STATE	STATE PROJECT REFERENCE NO.		SHEET NO.	TOTAL SHEETS
N.C.	34981.1.1 (U-3823)		1	18
STATE PROJ. NO.		F. A. PROJ. NO.	DESCRIPTION	
			P.E.	
			CONST.	

ID: U-3823

CONTRACT:

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 34981.1.1 I.D. NO. U-3823

F.A. PROJECT STP-1158(2)

COUNTY WILSON

PROJECT DESCRIPTION WILSON - SR 1158 (AIRPORT BLVD.) FROM NC 42 WEST TO US 264 ALT

SITE DESCRIPTION BRIDGE ON SR 1158 (RELOCATED) OVER BLOOMERY SWAMP AT -L- STATION 83+24.5

CONTENTS:

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.

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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.

INVESTIGATED BY KBM PERSONNEL JLS

CHECKED BY KBM CDC

SUBMITTED BY DNA KBQ

DATE OCTOBER 2004 LWD

RES

MMH

F&R: DT, JG

DRAWN BY: ANK, CDC, KBM

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 LICENSED SEAL 1050 GEOLOGIST D. N. ARGENBRIGHT 10-14-04

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
U-3823	34981.1.1	2	18

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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 (AASHTO T206, 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:

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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤35% PASSING #200)							SILT-CLAY MATERIALS (>35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7 (A-7-5, A-7-6)	A-1, A-2, A-3	A-4, A-5, A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7							
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		N.P.	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

P.I. OF A-7-5 ≤ L.L. - 30 ; P.I. OF A-7-6 > L.L. - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.5
	MEDIUM STIFF	4 TO 8	0.5 TO 1
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.0	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F. SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12"	3"				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
PLASTIC RANGE (PI): LL — LIQUID LIMIT		
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE; SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

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.

GRADATION

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.

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 30
MODERATELY COMPRESSIBLE	LIQUID LIMIT 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT- CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING.
- STATIC WATER LEVEL AFTER 24 HOURS.
- PW — PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA
- SPRING OR SEEPAGE

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS
- INFERRED SOIL BOUNDARIES
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP/DIP DIRECTION OF ROCK STRUCTURES
- SOUNDING ROD
- SPT CPT DPT DMT VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF — SPT REFUSAL

SAMPLE DESIGNATIONS
S- BULK SAMPLE
SS- SPLIT SPOON SAMPLE
ST- SHELBY TUBE SAMPLE
RS- ROCK SAMPLE
RT- RECOMPACTED TRIAXIAL SAMPLE
CBR - CBR SAMPLE

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F. - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED
FRAGS. - FRAGMENTS
MED. - MEDIUM
PMT - PRESSUREMETER TEST
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT
W - MOISTURE CONTENT
V. - VERY
VST - VANE SHEAR TEST

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [X] MOBILE B- 47
- [ ] BK-51
- [X] CME-55
- [ ] CME-550
- [ ] PORTABLE HOIST
- [ ] OTHER _____
- [ ] OTHER _____

ADVANCING TOOLS:
- [X] CLAY BITS
- [X] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [X] CORE BIT
- [ ] OTHER _____

HAMMER TYPE:
- [X] AUTOMATIC [X] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -NWD4
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] OTHER _____

ROCK DESCRIPTION

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 FOLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V. SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
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*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGISTS 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 GEOLOGISTS 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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGISTS PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
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 FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
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

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE 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.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS WHICH 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, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS 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.

BENCH MARK: BL-6 -L- STATION 83+17.23 8.02' LEFT

ELEVATION: 110.09'

NOTES:

REVISED 09/15/00

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 13, 2004

MEMORANDUM TO: Mr. Jerry P. Page, P.E.
Division Project Manager

FROM: Njoroge Wainaina, P.E.
State Geotechnical Engineer

STATE PROJECT: 34981.1.1 U-3823
FEDERAL PROJECT: STP–1158 (2)
COUNTY: Wilson

DESCRIPTION: Wilson – SR 1158 (Airport Blvd) from NC 42 West to US ALT 264

SUBJECT: Geotechnical Report – Structure Inventory for bridge on SR 1158 (Relocated) over Bloomery Swamp at –L– Station 83+24.50

Project Description

This project consists of a 205-foot long four span bridge to be constructed over Bloomery Swamp along the proposed -L- alignment on SR 1158 (Airport Boulevard). The project is located in Wilson County approximately four miles west of the town of Wilson. The proposed bridge has a 90° skew and will replace the existing five barrel 12 x 7 feet reinforced concrete box culvert. The area is wooded north and south of the existing structure.

The geotechnical field investigation was conducted in July 2004. Borings were advanced using a CME-55 drill machine with an automatic hammer and a Mobile B-47 drill truck with a manual hammer. All borings except EB2-B were advanced until non-crystalline rock was encountered. Borings B1-B and B2-B were cored using NWD core equipment to recover rock samples from the non-crystalline rock. Standard Penetration Tests were performed at each location. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-250-4088
FAX: 919-250-4237

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

Physiography and Geology

The project is located in flat to gently sloping terrain in the western portion of the Coastal Plain Physiographic Province. The project occurs within an area where Coastal Plain Sediments overlie rocks of the Eastern Slate Belt geologic province.

Soil Properties

Soils encountered at the project site include roadway embankment, alluvial, and residual soil.

Roadway embankment fill soil occurs along the left side of the proposed structure. These soils range in thickness from four to seven feet. Fill soil at each proposed end bent consists of medium stiff to stiff sandy silt (AASHTO classification of A-4). The fill soil at each interior bent location is generally sandy, and consists of loose to medium dense, sand and clayey sand (A-1-b, A-2-4, A-2-6) with gravel. The fill soil overlies alluvial soil in each boring except at B2-A where fill soil lies directly on residual soil.

Alluvial soil occurs at all bent locations on this project. At End Bent 1, eight feet of alluvial soil occurs beneath embankment fill soil and consists of medium dense silty fine to coarse sand (A-2-4). This layer grades to coarse sand (A-1-b) overlying weathered rock towards boring EB1-B. Three ± feet of soft fine sandy clayey silt (A-4) overlies these sandy soils on the right side of End Bent 1. Five to six feet of alluvial sandy soil (A-2-4, A-3) occurs at Bent 1. Three feet of soft clayey fine sandy silt (A-4) overlies the sandy soils in boring B1-B. At Bent 2 three to five feet of alluvial very loose clayey sand (A-2-6) and very soft fine sandy silt (A-4) overlie residual soils. Alluvial soils at boring B3-B generally consist of loose sand (A-2-4). A boring was not feasible along the left side of Bent 3 due to the existing culvert. Five feet of soft to medium stiff coarse sandy silty clay (A-6) was encountered at boring EB2-A and grades into a two to three feet thick layer of medium dense sand (A-2-4) towards boring EB2-B. Alluvial soils at the site typically overlie residual soils derived from non-crystalline rock, metamudstone, of the Eastern Slate Belt.

Generally two to twelve feet of residual soil separates the alluvial soil from weathered rock. Five feet of residual dense coarse sand (A-1-b) occurs on the left side of End Bent 1. This layer grades laterally to up to twelve feet of stiff to hard sandy silt and silty clay (A-4, A-6, A-7-6) through Bent 3. The soil thins and grades to 2 feet of very dense silty fine sand at boring EB2-B. The residual soils overlie weathered metamudstone bedrock.

Rock Properties

Weathered rock, which is derived from the underlying metamudstone bedrock, varies in thickness from seven feet to as much as thirty-one feet in the B3-B boring. Weathered rock was encountered in all borings.

