

REFERENCE: R-2707C

PROJECT: 34497

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CLEVELAND
 PROJECT DESCRIPTION US 74 SHELBY BYPASS FROM
EAST OF NC 226 TO EAST OF NC 150

SITE DESCRIPTION BRIDGE NO. 472 AND BRIDGE NO.
473 ON -L- (US 74) OVER -YIIEV2- (NC 180)
AND -YI3- (CSX RR)

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	PROFILES
6-11	CROSS SECTION(S)
12-29	BORE LOGS, CORE REPORTS, AND ROCK CORE PHOTOS
30	SOIL TEST RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2707C	1	30

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 1919 T07-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

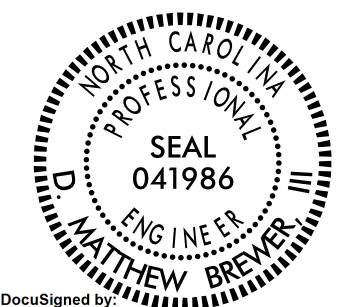
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND 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:
1. 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.
 2. 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.

NCDOT PERSONNEL	ECS PERSONNEL
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INVESTIGATED BY ECS CAROLINAS, LLP
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 CHECKED BY M. WALKO, P.E.
 SUBMITTED BY ECS CAROLINAS, LLP
 DATE AUGUST 2016



DocuSigned by:
D. Matthew Brewer
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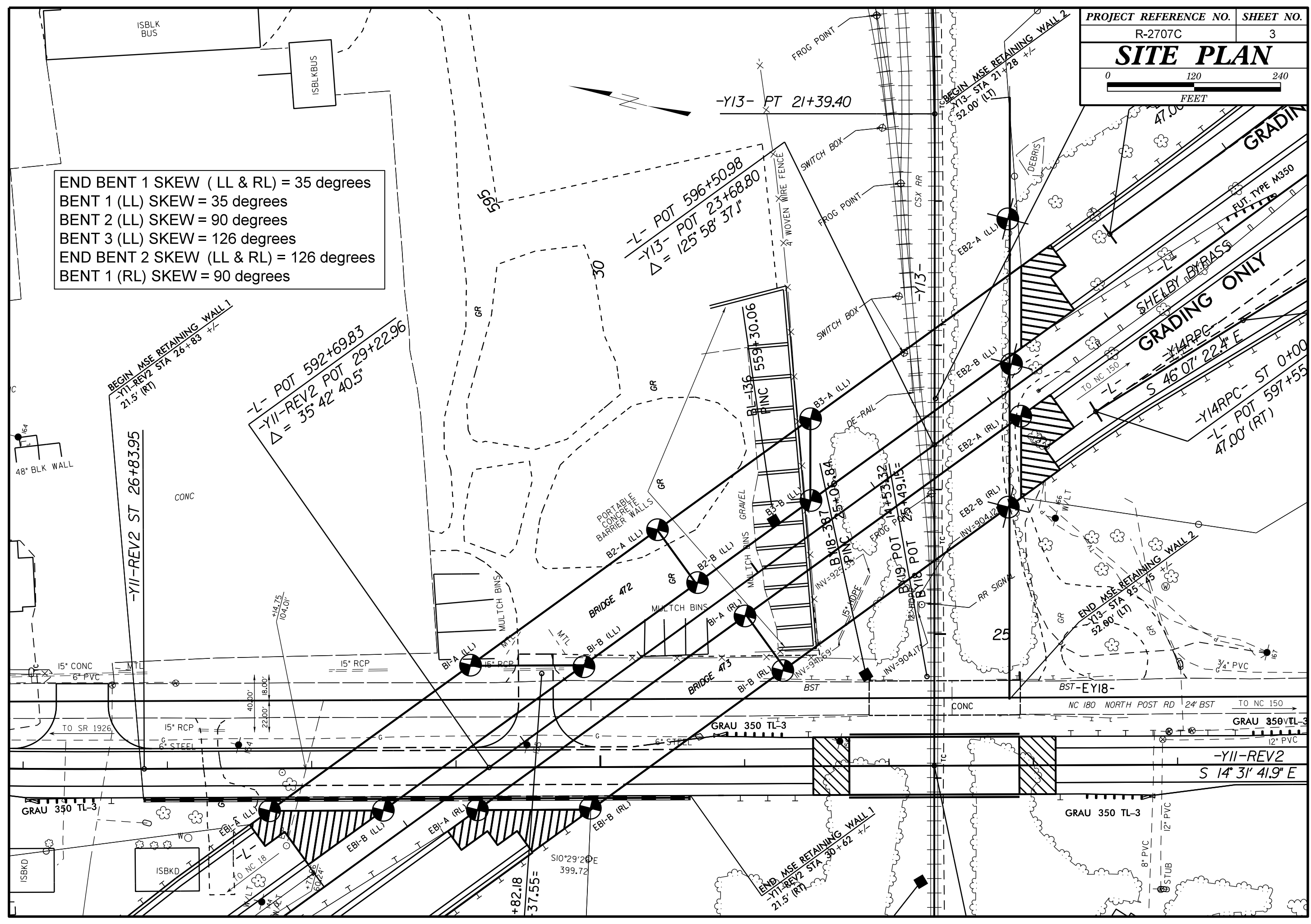
SIGNATURE DATE

**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:										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 DISLOGGED 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 (ROQ) - 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 INTRUDED 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 (N 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 (SROQ) - 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.																													
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.																													
MINERALOGICAL COMPOSITION										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.																			
COMPRESSION										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																													
PERCENTAGE OF MATERIAL										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.																			
GROUND WATER										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.																			
MISCELLANEOUS SYMBOLS										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. IF TESTED, WOULD YIELD SPT REFUSAL										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. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF																			
RECOMMENDATION SYMBOLS										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. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF										VERY SOFT										CAN BE GROVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																			
ABBREVIATIONS										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.										ROCK HARDNESS										VERY HARD										CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.									
TEXTURE OR GRAIN SIZE										HARD										CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.										MODERATELY HARD										CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.																			
SOIL MOISTURE - CORRELATION OF TERMS										MEDIUM HARD										CAN BE GROVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.										SOFT										CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																			
PLASTICITY										VERY SOFT										CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.										FRACTURE SPACING										BEDDING																			
COLOR										EQUIPMENT USED ON SUBJECT PROJECT										VERY WIDE										MORE THAN 10 FEET										VERY THICKLY BEDDED										4 FEET									
NOTES:										DRILL UNITS:										WIDE										3 TO 10 FEET										THICKLY BEDDED										1.5 - 4 FEET									
DRILL UNITS:										ADVANCING TOOLS:										MODERATELY CLOSE										1 TO 3 FEET										THINLY BEDDED										0.16 - 1.5 FEET									
ADVANCING TOOLS:										HAMMER TYPE:										CLOSE										0.16 TO 1 FOOT										VERY THINLY BEDDED										0.03 - 0.16 FEET									
HAMMER TYPE:										CORE SIZE:										VERY CLOSE										LESS THAN 0.16 FEET										THICKLY LAMINATED										0.008 - 0.03 FEET									
CORE SIZE:										HAND TOOLS:										EXTREMELY CLOSE										SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.										INDURATION										INDURATION									
HAND TOOLS:										INDURATION										INDURATED										GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.										INDURATED										GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.									
INDURATION										EXTREMELY INDURATED										SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.										INDURATED										GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.																			
EXTREMELY INDURATED										SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.										INDURATED										GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.										EXTREMELY INDURATED										SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.									

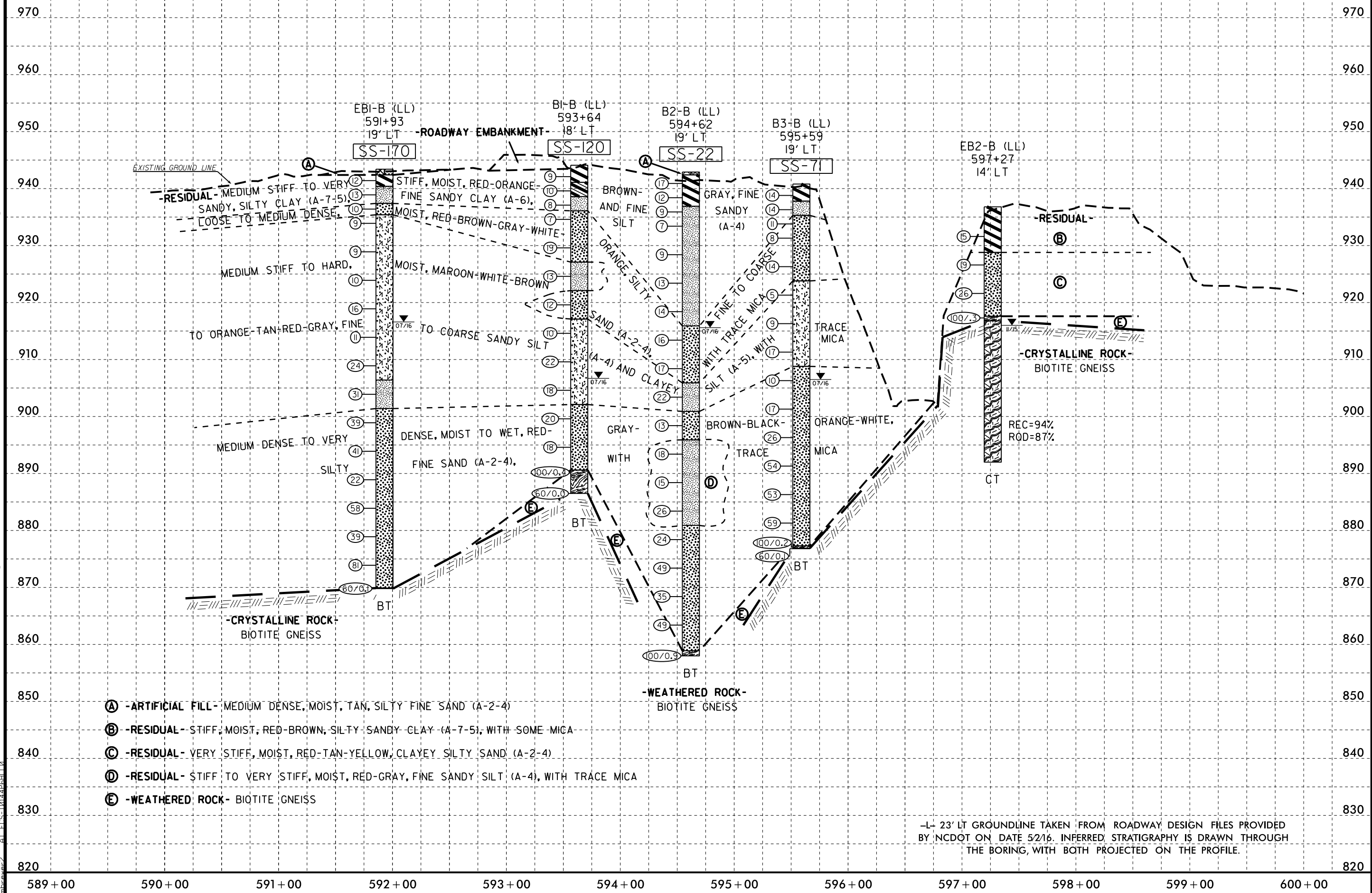
END BENT 1 SKEW (LL & RL) = 35 degrees
 BENT 1 (LL) SKEW = 35 degrees
 BENT 2 (LL) SKEW = 90 degrees
 BENT 3 (LL) SKEW = 126 degrees
 END BENT 2 SKEW (LL & RL) = 126 degrees
 BENT 1 (RL) SKEW = 90 degrees



