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REFERENCE: B-5389

PROJECT: 46104

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY YADKIN  
 SITE DESCRIPTION BRIDGE NO. 105 OVER YADKIN  
RIVER OVERFLOW ON US 421 AND DETOUR  
BRIDGE OVER YADKIN RIVER OVERFLOW ON  
ON US 421

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5389	1	16

**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

J.K. STICKNEY

C.L. SMITH

INVESTIGATED BY J.E. BEVERLY

DRAWN BY T.T. WALKER, F&R Inc.

CHECKED BY J.E. BEVERLY

SUBMITTED BY K.B. MILLER

DATE SEPTEMBER 2018



Signature: [Signature]  
 Date: 9/18/2018

SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRODUCED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>	<b>ANGULARITY OF GRAINS</b> THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	<b>WEATHERING</b> FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SLI.) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SLI.) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> SEVERE (SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</i> VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i> COMPLETE - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	<b>MINERALOGICAL COMPOSITION</b> MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.
<b>GENERAL CLASS.</b> GRANULAR MATERIALS (≤ 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS	<b>COMPRESSION</b> SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50	<b>PERCENTAGE OF MATERIAL</b> ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	<b>GROUND WATER</b> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP
<b>GROUP CLASS.</b> A-1, A-1-b, A-3, A-2-4, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7	<b>COMPRESSIBILITY</b>	<b>CRISTALLINE ROCK (CR)</b>	<b>CRISTALLINE ROCK (CR)</b>
<b>SYMBOL</b>	<b>PERCENTAGE OF MATERIAL</b>	<b>NON-CRYSTALLINE ROCK (NCR)</b>	<b>NON-CRYSTALLINE ROCK (NCR)</b>
<b>% PASSING</b> *10 *40 *200	<b>PERCENTAGE OF MATERIAL</b>	<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>	<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>
<b>MATERIAL PASSING #40 LL PL</b>	<b>GROUND WATER</b>	<b>WEATHERING</b>	<b>WEATHERING</b>
<b>GROUP INDEX</b>	<b>MISCELLANEOUS SYMBOLS</b>	<b>ROCK HARDNESS</b>	<b>ROCK HARDNESS</b>
<b>USUAL TYPES OF MAJOR MATERIALS</b>	<b>RECOMMENDATION SYMBOLS</b>	<b>VERY HARD</b>	<b>VERY HARD</b>
<b>GEN. RATING AS SUBGRADE</b>	<b>ABBREVIATIONS</b>	<b>HARD</b>	<b>HARD</b>
<b>PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS &gt; LL - 30</b>	<b>SOIL MOISTURE - CORRELATION OF TERMS</b>	<b>MODERATELY HARD</b>	<b>MODERATELY HARD</b>
<b>CONSISTENCY OR DENSENESS</b>	<b>EQUIPMENT USED ON SUBJECT PROJECT</b>	<b>MEDIUM HARD</b>	<b>MEDIUM HARD</b>
<b>PRIMARY SOIL TYPE</b>	<b>PLASTICITY</b>	<b>SOFT</b>	<b>SOFT</b>
<b>COMPACTNESS OR CONSISTENCY</b>	<b>COLOR</b>	<b>VERY SOFT</b>	<b>VERY SOFT</b>
<b>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</b>	<b>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</b>	<b>INDURATION</b>	<b>INDURATION</b>
<b>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT<sup>2</sup>)</b>	<b>TEXTURE OR GRAIN SIZE</b>	<b>FRIABLE</b>	<b>FRIABLE</b>
<b>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</b>	<b>U.S. STD. SIEVE SIZE OPENING (MM)</b>	<b>MODERATELY INDURATED</b>	<b>MODERATELY INDURATED</b>
<b>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</b>	<b>BOULDER (BLDR.)</b>	<b>INDURATED</b>	<b>INDURATED</b>
<b>VERY LOOSE</b>	<b>COBBLE (COB.)</b>	<b>EXTREMELY INDURATED</b>	<b>EXTREMELY INDURATED</b>
<b>VERY SOFT</b>	<b>GRAVEL (GR.)</b>		
<b>VERY STIFF</b>	<b>COARSE SAND (CSE. SD.)</b>		
<b>HARD</b>	<b>FINE SAND (F. SD.)</b>		
	<b>SILT (SL.)</b>		
	<b>CLAY (CL.)</b>		
	<b>GRAIN SIZE</b>		
	<b>MM</b>		
	<b>IN.</b>		
	<b>305</b>		
	<b>75</b>		
	<b>2.0</b>		
	<b>0.25</b>		
	<b>0.05</b>		
	<b>0.005</b>		
	<b>4</b>		
	<b>10</b>		
	<b>40</b>		
	<b>60</b>		
	<b>200</b>		
	<b>270</b>		
	<b>0.42</b>		
	<b>0.25</b>		
	<b>0.075</b>		
	<b>0.053</b>		
	<b>4.76</b>		
	<b>2.00</b>		

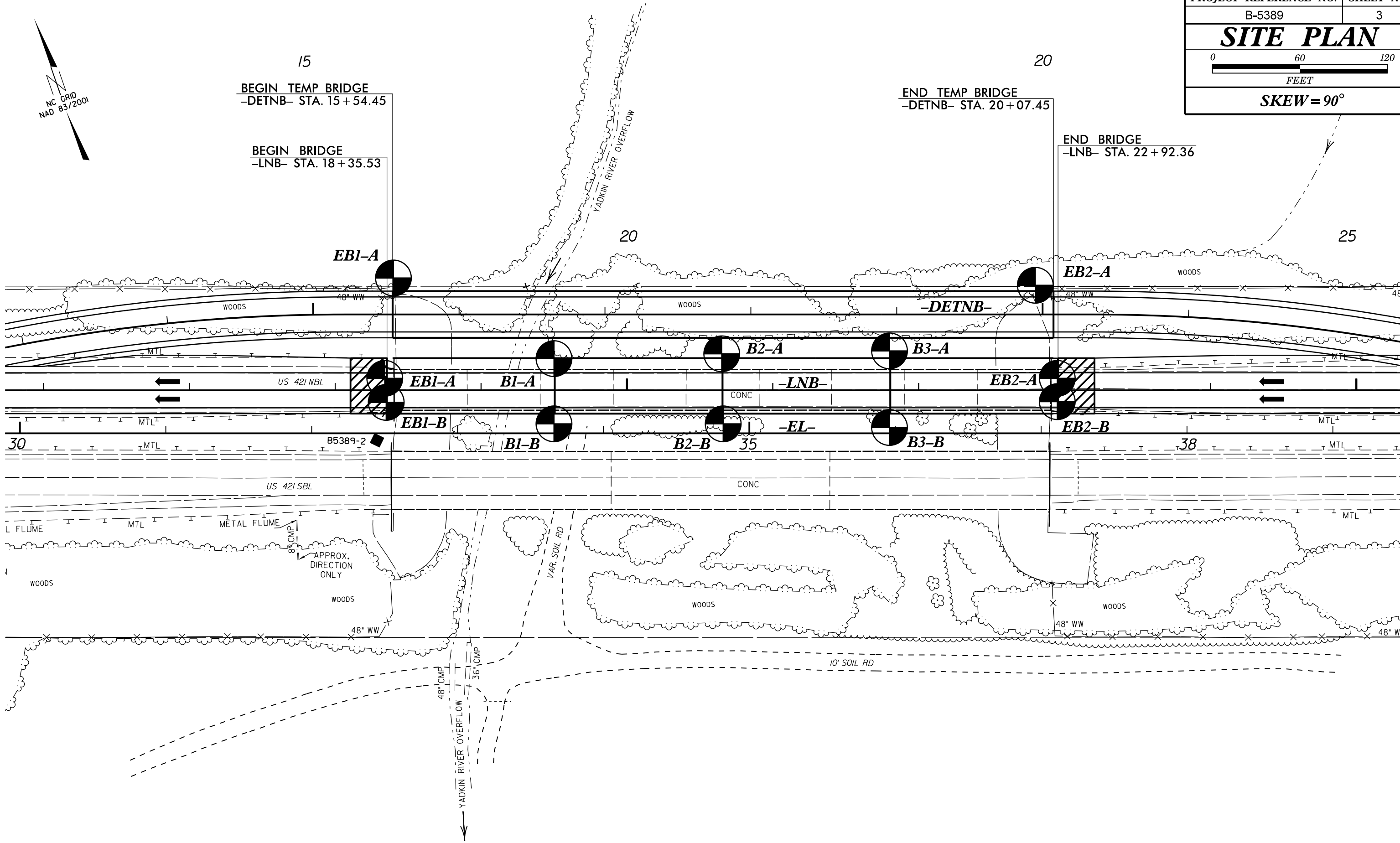
PROJECT REFERENCE NO.	SHEET NO.
B-5389	3
<b>SITE PLAN</b>	
<b>SKEW = 90°</b>	

