

REFERENCE: B-5152

PROJECT: 42313

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

**STRUCTURE
SUBSURFACE INVESTIGATION**

COUNTY FORSYTH
PROJECT DESCRIPTION REPLACE BRIDGE NO. 95
OVER BLANKET CREEK ON SR 1100
SITE DESCRIPTION STA. 16 + 52.50 -L-

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5152	1	15

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

B. JOHNSON

R. TOOTHMAN

W. ALLEN

T. WELLS

INVESTIGATED BY B. JOHNSON

DRAWN BY B. JOHNSON

CHECKED BY X. BARRETT

SUBMITTED BY KLEINFELDER, INC.

DATE MARCH 2017



DocuSign
Xavier C. Barrett

2D00374FA68B407... 3/17/2017
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

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, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

Table with columns for General Class, Group Class, Symbol, % Passing, Material, Group Index, Usual Types, Gen. Rating, and Soil Legend (Granular, Silty, Clayey, Organic materials).

CONSISTENCY OR DENSENESS

Table mapping Primary Soil Type (e.g., Generally Granular, Silty-Clay) to Consistency (e.g., Very Loose, Medium Dense) and Range of Standard Penetration Resistance.

TEXTURE OR GRAIN SIZE

Table showing U.S. Std. Sieve Size (mm) and corresponding percentages for various soil fractions like Boulder, Cobble, Gravel, Sand, Silt, and Clay.

SOIL MOISTURE - CORRELATION OF TERMS

Table correlating Soil Moisture Scale (Atterberg Limits), Field Moisture Description (Saturated, Wet, Moist, Dry), and Guide for Field Moisture Description (Liquid Limit, Plastic Limit, Optimum Moisture).

PLASTICITY

Table relating Plasticity Index (PI) to Plasticity (Non-Plastic to Highly Plastic) and Dry Strength (Very Low to High).

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

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.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50

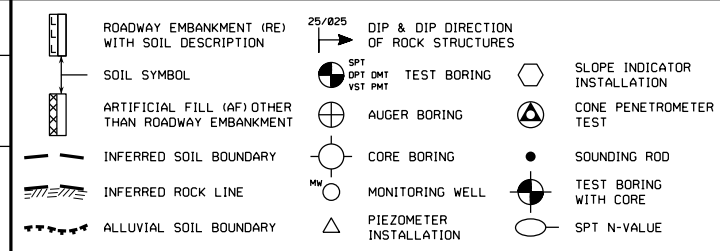
PERCENTAGE OF MATERIAL

Table showing percentages for Organic Material, Granular Soils, Silty-Clay Soils, and Other Material.

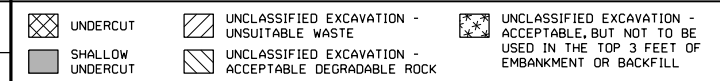
GROUND WATER

Water level symbols and descriptions: Water level in bore hole immediately after drilling, static water level after 24 hours, perched water, saturated zone, spring or seep.

MISCELLANEOUS SYMBOLS



RECOMMENDATION SYMBOLS



ABBREVIATIONS

- List of abbreviations for soil tests and materials: AR - Auger Refusal, BT - Boring Terminated, CL - Clay, CPT - Cone Penetration Test, etc.

EQUIPMENT USED ON SUBJECT PROJECT

Form for recording equipment used, including sections for Drill Units, Advancing Tools, Hammer Type, Core Size, Hand Tools, and Vane Shear Test.

ROCK DESCRIPTION

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.

WEATHERED ROCK (WR)

NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.

CRYSTALLINE ROCK (CR)

FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.

NON-CRYSTALLINE ROCK (NCR)

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 SEDIMENTARY ROCK (CP)

COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

Descriptions of weathering degrees: Fresh, Very Slight (IV SLI), Slight (SLI), Moderate (MOD), Moderately Severe (MOD. SEV.), Severe (SEV.), Very Severe (IV SEV.), Complete.

ROCK HARDNESS

Descriptions of rock hardness levels: Very Hard, Hard, Moderately Hard, Medium Hard, Soft, Very Soft.

FRACTURE SPACING

Table mapping Fracture Spacing (Very Wide to Very Close) to Bedding Thickness (Very Thickly Bedded to Thinly Laminated).

BEDDING

Notes on bedding types and their characteristics.

INDURATION

Descriptions of induration levels: Friable, Moderately Indurated, Indurated, Extremely Indurated.

TERMS AND DEFINITIONS

- List of geotechnical terms and definitions: Alluvium, Aquifer, Arenaceous, Argillaceous, Artesian, Calcareous, Colluvium, Core Recovery, Dike, Dip, Dip Direction, Fault, Fissile, Float, Flood Plain, Formation, Joint, Ledger, Lens, Mottled, Perched Water, Residual Soil, Rock Quality Designation, Saprolite, Sill, Slickenside, Standard Penetration Test, Strata Core Recovery, Strata Rock Quality Designation, Topsoil, Bench Mark, Notes, and Induration.

