

CONTRACT: ID: B-4231

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 33574.1.1 I.D. NO. B-4231
F.A. PROJECT BRSTP-102(2)
COUNTY PITT
SITE DESCRIPTION BRIDGE NO. 53 OVER
SWIFT CREEK ON NC 102 AT -L-
STATION 22+47

CONTENTS:

| SHEET | DESCRIPTION |
|-------|---------------------|
| 1 | TITLE SHEET |
| 2 | LEGEND |
| 3 | STRUCTURE INVENTORY |
| 4 | SITE PLAN |
| 5 | PROFILE |
| 6 | BORE LOGS |
| 7 | SOIL TEST RESULTS |
| 8 | SCOUR REPORT |
| 9 | SITE PHOTOGRAPH |

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-----------------|-----------------------------|-------------|--------------|
| N.C. | 33574.1.1 (B-4231) | 1 | 9 |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| | | P.E. | |
| | | CONST. | |

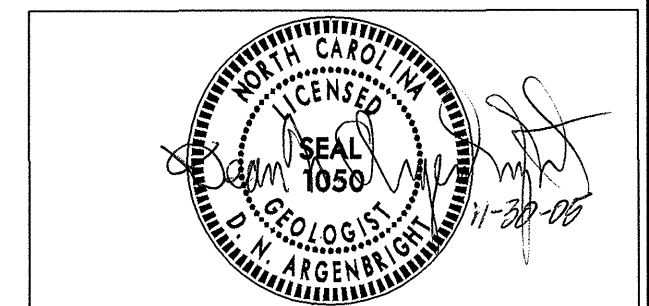
CAUTION NOTICE

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.

INVESTIGATED BY JRM PERSONNEL JRM
 CHECKED BY DNA JLS
 SUBMITTED BY DNA JNJ
 DATE AUGUST 2005 WNC
LWD
RES



NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT 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.

DRAWN BY: T.T. WALKER

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

| | | | |
|--------|-------------------|-----------|--------------|
| ID | STATE PROJECT NO. | SHEET NO. | TOTAL SHEETS |
| B-4231 | 33574.1.1 | 2 | 9 |

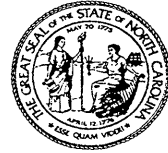
SUBSURFACE INVESTIGATION

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 (ASHTO 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: <i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY 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. 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 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 ELONGATED 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. | |
| SOIL LEGEND AND AASHTO CLASSIFICATION | | MINERALOGICAL COMPOSITION | | WEATHERING | | | |
| GENERAL CLASS. GRANULAR MATERIALS (<5% PASSING #200) SILT-CLAY MATERIALS (>5% 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-2 A-3 A-4 A-5 A-6 A-7 A-1, A-2 A-3 A-4, A-5 A-6, A-7 | | COMPRESSIBILITY | | 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 | | SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50 | | 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 | | ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL | | | | | |
| GROUP INDEX | | TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC >10% | | | | | |
| USUAL TYPES OF MAJOR MATERIALS | | GROUND WATER | | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. | | | |
| GENERATING AS A SUBGRADE | | WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING. STATIC WATER LEVEL AFTER 24 HOURS. PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA SPRING OR SEEPAGE | | 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. | | | |
| P.I. OF A-7-5 ≤ L.L. - 30 ; P.I. OF A-7-6 > L.L. - 30 | | MISCELLANEOUS SYMBOLS | | 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. | | | |
| CONSISTENCY OR DENSENESS | | 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. | | | |
| PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/F ²) | | SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL | | MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> | | | |
| GENERALY GRANULAR MATERIAL (NON-COHESIVE) | | ABBREVIATIONS | | SEVERE (SEV.) ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 B.P.F.</i> | | | |
| GENERALY SILT-CLAY MATERIAL (COHESIVE) | | 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 _v - VERY VST - VANE SHEAR TEST | | 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. <i>IF TESTED, YIELDS SPT N VALUES < 100 B.P.F.</i> | | | |
| TEXTURE OR GRAIN SIZE | | EQUIPMENT USED ON SUBJECT PROJECT | | 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) | | DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST OTHER CME-45B OTHER | | ROCK HARDNESS | | | |
| BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F, SD.) SILT (SL.) CLAY (CL.) | | ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE * STEEL TEETH TRICONE 2 5/8" * TUNG-CARB. CORE BIT OTHER | | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. | | | |
| GRAIN SIZE | | HAMMER TYPE: AUTOMATIC MANUAL | | HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. | | | |
| SOIL MOISTURE - CORRELATION OF TERMS | | CORE SIZE: B N H | | MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. | | | |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION | | HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST OTHER | | 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. | | | |
| LL - LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | | | | 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. | | | |
| PL - PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | | | | 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. | | | |
| OM - OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE | | | | FRACTURE SPACING | | BEDDING | |
| SL - SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | | | | TERM SPACING TERM THICKNESS | | TERM THICKNESS | |
| PLASTICITY | | | | VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET | | > 4 FEET | |
| NONPLASTIC 0-5 VERY LOW | | | | WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET | | 1.5 - 4 FEET | |
| LOW PLASTICITY 6-15 SLIGHT | | | | MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET | | 0.16 - 1.5 FEET | |
| MED. PLASTICITY 16-25 MEDIUM | | | | CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET | | 0.03 - 0.16 FEET | |
| HIGH PLASTICITY 26 OR MORE HIGH | | | | VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET | | 0.008 - 0.03 FEET | |
| COLOR | | | | INDURATION | | INDURATION | |
| 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. | | | | 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. | | | |