Boring EB2-B was the only boring that did not encounter non-crystalline rock. Rock core was recovered from borings B1-B and B2-B. This rock consists of gray-green to dark green metamudstone of the Eastern Slate Belt. The rock is typically severely weathered, but becomes moderately to slightly weathered near elevation 70.0 feet. Fractures are generally closely spaced and have steep to near vertical dip orientations. Core recovery ranges from 30% to 100%, with an average of 75%. Rock Quality Designation (RQD) values ranges from 0% to 74%, with an average of 43%. Two different drill operators may account for the low average recovery and RQD percentages. More detailed rock descriptions can be found in the Core Boring Reports.

Groundwater

Groundwater was encountered at each bent location. Groundwater elevations ranged from 104 feet to 101 feet. The water elevation of Bloomery Swamp was measured at 104.5 in May of 2004.

Notice

This Geotechnical foundation report is based on the bent locations provided in the memo "Request for Foundation Recommendations", dated July 9, 2004, and the Hydraulic Bridge Survey Report dated May 7, 2004. If significant changes are made in the design, or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

Prepared by:

Kevin B. Miller
Engineering Geologist II

NWW/KBM

PROJECT REF. NO.	SHEET NO.	TOTAL SHEETS
34981.1.1 (U-3823)	4	18

TEST SITE PLAN

79+00 80+00 81+00 82+00 83+00 84+00 85+00 86+00 87+00 88+00

BZ 1 BZ 2

LO WLB HO WLB MTL

EBI-A B2-A EB2-A

BI-A

-L-

TO US 264 ALT

12" PVC

EBI-B B2-B EB2-B

BI-B B3-B

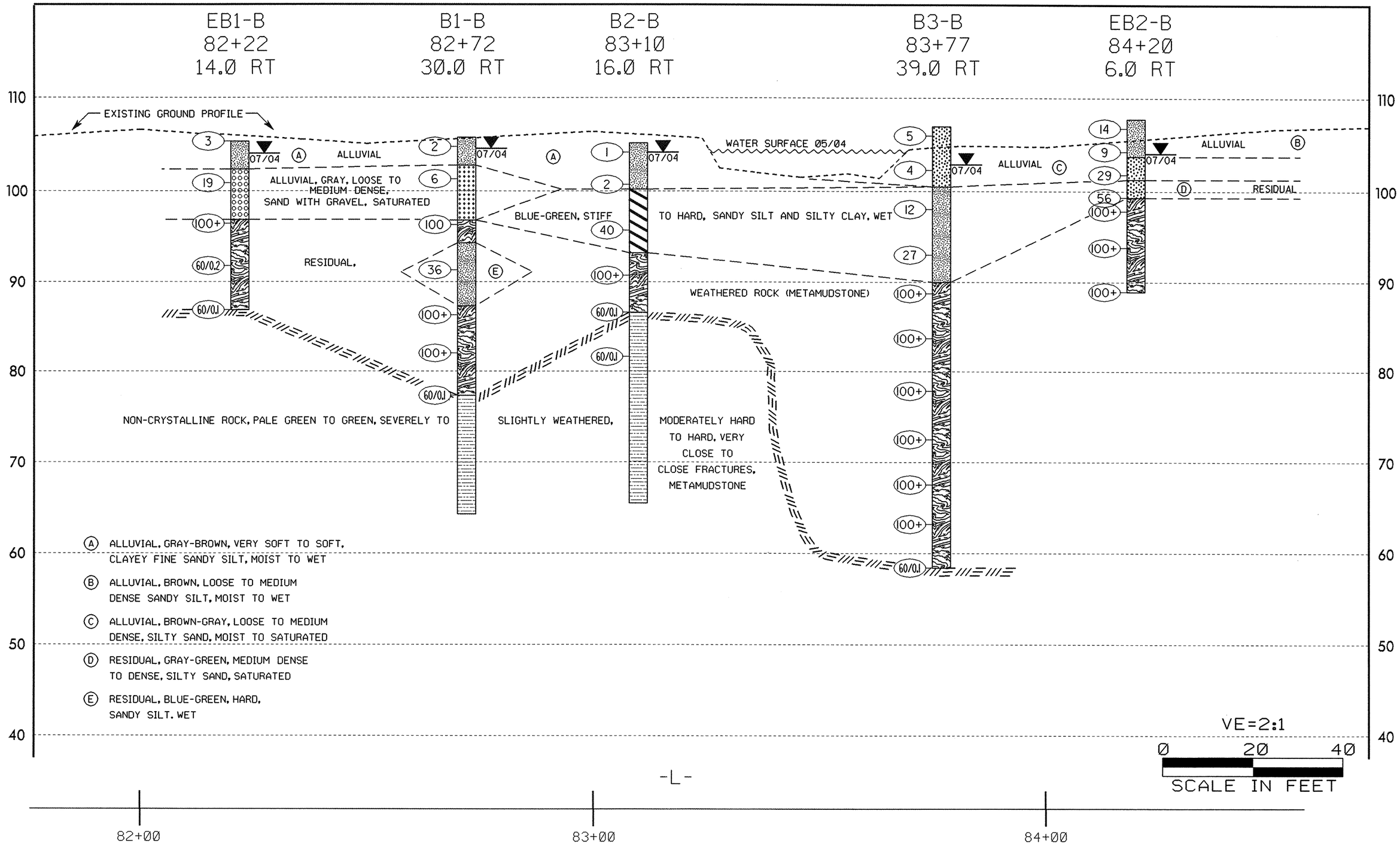
NAD 83

NORFOLK SOUTHERN RR

0 60 120

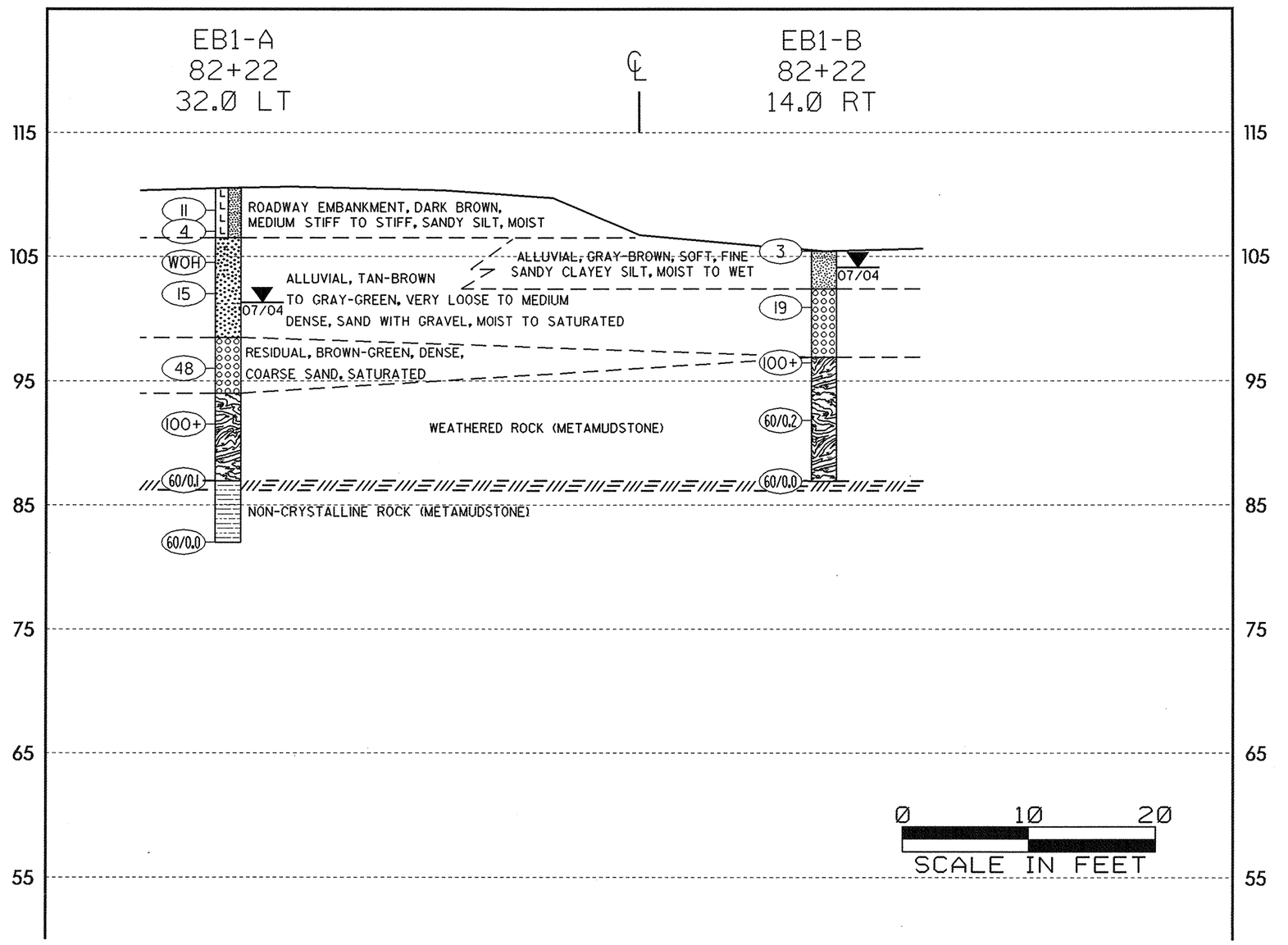
SCALE IN FEET

PROFILE THROUGH BORINGS PROJECTED ALONG -L-



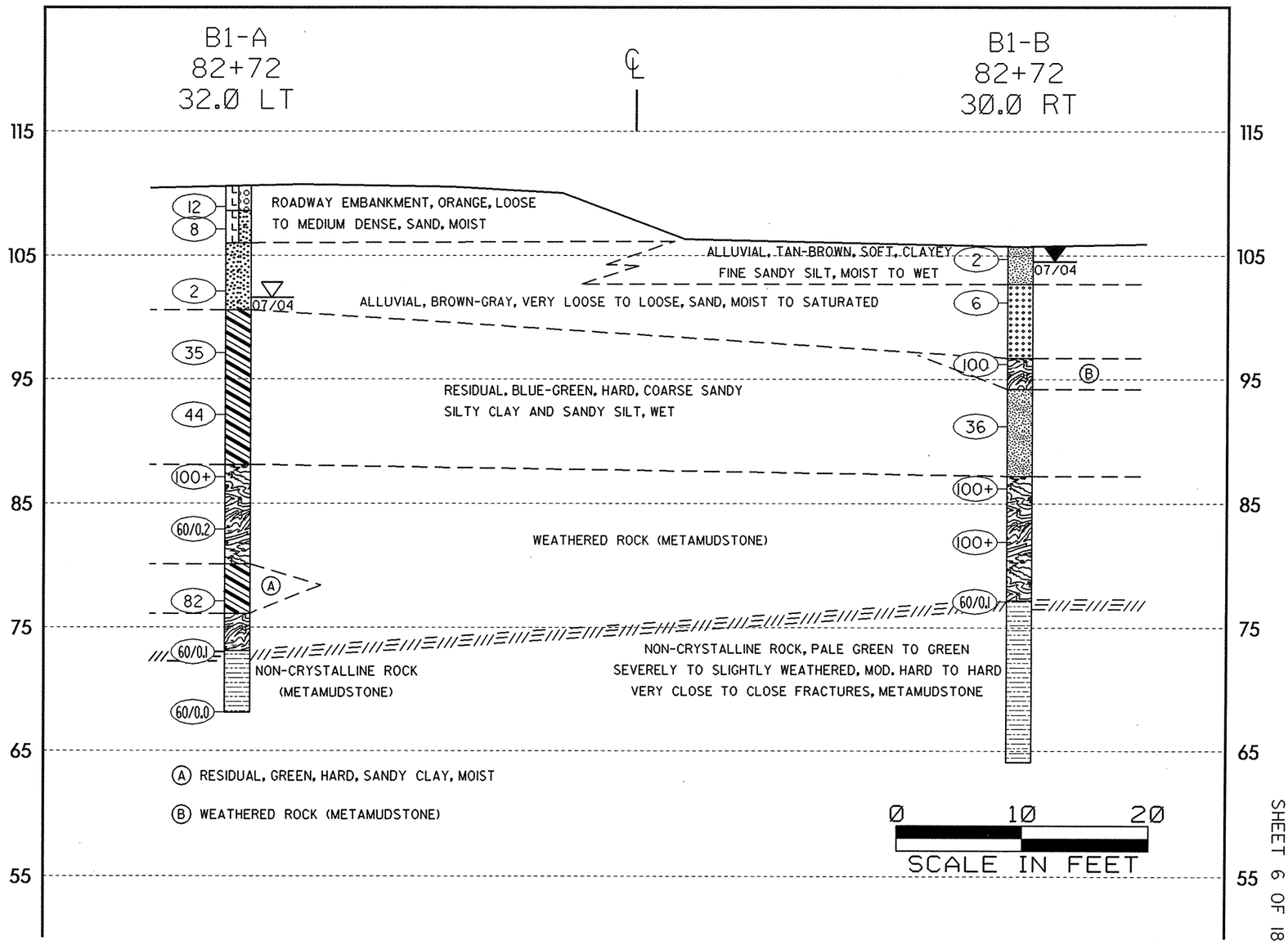
CROSS SECTION THROUGH END BENT 1

34981.1.1 (U-3823)



