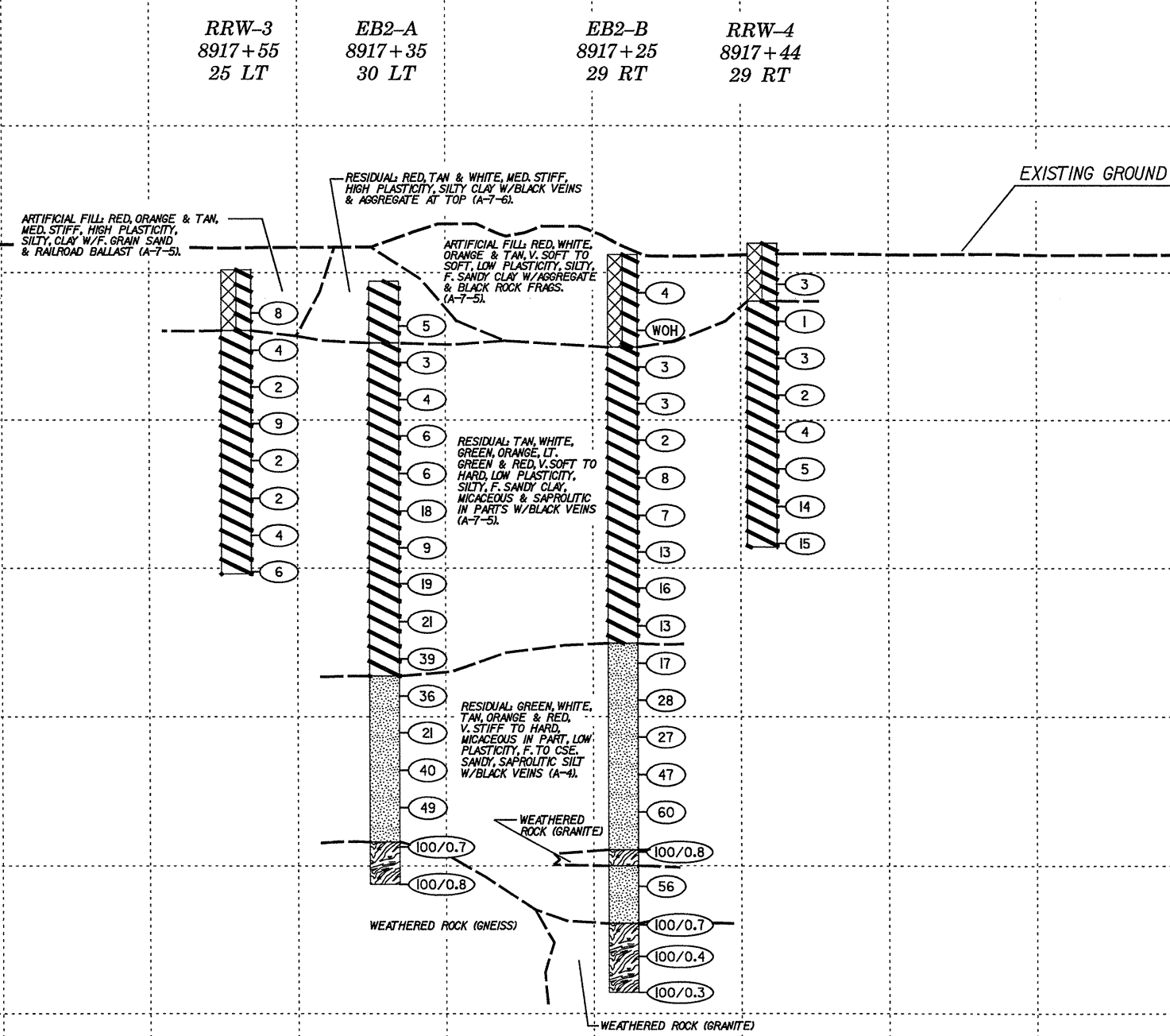
720    720

700    700

680    680

660    660

0+40    0+60    0+80    1+00    1+20    1+40    1+60    1+80    2+00    2+20    2+40    2+60    2+80    3+00





