NOTE: SEE SHEET IA FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. **B-4322**

F.A. PROJ. *BRZ-1167(1)*

COUNTY _WILKES

PROJECT DESCRIPTION BRIDGE OVER STONY FORK CREEK ON

S.R. 1167 BETWEEN S.R. 1155 AND 1501

INVENTORY

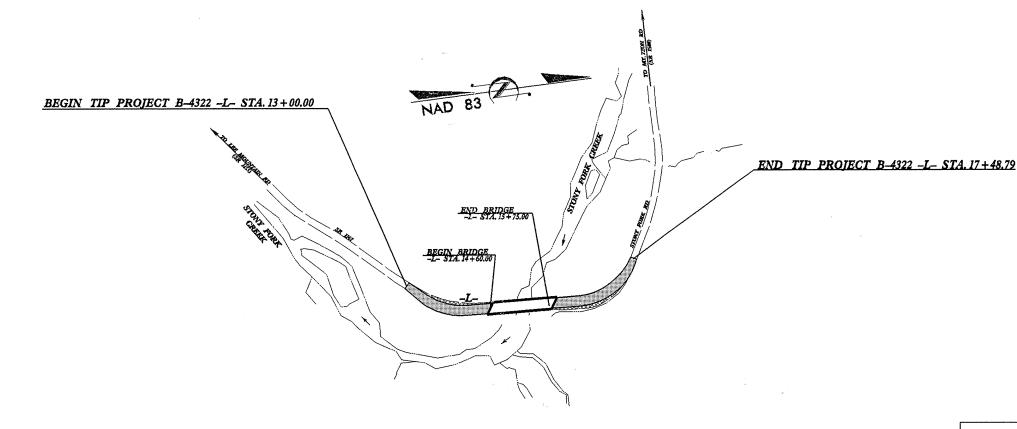
STATE STATE PROJECT REFERENCE NO. N.C. 13 STATE PROLNO. P. A. PROLING 33659.1.1 BRZ-1167(1) 33659.2.1 BRZ-1167(1) RW & UTIL. 33659.3.1 BRZ-1167(1) CONST.

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESSIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN PALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919/250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON CEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNOS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE, THE LABORATORY SAMPLE DATA MNOT THE IN STITU OH-PLACED ITEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABLITY PHIERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOSTURE COMDITIONS INDICATED IN THE SUBSURFACE INVESTIGATION, THESE WATER DEVELS OR SOIL MOSTURE CONDITIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER DEVELS OR SOIL MOSTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TREDERIALIZED PROPRIETATION AND WITH THE 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 DURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR QUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE PRATMENTS AT THE THYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH EXCEPTIONS TO SUBSURFACE NVESTIGATIONS AS HE DEEMS INCESSARY TO SATISFY HAMSELF AS TO CONSTROYS TO SE EXPODURITIES ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS.



PERSONNEL T. B. DANIEL

> D.O. CHEEK L. E. LANKFORD

R. D. CHILDERS

CJ. COFFEY G.K. ROSE

INVESTIGATED BY L. L. ACKER

W. D. FRYE CHECKED BY

SUBMITTED BY W.D. FRYE

6.17.05

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.

