

PROJECT: 8.2851501 ID: R-2824

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 8.2851501 I.D. NO. R-2824

F.A. PROJECT STP-1546(8)

COUNTY BURKE

PROJECT DESCRIPTION _____

SITE DESCRIPTION BRIDGE NO. 110 ON SR-1545
OVER HOYLE CREEK

	STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	N.C.	R-2824	1	16
	STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
	8.2851501	STP-1546(8)	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 J.W. MANN PERSONNEL D.O. CHEEK

CHECKED BY W.D. FRYE J.T. WILLIAMS

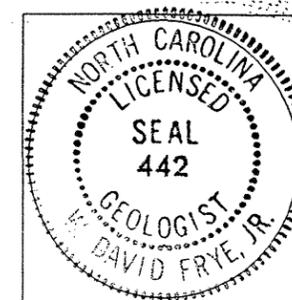
SUBMITTED BY W.D. FRYE L.E. LANKFORD

DATE 6/03 D.P. MURPHY

DRAWN BY: J.W. MANN

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.



David Frye, Jr.
SIGNATURE

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 30 cm 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: <i>VERY STIFF, GRAY SILTY CLAY, WITH INTERBEDDED FINE SAND LAYERS, HIGH 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 2.5 cm PER 50 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 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 DISLOADED 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 10 CENTIMETERS 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) OF A 63.5 kg HAMMER FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION WITH 50 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										ROCK HARDNESS									
GENERAL CLASS. GRANULAR MATERIALS (>5% PASSING #200) SILT-CLAY MATERIALS (>85% 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 30 cm.										ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER.									
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7										SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50										CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.										ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.									
SYMBOL										PERCENTAGE OF MATERIAL										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.										COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.									
% PASSING										ORGANIC MATERIAL GRANULAR SILT-CLAY OTHER 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.										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.									
LIQUID LIMIT PLASTIC INDEX										GROUND WATER										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.										DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.									
GROUP INDEX										MISCELLANEOUS SYMBOLS										MODERATELY SEVERE (MOD. SEV.) ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOIDS, 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.										DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.									
USUAL TYPES OF MAJOR MATERIALS										ROADWAY EMBANKMENT WITH SOIL DESCRIPTION										SEVERE (SEV.) ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOIDS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BLOWS PER 30 cm.										FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.									
GEN. RATING AS A SUBGRADE										ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS										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 BLOWS PER 30 cm.										JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.									
CONSISTENCY OR DENSENESS										INFERRED SOIL BOUNDARIES										MODERATELY SEVERE (MOD. SEV.) ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOIDS, 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.										LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.									
PRIMARY SOIL TYPE										INFERRED ROCK LINE										SEVERE (SEV.) ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOIDS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BLOWS PER 30 cm.										LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.									
COMPACTNESS OR CONSISTENCY										ALLUVIAL SOIL BOUNDARY										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 BLOWS PER 30 cm.										MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.									
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)										DIP/DIP DIRECTION OF ROCK STRUCTURES										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.										PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.									
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (kN/m ²)										SOUNDING ROD										MODERATELY SEVERE (MOD. SEV.) ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOIDS, 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.										RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.									
TEXTURE OR GRAIN SIZE										ABBREVIATIONS										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.										ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.									
U.S. STD. SIEVE SIZE OPENING (mm)										AR - AUGER REFUSAL										HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.										STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg HAMMER FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION WITH 50 BLOWS.									
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CS, SO.) FINE SAND (FS, SO.) SILT (SL.) CLAY (CL.)										BT - BORING TERMINATED										MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 6 mm DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.										STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.									
GRAIN SIZE										CL - CLAY										MEDIUM HARD CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.										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.									
SOIL MOISTURE - CORRELATION OF TERMS										CPT - CONE PENETRATION TEST										SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.										TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.									
SOIL MOISTURE SCALE (ATTERBERG LIMITS)										CSE - COARSE										VERY SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.										BENCH MARK: BM 60 NAIL IN BASE OF 12" MAPLE TREE									
FIELD MOISTURE DESCRIPTION										DHT - DILATOMETER TEST										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.										STA. 20+1.255 31.8071 LT -L-									
GUIDE FOR FIELD MOISTURE DESCRIPTION										DPT - DYNAMIC PENETRATION TEST										HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.										ELEVATION: 316.138									
LIQUID LIMIT										F - FINE										MODERATELY HARD CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.										NOTES:									
WET - (W)										FOSS. - FOSSILIFEROUS										MEDIUM HARD CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																			
SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE										FRAC. - FRACTURED										SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																			
MOIST - (M)										FRAGS. - FRAGMENTS										VERY SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																			
SOLID; AT OR NEAR OPTIMUM MOISTURE										MED. - MEDIUM										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.																			
DRY - (D)																				MODERATELY HARD CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																			
REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																				MEDIUM HARD CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																			
PLASTICITY										EQUIPMENT USED ON SUBJECT PROJECT										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.																			
PLASTICITY INDEX (PI)										DRILL UNITS:										HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.																			
DRY STRENGTH										ADVANCING TOOLS:										MODERATELY HARD CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																			
VERY LOW										CLAY BITS										MEDIUM HARD CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																			
SLIGHT										152 mm CONTINUOUS FLIGHT AUGER										SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																			
MEDIUM										203 mm HOLLOW AUGERS										VERY SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																			
HIGH										HARD FACED FINGER BITS										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.																			
										TUNG-CARBIDE INSERTS										HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.																			
										CASING W/ ADVANCER										MEDIUM HARD CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.																			
										TRICONE mm STEEL TEETH										SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																			
										TRICONE mm TUNG-CARB.										VERY SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.																			
										CORE BIT										HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.																			
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										OTHER										SOFT CAN BE GROOVED OR GOUGED READILY																			



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

June 2003

STATE PROJECT: 8.2851501 (R-2824)
F. A. PROJECT: STP-1546(8)
COUNTY: Burke
DESCRIPTION: Bridge No. 110 on SR-1546 over Hoyle Creek

SUBJECT: Geotechnical Report – Foundation Investigation

This project is located within the municipalities of Valdese and Rutherford College in Burke County. The new bridge will be constructed at the same location as the existing structure, but will be lengthened to 24 meters and widened to 12 meters. The proposed crossing is to be a single span, with end bents erected on a 90-degree skew angle.

The subsurface investigation was completed with the use of a CME-550 ORV drill unit equipped with an automatic drop hammer for Standard Penetration Testing (SPT). Borings were advanced with NX casing and NXWL rock coring apparatus. Representative soil samples were collected and submitted for testing to determine AASHTO classification. Rock specimens were retrieved and tested for Young's Modulus and compressive strength.