WBS 34951.1.1		TIP U-3459		COUNTY ROWAN		GEOLOGIST DeLost, R.									
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation						GROUND WTR (ft)									
BORING NO. EB1-A		STATION 8915+92		OFFSET 15 ft LT		ALIGNMENT -Main 1-									
COLLAR ELEV. 760.8 ft		TOTAL DEPTH 86.0 ft		NORTHING 696,661		EASTING 1,557,605									
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Woodard, F.		START DATE 03/30/12		COMP. DATE 03/30/12		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														760.8	0.0
755	756.1	4.7	3	2	4								M		
750	751.1	9.7	3	6	10								D		
745	746.1	14.7	1	2	2								M		
740	741.1	19.7	1	1	1								W		
735	736.1	24.7	WOH	WOH	2								W		
730	731.1	29.7	1	2	4								W		
725	726.1	34.7	2	5	5								M		
720	721.1	39.7	2	4	8								M	SS-2	
715	716.1	44.7	3	5	9								M		
710	711.1	49.7	7	10	14								M		
705	706.1	54.7	7	15	14								D		
700	701.1	59.7	10	14	19								D		
695	696.1	64.7	7	8	15								D		
690	691.1	69.7	17	23	38								D		
685	686.1	74.7	12	16	18								D		

NCDOT BORE SINGLE U3459\_GEO\_BRDGNRR\_BORE.GPJ\_NC\_DOT.GDT 6/26/12

WBS 34951.1.1		TIP U-3459		COUNTY ROWAN		GEOLOGIST DeLost, R.									
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation						GROUND WTR (ft)									
BORING NO. EB1-A		STATION 8915+92		OFFSET 15 ft LT		ALIGNMENT -Main 1-									
COLLAR ELEV. 760.8 ft		TOTAL DEPTH 86.0 ft		NORTHING 696,661		EASTING 1,557,605									
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Woodard, F.		START DATE 03/30/12		COMP. DATE 03/30/12		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					
685															
680	681.1	79.7	66	34	0.1									683.0	77.8
675	676.1	84.7	42	54	46/0.3									674.8	86.0

NCDOT BORE SINGLE U3459\_GEO\_BRDGNRR\_BORE.GPJ\_NC\_DOT.GDT 6/26/12



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 34951.1.1		TIP U-3459		COUNTY ROWAN		GEOLOGIST DeLost, R.										
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 8915+81		OFFSET 29 ft RT		ALIGNMENT -Main 1-	0 HR. N/A									
COLLAR ELEV. 759.2 ft		TOTAL DEPTH 74.9 ft		NORTHING 696,704		EASTING 1,557,594	24 HR. N/A									
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Woodard, F.		START DATE 03/29/12		COMP. DATE 03/29/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						ELEV. (ft)
760															759.2	0.0
755	754.4	4.8	2	2	4									M		
750	749.4	9.8	1	1	3									M		
745	744.4	14.8	WOH	1	2									W	746.1	13.1
740	739.4	19.8	WOH	1	2									W		
735	734.4	24.8												M		
730	729.4	29.8												W		
725	724.4	34.8												M		
720	719.4	39.8												M		
715	714.4	44.8												W		
710	709.4	49.8												M	710.2	49.0
705	704.4	54.8												D		
700	699.4	59.8												M	699.2	60.0
695	694.4	64.8												D		
690	689.4	69.8													688.9	70.3
685	684.4	74.8													684.3	74.9

NCDOT BORE SINGLE U3459\_GEO\_BRDGNRR\_BORE.GPJ NC\_DOT.GDT 8/26/12

**GROUND SURFACE**  
ELEV. 759.2

**ARTIFICIAL FILL**  
Tan, red & white, med. stiff, high plasticity, silty clay w/black rock frags. & roots (A-7-6).

**RESIDUAL**  
Tan, white, green, red, orange & pink, soft to hard, low plasticity, calcareous, micaceous, silty, f., micaceous clay w/black rock veins, rock frags. in parts (A-7-5).