DRAWN BY: J. T. WILLIAMS

201973

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. B-4322 SHEET NO. of 13

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

| CONT. DECODIOTION | GRADATION | ROCK DESCRIPTION | TERMS AND DEFINITIONS |
|--|--|--|---|
| SOIL DESCRIPTION | WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. | HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED | ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. |
| SDIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS | UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO | 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. | AQUIFER - A WATER BEARING FORMATION OR STRATA. |
| THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN | POORLY GRADED) | IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE | |
| 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: | GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS | OF WEATHERED ROCK. | ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. |
| CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH | | ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: | ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, |
| AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: | THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS; ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED. | WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 | OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. |
| VERY STIFF, GRAY, SUTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6 | | ROCK (WR) BLOWS PER FOOT IF TESTED. | 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 |
| SOIL LEGEND AND AASHTO CLASSIFICATION | MINERALOGICAL COMPOSITION | CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT | GROUND SURFACE. |
| GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS | MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS | ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE. GNEISS, GABBRO, SCHIST, ETC. | CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. |
| CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) | WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE. | FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN | COLLUVIUM - ROCK FRAGMENTS MIXED WITH SDIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM |
| GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 | COMPRESSIBILITY | NON-CRYSTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK TYPE ROCK (NCR) ACCURATE PROPERTY LITE STATE SAMPETONE FTC | OF SLOPE. |
| CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7 | SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 | COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD | CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL |
| 0000000000 | MODERATELY COMPRESSIBLE LIOUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIOUID LIMIT GREATER THAN 50 | SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED | LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. |
| SYMBOL 000000000000000000000000000000000000 | PERCENTAGE OF MATERIAL | (CP) SHELL BEDS, ETC. | DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT |
| 2 PASSING SILT- MUCK, | CDANII AR STIT - CLAY | - WEATHERING | ROCKS OR CUTS MASSIVE ROCK. |
| LLAY DEAT | ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER | DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE |
| 40 30 MX 50 MX 51 MN | TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% | HAMMER IF CRYSTALLINE. | HORIZONTAL. |
| | LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% | VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, | DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF |
| LIQUID LIMIT | MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE | (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF | THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. |
| MODERATE | | OF A CRYSTALLINE NATURE. | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE |
| GROUP INDEX 8 8 8 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANIC SOILS | GROUND WATER | SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO | SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. |
| USUAL TYPES STONE FRAGS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC | | (SLI,) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. | FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. |
| OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SDILS MATTER | STATIC WATER LEVEL AFTER 24 HOURS | THE PARTY OF THE P | FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM |
| MATERIALS SAND OFFICE | - | MODERATE (MOD.) SIGNIFICANT PORTIONS OF RUCK SHOW DISCULDRATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS | PARENT MATERIAL. |
| GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE | PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA | DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED | FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY |
| SUBGRADE | SPRING OR SEEP | WITH FRESH ROCK. | THE STREAM. |
| PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30 | ~ ` | MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH | FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN |
| CONSISTENCY OR DENSENESS | MISCELLANEOUS SYMBOLS | TOTAL CALL CALL CALL CALL CALL CALL CALL C | THE FIELD. |
| COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED | ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION PROPRIES OF CHI TEST BORING DESIGNATIONS SAMPLE OF CHI TEST BORING DESIGNATIONS | (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, RUCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. | JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. |
| PRIMARY SOIL TYPE COMPACTNESS ON CONSISTENCY PENETRATION RESISTENCE (N-VALUE) (TONS/FT ²) | | SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED | LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO |
| VERY LOOSE 4 | AUGER BORING S - BULK SAMPLE AUGER BORING | (SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME | ITS LATERAL EXTENT. |
| GENERALLY LODSE 4 TO 10 | SS - SPLIT SPOON | EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. | LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. |
| GRANULAR MEDIUM DENSE 10 TO 30 N/A | ARTIFICIAL FILL (AF) OTHER ———————————————————————————————————— | IF TESTED, YIELDS SPT N VALUES > 100 BPF | MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN |
| (NON-COMESIVE) DENSE 30 10 50 | THAN ROADWAY EMBANKMENT ST - SHELBY TUBE | VERY SEVERE 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 | SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. |
| VERY DENSE >50 | INFERRED SOIL BOUNDARY ———————————————————————————————————— | (V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH UNLY PRADMENTS OF STRONG ROCK REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR | PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN |
| VERY SOFT <2 <0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.50 | RM - RESILIENT MODULUS | VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF | INTERVENING IMPERVIOUS STRATUM. |
| GENERALLY SOFT 2 TO 4 0,25 TO 0,50 SILT-CLAY MEDIUM STIFF 4 TO 8 0,5 TO 1,0 | INFERRED ROCK LINE MONITORING WELL SAMPLE | COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND | RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. |
| MATERIAL STIFF 8 TO 15 1 TO 2 | ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY ALLUVIAL SOIL BOUNDARY | SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS | ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF |
| (COHESIVE) VERY STIFF 15 TO 30 2 TO 4 | INSTALLATION | ALSO AN EXAMPLE. | ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND |
| HARD >30 >4 | 25/825 DIP & DIP DIRECTION OF SLOPE INDICATOR RT - RECOMPACTED TRIAXIAL | ROCK HARDNESS | EXPRESSED AS A PERCENTAGE. |
| TEXTURE OR GRAIN SIZE | SPT N-VALUE CBR - CALIFORNIA BEARING | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES | SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE |
| U.S. STD. SIEVE SIZE 4 10 40 60 200 270 | SOUNDING ROD REF SPT REFUSAL RATIO SAMPLE | SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. | PARENT ROCK. |
| U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053 | | HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED | SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL |
| COARSE FINE | ABBREVIATIONS | TO DETACH HAND SPECIMEN. | TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. |
| BOULDER COBBLE GRAVEL SAND SAND SILI CLAY | AR - AUGER REFUSAL HI HIGHLY # - MOISTURE CONTENT BT - BORING TERMINATED MED MEDIUM V - VERY | MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE | SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR |
| (BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.) | BT - BORING TERMINATED MED MEDIUM V - VERY - CL CLAY MICA MICACEOUS VST - VANE SHEAR TEST | HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED | SLIP PLANE. |
| GRAIN MM 305 75 2.0 0.25 0.05 0.005 | CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED | BY MODERATE BLOWS. | STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF |
| SIZE IN. 12 3 | CSE COARSE NP - NON PLASTIC 7 - UNIT WEIGHT | MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE | A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS |
| SOIL MOISTURE - CORRELATION OF TERMS | DMT - DILATOMETER TEST ORG ORGANIC 7d - DRY UNIT WEIGHT | POINT OF A GEOLOGIST'S PICK. | THAN 0.1 FOOT PER 60 BLOWS. |
| SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION | DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST • - VOID RATIO SAP SAPROLITIC | SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS | STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH |
| (ATTERBERG LIMITS) DESCRIPTION GOIDE FOR FIELD MOISTORE DESCRIPTION | F - FINE SD SAND, SANDY | FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN | OF STRATUM AND EXPRESSED AS A PERCENTAGE. |
| - SATURATED - USUALLY LIQUID; VERY WET, USUALLY | FOSS FOSBILIFEROUS SL SILT, SILTY | PIECES CAN BE BROKEN BY FINGER PRESSURE. | STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY |
| (SAT.) SATURATED - OSCILLET ELOUID; VERT WET, OSCILLET | FRAC FRACTURED, FRACTURES SLI SLIGHTLY | VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH | TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED |
| LL LIQUID LIMIT | FRAGS FRAGMENTS TCR - TRICONE REFUSAL | SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. | BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. |
| PLASTIC SEMISOLID: REQUIRES DRYING TO | FOUNDMENT HOED ON CHRISCI DOCIECT | FRACTURE SPACING BEDDING | TOPSOIL (TS,) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. |
| RANGE - WET - (W) ATTAIN OPTIMUM MOISTURE | EQUIPMENT USED ON SUBJECT PROJECT | TERM THICKNESS | BENCH MARK: BM #3 BL STA.17+69.72 16.19' LT |
| (PI) PL PLASTIC LIMIT | DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: | TERM SPACING VERY THICKLY BEDDED > 4 FEET | DENUT MHOVE DIM DE STATILIOSTIZ 10:13 ET |
| OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE | X AUTOMATIC MANUAL | VERY WIDE MURE IHAN 10 FEET THICKLY BEDDED 1.5 - 4 FEET | ELEVATION: 1976.97 FT. |
| OM T OF TIMON MOISTORE | MOBILE B- CLAY BITS | MODERATELY CLOSE 1 TO 2 SEET HINLY BEDDED 010 - 1.5 FEET | ELLITION STOLET |
| SL SHRINKAGE LIMIT | 6 CONTINUOUS FLIGHT AUGER CORE SIZE: | CLOSE 0.16 TO 1 FEET THICKLY LAMINATED 0.008 - 0.03 FEET | NOTES: |
| REQUIRES ADDITIONAL WATER TO - DRY - (D) ATTAIN OPTIMUM MOISTURE | | VERY CLOSE LESS THAN 0.16 FEET THINLY LAMINATED & 0.008 FEET | |
| HITHIN OF THIS TOP | | INDURATION | |
| PLASTICITY | X CME-45C HARD FACED FINGER BITS X-N | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. | 7 |
| PLASTICITY INDEX (PI) DRY STRENGTH | | | |
| NONPLASTIC 0-5 VERY LOW | 111 | FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. | |
| LIOW PLASTICITY 6-15 SLIGHT | CASING X W/ ADVANCER HAND TOOLS: | PENITE BLOW BY HAMMEN DISTALEMENTS SHALLES | |
| MED. PLASTICITY 16-25 MEDIUM | PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER | MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; | |
| HIGH PLASTICITY 26 OR MORE HIGH | TRICONE 'TUNG,-CARB, HAND AUGER | BREAKS EASILY WHEN HIT WITH HAMMER. | |
| COLOR | OTHER INCOME. | INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; | |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). | LA CURE BIT | DIFFICULT TO BREAK WITH HAMMER. | |
| MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. | OTHER OTHER OTHER | EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; | |
| The state of the s | OTHER | SAMPLE BREAKS ACROSS GRAINS. | |
| | | | REVISED 03/07/05 |



