

CONTRACT ID: B-4155

CONTRACT ID: B-4155

# STATE OF NORTH CAROLINA

## DEPARTMENT OF TRANSPORTATION

### DIVISION OF HIGHWAYS

### GEOTECHNICAL UNIT

# STRUCTURE SUBSURFACE INVESTIGATION

#### CONTENTS:

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	REPORT
4	SITE PLAN
5-7	CROSS SECTIONS
8	PROFILE
9-12	BORE LOGS
13	SOIL TEST RESULTS
14	SCOUR REPORT
15	CORE PHOTOS
16	SITE PHOTOS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4155	1	16
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		CONST.	

#### CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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 THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

DW 13

STATE PROJECT 33503.1.1 I.D. NO. B-4155

F.A. PROJECT \_\_\_\_\_

COUNTY IREDELL

PROJECT DESCRIPTION BRIDGE NO. 116  
ON SR 1521 OVER 3RD CREEK

SITE DESCRIPTION BRIDGE NO. 116  
ON SR 1521 OVER 3RD CREEK

INVESTIGATED BY J.E. BEVERLY PERSONNEL J.K. STICKNEY

CHECKED BY C.B. LITTLE C.L. SMITH

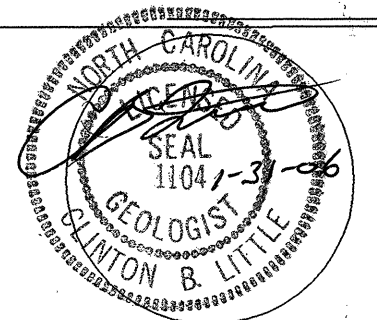
SUBMITTED BY C.B. LITTLE K. WISE

DATE JANUARY 2006

DRAWN BY: J.E. BEVERLY

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

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

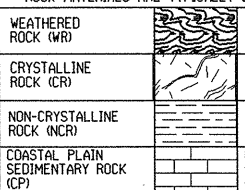


NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL UNIT

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-4245	33588.1.1	2	16

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION				GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS			
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, BROWN SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, MOD. PLASTIC, A-7-6</i>				WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.				HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. 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 WHICH HAVE BEEN TRANSPORTED BY WATER. ADJUFER - 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, 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 WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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 B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 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 (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>				<b>MINERALOGICAL COMPOSITION</b>				<b>WEATHERING</b>							
GENERAL CLASS. GRANULAR MATERIALS (< 75% PASSING #200) SILT-CLAY MATERIALS (> 75% PASSING #200) ORGANIC MATERIALS				MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.				WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT.							
GROUP CLASS. A-1, A-1-b, A-3, A-2, A-2-4, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7				SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50				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.							
SYMBOL				COMPRESSIBILITY				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.							
% PASSING # 10, # 40, # 200				PERCENTAGE OF MATERIAL				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.							
LIQUID LIMIT, PLASTIC INDEX, GROUP INDEX				ORGANIC MATERIAL				FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.							
USUAL TYPES OF MAJOR MATERIALS				GROUND WATER				VERY SLIGHT (V.SL.) 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.							
GEN. RATING AS A SUBGRADE				MISCELLANEOUS SYMBOLS				SLIGHT (SL.) 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.							
P.I. OF A-7-5 ≤ L.L. - 30 ; P.I. OF A-7-6 > L.L. - 30				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION, SOIL SYMBOL, ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS, INFERRED SOIL BOUNDARIES, INFERRED ROCK LINE, ALLUVIAL SOIL BOUNDARY, DIP/DIP DIRECTION OF ROCK STRUCTURES, SOUNDING ROD				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.							
<b>CONSISTENCY OR DENSITY</b>				AR - AUGER REFUSAL, BT - BORING TERMINATED, CL - CLAY, CPT - CONE PENETRATION TEST, CSE - COARSE, DMT - DILATOMETER TEST, DPT - DYNAMIC PENETRATION TEST, F - VOID RATIO, FOSS. - FOSSILIFEROUS, FRAC. - FRACTURED, FRAGS. - FRAGMENTS, MED. - MEDIUM				SEVERE (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.							
PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )				AUGER BORING, CORE BORING, MONITORING WELL, PIEZOMETER INSTALLATION, SLOPE INDICATOR INSTALLATION, SPT N-VALUE, SPT REFUSAL				VERY SEVERE (V.SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF.							
TEXTURE OR GRAIN SIZE				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.							
U.S. STD. SIEVE SIZE OPENING (MM), BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE. SD.), FINE SAND (F. SD.), SILT (SL.), CLAY (CL.)				PMT - PRESSUREMETER TEST, SD. - SAND, SANDY, SL. - SILT, SILTY, SLI. - SLIGHTLY, TCR - TRICONE REFUSAL, UNIT WEIGHT, DRY UNIT WEIGHT, MOISTURE CONTENT, VERY, VST - VANE SHEAR TEST				ROCK HARDNESS							
GRAIN SIZE				EQUIPMENT USED ON SUBJECT PROJECT				VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.							
SOIL MOISTURE - CORRELATION OF TERMS				DRILL UNITS: MOBILE B-, BK-51, CME-45C, CME-550X, PORTABLE HOIST, OTHER				HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.							
SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION				ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 6" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING W/ ADVANCER, TRICONE STEEL TEETH, TRICONE TUNG-CARB., CORE BIT, OTHER				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.							
LL - LIQUID LIMIT, PL - PLASTIC LIMIT, OM - OPTIMUM MOISTURE SHRINKAGE LIMIT				HAMMER TYPE: AUTOMATIC, MANUAL, CORE SIZE: B, N-XWL, H, HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST, OTHER				MEDIUM HARD CAN BE GROVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.							
PLASTICITY				FRACTURE SPACING				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.							
NONPLASTIC, LOW PLASTICITY, MED. PLASTICITY, HIGH PLASTICITY				INDURATION				VERY SOFT CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK. PICKES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.							
COLOR				FRAGILE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.				FRAC. SPACING MORE THAN 10 FEET, 3 TO 10 FEET, 1 TO 3 FEET, CLOSE, VERY CLOSE LESS THAN 0.16 FEET							
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.				MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.				BEDDING THICKNESS > 4 FEET, 1.5 - 4 FEET, 0.16 - 1.5 FEET, 0.03 - 0.16 FEET, 0.008 - 0.03 FEET, < 0.008 FEET							
				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.											