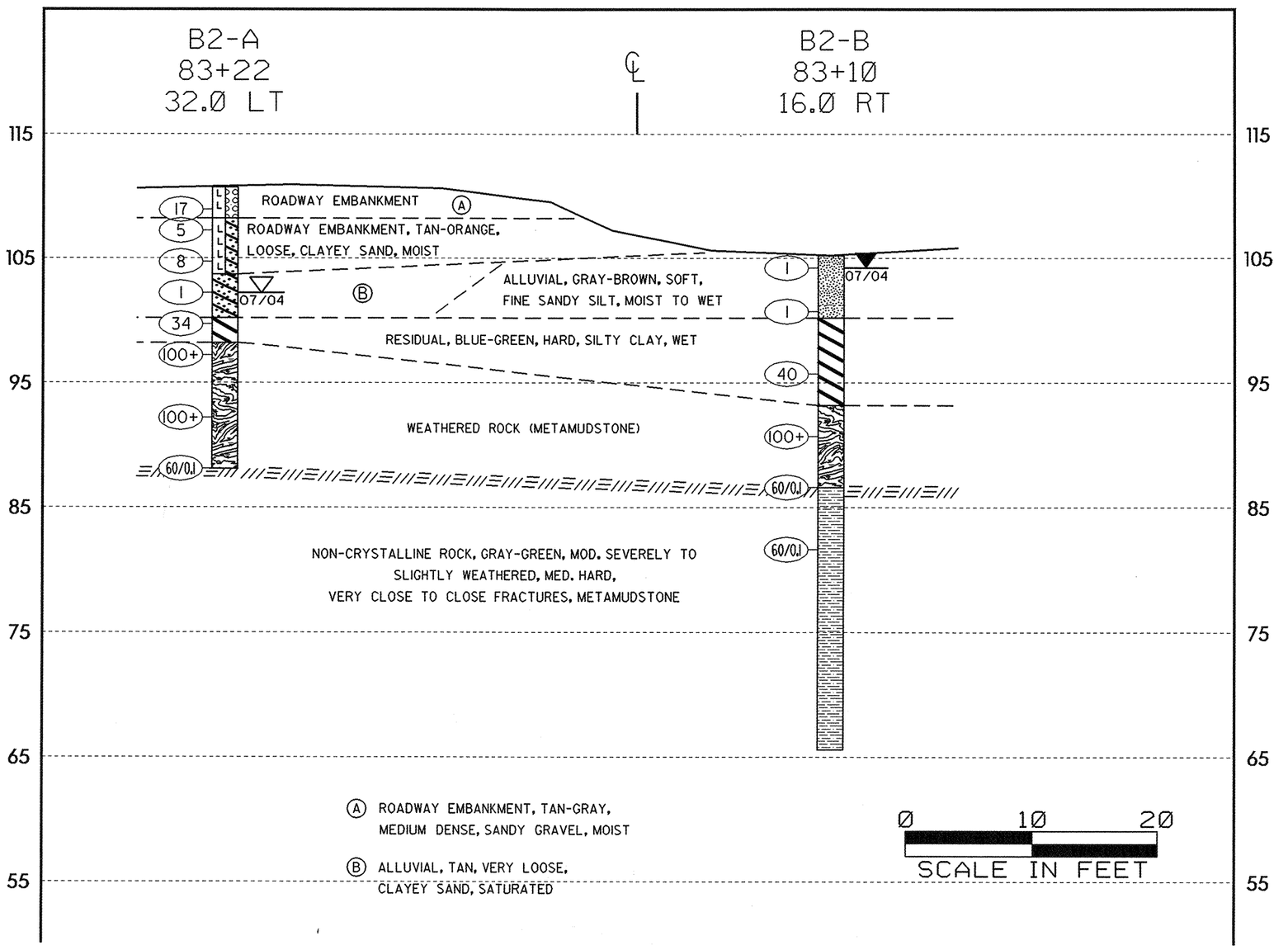
CROSS SECTION THROUGH BENT 1

34981.1.1 (U-3823)



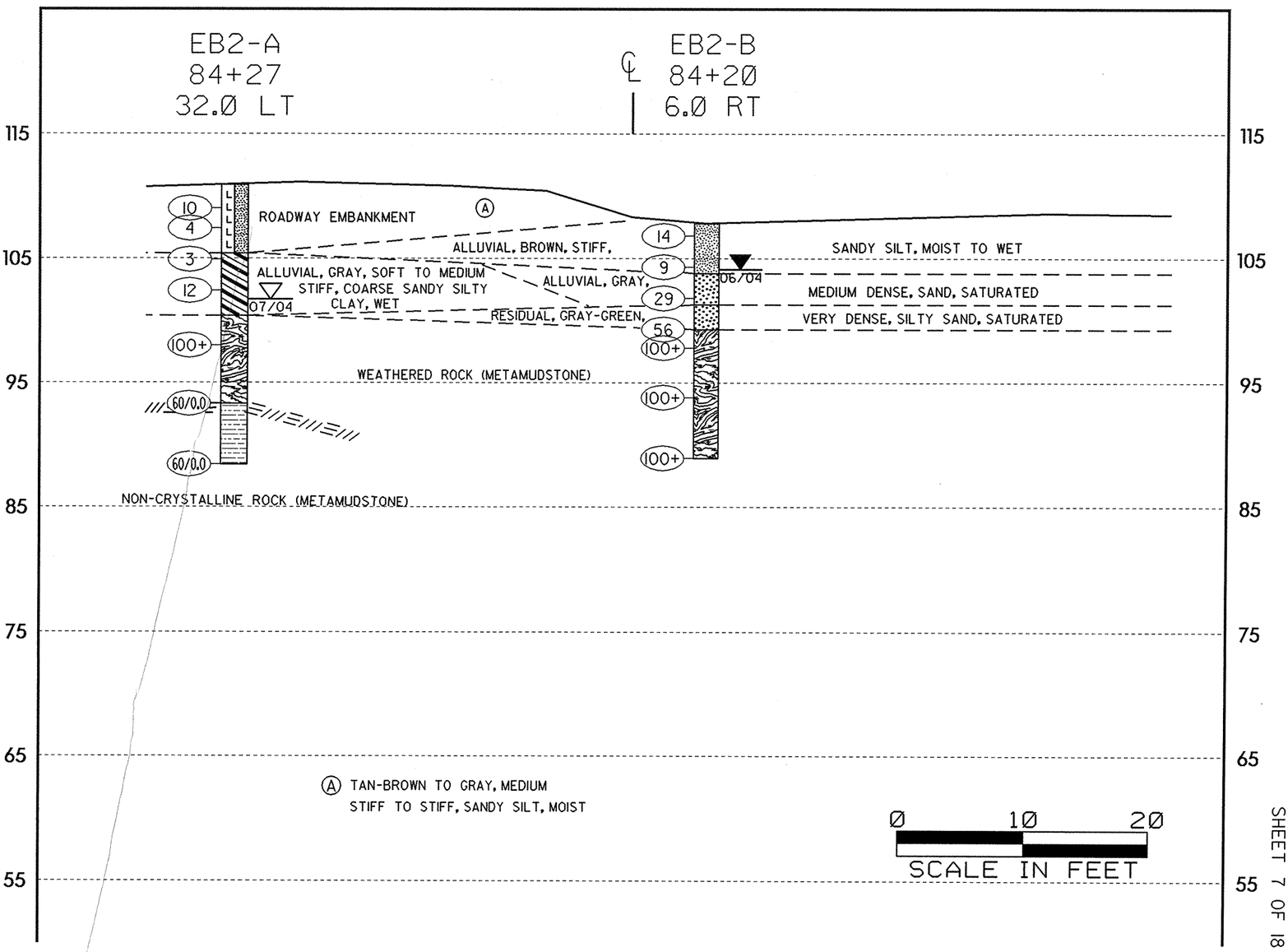
CROSS SECTION THROUGH BENT 2

34981.1.1 (U-3823)



CROSS SECTION THROUGH END BENT 2

34981.1.1 (U-3823)



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34981.1.1	**ID.** U-3823	**COUNTY** WILSON	**GEOLOGIST** J. L. STONE
SITE DESCRIPTION BRIDGE ON SR 1158 OVER BLOOMERY SWAMP			**GROUND WATER**
BORING NO. EBI-A	**BORING LOCATION** 82+22	**OFFSET** 32' LT	**ALIGNMENT** -L-	**0 HR.** N.M.
COLLAR ELEVATION 110.5'	**NORTHING** 0.00	**EASTING** 0.00		**24 HR.** 9.2'
TOTAL DEPTH 28.5'	**DRILL MACHINE** CME-55	**DRILL METHOD** H.S. AUGERS	**HAMMER TYPE** AUTOMATIC	
START DATE 7/29/04	**COMPLETION DATE** 7/29/04	**SURFACE WATER DEPTH** N/A		

