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REFERENCE: U-2579C

PROJECT: 34839

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579C	1	39

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
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STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY FORSYTH
PROJECT DESCRIPTION WINSTON SALEM NORTHERN BELTWAY

SITE DESCRIPTION DUAL BRIDGES 702 & 703 ON -L- (FUTURE I-74) OVER LOWERY MILL CREEK

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 CONTRACTOR 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.

PERSONNEL

J. BRADSHAW, E.I.

C. BUKOVITZ, E.I.

M. BREWER, P.E.

GEOLOGIC EX.

A. ROTH

INVESTIGATED BY ECS CAROLINAS, LLP

DRAWN BY M. BREWER, P.E.

CHECKED BY M. WALKO, P.E.

SUBMITTED BY ECS CAROLINAS, LLP

DATE APRIL 2016



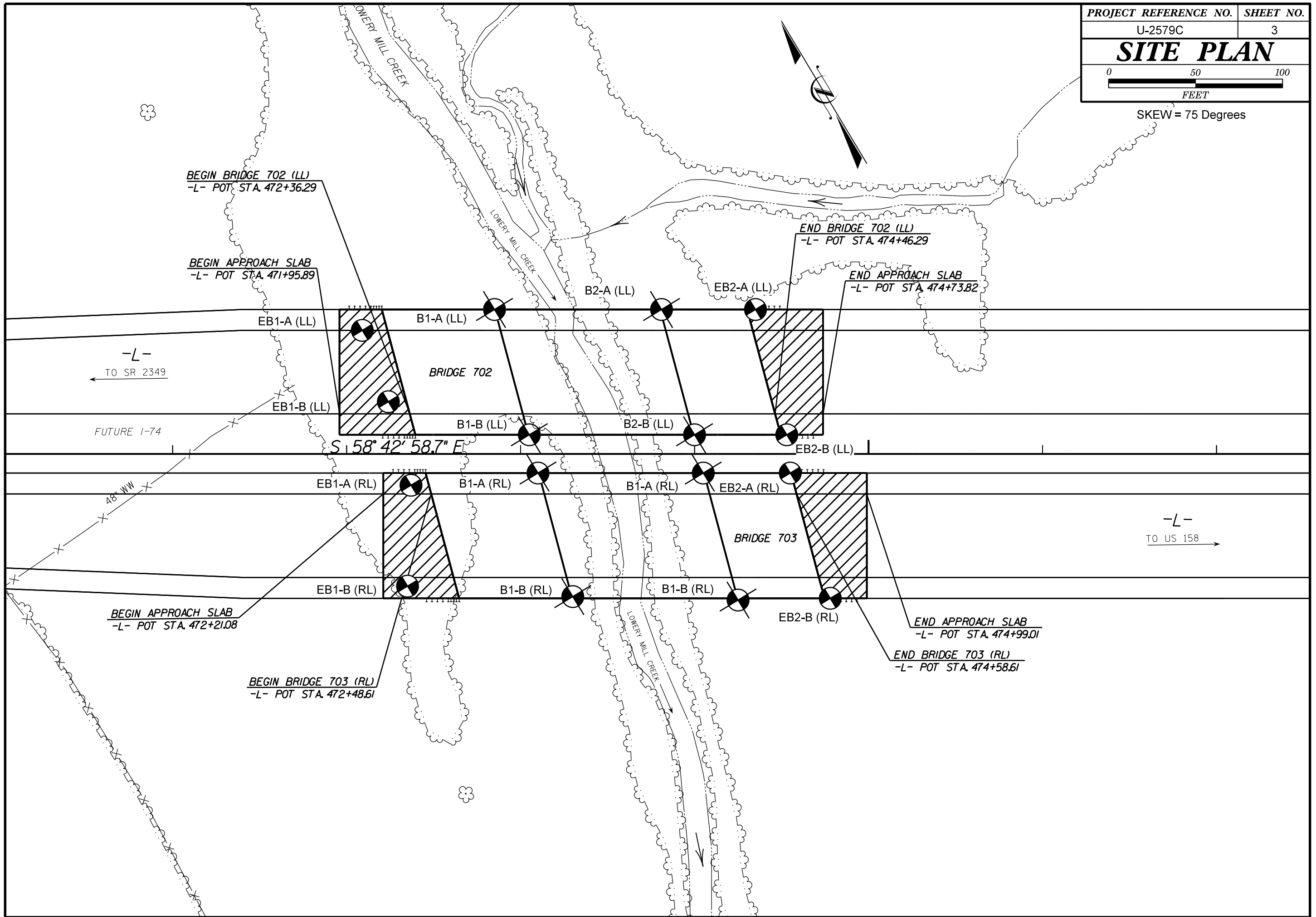
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5/25/2016 DATE

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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 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 (ROD) - 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 (SROD) - 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										WEATHERING																			
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.										FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.																			
MINERALOGICAL COMPOSITION										COMPRESSION										PERCENTAGE OF MATERIAL																			
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50										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																			
GROUND WATER										MISCELLANEOUS SYMBOLS										ROCK HARDNESS																			
FAIR TO POOR POOR UNSUITABLE										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY										DIP & DIP DIRECTION OF ROCK STRUCTURES SPT DMT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. 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. MEDIUM HARD CAN BE GROOVED 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. SOFT CAN BE GROOVED 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. 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.									
CONSISTENCY OR DENSENESS										RECOMMENDATION SYMBOLS										ABBREVIATIONS																			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - COARSE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED UNIT WEIGHT DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO										UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK									
TEXTURE OR GRAIN SIZE										SOIL MOISTURE - CORRELATION OF TERMS										EQUIPMENT USED ON SUBJECT PROJECT																			
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053										SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST DIEDRICH D-50 DIEDRICH D-120										FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. 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.									
PLASTICITY										TEXTURE OR GRAIN SIZE										ROCK HARDNESS																			
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC										Boulder (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. 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. MEDIUM HARD CAN BE GROOVED 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. SOFT CAN BE GROOVED 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. 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.										BENCH MARK: BL-13 N = 874480, 5920, E = 1657767.3060 ELEVATION: 859.16 FEET									
COLOR										SOIL MOISTURE - CORRELATION OF TERMS										ROCK HARDNESS																			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.										LL - LIQUID LIMIT PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT										VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FOOT VERY CLOSE LESS THAN 0.16 FEET										VERY THICKLY BEDDED 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET									
NOTES:										INDURATION																													
NORTHINGS AND EASTINGS OBTAINED WITH A TRIMBLE GEO 7X WITH SUB-FOOT ACCURACY.										FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. 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.																													

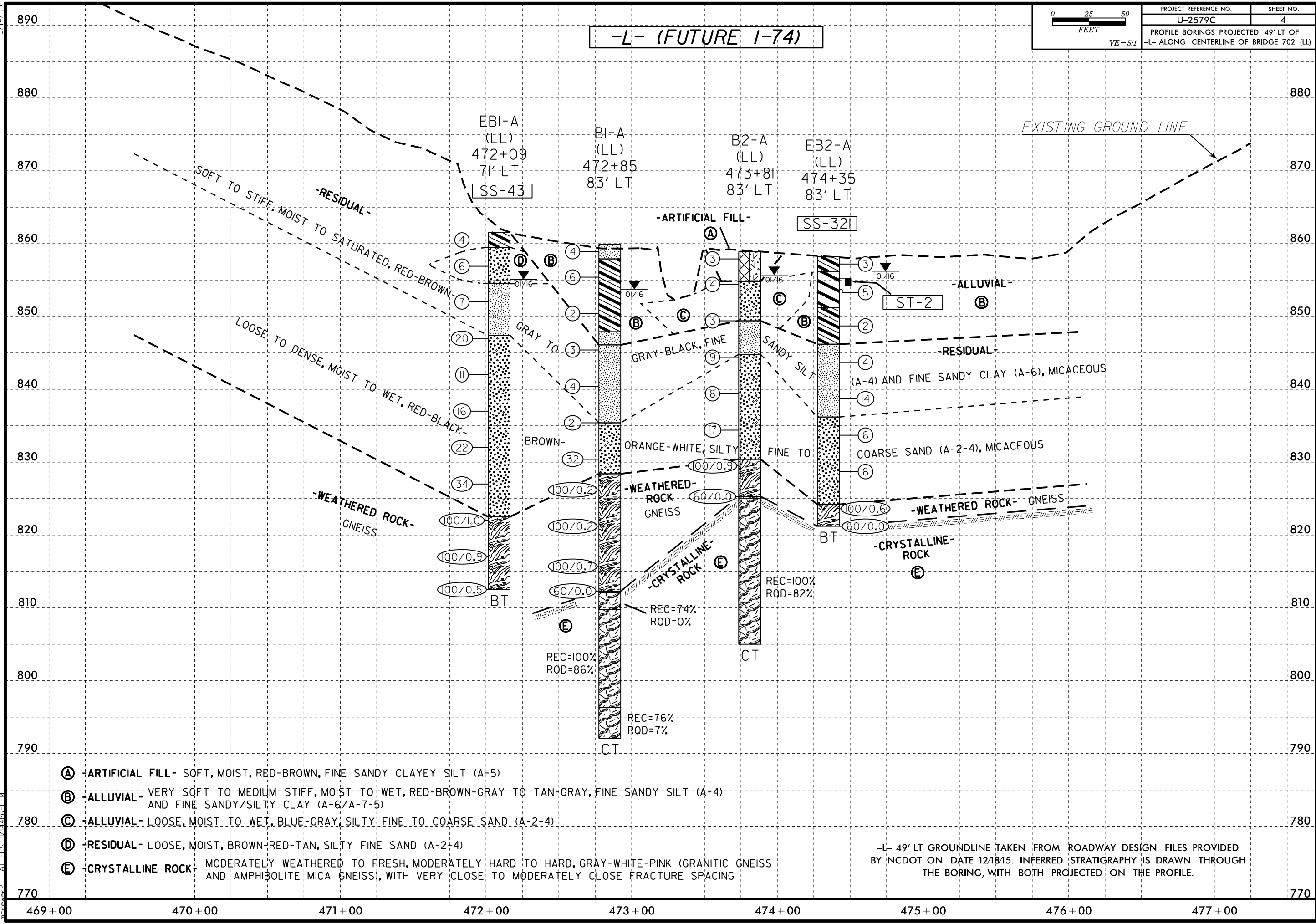
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 5/14/99

-L- (FUTURE I-74)

PROJECT REFERENCE NO. U-2579C	SHEET NO. 4
PROFILE BORINGS PROJECTED 49' LT OF -L- ALONG CENTERLINE OF BRIDGE 702 (LL)	



- (A)** -ARTIFICIAL FILL- SOFT, MOIST, RED-BROWN, FINE SANDY CLAYEY SILT (A-5)
- (B)** -ALLUVIAL- VERY SOFT TO MEDIUM STIFF, MOIST TO WET, RED-BROWN-GRAY TO TAN-GRAY, FINE SANDY SILT (A-4) AND FINE SANDY/SILTY CLAY (A-6/A-7-5)
- (C)** -ALLUVIAL- LOOSE, MOIST TO WET, BLUE-GRAY, SILTY FINE TO COARSE SAND (A-2-4)
- (D)** -RESIDUAL- LOOSE, MOIST, BROWN-RED-TAN, SILTY FINE SAND (A-2-4)
- (E)** -CRYSTALLINE ROCK- MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD, GRAY-WHITE-PINK (GRANITIC GNEISS AND AMPHIBOLITE MICA GNEISS), WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING

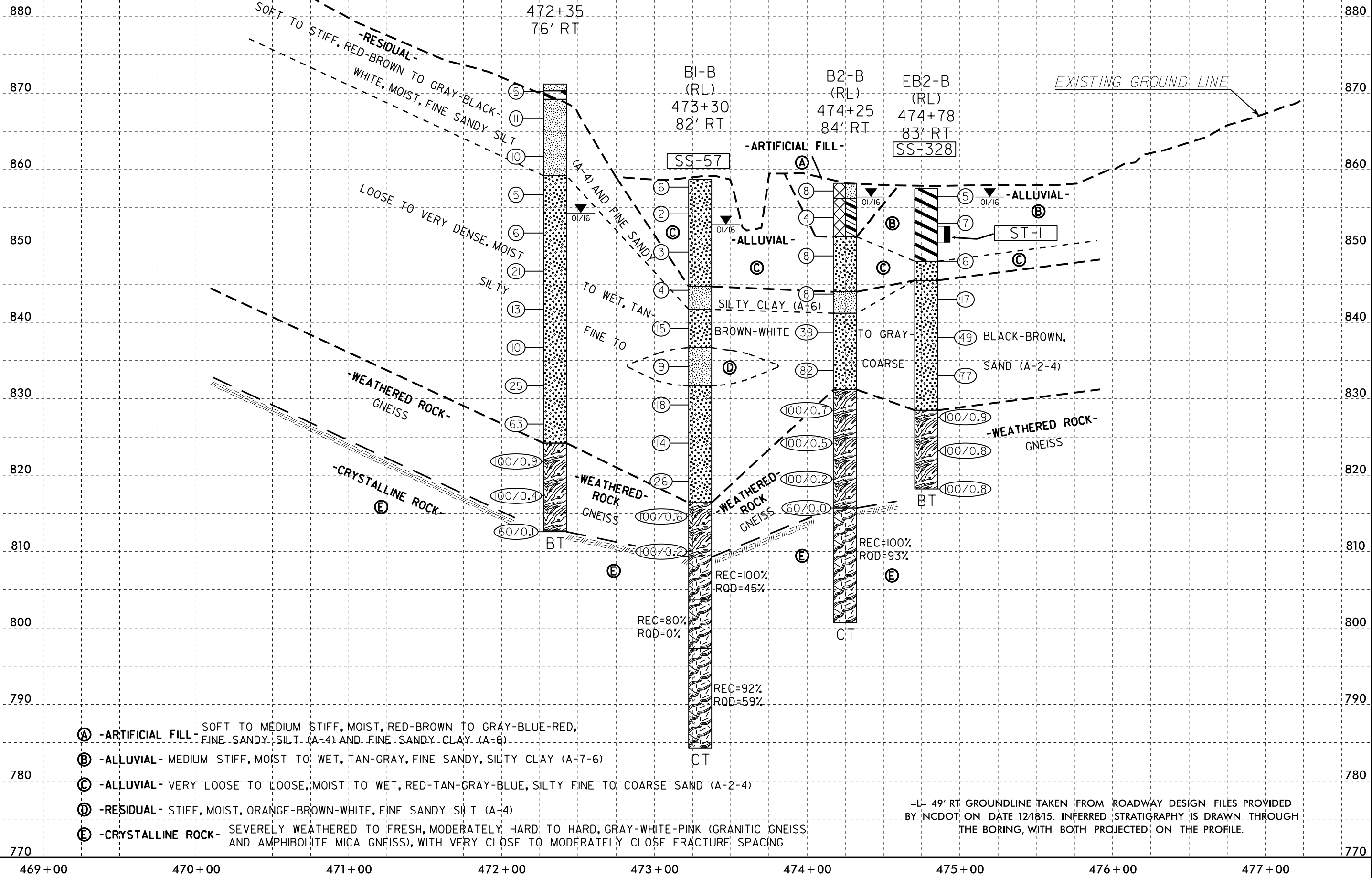
-L- 49' LT GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT, ON DATE 12/18/15. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

469+00 470+00 471+00 472+00 473+00 474+00 475+00 476+00 477+00

5/14/99
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 11/10/10
 11/10/10

-L- (FUTURE I-74)

0 25 50 FEET	VE=5:1	PROJECT REFERENCE NO. U-2579C	SHEET NO. 5
PROFILE BORINGS PROJECTED 49' RT OF -L- ALONG CENTERLINE OF BRIDGE 703 (RL)			



- (A) -ARTIFICIAL FILL- SOFT TO MEDIUM STIFF, MOIST, RED-BROWN TO GRAY-BLUE-RED, FINE SANDY SILT (A-4) AND FINE SANDY CLAY (A-6)
- (B) -ALLUVIAL- MEDIUM STIFF, MOIST TO WET, TAN-GRAY, FINE SANDY, SILTY CLAY (A-7-6)
- (C) -ALLUVIAL- VERY LOOSE TO LOOSE, MOIST TO WET, RED-TAN-GRAY-BLUE, SILTY FINE TO COARSE SAND (A-2-4)
- (D) -RESIDUAL- STIFF, MOIST, ORANGE-BROWN-WHITE, FINE SANDY SILT (A-4)
- (E) -CRYSTALLINE ROCK- SEVERELY WEATHERED TO FRESH, MODERATELY HARD TO HARD, GRAY-WHITE-PINK (GRANITIC GNEISS AND AMPHIBOLITE MICA GNEISS), WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING

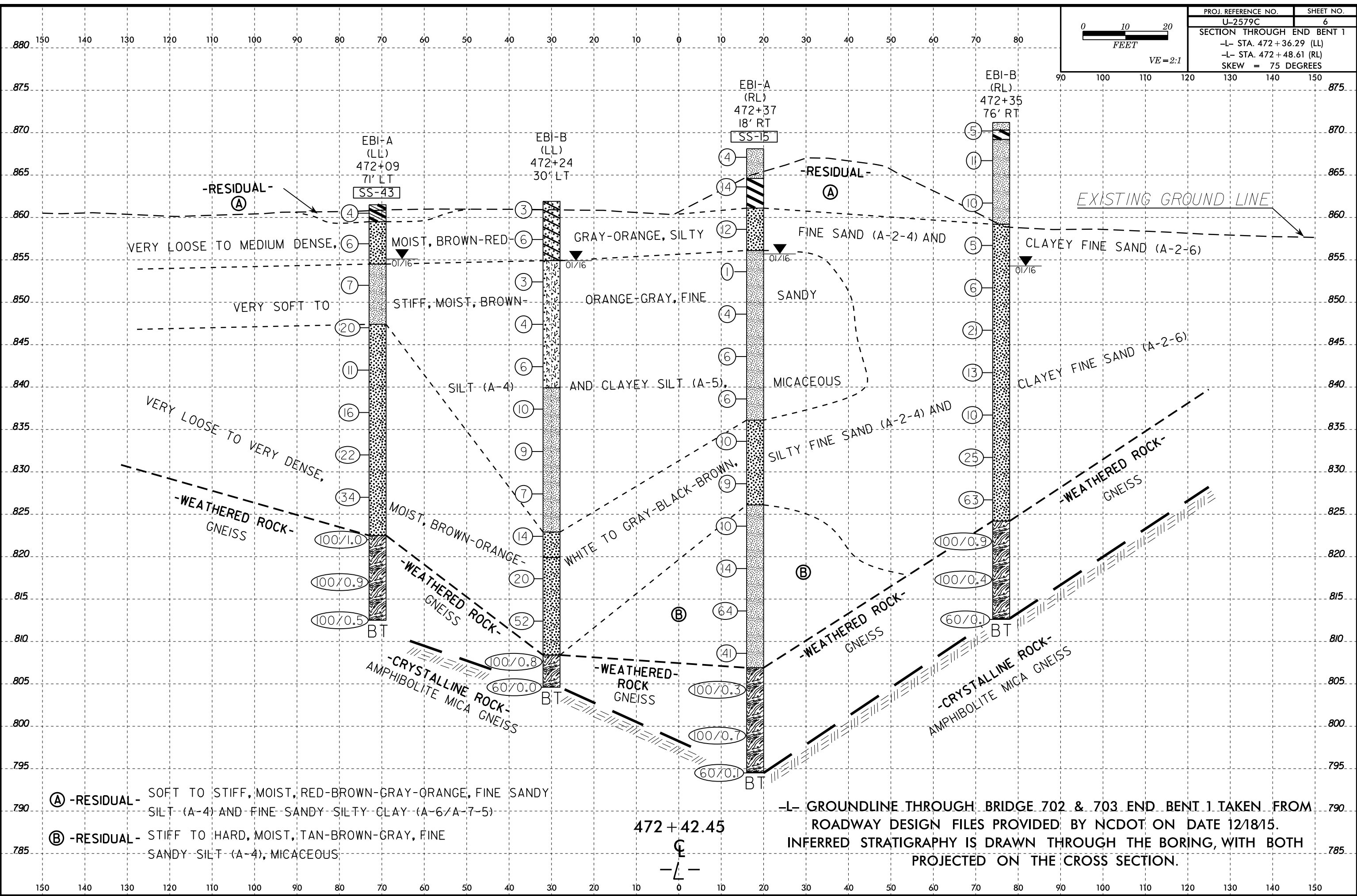
-L- 49' RT GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 12/18/15. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