5/14/99
 K:\AUG-2016\1537-PROJ\11000-11999\11700\11717 - R-2707C - Site 6 Dual Bridges US74 over NC180\CADD\GEO\TECH\Site\SS&Sub\AR2707C_GEO_BRD04728BRD0473_PFI.LL.dgn
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 AT: FCS-104428110

-L- (SHELBY BYPASS)

PROJECT REFERENCE NO. R-2707C	SHEET NO. 4
PROFILE BORINGS PROJECTED 23' LT OF -L- ALONG GRADELINE OF BRIDGE 472 (LL)	
VE=5:1	

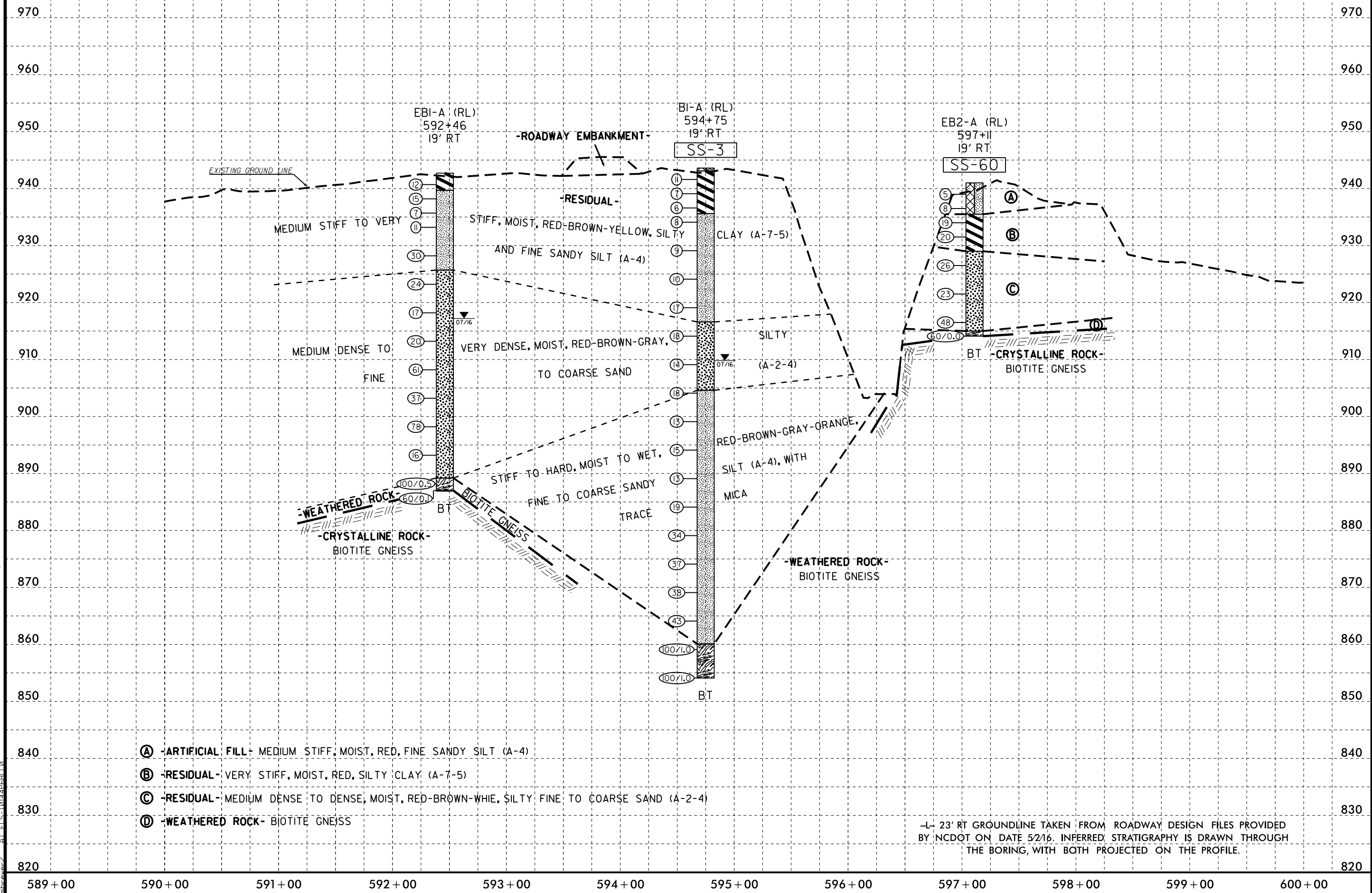


-L- 23' LT GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 5/2/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

5/14/99
 I:\AUG-2016\1537-PROJ\PROJECTS\11000-11999\11700\11717 - R-2707C - Site 6 Dual Bridges US74 over NC180\CADD\GEO\TECH\Site&Sub\AR2707C_GEO_BRD0472&BRD60473_PFI.L1.dgn
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 5/14/99

-L- (SHELBY BYPASS)

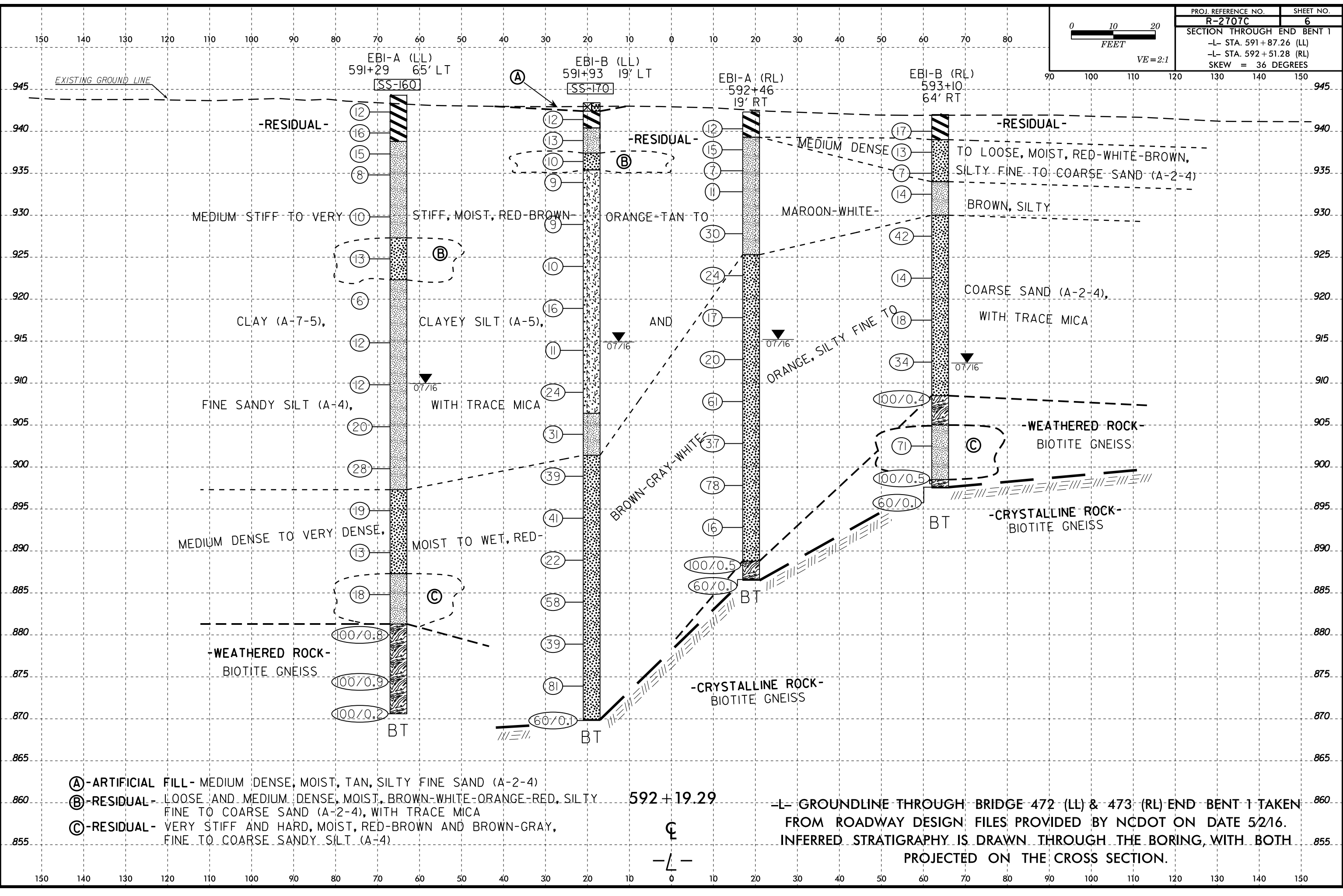
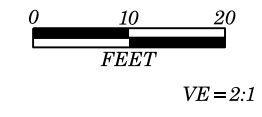
PROJECT REFERENCE NO.	SHEET NO.
R-2707C	5
PROFILE BORINGS PROJECTED 23' RT OF -L- ALONG GRADELINE OF BRIDGE 473 (RL)	
VE=5:1	