ELEVATION: 44.39'

NOTES:



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

LYNDO TIPPETT
SECRETARY

August 29, 2005

STATE PROJECT: 33574.1.1 (B-4231)
FEDERAL PROJECT: BRSTP-102(1)
COUNTY: Pitt
DESCRIPTION: Bridge No. 53 on NC 102 over Swift Creek at -L- station 22+47
SUBJECT: Bridge Inventory Report – Structure Investigation

Site Description

The proposed project is located at the existing NC 102 bridge over the Swift Creek east of Ayden. The replacement structure will be located at the same site as the existing bridge. Based on the proposed design, the new structure will consist of a single 100 foot span at a 100 degree skew. During construction, traffic will be routed on an off-site detour.

A total of two Standard Penetration Test borings were made at or near each of the proposed bent locations. Subsurface conditions were noted to be similar across the site. The borings were made using ATV mounted CME 45B and CME 45C drill machines and advanced by rotary drill methods using bentonite drilling fluid.

The project is located in the Coastal Plain Physiographic Province and is underlain by roadway embankment soils, Recent alluvium, and sediments of the Cretaceous Peedee Formation. The topography of the surrounding area is nearly flat with elevations at the site ranging from 29± feet along the stream bed to 43± feet above sea level along the existing NC 102 embankment. The floodplain surface lies at an average elevation of 38± feet. Swift Creek is a 30± feet wide, 4± feet deep channelized stream in a rural setting. During our investigation, water

levels in the bore holes and the surface of Swift Creek were measured at elevations ranging from 32.4 to 36.9 feet.

Soil Description

Subsurface conditions at the site are typically uniform. The stratigraphy underlying the site is characterized by roadway embankment placed on Recent alluvial soils underlain by sands of the Cretaceous Peedee Formation. Alluvial soils encountered during the investigation consist of 11 to 17 feet of very loose to medium dense silty sand to coarse sand (A-2-4, A-3, and A-1-b). Approximately five feet of soft alluvial silty clay (A-7-6) is present overlying the sand at boring EB2-A.

Cretaceous age sediments of the Peedee Formation underlie the Recent alluvial soils at elevations ranging from 20 to 21 feet. The upper sediments of the Peedee Formation encountered at the site consist primarily of 14.5 to 25 feet of very loose to medium dense silty sand (A-2-4). A sandy clay (A-6) layer ranging in thickness from 1.0 to 11.0 feet, thickening toward EB2, was encountered near the base of the upper sand beds. The upper sand beds are underlain by 23± feet of medium dense to very dense sand and silty sand (A-3, A-2-4) with thin indurated layers at an elevation of -5 feet. A layer of A-3 sand and a distinguishable increase in N-values marks the top of the lower sand beds. Stiff sandy silt (A-4) of the Peedee Formation was encountered below the sand beds at an elevation of -29.0 feet. Boring EB1-B was extended to elevation -33.5 feet with no significant change in stratigraphy noted.