Physiography and Geology

The project is located in the foothills of the Piedmont Physiographic Province. Topography consists of rolling hills with relief generally less than 40 meters. Geologically, the replacement bridge is sited in the Inner Piedmont Belt, and underlain by a mica schist unit (symbol CZms on the 1985 Geologic Map of North Carolina). Locally, the rock was found to be gneissic.

Foundation Materials

Up to 1.3 meters of embankment composed of silty sand has been constructed at both of the end bents. The fill has been placed on approximately one to two meters of very loose to very dense alluvial silty sand and gravel. The alluvial deposit lies upon 0.5 to 1.4 meters of medium dense saprolitic silty sand. A weathered rock horizon is present beneath the saprolite between elevations 312.3± and 315.3± meters. Weathered rock grades to hard rock at the following elevations and boring locations.

<u>Location</u>	<u>Elevation (meters)</u>
EB1-A	312.5±
EB1-B	314.4±
EB2-A	312.1±
EB2-B	312.9±

Detour Bridge

Borings advanced in the vicinity of the proposed detour bridge revealed from 2.68 to 4.0 meters of very loose to medium dense alluvial sand and gravel deposited over saprolitic micaceous silty sand. Densities of this residual horizon where tested varied from loose to very dense. All borings were terminated in this strata.

Groundwater

Groundwater was measured in the alluvial horizon between elevations 314.7 and 316 meters.

Embankments

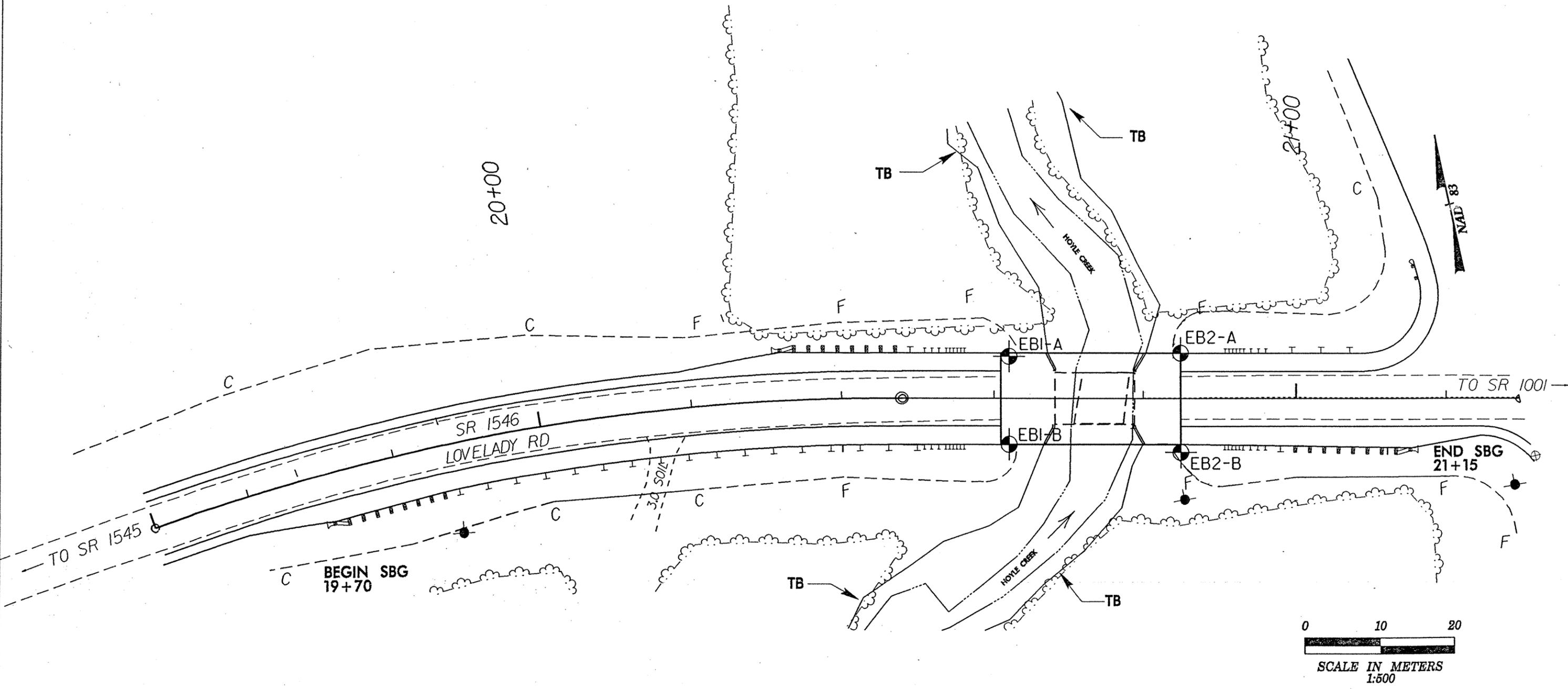
End Bent slopes of 1.5:1 plated with rip-rap are recommended.