-L- 23' RT GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 5/2/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

8/23/99
 12-AUG-2016 15:40
 I:\2016\CH-02-PRG\JCS\1000\1999\11700\11717 - R-2707C - Site 6 Dual Bridges US74 over NC180\CADD\GEO\TECH\Site\Sub\1\2707C_Geo_BRD00472&BRD00473_xsi.dgn
 10/10/16 10:10:16 AM
 User: jcs

PROJ. REFERENCE NO.	SHEET NO.
R-2707C	6
SECTION THROUGH END BENT 1	
-L- STA. 591+87.26 (LL)	
-L- STA. 592+51.28 (RL)	
SKEW = 36 DEGREES	

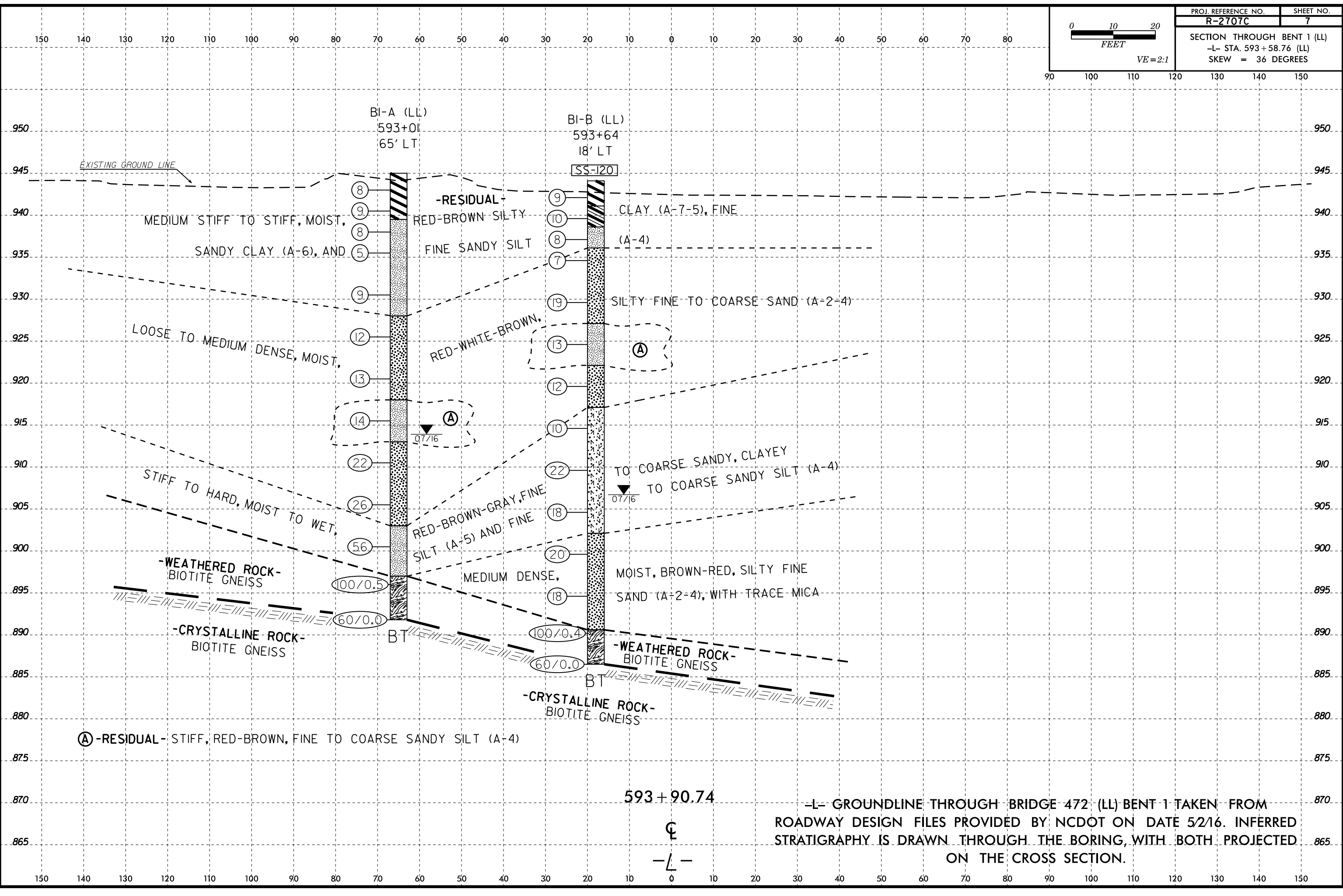


- (A) -ARTIFICIAL FILL - MEDIUM DENSE, MOIST, TAN, SILTY FINE SAND (A-2-4)
 - (B) -RESIDUAL - LOOSE AND MEDIUM DENSE, MOIST, BROWN-WHITE-ORANGE-RED, SILTY FINE TO COARSE SAND (A-2-4), WITH TRACE MICA
 - (C) -RESIDUAL - VERY STIFF AND HARD, MOIST, RED-BROWN AND BROWN-GRAY, FINE TO COARSE SANDY SILT (A-4)
- 592 + 19.29
- L- GROUNDLINE THROUGH BRIDGE 472 (LL) & 473 (RL) END BENT 1 TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 5/2/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

8/23/99
12-AUG-2016 15:17
I:\2016\1517-PROJ\CH-02-EGS-10-14\BIBL6
12-AUG-2016 15:17
I:\2016\1517-PROJ\CH-02-EGS-10-14\BIBL6
Site 6 Dual Bridges US74 over NC180\CADD\GEOTECH\Site\Sub\A\2707C_Geo_BRD00472&BRD00473_xsi.dgn

PROJ. REFERENCE NO.	SHEET NO.
R-2707C	7
SECTION THROUGH BENT 1 (LL)	
-L- STA. 593+58.76 (LL)	
SKEW = 36 DEGREES	

0 10 20
FEET
VE=2:1



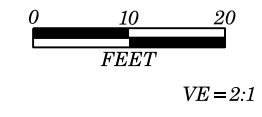
Ⓐ -RESIDUAL- STIFF, RED-BROWN, FINE TO COARSE SANDY SILT (A-4)

593 + 90.74

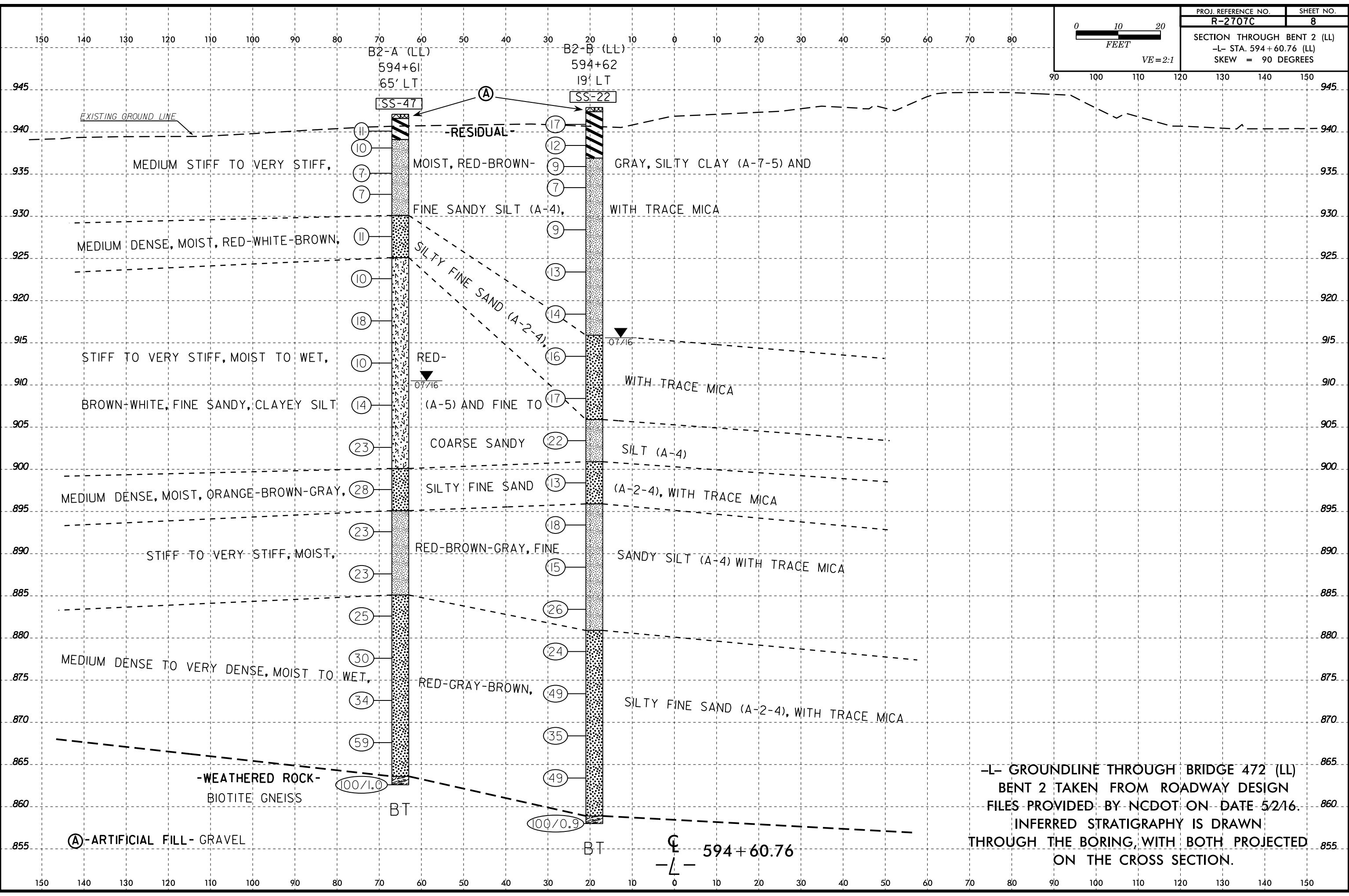
-L- GROUNDLINE THROUGH BRIDGE 472 (LL) BENT 1 TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 5/2/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