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY GOVERNOR

LYNDO TIPPETT SECRETARY

July 5, 2005

STATE PROJECT:

33659.1.1 (B-4322)

F.A. PROJECT:

BRZ-1167 (1)

COUNTY:

Wilkes

DESCRIPTION:

Approaches to Bridge 71 over Stony Fork Creek on

SR 1167 (Stony Fork Rd.)

SUBJECT:

Geotechnical Report - Inventory

Site Description

This project is located in western Wilkes County approximately one mile from the Watauga County Line. Bridge number 71 is a single lane structure on gravel road SR 1167. It is approximately 2.5 miles from the intersection with US Highway 421 in Watauga County.

Stony Fork Creek is a turbulent mountain stream flowing on hard rock with bars of sand, gravel and boulders. The channel is about 12 to 15 feet wide in a floodplain 100 feet wide. Valley slopes above the floodplain are 25 to 35 degrees, except at the base of slope on the north side of the valley, where the slope is almost 45 degrees. The area is completely wooded and there are no houses or other structures in the vicinity.

The project begins at Station 13+00 and ends at Station 17+49. Plans call for small cuts of 10 feet or less and fills of 5 feet or less. A complete subsurface investigation was done under an earlier plan that called for large cuts on the approaches at both ends of the bridge. Six borings were made with a CME 45 power drilling machine equipped with rotary and diamond bit coring tools. The results are presented in this report, although most of the borings fall outside the limits of the project as now conceived.

Areas of Special Geotechnical Interest

Water at Ground Surface

A wet area occupies both sides of the road between the proposed north bridge abutment at Station 15+50 and Station 16+50. Water is flowing in the existing ditch on the Right

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

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

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

CENTURY CENTER COMPLEX BUILDING B 1020 BIRCH RIDGE DRIVE

Side. Heavy trucks may bog down in wet soil in a small parking area on the Left Side where water is standing in tire ruts. A boring at Station 16+50, CL found 3.3 feet of saturated alluvial silt directly overlying hard rock. The static groundwater table was 0.5 feet below ground surface.

Soil and Rock Materials

The principal materials on this project are colluvium, saprolite and hard rock. Other materials include a thin alluvial soil on the flood plain, and weathered rock in some, but not all, residual profiles. Soil is very thin on slopes north of the bridge, where rock can be seen at the ground surface in several outcrops.

Borings on the Left Side, south of the bridge, encountered thick accumulations of old, deeply weathered colluvium. It typically consisted of an upper layer more than 10 feet thick composed of a red clay matrix (A-6 and A-7-6) enclosing pebbles and cobbles in various states of weathering, and a lower layer with a sandy, silty matrix and relatively unweathered clasts. The total thickness is more than 20 feet at one boring. N values in this old weathered colluvium range between 4 and 9, except where they are higher due to interference by large clasts.

Saprolite is about 10 feet thick underlying the old weathered colluvium, and it grades downward to weathered rock. It is composed of reddish brown, micaceous, silty sand (A-2-4) and white, feldspathic, silty coarse sand (A-1-b). Open joints in saprolite and weathered rock are filled with manganese oxide.

Unweathered colluvium is found near the base of the slope north of the bridge. It consists of brown, loose, silty sand with cobbles and boulders (A-2-4 to A-1-b). It is underlain by weathered rock and hard rock.

Floodplain soil is composed of saturated, brown, soft or loose, sandy, gravelly silt or sand (A-4, A-1-b) a few feet deep.