**WEATHERED ROCK**  
Weathered rock (Gneiss).

Boring Terminated with Standard Penetration Test Refusal at Elevation 684.3 ft on Crystalline Rock (Gneiss).

WBS 34951.1.1	TIP U-3459	COUNTY ROWAN	GEOLOGIST DeLost, R.
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation			GROUND WTR (ft)
BORING NO. B1-A	STATION 8916+30	OFFSET 11 ft LT	ALIGNMENT -Main 1-
COLLAR ELEV. 762.7 ft	TOTAL DEPTH 84.6 ft	NORTHING 696,646	EASTING 1,557,569
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Woodard, F.	START DATE 04/02/12	COMP. DATE 04/03/12	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					
765															
													762.7	0.0	
													GROUND SURFACE		
760	758.2	4.5		1	2	3						SS-1	ARTIFICIAL FILL Red, med. stiff, high plasticity, silty clay w/rock frags. (A-7-6).		
755	753.2	9.5		2	5	7								754.9	7.8
													RESIDUAL Orange, tan, white, green & cream, v. soft to stiff, low plasticity, silty, f. sandy clay w/black rock veins trc. calcareous (A-7-5).		
750	748.2	14.5		1	1	2									
745	743.2	19.5		1	1	1									
740	738.2	24.5	WOH	WOH	2										
735	733.2	29.5	WOH	2	1										
730	728.2	34.5		1	4	4									
725	723.2	39.5		1	4	6									
720	718.2	44.5		3	5	8									
715	713.2	49.5		4	8	11									
710	708.2	54.5		9	13	15									
705	703.2	59.5		10	15	20									
700	698.2	64.5		14	26	45									
695	693.2	69.5		22	61	39/0.1									
690	688.2	74.5		35	54	46/0.3									
													692.7	70.0	
													WEATHERED ROCK Weathered rock (Gneiss).		
685													685.2	77.5	

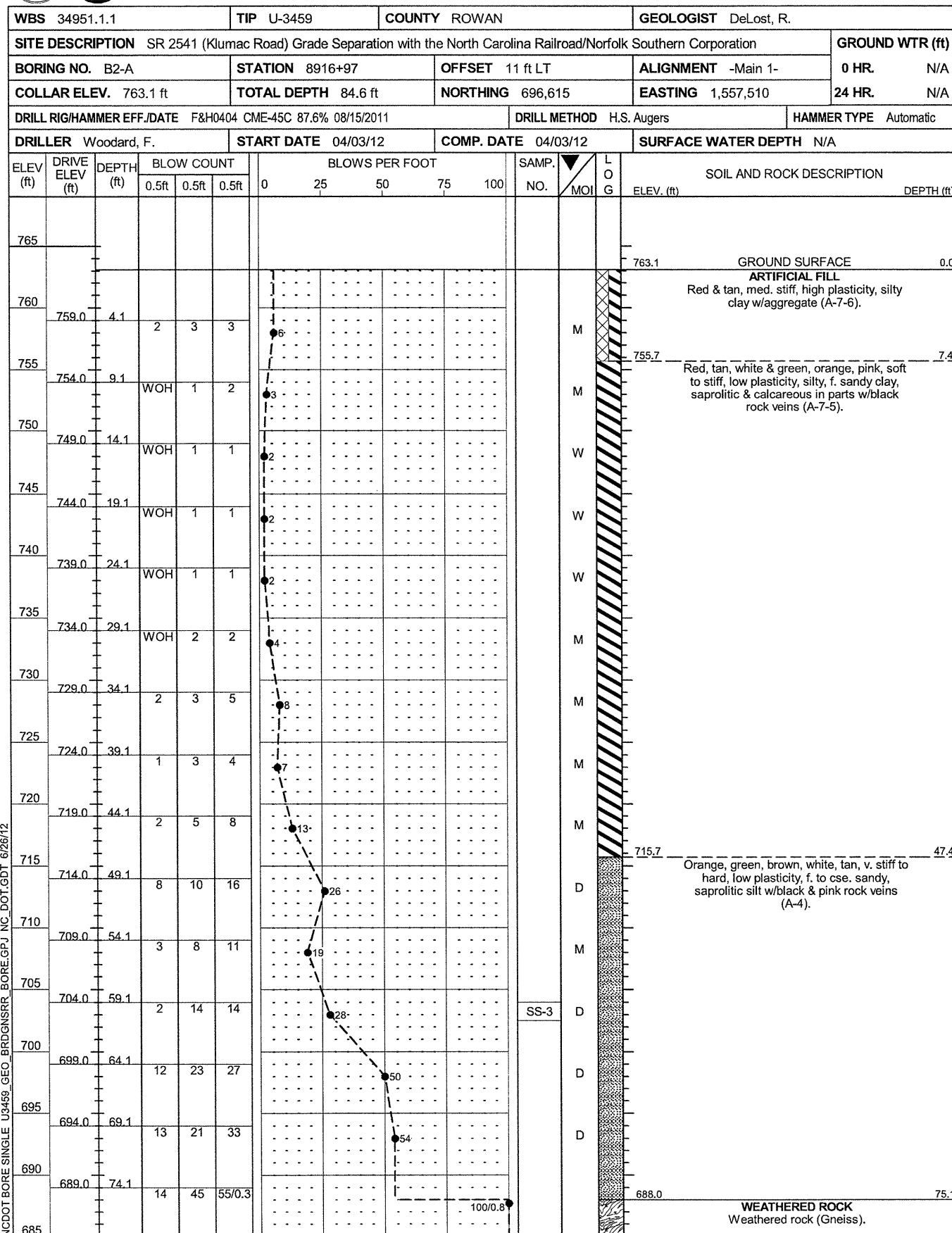
NCDOT BORE SINGLE U3459 GEO BRDGNRR BORE.GPJ NC DOT.GDT 6/26/12