Based on the proposed design, the existing grade will be raised 1.2 feet. The existing roadway embankment at the site is constructed of up to 6 feet of loose silty sand (A-2-4) and exhibits good engineering properties. The proposed end slopes will be constructed within existing embankment material. Borrow meeting Coastal Plain criteria should be available in nearby areas. Slope protection methods should be used on the end slopes.

This Geotechnical foundation report is based on the bent locations provided in the Bridge Survey and Hydraulic Design Report for Swift Creek dated May 26, 2005. 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:

John R. McCray
Project Geologist

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

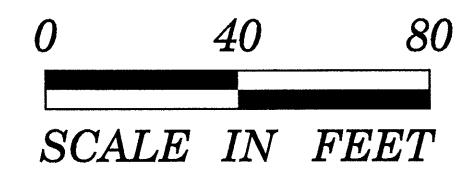
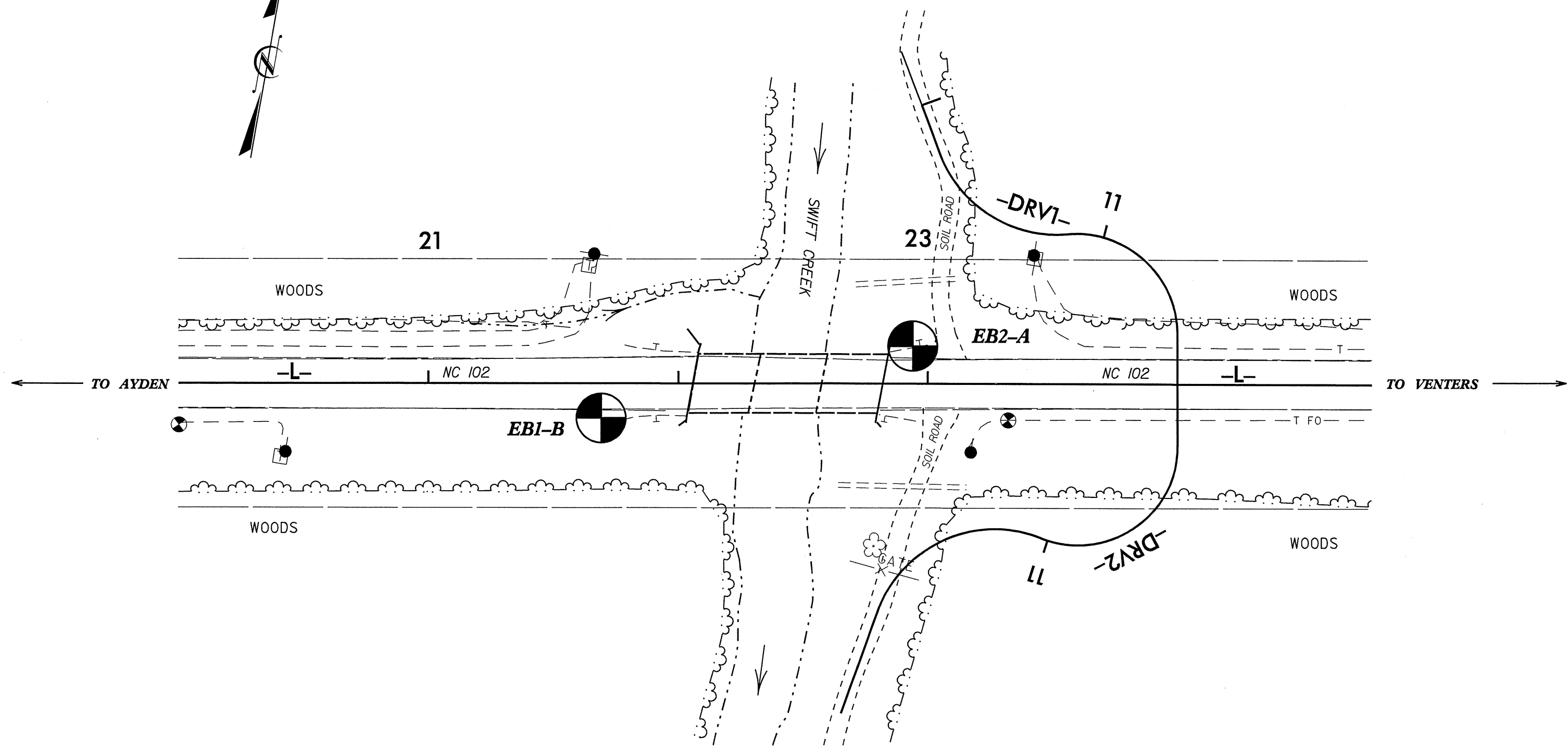
WEBSITE: WWW.DOH.DOT.STATE.NC.US