469+00 470+00 471+00 472+00 473+00 474+00 475+00 476+00 477+00

8/23/99
 19-APR-2016 09:39
 I:\2\GEO\TECH\2-PRG\JCS\10206\1999\11500\11502 - U-2579C BR06 (26412) - Bridge No. 702 and 703 - DTR\CADD\GEO\TECH\Site&Sub\U2579C.Geo.BR06702&703.xsl.L.dgn
 mbruner2 AT EG-104P&LLO

PROJ. REFERENCE NO.	SHEET NO.
U-2579C	6
SECTION THROUGH END BENT 1	
-L- STA. 472+36.29 (LL)	
-L- STA. 472+48.61 (RL)	
SKEW = 75 DEGREES	

0 10 20
 FEET
 VE=2:1



- Ⓐ -RESIDUAL- SOFT TO STIFF, MOIST, RED-BROWN-GRAY-ORANGE, FINE SANDY SILT (A-4) AND FINE SANDY SILTY CLAY (A-6/A-7-5)
- Ⓑ -RESIDUAL- STIFF TO HARD, MOIST, TAN-BROWN-GRAY, FINE SANDY SILT (A-4), MICACEOUS

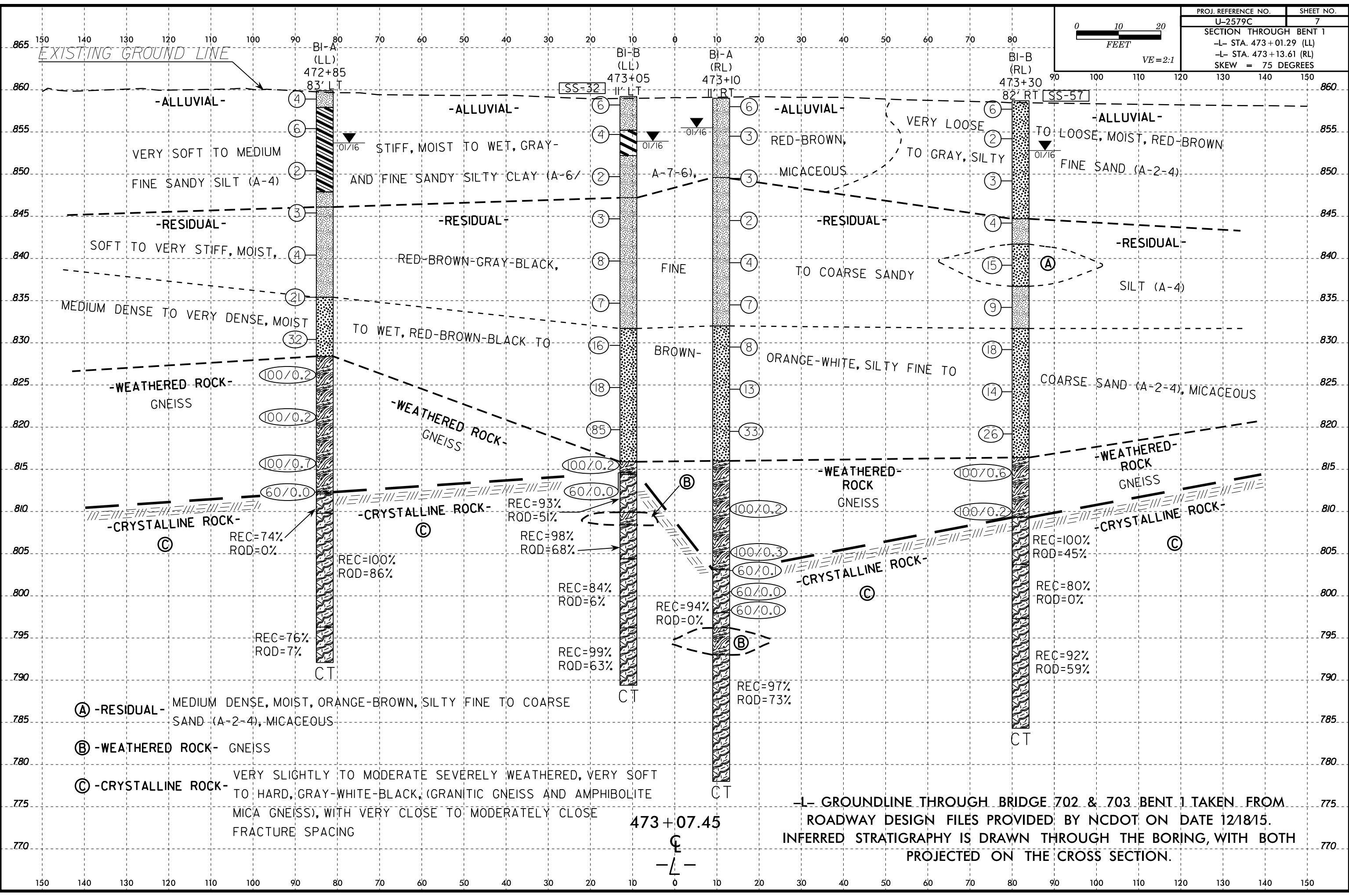
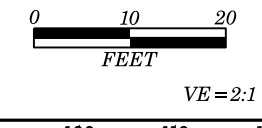
-L- GROUNDLINE THROUGH BRIDGE 702 & 703 END BENT 1 TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 12/18/15. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

472 + 42.45

☺
 -L-

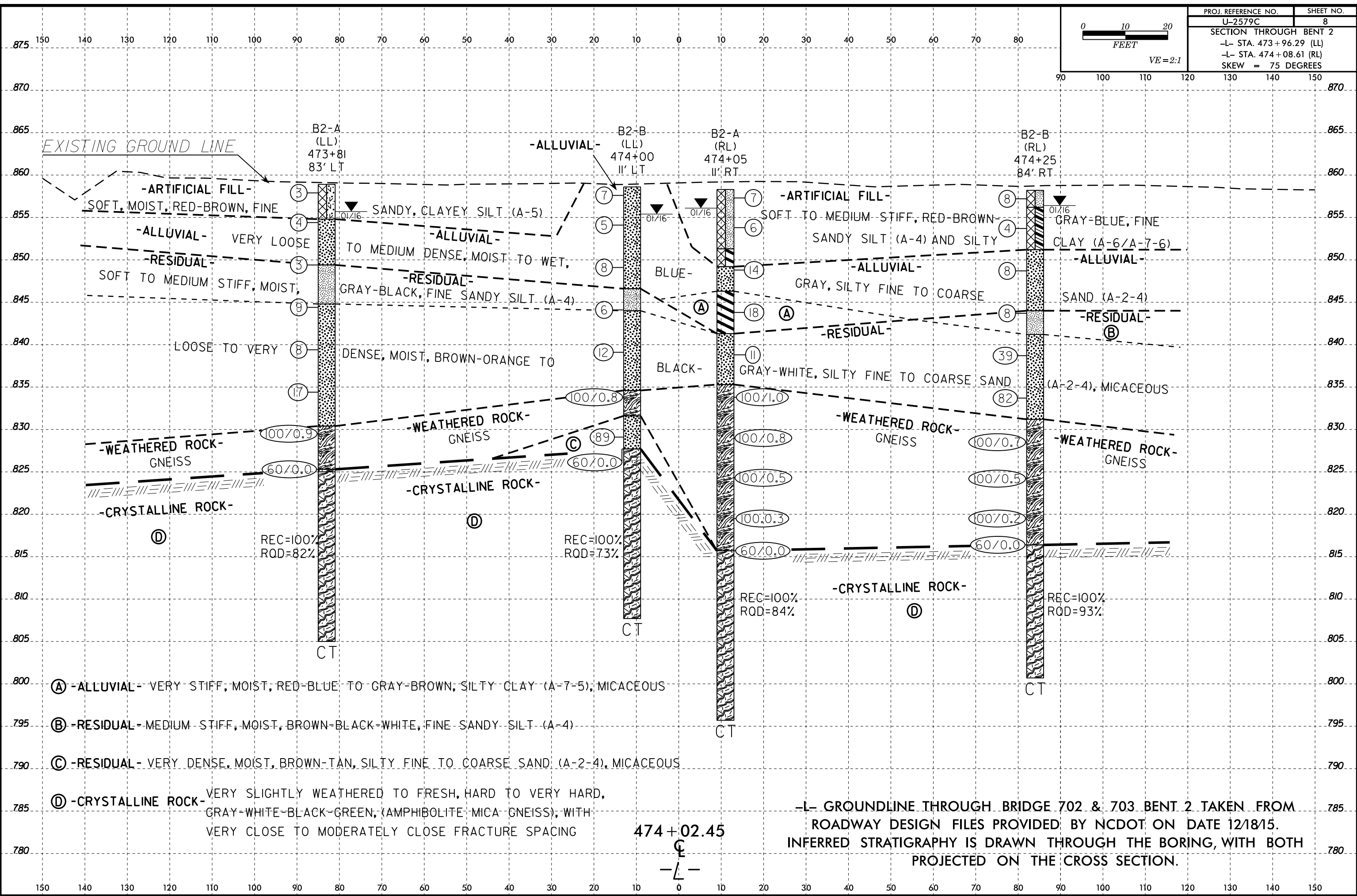
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 mbr:ewerz AT EGS-104461110

PROJ. REFERENCE NO.	SHEET NO.
U-2579C	7
SECTION THROUGH BENT 1	
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-L- STA. 473+13.61 (RL)	
SKEW = 75 DEGREES	



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 8/23/99

PROJ. REFERENCE NO.	SHEET NO.
U-2579C	8
SECTION THROUGH BENT 2	
-L- STA. 473+96.29 (LL)	
-L- STA. 474+08.61 (RL)	
SKEW = 75 DEGREES	



- (A) -ALLUVIAL- VERY STIFF, MOIST, RED-BLUE TO GRAY-BROWN, SILTY CLAY (A-7-5), MICACEOUS
- (B) -RESIDUAL- MEDIUM-STIFF, MOIST, BROWN-BLACK-WHITE, FINE SANDY SILT (A-4)
- (C) -RESIDUAL- VERY DENSE, MOIST, BROWN-TAN, SILTY FINE TO COARSE SAND (A-2-4), MICACEOUS
- (D) -CRYSTALLINE ROCK- VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, GRAY-WHITE-BLACK-GREEN, (AMPHIBOLITE-MICA GNEISS), WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING

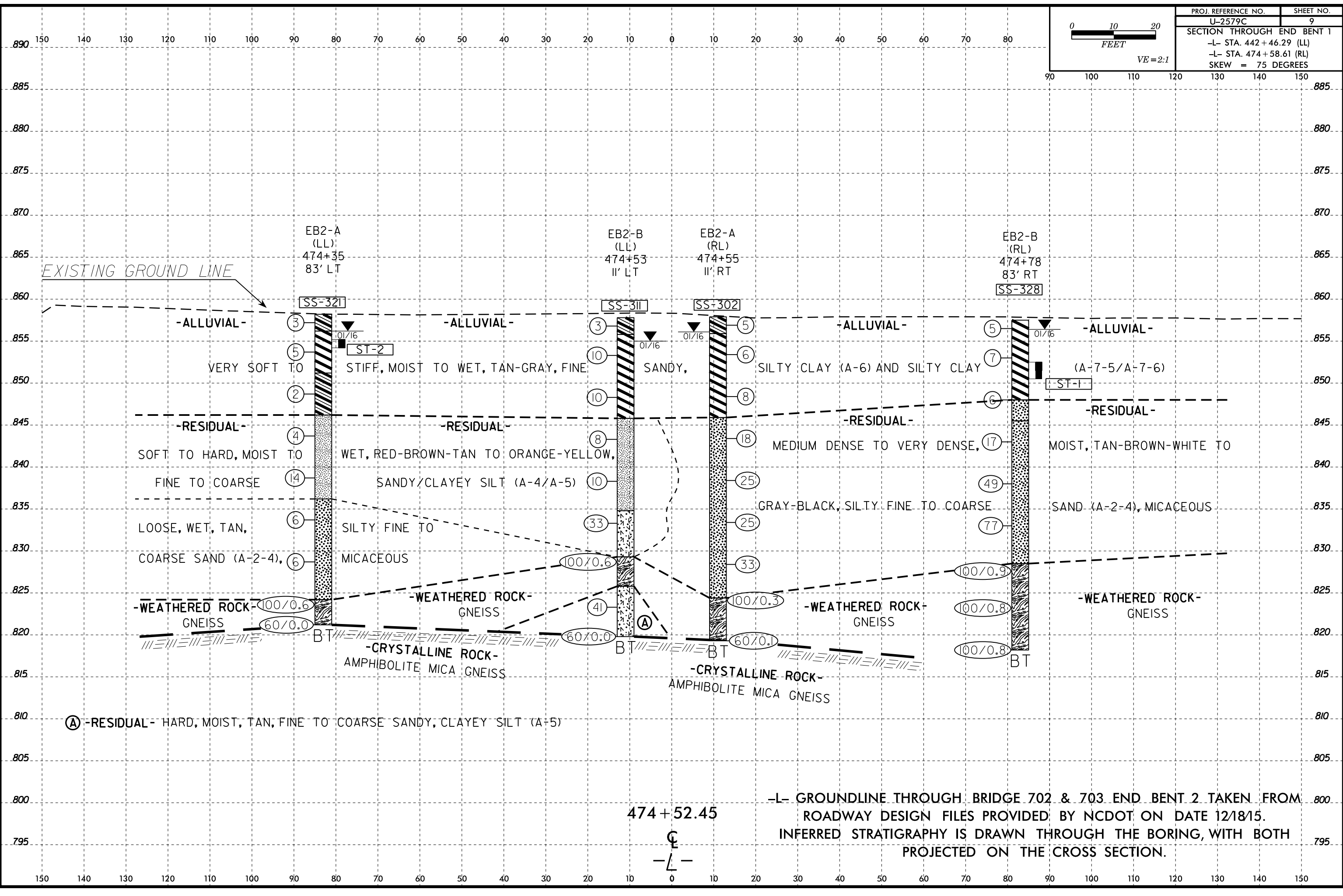
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474+02.45
 L

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 mbrayer2 AT EGS-104461110

PROJ. REFERENCE NO.	SHEET NO.
U-2579C	9
SECTION THROUGH END BENT 1	
-L- STA. 442+46.29 (LL)	
-L- STA. 474+58.61 (RL)	
SKEW = 75 DEGREES	

0 10 20
 FEET
 VE=2:1



-L- GROUNDLINE THROUGH BRIDGE 702 & 703 END BENT 2 TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 12/18/15.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

474+52.45
 CL
 -L-

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST C. Bukovitz											
SITE DESCRIPTION Bridge 702 on -L- (Future I-74) over Lowery Mill Creek							GROUND WTR (ft)										
BORING NO. B1-A (LL)		STATION 472+85		OFFSET 83 ft LT		ALIGNMENT -L-											
COLLAR ELEV. 859.9 ft		TOTAL DEPTH 67.8 ft		NORTHING 874,573		EASTING 1,657,775											
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic											
DRILLER B. Thomas		START DATE 01/14/16		COMP. DATE 01/15/16		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)		
860	859.9	0.0	3	2	2										859.9	GROUND SURFACE	0.0
855	856.4	3.5	3	3	3										857.9	ALLUVIAL Red-Brown, Fine Sandy SILT (A-4), Soft, with Trace Organics	2.0
	851.4	8.5														Gray-Red-Brown, Silty CLAY (A-6), Medium Stiff to Soft, Micaceous, with Trace Organics	
845	846.4	13.5	1	1	2										847.9	Brown-Gray, Fine to Coarse Sandy SILT (A-4), Soft, Micaceous	12.0
	841.4	18.5	2	1	3										846.1	RESIDUAL Red-Brown-Black, Fine Sandy SILT (A-4), Soft to Very Stiff, Micaceous, with Trace Clay	13.8
835	836.4	23.5	3	4	17										835.4	Red-Brown-Black, Silty Fine SAND (A-2-4), Medium Dense, Micaceous	24.5
	831.4	28.5	11	14	18										828.4	WEATHERED ROCK Gray-White, (GNEISS)	31.5
825	826.4	33.5	100/0.2														
	821.4	38.5	100/0.2														
815	816.4	43.5	78	22/0.2													
	812.3	47.6	60/0.0												812.3	CRYSTALLINE ROCK	47.6
810															812.1	Gray-White-Pink, (AMPHIBOLITE MICA GNEISS)	47.8
															809.8	Gray-White, (AMPHIBOLITE MICA GNEISS)	50.1
805																	
800																	
795															796.3	Gray-White-Pink, (GRANITIC GNEISS)	63.6
															792.1	Boring Terminated at Elevation 792.1 ft IN CRYSTALLINE ROCK (GRANITIC GNEISS)	67.8

NCDOT BORE DOUBLE U2579C_GEO_BRDG702.GPJ NC_DOT_GDT 4/19/16

RS-1

GEOTECHNICAL BORING REPORT CORE LOG

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST C. Bukovitz					
SITE DESCRIPTION Bridge 702 on -L- (Future I-74) over Lowery Mill Creek							GROUND WTR (ft)				
BORING NO. B1-A (LL)		STATION 472+85		OFFSET 83 ft LT		ALIGNMENT -L-					
COLLAR ELEV. 859.9 ft		TOTAL DEPTH 67.8 ft		NORTHING 874,573		EASTING 1,657,775					
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic					
DRILLER B. Thomas		START DATE 01/14/16		COMP. DATE 01/15/16		SURFACE WATER DEPTH N/A					
CORE SIZE NQ2		TOTAL RUN 20.0 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) %			
812.1										Begin Coring @ 47.8 ft	
810	812.1	47.8	5.0	2:27/1.0 1:24/1.0 3:13/1.0 5:20/1.0 5:38/1.0	(4.3) 86%	(1.9) 38%	(1.7) 74%	(0.0) 0%		812.1 Moderate to Slightly Weathered, Moderately Hard to Hard, Very Close to Close Fracture Spacing, Gray-White-Pink (AMPHIBOLITE MICA GNEISS)	47.8
	807.1	52.8					(13.5) 100%	(11.6) 86%		809.8 Very Slight to Fresh Weathering, Hard, Close to Moderately Close Fracture Spacing, Gray-White (AMPHIBOLITE MICA GNEISS)	50.1
805			5.0	4:29/1.0 4:30/1.0 4:45/1.0 5:09/1.0 5:52/1.0	(5.0) 100%	(4.3) 86%					
800	802.1	57.8									RS-1: 58.9-59.3' q _{u-1} =6,405 psi
	797.1	62.8									796.3
795			5.0	5:03/1.0 5:01/1.0 4:46/1.0 4:52/1.0 4:57/1.0	(4.8) 96%	(4.3) 86%	(3.2) 76%	(0.3) 7%		Moderate to Slight Weathering, Moderately Hard to Hard, Very Close to Close Fracture Spacing, Gray-White-Pink (GRANITIC GNEISS)	63.6
	792.1	67.8									792.1
										Boring Terminated at Elevation 792.1 ft IN CRYSTALLINE ROCK (GRANITIC GNEISS)	