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY P.O. BOX 25201, RALEIGH, N.C. 27611-5201 LYNDY TIPPETT  
GOVERNOR SECRETARY

January 20, 2006

STATE PROJECT: 33503.1.1 (B-4155)  
COUNTY: Iredell  
DESCRIPTION: Bridge #116 on SR 1521 over Third Creek  
@ -L- Station 14+40

SUBJECT: Geotechnical Report – Bridge Foundation Investigation

This is a proposed bridge replacement for bridge 116 on SR 1521 over Third Creek. The new structure will occupy the same location as the existing structure except the new bridge will be larger. The proposed structure is comprised of 2 spans at 55' and 50 feet on a 90 degree skew angle. Proposed bridge design is a prestressed concrete cored slab at 33' in width.

A total of six foundation test borings were performed utilizing a CME-550X drill machine, NW Casing, NXWL core apparatus, and an automatic drop hammer. The field investigation for this project was conducted in October of 2005.

**Physiography/Geology**

The project is located northwest of the city of Statesville in Iredell County. The site is flat to gently sloping, has a wide floodplain, and is surrounded by trees and open areas. Geologically this site is part of the Inner Piedmont Belt and is underlain by biotite gneiss rock.

Site specific soils encountered during our investigation include roadway fill, alluvium, and residual types. Roadway fill soils associated with SR 1521 consist of medium stiff micaceous silty sandy clay (A-7-5, A-7-6). Alluvial soils are 4 to 11 feet in thickness and consist of very soft to soft sandy silty clay (A-7-5) and very loose to medium dense clayey silty sand (A-1-b). Residual soil was found to be 4 to 6.4 feet in thickness and consist of medium dense micaceous sand (A-2-4, A-1-b).

**Foundation Materials**

*End Bent 1:*

Two borings were performed south of Third Creek for this bent location. Roadway fill was encountered for the first 14.5 feet and is composed of medium stiff tan-brown micaceous silty sandy clay (A-7-5). Below fill lies 4 to 5 feet of alluvial very soft gray sandy silty clay (A-7-5). A small alluvial gravel layer was encountered at a depth of 17.1 feet in boring EB1-A. Residual soil begins about elevation 856 feet, underlies alluvium, and consists of 4 to 5 feet of medium dense tan-gray-white micaceous sand (A-2-4). Weathered rock was encountered at the base of residual soil and is inner-layered with harder material (rock) yielding SPT refusal. Each boring was terminated in weathered rock. The following is a listing of weathered and hard rock elevations at each boring location:

<b><u>Boring Location</u></b>	<b><u>Weathered Rock Elev. (feet)</u></b>	<b><u>Hard Rock Elev. (feet)</u></b>
EB1-A	850.65	846.16 (SPT Refusal)
EB1-B	850.82	841.22 (SPT Refusal)

*Bent 1:*

Two borings were performed through the bridge deck at the creek edge for this location. Alluvium 3.7 to 4.7 feet in thickness was encountered first and is comprised of very loose to medium dense gray-brown clayey silty sand with gravel size quartz rocks (A-1-b). Residual soil occurs next at elevation 855.2 feet and consists of 4 to 5 feet of medium dense tan-gray-white micaceous sand (A-2-4). Below residual soil lies weathered rock followed by hard rock. Rock core was successfully taken from boring B1-A however the core barrel broke on the first run in boring B1-B and the hole had to be abandoned. The following is a listing of weathered and hard rock elevations at each boring location:

<b><u>Boring Location</u></b>	<b><u>Weathered Rock Elev. (feet)</u></b>	<b><u>Hard Rock Elev. (feet)</u></b>
B1-A	850.90	847.74
B1-B	851.20	836.53

*End Bent 2:*

Two borings were performed north of Third Creek for this bent location. Roadway fill was encountered for 14.4 feet in boring EB2-A and 9.3 feet in boring EB2-B. Fill consists of soft red-brown micaceous silty sandy clay (A-7-5). Beneath fill lies 3.5 to 11 feet of alluvial very soft to soft gray micaceous sandy silty clay (A-7-5). Alluvium changes to residual between elevation 854.9 - 857.2 feet with residual soil consisting of medium dense orange-gray sand (A-2-4). At the bottom of residual soil weathered rock is encountered. Boring EB2-A achieved refusal on hard rock at depth. The following is a listing of weathered and hard rock elevations at each boring location:

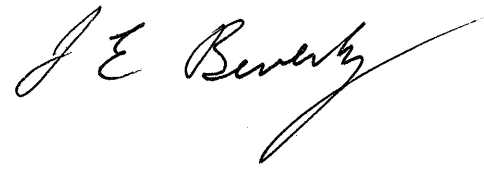
<b><u>Boring Location</u></b>	<b><u>Weathered Rock Elev. (feet)</u></b>	<b><u>Hard Rock Elev. (feet)</u></b>
EB2-A	850.80	N/A
EB2-B	850.95	836.66

Groundwater

Groundwater measurements taken more than 24 hours after each boring was performed indicate the static groundwater table lies between elevation 860 - 863 feet.