WBS 34951.1.1	TIP U-3459	COUNTY ROWAN	GEOLOGIST DeLost, R.
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation			GROUND WTR (ft)
BORING NO. B1-A	STATION 8916+30	OFFSET 11 ft LT	ALIGNMENT -Main 1-
COLLAR ELEV. 762.7 ft	TOTAL DEPTH 84.6 ft	NORTHING 696,646	EASTING 1,557,569
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Woodard, F.	START DATE 04/02/12	COMP. DATE 04/03/12	SURFACE WATER DEPTH N/A

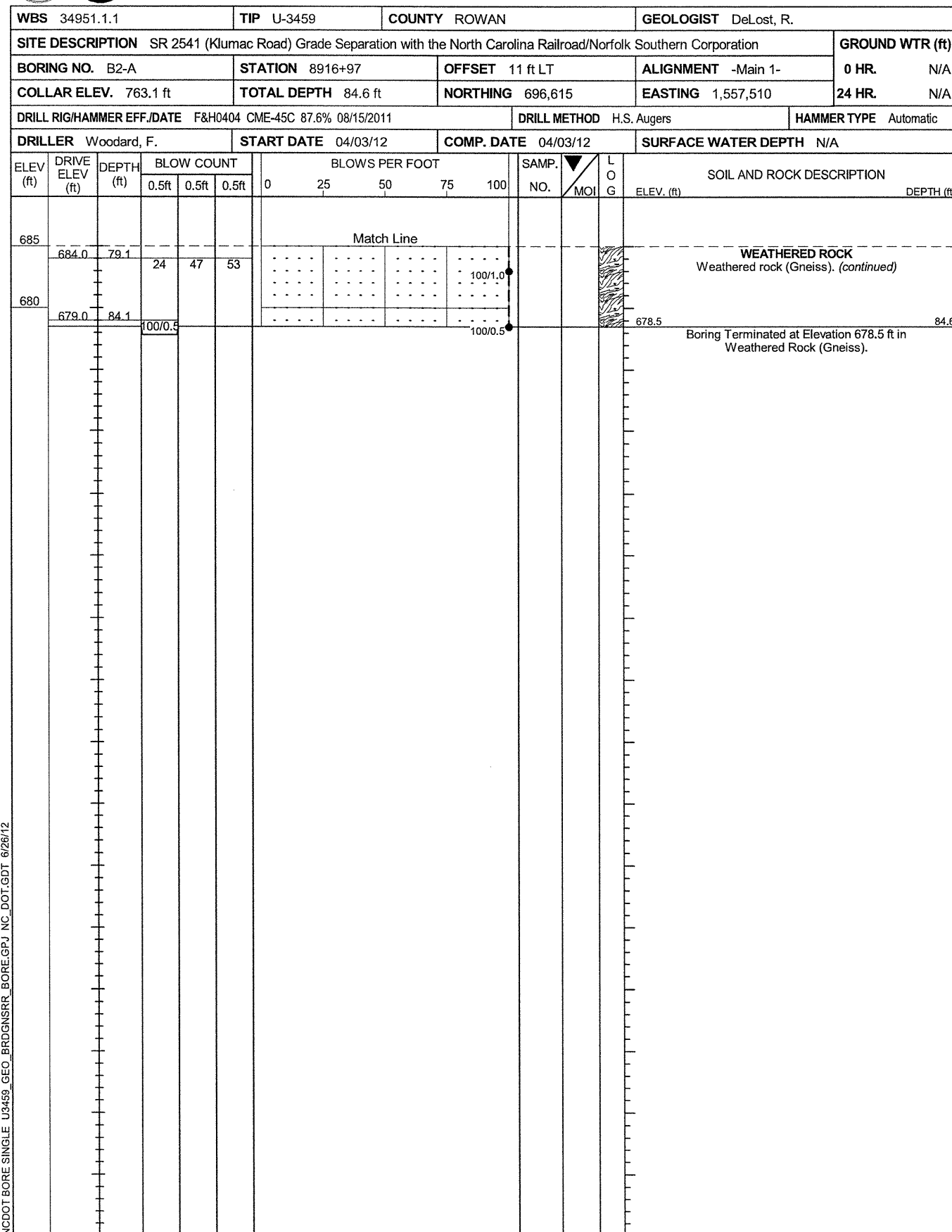
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
685														
	683.2	79.5		28	20	25								
	678.2	84.5		60	0.1									
													678.1	84.6
													Boring Terminated with Standard Penetration Test Refusal at Elevation 678.1 ft on Crystalline Rock (Gneiss).	

NCDOT BORE SINGLE U3459 GEO BRDGNRR BORE.GPJ NC DOT.GDT 6/26/12





NCDOT BORE SINGLE U3459 GEO\_BRDGSRR\_BORE.GPJ NC\_DOT.GDT 6/26/12



NCDOT BORE SINGLE U3459 GEO\_BRDGSRR\_BORE.GPJ NC\_DOT.GDT 6/26/12



WBS 34951.1.1		TIP U-3459		COUNTY ROWAN		GEOLOGIST DeLost, R.										
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation						GROUND WTR (ft)										