NCDOT CORE DOUBLE U2579C_GEO_BRDG702.GPJ NC_DOT.GDT 4/19/16



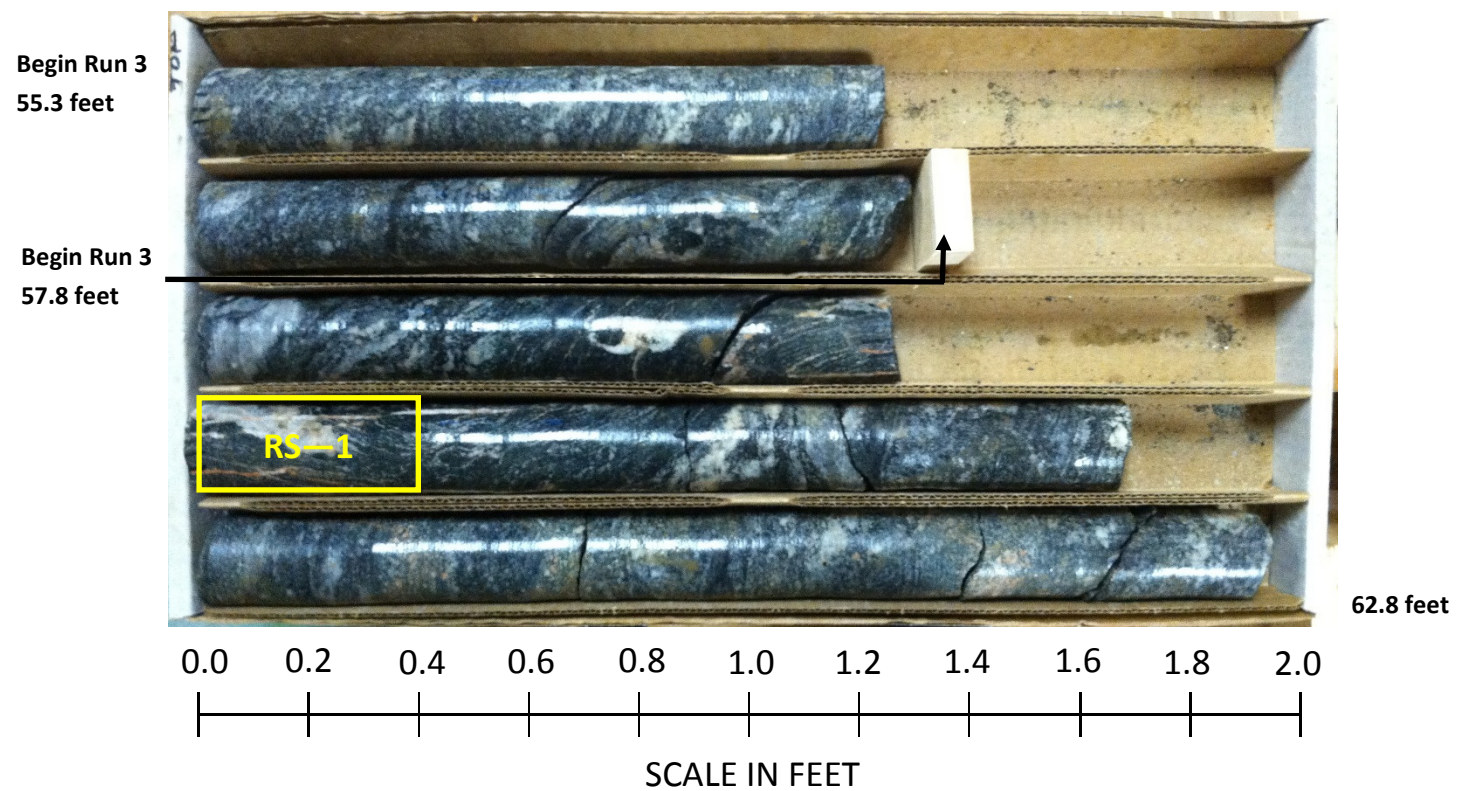
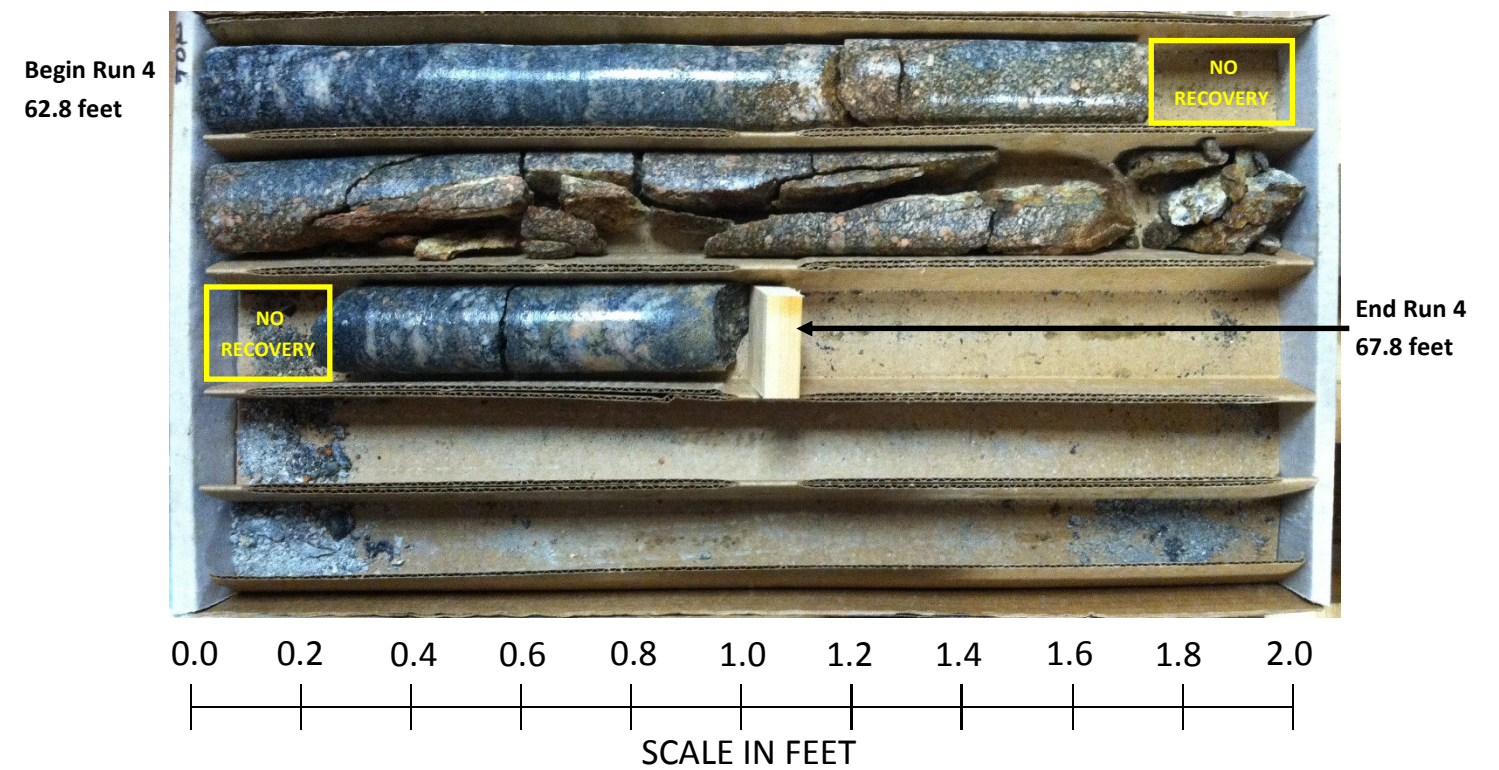
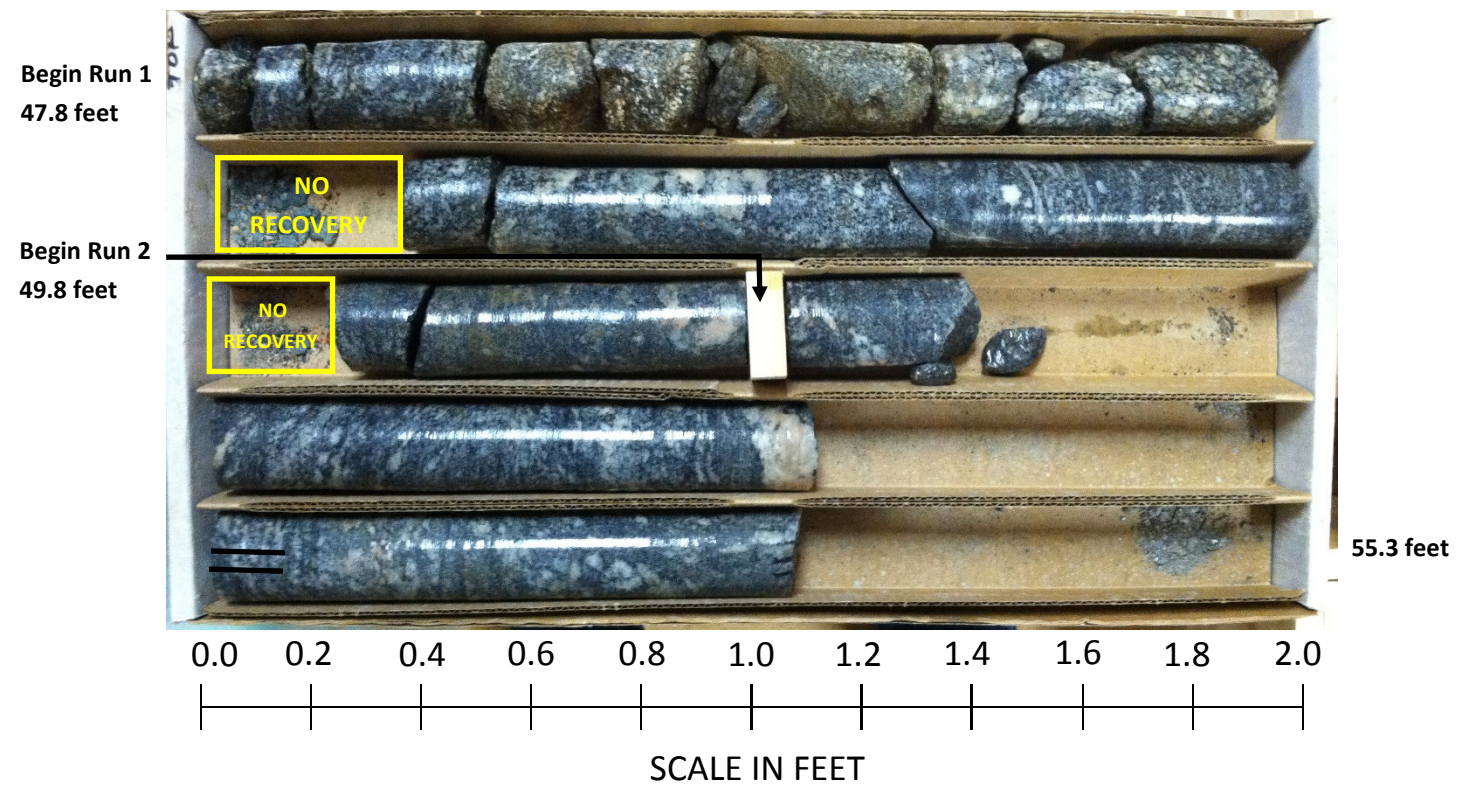
Bridge No. 702 on -L- (Future I-74) over Lowery Mill Creek

WBS - 34839.1.1 TIP No. - U-2579C

ECS Carolinas Project No. 08:11502

Sheet No. 13

Rock Core Photographs: Boring - B1-A (LL) — Station: 472+85 Offset: 83' LT



GEOTECHNICAL BORING REPORT CORE LOG

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST C. Bukovitz					
SITE DESCRIPTION Bridge 702 on -L- (Future I-74) over Lowery Mill Creek							GROUND WTR (ft)				
BORING NO. B1-B (LL)		STATION 473+05		OFFSET 11 ft LT		ALIGNMENT -L-					
COLLAR ELEV. 859.2 ft		TOTAL DEPTH 69.8 ft		NORTHING 874,501		EASTING 1,657,755					
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic					
DRILLER B. Thomas		START DATE 01/13/16		COMP. DATE 01/14/16		SURFACE WATER DEPTH N/A					
CORE SIZE NQ2		TOTAL RUN 25.0 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) %			
814.4										Begin Coring @ 44.8 ft	
	814.4	44.8	5.0	4:22/1.0 5:03/1.0 4:14/1.0 5:54/1.0 2:11/1.0	(4.1) 82%	(2.3) 46%	(4.2) 93%	(2.3) 51%		814.4 Very Slightly Weathered to Fresh, Hard, Very Close to Close Fracture Spacing, Gray-White (AMPHIBOLITE MICA GNEISS)	44.8
810	809.4	49.8								809.9	49.3
			5.0	1:33/1.0 2:47/1.0 3:18/1.0 3:55/1.0 5:24/1.0	(4.0) 80%	(1.8) 36%	(0.0) 0%	(0.0) 0%		WEATHERED ROCK (GNEISS)	50.8
805	804.4	54.8							RS-2	804.4 Slightly to Very Slightly Weathered, Moderately Hard to Hard, Very Close to Moderately Close Fracture Spacing, Gray-White (AMPHIBOLITE MICA GNEISS)	54.8
			5.0	1:36/1.0 2:05/1.0 2:10/1.0 2:40/1.0 3:24/1.0	(3.9) 78%	(0.5) 10%	(6.9) 84%	(0.5) 6%		CRYSTALLINE ROCK RS-2: 52.8-53.2' q ₋₂ = 8,836 psi	
800	799.4	59.8								796.2 Moderate to Slight Weathering, Moderately Hard to Hard, Very Close to Close Fracture Spacing, Gray-White-Pink (AMPHIBOLITE MICA GNEISS)	63.0
			5.0	2:17/1.0 2:51/1.0 2:14/1.0 3:04/1.0 4:27/1.0	(4.7) 94%	(0.9) 18%	(6.7) 99%	(4.3) 63%		794.4 Very Slightly Weathered to Fresh, Hard, Close to Moderately Close Fracture Spacing, Gray-White (AMPHIBOLITE MICA GNEISS)	
795	794.4	64.8									
			5.0	5:20/1.0 4:48/1.0 4:46/1.0 4:57/1.0 4:59/1.0	(5.0) 100%	(4.3) 86%				789.4 Boring Terminated at Elevation 789.4 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)	69.8
790	789.4	69.8									

NCDOT CORE DOUBLE U2579C_GEO_BRDG702.GPJ NC_DOT.GDT 4/19/16



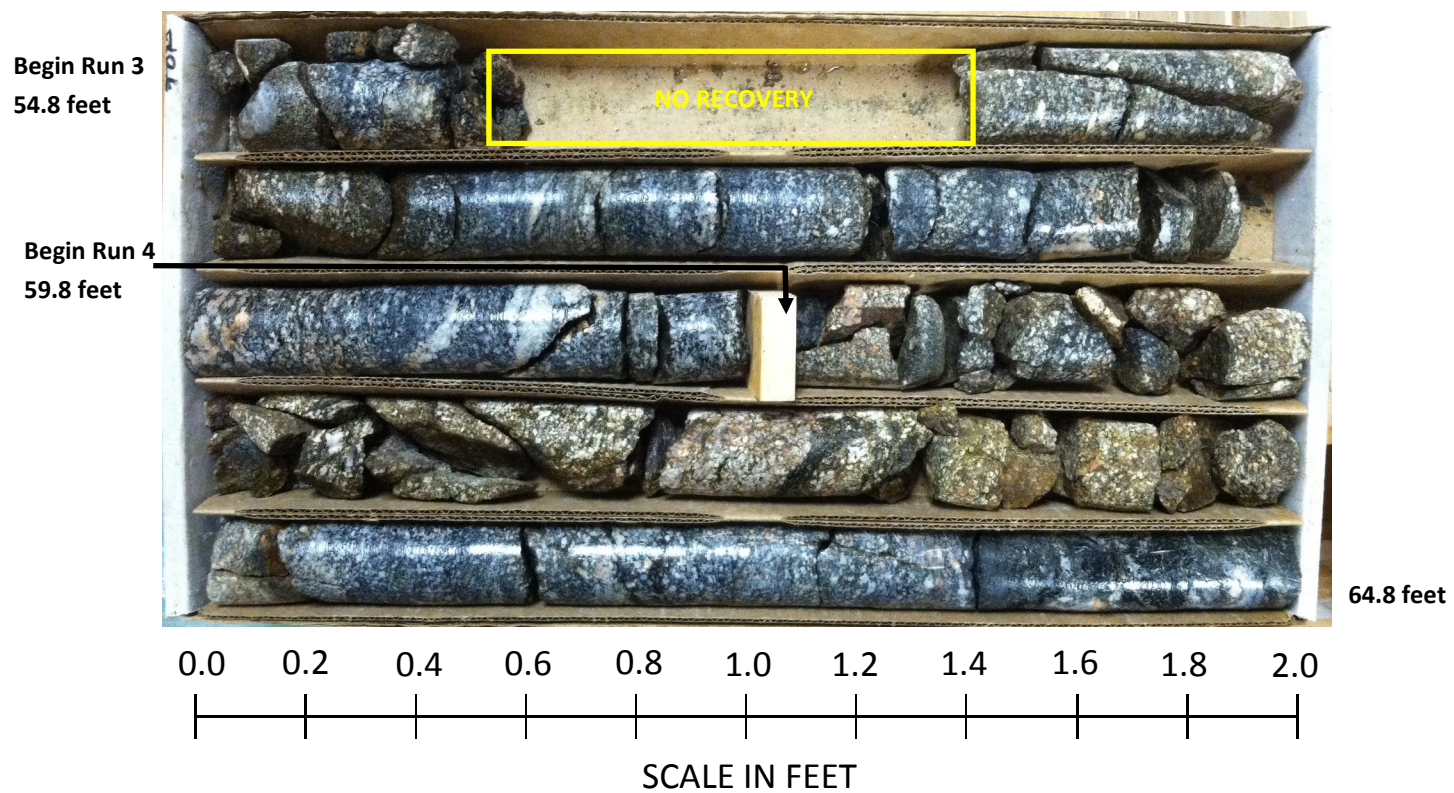
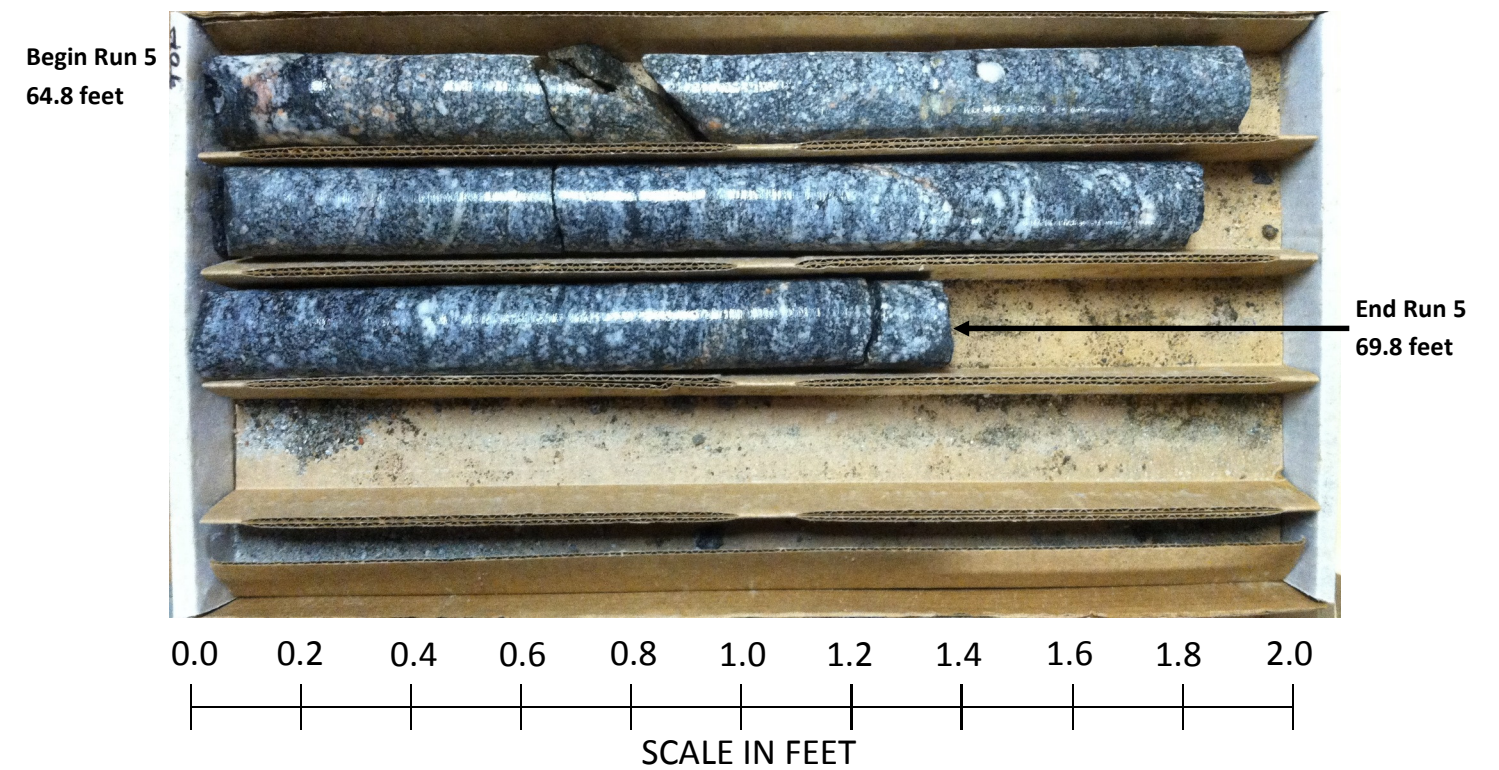
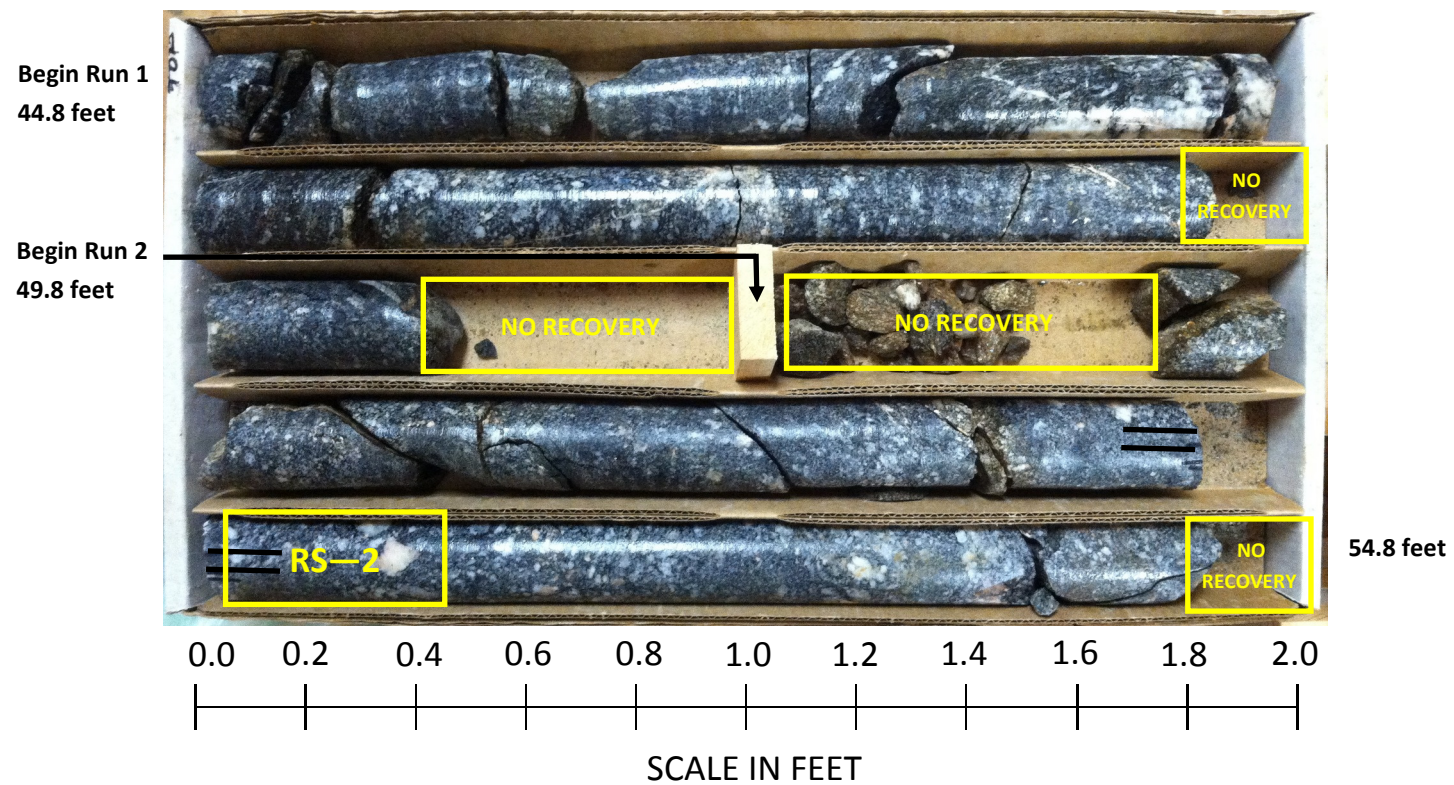
Bridge No. 702 on -L- (Future I-74) over Lowery Mill Creek