8/23/99
 12-AUG-2016 15:16
 I:\26015\CH\02_PRC\JCS\1000\1999\11700\11717 - R-2707C - Site 6 Dual Bridges US74 over NC180\CADD\GEOTECH\Site&Sub\R2707C.Geo.BRD00472&BRD00473.xs.dgn
 11/17/2000
 AT EGS-10-4-4-11-16

PROJ. REFERENCE NO.	SHEET NO.
R-2707C	8



SECTION THROUGH BENT 2 (LL)
 -L- STA. 594+60.76 (LL)
 SKEW = 90 DEGREES



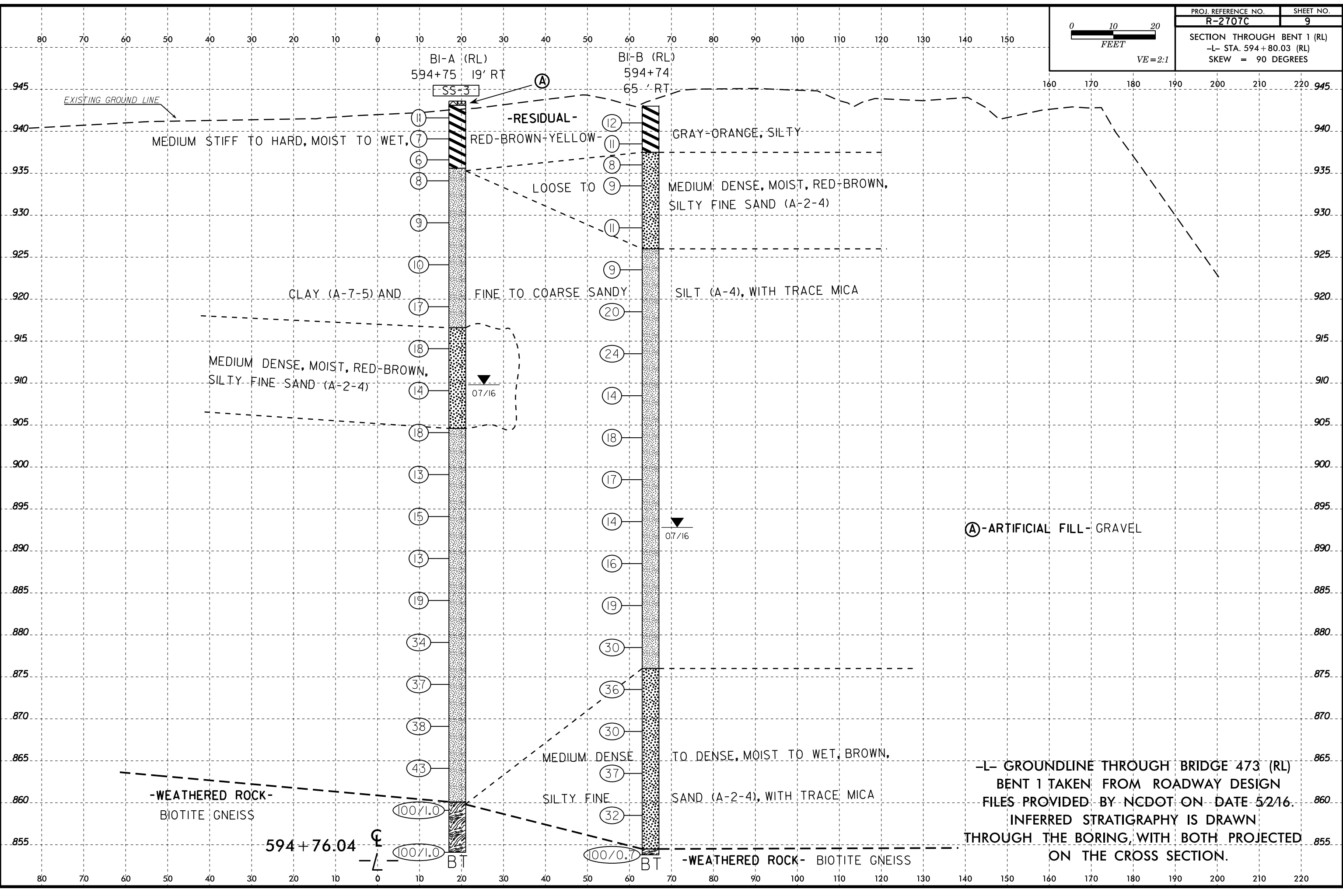
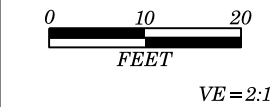
-L- GROUNDLINE THROUGH BRIDGE 472 (LL)
 BENT 2 TAKEN FROM ROADWAY DESIGN
 FILES PROVIDED BY NCDOT ON DATE 5/21/16.
 INFERRED STRATIGRAPHY IS DRAWN
 THROUGH THE BORING, WITH BOTH PROJECTED
 ON THE CROSS SECTION.

Ⓐ - ARTIFICIAL FILL - GRAVEL

8/23/99

I:\2016\1517 - AUG 2016 1517 - PROJ FILES\1000\1999\11700\11717 - R-2707C - Site 6 Dual Bridges US74 over NC180\CADD_GEO\TECH\Site\Sub\R2707C_Geo_BRD00472&BRD00473_xsi.dgn

PROJ. REFERENCE NO.	SHEET NO.
R-2707C	9
SECTION THROUGH BENT 1 (RL)	
-L- STA. 594+80.03 (RL)	
SKEW = 90 DEGREES	



BI-A (RL)
594+75 19' RT

BI-B (RL)
594+74
65' RT

EXISTING GROUND LINE

MEDIUM STIFF TO HARD, MOIST TO WET,

-RESIDUAL-
RED-BROWN-YELLOW

GRAY-ORANGE, SILTY

LOOSE TO

MEDIUM DENSE, MOIST, RED-BROWN,
SILTY FINE SAND (A-2-4)

CLAY (A-7-5) AND

FINE TO COARSE SANDY

SILT (A-4), WITH TRACE MICA

MEDIUM DENSE, MOIST, RED-BROWN,
SILTY FINE SAND (A-2-4)