BORING NO. EB2-A		STATION 8917+35		OFFSET 30 ft LT		ALIGNMENT -Main 1-										
COLLAR ELEV. 758.8 ft		TOTAL DEPTH 81.3 ft		NORTHING 696,581		EASTING 1,557,485										
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Woodard, F.		START DATE 04/03/12		COMP. DATE 04/30/12		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						
760																758.8
																GROUND SURFACE
																RESIDUAL
																Red, tan, white, med. stiff, high plasticity, silty clay w/black veins & aggregate at top (A-7-6).
755	753.8	5.0	1	2	3											5
750	748.8	10.0	1	1	2											3
745	743.8	15.0	1	1	3											4
740	738.8	20.0	1	2	4											6
735	733.8	25.0	2	3	3											6
730	728.8	30.0	2	7	11											18
725	723.8	35.0	2	3	6											9
720	718.8	40.0	4	7	12											19
715	713.8	45.0	6	9	12											21
710	708.8	50.0	12	17	22											39
705	703.8	55.0	7	13	23											36
700	698.8	60.0	7	9	12											21
695	693.8	65.0	7	16	24											40
690	688.8	70.0	10	20	29											49
685	683.8	75.0	20	57	43/0.2											100/0.7
680																WEATHERED ROCK
																Weathered rock (Gneiss).