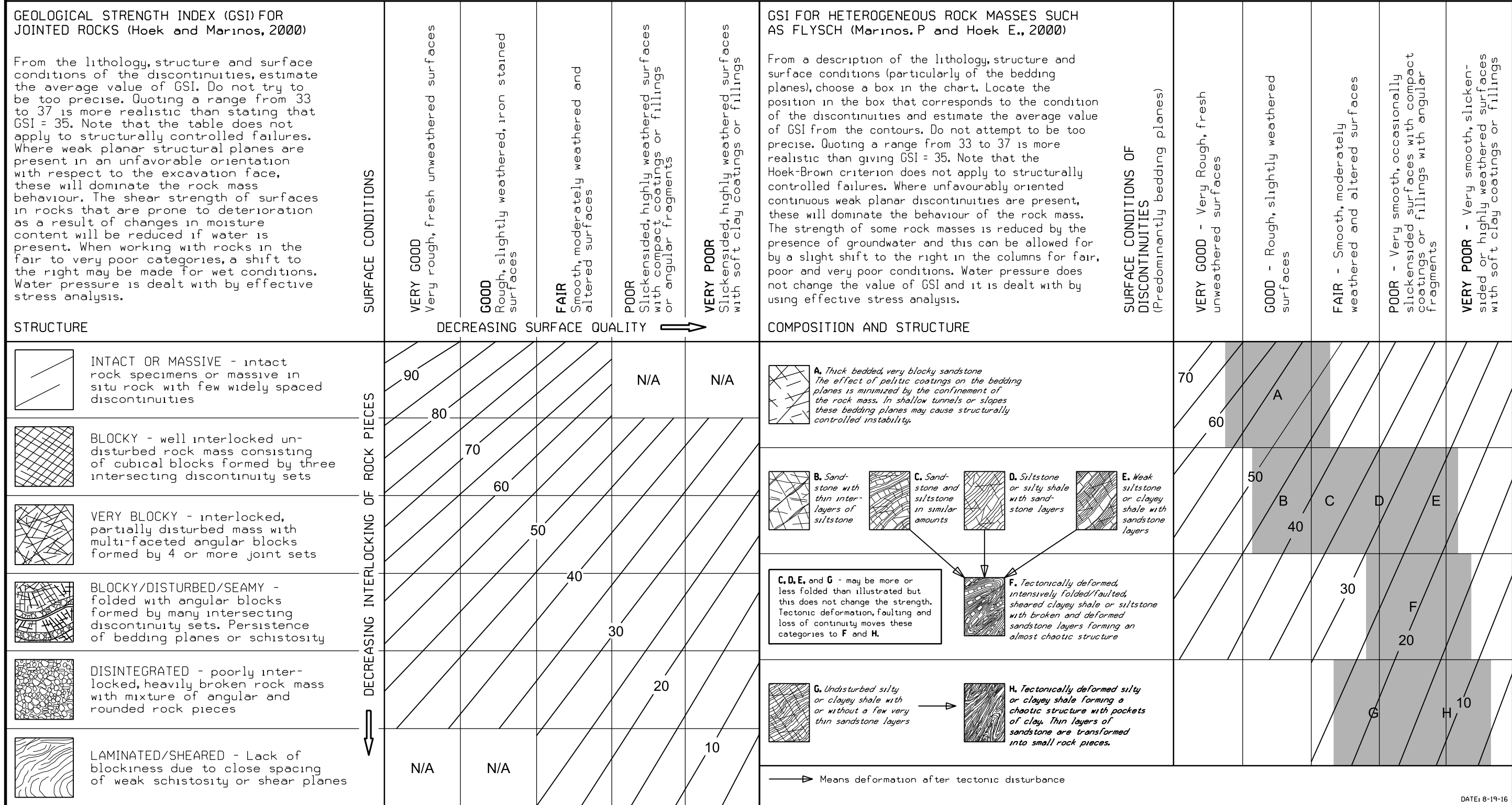
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
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SUBSURFACE INVESTIGATION

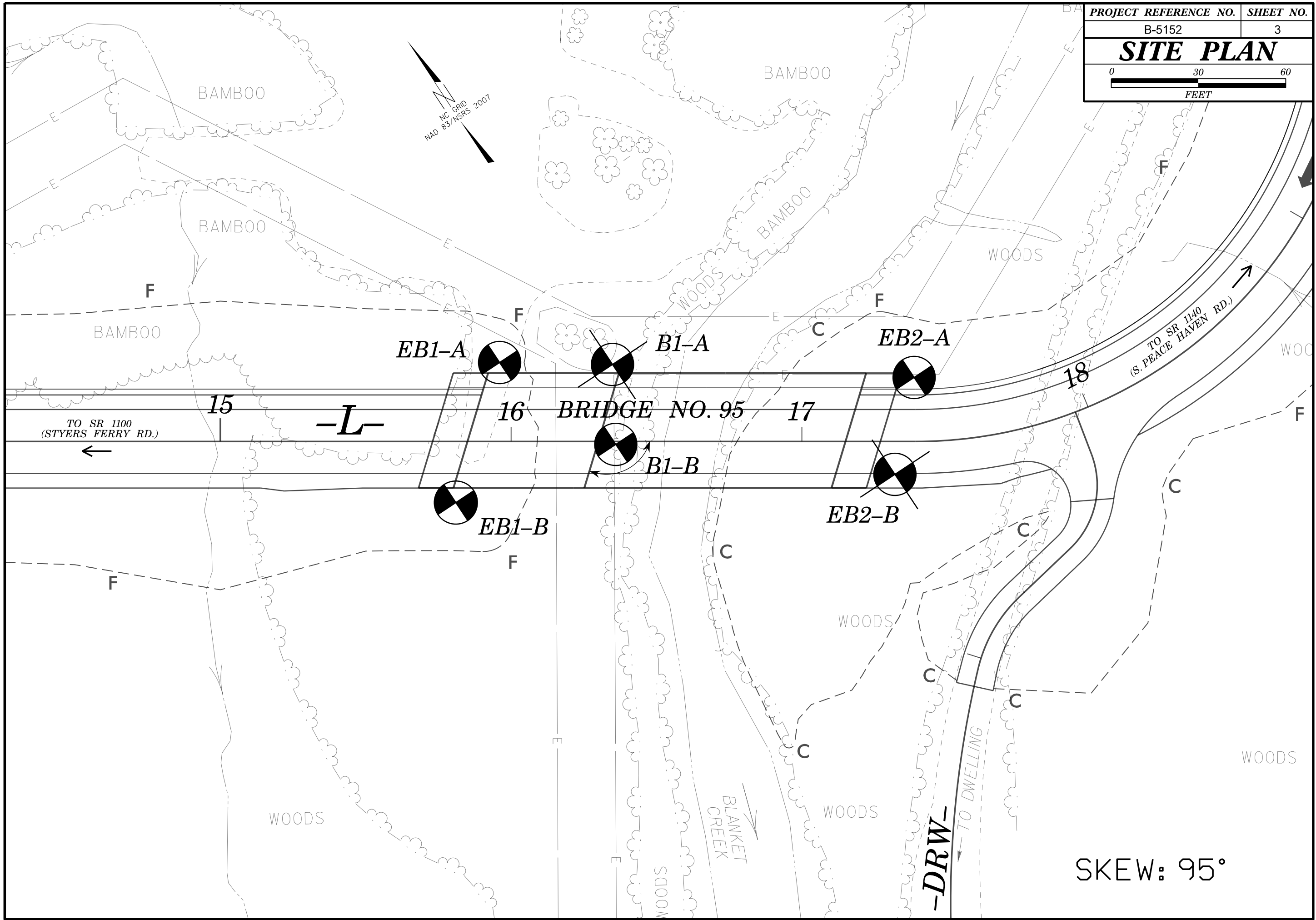
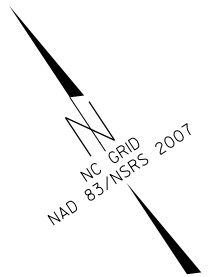
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