WBS - 34839.1.1 TIP No. - U-2579C

ECS Carolinas Project No. 08:11502

Sheet No. 16

Rock Core Photographs: Boring - B1-B (LL) — Station: 473+05 Offset: 11' LT



GEOTECHNICAL BORING REPORT


BORE LOG

WBS 34839.1.1	TIP U-2579C	COUNTY FORSYTH	GEOLOGIST C. Bukovitz
SITE DESCRIPTION Bridge 702 on -L- (Future I-74) over Lowery Mill Creek			GROUND WTR (ft)
BORING NO. B2-A (LL)	STATION 473+81	OFFSET 83 ft LT	ALIGNMENT -L-
COLLAR ELEV. 858.9 ft	TOTAL DEPTH 53.9 ft	NORTHING 874,523	EASTING 1,657,857
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER B. Thomas	START DATE 01/20/16	COMP. DATE 01/20/16	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				
860	858.9	0.0											GROUND SURFACE	0.0
855	855.4	3.5	2	1	2	3						M	ARTIFICIAL FILL Red-Brown, Fine Sandy, Clayey SILT (A-5), Soft	4.1
850	850.4	8.5	2	1	2	4						M	ALLUVIAL Blue-Gray, Silty Fine to Coarse SAND (A-2-4), Very Loose	9.5
845	845.4	13.5	4	4	5	9						W	RESIDUAL Gray-Black, Fine Sandy SILT (A-4), Soft, Micaceous	14.1
840	840.4	18.5	3	4	4	8						M	Black-Yellow-Brown-Orange, Silty Fine SAND (A-2-4), Loose to Medium Dense, Micaceous	28.5
835	835.4	23.5	7	9	8	17						M	WEATHERED ROCK Brown-White (GNEISS).	33.6
830	830.4	28.5	17	83/0.4		60/0.0						M	CRYSTALLINE ROCK Gray-White-Pink, (AMPHIBOLITE MICA GNEISS).	33.9
825	825.3	33.6	60/0.0											
820														
815														
810														
805												RS-3		
Boring Terminated at Elevation 805.0 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)														

NCDOT BORE DOUBLE U2579C_GEO_BRDG702.GPJ NC_DOT.GDT 4/19/16

GEOTECHNICAL BORING REPORT CORE LOG

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST C. Bukovitz						
SITE DESCRIPTION Bridge 702 on -L- (Future I-74) over Lowery Mill Creek							GROUND WTR (ft)					
BORING NO. B2-A (LL)		STATION 473+81		OFFSET 83 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 858.9 ft		TOTAL DEPTH 53.9 ft		NORTHING 874,523		EASTING 1,657,857						
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic						
DRILLER B. Thomas		START DATE 01/20/16		COMP. DATE 01/20/16		SURFACE WATER DEPTH N/A						
CORE SIZE NQ2		TOTAL RUN 20.0 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) %				
825	825.0	33.9	5.0	4:10/1.0 4:37/1.0 4:35/1.0 4:15/1.0 4:10/1.0	(5.0) 100%	(3.5) 70%	(20.0) 100%	(16.4) 82%		Begin Coring @ 33.9 ft	33.9	
										825.0	Very Slightly Weathered to Fresh, Moderately Hard to Hard, Very Close to Moderately Close Fracture Spacing, Gray-White-Pink, (AMPHIBOLITE MICA GNEISS).	
820	820.0	38.9	5.0	3:37/1.0 4:20/1.0 3:29/1.0 3:32/1.0 3:21/1.0	(5.0) 100%	(3.1) 62%						
815	815.0	43.9	5.0	4:08/1.0 3:50/1.0 4:16/1.0 4:02/1.0 3:57/1.0	(5.0) 100%	(4.9) 98%						
810	810.0	48.9	5.0	3:10/1.0 3:18/1.0 3:07/1.0 3:18/1.0 2:45/1.0	(5.0) 100%	(4.9) 98%						
805	805.0	53.9								RS-3: 49.2-49.6' q _u -3 = 10,133 psi	53.9	
Boring Terminated at Elevation 805.0 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)												

NCDOT CORE DOUBLE U2579C_GEO_BRDG702.GPJ NC_DOT.GDT 4/19/16

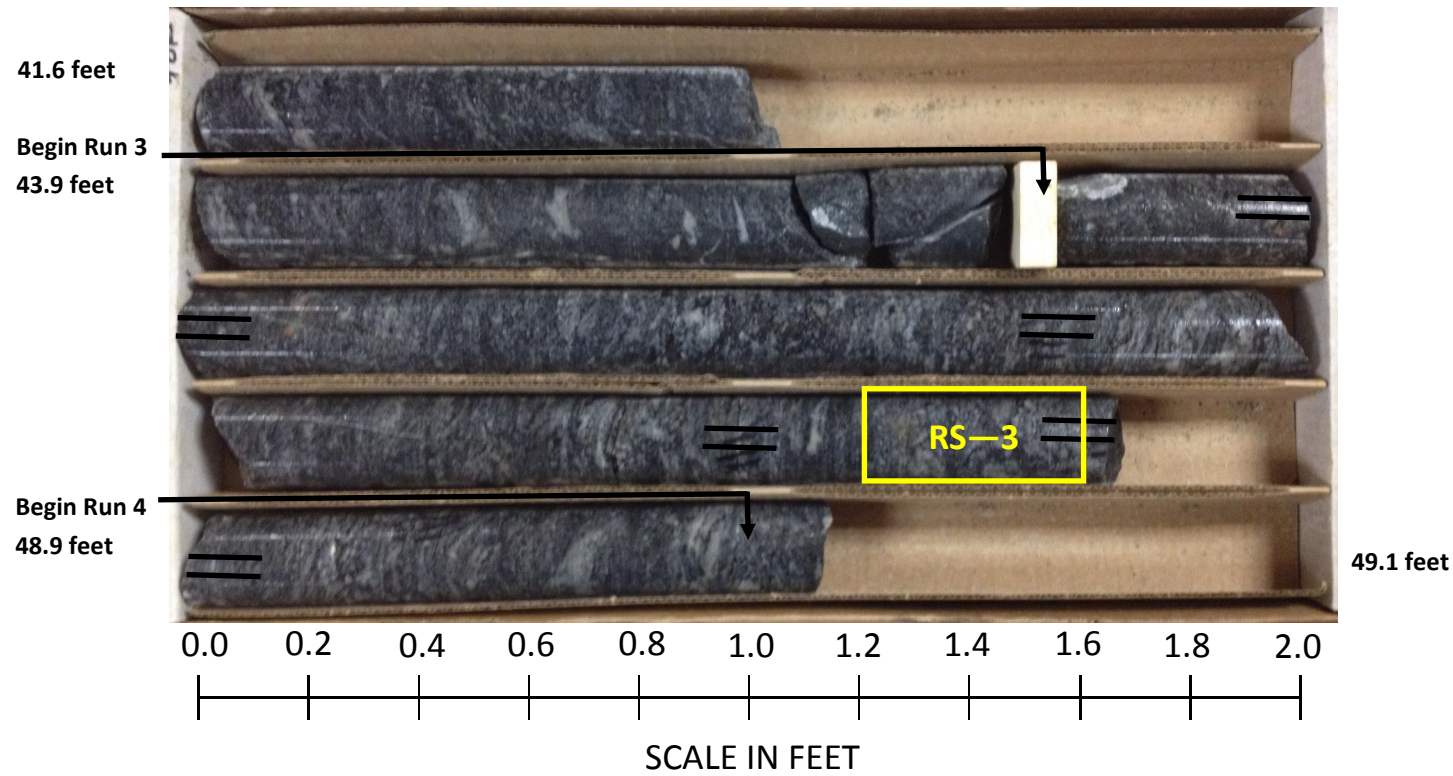
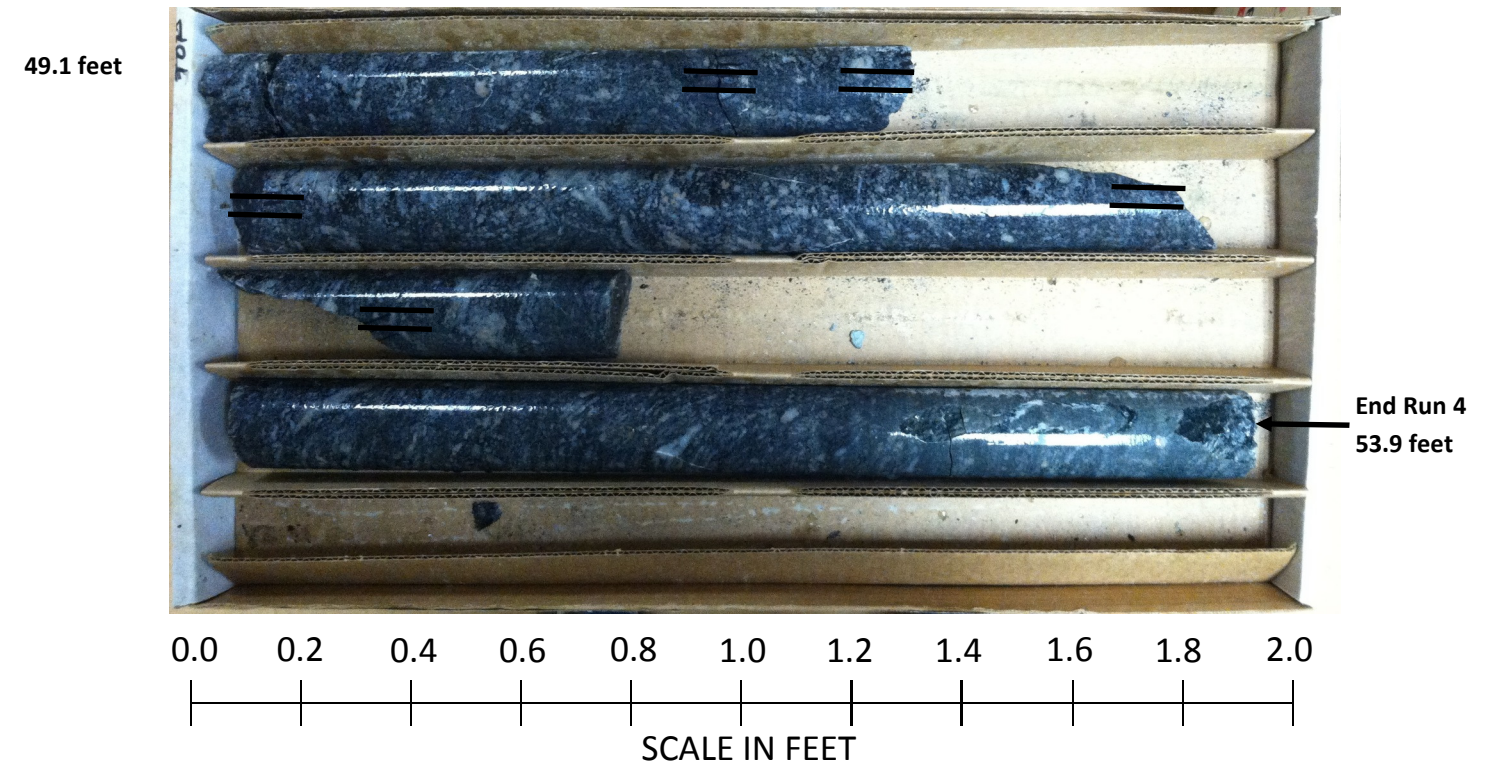
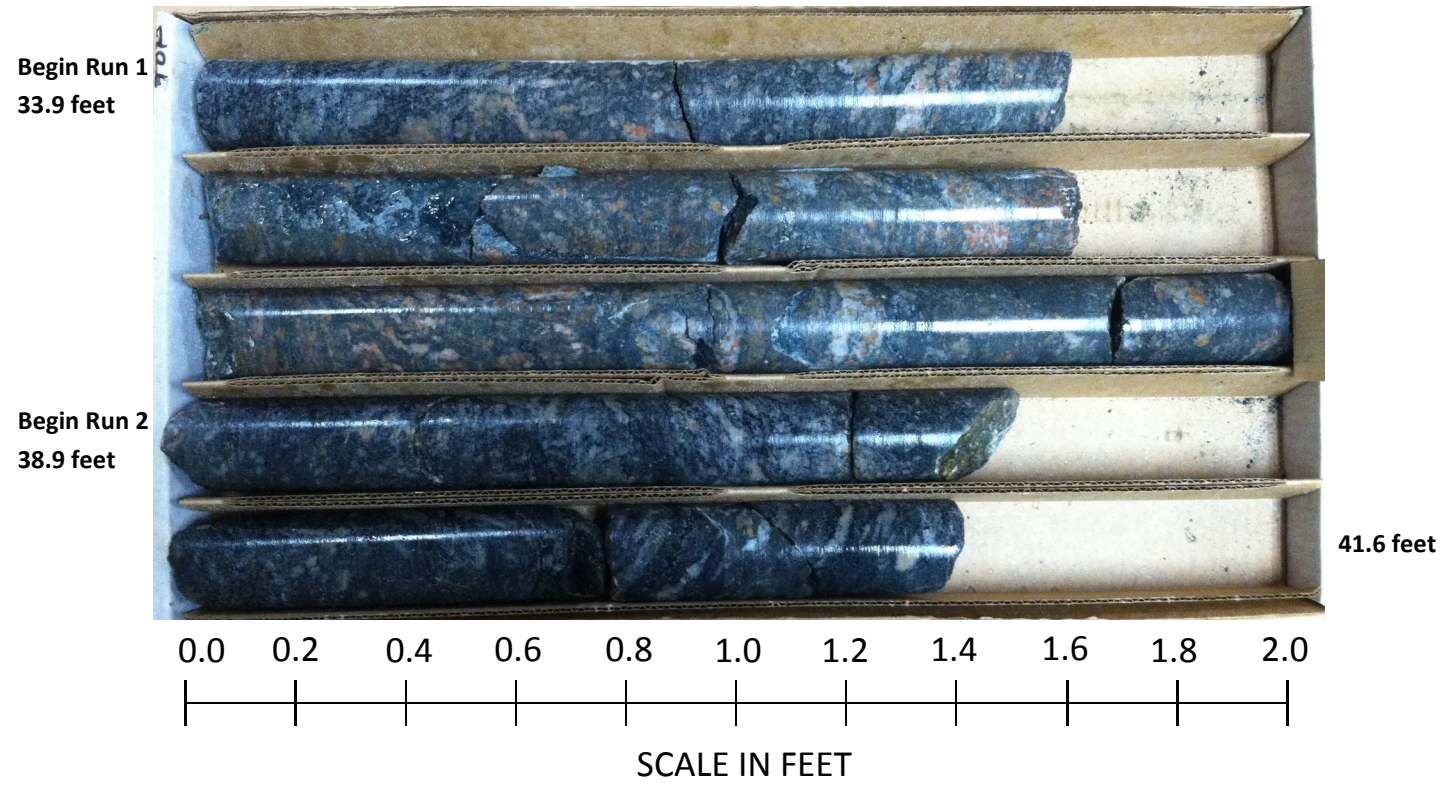