ELEV.	DEPTH (FT.)	BLOW COUNT 0.5'	0.5'	0.5'	PEN. (FT.)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NUMBER	▼/MOI.	LOG	SOIL AND ROCK DESCRIPTION
110.0										
110.5	0.8	3	2	9	1.0	X 11	SS-52	M		DARK BROWN, SANDY SILT, MOI. (ROADWAY EMBANKMENT)
	2.5	2	2	2	1.0	X 4				
105.0	5.0	WOH	WOH	WOH	1.0	X 0	SS-53	M		BROWN-GREEN, SAND, MOI. TO SAT. (ALLUVIUM)
	7.5	1	2	13	1.0	X 15	SS-54	M-S		
100.0										
	13.5	12	20	28	1.0	X 48		S		BROWN-GREEN, COARSE SAND, SAT. (RESIDUAL)
95.0										
	18.5	51	49		0.9	100+ X				GREEN, SEVERELY WEATHERED METAMUDSTONE
90.0										
	23.5	60			0.1	60/0.1 X				
85.0										GREEN METAMUDSTONE
	28.5	60			0.0	60/0.0 X				
80.0						BORING TERMINATED AT ELEV. 82.0 IN META-MUDSTONE				
75.0										
70.0										
65.0										
60.0										
55.0										
50.0										
45.0										
40.0										

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34981.1.1	**ID.** U-3823	**COUNTY** WILSON	**GEOLOGIST** J. L. STONE
SITE DESCRIPTION BRIDGE ON SR 1158 OVER BLOOMERY SWAMP			**GROUND WATER**
BORING NO. EBI-B	**BORING LOCATION** 82+22	**OFFSET** 14' RT	**ALIGNMENT** -L-	**0 HR.** N.M.
COLLAR ELEVATION 105.4'	**NORTHING** 0.00	**EASTING** 0.00		**24 HR.** 1.3'
TOTAL DEPTH 18.5'	**DRILL MACHINE** CME-55	**DRILL METHOD** H.S. AUGERS	**HAMMER TYPE** AUTOMATIC	
START DATE 7/28/04	**COMPLETION DATE** 7/28/04	**SURFACE WATER DEPTH** N/A		

ELEV.	DEPTH (FT.)	BLOW COUNT 0.5'	0.5'	0.5'	PEN. (FT.)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NUMBER	▼/MOI.	LOG	SOIL AND ROCK DESCRIPTION
105.4										
105.0	0.0	1	1	2	1.0	X 3				GRAY-BROWN, FINE SANDY CLAYEY SILT, MOI. TO WET (ALLUVIUM)
	3.5	5	10	9	1.0	X 19	SS-44	M-S		GRAY-GREEN, SANDY GRAVEL, SAT. (ALLUVIUM)
100.0								S		
	8.5	34	66		0.9	100+ X	SS-45			BLUE-GREEN, SEVERELY WEATHERED METAMUDSTONE
95.0										
	13.5	60			0.2	60/0.2 X				
90.0										
	18.5	60			0.0	60/0.0 X				
85.0						BORING TERMINATED AT ELEV. 86.9 IN META-MUDSTONE				
80.0										
75.0										
70.0										
65.0										
60.0										
55.0										
50.0										
45.0										
40.0										
35.0										

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34981.1.1	**ID.** U-3823	**COUNTY** WILSON	**GEOLOGIST** J. L. STONE
SITE DESCRIPTION BRIDGE ON SR 1158 OVER BLOOMERY SWAMP			**GROUND WATER**
BORING NO. BI-A	**BORING LOCATION** 82+72	**OFFSET** 32' LT	**ALIGNMENT** -L-	**0 HR.** 9.0'
COLLAR ELEVATION 110.6'	**NORTHING** 0.00	**EASTING** 0.00	**24 HR.** N.M.
TOTAL DEPTH 42.5'	**DRILL MACHINE** CME-55	**DRILL METHOD** H.S. AUGERS	**HAMMER TYPE** AUTOMATIC
START DATE 7/29/04	**COMPLETION DATE** 7/29/04	**SURFACE WATER DEPTH** N/A	

ELEV.	DEPTH (FT.)	BLOW COUNT 0.5'	0.5'	0.5'	PEN. (FT.)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NUMBER	MOI.	LOG	SOIL AND ROCK DESCRIPTION
110.6	0.7	8	8	4	1.0	X-12				
	2.5	2	4	4	1.0	X-8		M		ORANGE, SAND, MOI. (ROADWAY EMBANKMENT)
105.0	7.5	WOH	WOH	2	1.0	X-2	SS-50	▽		BROWN-GRAY, SAND, MOI. TO SAT. (ALLUVIUM)
100.0	12.5	16	16	19	1.0	X-35		W		BLUE-GREEN, SILTY COARSE SANDY CLAY, WET (RESIDUAL)
95.0	17.5	25	17	27	1.0	X-44				
90.0	22.5	63	37		0.6	X-100+	SS-51			BLUE-GREEN, SEVERELY WEATHERED METAMUDSTONE
85.0	27.5	60			0.2	X-60/0.2				
80.0	32.5	31	32	50	1.0	X-82				GREEN, SANDY CLAY, MOI. (RESIDUAL)
75.0	37.5	60			0.1	X-60/0.1				BLUE-GREEN, SEVERELY WEATHERED METAMUDSTONE
70.0	42.5	60			0.0	X-60/0.0				BLUE-GREEN METAMUDSTONE
65.0						BORING TERMINATED AT ELEV. 68.1 IN META-MUDSTONE				
60.0										
55.0										
50.0										
45.0										
40.0										

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34981.1.1	**ID.** U-3823	**COUNTY** WILSON	**GEOLOGIST** J. L. STONE
SITE DESCRIPTION BRIDGE ON SR 1158 OVER BLOOMERY SWAMP			**GROUND WATER**
BORING NO. BI-B	**BORING LOCATION** 82+72	**OFFSET** 30' RT	**ALIGNMENT** -L-	**0 HR.** N.M.
COLLAR ELEVATION 105.8'	**NORTHING** 0.00	**EASTING** 0.00	**24 HR.** 1.2'
TOTAL DEPTH 41.5'	**DRILL MACHINE** CME-55	**DRILL METHOD** H.S. AUGERS	**HAMMER TYPE** AUTOMATIC
START DATE 7/27/04	**COMPLETION DATE** 7/27/04	**SURFACE WATER DEPTH** N/A	

ELEV.	DEPTH (FT.)	BLOW COUNT 0.5'	0.5'	0.5'	PEN. (FT.)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NUMBER	MOI.	LOG	SOIL AND ROCK DESCRIPTION
105.8										
105.0	0.0	WOH	1	1	1.0	X 2	SS-41	M-S		TAN-BROWN, CLAYEY FINE SANDY SILT, MOI. TO WET (ALLUVIUM)
	3.5	1	3	3	1.0	X 6	SS-42	S		GRAY, SAND, SAT. (ALLUVIUM)
100.0	8.5	22	55	45	1.0	100 X				BLUE-GREEN, SEVERELY WEATHERED METAMUDSTONE
95.0	13.5	9	16	20	1.0	X 36	SS-43	W		BLUE-GREEN, SANDY SILT, WET (RESIDUAL)
90.0	18.5	6	29	71	0.7	100+ X				
85.0	23.5	100			0.3	100+ X				BLUE-GREEN, SEVERELY WEATHERED METAMUDSTONE
80.0	28.5	60			0.1	60/0.1 X				
75.0										NON-CRYSTALLINE ROCK, PALE GREEN TO GREEN SEVERELY TO SLIGHTLY WEATHERED, MOD. HARD TO HARD VERY CLOSE TO CLOSE FRACTURES, METAMUDSTONE
70.0										AVG. REC=48%
65.0										AVG. RQD=10%
60.0						CORING TERMINATED AT ELEV. 64.3' IN NON-CRYSTALLINE ROCK (METAMUDSTONE)				
55.0										
50.0										
45.0										
40.0										
35.0										