Respectfully Submitted,

J. W. Mann, TEG-III

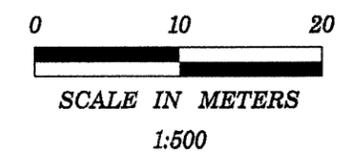
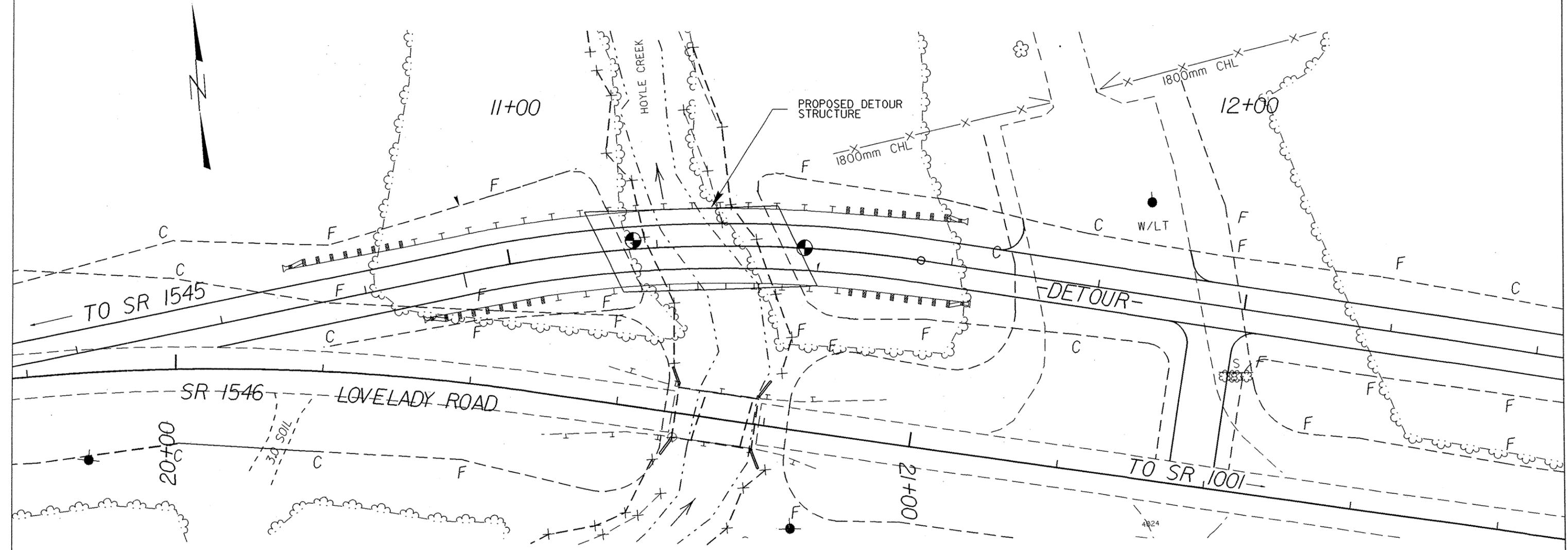
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BRIDGE NO. 110 ON SR-1546 OVER HOYLE CREEK SITE PLAN