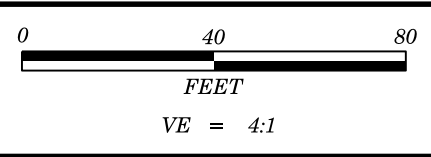


15  
 BEGIN TEMP BRIDGE  
 -DETNB- STA. 15 + 54.45

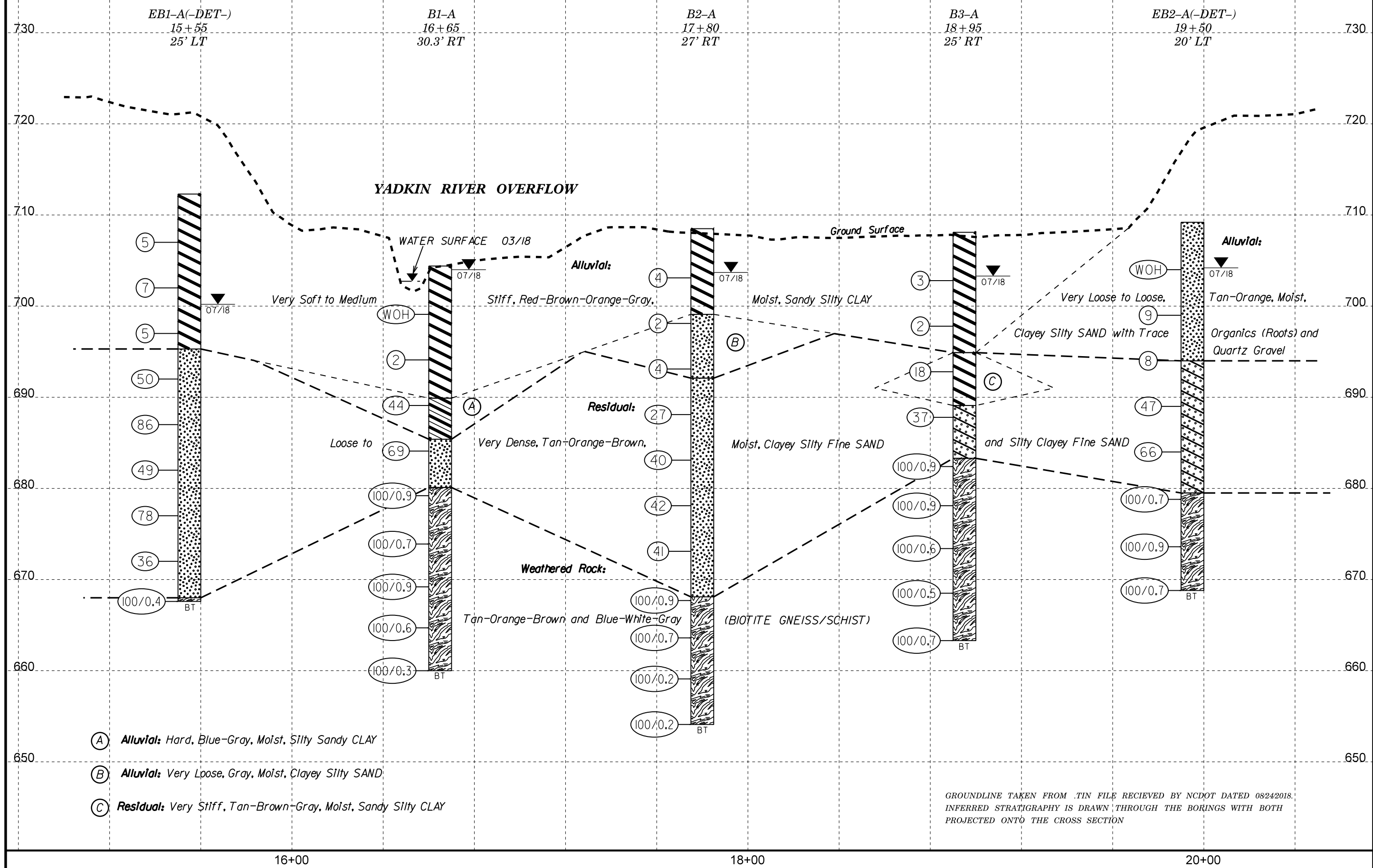
20  
 END TEMP BRIDGE  
 -DETNB- STA. 20 + 07.45

END BRIDGE  
 -LNB- STA. 22 + 92.36





<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
B-5389	4
<b>PROFILE BORINGS PROJECTED ALONG -DETNB-</b>	



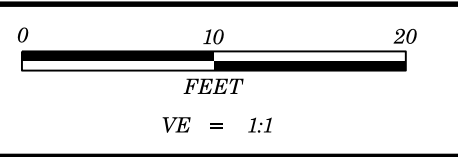
- (A) **Alluvial:** Hard, Blue-Gray, Moist, Silty Sandy CLAY
- (B) **Alluvial:** Very Loose, Gray, Moist, Clayey Silty SAND
- (C) **Residual:** Very Stiff, Tan-Brown-Gray, Moist, Sandy Silty CLAY

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 08/24/2018.  
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
PROJECTED ONTO THE CROSS SECTION