NCDOT BORE SINGLE U3459 GEO BRDGNRR BORE.GPJ NC\_DOT.GDT 6/26/12

WBS 34951.1.1		TIP U-3459		COUNTY ROWAN		GEOLOGIST DeLost, R.										
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation						GROUND WTR (ft)										
BORING NO. EB2-A		STATION 8917+35		OFFSET 30 ft LT		ALIGNMENT -Main 1-										
COLLAR ELEV. 758.8 ft		TOTAL DEPTH 81.3 ft		NORTHING 696,581		EASTING 1,557,485										
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Woodard, F.		START DATE 04/03/12		COMP. DATE 04/30/12		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						
680																
																Match Line
																WEATHERED ROCK
																Weathered rock (Gneiss). (continued)
																Boring Terminated at Elevation 677.5 ft in Weathered Rock (Gneiss).
																677.5
																81.3

NCDOT BORE SINGLE U3459 GEO BRDGNRR BORE.GPJ NC\_DOT.GDT 6/26/12

WBS 34951.1.1		TIP U-3459		COUNTY ROWAN		GEOLOGIST DeLost, R.									
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation							GROUND WTR (ft)								
BORING NO. RRW-1		STATION 8915+74		OFFSET 14 ft LT		ALIGNMENT -Main 1-									
COLLAR ELEV. 761.1 ft		TOTAL DEPTH 41.5 ft		NORTHING 696,669		EASTING 1,557,620									
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Woodard, F.		START DATE 05/01/12		COMP. DATE 05/01/12		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					
765															
760														761.1	GROUND SURFACE 0.0
755	756.1	5.0	4	4	6										ARTIFICIAL FILL Red, stiff, high plasticity, silty clay w/trcs. f. grain snad & railroad ballast (A-7-5).
750	751.1	10.0	2	5	7									752.8	RESIDUAL Orange, tan, white, green, v. soft to stiff, low plasticity, silty, f. sandy clay, micaceous & calcareous in parts w/black veins (A-7-5).
745	746.1	15.0	1	1	2										
740	741.1	20.0	WOH	1	WOH										
735	736.1	25.0	WOH	1	1										
730	731.1	30.0	WOH	2	2										
725	726.1	35.0	1	2	5										
720	721.1	40.0	2	5	7										
														719.6	Boring Terminated at Elevation 719.6 ft in Silty Clay.

NCDOT BORE SINGLE U3459 GEO BRDGNRR\_BORE.GPJ NC\_DOT.GDT 6/26/12

WBS 34951.1.1		TIP U-3459		COUNTY ROWAN		GEOLOGIST DeLost, R.									
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation							GROUND WTR (ft)								
BORING NO. RRW-2		STATION 8915+64		OFFSET 69 ft RT		ALIGNMENT -Main 1-									
COLLAR ELEV. 765.9 ft		TOTAL DEPTH 41.4 ft		NORTHING 696,748		EASTING 1,557,591									
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Woodard, F.		START DATE 04/28/12		COMP. DATE 04/28/12		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					
770															
765														765.9	GROUND SURFACE 0.0
760	761.0	4.9	1	1	2										RESIDUAL red, orange, tan, green, white, pink, soft to stiff, low plasticity, silty, f. sandy clay, micaceous & calcareous in parts w/black veins & frags. (A-7-5).
755	756.0	9.9	WOH	1	1										
750	751.0	14.9	WOH	WOH	2										
745	746.0	19.9	WOH	1	1								SS-5		
740	741.0	24.9	WOH	1	2										
735	736.0	29.9	WOH	1	2										
730	731.0	34.9	WOH	2	2										
725	726.0	39.9	2	7	8										
														724.5	Boring Terminated at Elevation 724.5 ft in Sandy Clay.