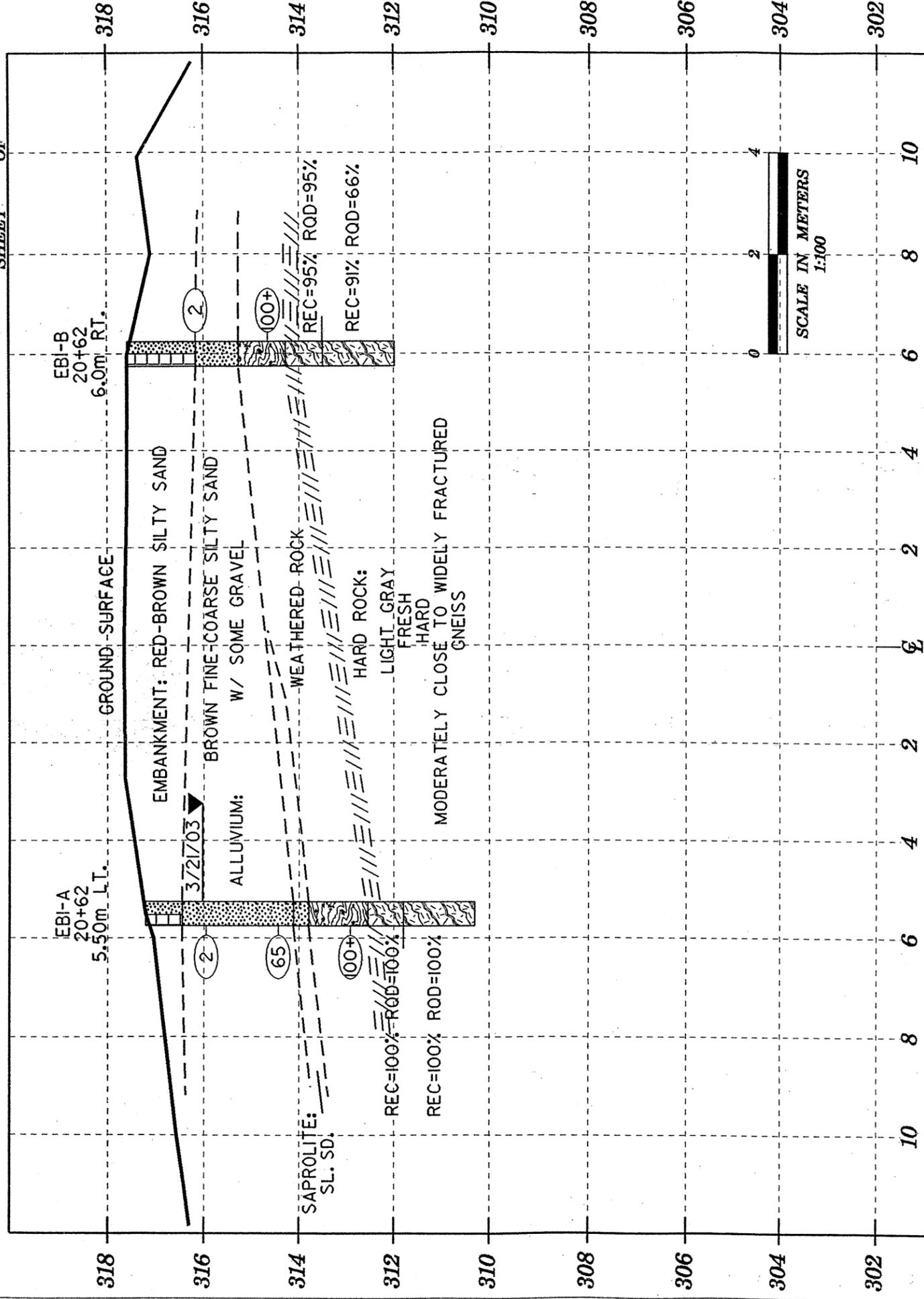
DETOUR BRIDGE SITE PLAN

8.2851501 R-2824
BURKE CO.
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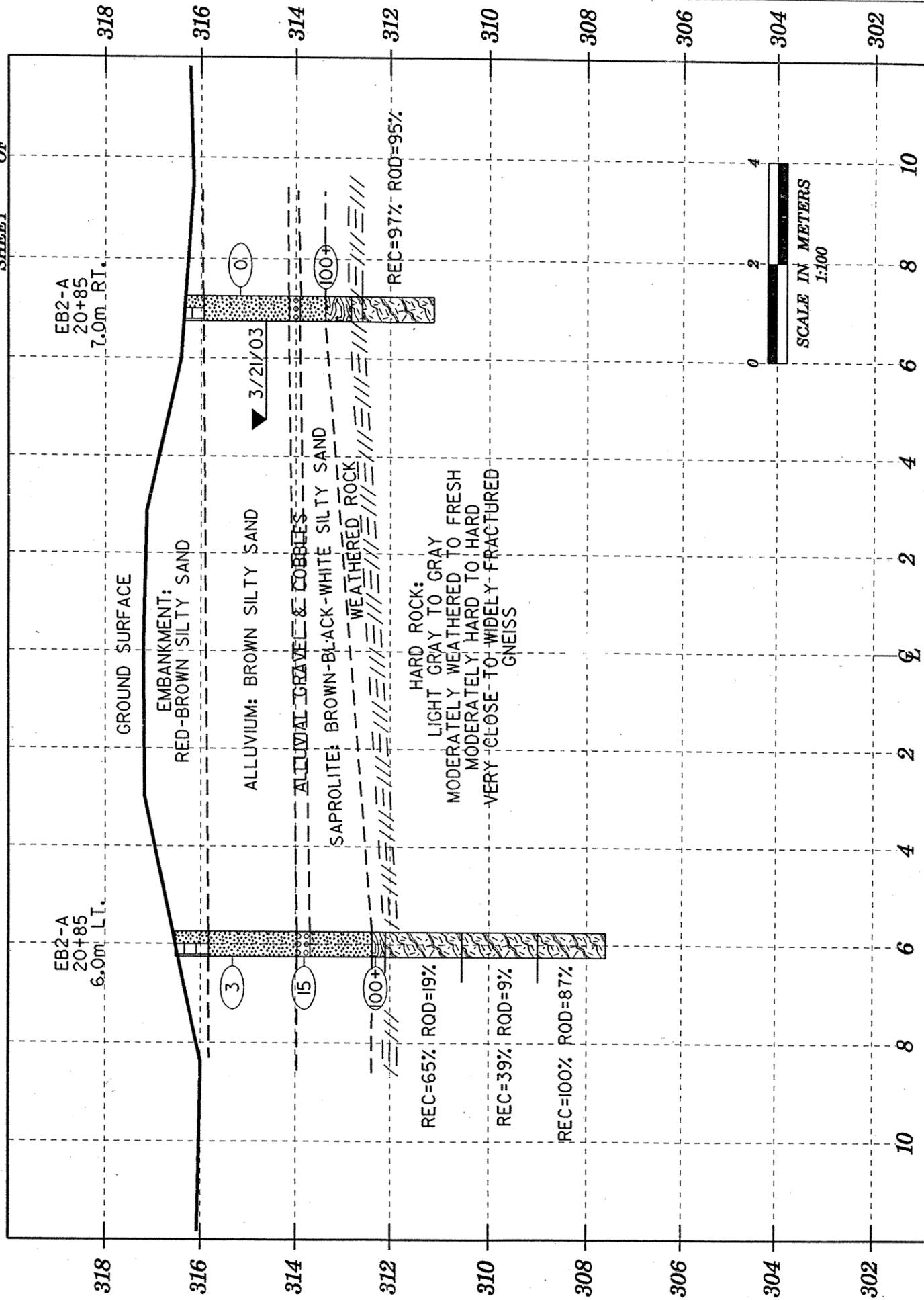
SECTION THROUGH EB1

PROJECT 8.2851501 R-2824
COUNTY BURKE
SHEET OF



SECTION THROUGH EB2

PROJECT 8.2851501 R-2824
COUNTY BURKE
SHEET OF



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

7 or 10

PROJECT NO 8.2851501		ID R-2824		COUNTY BURKE		GEOLOGIST D.P. MURPHY						
SITE DESCRIPTION BRIDGE NO. 110 ON SR-1546 OVER HOYLE CR							GND WATER					
BORING NO EB1-A		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 20+62.000		OFFSET 5.50m LT		24 HR 1.20m						
COLLAR ELEV 317.22m		TOTAL DEPTH 6.91m		START DATE 3/21/03		COMPLETION DATE 03/21/03						
DRILL MACHINE CME-550X			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK 4.66m			Log EB1-A, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		15cm	15cm	15cm		0	25	50	75			
317.22												Ground Surface
316.00	1.27	0	1	1	0.30	2						EMBANKMENT: RED-BROWN SILTY SAND
314.00	2.79	2	20	45	0.30	65						ALLUVIUM: BROWN FINE-COARSE SILTY SAND W/ SOME GRAVEL
312.00	4.32	100			0.03	100						SAPROLITE: GREY-RED-WHITE SLI. MICAC. SILTY SAND WEATHERED ROCK
310.31												CORE 1: 4.66-5.42M REC=100% RQD=100% CORE 2: 5.42-6.91M REC=100% RQD=100%
BORING TERMINATED AT ELEV. 310.31M IN HARD ROCK												

SHEET 1 OF 1

DATE 6/3/03

CORE BORING REPORT

PROJECT: 8.2851501 I. D. NO: R-2824 BORING NO: EB1-A GEOLOGIST: J.W. MANN
 DESCRIPTION: BRIDGE NO. 110 ON SR-1546 OVER HOYLE CREEK
 COUNTY: BURKE COLLAR ELEVATION: 317.22 m TOTAL DEPTH: 6.91 m

ELEV. (m)	DEPTH (m)	DRILL RATE MIN./3 m	RUN (m)	REC. METERS %	RQD. METERS %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
312.56	4.66		0.76	0.76	0.76		LIGHT GRAY, FRESH, HARD, WIDELY FRACTURED GNEISS WITH NO JOINTS.
311.80	5.42		1.49	1.49	1.49		
310.31	6.91		1.49	1.49	1.49		

CORING TERMINATED AT ELEVATION 310.31 m

DRILLER: E.A. SMITH CORE SIZE: NXWL EQUIPMENT: CME-550X

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

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SHEET 1 OF 1

DATE 6/3/03

PROJECT NO 8.2851501		ID R-2824		COUNTY BURKE		GEOLOGIST D.P. MURPHY						
SITE DESCRIPTION BRIDGE NO. 110 ON SR-1546 OVER HOYLE CR							GND WATER					
BORING NO EB1-B		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 20+62.000		OFFSET 6.00m RT		24 HR N/A						
COLLAR ELEV 317.58m		TOTAL DEPTH 5.60m		START DATE 3/19/03		COMPLETION DATE 03/19/03						
DRILL MACHINE CME-550X			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK 3.30m			Log EB1-B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		15cm	15cm	15cm		0	25	50	75			
317.58												Ground Surface
317.00	1.42	1	1	1	0.30	2						EMBANKMENT: RED-BROWN SILTY SAND
315.00	2.94	100			0.02				100			ALLUVIUM: BROWN SILTY SAND W/ SOME GRAVEL
313.00												WEATHERED ROCK
311.98												CORE 1: 3.30-4.08M REC=95% RQD=95%
												CORE 2: 4.08-5.60M REC=91% RQD=66%
BORING TERMINATED AT ELEV. 311.983M IN HARD ROCK												