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

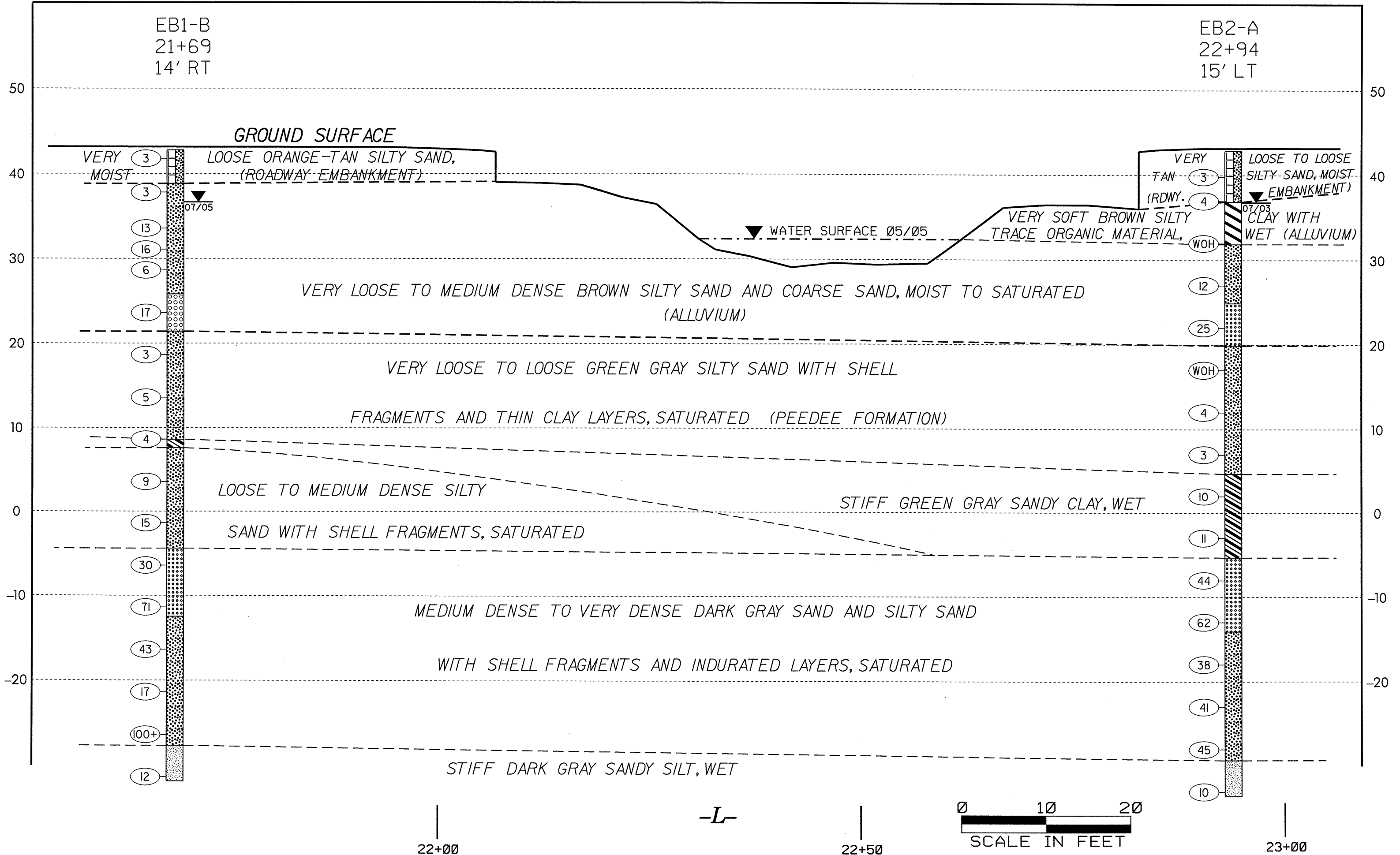
NWW / JRM

| STATE PROJECT NO. | SHEET NO. | TOTAL SHEETS |
|-------------------|-----------|--------------|
| 33574.1.1 | 4 | 9 |

TEST SITE PLAN



PROFILE THROUGH BORINGS PROJECTED ALONG -L-



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

SHEET 6 OF 9

| PROJECT NO. 33574.1.I | | ID. B-423I | | COUNTY PITT | | GEOLOGIST J.N. JORDAN | | | | |
|--|-------------|-------------------------|------------|---------------------------|-----|-----------------------|--------------|---------------|-------|---|
| SITE DESCRIPTION BRIDGE NO. 53 OVER SWIFT CREEK ON NC 102 | | | | | | | GROUND WATER | | | |
| BORING NO. EBI-B | | BORING LOCATION 21+69 | | OFFSET 14' RT | | ALIGNMENT -L- | | | | |
| COLLAR ELEVATION 42.8' | | NORTHING | | EASTING | | 0 HR. N/A | | | | |
| TOTAL DEPTH 74.7' | | DRILL MACHINE CME-45B | | DRILL METHOD ROTARY W/MUD | | HAMMER TYPE AUTOMATIC | | | | |
| START DATE 7/28/05 | | COMPLETION DATE 7/29/05 | | SURFACE WATER DEPTH N/A | | DEPTH TO ROCK N/A | | | | |
| ELEV. | DEPTH (FT.) | BLOW COUNT | PEN. (FT.) | BLOWS PER FOOT | | | | SAMPLE NUMBER | LOG | SOIL AND ROCK DESCRIPTION |
| | | 0.5' 1.0' 0.5' | | 0 | 25 | 50 | 75 | 100 | | |