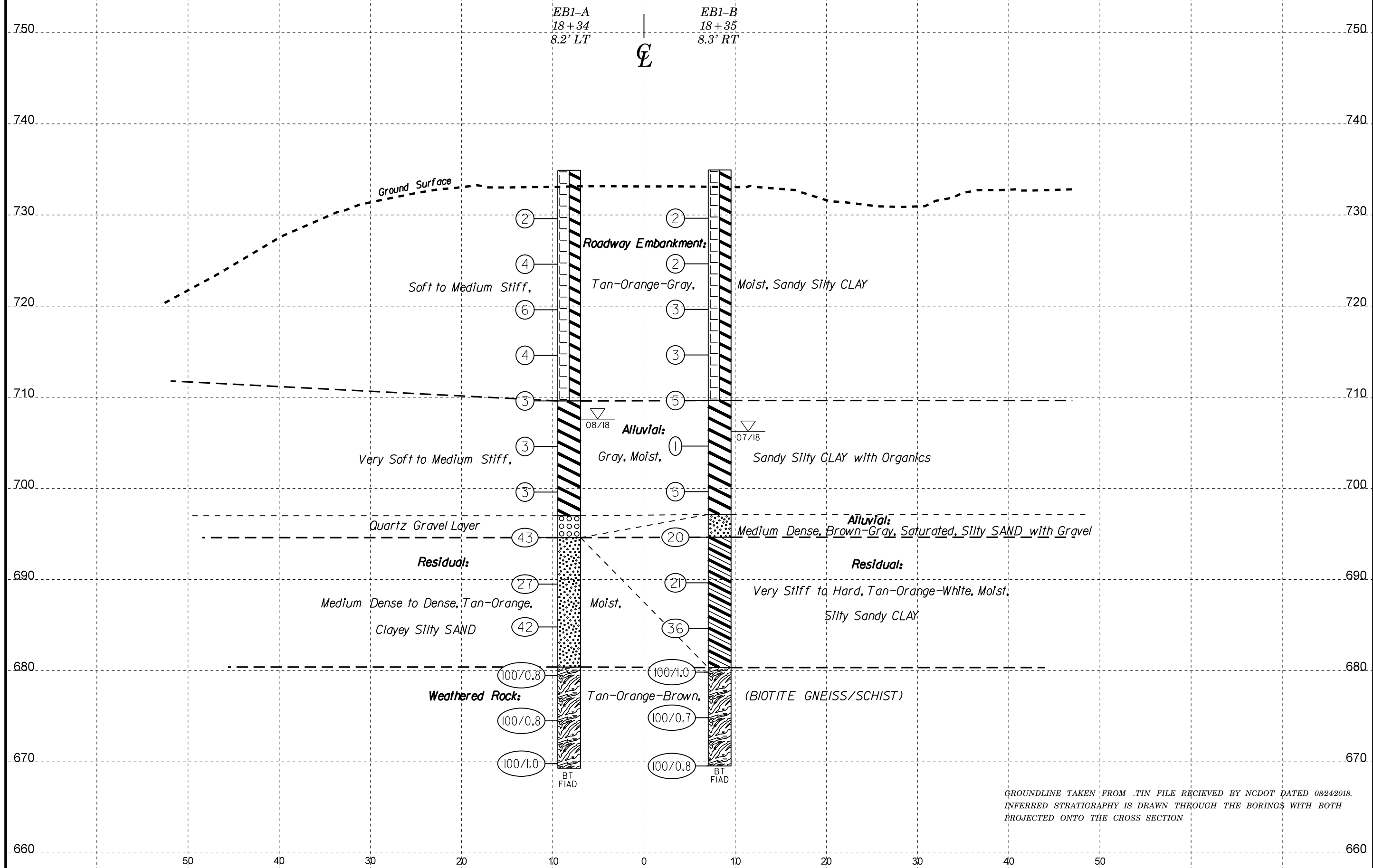
16+00

18+00

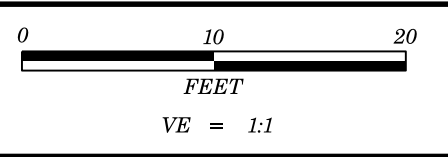
20+00



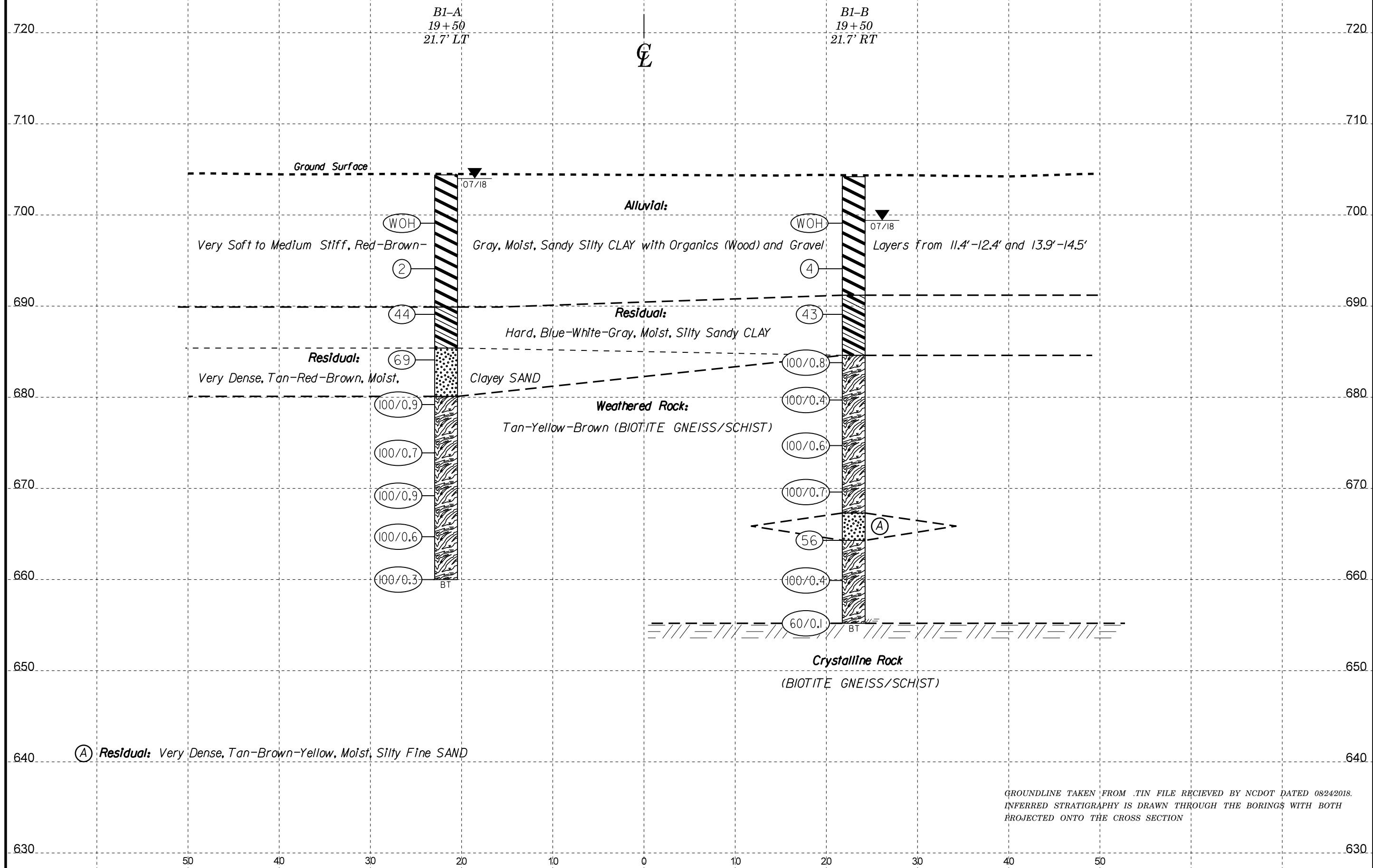
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
B-5389	5
<b>CROSS SECTION THROUGH END BENT 1</b>	
<b>AT -LNB- STATION 18+35.54</b>	
<b>SKEW=90°</b>	