CORE BORING REPORT							FIELD CLASSIFICATION AND REMARKS
ELEV. (m)	DEPTH (m)	DRILL RATE MIN./3 m	RUN (m)	REC. METERS %	RQD. METERS %	SAMP. #	
314.28	3.30		0.78	0.74	0.74		GNEISS IS GENERALLY FRESH, HARD, & MODERATELY CLOSELY FRACTURED. SLIGHTLY WEATHERED, VERY CLOSELY FRACTURED ZONE FROM 4.34-4.61M. JOINTS ARE HORIZONTAL TO CORE AXIS
313.50	4.08			95	95		
313.50	4.08		1.52	1.38	1.00		
311.98	5.60			91	66		
							CORING TERMINATED AT ELEVATION 311.98 m
DRILLER: E.A. SMITH		CORE SIZE: NXWL		EQUIPMENT: CME-550X			

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

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SHEET 1 OF 1

DATE 6/3/03

CORE BORING REPORT

PROJECT: 8.2851501 I. D. NO: R-2824 BORING NO: EB2-A GEOLOGIST: J.W. MANN

DESCRIPTION: BRIDGE NO. 110 ON SR-1546 OVER HOYLE CREEK

COUNTY: BURKE COLLAR ELEVATION: 316.54 m TOTAL DEPTH: 8.93 m

ELEV. (m)	DEPTH (m)	DRILL RATE MIN./3 m	RUN (m)	REC. METERS %	RQD. METERS %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
312.10	4.44		1.57	1.02 65	0.30 19		GRAY, MODERATELY WEATHERED, MODERATELY HARD GNEISS. FRACTURES ARE VERY CLOSE TO CLOSE. JOINTS ARE ALONG FOLIATION AT 20°.
310.53	6.01		1.52	0.60 39	0.14 9		
309.01	7.53		1.40	1.40 100	1.22 87		GRAY, FRESH, HARD GNEISS. FRACTURES ARE CLOSE AND ALONG FOLIATION AT 20°.
307.61	8.93						

CORING TERMINATED AT
 ELEVATION 307.61 m

DRILLER: E.A. SMITH CORE SIZE: NXWL EQUIPMENT: CME-550X

PROJECT NO 8.2851501		ID R-2824		COUNTY BURKE		GEOLOGIST D.P. MURPHY						
SITE DESCRIPTION BRIDGE NO. 110 ON SR-1546 OVER HOYLE CR							GND WATER					
BORING NO EB2-A		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 20+85.000		OFFSET 6.00m LT		24 HR N/A						
COLLAR ELEV 316.54m		TOTAL DEPTH 8.93m		START DATE 3/19/03		COMPLETION DATE 03/19/03						
DRILL MACHINE CME-550X			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK 4.44m			Log EB2-A, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		15cm	15cm	15cm		0	25	50	75			
316.54												Ground Surface
316.00	1.20	1	1	2	0.30	3						EMBANKMENT: RED-BROWN SILTY SAND
314.00	2.72	11	9	6	0.30	15				SS-1		ALLUVIUM: BROWN SILTY SAND
312.00	4.25	100			0.12	100				CORE 1		ALLUVIAL GRAVEL & COBBLES
												SAPROLITE: BROWN-BLACK-WHITE SILTY SAND
												WEATHERED ROCK
												CORE 1: 4.44-6.01M REC=65% RQD=19%
												CORE 2: 6.01-7.53M REC=39% RQD=9%
												CORE 3: 7.53-8.93M REC=100% RQD=87%
308.00												
307.61												
												BORING TERMINATED AT ELEV. 307.61M IN HARD ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

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SHEET 1 OF 1

DATE 6/3/03

PROJECT NO 8.2851501	ID R-2824	COUNTY BURKE	GEOLOGIST D.P. MURPHY
SITE DESCRIPTION BRIDGE NO. 110 ON SR-1546 OVER HOYLE CR			GND WATER
BORING NO EB2-B	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT -L-	BORING LOCATION 20+85.000	OFFSET 7.00m RT	24 HR 1.70m
COLLAR ELEV 316.34m	TOTAL DEPTH 5.23m	START DATE 3/21/03	COMPLETION DATE 03/21/03
DRILL MACHINE CME 550X	DRILL METHOD SPT CORE BORING	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK 3.51m	Log EB2-B, Page 1 of 1

ELEV	DEPTH	BLOW CT		PEN (m)	BLOWS PER 30cm					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		5cm	15cm		0	25	50	75	100			
316.34												Ground Surface
315.00	1.15	0	0	0.30	0							EMBANKMENT: RED-BROWN SILTY SAND
												ALLUVIUM: BROWN FINE-COARSE SILTY SAND
	2.67	3	31	0.39								ALLUVIAL GRAVEL & COBBLES
313.00												SAPROLITE: BROWN-BLACK-WHITE SILTY SAND
												WEATHERED ROCK
												CORE 1: 3.51-3.75M REC=100% RQD=100%
311.11												CORE 2: 3.75-5.23M REC=97% RQD=95%

CORE BORING REPORT

PROJECT: 8.2851501 I. D. NO: R-2824 BORING NO: EB2-B GEOLOGIST: J.W. MANN

DESCRIPTION: BRIDGE NO. 110 ON SR-1546 OVER HOYLE CREEK

COUNTY: BURKE COLLAR ELEVATION: 316.34 m TOTAL DEPTH: 5.23 m

ELEV. (m)	DEPTH (m)	DRILL RATE MIN./3 m	RUN (m)	REC. METERS %	RQD. METERS %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
312.83	3.51		0.24	0.24	0.24		LIGHT GRAY, FRESH, HARD, WIDELY FRACTURED GNEISS WITH FEW JOINTS.
312.59	3.75			100	100		
312.59	3.75		1.48	1.44	1.41		
311.11	5.23			97	95		