CORE BORING REPORT

PROJECT: 34981.1.1 ID: U-3823 COUNTY: WILSON BORING NO: B1-B

DESCRIPTION: BRIDGE ON SR 1158 OVER BLOOMERY SWAMP

LOCATION OF BORING: -L- STA 82+72, 30.0' RT COMPLETION DATE: 07/27/04

COLLAR or GROUND ELEVATION: 105.8 ft CORE SIZE: NWD4 GEOLOGIST: J. L. STONE

CORE EQUIPMENT: CME-55, NW CASING, NWD4 DRILLER: JIM GILCREST, F&R

ELEV (ft)	DEPTH (ft)	DRILL RATE (min/ft)	RUN (ft)	REC (ft) (%)	RQD (ft) (%)	SAMPLE NUMBER	FIELD CLASSIFICATION and REMARKS
76.3	29.5	3:45					Pale green, mod. to severely weathered, mod. hard to hard, very closely fractured at 45 degrees
		4:41	2.0	1.1 (55%)	0.0 (0%)		
74.3	31.5						
74.3	31.5	5:21					Green, mod. severely weathered, mod. hard to hard, closely fractured
		4:28					
		7:01	2.8	1.4 (50%)	0.4 (14%)		
71.5	34.3						
71.5	34.3	4:01					Dark green to mottled black, slightly weathered, mod hard to hard, closely fractured
		4:37					Chlorite, Na/Ca-feldspar, trace pyrite
			2.2	1.8 (82%)	0.8 (36%)		
69.3	36.5						
69.3	36.5	2:52					Dark green to black, slightly weathered, mod hard to hard, very closely fractured
		3:00					
		3:27	3.0	0.9 (30%)	0.0 (0%)		
66.3	39.5						
66.3	39.5	2:37					Dark green, slightly weathered, mod hard, close to very closely fractured
		5:11					
			2.0	0.6 (30%)	0.0 (0%)		
64.3	41.5						
							BOREHOLE TERMINATED AT ELEVATION OF 64.3 FEET, IN ROCK.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34981.1.1	**ID.** U-3823	**COUNTY** WILSON	**GEOLOGIST** J. L. STONE
SITE DESCRIPTION BRIDGE ON SR 1158 OVER BLOOMERY SWAMP			**GROUND WATER**
BORING NO. B2-A	**BORING LOCATION** 83+22	**OFFSET** 32' LT	**ALIGNMENT** -L-	**0 HR.** 8.5'
COLLAR ELEVATION 110.7'	**NORTHING** 0.00	**EASTING** 0.00	**24 HR.** N.M.
TOTAL DEPTH 22.6'	**DRILL MACHINE** CME-55	**DRILL METHOD** H.S. AUGERS	**HAMMER TYPE** AUTOMATIC
START DATE 7/29/04	**COMPLETION DATE** 7/29/04	**SURFACE WATER DEPTH** N/A	

ELEV.	DEPTH (FT.)	BLOW COUNT 0.5'	0.5'	0.5'	PEN. (FT.)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NUMBER	MOI.	LOG	SOIL AND ROCK DESCRIPTION
110.7										
110.0	0.8	19	9	8	1.0	X 17	SS-46	M		TAN-GRAY, SANDY GRAVEL, MOI. (ROADWAY EMBANKMENT)
	2.5	3	2	3	1.0	X 5	SS-47			TAN-ORANGE, CLAYEY SAND, MOI. (ROADWAY EMBANKMENT)
105.0	5.0	4	5	3	1.0	X 8		M-S		
	7.5	1	0	1	1.0	X 1	SS-48			TAN-ORANGE, CLAYEY SAND, MOI. (ALLUVIAL)
100.0	10.0	6	15	19	1.0	X 34				
	12.5	25	45	55	0.9	100+ X	SS-49	W		GRAY-GREEN, SILTY CLAY, WET (RESIDUAL)
95.0										
	17.5	30	70		0.8	100+ X				GRAY-GREEN, SEVERELY WEATHERED METAMUDSTONE
90.0	22.5	60			0.1	60/0.1 X				
						BORING TERMINATED AT ELEV. 88.1 IN META-MUDSTONE				
85.0										
80.0										
75.0										
70.0										
65.0										
60.0										
55.0										
50.0										
45.0										
40.0										

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34981.1.1	**ID.** U-3823	**COUNTY** WILSON	**GEOLOGIST** J. L. STONE
SITE DESCRIPTION BRIDGE ON SR 1158 OVER BLOOMERY SWAMP			**GROUND WATER**
BORING NO. B2-B	**BORING LOCATION** 83+10	**OFFSET** 16' RT	**ALIGNMENT** -L-	**0 HR.** N.M.
COLLAR ELEVATION 105.2'	**NORTHING** 0.00	**EASTING** 0.00	**24 HR.** 1.0'
TOTAL DEPTH 39.6'	**DRILL MACHINE** CME-55	**DRILL METHOD** ROTARY W/MUD	**HAMMER TYPE** AUTOMATIC
START DATE 7/23/04	**COMPLETION DATE** 7/28/04	**SURFACE WATER DEPTH** N/A	

ELEV.	DEPTH (FT.)	BLOW COUNT 0.5'	0.5'	0.5'	PEN. (FT.)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NUMBER	MOI.	LOG	SOIL AND ROCK DESCRIPTION
105.0										
105.2	0.0	WOH	WOH	1	1.0	X	SS-57	M-W		GRAY-BROWN, FINE SANDY SILT, MOI. TO WET (ALLUVIUM)
	3.5	WOH	1	0	1.0	X				
100.0										BLUE-GREEN, SILTY CLAY, WET (RESIDUAL)
	8.5	3	17	23	1.0	X 40	SS-58	W		
95.0										
	13.5	8	35	65	0.8	100+ X				BLUE-GREEN, SEVERELY WEATHERED METAMUDSTONE
90.0										
	18.5	60			0.1	60/0.1 X				
85.0										
	23.5	60			0.1	60/0.1 X				NON-CRYSTALLINE ROCK, GRAY-GREEN, MOD. SEVERELY TO SLIGHTLY WEATHERED, MED. HARD, VERY CLOSE TO CLOSE FRACTURES, METAMUDSTONE
80.0										
										AVG. REC=94%
75.0										AVG. RQD=68%
70.0										
65.0										CORING TERMINATED AT ELEV. 65.6 IN NON-CRYSTALLINE ROCK (METAMUDSTONE)
60.0										
55.0										
50.0										
45.0										
40.0										
35.0										