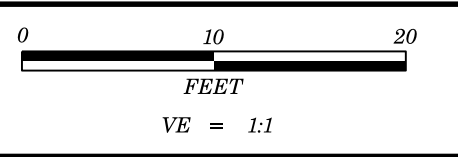
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 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
 PROJECTED ONTO THE CROSS SECTION



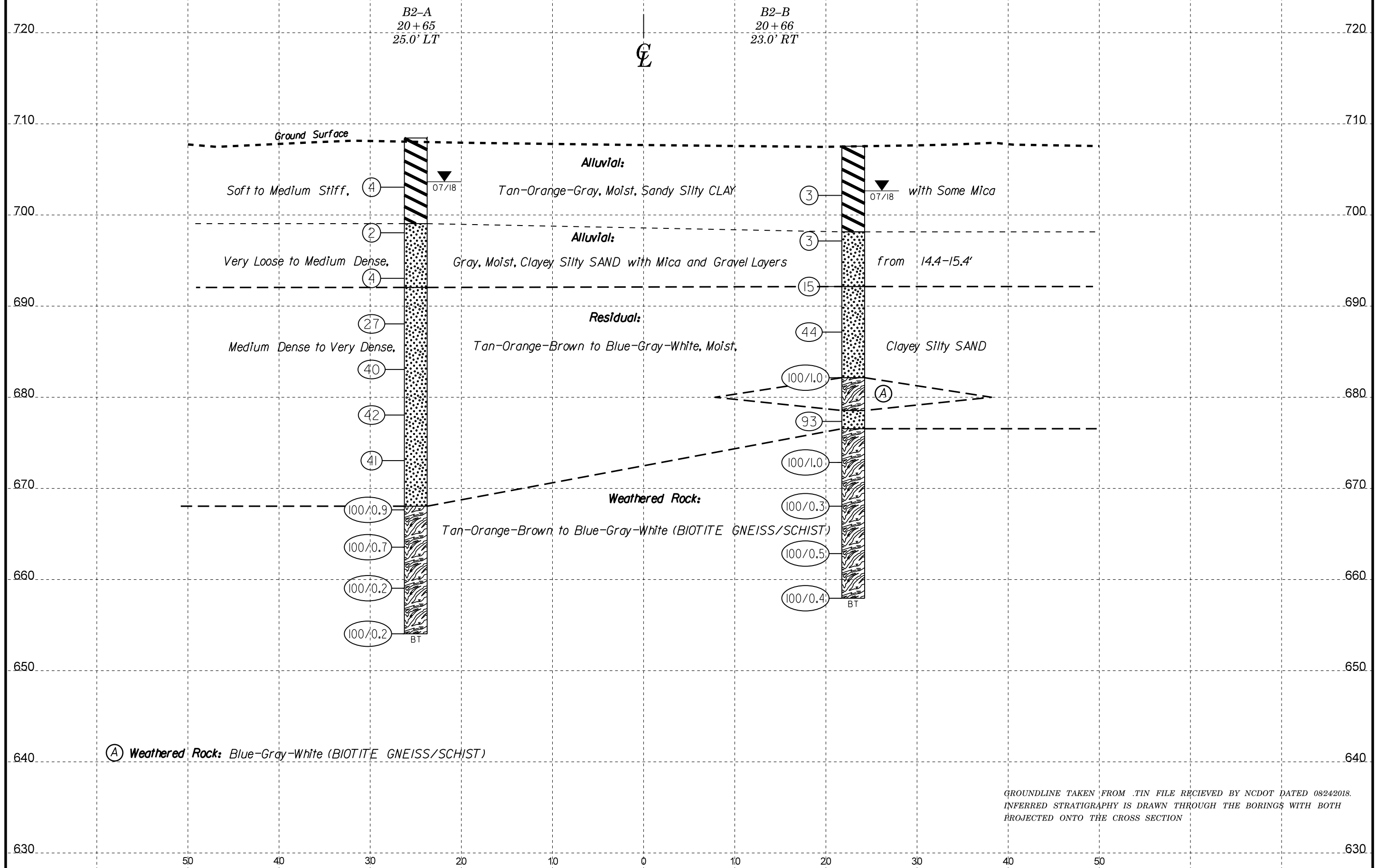
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
B-5389	6
<b>CROSS SECTION THROUGH BENT 1</b>	
AT -LNB- STATION 19+50.53	
SKEW=90°	



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 08/24/2018.  
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
 PROJECTED ONTO THE CROSS SECTION



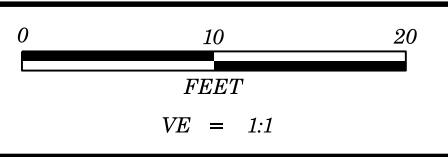
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B-5389	7
<b>CROSS SECTION THROUGH BENT 2</b>	
AT -LNB- STATION 20+65.53	
SKEW=90°	



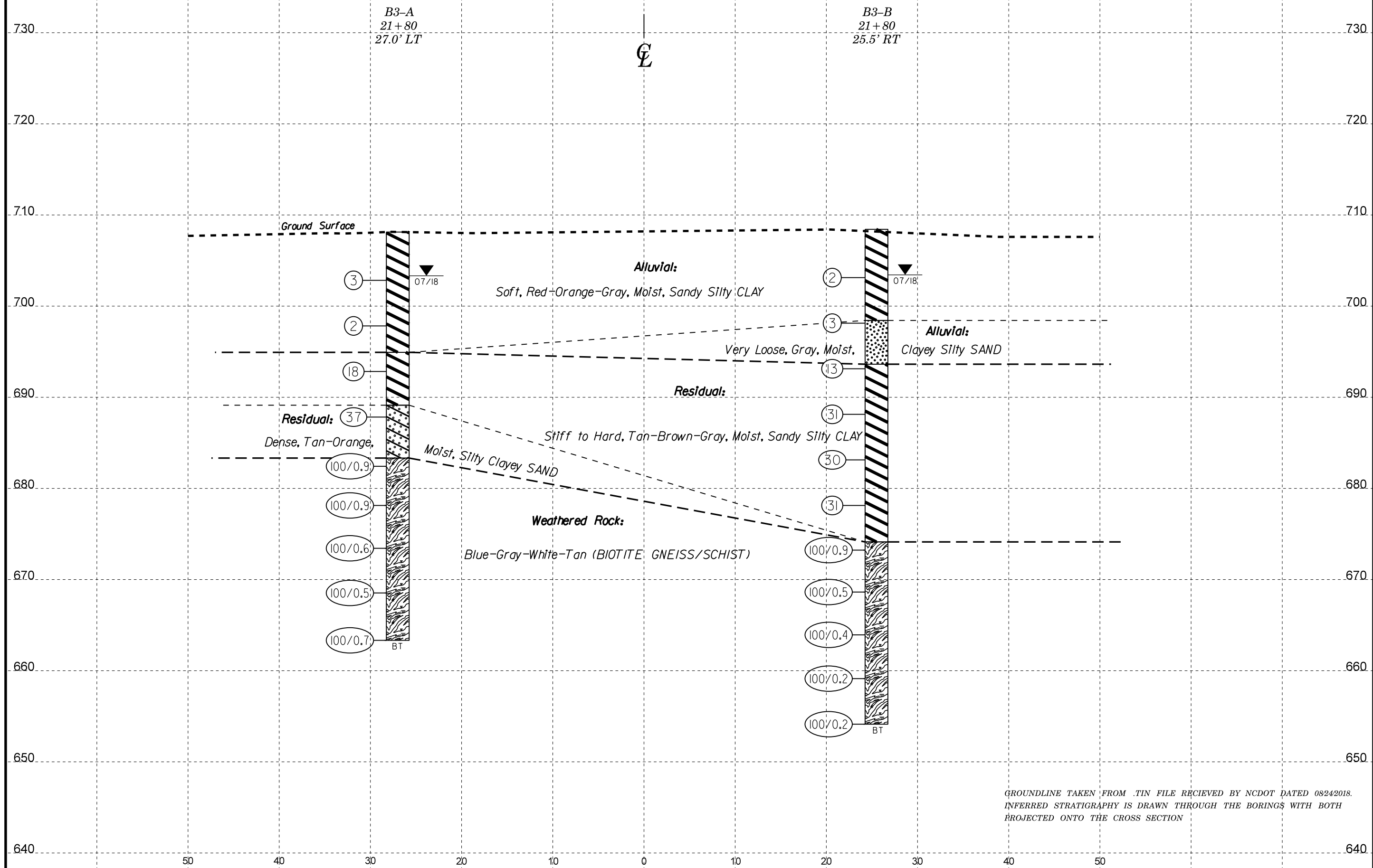
(A) Weathered Rock: Blue-Gray-White (BIOTITE GNEISS/SCHIST)

GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 08/24/2018.  
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
 PROJECTED ONTO THE CROSS SECTION

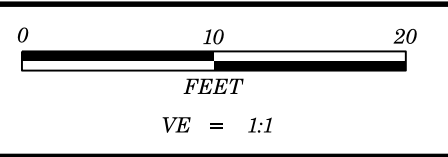




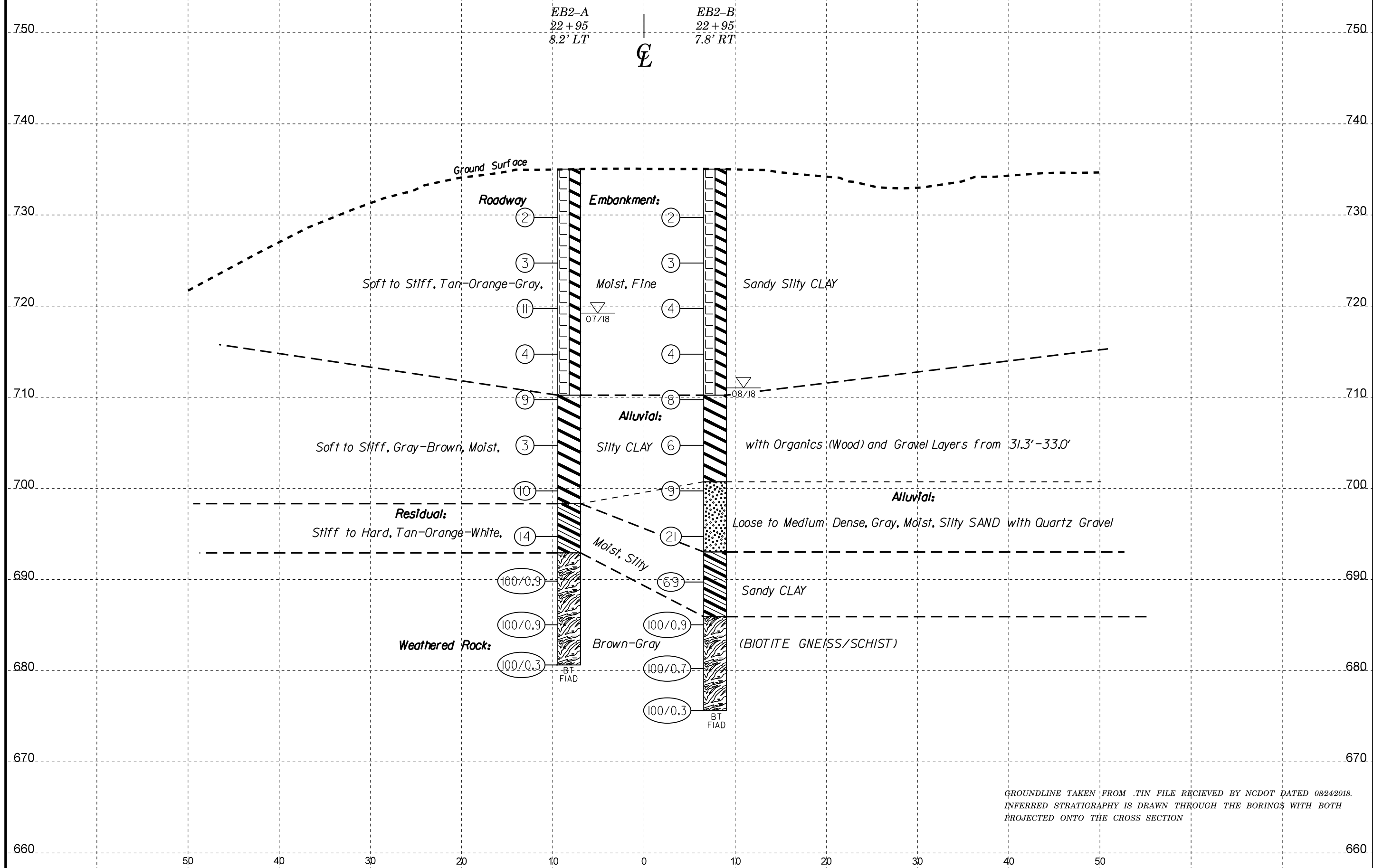
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
B-5389	8
<b>CROSS SECTION THROUGH BENT 3</b>	
AT -LNB- STATION 21+80.53	
SKEW=90°	



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 08/24/2018.  
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
 PROJECTED ONTO THE CROSS SECTION



<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
B-5389	9
<b>CROSS SECTION THROUGH END BENT 2</b>	
AT -LNB- STATION 22+95.53	
SKEW=90°	



GROUNDLINE TAKEN FROM .TIN FILE RECEIVED BY NCDOT DATED 08/24/2018.  
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
 PROJECTED ONTO THE CROSS SECTION

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 46104.1.1		TIP B-5389		COUNTY YADKIN		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 105 over Yadkin River Overflow on US 421							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 18+34		OFFSET 8 ft LT		ALIGNMENT -LNB-										
COLLAR ELEV. 734.9 ft		TOTAL DEPTH 65.6 ft		NORTHING 860,842		EASTING 1,552,037										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 90% 05/23/2017			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 08/07/18		COMP. DATE 08/07/18		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						
735														734.9	GROUND SURFACE	0.0
															ROADWAY EMBANKMENT	
															Tan-Orange-Gray, Sandy Silty CLAY	
730	730.6	4.3														
725	725.6	9.3														
720	720.6	14.3														
715	715.6	19.3														
710	710.6	24.3														
705	705.6	29.3														
700	700.6	34.3														
695	695.6	39.3														
690	690.5	44.4														
685	685.8	49.1														
680	680.8	54.1														
675	675.8	59.1														
670	670.8	64.1														

WBS 46104.1.1		TIP B-5389		COUNTY YADKIN		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 105 over Yadkin River Overflow on US 421							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 18+35		OFFSET 8 ft RT		ALIGNMENT -LNB-										
COLLAR ELEV. 734.9 ft		TOTAL DEPTH 65.4 ft		NORTHING 860,826		EASTING 1,552,032										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 90% 05/23/2017			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 07/26/18		COMP. DATE 07/26/18		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						
735														734.9	GROUND SURFACE	0.0
															ROADWAY EMBANKMENT	
															Tan-Orange-Gray, Sandy Silty CLAY	
730	730.6	4.3														
725	725.6	9.3														
720	720.6	14.3														
715	715.6	19.3														
710	710.6	24.3														
705	705.6	29.3														
700	700.6	34.3														
695	695.6	39.3														
690	690.6	44.3														
685	685.6	49.3														
680	680.8	54.1														
675	675.8	59.1														
670	670.8	64.1														