Respectfully submitted,

J.E. Beverly, Project Geologist

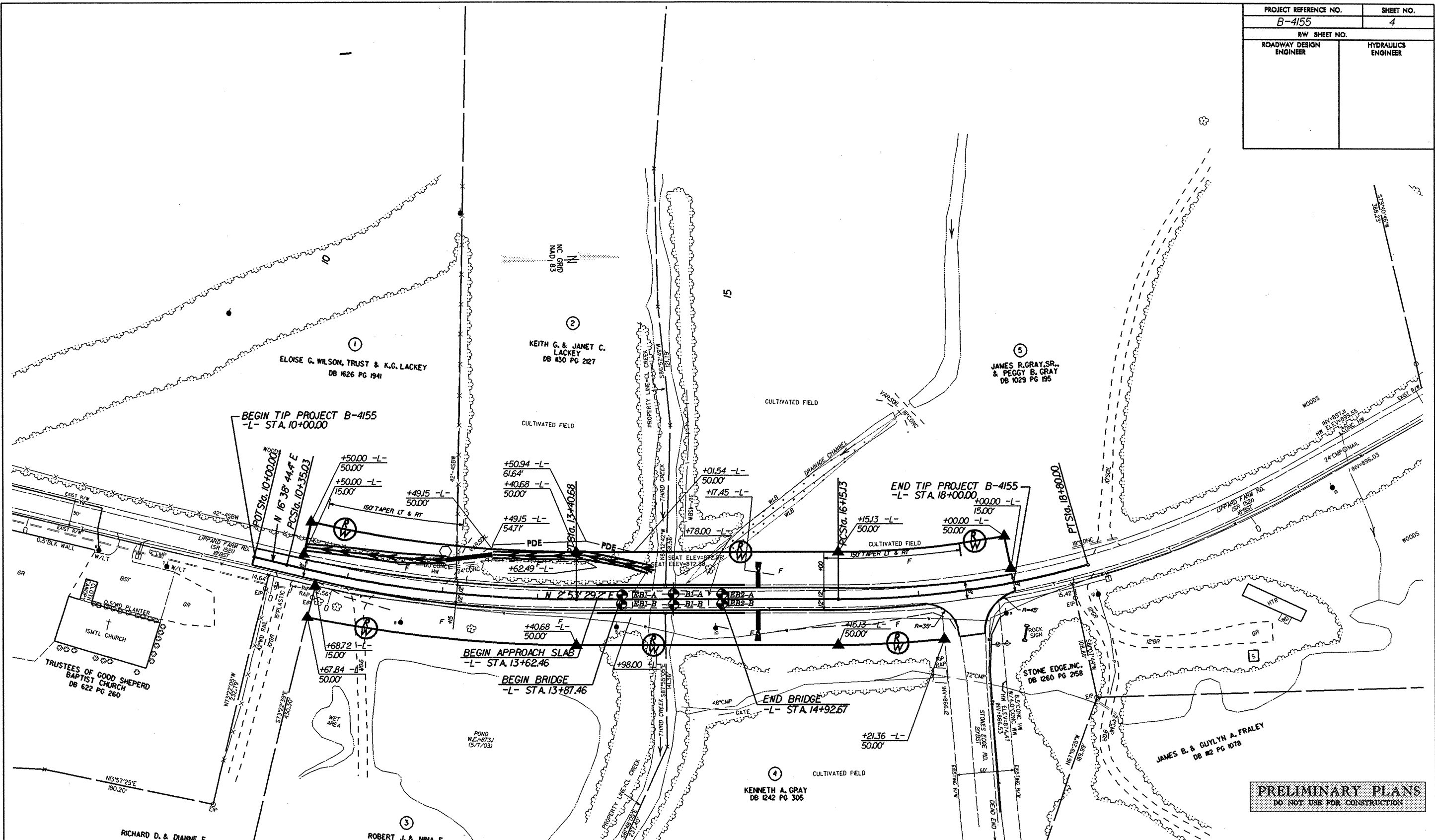
Handwritten signature of J.E. Beverly in cursive script.

Sheet 3A

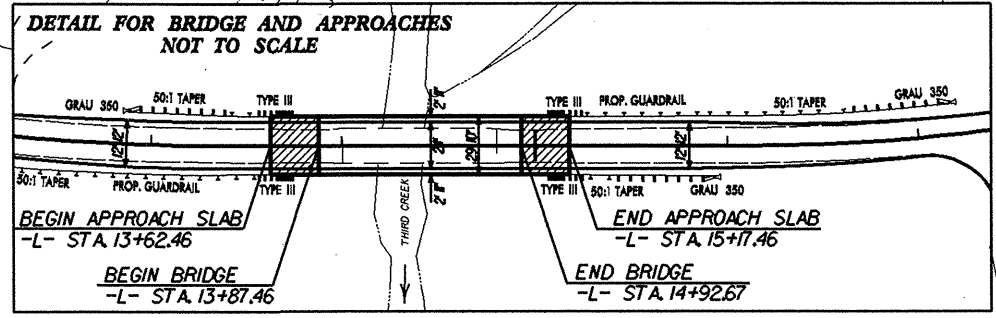
B-4155 (Iredell CO.)  
Bridge #116 / Third Creek

5/14/99  
 19-JAN-2006 15:45  
 4155\_cnc\_brdg.dwg  
 19-JAN-2006 15:45  
 4155\_cnc\_brdg.dwg  
 19-JAN-2006 15:45  
 4155\_cnc\_brdg.dwg

PROJECT REFERENCE NO. B-4155	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



-L-	
PI Sta 11+88.59	PI Sta 17+48.43
$\Delta = 13^\circ 45' 15.2''$ (LT)	$\Delta = 15^\circ 53' 32.0''$ (LT)
D = 4' 30' 00.0"	D = 6' 00' 00.0"
L = 305.65'	L = 264.87'
T = 153.56'	T = 133.29'
R = 1,273.24'	R = 954.93'
RO = 150'	RO = 150'
S.E. = 4.0%	S.E. = 4.0%
DS = 50 mph	DS = 50 mph



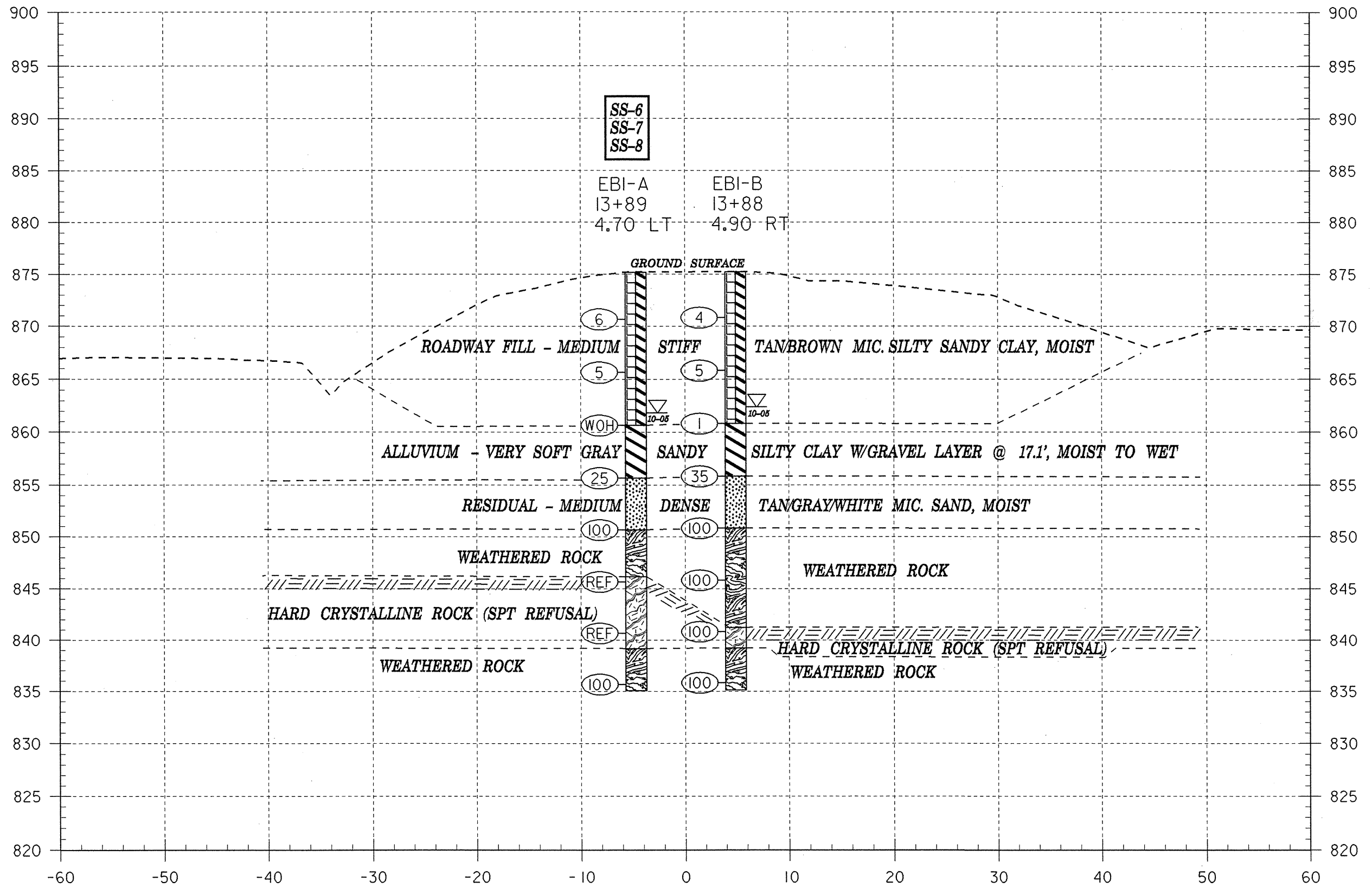
**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