CORE BORING REPORT

PROJECT: **34981.1.1** ID: **U-3823** COUNTY: **WILSON** BORING NO: **B2-B**

DESCRIPTION: BRIDGE ON SR 1158 OVER BLOOMERY SWAMP

LOCATION OF BORING: -L- STA 83+10, 16.0' RT COMPLETION DATE: 7/28/04

COLLAR or GROUND ELEVATION: 105.2 ft CORE SIZE: NWD4 GEOLOGIST: J. L. STONE

CORE EQUIPMENT: CME-55, NW-Casing, NWD4 DRILLER: DAVID TIGNOR

ELEV (ft)	DEPTH (ft)	DRILL RATE (min/ft)	RUN (ft)	REC (ft) (%)	RQD (ft) (%)	SAMPLE NUMBER	FIELD CLASSIFICATION and REMARKS
81.6	23.6	5:44	1.0	1.0 (100%)	0.4 (40%)		Gray-green, mod severely weathered , med hard, very closely to closely fractured, greenstone/meta-mudstone, laminations visiable
80.6	24.6						
80.6	24.6	3:31	5.0	4.8 (96%)	3.1 (62%)		Gray-green, moderately weathered, med hard, steeply dipping closely to mod closely fractures, laminated, greenstone
		4:22					
		7:06					
		7:04					
75.6	29.6	8:09					
75.6	29.6	8:41	5.0	4.6 (92%)	3.7 (74%)		Green, mod weathered, med hard, closely to very closely fractured, laminated greenstone
		7:15					
		8:39					
		11:04					
70.6	34.6	7:41					
70.6	34.6	6:06	5.0	4.7 (94%)	3.7 (74%)		Pale green, mod to slightly weathered, med hard, closely to very closely fractured, fractures lined with chlorite, Na-Ca feldspar, pyrite
		7:15					
		9:11					
		7:14					
65.6	39.6	10:12					
							BOREHOLE TERMINATED AT ELEVATION OF 65.6 FEET, IN ROCK.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34981.1.1	**ID.** U-3823	**COUNTY** WILSON	**GEOLOGIST** J. L. STONE
SITE DESCRIPTION BRIDGE ON SR 1158 OVER BLOOMERY SWAMP			**GROUND WATER**
BORING NO. B3-B	**BORING LOCATION** 83+77	**OFFSET** 39' RT	**ALIGNMENT** -L-	**0 HR.** N.M.
COLLAR ELEVATION 107.0'	**NORTHING** 0.00	**EASTING** 0.00	**24 HR.** 4.1'
TOTAL DEPTH 48.6'	**DRILL MACHINE** CME-55	**DRILL METHOD** H.S. AUGERS	**HAMMER TYPE** AUTOMATIC
START DATE 7/26/04	**COMPLETION DATE** 7/27/04	**SURFACE WATER DEPTH** N/A	

ELEV.	DEPTH (FT.)	BLOW COUNT 0.5'	0.5'	0.5'	PEN. (FT.)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NUMBER	MOI.	LOG	SOIL AND ROCK DESCRIPTION
107.0										
105.0	0.0	1	2	3	1.0	5				BROWN, SAND, MOI. TO SAT. (ALLUVIUM)
	3.7	4	2	2	1.0	4	SS-37	M-S		
100.0	8.0	5	5	7	1.0	12	SS-38	W		GRAY-GREEN, SANDY SILT, WET (RESIDUAL)
95.0	13.0	11	12	15	1.0	27				
90.0	18.0	100			0.3	100+	SS-39			GREEN-GRAY, SEVERELY WEATHERED METAMUDSTONE
85.0	23	100			0.3	100+				
80.0	28.5	53	47		0.7	100+	SS-59			
75.0	33.5	12	33	67	0.9	100+				
70.0	38.5	19	51	49	0.8	100+	SS-40			
65.0	43.5	100			0.3	100+				
60.0	48.5	60			0.1	60/0.1				
55.0						BORING TERMINATED AT ELEV. 58.4' IN META-MUDSTONE				
50.0										
45.0										
40.0										
35.0										

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34981.1.1	**ID.** U-3823	**COUNTY** WILSON	**GEOLOGIST** J. L. STONE
SITE DESCRIPTION BRIDGE ON SR 1158 OVER BLOOMERY SWAMP			**GROUND WATER**
BORING NO. EB2-A	**BORING LOCATION** 84+27	**OFFSET** 32' LT	**ALIGNMENT** -L-	**0 HR.** 9.2'
COLLAR ELEVATION 110.9'	**NORTHING** 0.00	**EASTING** 0.00		**24 HR.** N.M.
TOTAL DEPTH 22.5'	**DRILL MACHINE** CME-55	**DRILL METHOD** H.S. AUGERS	**HAMMER TYPE** AUTOMATIC	
START DATE 7/30/04	**COMPLETION DATE** 7/30/04	**SURFACE WATER DEPTH** N/A		

ELEV.	DEPTH (FT.)	BLOW COUNT 0.5'	0.5'	0.5'	PEN. (FT.)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NUMBER	MOI.	LOG	SOIL AND ROCK DESCRIPTION
110.9										
110.0	0.9	7	5	5	1.0	X10				
	2.5	1	2	2	1.0	X4	SS-55	M		TAN-BROWN TO GRAY, SANDY SILT, MOI. (ROADWAY EMBANKMENT)
105.0	5.0	2	2	1	1.0	X3				
	7.5	WOH	2	10	1.0	X12	SS-56	23%		LIGHT GRAY, COARSE SILTY SANDY CLAY, WET (ALLUVIUM)
100.0										
	12.5	100			0.4	100+X				BLUE-GREEN, SEVERELY WEATHERED METAMUDSTONE
95.0										
	17.5	60			0.0	60/0.0X				BLUE-GREEN METAMUDSTONE
90.0	22.5	60			0.0	60/0.0X				
						BORING TERMINATED AT ELEV. 88.4' IN META-MUDSTONE				
85.0										
80.0										
75.0										
70.0										
65.0										
60.0										
55.0										
50.0										
45.0										
40.0										

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 34981.1.1	**ID.** U-3823	**COUNTY** WILSON	**GEOLOGIST** J. L. STONE
SITE DESCRIPTION BRIDGE ON SR 1158 OVER BLOOMERY SWAMP			**GROUND WATER**
BORING NO. EB2-B	**BORING LOCATION** 84+20	**OFFSET** 6' RT	**ALIGNMENT** -L-	**0 HR.** 5.5'
COLLAR ELEVATION 107.8'	**NORTHING** 0.00	**EASTING** 0.00		**24 HR.** 3.7'
TOTAL DEPTH 18.9'	**DRILL MACHINE** MOBILE B-47	**DRILL METHOD** SOLID AUGERS	**HAMMER TYPE** MANUAL	
START DATE 6/21/04	**COMPLETION DATE** 6/25/04	**SURFACE WATER DEPTH** N/A		

ELEV.	DEPTH (FT.)	BLOW COUNT 0.5'	0.5'	0.5'	PEN. (FT.)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NUMBER	MOI.	LOG	SOIL AND ROCK DESCRIPTION
107.8										
	0.0	5	7	7	1.0	X14				
105.0	2.5	3	4	5	1.0	X9	SS-1	M-W		BROWN, SANDY SILT, MOI. TO WET (ALLUVIUM)
	5.0	5	10	19	1.0	X29	SS-2	S		GRAY, SAND, SAT. (ALLUVIUM)
100.0	7.5	6	21	35	1.0	X56	SS-3	S		GRAY-GREEN, SILTY SAND, SAT. (RESIDUAL)
	9.0	20	45	55	0.9	100+X				
95.0										
	13.5	100			0.5	100+X				GRAY-GREEN, SEVERELY WEATHERED METAMUDSTONE
90.0	18.3	40	60		0.6	100+X	SS-8			
						BORING TERMINATED AT ELEV. 88.9' IN SEVERELY WEATHERED META-MUDSTONE				
85.0										
80.0										
75.0										
70.0										
65.0										
60.0										
55.0										
50.0										
45.0										
40.0										
35.0										

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 34981.1.1 ID: U-3823 COUNTY: WILSON

DESCRIPTION(1): BRIDGE ON SR 1158 (RELOCATED) OVER BLOOMERY SWAMP

INFORMATION ON EXISTING BRIDGE

Information obtained from: ☑ field inspection ☐ microfilm (Reel: ____ Pos: ____) ☐ other: ____

BR. NO.: C77 BR. LENGTH: 65.0' NO. BENTS: N/A NO. BENTS IN: CHANNEL: N/A FLOODPLAIN: N/A

FOUNDATION TYPE: 5 Barrel - 12'X7' Box Culvert

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: None Noted

INTERIOR BENTS: None Noted

CHANNEL BED: None Noted

CHANNEL BANKS: None Noted

EXISTING SCOUR PROTECTION:

TYPE(3): Concrete Wing Walls

EXTENT(4): To Approximate Toe of Fill

EFFECTIVENESS(5): Appear Satisfactory

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

DESIGN INFORMATION

CHANNEL BED MATERIAL(7): Gray, Loose To Medium Dense, Sand (SS-42)

CHANNEL BANK MATERIAL(8): Tan-Brown, Soft, Clayey Fine Sandy Silt (SS-41)

CHANNEL BANK COVER(9): Wooded, Grasses Near Roadway

FLOOD PLAIN WIDTH(10): Approximately 800'

FLOOD PLAIN COVER(11): Wooded, Grasses Near Roadway

DESIGN INFORMATION CONT.