0.7/16

0.7/16

Ⓐ - ARTIFICIAL FILL - GRAVEL

-WEATHERED ROCK-
BIOTITE GNEISS

594+76.04

Ⓒ

100%/1.0

100%/0.7

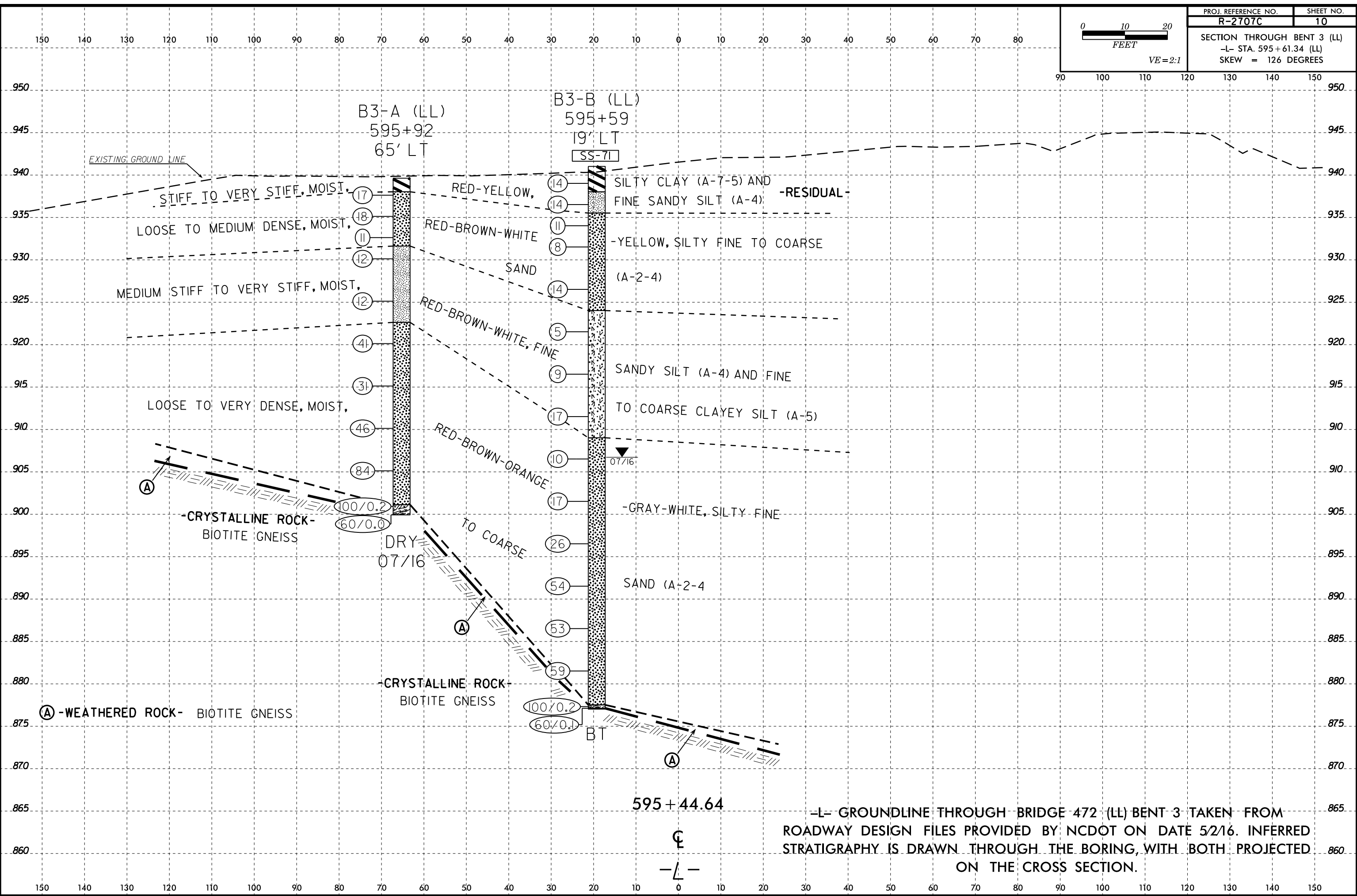
-WEATHERED ROCK- BIOTITE GNEISS

-L- GROUNDLINE THROUGH BRIDGE 473 (RL)
BENT 1 TAKEN FROM ROADWAY DESIGN
FILES PROVIDED BY NCDOT ON DATE 5/2/16.
INFERRED STRATIGRAPHY IS DRAWN
THROUGH THE BORING WITH BOTH PROJECTED
ON THE CROSS SECTION.

8/23/99
12-AUG-2016 15:46
I:\2601\CH-VZ-PROJ\10000\1999\11700\11717 - R-2707C - Site 6 Dual Bridges US74 over NC180\CADD\GEO\TECH\Site&Sub\R2707C.Geo.BRD00472&BRD00473.xsxdgn

PROJ. REFERENCE NO.	SHEET NO.
R-2707C	10
SECTION THROUGH BENT 3 (LL)	
-L- STA. 595+61.34 (LL)	
SKEW = 126 DEGREES	

0 10 20
FEET
VE=2:1



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST M. Brewer										
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. EB1-B (LL)		STATION 591+93		OFFSET 19 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 943.4 ft		TOTAL DEPTH 73.6 ft		NORTHING 579,674		EASTING 1,255,818										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Messick		START DATE 07/14/16		COMP. DATE 07/14/16		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						
945																
	942.4	1.0	4	5	7	12									943.4	0.0
															942.4	1.0
940	939.9	3.5	6	6	7	13									940.4	3.0
															937.4	6.0
	937.4	6.0	4	4	6	10									935.4	8.0
935	934.9	8.5	2	4	5	9										
930	929.9	13.5	4	3	6	9										
925	924.9	18.5	4	4	6	10										
920	919.9	23.5	3	6	10	16										
915	914.9	28.5	4	4	7	11										
910	909.9	33.5	14	12	12	24										
905	904.9	38.5	7	13	18	31										
900	899.9	43.5	39	17	22	39										
895	894.9	48.5	9	14	27	41										
890	889.9	53.5	10	7	15	22										
885	884.9	58.5	12	22	36	58										
880	879.9	63.5	12	14	25	39										
875	874.9	68.5	32	41	40	81										
870	869.9	73.5	60/0.1			60/0.1									869.9	73.5
															869.8	73.6

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST M. Brewer										
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. EB1-B (LL)		STATION 591+93		OFFSET 19 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 943.4 ft		TOTAL DEPTH 73.6 ft		NORTHING 579,674		EASTING 1,255,818										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Messick		START DATE 07/14/16		COMP. DATE 07/14/16		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						
865																

NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ NC_DOT.GDT 8/12/16

SS-170 37%

CRYSTALLINE ROCK
(BIOTITE GNEISS)
Boring Terminated with Standard
Penetration Test Refusal at Elevation 869.8

Match Line

ft In Crystalline Rock (BIOTITE GNEISS)

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. B1-A (LL)		STATION 593+01		OFFSET 65 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 945.0 ft		TOTAL DEPTH 53.2 ft		NORTHING 579,640		EASTING 1,255,930										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Messick		START DATE 07/14/16		COMP. DATE 07/14/16		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						
945														945.0	GROUND SURFACE	0.0
	944.0	1.0	4	4	4										RESIDUAL Medium Stiff to Stiff, Red, Silty CLAY (A-7-5)	
	941.5	3.5	4	4	5											
940	939.0	6.0	2	4	4									939.5	Medium Stiff to Stiff, Red-Brown, Fine Sandy SILT (A-4)	5.9
	936.5	8.5	2	3	2											
935	931.5	13.5	4	4	5											
	926.5	18.5	5	6	6									928.0	Medium Dense, Red-Brown, Silty Fine SAND (A-2-4)	17.0
925	921.5	23.5	5	7	6											
	916.5	28.5	5	6	8									918.0	Stiff, Red-Brown, Fine Sandy SILT (A-4)	27.0
915	911.5	33.5	11	9	13									913.0	Medium Dense, Red-Brown, Silty Fine to Coarse SAND (A-2-4)	32.0
	906.5	38.5	8	11	15											
905	901.5	43.5	5	31	25									903.0	Hard, Brown-Gray, Fine to Coarse Sandy SILT (A-4), with trace gravel-sized rock fragments	42.0
	896.5	48.5	75	25/0.0										897.0	WEATHERED ROCK Gray (BIOTITE GNEISS)	48.0
895	891.8	53.2	60/0.0											891.8	Boring Terminated with Standard Penetration Test Refusal at Elevation 891.8 ft On Crystalline Rock (BIOTITE GNEISS)	53.2
															1) Approximately 0.3 ft. of topsoil was encountered at the ground surface.	

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. B1-B (LL)		STATION 593+64		OFFSET 18 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 944.1 ft		TOTAL DEPTH 57.6 ft		NORTHING 579,564		EASTING 1,255,948										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Messick		START DATE 07/13/16		COMP. DATE 07/13/16		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						
945														944.1	GROUND SURFACE	0.0
	943.1	1.0	3	4	5										RESIDUAL Stiff, Red, Fine Sandy, Silty CLAY (A-7-5)	
	940.6	3.5	5	5	5									941.1	Stiff, Red-Brown, Fine Sandy CLAY (A-6)	3.0
940	938.1	6.0	3	3	5									938.6	Medium Stiff, Red-Brown, Fine Sandy SILT (A-4)	5.5
	935.6	8.5	4	3	4									936.1	Loose to Medium Dense, Red-White-Brown, Silty Fine to Coarse SAND (A-2-4)	8.0
935	930.6	13.5	5	10	9											
	925.6	18.5	3	5	8									927.1	Stiff, Red-Brown, Fine to Coarse Sandy SILT (A-4)	17.0
925	920.6	23.5	7	4	8									922.1	Medium Dense, Red-Brown, Silty Fine to Coarse SAND (A-2-4)	22.0
	915.6	28.5	6	5	5									917.1	Stiff to Very Stiff, Red-Brown-Gray, Fine to Coarse Sandy, Clayey SILT (A-5(1))	27.0
915	910.6	33.5	6	9	13											
	905.6	38.5	7	8	10											
905	900.6	43.5	6	8	12									902.1	Medium Dense, Brown-Red, Silty Fine SAND (A-2-4), with trace mica	42.0
	895.6	48.5	10	8	10											
895	890.6	53.5	60/0.4											890.6	WEATHERED ROCK (BIOTITE GNEISS)	53.5
	886.5	57.6	60/0.0											886.5	Boring Terminated with Standard Penetration Test Refusal at Elevation 886.5 ft On Crystalline Rock (BIOTITE GNEISS)	57.6
															1) Approximately 0.3 ft. of topsoil was encountered at the ground surface.	

NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ NC_DOT.GDT 8/12/16

GEOTECHNICAL BORING REPORT BORE LOG

WBS 34497.1.2	TIP R-2707C	COUNTY CLEVELAND	GEOLOGIST C. Bukovitz
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)			GROUND WTR (ft)
BORING NO. B2-A (LL)	STATION 594+61	OFFSET 65 ft LT	ALIGNMENT -L- 0 HR. 17.7
COLLAR ELEV. 942.1 ft	TOTAL DEPTH 79.5 ft	NORTHING 579,538	EASTING 1,256,053 24 HR. 31.6
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER M. Ireland	START DATE 07/08/16	COMP. DATE 07/08/16	SURFACE WATER DEPTH N/A

WBS 34497.1.2	TIP R-2707C	COUNTY CLEVELAND	GEOLOGIST C. Bukovitz
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)			GROUND WTR (ft)
BORING NO. B2-A (LL)	STATION 594+61	OFFSET 65 ft LT	ALIGNMENT -L- 0 HR. 17.7
COLLAR ELEV. 942.1 ft	TOTAL DEPTH 79.5 ft	NORTHING 579,538	EASTING 1,256,053 24 HR. 31.6
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER M. Ireland	START DATE 07/08/16	COMP. DATE 07/08/16	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
945														GROUND SURFACE	0.0	
940	941.1	1.0	4	5	6									ARTIFICIAL FILL Gravel (0.5 feet)	0.9	
	939.1	3.0	3	4	6									RESIDUAL Stiff, Red, Fine Sandy, Silty CLAY (A-7-5)	3.0	
	936.1	6.0	3	3	4									Stiff to Medium Stiff, Red-Brown, Fine Sandy SILT (A-4), with trace mica		
935	933.6	8.5	3	3	4											
	928.6	13.5	9	5	6									Medium Dense, Red-Brown, Silty Fine SAND (A-2-4), with trace mica	12.0	
930	923.6	18.5	3	4	6									Stiff to Very Stiff, Red-Brown, Fine Sandy, Clayey SILT (A-5(5)), with trace mica	17.0	
925	918.6	23.5	5	8	10											
920	913.6	28.5	4	5	5											
915	908.6	33.5	4	6	8											
910	903.6	38.5	8	11	12											
905	898.6	43.5	10	12	16									Medium Dense, Orange-Brown, Silty Fine SAND (A-2-4)	42.0	
900	893.6	48.5	9	10	13									Very Stiff, Red-Brown, Fine Sandy SILT (A-4), with trace mica	47.0	
895	888.6	53.5	7	10	13											
890	883.6	58.5	7	10	15									Medium Dense to Very Dense, Brown, Silty Fine SAND (A-2-4), with trace mica	57.0	
885	878.6	63.5	9	13	17											
880	873.6	68.5	11	15	19											
875	868.6	73.5	11	22	37											
870																
865																