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

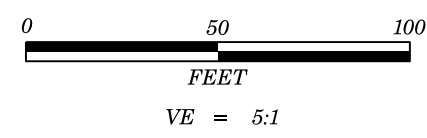
AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)



PROJECT REFERENCE NO.	SHEET NO.
B-5152	3
SITE PLAN	



SKEW: 95°



(A) ALLUVIAL:
 MOIST TO WET, GRAY TO BROWN-GRAY, VERY LOOSE TO LOOSE, CLAYEY, FINE SAND AND SILTY, FINE SAND WITH TRACE GRAVEL

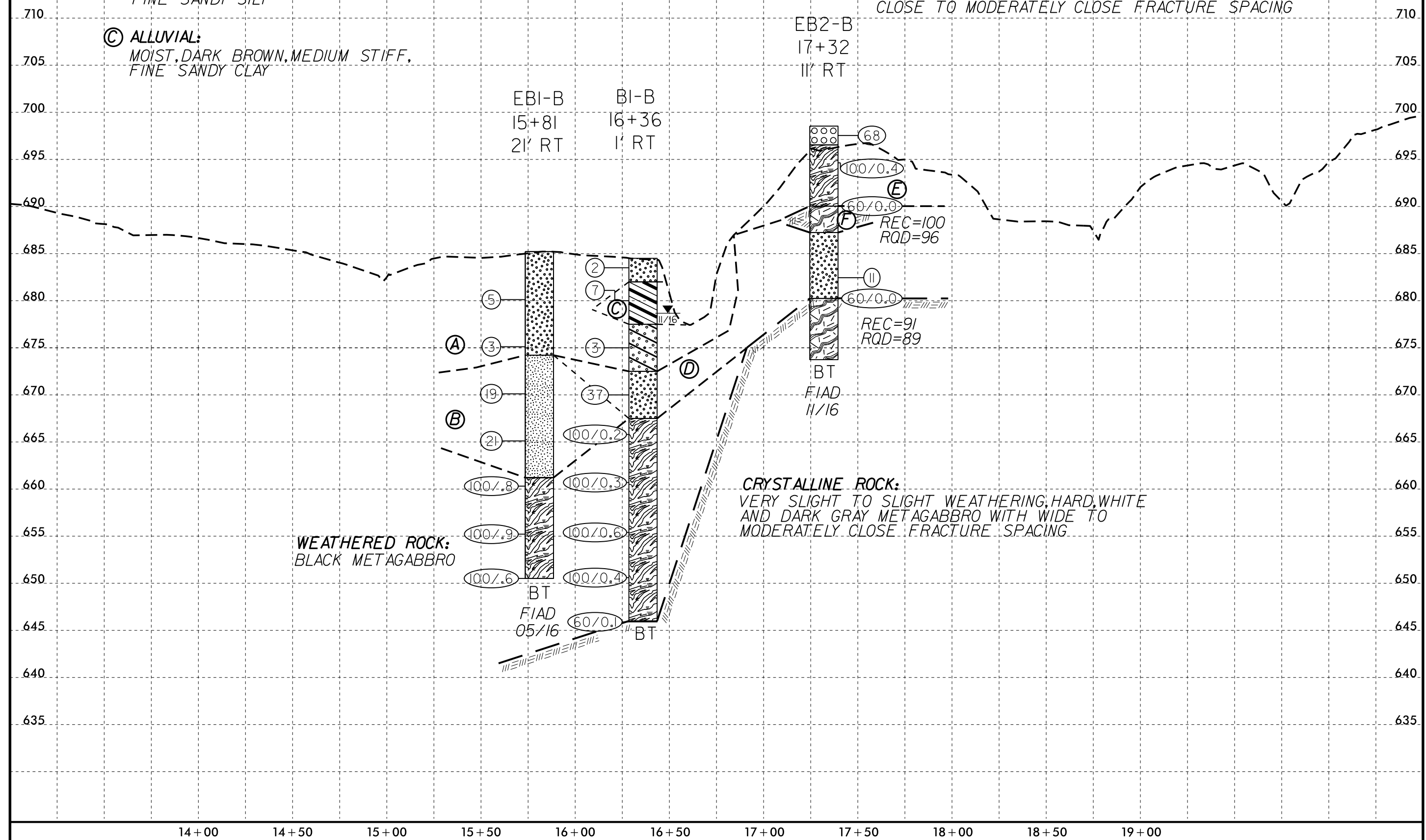
(B) RESIDUAL:
 MOIST, BLACK TO DARK GRAY TO BLACK AND WHITE, STIFF TO HARD, FINE SANDY SILT