SEE SHEET 5 FOR -L- PROFILE

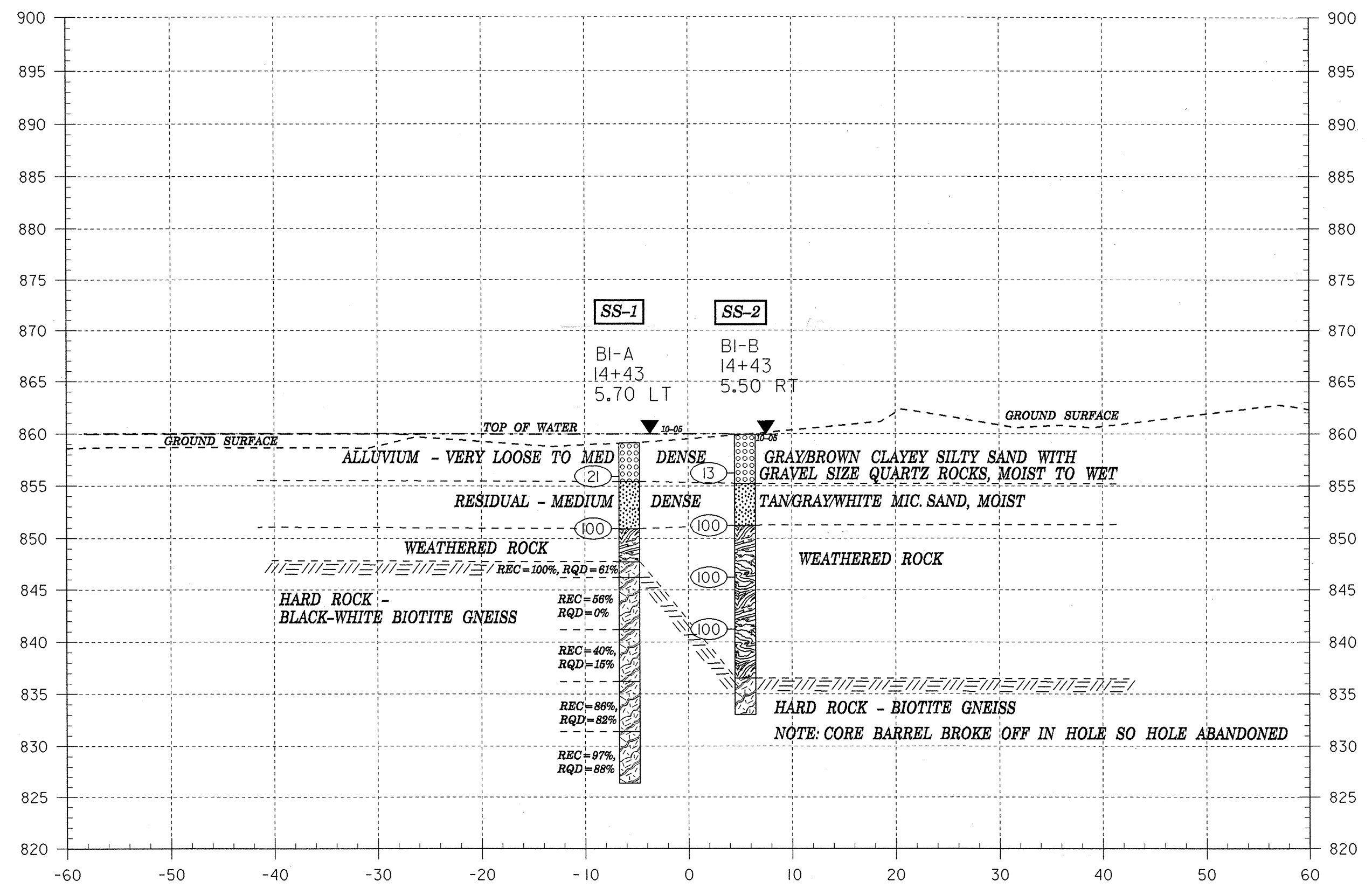
SEE SHEET S-1 THRU S-5 FOR STRUCTURE PLANS

**Mattern & Craig**  
 CONSULTING ENGINEERS - SURVEYORS  
 12 BROAD STREET  
 ASHEVILLE, NORTH CAROLINA 28801  
 (828) 254-2201  
 FAX (828) 254-4562