NCDOT BORE DOUBLE B-5389\_GEO\_BH\_BRDG105.GPJ NC\_DOT\_GDT\_9/6/18

# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 46104.1.1		<b>TIP</b> B-5389		<b>COUNTY</b> YADKIN		<b>GEOLOGIST</b> Stickney, J. K.											
<b>SITE DESCRIPTION</b> Bridge No. 105 over Yadkin River Overflow on US 421							<b>GROUND WTR (ft)</b>										
<b>BORING NO.</b> B1-A		<b>STATION</b> 19+50		<b>OFFSET</b> 22 ft LT		<b>ALIGNMENT</b> -LNB-											
<b>COLLAR ELEV.</b> 704.4 ft		<b>TOTAL DEPTH</b> 44.4 ft		<b>NORTHING</b> 860,817		<b>EASTING</b> 1,552,151											
<b>DRILL RIG/HAMMER EFF./DATE</b> HFC0072 CME-550X 90% 05/23/2017				<b>DRILL METHOD</b> H.S. Augers		<b>HAMMER TYPE</b> Automatic											
<b>DRILLER</b> Smith, C. L.		<b>START DATE</b> 07/17/18		<b>COMP. DATE</b> 07/17/18		<b>SURFACE WATER DEPTH</b> 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							
705															704.4	GROUND SURFACE	0.0
700	700.1	4.3	WOH	WOH	WOH											<b>ALLUVIAL</b> Red-Brown-Gray, Sandy Silty CLAY with Gravel Layer from 13.9'-14.5'	
695	695.1	9.3	WOH	WOH	2												
690	690.1	14.3													689.9	<b>RESIDUAL</b> Blue-Gray, Silty Sandy CLAY	14.5
685	685.1	19.3													685.4	Tan-Red-Brown, Clayey SAND	19.0
680	680.1	24.3													680.1	<b>WEATHERED ROCK</b> Tan-Yellow-Brown	24.3
675	675.1	29.3															
670	670.1	34.3															
665	665.3	39.1															
660	660.3	44.1															
															660.0	Boring Terminated at Elevation 660.0 ft in Weathered Rock	44.4

<b>WBS</b> 46104.1.1		<b>TIP</b> B-5389		<b>COUNTY</b> YADKIN		<b>GEOLOGIST</b> Stickney, J. K.											
<b>SITE DESCRIPTION</b> Bridge No. 105 over Yadkin River Overflow on US 421							<b>GROUND WTR (ft)</b>										
<b>BORING NO.</b> B1-B		<b>STATION</b> 19+50		<b>OFFSET</b> 23 ft RT		<b>ALIGNMENT</b> -LNB-											
<b>COLLAR ELEV.</b> 704.2 ft		<b>TOTAL DEPTH</b> 49.0 ft		<b>NORTHING</b> 860,775		<b>EASTING</b> 1,552,136											
<b>DRILL RIG/HAMMER EFF./DATE</b> HFC0072 CME-550X 90% 05/23/2017				<b>DRILL METHOD</b> H.S. Augers		<b>HAMMER TYPE</b> Automatic											
<b>DRILLER</b> Smith, C. L.		<b>START DATE</b> 07/23/18		<b>COMP. DATE</b> 07/23/18		<b>SURFACE WATER DEPTH</b> 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							
705															704.2	GROUND SURFACE	0.0
700	700.1	4.1	WOH	WOH	WOH											<b>ALLUVIAL</b> Gray, Sandy Silty CLAY with Organics (Wood) and Gravel Layer from 11.4'-12.4'	
695	695.1	9.1	1	1	3												
690	690.1	14.1													689.2	<b>RESIDUAL</b> Blue-Gray-White, Silty Sandy CLAY	13.0
685	685.1	19.1													684.6	<b>WEATHERED ROCK</b> Tan-Yellow-Brown	19.6
680	680.1	24.1															
675	675.3	28.9															
670	670.3	33.9															
665	665.3	38.9															
660	660.3	43.9															
															660.0	Boring Terminated at Elevation 660.0 ft in Weathered Rock	44.4
															655.2	Boring Terminated at Elevation 655.2 ft on Crystalline Rock	49.0

NCDOT BORE DOUBLE B-5389\_GEO\_BH\_BRDG105.GPJ NC\_DOT.GDT 9/6/18

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 46104.1.1		TIP B-5389		COUNTY YADKIN		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 105 over Yadkin River Overflow on US 421							GROUND WTR (ft)									
BORING NO. B2-A		STATION 20+65		OFFSET 25 ft LT		ALIGNMENT -LNB-										
COLLAR ELEV. 708.5 ft		TOTAL DEPTH 54.4 ft		NORTHING 860,783		EASTING 1,552,261										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 90% 05/23/2017			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 07/17/18		COMP. DATE 07/17/18		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						
710														708.5	GROUND SURFACE	0.0
705	704.1	4.4	2	2	2										ALLUVIAL Tan-Orange-Gray, Sandy Silty CLAY with Some Mica	
700	699.1	9.4	1	1	1										Gray, Clayey Silty SAND and Gravel Layer from 14.4'-15.4'	9.4
695	694.1	14.4	4	1	3										RESIDUAL Tan-Orange-Brown, Clayey Silty SAND	16.4
690	689.1	19.4	9	11	16											
685	684.1	24.4	14	18	22											
680	679.1	29.4	13	20	22											
675	674.1	34.4	14	18	23											
670	669.1	39.4	23	27	73/0.4											
665	664.3	44.2	55	45/0.2												
660	659.3	49.2	100/0.2													
655	654.3	54.2	100/0.2													
														654.1	Boring Terminated at Elevation 654.1 ft in Weathered Rock	54.4

WBS 46104.1.1		TIP B-5389		COUNTY YADKIN		GEOLOGIST Stickney, J. K.										
SITE DESCRIPTION Bridge No. 105 over Yadkin River Overflow on US 421							GROUND WTR (ft)									
BORING NO. B2-B		STATION 20+66		OFFSET 23 ft RT		ALIGNMENT -LNB-										
COLLAR ELEV. 707.6 ft		TOTAL DEPTH 49.6 ft		NORTHING 860,737		EASTING 1,552,246										
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 90% 05/23/2017			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER Smith, C. L.		START DATE 07/23/18		COMP. DATE 07/23/18		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						
710														707.6	GROUND SURFACE	0.0
705	703.2	4.4	1	1	2										ALLUVIAL Tan-Orange-Gray, Sandy Silty CLAY	
700	698.2	9.4	1	1	2										Gray, Clayey Silty SAND with Mica and Gravel Layer from 14.4'-15.4'	9.4
695	693.2	14.4	3	6	9										RESIDUAL Blue-Gray-White, Clayey Silty SAND	15.4
690	688.2	19.4	17	22	22											
685	683.2	24.4	14	28	72/0.5											
680	678.4	29.2	27	35	58											
675	673.4	34.2	88	12/0.0												
670	668.4	39.2	100/0.3													
665	663.4	44.2	100/0.5													
660	658.4	49.2	100/0.4													
														658.0	Boring Terminated at Elevation 658.0 ft in Weathered Rock	49.6