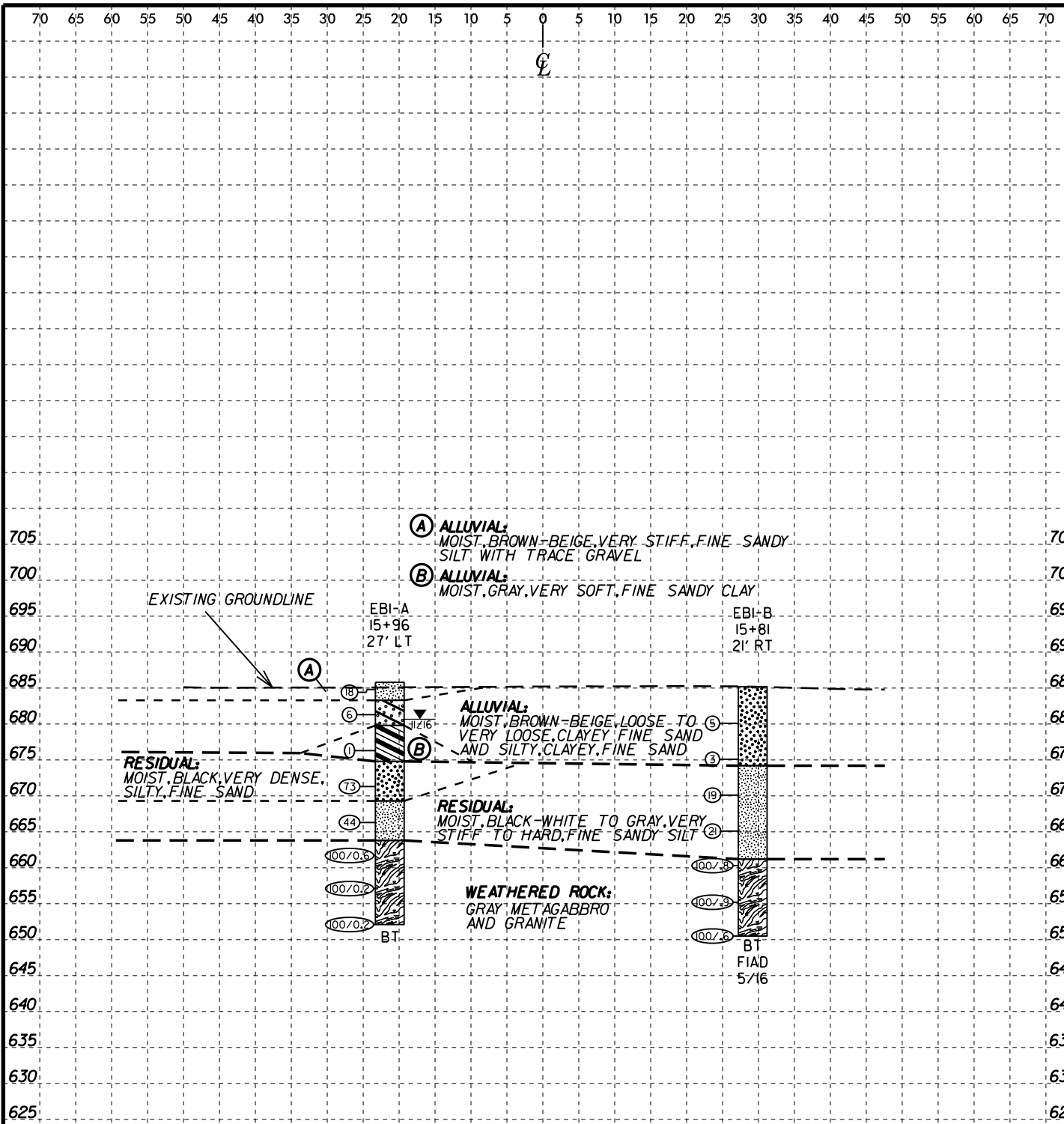
(C) ALLUVIAL:
 MOIST, DARK BROWN, MEDIUM STIFF, FINE SANDY CLAY

(D) RESIDUAL:
 MOIST TO WET, BLACK TO DARK GRAY, DENSE TO MEDIUM DENSE, SILTY, FINE SAND

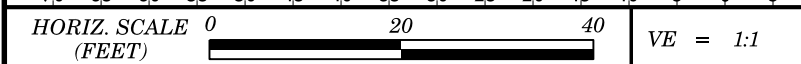
(E) WEATHERED ROCK:
 GRAY METAGABBRO

(F) CRYSTALLINE ROCK:
 SLIGHT TO MODERATE WEATHERING, MODERATELY HARD TO HARD, WHITE AND DARK GRAY METAGABBRO WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING

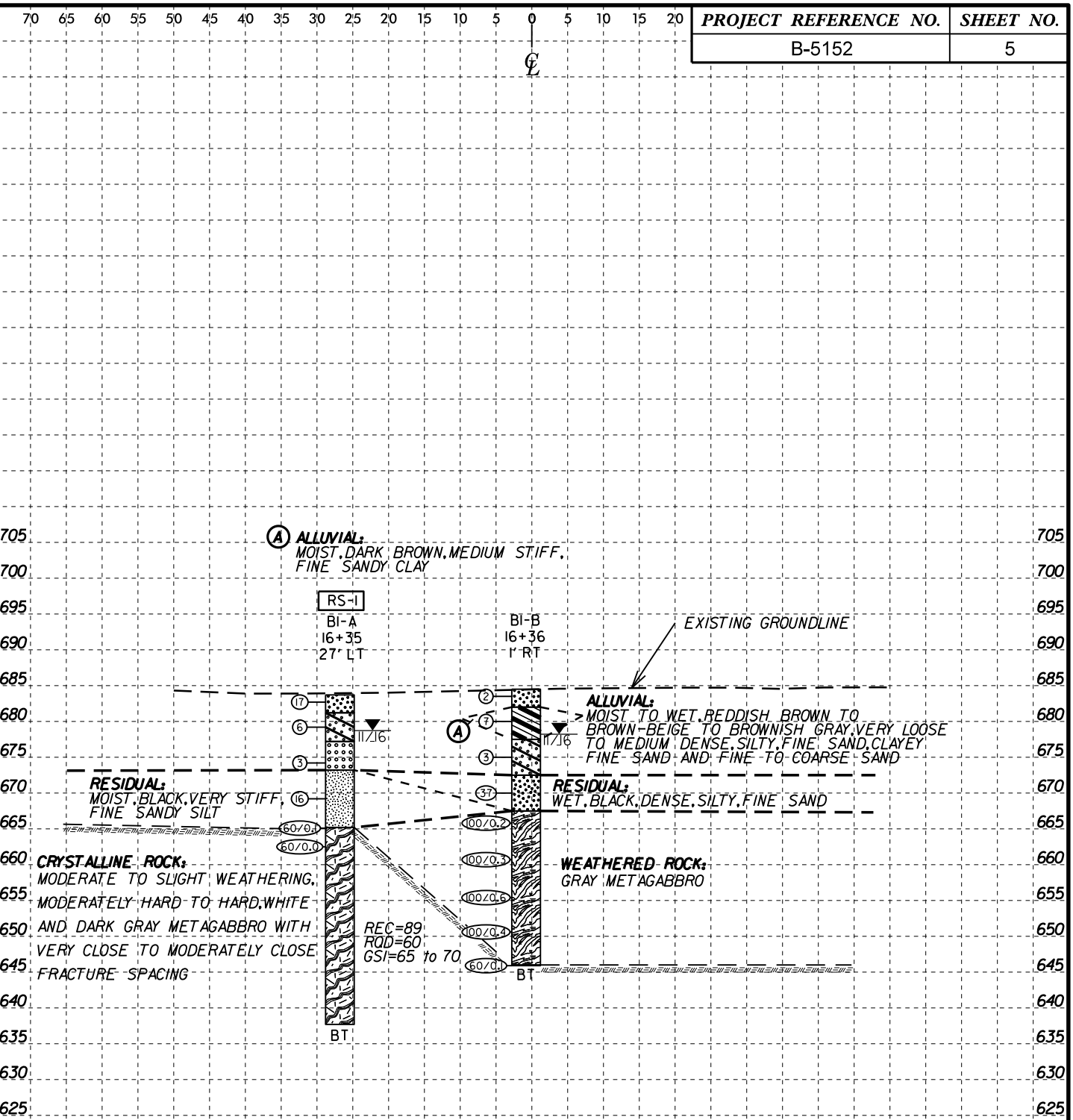




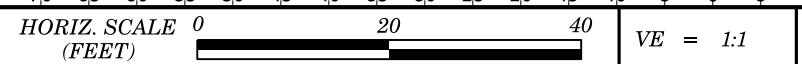
NOTES:
 GROUNDLINE TAKE FROM ROADWAY DESIGN TIN FILE B5152.LS.TIN.TIN DATED 5/17/2016
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION
 SKEW: 95°



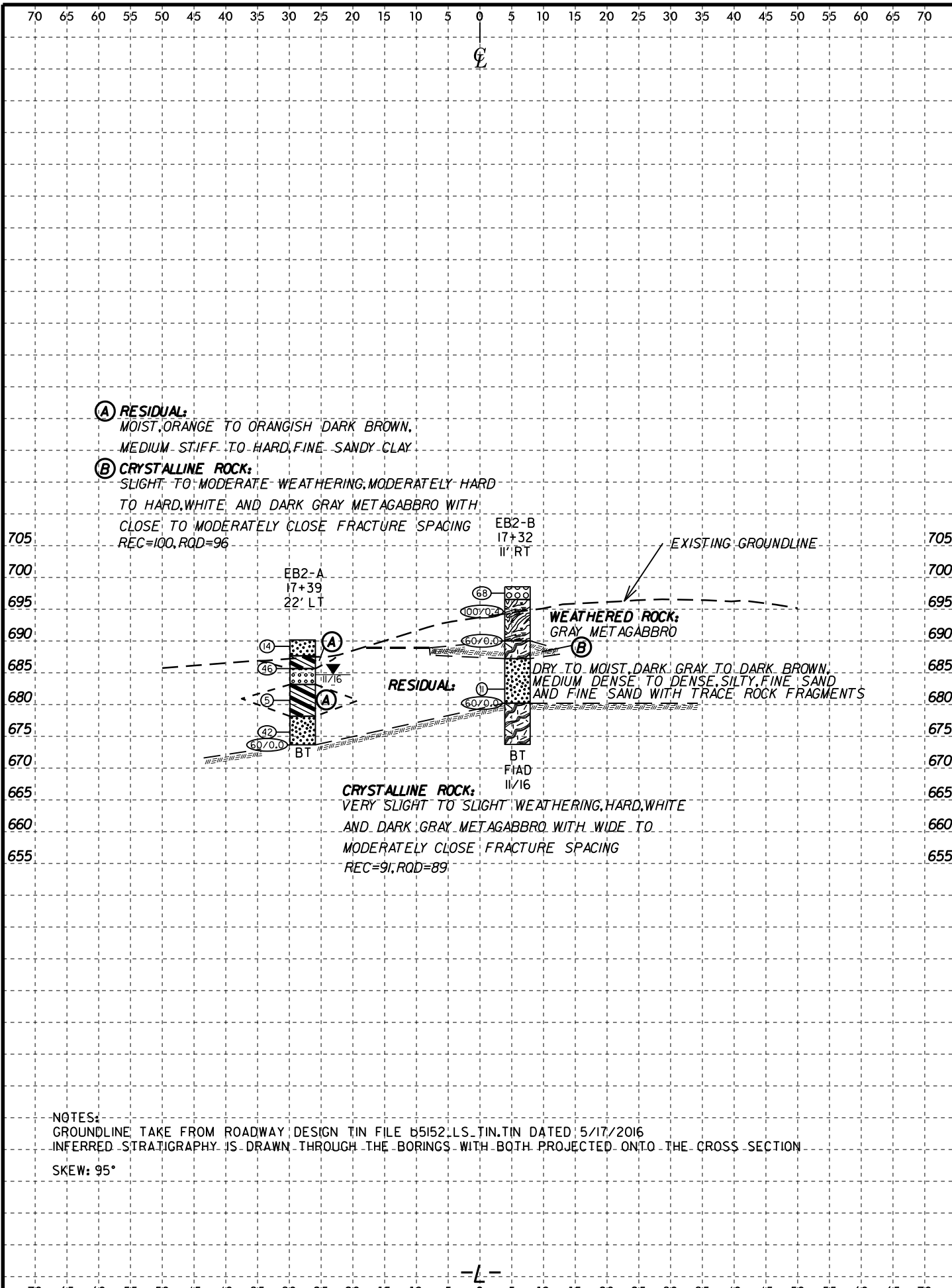
END BENT NO. 1 CROSS SECTION AT STA. 15+85