| 42.8 | 0.0 | 1 | 2 | 1 | 1.0 | X 3 | | | | ORANGE-TAN SILTY SAND, MOIST (ROADWAY EMBANKMENT) |
| 40.0 | 4.0 | 2 | 2 | 1 | 1.0 | X 3 | | | SS-8 | |
| 35.0 | 8.2 | 4 | 6 | 7 | 1.0 | X 13 | | | | BROWN SILTY SAND AND COARSE SAND, MOIST TO SATURATED (ALLUVIUM) |
| | 10.7 | 7 | 9 | 7 | 1.0 | X 16 | | | | |
| 30.0 | 13.2 | WOH | 1 | 5 | 1.0 | X 6 | | | SS-9 | |
| 25.0 | 18.2 | 8 | 9 | 8 | 1.0 | X 17 | | | SS-10 | |
| 20.0 | 23.2 | WOH | 1 | 2 | 1.0 | X 3 | | | SS-11 | |
| 15.0 | 28.2 | 3 | 2 | 3 | 1.0 | X 5 | | | | GREEN GRAY SILTY SAND WITH SHELL FRAGMENTS AND THIN CLAY LAYERS, SATURATED (PEEDEE FORMATION) |
| 10.0 | 33.2 | 2 | 1 | 3 | 1.0 | X 4 | | | | |
| 5.0 | 38.2 | 3 | 3 | 6 | 1.0 | X 9 | | | SS-12 | |
| 0.0 | 43.2 | 5 | 5 | 10 | 1.0 | X 15 | | | | DARK GRAY SAND AND SILTY SAND WITH SHELL FRAGMENTS AND INDURATED LAYERS, SATURATED |
| -5.0 | 48.2 | 9 | 14 | 16 | 1.0 | X 30 | | | SS-13 | |
| -10.0 | 53.2 | 16 | 21 | 50 | 1.0 | X 71 | | | | |
| -15.0 | 58.2 | 16 | 19 | 24 | 1.0 | X 43 | | | SS-14 | |
| -20.0 | 63.2 | 9 | 7 | 10 | 1.0 | X 17 | | | SS-15 | |
| -25.0 | 68.2 | 11 | 31 | 60 | 0.6 | | | 100+ | | |
| -30.0 | 73.2 | 4 | 5 | 7 | 1.0 | X 12 | | | SS-16 | |
| BORING TERMINATED AT ELEVATION -31.9 FEET IN STIFF SANDY SILT (PEEDEE FORMATION) | | | | | | | | | | |