CORING TERMINATED AT ELEVATION 311.11 m

DRILLER: E.A. SMITH CORE SIZE: NXWL EQUIPMENT: CME-550X

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 8.2851501		ID R-2824		COUNTY BURKE		GEOLOGIST D.P. MURPHY							
SITE DESCRIPTION TEMPORARY BRIDGE FOR BRIDGE NO. 110 ON SR-1546 OVER HOYLE CR							GND WATER						
BORING NO 11+17.6		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT DET		BORING LOCATION 11+17.600		OFFSET 1.00m LT		24 HR 2.20m							
COLLAR ELEV 0.00m		TOTAL DEPTH 8.57m		START DATE 8/29/02		COMPLETION DATE 08/29/02							
DRILL MACHINE CME-550X			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log 11+17.6, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75				100
0.00													Ground Surface
-1.00	0.52	3	3	2	0.30								ALLUVIUM: BROWN MICACEOUS SILTY SAND WITH GRAVEL
-2.04	2.04	4	13	15	0.30								
-3.00	3.57	3	2	2	0.30							SS-18	
-5.00	5.08	7	14	14	0.30							SS-19	SAPROLITE: RED-BROWN-WHITE MICACEOUS SILTY SAND
-7.00	6.60	9	12	19	0.30								
-8.57	8.13	12	18	46	0.30								
													BORING TERMINATED AT 8.57M IN SAPROLITE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 8.2851501		ID R-2824		COUNTY BURKE		GEOLOGIST D.P. MURPHY							
SITE DESCRIPTION TEMPORARY BRIDGE FOR BRIDGE NO. 110 ON SR-1546 OVER HOYLE CR							GND WATER						
BORING NO 11+40		NORTHING 0.00		EASTING 0.00		0 HR N/A							
ALIGNMENT DET		BORING LOCATION 11+40.000		OFFSET 0.00m		24 HR 1.49m							
COLLAR ELEV 0.00m		TOTAL DEPTH 7.44m		START DATE 8/27/02		COMPLETION DATE 08/27/02							
DRILL MACHINE CME-45B			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log 11+40, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (m)	BLOWS PER 30cm				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		15cm	15cm	15cm		0	25	50	75				100
0.00													Ground Surface
-1.00	0.91	2	1	2	0.30								ALLUVIUM: BROWN SILTY SAND
-2.00	2.43	5	2	2	0.30								ALLUVIUM: RED-BROWN SILTY SANDY CLAY
-3.00	3.96	4	3	3	0.30								ALLUVIUM: BROWN SILTY SAND W/GRAVEL
-5.00	5.48	1	1	3	0.30								SAPROLITE: BROWN-GRAY MICACEOUS SILTY SAND W/MNO STAINING
-7.00	7.01	4	11	33	0.30								
-7.44													BORING TERMINATED AT 7.44M IN SAPROLITE

JJL
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:	--
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REPORT ON SAMPLES OF: Soil for Classification
--

PROJECT: 8.2851501	COUNTY: Burke	Owner: --
DATE SAMPLED: 3-19-03	DATE RECEIVED: 5-8-03	DATE REPORTED: 6-2-03
SAMPLED FROM: Roadway	SAMPLED BY: J. W. Mann	
SUBMITTED BY: W. D. Frye	2002	STANDARD SPECIFICATION
LABORATORY: Asheville		

TEST RESULTS

Project Sample No.	SS-1	SS-2	SS-3				
Lab Sample No. A	141411	141412	141413				
HiCAMS Sample #	--	--	--				
Retained #4 Sieve %	--	--	--				
Passing #10 Sieve %	72	60	93				
Passing #40 Sieve %	55	44	81				
Passing #200 Sieve %	13	15	35				

MINUS #10 FRACTION

Soil Mortar - 100%							
Coarse Sand -Ret. #60	44	41	27				
Fine Sand - Ret. #270	45	44	42				
Silt 0.05-0.005 mm %	9	11	19				
Clay < 0.005 mm %	2	4	12				
Passing # 40 Sieve %	--	--	--				
Passing # 200 Sieve %	--	--	--				

Liquid Limit	34	34	20				
Plastic Index	NP	NP	NP				
AASHTO Classification	A-2-4 (0)	A-1-b (0)	A-2-4 (0)				
Quantity							
Texture							
Station	20+85 LT	20+85 LT	20+62 RT				
Hole No.							
Depth (ft) From:	2.87	4.24	1.57				
To:	3.17	4.36	1.87				

Remarks:
A-141411 - 141413

CC:

W. D. Frye	
J. J. Lail	
File	

SOILS ENGINEER:

JJL
 North Carolina Department of Transportation
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:						
REPORT ON SAMPLES OF:	Soil for Classification					
PROJECT:	8.2851501	COUNTY:	Burke	OWNER:	--	
DATE SAMPLED:	8-27-02	DATE RECEIVED:	9-3-02	DATE REPORTED:	9-11-02	
SAMPLED FROM:	-L- Rd Foundation Elevation	SAMPLED BY:	D P Murphy			
SUBMITTED BY:	W D Frye	2002	STANDARD SPECIFICATION			
LABORATORY:	Asheville					

TEST RESULTS

Project Sample No.	SS-17	SS-18	SS-19	SS-20	SS-21	SS-22
Lab Sample No. A-	138899	138900	138901	138902	138903	138904
HiCAMS Sample #	--	--	--	--	--	--
Retained 4.75mm Sieve%	--	--	--	--	--	--
Passing 2.00 mm Sieve%	97	85	84	91	89	93
Passing 0.425 mm Sieve%	80	65	63	75	64	67
Passing 0.075 mm Sieve%	31	16	18	48	21	20

MINUS 2.00 mm FRACTION

Soil Mortar - 100%						
Coarse Sand Ret-250 um%	35	46	45	28	48	49
Fine Sand Ret. -53 um%	40	41	41	24	34	34
Silt 0.05-0.005 mm %	13	7	12	13	12	11
Clay < 0.005 mm%	12	6	2	35	6	6
	--	--	--	--	--	--
	--	--	--	--	--	--

Liquid Limit	40	36	36	50	47	40
Plastic Index	NP	NP	NP	13	NP	NP
AASHTO Classification	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-7-5 (4)	A-2-5 (0)	A-2-4 (0)
Quantity						
Texture						
Station	11+00 CL	11+17.6CL	11+17.6CL	17+00 Lt	17+00 Lt	17+00 Lt
Hole No.						
Depth (M) From:	2.50	3.56	5.08	0.99	4.03	7.07
To:	2.95	4.01	5.53	1.44	4.47	7.52

Remarks:
 A-138883 through A-138904
 CC:
 W D Frye
 J J Lail
 File

SOILS ENGINEER:

JJL
 North Carolina Department of Transportation
 DIVISION OF HIGHWAYS-MATERIALS AND TESTS UNIT
 SOILS TEST REPORT-SOILS LABORATORY

T.I.P. ID #:						
REPORT ON SAMPLES OF:	Soil for Classification					
PROJECT:	8.2851501	COUNTY:	Burke	OWNER:	--	
DATE SAMPLED:	8-27-02	DATE RECEIVED:	9-3-02	DATE REPORTED:	9-11-02	
SAMPLED FROM:	-L- Rd Foundation Elevation	SAMPLED BY:	D P Murphy			
SUBMITTED BY:	W D Frye	2002	STANDARD SPECIFICATION			
LABORATORY:	Asheville					