NOTES:
 GROUNDLINE TAKE FROM ROADWAY DESIGN TIN FILE B5152.LS.TIN.TIN DATED 5/17/2016
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION
 SKEW: 95°



BENT NO. 1 CROSS SECTION AT STA. 16+30



NOTES:
GROUNDLINE TAKE FROM ROADWAY DESIGN TIN FILE B5152.LS.TIN.TIN DATED 5/17/2016
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION
SKEW: 95°

HORIZ. SCALE 0 20 40
(FEET)

VE = 1:1

END BENT NO. 2 CROSS SECTION
AT STA. 17+15

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 42313.1.1					TIP B-5152					COUNTY FORSYTH					GEOLOGIST B. Johnson						
SITE DESCRIPTION Replace Bridge No. 95 over Blanket Creek on SR 1100															GROUND WTR (ft)						
BORING NO. EB1-A					STATION 15+96					OFFSET 27 ft LT					ALIGNMENT -L-					0 HR. 9.0	
COLLAR ELEV. 684.8 ft					TOTAL DEPTH 33.7 ft					NORTHING 831,143					EASTING 1,579,974					24 HR. 5.1	
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016										DRILL METHOD H.S. Augers					HAMMER TYPE Automatic						
DRILLER Toothman, R.					START DATE 11/17/16					COMP. DATE 11/17/16					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							
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)						
685	684.8	0.0	10	10	8									684.8	GROUND SURFACE	0.0					
680	681.3	3.5	3	2	4							M		682.3	ALLUVIAL Brown-Beige, Fine Sandy SILT with Trace Gravel	2.5					
	678.8	6.0										M		678.8	Brown-Beige, Clayey, Fine SAND						
675	676.3	8.5	1	0	1							M		673.8	Gray, Fine Sandy CLAY	11.0					
	671.3	13.5										M		673.8	RESIDUAL Black, Silty, Fine SAND						
670	666.3	18.5	22	20	24							M		668.3	Black-White, Fine Sandy SILT	16.5					
	661.3	23.5	58	42/0.1								M		662.8	WEATHERED ROCK Brown-Gray to Brown-Gray-White, METAGABBRO	22.0					
665	656.3	28.5	100/0.2									M		662.8	WEATHERED ROCK Brown-Gray to Brown-Gray-White, METAGABBRO						
	651.3	33.5	100/0.2									M		651.1	WEATHERED ROCK Brown-Gray to Brown-Gray-White, METAGABBRO	33.7					
Boring Terminated at Elevation 651.1 ft IN WEATHERED ROCK: METAGABBRO																					
Topsoil 0.0 to 0.1 foot																					

WBS 42313.1.1					TIP B-5152					COUNTY FORSYTH					GEOLOGIST Stickney, J. K.						
SITE DESCRIPTION Bridge No. 95 over Blanket Creek on SR 1100															GROUND WTR (ft)						
BORING NO. EB1-B					STATION 15+81					OFFSET 21 ft RT					ALIGNMENT -L-					0 HR. N/A	
COLLAR ELEV. 685.2 ft					TOTAL DEPTH 34.7 ft					NORTHING 831,111					EASTING 1,579,935					24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550X 84% 05/15/2015										DRILL METHOD H.S. Augers					HAMMER TYPE Automatic						
DRILLER Smith, C.L.					START DATE 05/24/16					COMP. DATE 05/24/16					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							
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)						
690														685.2	GROUND SURFACE	0.0					
685														685.2	ALLUVIAL BROWN-GRAY, VERY LOOSE TO LOOSE, MOIST TO WET, CLAYEY SAND (A-2-6)						
	681.1	4.1	3	2	3							M		674.2	RESIDUAL TAN-BROWN, VERY STIFF TO HARD, MOIST SANDY SILT (A-4)	11.0					
680	676.1	9.1	1	2	1							W		674.2	RESIDUAL TAN-BROWN, VERY STIFF TO HARD, MOIST SANDY SILT (A-4)						
	671.1	14.1	8	8	11							M		661.2	WEATHERED ROCK WEATHERED ROCK (GRANITIC)	24.0					
675	666.1	19.1	2	9	12							M		661.2	WEATHERED ROCK WEATHERED ROCK (GRANITIC)						
	661.1	24.1	41	59/3								M		650.5	Boring Terminated at Elevation 650.5 ft IN Weathered Rock (Granitic)	34.7					
670	656.1	29.1	28	72/4										650.5	Boring Terminated at Elevation 650.5 ft IN Weathered Rock (Granitic)						
	651.1	34.1	71	29/1										650.5	Boring Terminated at Elevation 650.5 ft IN Weathered Rock (Granitic)						
Boring EB1-B was provided by the NCDOT																					

GEOTECHNICAL BORING REPORT

BORE LOG

GEOTECHNICAL BORING REPORT

CORE LOG

WBS 42313.1.1		TIP B-5152		COUNTY FORSYTH		GEOLOGIST B. Johnson									
SITE DESCRIPTION Replace Bridge No. 95 over Blanket Creek on SR 1100							GROUND WTR (ft)								
BORING NO. B1-A		STATION 16+35		OFFSET 27 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 683.7 ft		TOTAL DEPTH 46.0 ft		NORTHING 831,121		EASTING 1,580,006									
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016			DRILL METHOD H.S. Augers/NQ CORE		HAMMER TYPE Automatic										
DRILLER Toothman, R.		START DATE 11/17/16		COMP. DATE 11/17/16		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			ELEV. (ft)	DEPTH (ft)	
685	683.7	0.0	4	8	9							M	683.7	GROUND SURFACE	0.0
680	680.2	3.5	4	3	3							W	681.2	ALLUVIAL Reddish Brown, Silty, Fine SAND with Trace Gravel	2.5
675	675.2	8.5	2	1	2							M	677.2	Brown-Beige, Clayey, Fine SAND	6.5
670	670.2	13.5	16	9	7							M	673.2	Brownish Gray, Fine to Coarse SAND	10.5
665	665.2	18.5											673.2	RESIDUAL Black, Fine Sandy SILT	10.5
660	662.5	21.2											665.2	CRYSTALLINE ROCK Black METAGABBRO	18.5
655													662.5		21.2
650													637.7		46.0
645															
640															