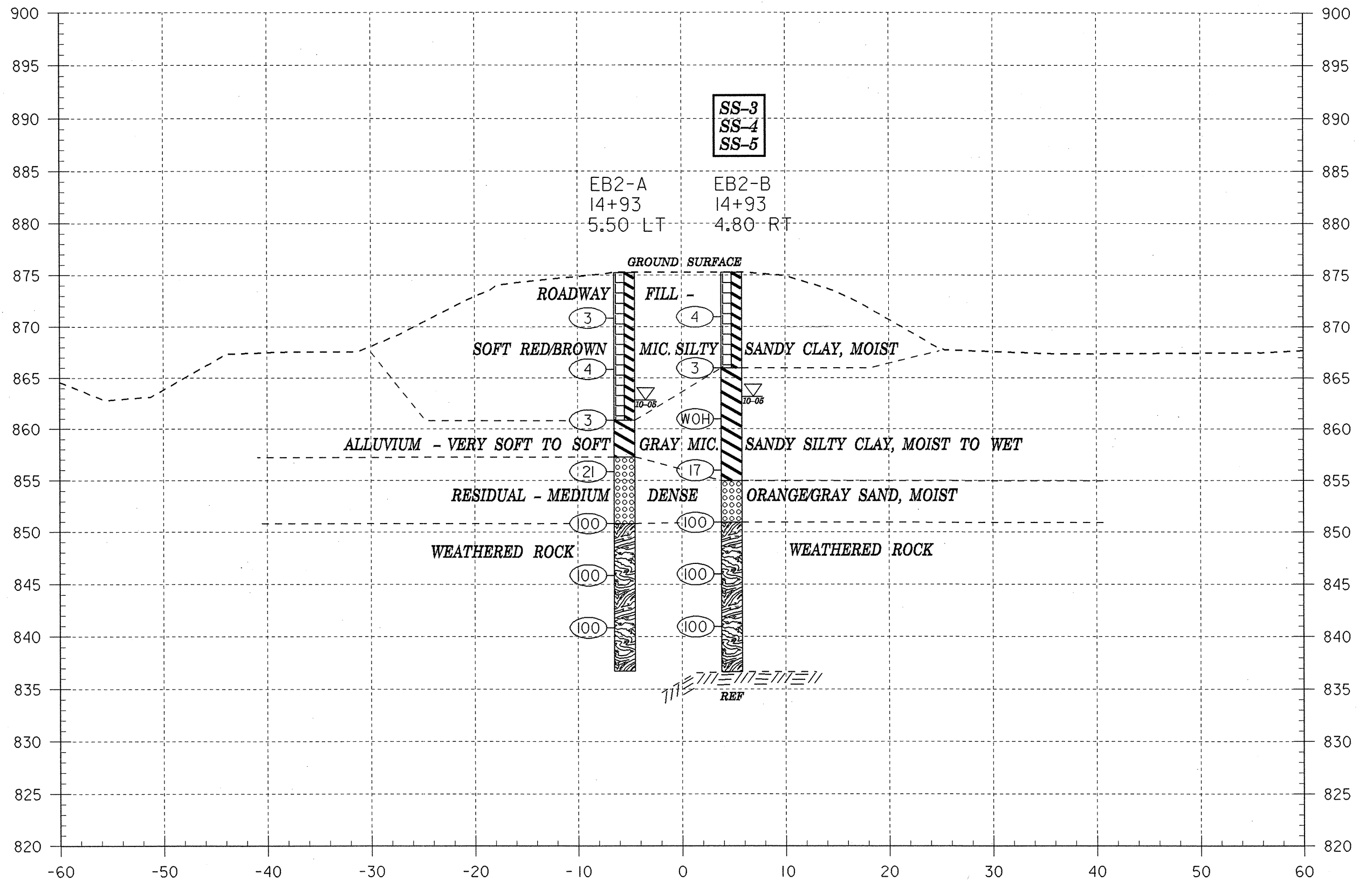
## SECTION THROUGH EB I-A & EB I-B



## SECTION THROUGH BI-A & BI-B

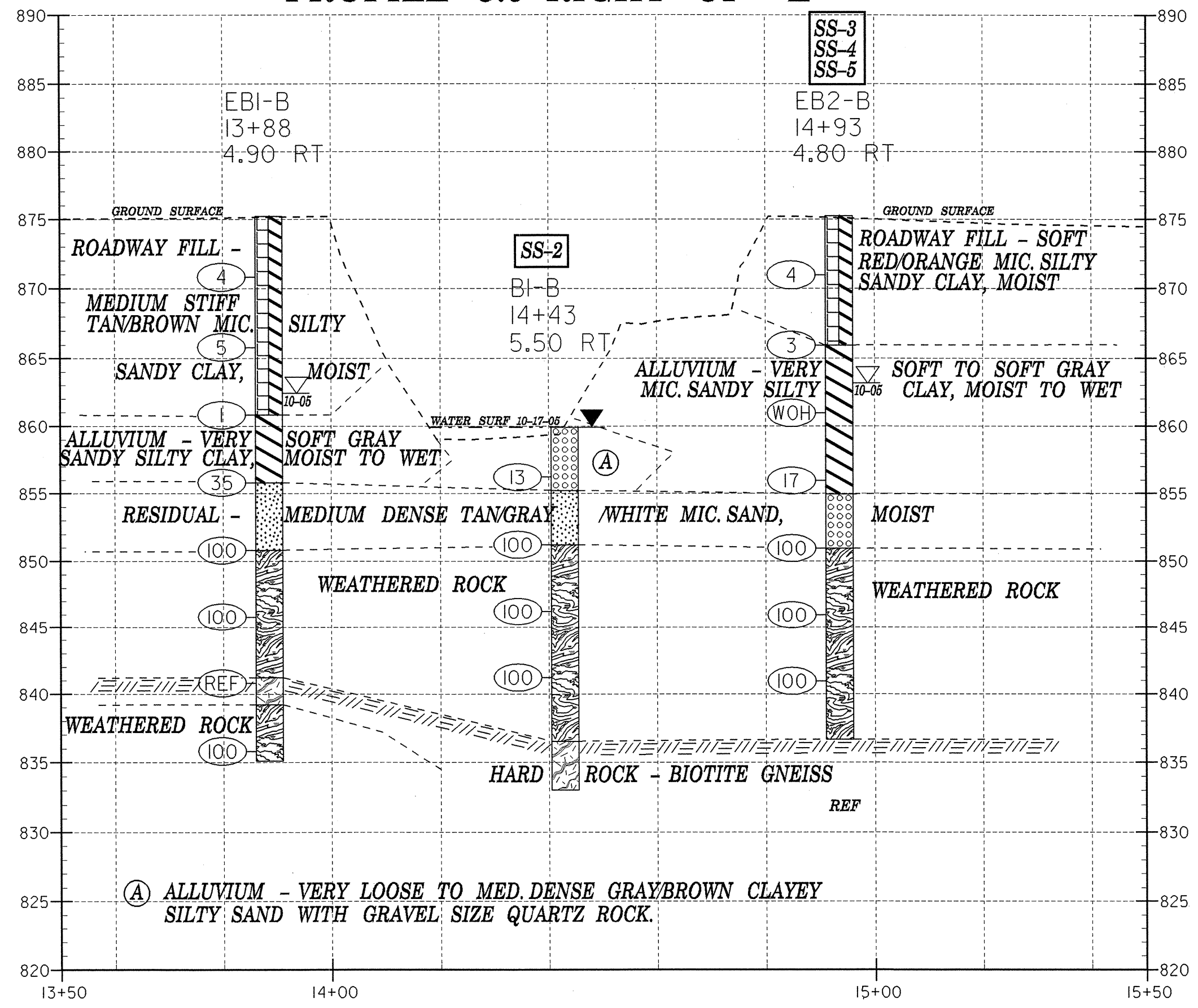


## SECTION THROUGH EB2-A & EB2-B





# PROFILE 5.0' RIGHT OF -L-



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33503.1.1		ID B-4155		COUNTY IREDELL		GEOLOGIST JKS							
SITE DESCRIPTION BRIDGE 116 OVER 3RD CREEK ON SR 1521							GND WATER						
BORING NO EB1-A		NORTHING 0.00		EASTING 0.00		0 HR 13.30ft	24 HR N/A						
ALIGNMENT L		BORING LOCATION 13+89.000		OFFSET 4.70ft LT									
COLLAR ELEV 875.16ft		TOTAL DEPTH 40.10ft		START DATE 10/18/05		COMPLETION DATE 10/18/05							
DRILL MACHINE CME 550X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-A, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
875.16													Ground Surface
870.00	4.50	1	2	4	1.5					6	SS-6	M	ROADWAY FILL - MEDIUM STIFF TAN/BROWN MIC. SILTY SANDY CLAY
	9.50	1	2	3	1.0					5			
860.00	14.50	0	0	0	1.0					0	SS-7	M/W	ALLUVIUM - VERY SOFT GRAY SANDY SILTY CLAY W/ GRAVEL LAYER @ 17.1'
	19.50	6	12	13	1.5					25	SS-8	M/W	RESIDUAL - MEDIUM DENSE TAN/GRAY/WHITE MIC. SAND
850.00	24.50	100			0.3					100			WEATHERED ROCK
	29.50	100			0.1					100			HARD CRYSTALLINE ROCK (SPT REFUSAL)
840.00	34.50	100			0.1					100			WEATHERED ROCK
835.06	39.50	77	23		0.6					100			WEATHERED ROCK
BORING TERMINATED IN WEATHERED ROCK AT ELEVATION 835.06 FEET													

Sheet 9

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33503.1.1		ID B-4155		COUNTY IREDELL		GEOLOGIST JKS							
SITE DESCRIPTION BRIDGE 116 OVER 3RD CREEK ON SR 1521							GND WATER						
BORING NO EB1-B		NORTHING 0.00		EASTING 0.00		0 HR 12.80ft	24 HR N/A						
ALIGNMENT L		BORING LOCATION 13+88.500		OFFSET 4.90ft RT									
COLLAR ELEV 875.22ft		TOTAL DEPTH 40.10ft		START DATE 10/18/05		COMPLETION DATE 10/18/05							
DRILL MACHINE CME 550 X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-B, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75				100
875.22													Ground Surface
870.00	4.40	1	2	2	1.5					4		M	ROADWAY FILL - MEDIUM STIFF TAN/BROWN MIC. SILTY SANDY CLAY
	9.40	1	2	3	1.5					5			