Bridge No. 702 on -L- (Future I-74) over Lowery Mill Creek

WBS - 34839.1.1 TIP No. - U-2579C

ECS Carolinas Project No. 08:11502

Rock Core Photographs: Boring - B2-A (LL) — Station: 473+81 Offset: 83' LT



GEOTECHNICAL BORING REPORT CORE LOG

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST C. Bukovitz						
SITE DESCRIPTION Bridge 702 on -L- (Future I-74) over Lowery Mill Creek							GROUND WTR (ft)					
BORING NO. B2-B (LL)		STATION 474+00		OFFSET 11 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 858.6 ft		TOTAL DEPTH 50.9 ft		NORTHING 874,452		EASTING 1,657,836						
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic						
DRILLER B. Thomas		START DATE 01/19/16		COMP. DATE 01/20/16		SURFACE WATER DEPTH N/A						
CORE SIZE NQ2		TOTAL RUN 20.0 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) %				
827.7	827.7	30.9	5.0	N=60/0.0 3:59/1.0 4:45/1.0 4:34/1.0 4:20/1.0 4:10/1.0	(5.0) 100%	(4.2) 84%	(20.0) 100%	(14.6) 73%		Begin Coring @ 30.9 ft	30.9	
825	822.7	35.9	5.0	3:41/1.0 3:33/1.0 3:59/1.0 3:58/1.0 4:18/1.0	(5.0) 100%	(4.4) 88%				RS-4	CRystalline Rock Slightly Weathered to Fresh, Moderately Hard to Hard, Very Close to Close Fracture Spacing, Gray-White-Green, (AMPHIBOLITE MICA GNEISS) RS-4: 35.4-35.8' q _{u-4} = 4,003 psi	
820	817.7	40.9	5.0	4:14/1.0 4:22/1.0 4:34/1.0 4:18/1.0 4:17/1.0	(5.0) 100%	(2.9) 58%						
815	812.7	45.9	5.0	3:34/1.0 3:34/1.0 3:57/1.0 4:01/1.0 3:59/1.0	(5.0) 100%	(3.1) 62%						
810	807.7	50.9										
											Boring Terminated at Elevation 807.7 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)	50.9

NCDOT CORE DOUBLE U2579C_GEO_BRDG702.GPJ NC_DOT.GDT 4/19/16



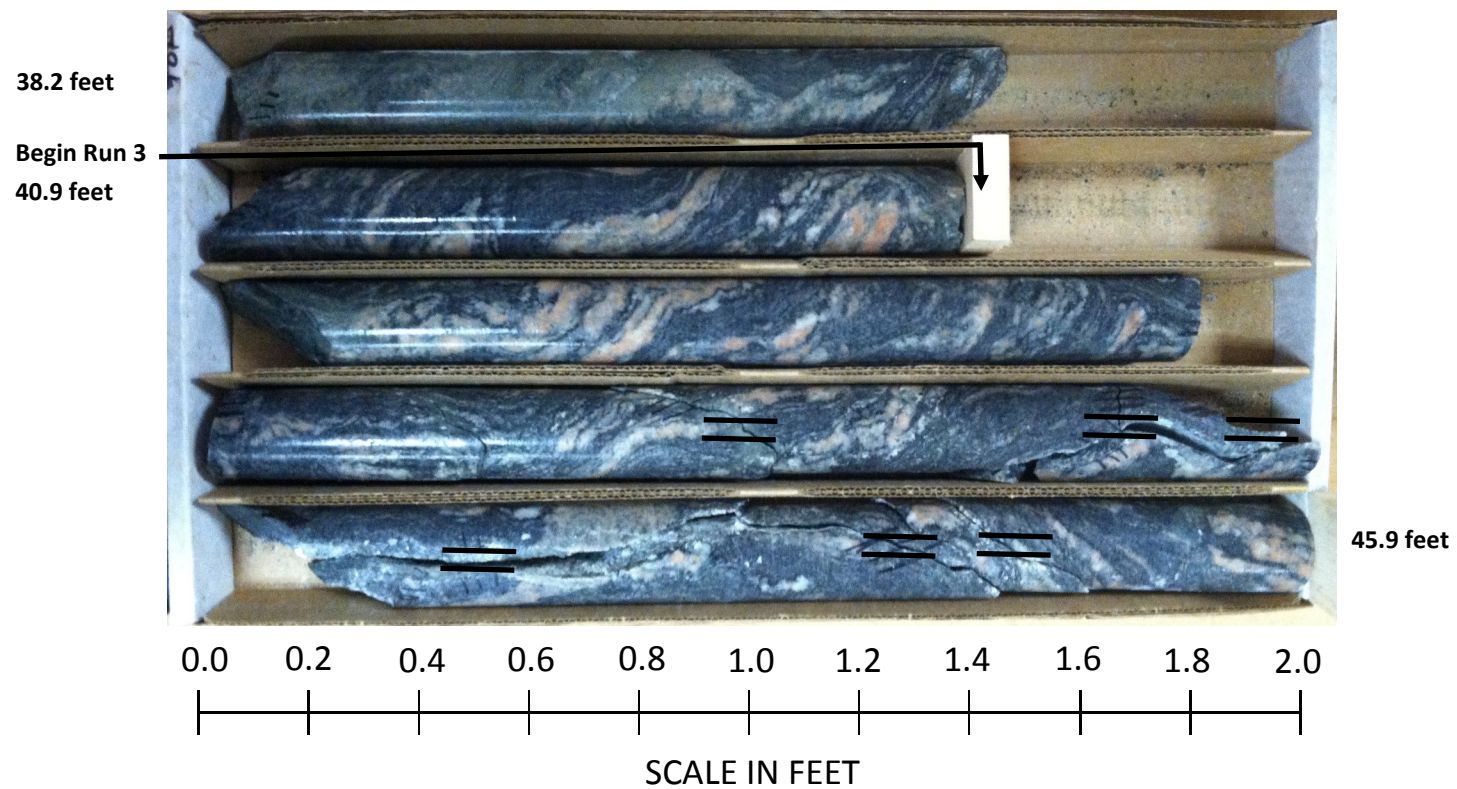
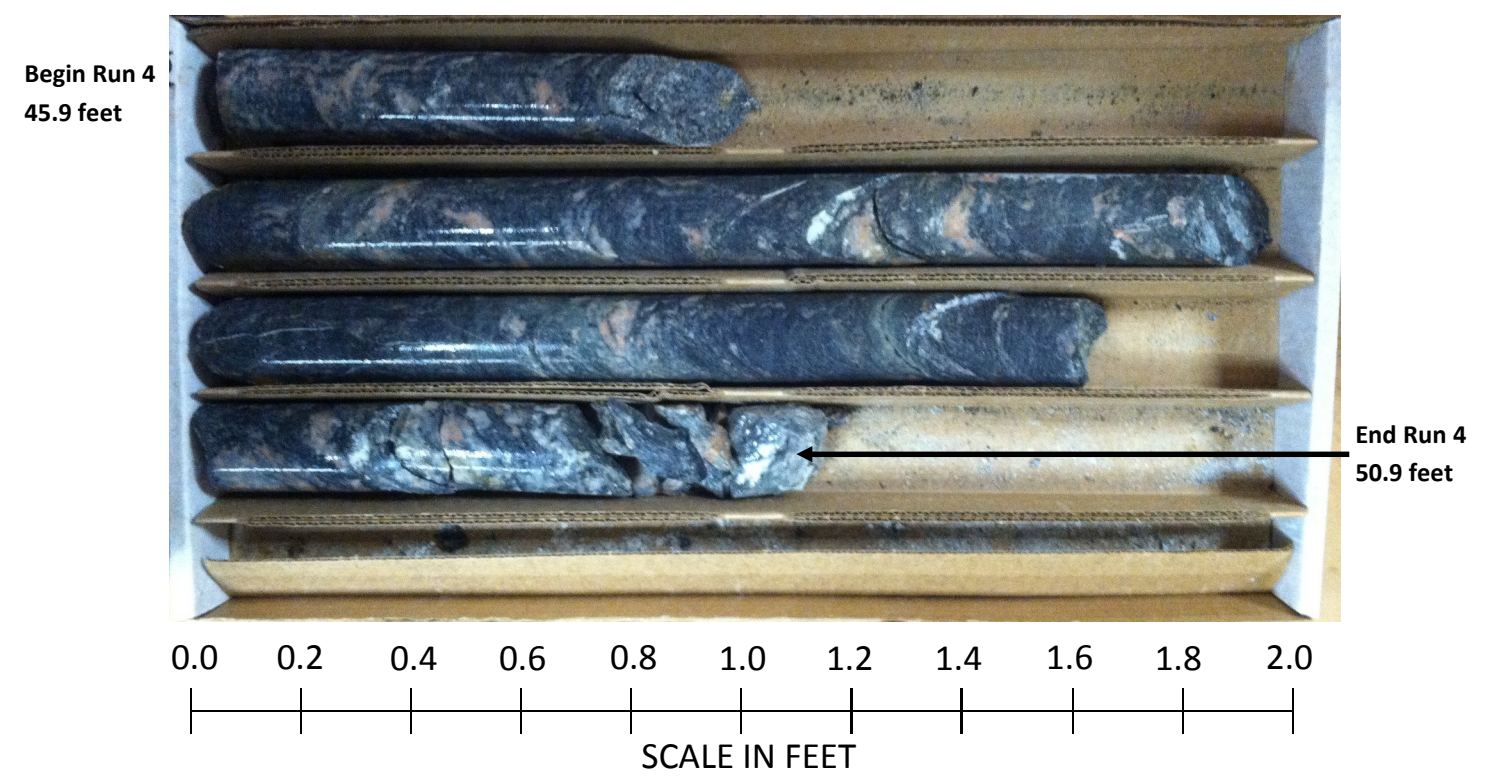
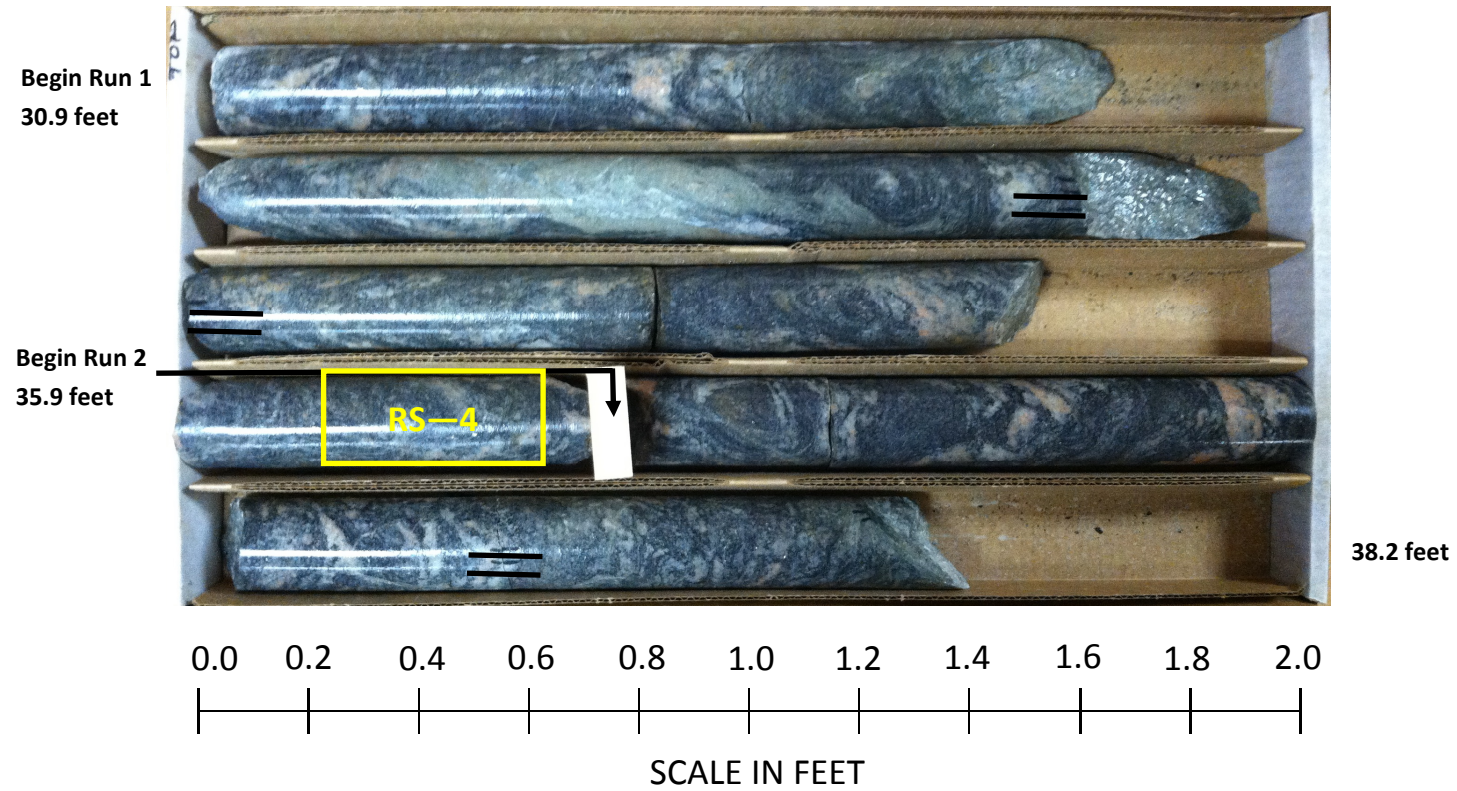
Bridge No. 702 on -L- (Future I-74) over Lowery Mill Creek

WBS - 34839.1.1 TIP No. - U-2579C

ECS Carolinas Project No. 08:11502

Sheet No. 22

Rock Core Photographs: Boring - B2-B (LL) — Station: 474+00 Offset: 11' LT



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST J. Bradshaw										
SITE DESCRIPTION Bridge 702 on -L- (Future I-74) over Lowery Mill Creek							GROUND WTR (ft)									
BORING NO. EB2-A (LL)		STATION 474+35		OFFSET 83 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 858.2 ft		TOTAL DEPTH 37.0 ft		NORTHING 874,495		EASTING 1,657,903										
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 01/20/16		COMP. DATE 01/20/16		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						
860	858.2	0.0	2	1	2									858.2	GROUND SURFACE	0.0
855	854.7	3.5	2	3	2									856.2	ALLUVIAL Tan, Fine Sandy CLAY (A-6), Soft Tan-Gray, Fine Sandy, Silty CLAY (A-7-5(18)), Medium Stiff	2.9
	849.7	8.5	2	1	1									851.2	Tan-Gray, Fine to Coarse Sandy, Silty CLAY (A-6(8)), Very Soft	7.0
845	844.7	13.5	2	1	3									846.2	RESIDUAL Red-Brown-Tan, Fine Sandy SILT (A-4), Soft to Stiff, Micaceous	12.0
840	839.7	18.5	5	8	6									836.2	Tan, Silty Fine to Coarse SAND (A-2-4), Loose, Micaceous	22.0
835	834.7	23.5	2	2	4									824.2	WEATHERED ROCK Tan-Gray, (GNEISS).	34.0
830	829.7	28.5	3	3	3									821.2	Boring Terminated with Standard Penetration Test Refusal at Elevation 821.2 ft ON CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)	37.0
825	824.7	33.5	15	60	40/0.1									821.2	Other Samples: ST-2 (3.0 - 4.0)	

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST J. Bradshaw										
SITE DESCRIPTION Bridge 702 on -L- (Future I-74) over Lowery Mill Creek							GROUND WTR (ft)									
BORING NO. EB2-B (LL)		STATION 474+53		OFFSET 11 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 857.8 ft		TOTAL DEPTH 38.0 ft		NORTHING 874,424		EASTING 1,657,881										
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 01/19/16		COMP. DATE 01/19/16		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						
860	857.8	0.0	2	1	2									857.8	GROUND SURFACE	0.0
855	854.3	3.5	7	4	6									855.8	ALLUVIAL Tan-Gray, Fine to Coarse Sandy CLAY (A-6), Soft Tan-Gray, Silty CLAY (A-7-6(15)), Stiff	2.0
	849.3	8.5	3	7	3									845.8	RESIDUAL Tan-Orange-Yellow, Fine to Coarse Sandy SILT (A-4), Medium Stiff to Stiff, Micaceous	12.0
845	844.3	13.5	2	3	5									834.8	Tan, Fine to Coarse Sandy Clayey SILT (A-5), Hard	23.0
840	839.3	18.5	5	5	5									829.3	WEATHERED ROCK Tan-Gray, (GNEISS).	28.5
835	834.3	23.5	14	21	12									825.8	RESIDUAL Tan, Fine to Coarse Sandy, Clayey SILT (A-5), Hard	32.0
830	829.3	28.5	16	84/0.1										819.8	Boring Terminated with Standard Penetration Test Refusal at Elevation 819.8 ft ON CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)	38.0
825	824.3	33.5	18	29	12											
820	819.8	38.0														

NCDOT BORE DOUBLE U2579C_GEO_BRDG702.GPJ NC_DOT.GDT 3/30/16

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34939.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST M. Brewer	
SITE DESCRIPTION Bridge No. 703 (RL) on -L- over Lowery Mill Creek							GROUND WTR (ft)
BORING NO. EB1-A (RL)		STATION 472+37		OFFSET 18 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 868.1 ft		TOTAL DEPTH 73.6 ft		NORTHING 874,511		EASTING 1,657,682	
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic			
DRILLER B. Thomas		START DATE 01/11/16		COMP. DATE 01/11/16		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			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
870	868.1	0.0	2	2	2										868.1	0.0	GROUND SURFACE
865	864.6	3.5	5	6	8							SS-15	23%		864.6	3.5	RESIDUAL Brown-Red, Clayey, Fine Sandy SILT (A-4), Trace Root Fragments, Soft
860	859.6	8.5	5	6	6										861.1	7.0	Red-Brown, Fine to Coarse Sandy, Silty CLAY (A-7-5(14)), Trace Mica, Stiff
855	854.6	13.5	1	0	1										856.1	12.0	Tan-Red-Orange, Silty Fine SAND (A-2-4), Medium Dense, Micaceous
850	849.6	18.5	2	2	2												Orange-Gray-Brown, Fine Sandy SILT (A-4), Very Soft to Medium Stiff, Micaceous
845	844.6	23.5	3	2	4												
840	839.6	28.5	2	2	4												
835	834.6	33.5	4	4	6										836.1	32.0	Gray-Brown to Gray-White Orange, Silty Fine to Coarse SAND (A-2-4), Loose, Micaceous
830	829.6	38.5	6	4	5										826.1	42.0	Tan-Brown to Gray-Brown, Fine Sandy SILT (A-4), Stiff to Hard, Micaceous
825	824.6	43.5	2	3	7												
820	819.6	48.5	4	5	9												
815	814.6	53.5	22	30	34												
810	809.6	58.5	20	20	21												
805	804.6	63.5	100/0.3														
800	799.6	68.5	75	25/0.2													
795	794.6	73.5	60/0.1														
															794.6	73.5	WEATHERED ROCK Gray-White to Orange-Red-White (GNEISS)
															794.5	73.5	CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS). Boring Terminated with Standard Penetration Test Refusal at Elevation 794.5 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)