TEST RESULTS

Project Sample No.	SS-9	SS-10	SS-11	SS-12	SS-13	SS-14	SS-15	SS-16
Lab Sample No. A-	138891	138892	138893	138894	138895	138896	138897	138898
HiCAMS Sample #	--	--	--	--	--	--	--	--
Retained 4.75mm Sieve%	--	--	--	--	--	--	--	--
Passing 2.00 mm Sieve%	100	80	81	99	95	87	77	97
Passing 0.425 mm Sieve%	93	63	60	86	79	72	60	85
Passing 0.075 mm Sieve%	66	21	23	22	22	40	24	55

MINUS 2.00 mm FRACTION

Soil Mortar - 100%								
Coarse Sand Ret-250 um%	18	40	44	32	34	31	38	23
Fine Sand Ret. -53 um%	18	41	33	59	53	28	38	26
Silt 0.05-0.005 mm %	26	13	17	5	9	10	14	18
Clay < 0.005 mm%	38	6	6	4	4	31	10	33
Passing 0.425 mm Sieve%	--	--	--	--	--	--	--	--
Passing 0.075 mm Sieve%	--	--	--	--	--	--	--	--

Liquid Limit	38	53	39	48	35	37	31	38
Plastic Index	13	NP	NP	NP	NP	17	NP	17
AASHTO Classification	A-6 (7)	A-2-5 (0)	A-2-4 (0)	A-2-5 (0)	A-2-4 (0)	A-6 (3)	A-2-4 (0)	A-6 (7)
Quantity								
Texture								
Station	11+40 CL	11+40 CL	11+40 CL	11+40 CL	11+40 CL	12+32 CL	12+35 CL	11+00 CL
Hole No.								
Depth (M) From:	0.91	2.43	3.95	5.47	6.99	2.37	3.89	0.98
To:	1.36	2.88	4.40	5.92	7.44	2.42	4.12	1.43

Remarks:
 A-138883 through A-138904
 CC:
 W D Frye
 J J Lail
 File

SOILS ENGINEER:

GEOTECHNICAL UNIT FIELD SCOUR REPORT

14 EF 16

PROJECT: 8.2851501 ID: R-2824 COUNTY: Burke

DESCRIPTION(1): Bridge No. 110 on SR-1546 (Lovely Rd.) over Hoyle Creek

INFORMATION ON EXISTING BRIDGES Information obtained from: field inspection
 microfilm(Reel: _____ Pos: _____)
 other _____

COUNTY BRIDGE NO. 110 BRIDGE LENGTH 24.138m NO. BENTS IN: CHANNEL 1 FLOOD PLAIN 1

FOUNDATION TYPE: _____

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: Scour on east (Bent Two) side of bridge.

INTERIOR BENTS: _____

CHANNEL BED: Some scour on Bent Two side of channel bed.

CHANNEL BANKS: Scouring on east (Bent Two) side of channel, especially EB2-A side.

EXISTING SCOUR PROTECTION:

TYPE(3): None

EXTENT(4): _____

EFFECTIVENESS(5): _____

OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): Concrete slab in the middle of creek at "B" side of bridge.

DESIGN INFORMATION

Brush in channel and on channel banks at "B" side.

CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): Silty sand, gravel, cobbles, exposed rock
 on "B" side of bridge.

CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): Silty sand, gravel, few cobbles and boulders.

FOUNDATION BEARING MATERIAL(9): _____

CHANNEL BANK COVER(10): Wooded on NW side; shrubs/wooded on NE side; wooded on SW side;
 shrubs and some trees on SE side.

FLOOD PLAIN WIDTH(11): 30-38m on north side; 30-38m immediately on south side then tapering to
 23-30m further on south side.

FLOOD PLAIN COVER(12): Woods, shrubs/grass on north and south side.

DESIGN INFORMATION CONT.

STREAM IS DEGRADING _____ AGGRADING (13)

OTHER OBSERVATIONS AND COMMENTS: Channel bank sand bar transgression from west to
 east underneath bridge. Drainage ditch 7.5m NE of existing bridge.

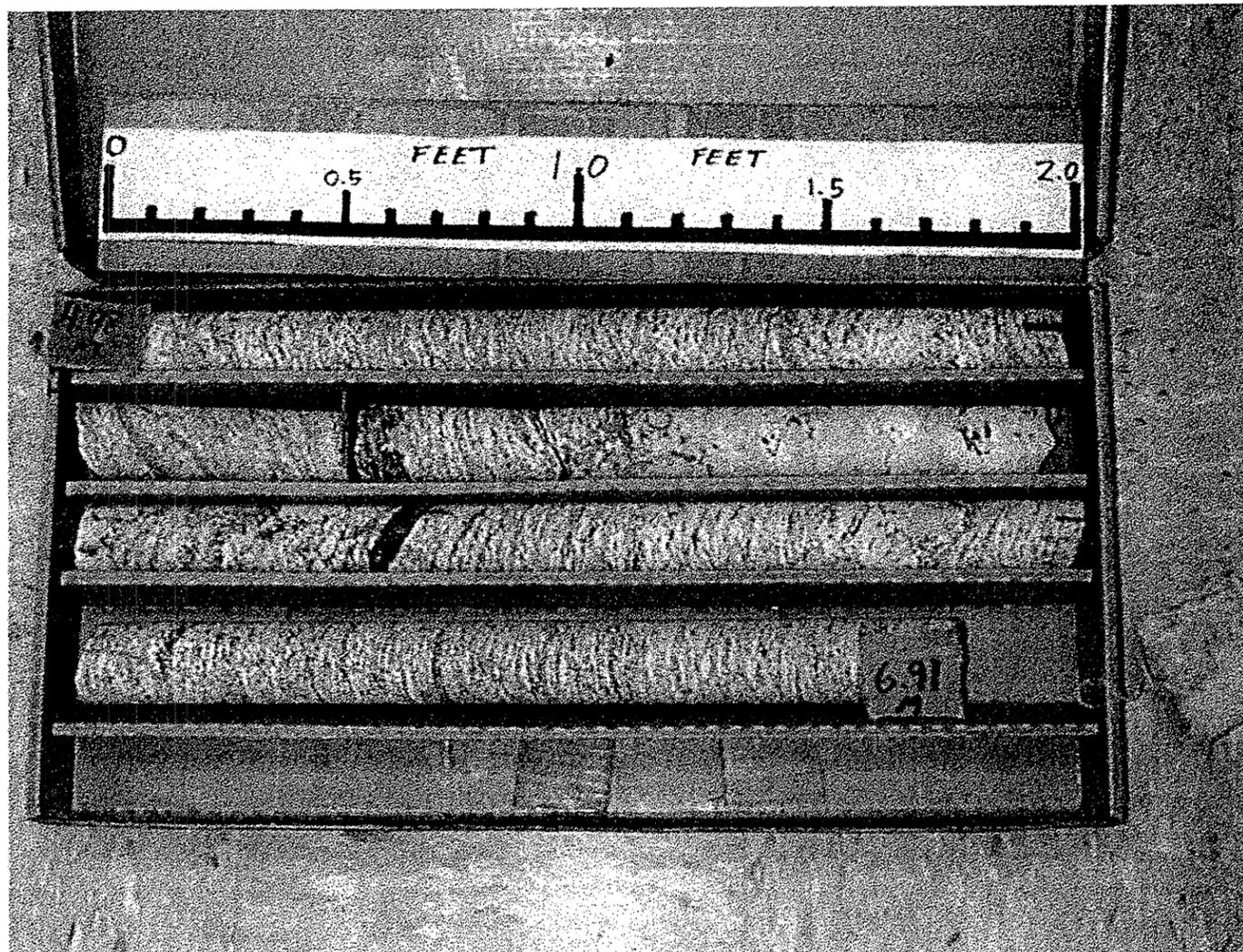
CHANNEL MIGRATION TENDENCY (14): North in bridge area then northwest downstream.

