

PROJECT: 33659.1.1 ID: B-4322

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 33659.1.1 I.D. NO. B-4322
 F.A. PROJECT BRZ-1167(I)
 COUNTY WILKES
 PROJECT DESCRIPTION BRIDGE #71 OVER
STONY FORK CREEK ON SR 1167 (STONY
FORK ROAD)
 SITE DESCRIPTION _____

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4322	1	50
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33659.1.1	BRZ-1167(I)	P.E.	
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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.

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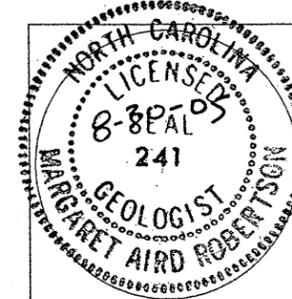
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 SUBMITTED BY TIERRA, INC. F. COX
 DATE AUGUST, 2005 E. RIVERA

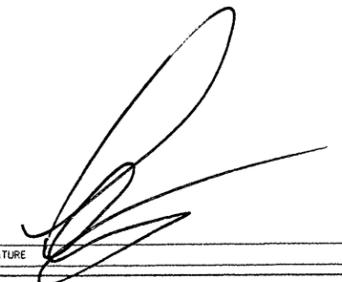
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DRAWN BY: E. WAGNER

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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.



SEAL

 SIGNATURE

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																											
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). 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. EXAMPLES: <i>VERY STIFF GRAY SILTY CLAY, MOST 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). POORLY GRADED: GAP-GRADED: INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.										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: NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT. FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. 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. COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEES, ETC.										ALLUVIUM (A-LJV) - 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 PLATYR 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 UP OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPT 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 4 INCHES 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 (75% PASSING #200) SILT-CLAY MATERIALS (75% PASSING #200) ORGANIC MATERIALS										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.										FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V. SLI.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SLI.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH, OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) ALL 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. IF TESTED, YIELDS SPT N VALUES > 100 B.P.F. 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 B.P.F. COMPLETE (C.) ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIXES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.										SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE										LIQUID LIMIT LESS THAN 30 LIQUID LIMIT 31-50 LIQUID LIMIT GREATER THAN 50										ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK, GUGGES 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. MEDIUM HARD CAN BE GROOVED OR GUGGED 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. SOFT CAN BE GROOVED OR GUGGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.										ORGANIC MATERIAL GRANULAR SILT-CLAY OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE										PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA										WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING. STATIC WATER LEVEL AFTER 24 HOURS. SPRING OR SEEPAGE									
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS										ROCK HARDNESS																																																																					
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										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										SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL										VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT										SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPT 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 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																																																	
TEXTURE OR GRAIN SIZE										ABBREVIATIONS										ROCK HARDNESS																																																																					
U.S. STD. SIEVE SIZE (OPENING (MM)) 4 10 40 60 200 270 4.76 2.0 0.42 0.25 0.075 0.053										AR - ALGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE C.T. - CORING TERMINATED DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - FINE FCSS - FOSSILIFEROUS FRAC. - FRACTURED FRAGS. - FRAGMENTS										MED. - MEDIUM PMT - PRESSUREMETER TEST REF. - REFUSAL SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL W - UNIT WEIGHT W _d - DRY UNIT WEIGHT W - MOISTURE CONTENT V. - VERY VST - VANE SHEAR TEST										VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT										SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPT 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 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																																																	
SOIL MOISTURE - CORRELATION OF TERMS										EQUIPMENT USED ON SUBJECT PROJECT										ROCK HARDNESS																																																																					
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										DRILL UNITS: MCB-LE 3- 3K-51 CME-45 CME-550 PORTABLE HCIST OTHER D-50 OTHER										ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING W/ ADVANCER TRICONE 3" STEEL TEETH TRICONE TUNG-CARB. CORE BIT OTHER										HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B H H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST OTHER										VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT										SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPT 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 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																																							
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August 30, 2005

N.C. Department of Transportation
Geotechnical Engineering Unit
1589 Mail Service Center
Raleigh, North Carolina 27699-1589

Attn: Mr. Njoroge W. Wainaina, P.E.

Ref: Geotechnical Structure Subsurface Investigation Report

State Project No.: 33659.1.1
Tip No.: B-4322
County: Wilkes County
Description: Bridge # 71 over Stony Fork Creek on SR 1167
(Stony Fork Road)
Tierra, Inc. Project No.: 6211-05-027

Dear Mr. Wainaina,

As authorized, Tierra, Inc. has completed the geotechnical subsurface investigation for the proposed replacement structure along SR 1167 over Stony Fork Creek located in Wilkes County, North Carolina. Additionally, a subsurface investigation was performed at the proposed detour structure located approximately 25 to 30 feet downstream. The purpose of this report is to present subsurface conditions and general notes to the designer for consideration during design of the planned structures. Field and laboratory test results, site and boring location plans, and profile/cross sections depicting subsurface conditions may be found in the appendix of this report.