WBS 34939.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST M. Brewer	
SITE DESCRIPTION Bridge No. 703 (RL) on -L- over Lowery Mill Creek							GROUND WTR (ft)
BORING NO. EB1-B (RL)		STATION 472+35		OFFSET 76 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 871.2 ft		TOTAL DEPTH 58.6 ft		NORTHING 874,463		EASTING 1,657,650	
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic			
DRILLER B. Thomas		START DATE 01/11/16		COMP. DATE 01/11/16		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			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
875																	
870	871.2	0.0	2	2	3										871.2	0.0	GROUND SURFACE
865	867.7	3.5	2	5	6										870.3	0.9	RESIDUAL Brown, Clayey, Fine Sandy SILT (A-4), with Trace Roots, Medium Stiff
860	862.7	8.5	2	4	6										869.2	2.0	Red-Brown, Fine Sandy Silty CLAY (A-7-5), Medium Stiff
855	857.7	13.5	3	3	2												Red-Orange-Brown, Fine Sandy SILT (A-4), with Little Clay, Stiff
850	852.7	18.5	2	2	4												
845	847.7	23.5	4	6	15												
840	842.7	28.5	7	7	6												
835	837.7	33.5	3	4	6												
830	832.7	38.5	6	10	15												
825	827.7	43.5	12	24	39												
820	822.7	48.5	27	100/0.4													
815	817.7	53.5	100/0.4														
	812.7	58.5	60/0.1														
															824.2	47.0	WEATHERED ROCK Gray-Tan-White (GNEISS)
															812.7	58.5	CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS). Boring Terminated with Standard Penetration Test Refusal at Elevation 812.6 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)

NCDOT BORE DOUBLE U2579C_GEO_BRDG703.GPJ NC_DOT.GDT 4/19/16

GEOTECHNICAL BORING REPORT CORE LOG

WBS 34939.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST C. Bukovitz					
SITE DESCRIPTION Bridge No. 703 (RL) on -L- over Lowery Mill Creek							GROUND WTR (ft)				
BORING NO. B1-A (RL)		STATION 473+10		OFFSET 11 ft RT		ALIGNMENT -L-					
COLLAR ELEV. 859.0 ft		TOTAL DEPTH 81.0 ft		NORTHING 874,479		EASTING 1,657,748					
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic					
DRILLER B. Thomas		START DATE 01/12/16		COMP. DATE 01/13/16		SURFACE WATER DEPTH N/A					
CORE SIZE NQ		TOTAL RUN 20.0 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) %			
798										Begin Coring @ 61.0 ft	
795	798.0	61.0	5.0	2:10/1.0 4:02/1.0 3:16/1.0	(1.7) 34%	(0.0) 0%	(1.7) 94%	(0.0) 0%		Slightly to Very Slightly Weathered, Hard, Very Close Fracture Spacing, Gray-White (GRANITIC GNEISS)	61.0 62.8
	793.0	66.0		3:04/1.0 3:58/1.0			(0.0) 0%	(0.0) 0%		WEATHERED ROCK Weathered Zone, No Recovery (GNEISS)	66.0
790			5.0	3:27/1.0 3:57/1.0 4:53/1.0 3:33/1.0 3:10/1.0	(4.7) 94%	(2.9) 58%	(14.5) 97%	(11.0) 73%		CRYSTALLINE ROCK Very Slightly Weathered to Fresh, Hard to Very Hard, Very Close to Moderately Close Fracture Spacing, Gray-White-Black (AMPHIBOLITE MICA GNEISS)	
785	788.0	71.0	5.0	2:33/1.0 3:48/1.0 3:30/1.0 3:20/1.0 3:58/1.0	(4.9) 98%	(4.0) 80%			RS-5	RS-5: 71.1-71.5' q _u -5 = 7,193 psi	
780	783.0	76.0	5.0	3:46/1.0 2:58/1.0 3:24/1.0 3:42/1.0 3:12/1.0	(4.9) 98%	(4.1) 82%					
	778.0	81.0								Boring Terminated at Elevation 778.0 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)	81.0

NCDOT CORE DOUBLE U2579C_GEO_BRDG703.GPJ NC_DOT.GDT 4/19/16



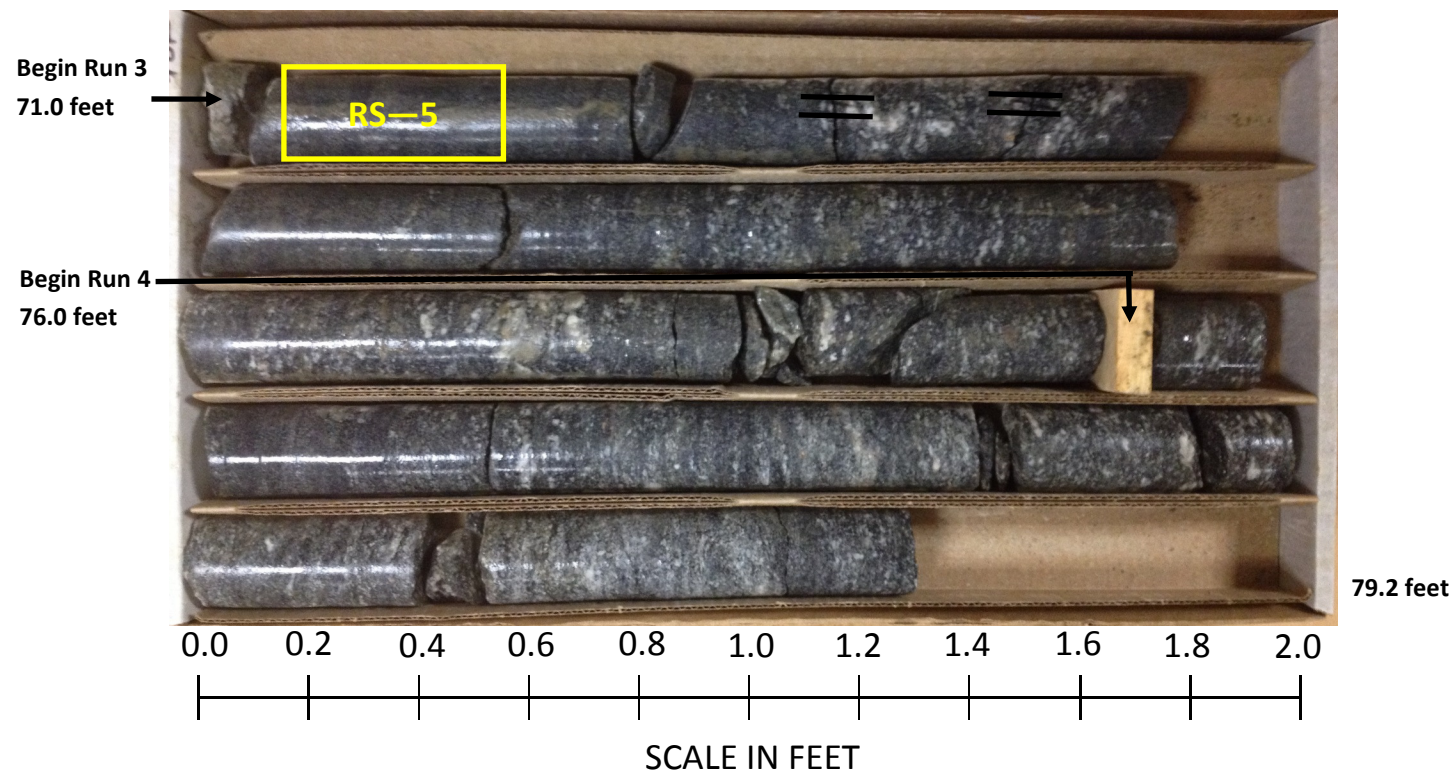
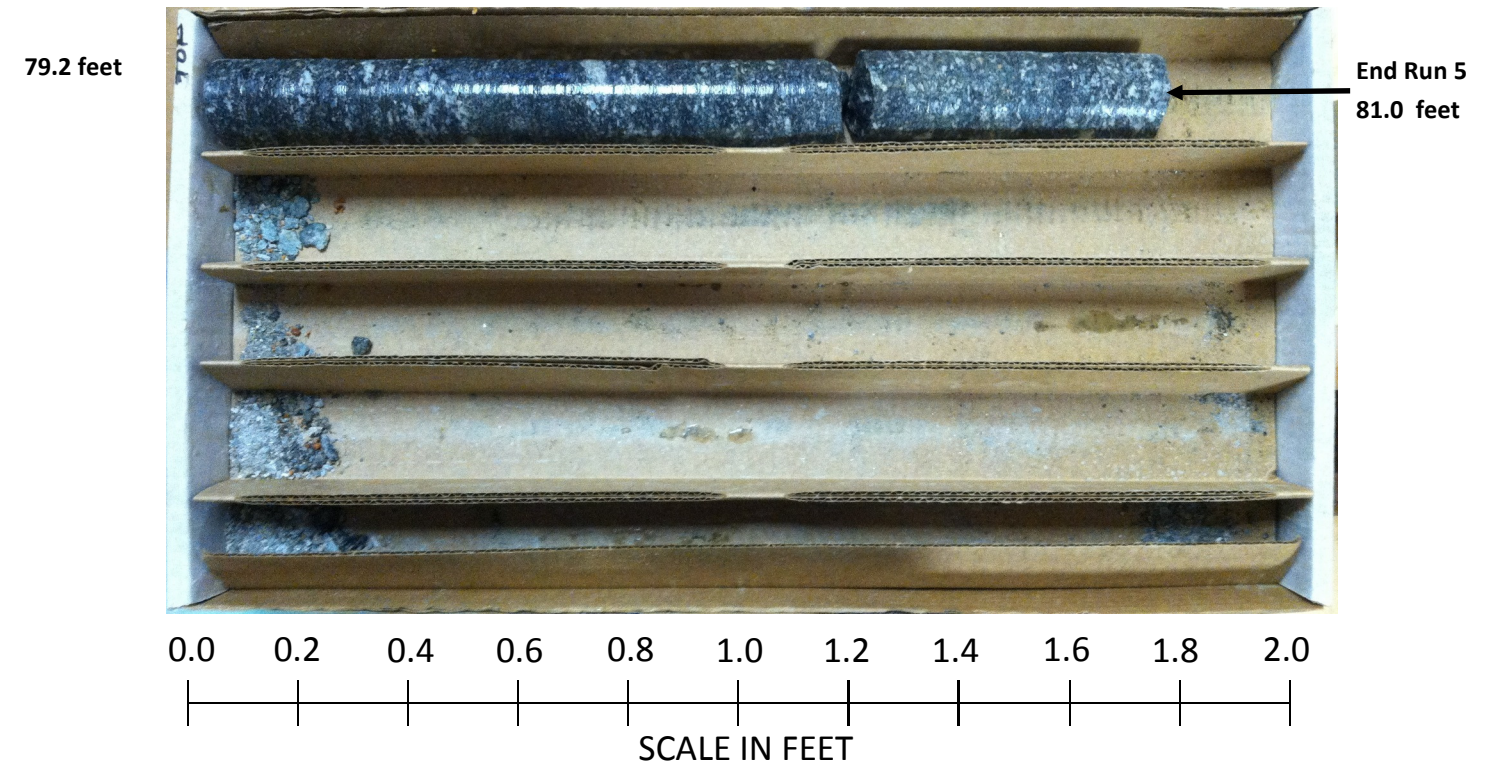
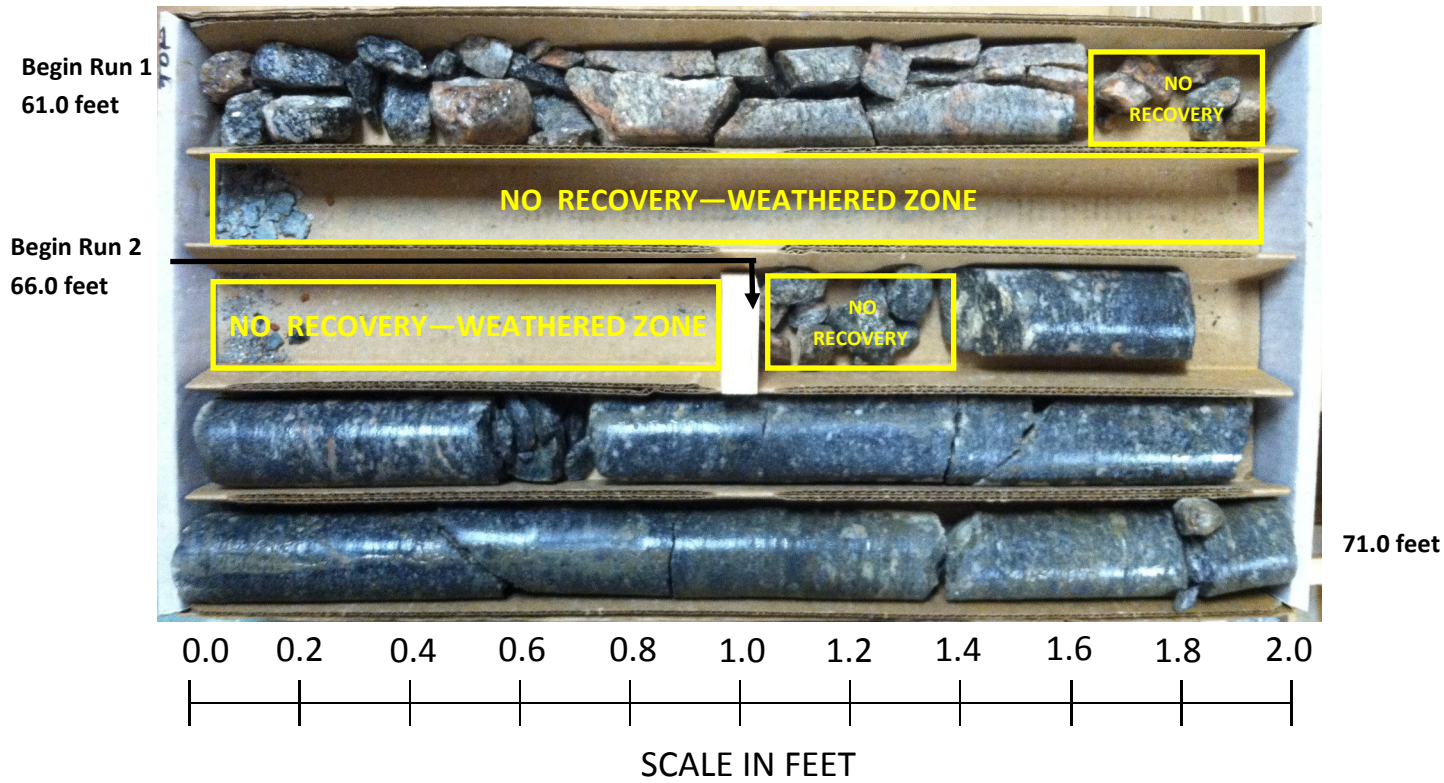
Bridge No. 703 on -L- (Future I-74) over Lowery Mill Creek

WBS - 34839.1.1 TIP No. - U-2579C

ECS Carolinas Project No. 08:11502

Sheet No. 27

Rock Core Photographs: Boring - B1-A (RL) — Station: 473+10 Offset: 11' RT



GEOTECHNICAL BORING REPORT CORE LOG

WBS 34939.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST C. Bukovitz						
SITE DESCRIPTION Bridge No. 703 (RL) on -L- over Lowery Mill Creek							GROUND WTR (ft)					
BORING NO. B1-B (RL)		STATION 473+30		OFFSET 82 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 858.7 ft		TOTAL DEPTH 74.4 ft		NORTHING 874,409		EASTING 1,657,728						
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic						
DRILLER B. Thomas		START DATE 01/12/16		COMP. DATE 01/12/16		SURFACE WATER DEPTH N/A						
CORE SIZE NQ		TOTAL RUN 25.0 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) %				
809.3										Begin Coring @ 49.4 ft		
	809.3	49.4	5.0	3:25/1.0 2:46/1.0 3:28/1.0	(5.0) 100%	(2.1) 42%	(5.6) 100%	(2.5) 45%		809.3	CRYSTALLINE ROCK Slightly Weathered, Moderately Hard, Very Close to Close Fracture Spacing, Black-Gray-White-Pink (GRANITIC GNEISS)	49.4
805	804.3	54.4		3:40/1.0 2:38/1.0				803.7		Moderately Severe, Medium Hard to Very Soft, Very Close Fracture Spacing, Gray-White-Brown (AMPHIBOLITE MICA GNEISS)	55.0	
			5.0	2:53/1.0 2:29/1.0 2:08/1.0 2:14/1.0 1:50/1.0	(5.0) 100%	(0.4) 8%	(5.1) 80%	(0.0) 0%		797.3	Slightly to Very Slightly Weathered, Medium Hard to Moderately Hard, Very Close and Moderately Close to Close Fracture Spacing, Black-Gray-White (AMPHIBOLITE MICA GNEISS)	61.4
800	799.3	59.4		2:08/1.0 2:01/1.0 2:53/1.0 2:38/1.0 2:26/1.0	(3.7) 74%	(1.1) 22%	(11.9) 92%	(7.7) 59%				
795	794.3	64.4		1:59/1.0 2:13/1.0 2:10/1.0 2:44/1.0 2:39/1.0	(4.0) 80%	(2.5) 50%					RS-6: 62.5-62.9' q _{u-6} = 4,036 psi	
790	789.3	69.4		2:24/1.0 2:23/1.0 2:18/1.0 2:11/1.0 3:21/1.0	(4.9) 98%	(4.1) 82%						
785	784.3	74.4								784.3	Boring Terminated at Elevation 784.3 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)	74.4