860.00	14.40	0	0	1	1.5					1		M	ALLUVIUM - VERY SOFT GRAY SANDY SILTY CLAY
	19.40	8	14	21	1.5					35		M	RESIDUAL - MEDIUM DENSE TAN/GRAY/WHITE MIC. SAND
850.00	24.40	100			0.3					100			WEATHERED ROCK
	29.40	100			0.3					100			HARD CRYSTALLINE ROCK (SPT REFUSAL)
840.00	34.40	100			0.1					100			WEATHERED ROCK
835.12	39.40	69	31		0.7					100			WEATHERED ROCK
BORING TERMINATED IN WEATHERED ROCK AT ELEVATION 835.12 FEET													

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO 33503.1.1	ID B-4155	COUNTY IREDELL	GEOLOGIST JKS
SITE DESCRIPTION BRIDGE 116 OVER 3RD CREEK ON SR 1521			GND WATER
BORING NO B1-A	NORTHING 0.00	EASTING 0.00	0 HR 0.00ft
ALIGNMENT L	BORING LOCATION 14+43.000	OFFSET 5.70ft LT	24 HR 0.00ft
COLLAR ELEV 859.14ft	TOTAL DEPTH 32.75ft	START DATE 10/17/05	COMPLETION DATE 10/17/05
DRILL MACHINE CME 550 X	DRILL METHOD SPT CORE BORING	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK 11.40ft	

PROJECT NO: 33503.1.1      PROJECT ID: B-4155      COUNTY: Iredell      GEOLOGIST: J.K. STICKNEY  
 SITE DESCRIPTION: Bridge 116 over Third Creek on SR1521      DRILLER: C.L. SMITH  
 BORING NO: B1-A      BORING LOCATION (STA): 14+43      OFFSET: 5.7 LT  
 COLLAR ELEV: 859.14'      PERSONNEL: HKW      CORE SIZE: NXWL  
 TOTAL DEPTH: 32.75      DRILL MACHINE: CME-550      DATE STARTED: 10/17/05  
 TOTAL RUN: 21.35      DRILL EQUIP: NX-CASING, TRICONE      DATE COMPLETED: 10/17/05

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
859.14												Ground Surface
	3.20	9	11	10	1.5							ALLUVIUM - VERY LOOSE TO MED DENSE GRAY/BROWN CLAYEY SILTY SAND WITH GRAVEL SIZE QUARTZ ROCKS.
	8.20	22	65	35	1.1							RESIDUAL - MEDIUM DENSE TAN/GRAY/WHITE MIC. SAND
												WEATHERED ROCK
												HARD ROCK - BLACK-WHITE FRESH VERY HARD CLOSELY FRACTURED AND THINLY BEDDED BIOTITE GNEISS
												BROWN MICACEOUS SEVERELY WEATHERED, VERY SOFT, CLOSELY FRACTURED BIOTITE GNEISS
												BLACK-WHITE MODERATELY WEATHERED, HARD, CLOSELY BEDDED BIOTITE GNEISS
												SAME AS ABOVE
826.39												CORE BORING TERMINATED IN HARD ROCK AT ELEVATION 826.39 FEET.