| PROJECT NO. 33574.1.I | | ID. B-423I | | COUNTY PITT | | GEOLOGIST J.T. COLLINS | | | | |
|--|-------------|-------------------------|------------|---------------------------|-----|------------------------|--------------|---------------|------|--|
| SITE DESCRIPTION BRIDGE NO. 53 OVER SWIFT CREEK ON NC 102 | | | | | | | GROUND WATER | | | |
| BORING NO. EB2-A | | BORING LOCATION 22+94 | | OFFSET 15' LT | | ALIGNMENT -L- | | | | |
| COLLAR ELEVATION 42.9' | | NORTHING | | EASTING | | 0 HR. N.M. | | | | |
| TOTAL DEPTH 76.4' | | DRILL MACHINE CME-45B | | DRILL METHOD ROTARY W/MUD | | HAMMER TYPE AUTOMATIC | | | | |
| START DATE 7/14/03 | | COMPLETION DATE 7/15/03 | | SURFACE WATER DEPTH N/A | | DEPTH TO ROCK N/A | | | | |
| ELEV. | DEPTH (FT.) | BLOW COUNT | PEN. (FT.) | BLOWS PER FOOT | | | | SAMPLE NUMBER | LOG | SOIL AND ROCK DESCRIPTION |
| | | 0.5' 1.0' 0.5' | | 0 | 25 | 50 | 75 | 100 | | |
| 42.9 | 0.0 | | | | | | | | | |
| 40.0 | 2.1 | 1 | 1 | 2 | 1.0 | X 3 | | | | TAN-BROWN SILTY SAND, MOIST (ROADWAY EMBANKMENT) |
| | 4.9 | 1 | 2 | 2 | 1.0 | X 4 | | | | BROWN SILTY CLAY WITH TRACE ORGANICS, WET (ALLUVIUM) |
| 35.0 | 9.9 | WOH | WOH | WOH | 1.0 | X 0 | | | SS-1 | |
| 30.0 | 14.9 | 3 | 3 | 9 | 1.0 | X 12 | | | | TAN FINE TO COARSE SAND, SAT. |
| 25.0 | 19.9 | 8 | 12 | 13 | 1.0 | X 25 | | | SS-2 | |
| 20.0 | 24.9 | WOH | WOH | WOH | 1.0 | X 0 | | | SS-3 | |
| 15.0 | 29.9 | 1 | 2 | 2 | 1.0 | X 4 | | | | GREEN-GRAY SILTY FINE SAND, SATURATED (PEEDEE FORMATION) |
| 10.0 | 34.9 | 2 | 1 | 2 | 1.0 | X 3 | | | | |
| 5.0 | 39.9 | 2 | 5 | 5 | 1.0 | X 10 | | | SS-4 | |
| 0.0 | 44.9 | 2 | 6 | 5 | 1.0 | X 11 | | | | GRAY GREEN SANDY CLAY, WET |
| -5.0 | 49.9 | 9 | 19 | 25 | 1.0 | X 44 | | | SS-5 | |
| -10.0 | 54.9 | 13 | 30 | 32 | 1.0 | X 62 | | | | GREEN GRAY SAND AND SILTY SAND WITH SOME INDURATED LAYERS, SATURATED |
| -15.0 | 59.9 | 14 | 16 | 22 | 1.0 | X 38 | | | | |
| -20.0 | 64.9 | 5 | 12 | 29 | 1.0 | X 41 | | | SS-6 | |
| -25.0 | 69.9 | 52 | 18 | 27 | 1.0 | X 45 | | | | |
| -30.0 | 74.9 | 3 | 4 | 6 | 1.0 | X 10 | | | SS-7 | |
| BORING TERMINATED AT ELEVATION -35.5 FEET IN STIFF SANDY SILT (PEEDEE FORMATION) | | | | | | | | | | |