NCDOT CORE DOUBLE U2579C_GEO_BRDG703.GPJ_NC_DOT.GDT 4/19/16



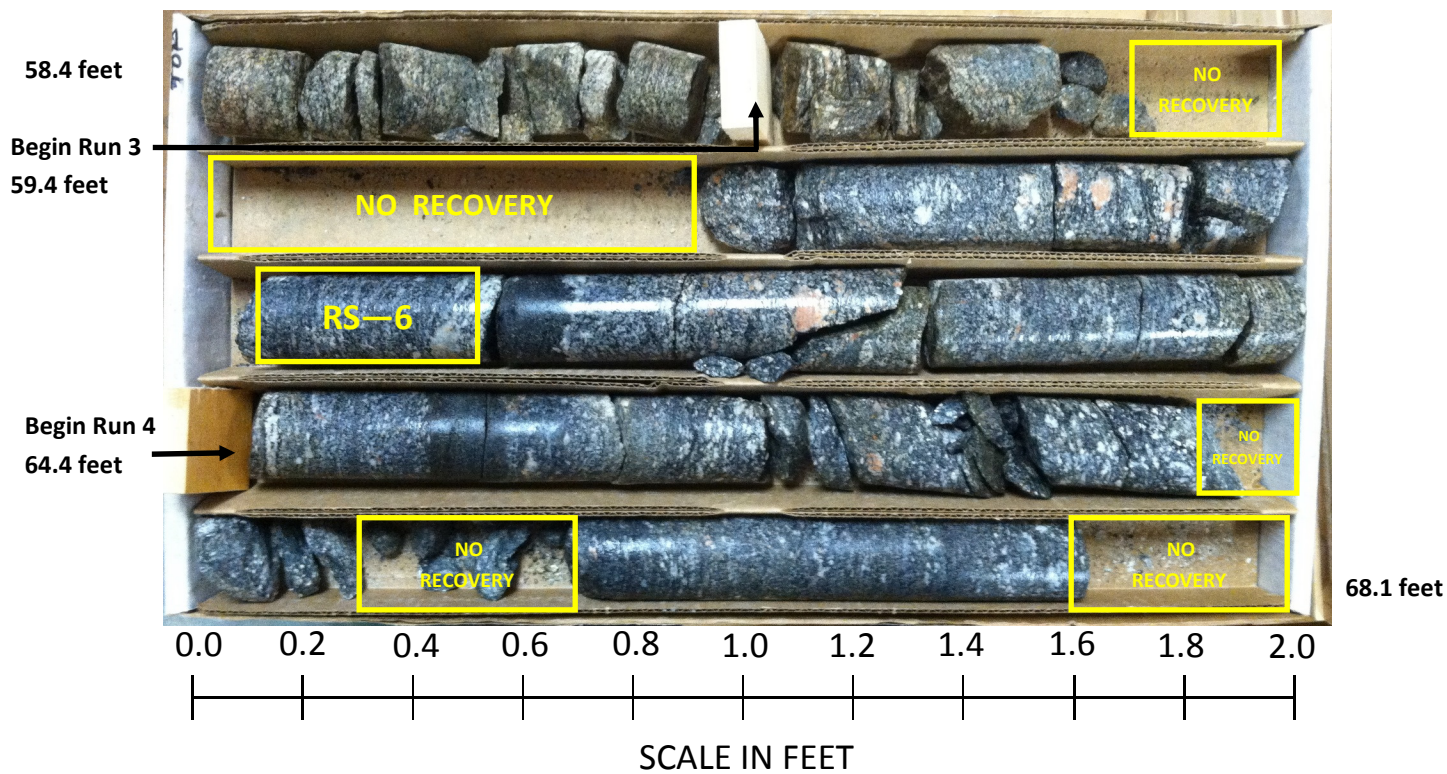
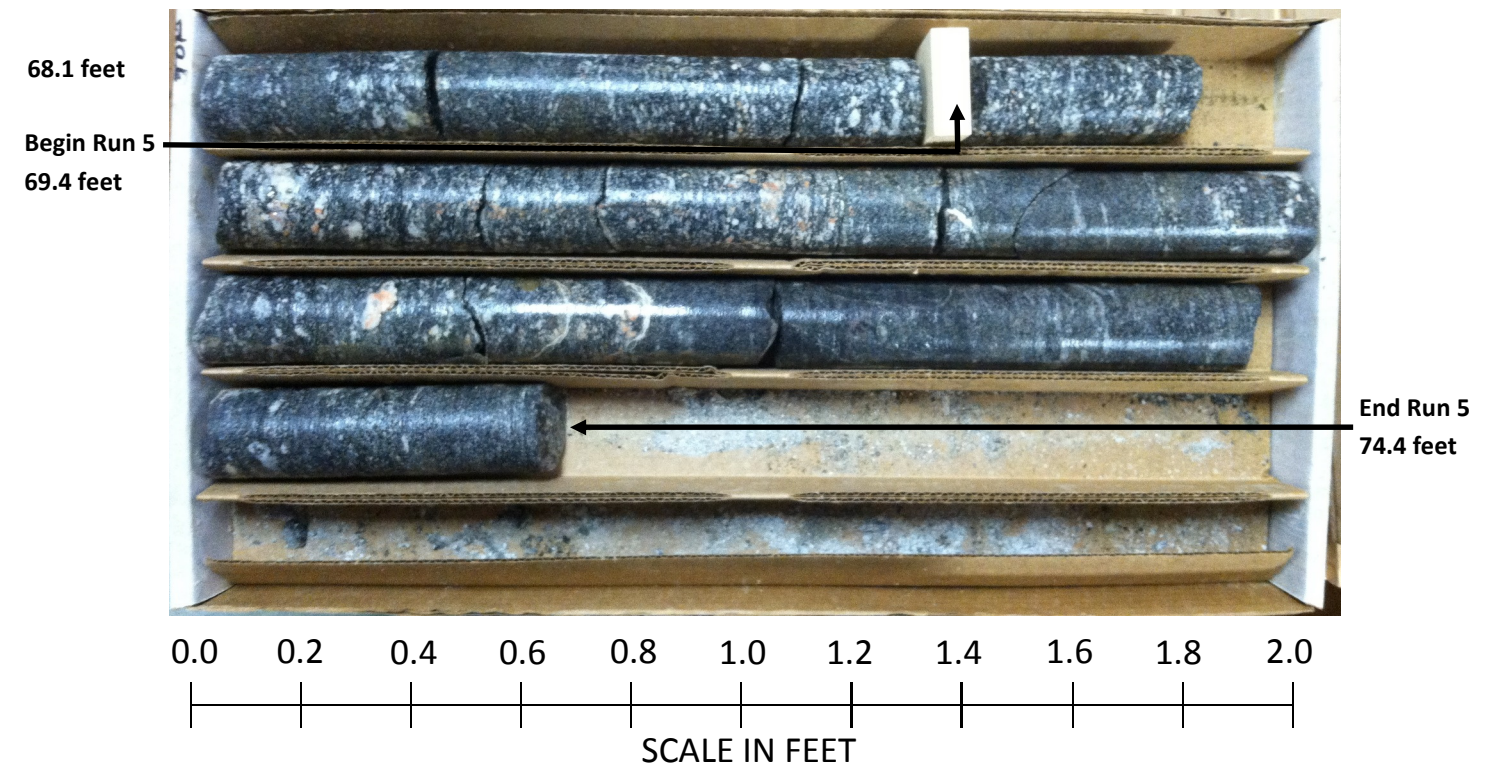
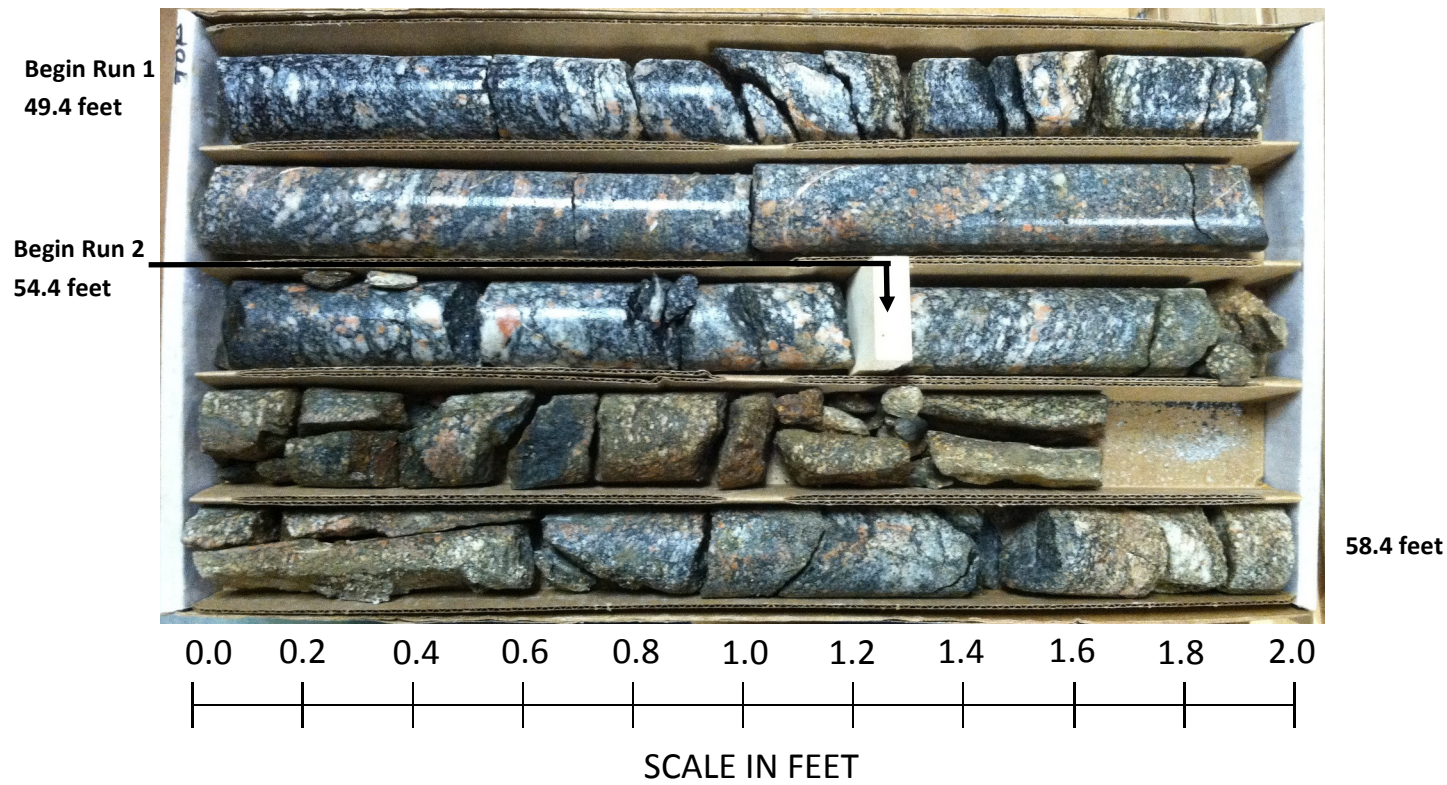
Bridge No. 703 on -L- (Future I-74) over Lowery Mill Creek

WBS - 34839.1.1 TIP No. - U-2579C

ECS Carolinas Project No. 08:11502

Sheet No. 30

Rock Core Photographs: Boring - B1-B (RL) — Station: 473+30 Offset: 82' RT



GEOTECHNICAL BORING REPORT CORE LOG

WBS 34939.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST C. Bukovitz					
SITE DESCRIPTION Bridge No. 703 (RL) on -L- over Lowery Mill Creek							GROUND WTR (ft)				
BORING NO. B2-A (RL)		STATION 474+05		OFFSET 11 ft RT		ALIGNMENT -L-					
COLLAR ELEV. 858.3 ft		TOTAL DEPTH 62.6 ft		NORTHING 874,430		EASTING 1,657,829					
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic					
DRILLER B. Thomas		START DATE 01/18/16		COMP. DATE 01/19/16		SURFACE WATER DEPTH N/A					
CORE SIZE NQ				TOTAL RUN 20.0 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) %			
815.7										Begin Coring @ 42.6 ft	
815	815.7	42.6	5.0	N=60/0.0 3:50/1.0 6:25/1.0 5:55/1.0 6:25/1.0 4:35/1.0	(5.0) 100%	(2.5) 50%	(20.0) 100%	(16.8) 84%	[Core Log Diagram]	815.7 Very Slightly Weathered to Fresh, Moderately Hard to Hard, Very Close to Moderately Close Fracture Spacing, Gray-White-Black (AMPHIBOLITE MICA GNEISS)	42.6
810	810.7	47.6	5.0	3:00/1.0 2:53/1.0 3:14/1.0 3:53/1.0 4:30/1.0	(5.0) 100%	(4.9) 98%					
805	805.7	52.6	5.0	3:40/1.0 3:24/1.0 3:39/1.0 3:58/1.0 4:16/1.0	(5.0) 100%	(4.6) 92%				RS-7: 52.6-53.0' q _c -7 = 5,807 psi	
800	800.7	57.6	5.0	3:58/1.0 4:02/1.0 4:20/1.0 3:41/1.0 3:49/1.0	(5.0) 100%	(4.8) 96%					
	795.7	62.6								Boring Terminated at Elevation 795.7 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)	62.6

NCDOT CORE DOUBLE U2579C_GEO_BRD6703.GPJ NC_DOT.GDT 4/19/16

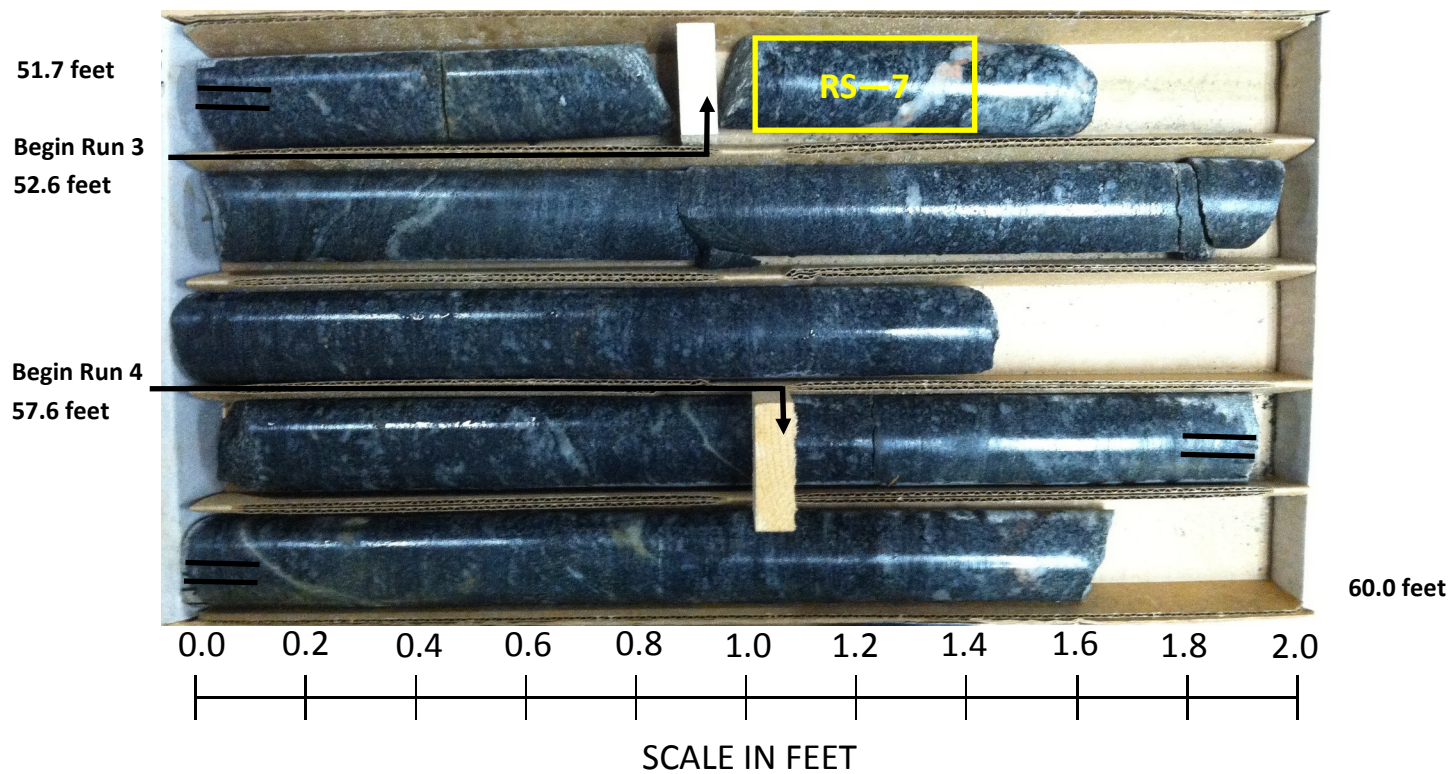
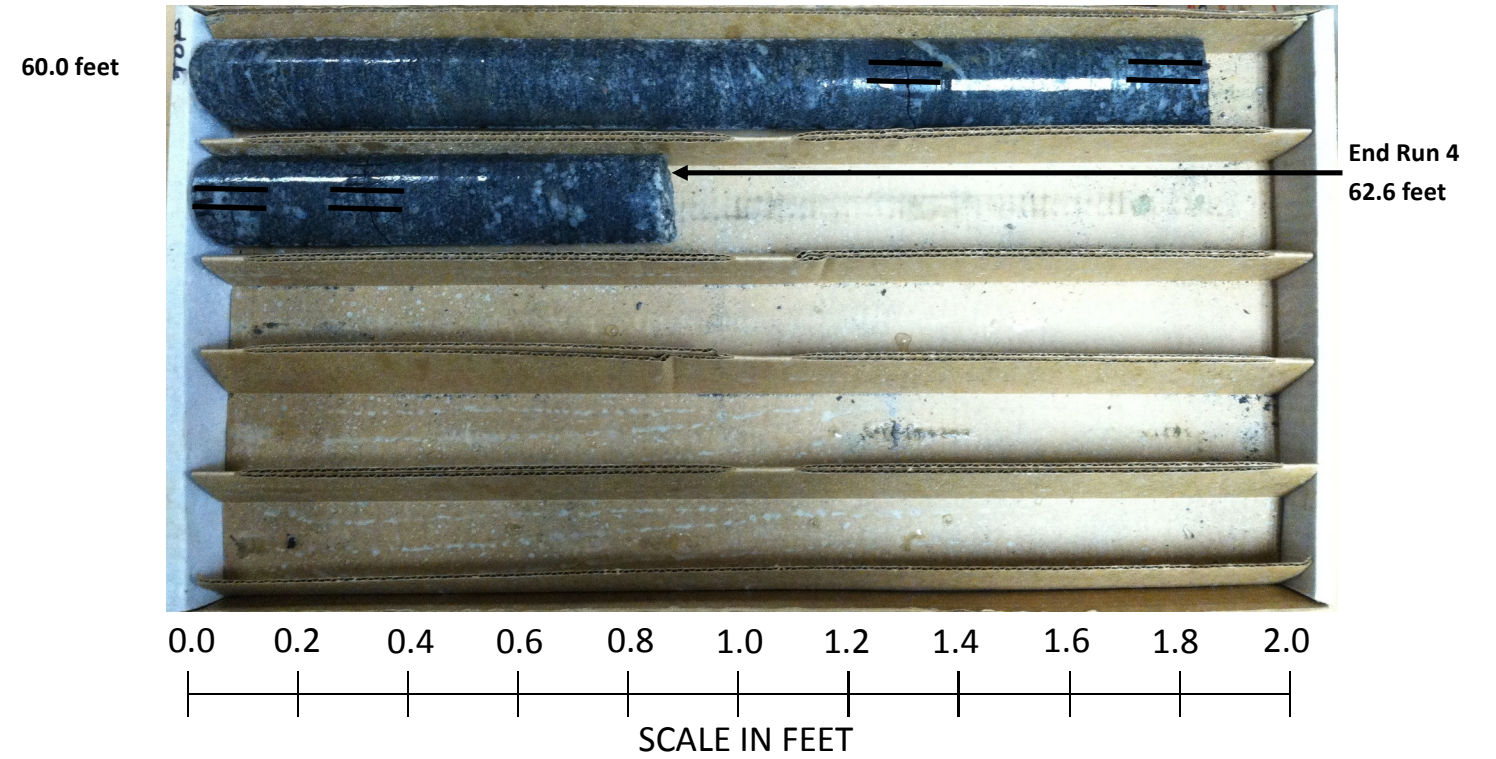
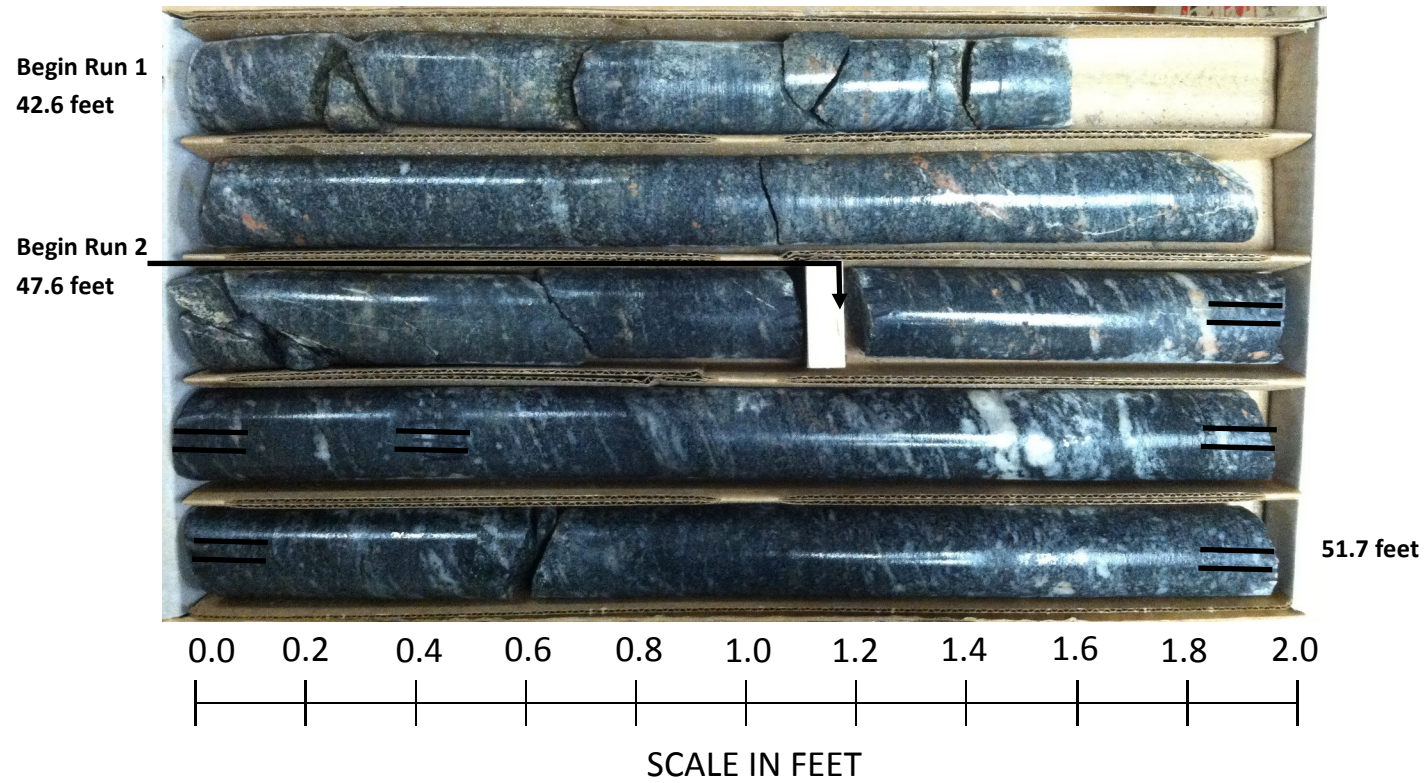