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
865														Match Line		
	863.6	78.5	31	69	0.5										78.5	
																79.5
														WEATHERED ROCK Gray-Brown (BIOTITE GNEISS)		
														Boring Terminated at Elevation 862.6 ft in Weathered Rock (BIOTITE GNEISS)		

NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ NC_DOT.GDT 8/12/16

GEOTECHNICAL BORING REPORT BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. B2-B (LL)		STATION 594+62		OFFSET 19 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 942.9 ft		TOTAL DEPTH 84.9 ft		NORTHING 579,502		EASTING 1,256,024										
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER M. Ireland		START DATE 07/07/16		COMP. DATE 07/07/16		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)	
945																
940	941.9	1.0	5	8	9								M			GROUND SURFACE ARTIFICIAL FILL Gravel (0.5 feet)
	939.4	3.5	5	5	7								SS-22 28%			RESIDUAL Very Stiff to Stiff, Red, Silty CLAY (A-7-5(24))
935	936.9	6.0	3	4	5								M			936.9 Medium Stiff to Stiff, Red-Brown-Gray, Fine Sandy SILT (A-4)
	934.4	8.5	3	3	4								M			
930	929.4	13.5	4	5	4								M			
	924.4	18.5	4	6	7								M			
925	919.4	23.5	5	7	7								M			
	914.4	28.5	5	8	8								M			915.9 Medium Dense, Red-White-Brown, Silty Fine SAND (A-2-4)
915	909.4	33.5	8	9	8								M			
	904.4	38.5	5	10	12								M			905.9 Very Stiff, Brown-White, Fine to Coarse Sandy SILT (A-4)
910	899.4	43.5	4	5	8								M			900.9 Medium Dense, Brown-Gray, Silty Fine SAND (A-2-4), with trace mica
	894.4	48.5	5	7	11								M			895.9 Stiff to Very Stiff, Red-Gray, Fine Sandy SILT (A-4), with trace mica
905	889.4	53.5	4	6	9								M			
	884.4	58.5	8	10	16								M			
900	879.4	63.5	5	11	13								M			880.9 Medium Dense to Dense, Red-Gray-Brown, Silty Fine SAND (A-2-4), with trace mica
	874.4	68.5	13	21	28								M			
895	869.4	73.5	8	14	21								M			
													M			

NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ_NC_DOT.GDT 8/12/16

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. B2-B (LL)		STATION 594+62		OFFSET 19 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 942.9 ft		TOTAL DEPTH 84.9 ft		NORTHING 579,502		EASTING 1,256,024										
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER M. Ireland		START DATE 07/07/16		COMP. DATE 07/07/16		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)	
865	864.4	78.5	13	19	30								M			Medium Dense to Dense, Red-Gray-Brown, Silty Fine SAND (A-2-4), with trace mica (continued)
860	859.4	83.5	21	53	47/0.4								M			WEATHERED ROCK Orange-White (BIOTITE GNEISS) Boring Terminated at Elevation 858.0 ft in Weathered Rock (BIOTITE GNEISS)

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz									
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)								
BORING NO. B3-A (LL)		STATION 595+92		OFFSET 65 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 939.4 ft		TOTAL DEPTH 39.7 ft		NORTHING 579,459		EASTING 1,256,154									
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER J. Messick		START DATE 07/12/16		COMP. DATE 07/12/16		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					
940														939.4	0.0
	938.4	1.0	5	6	11								M	937.8	1.8
935	935.9	3.5	7	8	10								M		
	933.4	6.0	4	5	6								M		
930	930.9	8.5	3	4	8								M	931.4	8.0
													M		
925	925.9	13.5	4	5	7								M		
													M		
920	920.9	18.5	9	13	28								M	922.4	17.0
													M		
915	915.9	23.5	11	21	10								M		
													M		
910	910.9	28.5	24	19	27								M		
													M		
905	905.9	33.5	14	28	56								M		
													M		
900	900.9	38.5											M	900.9	38.5
	899.7	39.7	100/0.2										M	899.7	39.7
			60/0.0												

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz									
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)								
BORING NO. B3-B (LL)		STATION 595+59		OFFSET 19 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 940.8 ft		TOTAL DEPTH 64.0 ft		NORTHING 579,440		EASTING 1,256,099									
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER J. Messick		START DATE 07/11/16		COMP. DATE 07/11/16		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					
945															
														940.8	0.0
940	939.8	1.0	4	6	8								M		
													M		
935	937.3	3.5	6	6	8								M	937.8	3.0
													M		
930	934.8	6.0	4	5	6								M	935.3	5.5
													M		
925	932.3	8.5	4	4	4								M		
													M		
920	927.3	13.5	5	7	7								M		
													M		
915	922.3	18.5	3	2	3								M	923.8	17.0
													M		
910	917.3	23.5	8	4	5								M		
													M		
905	912.3	28.5	5	7	10								M		
													M		
900	907.3	33.5	4	4	6								M		
													M		
895	902.3	38.5	7	5	12								M		
													M		
890	897.3	43.5	4	18	8								M		
													M		
885	892.3	48.5	70	26	28								M		
													M		
880	887.3	53.5	25	31	22								M		
													M		
	882.3	58.5	13	21	38								M		
													M		
	877.3	63.5											M		
	876.9	63.9	100/0.2										M		
			60/0.1												

NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ NC_DOT.GDT 8/12/16

WEATHERED ROCK
Brown-White (BIOTITE GNEISS)
CRYSTALLINE ROCK
(BIOTITE GNEISS)
Boring Terminated with Standard Penetration Test Refusal at Elevation 876.8 ft in Crystalline Rock (BIOTITE GNEISS)
1) Approximately 0.2 ft. of topsoil was encountered at the ground surface.

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34497.1.2	TIP R-2707C	COUNTY CLEVELAND	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)			GROUND WTR (ft)
BORING NO. EB2-A (LL)	STATION 597+84	OFFSET 97 ft LT	ALIGNMENT -L-
COLLAR ELEV. 935.8 ft	TOTAL DEPTH 45.8 ft	NORTHING 579,355	EASTING 1,256,322
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing w/ Core	HAMMER TYPE Automatic
DRILLER Smith, C.L.	START DATE 11/12/15	COMP. DATE 11/12/15	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)		
940																	
935															935.8	GROUND SURFACE 0.0	
930	931.6	4.2	3	6	8										927.8	RESIDUAL RED-TAN-BROWN STIFF MOIST SILTY SANDY CLAY (A-7) 8.0	
925	926.6	9.2	67	30	31										921.1	RESIDUAL TAN-BROWN-WHITE HARD MOIST CLAYEY SILTY SAND (A-2) 14.7	
920	921.6	14.2	25	75/3											914.8	WEATHERED ROCK SEVERELY WEATHERED BIOTITE GNEISS 21.0	
915	916.6	19.2	100/2													890.0	CRYSTALLINE ROCK BROWN-GRAY-WHITE BANDED BIOTITE GNEISS 45.8
910																	
905																	
900																	
895																	
890																	
																	Boring Terminated at Elevation 890.0 ft In Crystalline Rock (Biotite Gneiss)

NCDOT BORE DOUBLE R2707C_BORELOGS_BY_NCDOT.GPJ NC_DOT.GDT 8/12/16

GEOTECHNICAL BORING REPORT CORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Stickney, J. K.						
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)					
BORING NO. EB2-A (LL)		STATION 597+84		OFFSET 97 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 935.8 ft		TOTAL DEPTH 45.8 ft		NORTHING 579,355		EASTING 1,256,322						
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014				DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic						
DRILLER Smith, C.L.		START DATE 11/12/15		COMP. DATE 11/12/15		SURFACE WATER DEPTH N/A						
CORE SIZE NW		TOTAL RUN 23.8 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %				
914.8	914.8	21.0	3.8		(2.7) 71%	(0.0) 0%	(21.8) 88%	(17.2) 69%		Begin Coring @ 21.0 ft	21.0	
	911.0	24.8	5.0	1:18/1.0	(4.4) 88%	(3.1) 62%				914.8 BROWN-GRAY-WHITE BANDED, SEVERELY WEATHERED TO FRESH, MODERATELY HARD TO HARD BIOTITE GNEISS WITH VERY CLOSE TO WIDE FRACTURE SPACING R1=12, R2=17, R3=15, R4=20, R5=7, RMR=71 ROCK TYPE E		
910												
	906.0	29.8	5.0	1:26/1.0	(5.0) 100%	(4.4) 88%						
905												
	901.0	34.8	5.0	1:42/1.0	(4.8) 96%	(4.8) 96%						
	896.0	39.8	5.0	1:48/1.0	(4.9) 98%	(4.9) 98%						
895												
	891.0	44.8										
890										Boring Terminated at Elevation 890.0 ft In Crystalline Rock (Biotite Gneiss)	45.8	