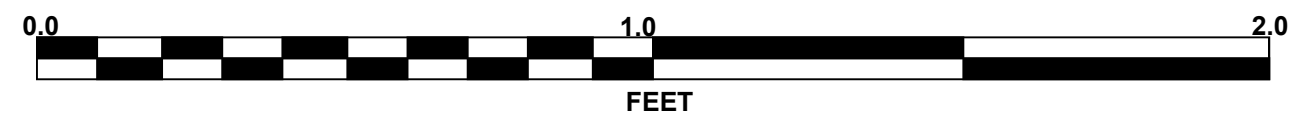
WBS 42313.1.1		TIP B-5152		COUNTY FORSYTH		GEOLOGIST B. Johnson	
SITE DESCRIPTION Replace Bridge No. 95 over Blanket Creek on SR 1100							GROUND WTR (ft)
BORING NO. B1-A		STATION 16+35		OFFSET 27 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 683.7 ft		TOTAL DEPTH 46.0 ft		NORTHING 831,121		EASTING 1,580,006	
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016			DRILL METHOD H.S. Augers/NQ CORE		HAMMER TYPE Automatic		
DRILLER Toothman, R.		START DATE 11/17/16		COMP. DATE 11/17/16		SURFACE WATER DEPTH N/A	
CORE SIZE NQ		TOTAL RUN 24.8 ft		L O G		DESCRIPTION AND REMARKS	
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.
662.5	662.5	21.2	4.8	2:48/0.8 N=60/0.0 2:48/0.8 2:00 2:04 1:07 1:22	(3.0) 63%	(0.7) 15%	
660	657.7	26.0	5.0	1:05 1:30 1:20 1:22 1:14	(4.4) 88%	(2.3) 46%	
655	652.7	31.0	5.0	1:32 1:30 1:40 2:41 1:45	(5.0) 100%	(3.9) 78%	
650	647.7	36.0	5.0	2:06 1:28 2:35 2:00 2:02	(4.9) 98%	(3.6) 72%	
645	642.7	41.0	5.0	1:50 1:45 1:30 1:36 2:04	(4.7) 94%	(4.5) 90%	
640	637.7	46.0					

NCDOT BORE DOUBLE B5152_BRDG_GINT.GPJ NC_DOT_GDT 12/2/16

CORE PHOTOGRAPHS

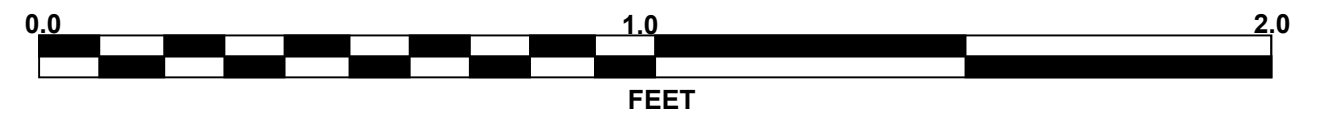
B1-A

BOXES 1 and 2: 21.2 to 41.0 FEET



B1-A

BOX 3: 41.0 to 46.0 FEET



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 42313.1.1		TIP B-5152		COUNTY FORSYTH		GEOLOGIST B. Johnson											
SITE DESCRIPTION Replace Bridge No. 95 over Blanket Creek on SR 1100							GROUND WTR (ft)										
BORING NO. B1-B		STATION 16+36		OFFSET 1 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 684.5 ft		TOTAL DEPTH 38.6 ft		NORTHING 831,098		EASTING 1,579,992											
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic											
DRILLER Toothman, R.		START DATE 11/22/16		COMP. DATE 11/22/16		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			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
685	684.5	0.0	1	1	1										684.5	0.0	GROUND SURFACE
	681.0	3.5													682.0	2.5	ALLUVIAL Brown, Silty, Fine SAND Dark Brown, Fine Sandy CLAY
680			6	4	3										677.5	7.0	Dark Brown, Clayey, Fine to Coarse SAND with Trace Gravel
675	676.0	8.5	2	1	2										672.5	12.0	RESIDUAL Black, Silty, Fine SAND
670	671.0	13.5	13	14	23										667.5	17.0	WEATHERED ROCK Black and White METAGABBRO
665	666.0	18.5	100/0.2														
660	661.0	23.5	100/0.3														
655	656.0	28.5	84	16/0.1													
650	651.0	33.5	100/0.4														
	646.0	38.5													646.0	38.5	CRYSTALLINE ROCK Black METAGABBRO Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 645.9 ft IN CRYSTALLINE ROCK: METAGABBRO Topsoil 0.0 to 0.1 foot

WBS 42313.1.1		TIP B-5152		COUNTY FORSYTH		GEOLOGIST B. Johnson											
SITE DESCRIPTION Replace Bridge No. 95 over Blanket Creek on SR 1100							GROUND WTR (ft)										
BORING NO. EB2-A		STATION 17+39		OFFSET 22 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 690.2 ft		TOTAL DEPTH 16.5 ft		NORTHING 831,060		EASTING 1,580,090											
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic											
DRILLER Toothman, R.		START DATE 11/22/16		COMP. DATE 11/22/16		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			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
695																	
690	690.2	0.0	4	7	7										690.2	0.0	GROUND SURFACE
	686.7	3.5	7	12	34										687.7	2.5	RESIDUAL Brown, Silty, Fine SAND with Trace Rock Fragments
685															685.7	4.5	Orange, Fine Sandy CLAY
	681.7	8.5	3	3	2										683.2	7.0	Dark Brown, Fine SAND with Trace Rock Fragments
680															678.2	12.0	Orangish Dark Brown, Fine Sandy CLAY
	676.7	13.5	20	24	18										673.7	16.5	Orangish Dark Brown, Silty, Fine SAND
675	673.7	16.5	60/0.0														Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 673.7 ft ON CRYSTALLINE ROCK: METAGABBRO Topsoil 0.0 to 0.2 foot