ELEV. (FT)	DEPTH (FT)	DRILL RATE (MIN/1.0 FT)	RUN NO.	REC % (FT)	RQD % (FT)	SAMPLE NO.	FIELD CLASSIFICATION AND REMARKS
852.3	11.4	NM	1	100	61		Black/White, fresh, very hard, closely fractured and thinly bedded biotite gneiss
850.75	12.95	NM	2	56	0		Brown micaceous, severely weathered, very soft, closely fractured biotite gneiss
845.75	17.95	NM	3	40	15		Black/White moderately weathered, hard, closely fractured biotite gneiss
840.75	22.95	NM	4	86	82	RS-1	Black/White fresh, very hard, closely fractured, thickly laminated biotite gneiss, with mineral traces of garnet and amphibolite.
835.75	27.95	NM	5	97	83		Same as Run 4
830.95	32.75						
NOTES							

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
GEOTECHNICAL UNIT BORING LOG**

Sheet 11

<b>PROJECT NO</b> 33503.1.1		<b>ID</b> B-4155		<b>COUNTY</b> IREDELL		<b>GEOLOGIST</b> JKS							
<b>SITE DESCRIPTION</b> BRIDGE 116 OVER 3RD CREEK ON SR 1521							<b>GND WATER</b>						
<b>BORING NO</b> B1-B		<b>NORTHING</b> 0.00		<b>EASTING</b> 0.00		0 HR 0.00ft	24 HR 0.00ft						
<b>ALIGNMENT</b> L		<b>BORING LOCATION</b> 14+43.000		<b>OFFSET</b> 5.50ft RT									
<b>COLLAR ELEV</b> 859.93ft		<b>TOTAL DEPTH</b> 26.90ft		<b>START DATE</b> 10/17/05		<b>COMPLETION DATE</b> 10/17/05							
<b>DRILL MACHINE</b> CME 550 X			<b>DRILL METHOD</b> SPT CORE BORING			<b>HAMMER TYPE</b> AUTOMATIC							
<b>SURFACE WATER DEPTH</b>			<b>DEPTH TO ROCK</b> 23.40ft			Log B1-B, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	M/W	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75				
859.93													
	3.70	2	3	10	1.5					SS-2			ALLUVIUM - VERY LOOSE GRAY/BROWN CLAYEY SILTY SAND WITH GRAVEL SIZE QUARTZ ROCK.
850.00	8.70	35	45	55	1.4								RESIDUAL - MEDIUM DENSE TAN/GRAY/WHITE MIC. SAND
	13.70	61	39		0.8								WEATHERED ROCK
840.00	18.70	85	15		0.6								
833.03										RUN #1			HARD ROCK - BIOTITE GNEISS - NOTE: CORE BARREL BROKE OFF IN HOLE SO HOLE ABANDONED
						CORE BORING TERMINATED AT 833.03 FEET DUE TO DRILLING COMPLICATIONS INVOLVING THE NX WIRELINE.							

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33503.1.1		ID B-4155		COUNTY IREDELL		GEOLOGIST JKS						
SITE DESCRIPTION BRIDGE 116 OVER 3RD CREEK ON SR 1521							GND WATER					
BORING NO EB2-A		NORTHING 0.00		EASTING 0.00		0 HR 12.40ft						
ALIGNMENT L		BORING LOCATION 14+93.300		OFFSET 5.50ft LT		24 HR N/A						
COLLAR ELEV 875.24ft		TOTAL DEPTH 38.50ft		START DATE 10/17/05		COMPLETION DATE 10/17/05						
DRILL MACHINE CME 550 X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK 24.40ft			Log EB2-A, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
875.24												Ground Surface
870.00	4.40	1	1	2	1.5	3					M	ROADWAY FILL - SOFT RED/BROWN MIC. SILTY SANDY CLAY
	9.40	2	2	2	1.5	4					M	
860.00	14.40	1	2	1	1.5	3					M/W	ALLUVIUM - SOFT GRAY MIC. SANDY SILTY CLAY
	19.40	9	10	11	1.5	21						RESIDUAL - MEDIUM DENSE ORANGE/GRAY SAND
850.00	24.40	100			0.5	100						WEATHERED ROCK
	29.40	44	56		0.8	100						
840.00	34.40	75	25		0.7	100						
836.74												BORING TERMINATED IN WEATHERED ROCK AT ELEVATION 836.74 FEET.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33503.1.1		ID B-4155		COUNTY IREDELL		GEOLOGIST JKS						
SITE DESCRIPTION BRIDGE 116 OVER 3RD CREEK ON SR 1521							GND WATER					
BORING NO EB2-B		NORTHING 0.00		EASTING 0.00		0 HR 12.10ft						
ALIGNMENT L		BORING LOCATION 14+93.500		OFFSET 4.80ft RT		24 HR N/A						
COLLAR ELEV 875.26ft		TOTAL DEPTH 38.60ft		START DATE 10/18/05		COMPLETION DATE 10/18/05						
DRILL MACHINE CME 550 X			DRILL METHOD NW CASING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 24.30ft			Log EB2-B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
875.26												Ground Surface
870.00	4.30	1	2	2	1.0	4				SS-3	M	ROADWAY FILL - SOFT RED/ORANGE MIC. SILTY SANDY CLAY
	9.30	1	1	2	1.0	3				SS-4	M	ALLUVIUM - VERY SOFT TO SOFT GRAY MIC. SANDY SILTY CLAY
860.00	14.30	0	0	0	1.0	0						RESIDUAL - MEDIUM DENSE ORANGE/GRAY SAND
	19.30	6	8	9	1.0	7				SS-5	M	RESIDUAL - MEDIUM DENSE ORANGE/GRAY SAND
850.00	24.30	52	48		0.7	100						WEATHERED ROCK
	29.30	47	53		0.9	100						
840.00	34.30	100			0.4	100						
836.66												BORING REFUSAL ON HARD ROCK AT ELEVATION 836.66 FEET.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAY  
 MATERIALS & TESTS UNIT  
 SOILS LABORATORY

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAY  
 MATERIALS & TESTS UNIT  
 SOILS LABORATORY