NCDOT CORE DOUBLE R2707C_BORELOGS_BY_NCDOT.GPJ NC_DOT.GDT 8/12/16



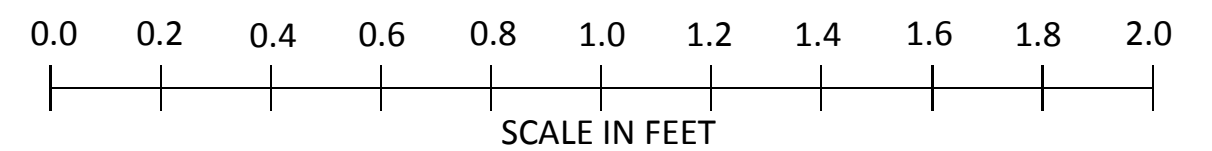
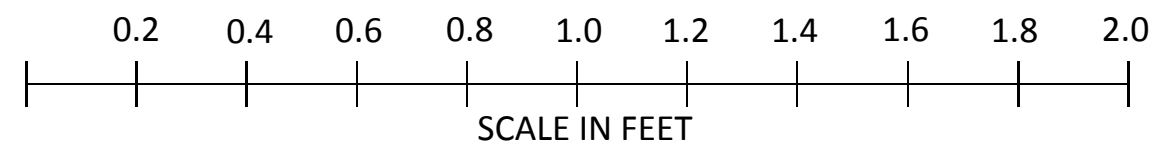
Bridge No. 472 on -L- (Shelby Bypass) over -Y11REV2- & -Y13-
WBS - 34497.1.2 TIP No. - R-2707C

Sheet No. 20

ECS Carolinas Project No. 08:11717

Rock Core Photographs: Boring - EB2-A (LL) — Station: 597+84 Offset: 97' LT

*Core Photos Provided By NCDOT



GEOTECHNICAL BORING REPORT BORE LOG

WBS 34497.1.2	TIP R-2707C	COUNTY CLEVELAND	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)			GROUND WTR (ft)
BORING NO. EB2-B (LL)	STATION 597+27	OFFSET 14 ft LT	ALIGNMENT -L-
COLLAR ELEV. 936.8 ft	TOTAL DEPTH 44.8 ft	NORTHING 579,329	EASTING 1,256,226
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing w/ Core	HAMMER TYPE Automatic
DRILLER Smith, C.L.	START DATE 11/10/15	COMP. DATE 11/10/15	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						ELEV. (ft)	DEPTH (ft)
940																	
														936.8	0.0	GROUND SURFACE	
935																RESIDUAL RED-BROWN STIFF MOIST SILTY SANDY CLAY (A-7) WITH SOME MICA	
	932.6	4.2				2	5	10								928.8	8.0
930																RESIDUAL RED-TAN-YELLOW VERY STIFF MOIST CLAYEY SILTY SAND (A-2)	
	927.6	9.2				7	9	10								922.6	14.2
925																917.6	19.2
920																916.8	20.0
915																WEATHERED ROCK SEVERELY WEATHERED BIOTITE GNEISS	
																CRYSTALLINE ROCK WHITE-BLACK-BROWN BANDED BIOTITE GNEISS WITH ZONES OF GRANITE	
910																	
905																	
900																	
895																	
																892.0	44.8
																Boring Terminated at Elevation 892.0 ft In Crystalline Rock (Biotite Gneiss)	

NCDOT BORE DOUBLE R2707C_BORELOGS_BY_NCDOT.GPJ NC_DOT.GDT 8/12/16

GEOTECHNICAL BORING REPORT

CORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Stickney, J. K.					
SITE DESCRIPTION Bridge No. 472 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)				
BORING NO. EB2-B (LL)		STATION 597+27		OFFSET 14 ft LT		ALIGNMENT -L-					
COLLAR ELEV. 936.8 ft		TOTAL DEPTH 44.8 ft		NORTHING 579,329		EASTING 1,256,226					
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014				DRILL METHOD NW Casing w/ Core		HAMMER TYPE Automatic					
DRILLER Smith, C.L.		START DATE 11/10/15		COMP. DATE 11/10/15		SURFACE WATER DEPTH N/A					
CORE SIZE NW		TOTAL RUN 24.8 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %			
916.8	916.8	20.0	4.8	1:48/1.0	(4.6) 96%	(3.2) 67%	(23.4) 94%	(21.6) 87%		Begin Coring @ 20.0 ft CRYSTALLINE ROCK WHITE-BLACK-BROWN BANDED, SLIGHTLY WEATHERED TO FRESH, HARD BIOTITE GNEISS WITH ZONES OF GRANITE, AND VERY CLOSE TO WIDE FRACTURE SPACING R1=15, R2=17, R3=20, R4=20, R5=7, RMR=79 ROCK TYPE E	20.0
915	912.0	24.8	5.0	1:43/1.0	(5.0) 100%	(5.0) 100%					916.8
910	907.0	29.8	5.0	2:00/1.0	(5.0) 100%	(5.0) 100%					
905	902.0	34.8	5.0	1:51/1.0	(4.6) 92%	(4.6) 92%					
900	897.0	39.8	5.0	1:55/1.0	(4.2) 84%	(3.8) 76%					
895	892.0	44.8									
										Boring Terminated at Elevation 892.0 ft In Crystalline Rock (Biotite Gneiss)	

NCDOT CORE DOUBLE R2707C_BORELOGS_BY_NCDOT.GPJ NC_DOT.GDT 8/12/16

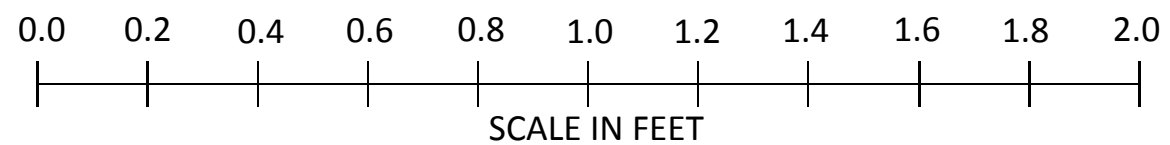
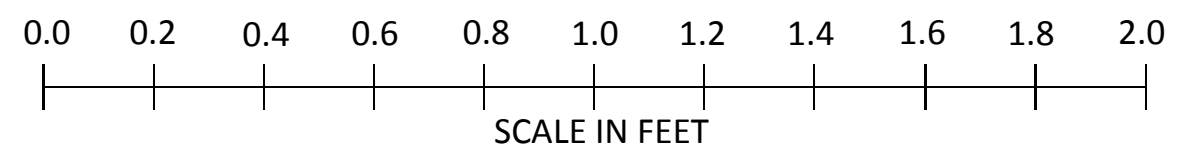
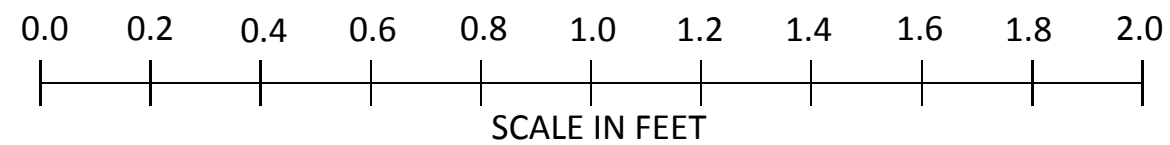


Bridge No. 472 on -L- (Shelby Bypass) over -Y11REV2- & -Y13-
WBS - 34497.1.2 TIP No. - R-2707C

ECS Carolinas Project No. 08:11717

Rock Core Photographs: Boring - EB2-B (LL) — Station: 597+27 Offset: 14' LT

*Core Photos Provided By NCDOT



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION Bridge No. 473 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. EB1-A (RL)		STATION 592+46		OFFSET 19 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 942.7 ft		TOTAL DEPTH 55.8 ft		NORTHING 579,611		EASTING 1,255,834										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Messick		START DATE 07/14/16		COMP. DATE 07/14/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
945														942.7	GROUND SURFACE	0.0
940	941.7	1.0	4	5	7	12						M	RESIDUAL Stiff, Red, Silty CLAY (A-7-5)	939.7	3.0	
	939.2	3.5	6	7	8	15						M	Medium Stiff to Very Stiff, Red-Brown, Fine Sandy SILT (A-4)			
	936.7	6.0	4	3	4	7						M				
935	934.2	8.5	9	5	6	11						M				
	929.2	13.5	4	11	19	30						M				
925	924.2	18.5	10	13	11	24						M	Medium Dense to Very Dense, Red-Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with little to some gravel-sized rock fragments	925.7	17.0	
	919.2	23.5	9	6	11	17						M				
915	914.2	28.5	14	13	7	20						M				
	909.2	33.5	8	31	30	61						M				
905	904.2	38.5	52	22	15	37						M				
	899.2	43.5	21	61	17	78						M				
890	894.2	48.5	7	6	10	16						M				
	889.2	53.5	100/0.5											889.2	WEATHERED ROCK	53.5
	887.0	55.7	60/0.1											887.0	Gray-Brown (BIOTITE GNEISS)	55.7
														886.9	CRYSTALLINE ROCK (BIOTITE GNEISS)	55.8
															Boring Terminated with Standard Penetration Test Refusal at Elevation 886.9 ft In Crystalline Rock (BIOTITE GNEISS)	

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION Bridge No. 473 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. EB1-B (RL)		STATION 593+10		OFFSET 64 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 942.0 ft		TOTAL DEPTH 44.5 ft		NORTHING 579,674		EASTING 1,255,818										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Messick		START DATE 07/14/16		COMP. DATE 07/14/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
945														942.0	GROUND SURFACE	0.0
940	941.0	1.0	4	7	10	17						M	RESIDUAL Very Stiff, Red, Silty CLAY (A-7-5)	939.0	3.0	
	938.5	3.5	7	7	6	13						M	Medium Dense to Loose, Red-White-Brown, Silty Fine to Coarse SAND (A-2-4)			
	936.0	6.0	5	4	3	7						M				
935	933.5	8.5	3	3	11	14						M	Stiff, Red-Brown, Fine Sandy SILT (A-4)	934.0	8.0	
	928.5	13.5	16	23	19	42						M	Medium Dense to Dense, Red-Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with trace gravel sized rock fragments	930.0	12.0	
	923.5	18.5	4	6	8	14						M				
920	918.5	23.5	6	7	11	18						M				
	913.5	28.5	8	18	16	34						M				
910	908.5	33.5	100/0.4									M		908.5	WEATHERED ROCK	33.5
														905.0	Brown-Gray (BIOTITE GNEISS)	37.0
905	903.5	38.5	66	14	57	71						M	RESIDUAL Hard, Brown-Gray, Fine Sandy SILT (A-4), with trace gravel sized rock fragments			
	898.5	43.5												898.5	WEATHERED ROCK	43.5
	897.6	44.4	100/0.5											897.6	Brown-Gray (BIOTITE GNEISS)	44.4
			60/0.1											897.5	CRYSTALLINE ROCK (BIOTITE GNEISS)	44.5
															Boring Terminated with Standard Penetration Test Refusal at Elevation 897.5 ft In Crystalline Rock (BIOTITE GNEISS)	
															1) Approximately 0.3 ft. of topsoil was encountered at the ground surface.	

NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ NC_DOT_GDT 8/12/16

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION Bridge No. 473 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. B1-A (RL)		STATION 594+75		OFFSET 19 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 943.6 ft		TOTAL DEPTH 89.5 ft		NORTHING 579,464		EASTING 1,256,010										
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER M. Ireland		START DATE 07/07/16		COMP. DATE 07/07/16		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
945																
	942.6	1.0	4	5	6	1										0.0
940	940.1	3.5	3	3	4	7										9.9
	937.6	6.0	3	3	3	6										
935	935.1	8.5	3	5	3	8										
930	930.1	13.5	4	5	4	9										
925	925.1	18.5	3	4	6	10										
920	920.1	23.5	4	9	8	17										
915	915.1	28.5	5	10	8	18										
910	910.1	33.5	4	6	8	14										
905	905.1	38.5	5	8	10	18										
900	900.1	43.5	4	6	7	13										
895	895.1	48.5	5	6	9	15										
890	890.1	53.5	3	5	8	13										
885	885.1	58.5	4	8	11	19										
880	880.1	63.5	9	14	20	34										
875	875.1	68.5	12	15	22	37										
870	870.1	73.5	9	14	24	38										
865	865.1	78.5														

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz										
SITE DESCRIPTION Bridge No. 473 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)									
BORING NO. B1-A (RL)		STATION 594+75		OFFSET 19 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 943.6 ft		TOTAL DEPTH 89.5 ft		NORTHING 579,464		EASTING 1,256,010										
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER M. Ireland		START DATE 07/07/16		COMP. DATE 07/07/16		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
865																
			11	17	26	43										
860	860.1	83.5	24	41	59/0.5											83.5
855	855.1	88.5	41	59/0.5												89.5

NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ NC_DOT.GDT 8/12/16

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST C. Bukovitz									
SITE DESCRIPTION Bridge No. 473 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)								
BORING NO. EB2-A (RL)		STATION 597+11		OFFSET 19 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 941.0 ft		TOTAL DEPTH 26.9 ft		NORTHING 579,313		EASTING 1,256,192									
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic									
DRILLER J. Messick		START DATE 07/11/16		COMP. DATE 07/11/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
945															
940	940.0	1.0	2	3	2								M	941.0 GROUND SURFACE 0.0	
	937.5	3.5	4	4	4								M	ARTIFICIAL FILL Medium Stiff, Red, Fine Sandy SILT (A-4), with trace gravel	
935	935.0	6.0	6	7	12								M	935.5 RESIDUAL Very Stiff, Red, Silty CLAY (A-7-5(25)) 5.5	
	932.5	8.5	7	9	11								M	26% SS-60	
930	927.5	13.5	10	12	14								M	929.0 Medium Dense to Dense, Red-Brown-White, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments 12.0	
925	922.5	18.5	7	12	11								M		
920	917.5	23.5	10	18	30								M		
915	914.1	26.9	60/0.0										M	915.0 WEATHERED ROCK (BIOTITE GNEISS) 26.0 914.1 26.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 914.1 ft On Crystalline Rock (BIOTITE GNEISS) 1) Approximately 0.2 ft. of topsoil was encountered at the ground surface.	

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Stickney, J. K.									
SITE DESCRIPTION Bridge No. 473 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)							GROUND WTR (ft)								
BORING NO. EB2-B (RL)		STATION 596+67		OFFSET 65 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 941.6 ft		TOTAL DEPTH 45.1 ft		NORTHING 579,305		EASTING 1,256,129									
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014			DRILL METHOD NW Casing w/ Advancer			HAMMER TYPE Automatic									
DRILLER Smith, C.L.		START DATE 11/04/15		COMP. DATE 11/04/15		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					
945															
940													M	941.6 GROUND SURFACE 0.0	
	937.1	4.5	7	14	19								M	RESIDUAL RED-BROWN HARD MOIST SILTY SANDY CLAY (A-7)	
935	935.0	6.0	6	7	12								M	933.6 RESIDUAL Very Stiff, Red, Silty CLAY (A-7-5(25)) 8.0	
	932.1	9.5	5	11	14								M	RESIDUAL RED-BROWN LOOSE TO DENSE MOIST CLAYEY SILTY SAND (A-2) WITH SOME MICA	
930	927.1	14.5	3	4	6								M		
925	922.1	19.5	5	7	27								M		
920	917.1	24.5	14	17	17								M		
915	912.1	29.5	16	6	7								M		
910													M		
905													M		
900													M		
													M	909.0 WEATHERED ROCK 32.6 906.7 SEVERELY WEATHERED CRYSTALLINE ROCK (BIOTITE GNEISS) 34.9 CRYSTALLINE ROCK GRAY-BLACK-WHITE BIOTITE GNEISS	
													M	896.5 Boring Terminated at Elevation 896.5 ft In Crystalline Rock (Biotite Gneiss) 45.1	

NCDOT BORE DOUBLE R-2707C_GEO_DUALBRIDGES_BORELOGS.GPJ NC_DOT_GDT 8/12/16

GEOTECHNICAL BORING REPORT CORE LOG

WBS 34497.1.2	TIP R-2707C	COUNTY CLEVELAND	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Bridge No. 473 on -L- (US 74) over -Y11REV2- (NC 180) & -Y13- (CSX RR)			GROUND WTR (ft)
BORING NO. EB2-B (RL)	STATION 596+67	OFFSET 65 ft RT	ALIGNMENT -L- 0 HR. N/A
COLLAR ELEV. 941.6 ft	TOTAL DEPTH 45.1 ft	NORTHING 579,305	EASTING 1,256,129 24 HR. 35.3
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing w/ Advancer	HAMMER TYPE Automatic
DRILLER Smith, C.L.	START DATE 11/04/15	COMP. DATE 11/04/15	SURFACE WATER DEPTH N/A

CORE SIZE NW				TOTAL RUN 10.2 ft				STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %			
906.7												
905	906.7 906.5	34.9 35.1	0.2 5.0		(0.2) 100%	(0.0) 0%		(9.5) 93%	(8.2) 80%		906.7	34.9
	901.5	40.1	5.0		(4.9) 98%	(3.8) 76%						
900					(4.4) 88%	(4.4) 88%						
	896.5	45.1									896.5	45.1
Boring Terminated at Elevation 896.5 ft In Crystalline Rock (Biotite Gneiss)												

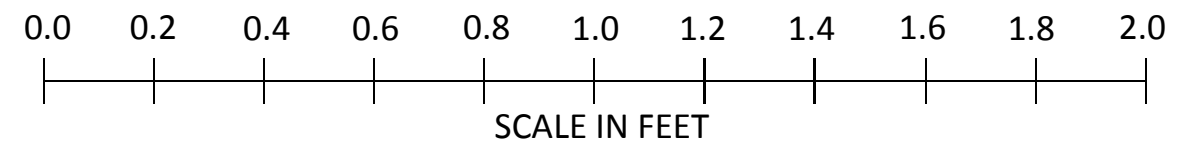
NCDOT CORE DOUBLE R2707C_BORELOGS_BY_NCDOT.GPJ NC_DOT.GDT 8/12/16



**Bridge No. 473 on -L- (Shelby Bypass) over -Y11REV2- & -Y13-
WBS - 34497.1.2 TIP No. - R-2707C
ECS Carolinas Project No. 08:11717**

Rock Core Photographs: Boring - EB2-B (RL) — Station: 596+67 Offset: 65' RT

***Core Photos Provided By NCDOT**



SOIL TEST RESULTS

BORING NO.	SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1-A (LL)	SS-160	65' LT	591+29	58.5 - 60.0'	A-4 (0)	34	6	26.2	37.7	26.5	9.7	99.0	83.0	45.0	27.9	-
EB1-B (LL)	SS-170	19' LT	591+93	28.5 - 30.0'	A-5(5)	48	8	16.3	33.4	41.1	9.2	99.0	91.0	59.0	36.7	-
B1-B (LL)	SS-120	18' LT	593+64	38.5 - 40.0'	A-5(1)	42	2	8.8	49.5	32.3	9.4	100.0	98.0	53.0	34.8	-
B2-A (LL)	SS-47	65' LT	594+61	28.5 - 30.0'	A-5(5)	43	8	13.1	32.3	42.0	12.5	99.0	91.0	64.0	32.2	-
B2-B (LL)	SS-22	19' LT	594+62	3.5 - 5.0'	A-7-5(24)	63	21	2.8	18.2	32.8	46.3	100.0	99.0	86.0	28.0	-
B3-B (LL)	SS-71	19' LT	595+59	23.5 - 25.0'	A-5(5)	47	8	14.6	32.4	38.5	14.5	100.0	92.0	62.0	32.3	-
B1-A (RL)	SS-3	19' RT	594+75	6.0 - 7.5'	A-7-5(12)	45	15	7.4	32.5	30.2	38.9	99.0	96.0	75.0	23.3	-
EB2-A (RL)	SS-60	19' RT	597+11	6.0 - 7.5'	A-7-5(5)	68	29	10.5	18.2	13.1	58.3	99.0	93.0	75.0	25.7	-

LAB TECHNICIAN: AMANDA R. ROTH

NCDOT CERTIFICATION NO. 112-09-1003

SIGNATURE: 