NCDOT BORE DOUBLE B5152_BRDG_GINT.GPJ NC_DOT.GDT 12/2/16

GEOTECHNICAL BORING REPORT

BORE LOG

GEOTECHNICAL BORING REPORT

CORE LOG

WBS 42313.1.1		TIP B-5152		COUNTY FORSYTH		GEOLOGIST B. Johnson										
SITE DESCRIPTION Replace Bridge No. 95 over Blanket Creek on SR 1100							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 17+32		OFFSET 11 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 698.5 ft		TOTAL DEPTH 24.8 ft		NORTHING 831,036		EASTING 1,580,066										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016			DRILL METHOD Mud Rotary/NQ CORE		HAMMER TYPE Automatic											
DRILLER Toothman, R.		START DATE 11/23/16		COMP. DATE 11/23/16		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			ELEV. (ft)	DEPTH (ft)		
700	698.5	0.0	5	14	54									698.5	GROUND SURFACE	0.0
														696.5	RESIDUAL Gray, Rock Fragments with Sand	2.0
695	695.0	3.5	100/0.4											690.0	WEATHERED ROCK Gray METAGABBRO	100/0.4
690	690.0	8.5	60/0.0											687.2	CRYSTALLINE ROCK White and Dark Gray METAGABBRO	60/0.0
685	683.4	15.1	13	6	5									680.2	RESIDUAL Dark Gray, Silty, Fine SAND with Trace Rock Fragments	11.3
680	680.2	18.3	60/0.0											673.7	CRYSTALLINE ROCK Dark Gray METAGABBRO	18.3
675														673.7	Coring Terminated at Elevation 673.7 ft IN CRYSTALLINE ROCK: METAGABBRO	24.8
															Topsoil 0.0 to 0.2 foot	

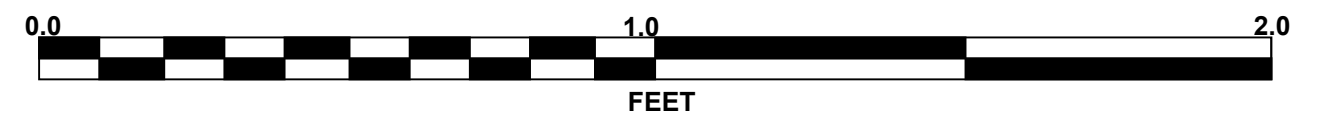
WBS 42313.1.1		TIP B-5152		COUNTY FORSYTH		GEOLOGIST B. Johnson							
SITE DESCRIPTION Replace Bridge No. 95 over Blanket Creek on SR 1100							GROUND WTR (ft)						
BORING NO. EB2-B		STATION 17+32		OFFSET 11 ft RT		ALIGNMENT -L-							
COLLAR ELEV. 698.5 ft		TOTAL DEPTH 24.8 ft		NORTHING 831,036		EASTING 1,580,066							
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 77% 02/22/2016			DRILL METHOD Mud Rotary/NQ CORE		HAMMER TYPE Automatic								
DRILLER Toothman, R.		START DATE 11/23/16		COMP. DATE 11/23/16		SURFACE WATER DEPTH N/A							
CORE SIZE NQ		TOTAL RUN 13.1 ft											
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS		
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		ELEV. (ft)	DEPTH (ft)	
690	690.0	8.5	1.6	0:58/0.6	(1.6)	(1.5)		(2.8)	(2.7)		690.0	Begin Coring @ 8.5 ft	8.5
	688.4	10.1	5.0	N=60/0.0 0:58/0.6 1:30	100%	94%		100%	96%		687.2	CRYSTALLINE ROCK Slight to Moderate Weathering, Moderately Hard to Hard, White and Dark Gray METAGABBRO with Close to Moderately Close Fracture Spacing	11.3
685				1:40 0:58 0:54 0:43 0:41 N=11				(1.4)	(0.0)			1 fracture at 0 to 10 degrees, 1 fracture at 10 to 20 degrees, 1 fracture at 20 to 30 degrees, 2 fractures at 40 to 50 degrees, 3 fractures at 50 to 60 degrees	
680	680.2	18.3	1.5	0:50/0.5	(1.1)	(1.0)		(5.9)	(5.8)		680.2	RESIDUAL Very Severe to Complete Weathering, Very Soft, Dark Gray, Silty Fine SAND with Rock Fragments	18.3
	678.7	19.8	5.0	N=60/0.0 0:50/0.5 2:35	73%	67%		91%	89%			Intensely Fractured from 11.3 to 15.1 feet.	
675				3:00 2:15 2:00 2:05 2:13	(4.8)	(4.8)						CRYSTALLINE ROCK Very Slight to Slight Weathering, Hard, White and Dark Gray, METAGABBRO with Wide to Moderately Close Fracture Spacing	24.8
	673.7	24.8										1 fracture at 0 to 10 degrees, 1 fracture at 40 to 50 degrees Coring Terminated at Elevation 673.7 ft IN CRYSTALLINE ROCK: METAGABBRO	
												Topsoil 0.0 to 0.2 foot	

NCDOT BORE DOUBLE B5152_BRDG_GINT.GPJ NC_DOT_GDT 12/2/16

CORE PHOTOGRAPHS

EB2-B

BOX 1: 8.5 to 24.8 FEET



SITE PHOTOGRAPHS



View Looking Southeast along -L- from
End Bent 1



View Looking Southwest between Bent 1 and
End Bent 2 over Blanket Creek