T. I. P. No. B4155

T. I. P. No. B4155

REPORT ON SAMPLES OF SOILS FOR QUALITY

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project 33503.1.1 County IREDELL Owner \_\_\_\_\_  
 Date: Sampled \_\_\_\_\_ Received 10/21/05 Reported 10/25/2005  
 Sampled from BRIDGE By J E BEVERLY  
 Submitted by N WAINAINA 1995 Standard Specifications

Project 33503.1.1 County IREDELL Owner \_\_\_\_\_  
 Date: Sampled \_\_\_\_\_ Received 10/21/05 Reported 10/25/2005  
 Sampled from BRIDGE By J E BEVERLY  
 Submitted by N WAINAINA 1995 Standard Specifications

LOCATION  
 726674 TO 726681  
 10/26/05

726674 TO 726681  
 10/26/05

TEST RESULTS

Proj. Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6
Lab. Sample No.	726674	726675	726676	726677	726678	726679
Retained #4 Sieve %	3	15	-	-	16	-
Passing #10 Sieve %	90	70	100	100	70	99
Passing #40 Sieve %	63	45	94	97	38	87
Passing #200 Sieve %	18	11	72	76	12	45

TEST RESULTS

Proj. Sample No.	SS-7	SS-8				
Lab. Sample No.	726680	726681				
Retained #4 Sieve %	-	12				
Passing #10 Sieve %	100	80				
Passing #40 Sieve %	99	51				
Passing #200 Sieve %	89	13				

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	47.5	53.1	11.4	4.6	59.7	25.5
Fine Sand Ret - #270 %	39.3	35.5	21.2	30.3	27.3	35.9
Silt 0.05 - 0.005 mm %	9.2	7.4	15.2	33.1	9.0	18.6
Clay < 0.005 mm %	4.0	4.0	52.1	32.1	4.0	20.0
Passing #40 Sieve %	-	-	-	-	-	-
Passing #200 Sieve %	-	-	-	-	-	-

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	1.4	55.5				
Fine Sand Ret - #270 %	15.8	33.3				
Silt 0.05 - 0.005 mm %	30.7	9.2				
Clay < 0.005 mm %	52.1	2.0				
Passing #40 Sieve %	-	-				
Passing #200 Sieve %	-	-				

L. L.	29	24	70	44	23	47
P. I.	NP	NP	27	15	NP	15
AASHTO Classification	A-2-4(0)	A-1-b(0)	A-7-5(23)	A-7-6(12)	A-1-b(0)	A-7-5(4)
Station	14+43	14+43	14+93.5	14+93.5	14+93.5	13+89
OFFSET	5.7 LT	5.5RT	4.8 RT	4.8 RT	4.8 RT	4.7 LT
ALIGNMENT	L	L	L	L	L	L
Depth (Ft)	3.70	3.70	4.80	9.80	20.30	3.40
to	4.70	4.70	5.80	10.80	20.80	4.40

L. L.	62	30				
P. I.	25	NP				
AASHTO Classification	A-7-5(28)	A-2-4(0)				
Station	13+87	13+87				
OFFSET	4.7 LT	4.7 LT				
ALIGNMENT	L	L				
Depth (Ft)	13.40	18.40				
to	14.40	19.40				

cc: J E BEVERLY  
 Soils File

## GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 33503.1.1 TIP NO.: B-4155 COUNTY: Iredell

DESCRIPTION(1): Bridge 116 over 3rd creek on Sr1521 between US 64 and Sr 1006

◆ **INFORMATION ON EXISTING BRIDGES** Information obtained from  Field Inspection  
 Microfilm (Reel: Position: )  
 Other

COUNTY BRIDGE NO. 116 BRIDGE LENGTH 80'8" NO. BENTS 3 NO. BENTS IN: CHANNEL 1 FLOODPLAIN 3

FOUNDATION TYPE: Timber deck on steel I-beams, supported by timber caps and piles

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: None

INTERIOR BENTS: None

CHANNEL BED: None

CHANNEL BANKS: Channel banks are steep, but stable.

◆ **EXISTING SCOUR PROTECTION:**

TYPE(3): None

EXTENT(4): N/A

EFFECTIVENESS(5): N/A

OBSTRUCTIONS(6) (DAMS, DEBRIS, ETC.): None

◆ **DESIGN INFORMATION**

CHANNEL BED MATERIAL(7) (Sample Results Attached): Gray/Brown clayey silty sand (A-1-b)

CHANNEL BANK MATERIAL(8) (Sample Results Attached): Tan/Brown micaceous silty sand (A-2-4)

CHANNEL BANK COVER(10): Mature trees and shrubs

FLOOD PLAIN WIDTH(11): appx. 500', station 12+00 - 17+00

FLOOD PLAIN COVER(12): Mature trees, shrubs, and agriculture crops

STREAM IS:  DEGRADING  AGGRADING (13)

OTHER OBSERVATIONS AND COMMENTS: Upstream timber pile on B-1 has been repaired with a concrete box

◆  
 ◆  
 ◆ **DESIGN INFORMATION CONT.**

CHANNEL MIGRATION TENDENCY(14): Slight

GEOTECHNICAL ADJUSTED SCOUR ELEVATIONS (15):

The NCDOT Hydro Report predicts 100 year maximum scour to elevation 845 feet in the channel at bent 1.

Based on calculations run off of boring data collected at the site the Geotechnical adjusted 100 year scour should be raised to elevation 850 feet. This is approximately 1 foot into weathered rock.

REPORTED BY: JKS / JEB DATE: Oct 19, 2005

### INSTRUCTIONS

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIPRAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL; A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL; A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE FOUNDATION BEARING MATERIAL
- (10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIPRAP, NONE, ETC.)
- (11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING.
- (14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (15) GIVE THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION. IF THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION IS DEPENDENT ON SCOUR COUNTER MEASURES, EXPLAIN. (RIPRAP ARMORING ON SLOPES, ETC.) THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENT RQD; DIFFERENTIAL WEATHERING; SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

333503.1.1 (B-4155)  
IREDELL COUNTY  
BRIDGE # 116 ON SR 1521 OVER 3<sup>RD</sup> CREEK

SITE PHOTOS



Looking North along SR 1521 (Creek flow left to right)



Looking South along SR 1521 (Creek flow right to left)



33503.1.1 (B-4155)  
IREDELL COUNTY  
BRIDGE # 116 ON SR 1521 OVER THIRD CREEK

CORE PHOTOS

B1-A



B1-A (#2)



Note: both above pictures are of same rock from boring B1-A. The picture without the scale was better quality that is why it was included.