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# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 46104.1.1		TIP B-5389		COUNTY YADKIN		GEOLOGIST Stickney, J. K.											
SITE DESCRIPTION Bridge No. 105 over Yadkin River Overflow on US 421							GROUND WTR (ft)										
BORING NO. B3-A		STATION 21+80		OFFSET 27 ft LT		ALIGNMENT -LNB-											
COLLAR ELEV. 708.1 ft		TOTAL DEPTH 44.8 ft		NORTHING 860,747		EASTING 1,552,370											
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 90% 05/23/2017				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Smith, C. L.		START DATE 07/18/18		COMP. DATE 07/18/18		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							
710														708.1	GROUND SURFACE	0.0	
705	703.8	4.3	1	1	2										ALLUVIAL Red-Orange-Gray, Sandy Silty CLAY		
700	698.8	9.3	1	1	1												
695	693.8	14.3	3	7	11										RESIDUAL Tan-Brown-Gray, Sandy Silty CLAY	13.2	
690	688.8	19.3	13	15	22										Tan-Orange, Silty Clayey SAND	19.0	
685	683.8	24.3	16	45	55/0.4												
680	679.0	29.1	25	75/0.4											WEATHERED ROCK Blue-Gray-White	24.8	
675	674.0	34.1	77	23/0.1													
670	669.0	39.1	71	29/0.0													
665	664.0	44.1	34	66/0.2													
																Boring Terminated at Elevation 663.3 ft in Weathered Rock	44.8

WBS 46104.1.1		TIP B-5389		COUNTY YADKIN		GEOLOGIST Stickney, J. K.											
SITE DESCRIPTION Bridge No. 105 over Yadkin River Overflow on US 421							GROUND WTR (ft)										
BORING NO. B3-B		STATION 21+80		OFFSET 26 ft RT		ALIGNMENT -LNB-											
COLLAR ELEV. 708.4 ft		TOTAL DEPTH 54.3 ft		NORTHING 860,697		EASTING 1,552,353											
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 90% 05/23/2017				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Smith, C. L.		START DATE 07/19/18		COMP. DATE 07/19/18		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							
710														708.4	GROUND SURFACE	0.0	
705	704.1	4.3	1	1	1										ALLUVIAL Red-Orange-Gray, Sandy Silty CLAY		
700	699.1	9.3				WOH	WOH	3									
695	694.1	14.3				10	6	7							RESIDUAL Tan-Orange-Gray, Sandy Silty CLAY	14.8	
690	689.1	19.3				7	12	19									
685	684.1	24.3	9	13	17												
680	679.1	29.3	11	11	20												
675	674.1	34.3	41	59/0.4													
670	669.1	39.3	89	11/0.0											WEATHERED ROCK Blue-Gray-Tan	34.3	
665	664.3	44.1															
660	659.3	49.1															
655	654.3	54.1															
																Boring Terminated at Elevation 654.1 ft in Weathered Rock	54.3

NCDOT BORE DOUBLE B-5389\_GEO\_BH\_BRDG105.GPJ NC\_DOT.GDT 9/6/18

# GEOTECHNICAL BORING REPORT

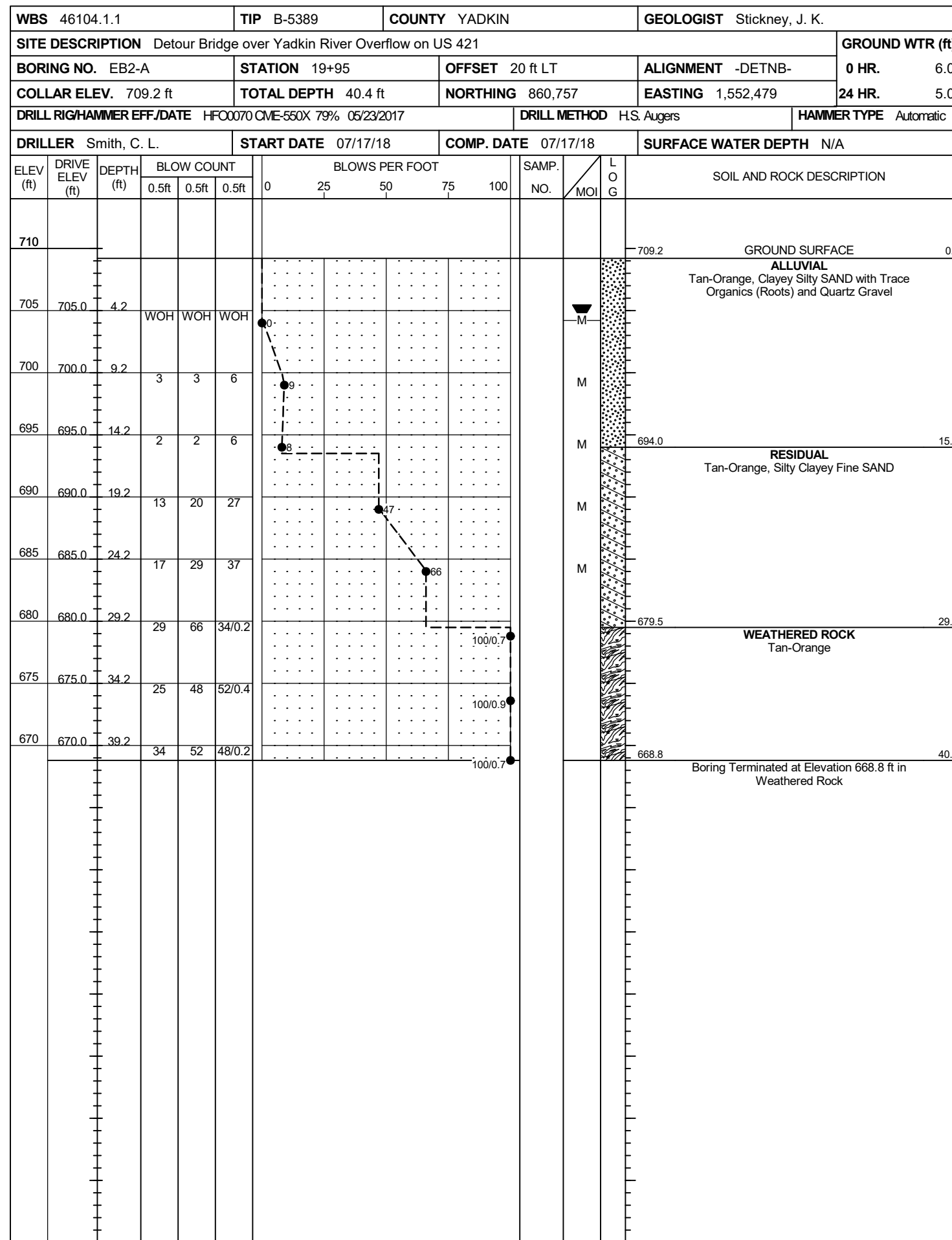
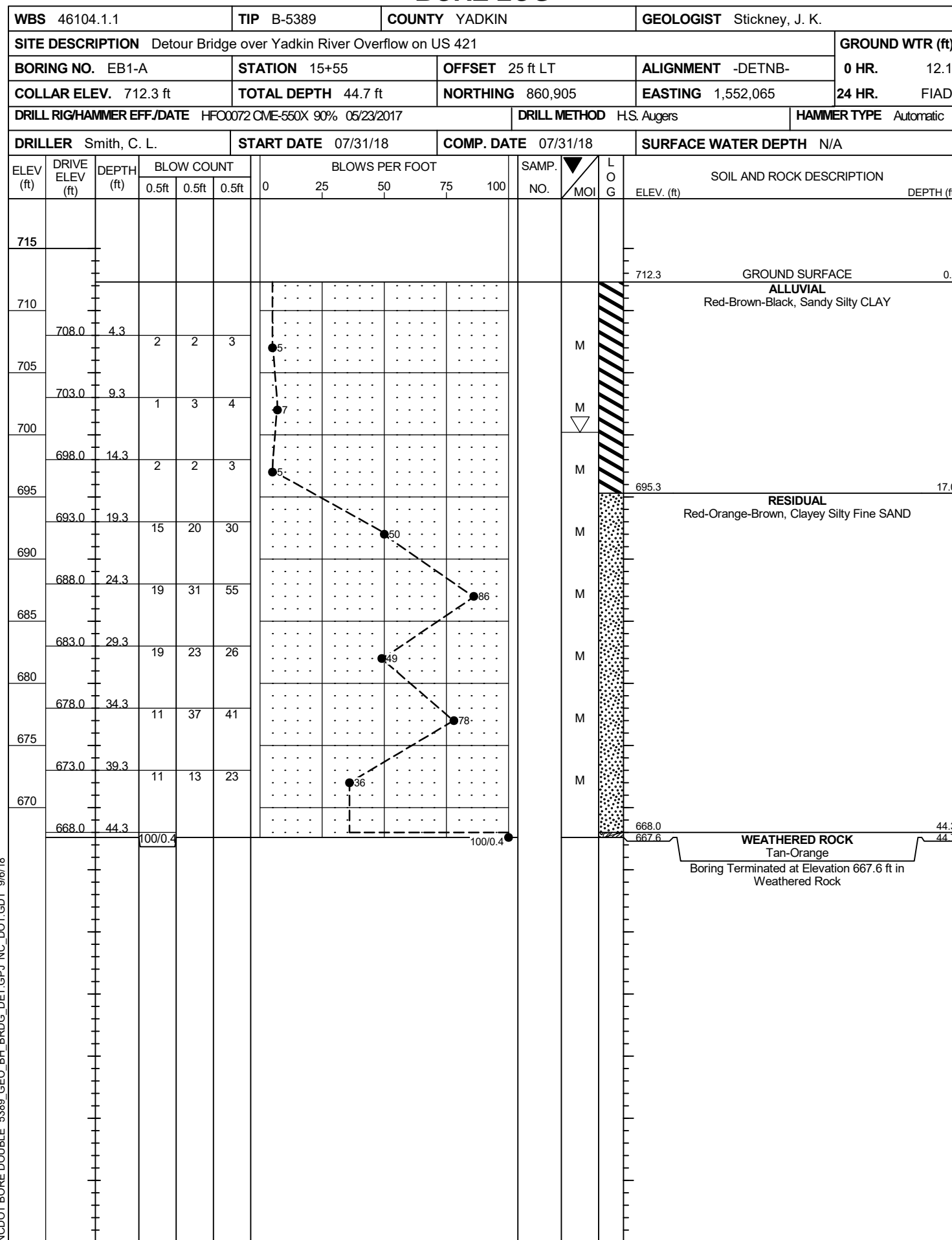
## BORE LOG