NCDOT BORE SINGLE U3459 GEO BRDGNRR\_BORE.GPJ NC\_DOT.GDT 6/26/12



WBS 34951.1.1	TIP U-3459	COUNTY ROWAN	GEOLOGIST DeLost, R.
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation			GROUND WTR (ft)
BORING NO. EB2-B	STATION 8917+25	OFFSET 29 ft RT	ALIGNMENT -Main 1-
COLLAR ELEV. 762.5 ft	TOTAL DEPTH 100.1 ft	NORTHING 696,638	EASTING 1,557,466
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Gower S.	START DATE 03/13/12	COMP. DATE 03/14/12	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						
765														762.5	GROUND SURFACE	0.0
760	758.2	4.3	3	2	2								M	ARTIFICIAL FILL Red, white & tan, v. soft to soft, low plasticity, silty, f. sandy clay w/aggregate & black rock frags. (A-7-5).		
755	753.2	9.3	WOH	WOH	WOH								W			
750	748.2	14.3	1	1	2								M	749.9	RESIDUAL Tan, green, white, orange & red, stiff to v. stiff, low plasticity, silty, f. sandy clay, saprolitic in parts w/black veins & rock frags. (A-7-5).	12.6
745	743.2	19.3	2	2	1								M			
740	738.2	24.3	1	1	1								W			
735	733.2	29.3	2	2	6								M			
730	728.2	34.3	1	2	5								W			
725	723.2	39.3	3	6	7								M			
720	718.2	44.3	4	7	9								M			
715	713.2	49.3	3	4	9								M			
710	708.2	54.3	4	7	10								M	709.9	Tan, green, white, red & orange, v. stiff to hard, low plasticity, f. to cse. sandy, saprolitic silt w/black veins (A-4).	52.6
705	703.2	59.3	6	12	16								M			
700	698.2	64.3	9	11	16								D			
695	693.2	69.3	9	17	30								D			
690	688.2	74.3	11	24	36								D			

NCDOT BORE SINGLE U3459 GEO BRDGNRR\_BORE.GPJ NC\_DOT.GDT 6/26/12

WBS 34951.1.1	TIP U-3459	COUNTY ROWAN	GEOLOGIST DeLost, R.
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation			GROUND WTR (ft)
BORING NO. EB2-B	STATION 8917+25	OFFSET 29 ft RT	ALIGNMENT -Main 1-
COLLAR ELEV. 762.5 ft	TOTAL DEPTH 100.1 ft	NORTHING 696,638	EASTING 1,557,466
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Gower S.	START DATE 03/13/12	COMP. DATE 03/14/12	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						
685																
680	683.2	79.3	24	41	59/0.3									682.2	WEATHERED ROCK Weathered rock (Granite).	80.3
675	678.2	84.3	11	18	38								D	680.0	RESIDUAL Orange & tan, hard, low plasticity, f. to cse. sandy, saprolitic silt w/black rock veins (A-4).	82.5
670	673.2	89.3	24	61	39/0.2									672.2	WEATHERED ROCK Weathered rock (Granite).	90.3
665	668.2	94.3	100/0.4													
660	663.2	99.3	100/0.3													
655																
650																
645																
640																
635																
630																
625																
620																
615																
610																
605																
600																
595																
590																
585																

NCDOT BORE SINGLE U3459 GEO BRDGNRR\_BORE.GPJ NC\_DOT.GDT 6/26/12

WBS 34951.1.1		TIP U-3459		COUNTY ROWAN		GEOLOGIST DeLost, R.										
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation							GROUND WTR (ft)									
BORING NO. RRW-3		STATION 8917+55		OFFSET 25 ft LT		ALIGNMENT -Main 1-										
COLLAR ELEV. 760.4 ft		TOTAL DEPTH 41.4 ft		NORTHING 696,576		EASTING 1,557,465										
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Woodard, F.		START DATE 04/30/12		COMP. DATE 04/30/12		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						
765																
760															760.4	0.0
755	755.5	4.9	2	4	4											
750	750.5	9.9	1	2	2											
745	745.5	14.9	WOH	1	1											
740	740.5	19.9	1	3	6											
735	735.5	24.9	WOH	1	1											
730	730.5	29.9	WOH	1	1											
725	725.5	34.9	WOH	1	3											
720	720.5	39.9	WOH	2	4											
															719.0	41.4
Boring Terminated at Elevation 719.0 ft in Silty, Saprolitic Clay.																