The hard rock underlying this site is of two types – gray, medium-grained, biotite gneiss and white, coarse pegmatite. The latter is composed of very large feldspar and quartz grains with scattered mica and with lenses or selvages of coarse black mica a few feet thick. The pegmatite forms intrusive sills up to ten feet or more in thickness between layers of gneiss.

Geotechnical Descriptive Analysis

Station 13+00 to 14+50

This segment covers ground between the beginning of the project and the proposed south bridge abutment. A small cut on the Left Side will encounter reddish brown, micaceous silty sand saprolite (A-2-4).

Station 15+75 to 17+49

This segment begins at the north abutment and ends at the end of the project. It is underlain by saturated alluvial sandy to gravelly silt from the Right Side ditch line to the Left Side beyond construction limits. The alluvial soil is approximately 3 feet deep overlying hard rock. Static groundwater is 0.5 feet or less below the ground surface and there is flowing or standing water in depressions. A small cut on the Right Side at Station 17+00 may encounter weathered rock or hard rock at the base of the slope adjacent to the ditch line.

Respectfully submitted,

Louis L. Acker, LG Project Geologist

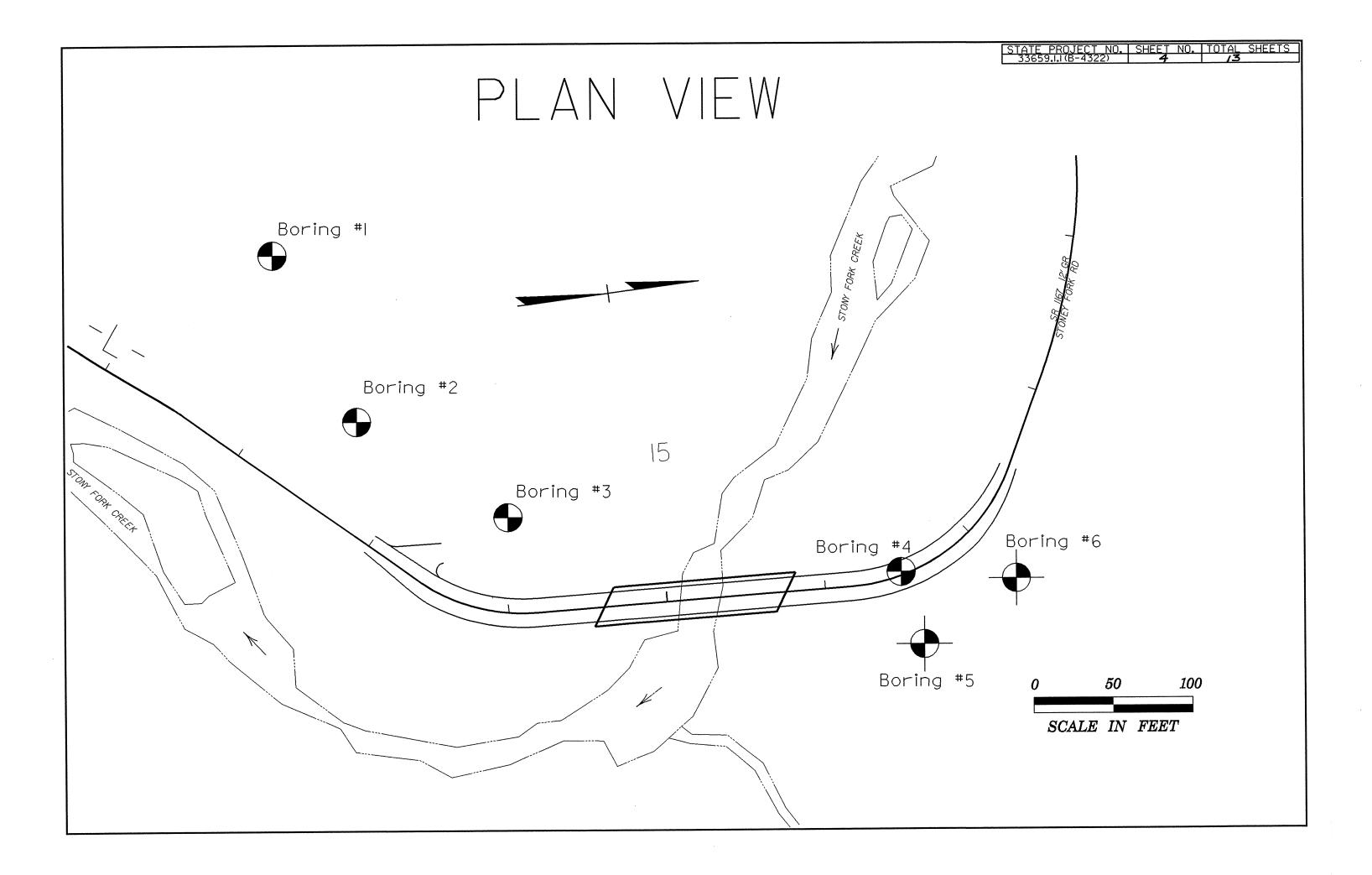
EARTHWORK BALANCE SHEET

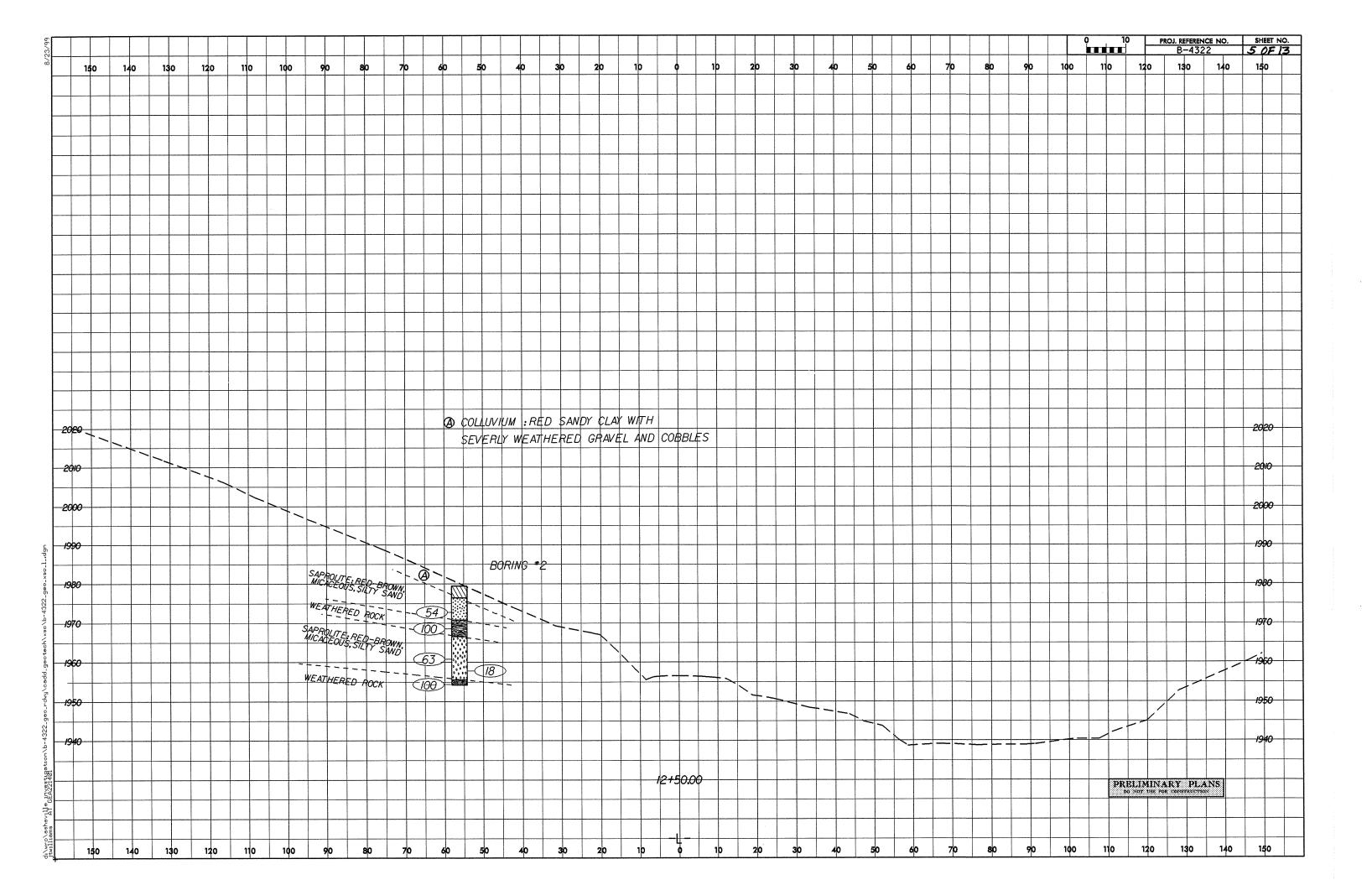
Volumes in Cubic Yards

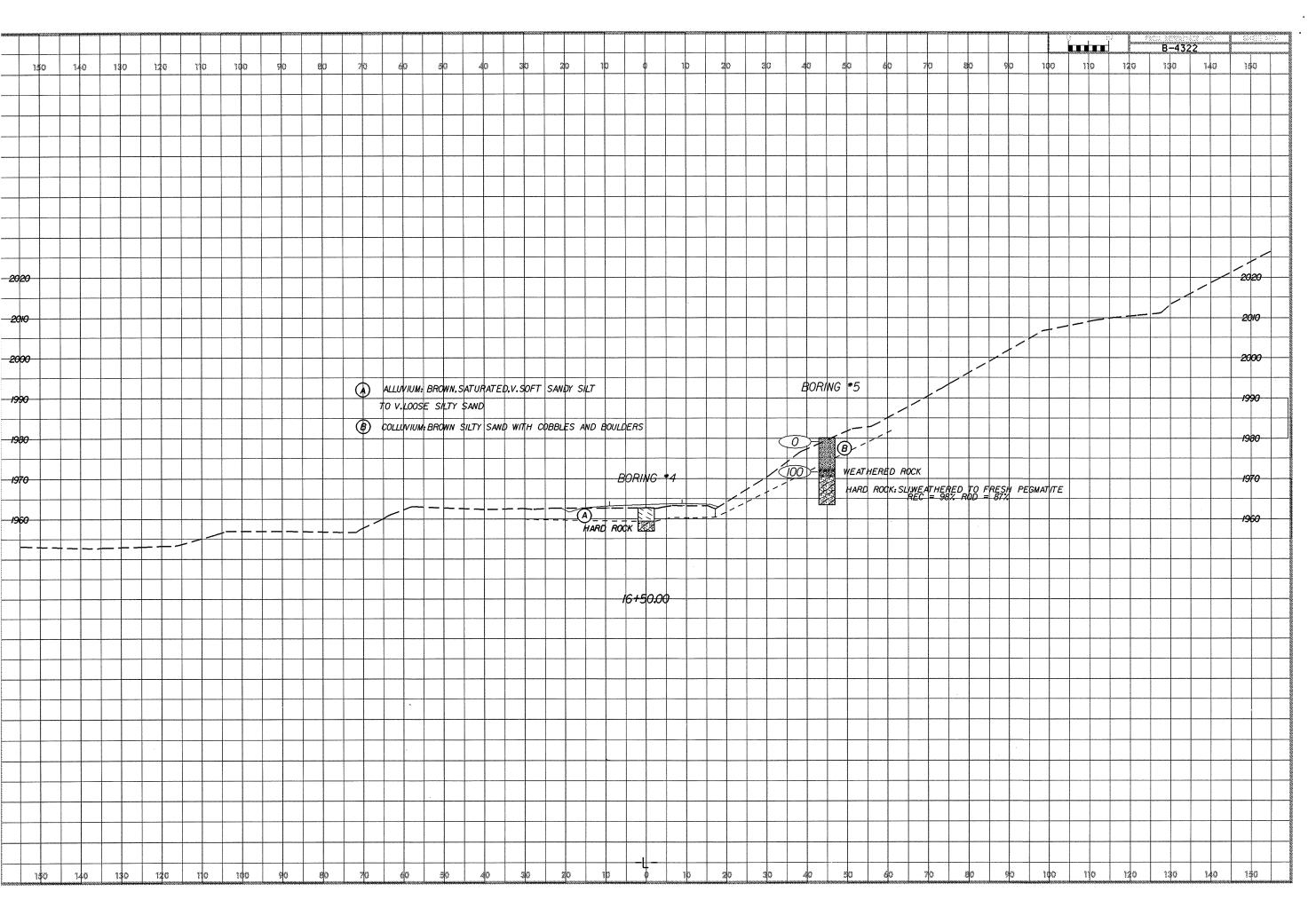
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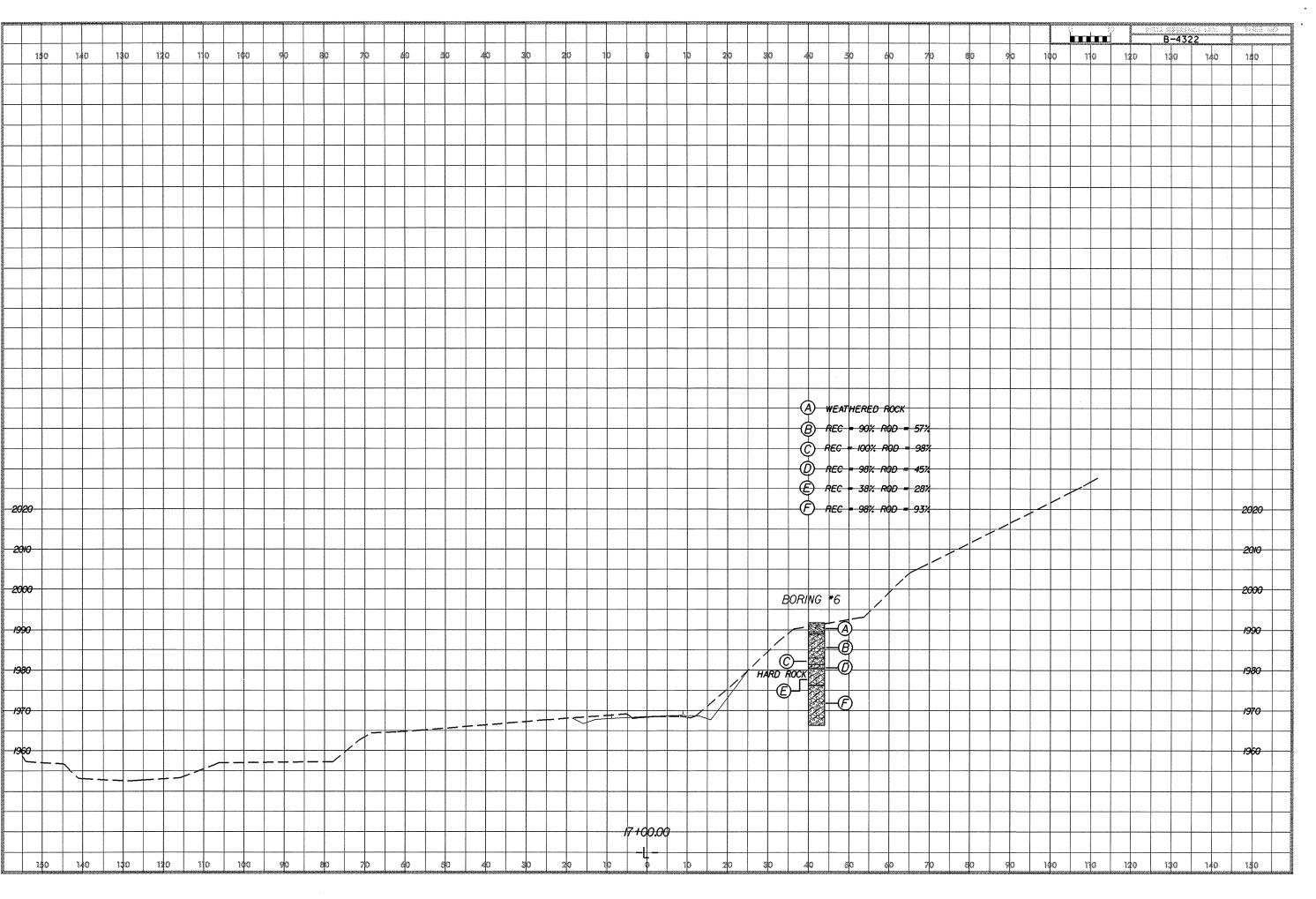
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EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.









NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

| | | | | | | GEOT | ECHN | ICAL (| JNIT B | ORING | LOG | | | · | , , , , , , , , , , , , , , , , , , , |
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| OJECT | NO 3365 | 9.1.1 | ` | | ID B-4 | 322 | COU | NTY WIL | | GIST L.L. ACKER | a kinding | | | | |
| E DES | CRIPTION | N APF | ROA | СНТ | O BR. | 70 OVER | STONY | FORK C | REEK ON | SR 1167 | | | | GND WATER | Ł. |
| RING I | NO BORIN | NG 5 | | 1 | NORTI | HING 0.0 | 0 | | | EASTING | 0.00 | | | 0 HR 7.40ft | |
| IGNMI | ENT -L- | | | 1 | BORIN | G LOCAT | TION 16- | +50.000 | | OFFSET 4 | 45.00ft | RT | | 24 HR N/A | |
| LLAR | ELEV 197 | 79.60f | t | | ГОТАІ | DEPTH_ | 16.70ft | | START DA | TE 3/29/0 | 5 | | COMPLETION D | ATE 03/29/05 | |
| ILL M | ACHINE (| CME-4 | 15 | | | | | | | Y W/O MU | D | | HAMMER TYPE | AUTOMATIC | |
| RFACE | WATER | | | | | | | | K 9.50ft | 7 | · · · · · · | | Log BORING 5, Page 1 | | |
| LEV | DEPTH | ŀ | OW (| | PEN | | BLOWS F | | | SAMPLE | MOI | P | | ID ROCK | |
| | | 6in | 6in | 6in | (ft) | 0 2 | 25 5 | 50 | 75 10 | d NO | MOI | G | DESCI | RIPTION | |
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| 0.00 | - | | | | | | | | | | | | HARD ROCK: SI | | ED |
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

| | | | | | | GEOT | ECHN | ICAL L | JNIT B | ORING | LOG | | | |
|-----------|------------|--------|------|----------|-------------|-------------------|-------------|----------|----------|-----------|-----------------|-----|----------------------|----------------------------|
| PROJECT | r NO 3365 | 9.1.1 | - | 1 | D B-4 | 322 | COUN | NTY WIL | KES | | GEOI | .og | IST L.L. ACKER | · |
| SITE DES | CRIPTION | N APF | PROA | CH T | O BR. | 70 OVER | STONY I | FORK CF | REEK ON | SR 1167 | | | | GND WATER |
| BORING | NO BORIN | NG 6 | | 1 | NORT | HING 0.00 |) | | | EASTING | 0.00 | | | 0 HR N/A |
| ALIGNM | ENT -L- | | | .] | BORIN | G LOCAT | ION 17+ | 00.000 | | OFFSET 4 | 42.00ft | RT | | 24 HR N/A |
| COLLAR | ELEV 199 | 91.201 | t | | FOTA | L DEPTH | 25.40ft | s | TART DA | TE 3/24/0 | 5 | | COMPLETION D. | ATE 03/24/05 |
| DRILL M | ACHINE (| CME-4 | 15 | | | | DRILL | METHOL | ROTAR | Y W/O MU | D | | HAMMER TYPE | AUTOMATIC |
| SURFACI | WATER | | | | | | | TO ROC | | T | | | Log BORING 6, Page 1 | |
| ELEÝ | DEPTH | l | OW (| | PEN | | LOWS P | | | SAMPLE | ▼ MOI | ρ | | ID ROCK |
| • | | 6in | 6in | 6in | (ft) | 0 2 | | 0 7 | '5 10 | o NO | MOI | G | DESCH | RIPTION |
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| - | - | · | | | | | | | | | | | | WEATHERED / |
| - | | | | | | | | | | | · | | | C=38% RQD=28%/ |
| 1970.00 | - " | | | reger is | | | | | | | | × | | ESH PEGMATITE |
| 1970.00 | - . | | | - | | | | | | | | | REC=98% | RQD=93% |
| 4005.00 | ‡ | | | | | | | | | | | | | |
| 1965.80 - | _ | | | | | TERMIN | ATED B | TRING IN | THARD- | | | | | |
| - | ‡ | | | | | TERMIN ROCK AT | ELEVAT | ION 196 | 5.8 FEET | | | | | |
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT SOILS TEST REPORT-SOILS LABORATORY