STREAM IS: ____ DEGRADING X AGGRADING (12)

OTHER OBSERVATIONS AND COMMENTS: ____

CHANNEL MIGRATION TENDENCY (13): Slight tendency towards End Bent 2.

GEOTECHNICALLY ADJUSTED SCOUR ELEVATIONS(14):

Calculations based on a correlation of scourability with the material strength yields the following critical scour depths:

Overtopping total scour depth = 9.2' (96.0' MSL)

These scour elevations are 6.0' higher than the maximum theoretical scour elevation provided by the Hydraulics Unit.

REPORTED BY: Kevin B. Miller KEVIN B. MILLER DATE: 10/04/04

INSTRUCTIONS

(1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE, INCLUDING 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 (RIR RAP, 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 BASED ON OBSERVATION AND/OR SAMPLES.
(8) DESCRIBE THE CHANNEL BANK MATERIAL BASED ON OBSERVATION AND/OR SAMPLES.
(9) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
(10) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
(11) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
(12) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING.
(13) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE LATERALLY DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
(14) GIVE THE GEOTECHNICALLY 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 THE RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. IF THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS DEPENDENT ON SCOUR COUNTER MEASURES, EXPLAIN. (RIPRAP ARMORING ON SLOPES, ETC.) THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY, CORE RECOVERY PERCENTAGE, PERCENTAGE RQD, DIFFERENTIAL WEATHERING, SHEAR STRENGTH, OBSERVATIONS AT EXISTING STRUCTURES, OTHER TESTS DEEMED APPROPRIATE, AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

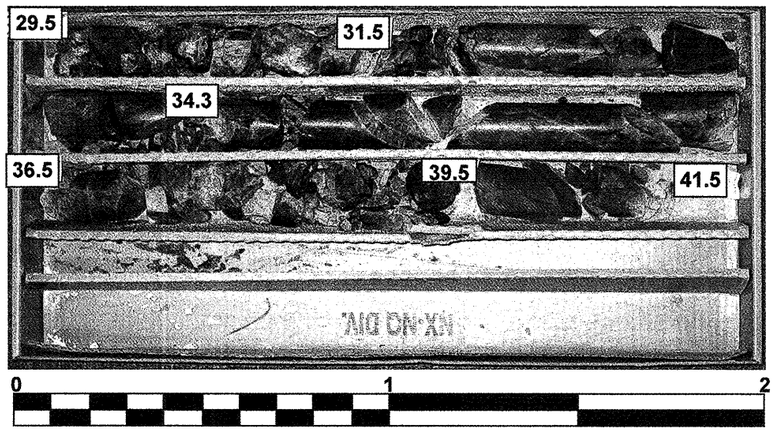
U-3823
Bridge on SR 1158 (Relocated) Over Bloomery Swamp

HOLE #	SAMPLE #	PASS 10	PASS 40	PASS 200	CSESAND	FINESAND	SI	CL	LL	PI	CLASS	DEPTH	MOIST.	ORG.
EB1-A	SS-52	92	71	38	33.2	32.3	18.2	16.3	17	NP	A-4(0)	0.8-2.3		
	SS-53	100	89	29	38.0	35.4	10.3	16.3	16	NP	A-2-4(0)	5.0-6.5		
	SS-54	80	55	28	50.3	17.1	18.4	14.2	30	8	A-2-4(0)	7.5-9.0		
EB1-B	SS-44	63	46	18	47.8	26.4	15.6	10.2	20	NP	A-1-b(0)	3.5-5.0		
	SS-45	100	96	72	10.2	23.6	41.8	24.4	44	16	A-7-6(12)	8.5-9.4		
B1-A	SS-50	99	93	18	28.5	56.0	5.4	10.2	18	NP	A-2-4(0)	7.5-9.0		
	SS-51	77	52	36	40.1	16.9	22.7	20.3	39	18	A-6(2)	22.5-23.1		
B1-B	SS-41	100	97	46	19.9	37.0	22.7	20.3	30	8	A-4(1)	1.0-1.5		
	SS-42	99	82	6	53.5	41.3	3.2	2.0	19	NP	A-3(0)	3.5-5.0		
	SS-43	100	83	40	30.7	34.4	22.7	12.2	26	NP	A-4(0)	13.5-15.0		
B2-A	SS-46	52	29	12	56.2	24.6	11.1	8.1	23	NP	A-1-b(0)	0.8-2.3		
	SS-47	83	51	29	48.6	19.3	13.7	18.3	40	15	A-2-6(1)	2.5-4.0		
	SS-48	84	51	30	52.7	14.6	14.3	18.3	41	17	A-2-7(1)	7.5-9.0		
	SS-49	89	80	72	12.0	12.0	39.4	36.6	42	21	A-7-6(14)	10.3-11.5		
B2-B	SS-57	100	97	43	14.6	48.8	20.2	16.3	19	NP	A-4(0)	1.0-1.5		
	SS-58	86	83	76	5.1	9.8	44.5	40.7	51	27	A-7-6(21)	8.5-10.0		
B3-B	SS-37	96	85	35	28.8	39.5	19.4	12.3	20	NP	A-2-4(0)	3.7-5.2		
	SS-38	97	72	43	35.4	27.0	25.4	12.3	31	NP	A-4(0)	8.0-9.5		
	SS-39	90	55	31	49.5	19.6	18.6	12.3	25	NP	A-2-4(0)	18.0-18.3		
	SS-59	77	60	40	31.3	20.8	23.5	24.4	33	12	A-6(1)	28.5-29.2		
	SS-40	75	51	34	40.1	17.9	21.7	20.3	39	20	A-2-6(2)	38.5-39.8		
EB2-A	SS-55	98	86	38	34.4	30.3	17.0	18.3	16	NP	A-4(0)	2.5-4.0		
	SS-56	93	82	55	26.4	16.7	22.3	34.6	28	14	A-6(4)	5.5-6.5	22.7	
EB2-B	SS-1	96	86	45	21.5	39.1	23.1	16.2	18	NP	A-4(0)	2.5-4.0		
	SS-2	85	65	22	49.6	27.6	10.6	12.2	20	NP	A-2-4(0)	5.0-6.5		
	SS-3	86	53	32	47.1	20.1	20.7	12.2	32	NP	A-2-4(0)	7.5-9.0		
	SS-8	93	62	39	41.8	19.7	24.3	14.2	26	6	A-4(0)	18.3-18.9		

CORE PHOTOGRAPHS

B1-B

BOX 1 of 1: 29.5 TO 41.5 FEET



CORE PHOTOGRAPHS

B2-B

BOXES 1 AND 2: 23.6 TO 39.6 FEET

34981.1.1
Wilson Co.
Bridge on SR 1158 (Relocated) over Bloomery Swamp

Looking south towards End Bent 1