Bridge No. 703 on -L- (Future I-74) over Lowery Mill Creek

WBS - 34839.1.1 TIP No. - U-2579C

ECS Carolinas Project No. 08:11502

Rock Core Photographs: Boring - B2-A (RL) — Station: 474+05 Offset: 11' LT



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34939.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST C. Bukovitz	
SITE DESCRIPTION Bridge No. 703 (RL) on -L- over Lowery Mill Creek							GROUND WTR (ft)
BORING NO. B2-B (RL)		STATION 474+25		OFFSET 84 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 858.2 ft		TOTAL DEPTH 57.5 ft		NORTHING 874,358		EASTING 1,657,808	
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic	
DRILLER B. Thomas		START DATE 01/18/16		COMP. DATE 01/18/16		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						
860														858.2	0.0	GROUND SURFACE
	858.2	0.0	2	4	4	8								856.2	2.0	ARTIFICIAL FILL Red-Brown, Fine Sandy SILT (A-4), Medium Stiff
855	854.7	3.5	2	2	2	4								851.2	7.0	Gray-Blue-Red, Silty CLAY (A-6), Soft
850	849.7	8.5	2	2	6	8								844.0	14.2	ALLUVIAL Gray-Blue, Silty Fine to Coarse SAND (A-2-4), with Trace Gravel, Loose
845	844.7	13.5	4	3	5	8								841.2	17.0	RESIDUAL Brown-Black-White, Fine Sandy SILT (A-4), Medium Stiff
840	839.7	18.5	4	14	25	39								831.2	27.0	Brown-Gray-White, Silty Fine SAND (A-2-4), Dense to Very Dense
835	834.7	23.5	18	27	55	82								816.4	41.8	WEATHERED ROCK Brown-Gray-White (GNEISS)
830	829.7	28.5	18	48	52/0.2	100/0.7								815.7	42.5	CRYSTALLINE ROCK Gray-White-Black (AMPHIBOLITE MICA GNEISS)
825	824.7	33.5	100/0.5			100/0.5								816.4	41.8	
820	819.7	38.5	100/0.2			100/0.2								815.7	42.5	
815	816.4	41.8	60/0.0			60/0.0								800.7	57.5	Boring Terminated at Elevation 800.7 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)
810																
805																

NCDOT BORE DOUBLE U2579C_GEO_BRDG703.GPJ NC_DOT_GDT 4/19/16

RS-8

GEOTECHNICAL BORING REPORT CORE LOG

WBS 34939.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST C. Bukovitz						
SITE DESCRIPTION Bridge No. 703 (RL) on -L- over Lowery Mill Creek							GROUND WTR (ft)					
BORING NO. B2-B (RL)		STATION 474+25		OFFSET 84 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 858.2 ft		TOTAL DEPTH 57.5 ft		NORTHING 874,358		EASTING 1,657,808						
DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic						
DRILLER B. Thomas		START DATE 01/18/16		COMP. DATE 01/18/16		SURFACE WATER DEPTH N/A						
CORE SIZE NQ		TOTAL RUN 15.0 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) %				
815.7	815.7	42.5	5.0	3:04/1.0 3:45/1.0 3:29/1.0 3:23/1.0 3:16/1.0	(5.0) 100%	(4.1) 82%	(15.0) 100%	(14.0) 93%		Begin Coring @ 42.5 ft	42.5	
										815.7	CRYSTALLINE ROCK	
											Very Slightly Weathered to Fresh, Moderately Hard to Hard. Very Close to Wide Fracture Spacing, Gray-White-Black (AMPHIBOLITE MICA GNEISS)	
	810.7	47.5	5.0	3:01/1.0 3:38/1.0 3:44/1.0 3:43/1.0 3:42/1.0	(5.0) 100%	(4.9) 98%						
	805.7	52.5	5.0	2:56/1.0 3:17/1.0 3:29/1.0 3:59/1.0 3:58/1.0	(5.0) 100%	(5.0) 100%				RS-8: 51.1-51.5' q _u -8 = 3.847 psi		
	800.7	57.5								Boring Terminated at Elevation 800.7 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)	57.5	

NCDOT CORE DOUBLE U2579C_GEO_BRDG703.GPJ NC_DOT.GDT 4/19/16



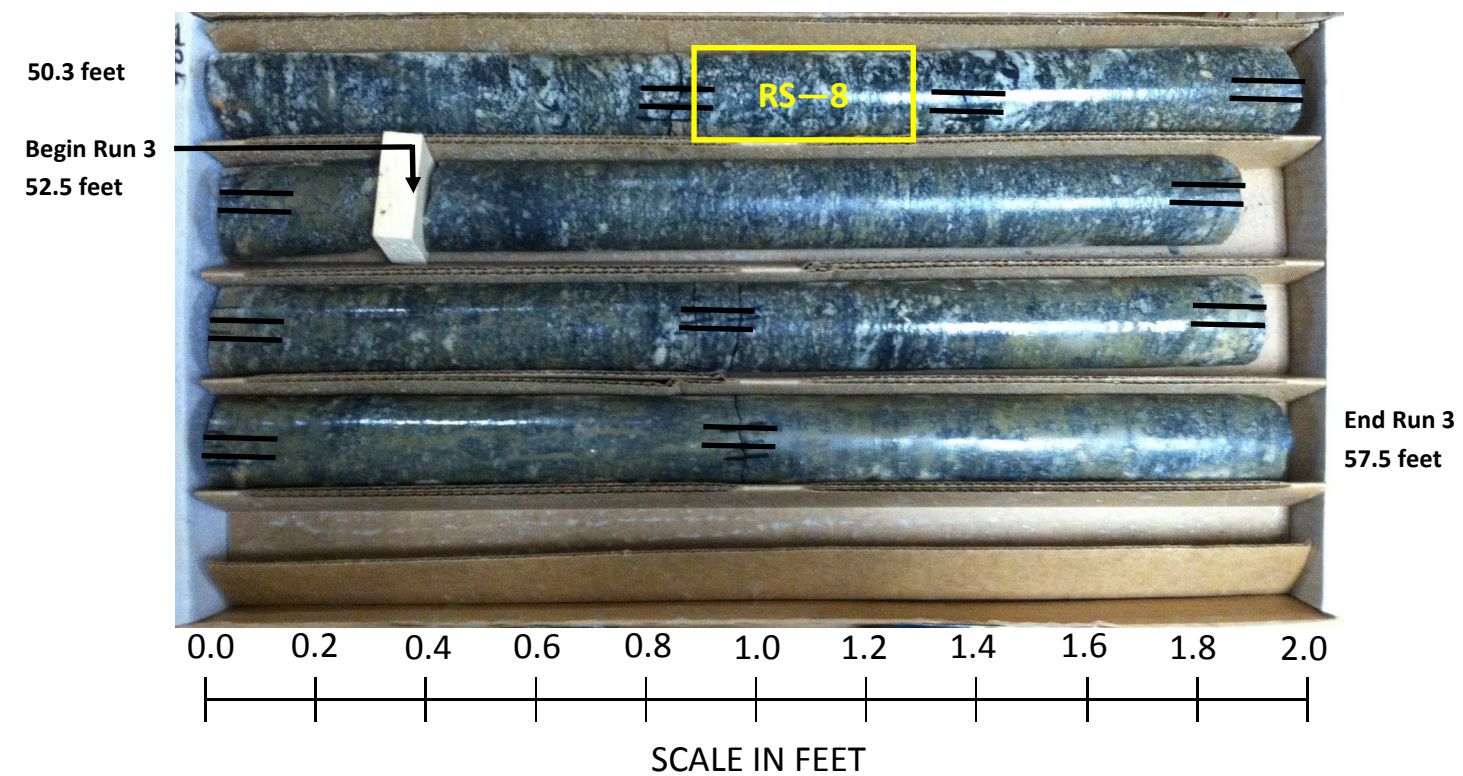
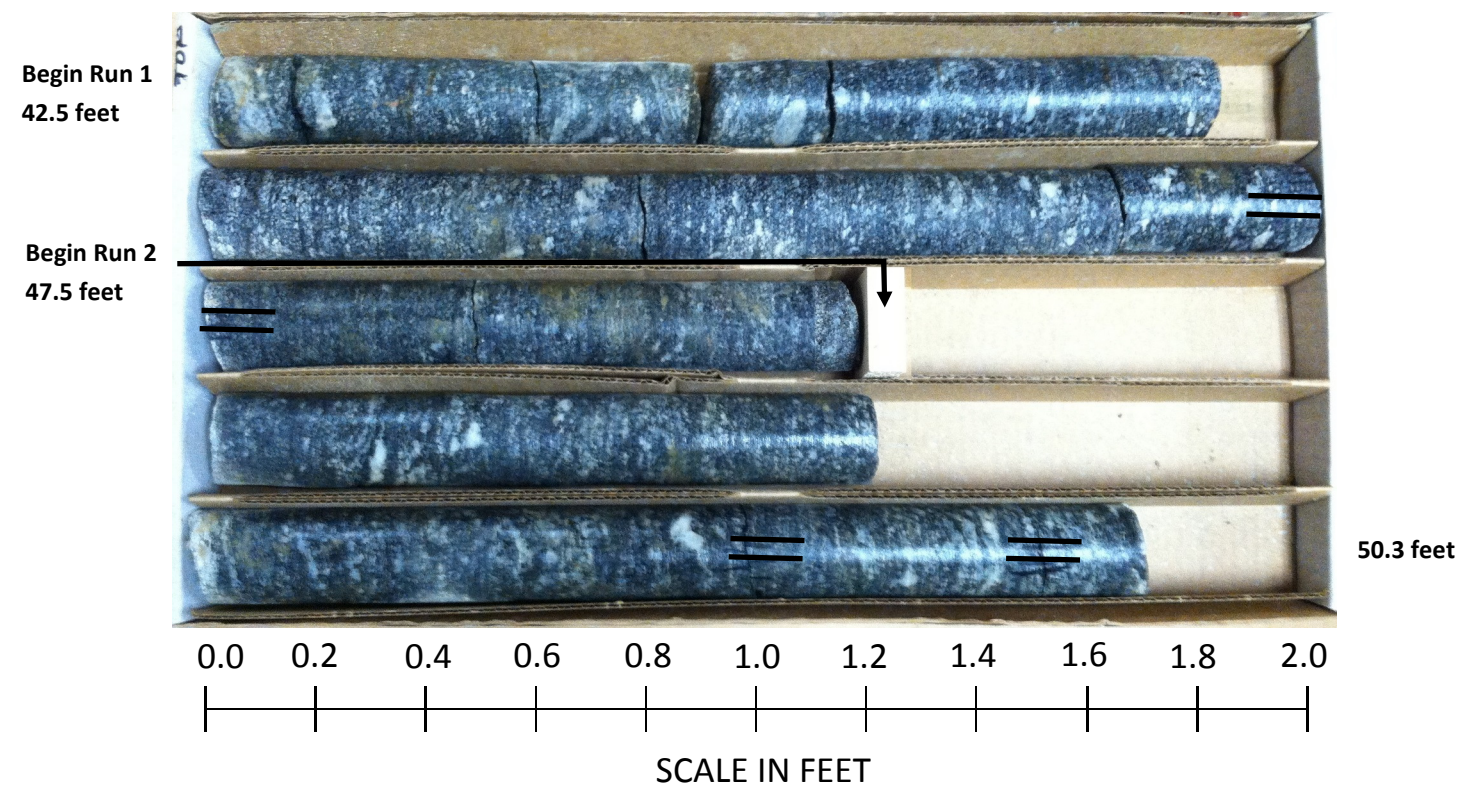
Bridge No. 703 on -L- (Future I-74) over Lowery Mill Creek

WBS - 34839.1.1 TIP No. - U-2579C

ECS Carolinas Project No. 08:11502

Sheet No. 36

Rock Core Photographs: Boring - B2-B (RL) — Station: 474+25 Offset: 84' RT



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34939.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST J. Bradshaw										
SITE DESCRIPTION Bridge No. 703 (RL) on -L- over Lowery Mill Creek							GROUND WTR (ft)									
BORING NO. EB2-A (RL)		STATION 474+55		OFFSET 11 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 857.9 ft		TOTAL DEPTH 38.6 ft		NORTHING 874,404		EASTING 1,657,872										
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 01/19/16		COMP. DATE 01/19/16		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						
860	857.9	0.0	2	2	3									857.9	0.0	GROUND SURFACE
855	854.4	3.5	2	3	3									855.9	2.9	ALLUVIAL Tan-Gray, Fine Sandy CLAY (A-6), Medium Stiff Tan-Gray, Silty CLAY (A-7-5(11)), Medium Stiff
	849.4	8.5	3	4	4									845.9	12.0	RESIDUAL Tan-Brown, Silty Fine to Coarse SAND (A-2-4), Medium Dense to Dense, Micaceous
845	844.4	13.5	4	7	11											
840	839.4	18.5	8	10	15											
835	834.4	23.5	7	10	15											
830	829.4	28.5	8	13	20											
825	824.4	33.5	100/0.3											824.4	33.5	WEATHERED ROCK Tan-Gray, (GNEISS)
820	819.4	38.5	60/0.1											819.4	38.5	CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS) Boring Terminated with Standard Penetration Test Refusal at Elevation 819.3 ft IN CRYSTALLINE ROCK (AMPHIBOLITE MICA GNEISS)

WBS 34939.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST J. Bradshaw										
SITE DESCRIPTION Bridge No. 703 (RL) on -L- over Lowery Mill Creek							GROUND WTR (ft)									
BORING NO. EB2-B (RL)		STATION 474+78		OFFSET 83 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 857.5 ft		TOTAL DEPTH 39.3 ft		NORTHING 874,331		EASTING 1,657,854										
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 01/20/16		COMP. DATE 01/20/16		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						
860	857.5	0.0												857.5	0.0	GROUND SURFACE
855	854.0	3.5	3	2	3									855.9	2.9	ALLUVIAL Tan-Gray, Fine Sandy, Silty CLAY (A-7-6(21)), Medium Stiff
	849.0	8.5	3	3	4									848.0	9.5	Gray, Silty Fine to Coarse SAND (A-2-4), Loose
845	844.0	13.5	5	3	3									845.5	12.0	RESIDUAL Gray-Black to Tan-White, Silty Fine to Coarse SAND (A-2-4), Medium Dense to Very Dense, Micaceous
840	839.0	18.5	6	7	10											
835	834.0	23.5	8	15	34											
830	829.0	28.5	16	28	49											
825	824.0	33.5	17	38	62/0.4									828.5	29.0	WEATHERED ROCK Tan-Gray, (GNEISS)
820	819.0	38.5	61	39/0.3										818.2	39.3	Boring Terminated at Elevation 818.2 ft IN WEATHERED ROCK (GNEISS) Other Samples: ST-1 (5.0 - 7.0)

NCDOT BORE DOUBLE U2579C_GEO_BRDG703.GPJ NC_DOT.GDT 3/30/16

SOIL TEST RESULTS

SAMPLE NO.	BORING	OFFSET	STATION -L-	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-43	EB1-A (LL)	71' LT	472+09	8.5-10.0'	A-4(1)	38	7	23.4	38.0	26.7	11.8	99.0	86.0	47.0	33.5	-
SS-32	EB1-B (LL)	30' LT	472+24	13.5-15.0'	A-5(0)	46	NP	33.2	39.5	20.6	6.7	99.0	78.0	36.0	36.8	-
SS-321	EB2-A (LL)	83' LT	474+35	8.5-10.0'	A-6(8)	40	17	10.3	34.8	25.0	29.9	98.0	94.0	60.0	29.4	-
SS-311	EB2-B (LL)	11' LT	474+53	3.5-5.0'	A-7-6(15)	48	22	5.3	30.4	24.2	40.0	99.0	98.0	69.0	32.3	-
ST-2	EB2-A (LL)	83' LT	474+53	3.0-4.0'	A-7-5(18)	49	18	2.3	14.3	30.3	53.2	100.0	99.0	87.0	44.0	-
SS-15	EB1-A (RL)	18' RT	472+37	3.5-5.0'	A-7-5(14)	59	26	23.8	18.2	7.8	50.2	99.0	83.0	59.0	22.6	-
SS-57	B1-B (RL)	82' RT	473+30	18.5-20.0'	A-2-4(0)	38	NP	43.3	39.7	8.3	8.8	95.0	71.0	23.0	26.9	-
SS-302	EB2-A(RL)	11' RT	474+55	3.5-5.0'	A-7-5(11)	55	17	12.3	27.5	26.1	34.1	99.0	94.0	64.0	57.3	-
SS-328	EB2-B (RL)	83' RT	474+78	3.5-5.0'	A-7-6(21)	53	28	3.5	25.4	21.9	49.2	98.0	97.0	75.0	35.0	-
ST-1	EB2-B (RL)	83' RT	474+78	5.0-7.0'	A-7-6(32)	65	36	1.9	17.8	25.3	55.0	92.0	92.0	80.0	45.0	-

SS = Split-Barrel Sample (ASTM D-1586)
 ST= Shebly Tube Sample (ASTM D-1587)

ROCK TEST RESULTS

SAMPLE NO.	BORING	OFFSET	STATION -L-	DEPTH INTERVAL	Rock Type	Unit Weight LB/FT ³	Unconfined Compressive Stregth, KSI	Section Modulus @ 40%, MPsi
RS-1	B1-A (LL)	83' LT	472+85	58.9-59.3'	Amphibolite Mica Gneiss	179.8	6.5	0.33
RS-2	B1-B (LL)	11' LT	473+05	52.8-53.2	Amphibolite Mica Gneiss	170.5	8.9	0.56
RS-3	B2-A (LL)	83' LT	473+81	49.2-49.6'	Amphibolite Mica Gneiss	171.0	10.3	0.52
RS-4	B2-B (LL)	11' LT	474+00	35.4-35.8'	Amphibolite Mica Gneiss	170.9	4.0	0.22
RS-5	B1-A (RL)	11' RT	473+10	71.1-71.5'	Amphibolite Mica Gneiss	170.5	7.3	0.28
RS-6	B1-B (RL)	82' RT	473+30	62.5-62.9'	Amphibolite Mica Gneiss	165.1	4.1	2.02
RS-7	B2-A (RL)	11' RT	474+05	52.6-53.0'	Amphibolite Mica Gneiss	170.0	5.9	0.20
RS-8	B2-B (RL)	84' RT	474+25	51.1-51.5'	Amphibolite Mica Gneiss	170.6	6.7	0.74

RS = NQ2 Rock Core Barrel Sample (ASTM D-2113)

Lab Technician: Amanda R. Roth

NCDOT Certification No.: 112-09-1003

Signature: 

SITE PHOTOS



Looking south along Bent 2 along Sanitary Sewer Easement



Looking south along Lowery Mill Creek between Bent 1 and Bent 2



Looking west (downstation) on -L- at Lowery Mill Creek toward Bent 1 and End Bent 1