WBS 46104.1.1				TIP B-5389				COUNTY YADKIN				GEOLOGIST Stickney, J. K.			
SITE DESCRIPTION Bridge No. 105 over Yadkin River Overflow on US 421										GROUND WTR (ft)					
BORING NO. EB2-A				STATION 22+95				OFFSET 8 ft LT				ALIGNMENT -LNB-			
COLLAR ELEV. 735.0 ft				TOTAL DEPTH 54.4 ft				NORTHING 860,691				EASTING 1,552,473			
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 90% 05/23/2017				DRILL METHOD H.S. Augers				HAMMER TYPE Automatic				0 HR. 15.8			
DRILLER Smith, C. L.				START DATE 07/30/18				COMP. DATE 07/30/18				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					
735													735.0	GROUND SURFACE	0.0
730	730.7	4.3	1	1	1									ROADWAY EMBANKMENT Tan-Red-Orange, Fine Sandy Silty CLAY	
725	725.7	9.3	1	1	2										
720	720.7	14.3	2	4	7										
715	715.7	19.3	1	2	2										
710	710.7	24.3	2	4	5								710.2	ALLUVIAL Gray-Brown, Silty CLAY with Organics (Wood) and Gravel Layer from 31.3'-33.0'	24.8
705	705.7	29.3	1	1	2										
700	700.7	34.3	1	3	7										
695	695.7	39.3	7	7	7								698.3	RESIDUAL Tan-Orange-White, Silty Sandy CLAY	36.7
690	690.7	44.3	26	74/0.4									692.9	WEATHERED ROCK Brown-Gray	42.1
685	685.9	49.1	35	65/0.4									680.6	Boring Terminated at Elevation 680.6 ft in Weathered Rock	54.4
	680.9	54.1													

WBS 46104.1.1				TIP B-5389				COUNTY YADKIN				GEOLOGIST Stickney, J. K.			
SITE DESCRIPTION Bridge No. 105 over Yadkin River Overflow on US 421										GROUND WTR (ft)					
BORING NO. EB2-B				STATION 22+95				OFFSET 8 ft RT				ALIGNMENT -LNB-			
COLLAR ELEV. 735.0 ft				TOTAL DEPTH 59.4 ft				NORTHING 860,676				EASTING 1,552,467			
DRILL RIG/HAMMER EFF./DATE HFC0072 CME-550X 90% 05/23/2017				DRILL METHOD H.S. Augers				HAMMER TYPE Automatic				0 HR. 24.0			
DRILLER Smith, C. L.				START DATE 08/08/18				COMP. DATE 08/08/18				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					
735													735.0	GROUND SURFACE	0.0
730	730.7	4.3	1	1	1									ROADWAY EMBANKMENT Tan-Orange-Gray, Fine Sandy Silty CLAY	
725	725.7	9.3	1	1	2										
720	720.7	14.3	1	2	2										
715	715.7	19.3	1	2	2										
710	710.7	24.3	1	4	4								710.2	ALLUVIAL Gray-Brown, Silty CLAY	24.8
705	705.7	29.3	1	2	4										
700	700.7	34.3	3	4	5								700.7	Gray, Silty SAND with Quartz Gravel	34.3
695	695.7	39.3	5	10	11								693.0	RESIDUAL Tan-Orange-White, Silty Sandy CLAY	42.0
690	690.7	44.3	12	30	39								685.9	WEATHERED ROCK Brown-Gray	49.1
685	685.9	49.1	43	57/0.4									680.6	Boring Terminated at Elevation 680.6 ft in Weathered Rock	54.4
680	680.9	54.1	52	48/0.2											
	675.9	59.1													

NCDOT BORE DOUBLE B-5389\_GEO\_BH\_BRDG105.GPJ\_NC\_DOT\_GDT\_9/6/18

# GEOTECHNICAL BORING REPORT BORE LOG



NCDOT BORE DOUBLE 5389\_GEO\_BH\_BRDG\_DET.GPJ NC\_DOT.GDT 9/6/18



**BRIDGE NO. 105 SITE PHOTOGRAPH**



**Photograph:** Looking at End Bent 1 toward End Bent 2