NCDOT BORE SINGLE U3459 GEO\_BRDGNRR\_BORE.GPJ NC\_DOT.GDT 6/26/12

WBS 34951.1.1		TIP U-3459		COUNTY ROWAN		GEOLOGIST DeLost, R.										
SITE DESCRIPTION SR 2541 (Klumac Road) Grade Separation with the North Carolina Railroad/Norfolk Southern Corporation							GROUND WTR (ft)									
BORING NO. RRW-4		STATION 8917+44		OFFSET 29 ft RT		ALIGNMENT -Main 1-										
COLLAR ELEV. 764.1 ft		TOTAL DEPTH 41.2 ft		NORTHING 696,630		EASTING 1,557,450										
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 87.6% 08/15/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Woodard, F.		START DATE 03/29/12		COMP. DATE 03/29/12		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						
765																
760															764.1	0.0
755	759.4	4.7	1	1	2											
750	754.4	9.7	WOH	WOH	1											
745	749.4	14.7	1	1	2											
740	744.4	19.7	WOH	1	1											
735	739.4	24.7	WOH	2	2											
730	734.4	29.7	1	2	3											
725	729.4	34.7	2	7	7											
	724.4	39.7	4	7	8											
															722.9	41.2
Boring Terminated at Elevation 722.9 ft in Silty Clay.																

NCDOT BORE SINGLE U3459 GEO\_BRDGNRR\_BORE.GPJ NC\_DOT.GDT 6/26/12

**STATE PROJECT NO.:** 34951.1.1  
**TIP NO.:** U-3459  
**COUNTY:** ROWAN  
**SITE DESC.:** SR 2541 Grade Separation with the NC Railroad/Norfolk Southern Corp. Railline

SUMMARY OF SOIL CLASSIFICATIONS AND GRADATIONS																
Boring No.	Sample No.	Depth Interval (ft.)	AASHTO Class.	N	Percent Passing No.10	Percent Passing No.40	Percent Retained No. 60	Percent Passing No.200	SOIL MORTAR				LL	PI	PL	Percent Moisture
									Coarse Sand	Fine Sand	Silt	Clay				
B1-A	SS-1	4.5'-6.0'	A-7-6(26)	5	99.5	96.6	6.4	84.9	5.9	11.1	22.8	60.2	54	28	26	28.2
EB1-A	SS-2	9.7'-76.8'	A-7-5(12)	17	98.8	94.8	8.9	75.6	7.8	22.8	46.9	22.5	51	13	38	35.7
B2-A	SS-3	49.1'-70.6'	A-4(0)	<100	96.6	77.3	34.5	40.1	32.2	33.2	30.6	4.0	27	3	24	14.0
RRW-3	SS-4	4.9'-6.4'	A-7-5(30)	8	96.4	94.5	7.0	86.1	3.5	10.7	31.6	54.2	64	29	35	24.2
RRW-2	SS-5	4.9'-41.4'	A-7-5(15)	4	100.0	97.6	5.2	82.4	5.2	16.3	48.9	29.6	52	14	38	43.6

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F&H, CERT. No. 102-0603

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Don Schmidt, CERT. No. 102-01-0603

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Michael Garrison, CERT. No. 102-02-0603

SITE PHOTOGRAPHIC RECORD

SR 2541 (Klumac Road) Grade Separation With The  
NC Railroad/Norfolk Southern Corp. Railline



**Proposed Bridge Site Looking West Along Profile**



**Proposed Bridge Site Looking Southeast**



**Proposed Bridge Site Looking South**



**Proposed Bridge Site Looking Southwest**