| T.I.P. ID #: B | -4322 | | | | | | | |
|-----------------------|--------------|----------------|------------|-------------|-------------|----------------|--------------------------|---------------------------------------|
| REPORT ON SAMPL | ES OF: Soi | ls for Classif | ication | | | | | |
| PROJECT: | 33659.1.1 | C | OUNTY: W | /ilkes | 0 | wner: | | |
| DATE SAMPLED: | 3-23-05 | | RECEIVED: | | | TE REPORTI | ED: 4-8-0 | - |
| L | | DATE | | | | I E KEFOKII | ED. 4-0-0. | 3 |
| SAMPLED FROM: | Roadway | | SAIVII | PLED BY: | L.L. Acker | COTA NO A TO Y | CDECIEIO | TYON. |
| SUBMITTED BY: | W.D. Frye | | | | 2002 | STANDARL | SPECIFICA O SPECIFICA | TION |
| LABORATORY: | Asheville | | | | | | | |
| | | | TEST RI | ESULTS | | | | |
| Project Sample No. | SS-1 | SS-2 | SS-3 | SS-4 | SS-5 | SS-6 | SS-7 | SS-8 |
| Lab Sample No. A | 148561 | 148562 | 148563 | 148564 | 148565 | 148566 | 148567 | 148568 |
| HiCAMS Sample # | | | | ••• | | | | |
| Retained #4 Sieve % | | | | | | | | |
| Passing #10 Sieve % | 88 | .90 | 96 | 94 | 99 | 84 | 90 | 92 |
| Passing #40 Sieve % | 76 | 74 | 75 | 70 | 72 | 67 | 54 | 73 |
| Passing #200 Sieve % | 45 | 36 | 26 | 31 | 21 | 30 | 15 | 27 |
| | | | | | | | | |
| | | M | INUS #10 I | FRACTIO | N | | | |
| Soil Mortar - 100% | | | | | 10 | ļ | | 40 |
| Coarse Sand -Ret. #60 | 26 | 34 | 39 | 41 | 49 | 37 | 59 | 40 |
| Fine Sand - Ret. #270 | 26 | 31 | 41 | 32 | 35 | 32 | 28 | 36 |
| Silt 0.05-0.005 mm % | 18 | 17 | 20 | 23 | 16 | 31 | 1 10 | 16 |
| Clay < 0.005 mm % | 30 | 18 | 0 | 4 | 0 | 0 | 12 | 8 |
| Passing # 40 Sieve % | | | | | | | | |
| Passing # 200 Sieve % | | | | | | | | |
| | 1, | | L | | <u> </u> | 1 | <u> </u> | |
| Y * * 1. Y * * * | 47 | 26 | 1 20 | 10 | T | 1 20 | | 76 |
| Liquid Limit | 47 19 | 36 | 38 | 40 | 27 | 29 ND | 39 | 36 NP |
| Plastic Index | | 11 | NP | NP | NP | NP | | } |
| AASHTO Classification | A-7-6 (5) | A-6 (0) | A-2-4 (0) | A-2-4 (0) | A-2-4 (0) | A-2-4 (0) | A-2-4 (0) | A-2-4 (0) |
| Quantity Texture | | | | | | | | |
| Station | 14+00 | 14+00 | 14+00 | 14+00 | 14+00 | 12+50 | 11+50 | 11+50 |
| Hole No. | 14100 | 14100 | 14100 | 14100 | 14100 | 12:30 | 11.30 | 11.50 |
| Depth (ft) From: | 3.5 | 6.2 | 11.2 | 16.2 | 21.2 | 6.1 | 15.6 | 20.6 |
| To: | 4.8 | 7.7 | 12.7 | 17.7 | 22.7 | 7.1 | 17.1 | 22.1 |
| | 1 | ··· | 12.7 | | | | | |
| Remarks: | | | L. | | | | | |
| A-148561-148568 | | | | | | | | |
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| L.L. Acker | | | | | | | | |
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| SOILS ENGINEER: | | | | | | | <i>i</i> . | |
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

| T.I.P. ID #: B- | -4322 | | | | | | · | | |
|--|---|---------------|---|--------------|----|-----------------|----------|---|----------|
| REPORT ON SAMPLES OF: Soils for Classification | | | | | | | | | |
| REPORT ON SAMPL | LES OF: Soils | for Classific | ation | | | | | | |
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| REPORT ON SAMPLES OF: Soils for Classification | | | | | | | | | |
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| REPORT ON SAMPLES OF: Soils for Classification | | | | | | | | | |
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| | | | TEST R | ESULTS | | | | | |
| Project Sample No. | SS-9 | | ······································ | T | T | | | | T · |
| | 148569 | | | | | | | | |
| HiCAMS Sample # | | | | | | | | | |
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| | | | *************************************** | 1 | | | | | |
| Passing #200 Sieve % | 18 | | | | | | | | <u></u> |
| Soil Mortar - 100% | T | MI | NUS #10 | FRACTIO | ON | | · · | | T |
| Coarse Sand -Ret. #60 | 50 | | | | | | | • | |
| REPORT ON SAMPLES OF: Soils for Classification | | | | | | | | | |
| Silt 0.05-0.005 mm % | EPORT ON SAMPLES OF: Soils for Classification ROJECT: 33659.1.1 COUNTY: Will ATE SAMPLED: 3-29-05 DATE RECEIVED: AMPLED FROM: Roadway SAMPLI JBMITTED BY: W. D. Frye ABORATORY: Asheville TEST RES Oject Sample No. A 148569 CAMS Sample No. A 148569 CAMS Sample # Petained #4 Sieve % 83 Sissing #10 Sieve % 83 Sissing #200 Sieve % 18 MINUS #10 FR Il Mortar - 100% Date of the same of th | | | | | | | | |
| Clay < 0.005 mm % | 2 | | | | | | | | |
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| Passing # 200 Sieve % | <u> </u> | | | | | | | | |
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| | A-2-4 (0) | | | | | | | | <u> </u> |
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| | 16+50 | | ······ | <u> </u> | | ···· | _ | | |
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| L.L. Acker | | | | | | | | | |
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| SOILS ENGINEER: | | | | | | | | | |

Project No. 33659.1.1 B-4322 Wilkes Co.

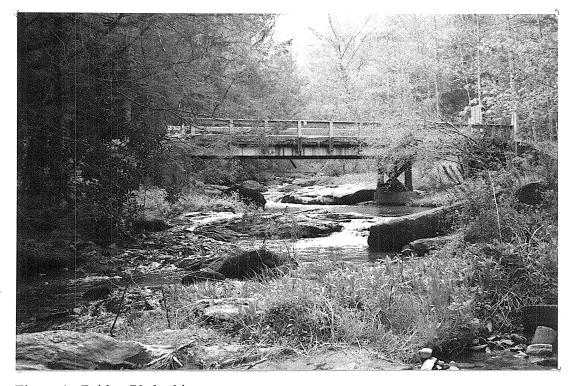


Figure 1. Bridge 70, looking upstream.



Figure 2. Looking forward from Station 13+00.

Project No. 33659.1.1 B-4322 Wilkes Co.



Figure 3. Looking back from Station 16+50. Note water in ruts on right.



Figure 4. Looking back from Station 17+00. Note water in ditch.