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (15):
 Scour is not anticipated at the end bents.

REPORTED BY: D. P. Murphy, TEG-II DATE: 3/24/2003

INSTRUCTIONS

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIP 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: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE FOUNDATION BEARING MATERIAL,
- (10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
- (11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
- (14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (15) GIVE THE 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 RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. 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.



8.2851501 (R-2824)
 BURKE COUNTY
 BRIDGE NO. 110 ON SR-1546 OVER HOYLE CREEK

EB1-A @ STATION 20+62, 5.50m LT (-L-)

BOX 1 OF 1

DEPTH: 4.97-6.91m

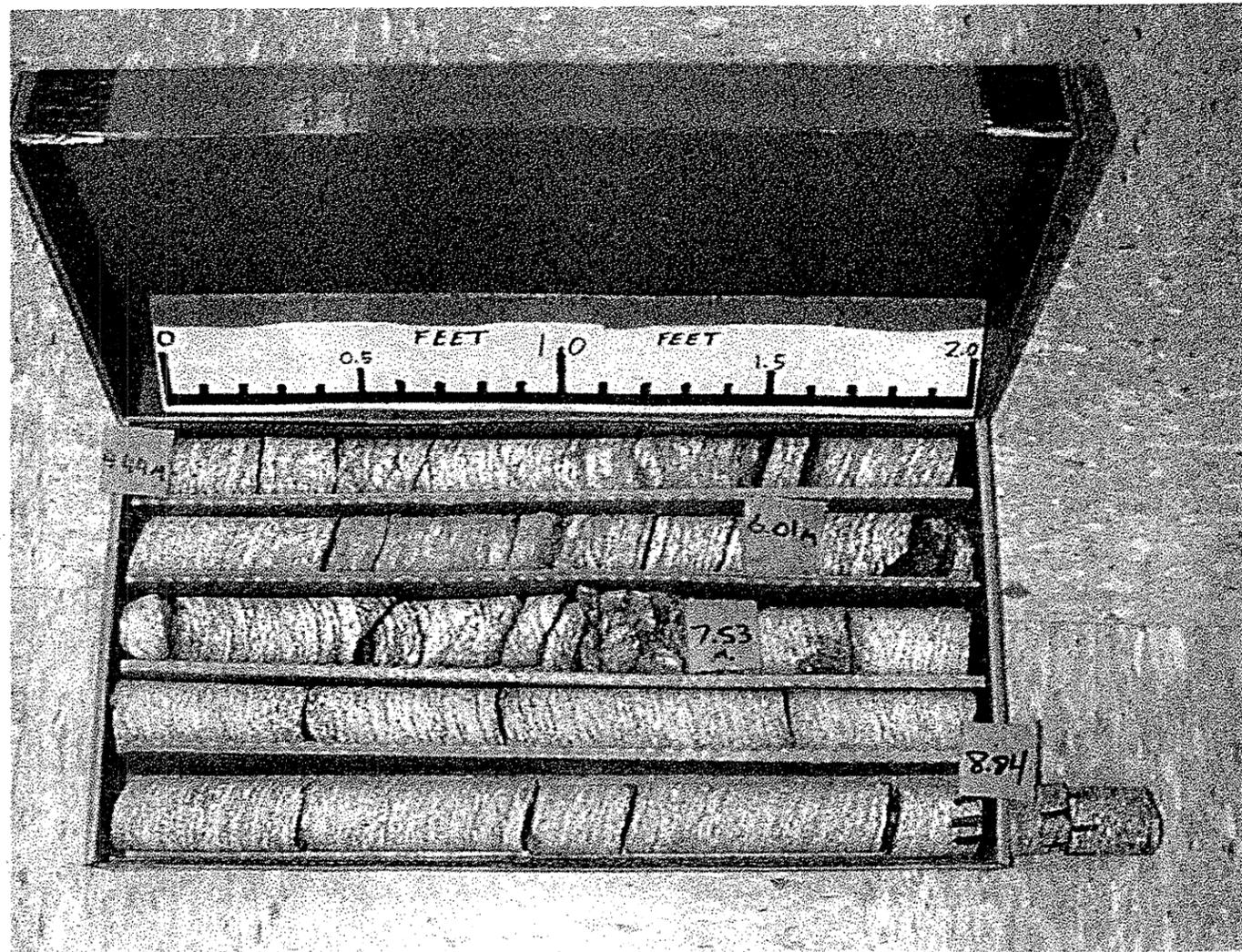


8.2851501 (R-2824)
 BURKE COUNTY
 BRIDGE NO. 110 ON SR-1546 OVER HOYLE CREEK

EB1-B @ STATION 20+62, 6.0m RT (-L-)

BOX 1 OF 1

DEPTH: 3.30-5.60m



8.2851501 (R-2824)
 BURKE COUNTY
 BRIDGE NO. 110 ON SR-1546 OVER HOYLE CREEK

EB2-A @ STATION 20+85, 6.0m LT (-L-)

BOX 1 OF 1

DEPTH: 4.44-8.84m



8.2851501 (R-2824)
 BURKE COUNTY
 BRIDGE NO. 110 ON SR-1546 OVER HOYLE CREEK

EB2-B @ STATION 20+85, 7.0m RT (-L-)

BOX 1 OF 1

DEPTH: 3.51-5.23m