B-4231
Pitt County
Bridge No. 53 over Swift Creek on NC 102

| HOLE # | SAMPLE # | PASS 10 | PASS 40 | PASS 200 | CSESAND | FINESAND | SI | CL | LL | PI | CLASS | DEPTH | MOIST. | ORG. |
|--------|----------|---------|---------|----------|---------|----------|------|------|----|----|-----------|-----------|--------|------|
| EB2-A | SS-1 | 100 | 100 | 88 | 0.8 | 13.5 | 26.4 | 59.3 | 51 | 28 | A-7-6(27) | 9.9-11.4 | | |
| | SS-2 | 100 | 51 | 4 | 73.3 | 23.4 | 0.2 | 3.1 | 19 | NP | A-3(0) | 19.9-21.4 | | |
| | SS-3 | 100 | 95 | 12 | 10.9 | 78.8 | 4.1 | 6.1 | 23 | NP | A-2-4(0) | 24.9-26.4 | | |
| | SS-4 | 100 | 91 | 43 | 26.8 | 37.6 | 15.1 | 20.4 | 34 | 12 | A-6(2) | 39.9-41.4 | | |
| | SS-5 | 99 | 78 | 10 | 59.7 | 31.7 | 2.5 | 6.1 | 19 | NP | A-3(0) | 49.9-51.4 | | |
| | SS-6 | 97 | 73 | 24 | 39.5 | 37.6 | 7.6 | 15.3 | 19 | 4 | A-2-4(0) | 64.9-66.4 | | |
| | SS-7 | 100 | 94 | 39 | 12.7 | 60.1 | 14.9 | 12.3 | 28 | 5 | A-4(0) | 74.9-76.4 | | |
| EB1-B | SS-8 | 100 | 94 | 25 | 13.1 | 66.3 | 8.4 | 12.3 | 18 | NP | A-2-4(0) | 4.0-5.5 | | |
| | SS-9 | 100 | 76 | 16 | 37.4 | 49.5 | 4.9 | 8.2 | 17 | NP | A-2-4(0) | 13.2-14.7 | | |
| | SS-10 | 99 | 39 | 3 | 79.1 | 19.2 | 0.6 | 1 | 17 | NP | A-1-b(0) | 18.2-19.7 | | |
| | SS-11 | 100 | 95 | 14 | 10.6 | 76.9 | 2.2 | 10.2 | 23 | NP | A-2-4(0) | 23.2-24.7 | | |
| | SS-12 | 100 | 91 | 32 | 33.6 | 40.6 | 11.5 | 14.3 | 25 | 6 | A-2-4(0) | 38.2-39.7 | | |
| | SS-13 | 100 | 80 | 9 | 56.1 | 36.6 | 3.2 | 4.1 | 18 | NP | A-3(0) | 48.2-49.7 | | |
| | SS-14 | 96 | 93 | 21 | 14.5 | 68.3 | 8 | 9.2 | 20 | NP | A-2-4(0) | 58.2-59.7 | | |
| | SS-15 | 93 | 60 | 22 | 52.5 | 24.9 | 6.2 | 16.4 | 19 | 4 | A-2-4(0) | 63.7-64.7 | | |
| | SS-16 | 99 | 90 | 36 | 19.3 | 55.5 | 10.8 | 14.3 | 24 | 4 | A-4(0) | 73.2-74.7 | | |

Site Photo
B-4231
Pitt County
Bridge No. 53 over Swift Creek on NC 102



Bridge No.53 from EB1 looking Northeast