Our professional services for this project have been performed in accordance with generally accepted engineering practices. No other warranty expressed or implied is made. Tierra, Inc. appreciates this opportunity to provide you with geotechnical engineering services for this project. If you have any questions regarding this report, please contact our office.

Sincerely,
TIERRA, INC.

Matthew A. Korn, EI
Staff Professional

Margaret A. Robertson, L.G.
Senior Engineering Geologist /
Branch Manager

1.0 PROJECT DESCRIPTION

Based on information obtained from the North Carolina Department of Transportation (NCDOT) Bridge Survey & Hydraulic Design Report dated March 3, 2005, a 3-span, 4-bent structure is proposed to replace the existing 2-span, 3-bent, timber deck bridge on steel I-beams. The proposed structure will be a 115 feet long by 22 feet wide, cored slab bridge. The new structure will replace the existing structure over Stony Fork Creek, along the same alignment. The proposed skew angle for all bents is 120 degrees.

To facilitate the construction of the new bridge, a detour bridge will be constructed approximately 25 to 30 feet downstream of the proposed bridge. The detour structure will be 100 feet long by 16 feet wide bridge. The proposed skew angle for each bent is 120 degrees.

2.0 SITE DESCRIPTION AND GEOLOGY

The project site is located along SR 1167 (Stony Fork Road) in a rural area 2.5 miles outside the town limits of Harley, North Carolina in Wilkes County. Stony Fork Creek flows southeast beneath Stony Fork Road into the Yadkin River approximately 11 miles downstream.

Topographically, the site is rolling to mountainous, ascending in elevation to the northwest. Stony Fork Creek was approximately 33 feet wide and 2 feet deep during our investigation. The existing floodplain is approximately 125 feet wide. Floodplain cover consists of shrubs, grasses, and small to large trees.

The project site is located in the Blue Ridge Physiographic Province of North Carolina, outside Harley, North Carolina. *The Geologic Map of North Carolina* (1985) shows the bridge site to be located within the gneisses of the Alligator Back Formation (Zabg). Rocks of this formation are Late Proterozoic to early Paleozoic in age and contain finely laminated to massive gneiss interlayered with schists, phyllite and amphibolite. The rocks encountered at the site consist of gneiss that has been injected with pegmatites. Therefore, the gneisses found do not look like typical finely laminated to massive Alligator Back Formation gneisses. In several cases, gneiss encountered appeared migmatitic, or only pegmatitic injections were encountered with layers of gneissic material. Schists and finely layered gneisses were also found in weathered and crystalline rock along the southern portion of the site.

Rock outcropping was observed across the site. However, due to extreme weathering of exposed rock faces, accurate dip and dip directions could only be obtained at Station 15+28, 55'LT of centerline (-L-) and at Station 15+89, 88'RT (-L-). Rock type consists of well-foliated fresh to weathered gneiss. Dip and dip direction measurements taken at these two outcrops have a general dip angle from 6 to 15 degrees, with a dip direction of 300 to 340 degrees. The contact zone between the nearby Fork Ridge Fault and the synclorium in the Alligator Back formation is a low angle thrust sheet reverse fault with the site located on the upper plate. Dip direction reflects the reverse fault direction to the north-northwest.

3.0 FIELD EVALUATION PROCEDURE

Subsurface conditions were evaluated for the proposed structure by advancing eight soil test borings. Two borings per bent were drilled near proposed bent centerlines in July and August 2005. Additionally, two borings along the centerline of the detour structure were performed. Borings EB1B and B1B were offset due to existing slopes. Soil test borings were drilled utilizing a track-mounted Diedrich D-50 rig with an automatic hammer. Borings were drilled using a 3-inch tricone wash rotary method and a continuous sampling method. Standard penetration tests were performed at regular intervals, in accordance with American Association of State Highway Transportation Officials (AASHTO T-206-03), and North Carolina Department of Transportation (NCDOT) latest Geotechnical Guidelines and Procedures Manual. Rock coring was conducted beneath all bent locations and was performed in accordance with (AASHTO T-225-83 (2000) procedure utilizing a 2.5-inch diameter HQ size core barrel.

In addition to our subsurface investigation, a visual scour evaluation was performed along the channel and banks of Stony Fork Creek to determine scour impact for foundation design purposes. The field scour report was electronically submitted August 12, 2005.

Groundwater measurements were recorded within each borehole utilizing a weighted 100-foot tape from a survey reference location at the top of each boring. Readings were recorded immediately after boring termination and after a 24-hour waiting period. Borings B1B and EB2B were performed in the road and therefore were backfilled immediately upon termination.

4.0 LABORATORY TESTING

Representative split-spoon samples were selected from soil test borings to verify visual field classification and determine soil index properties. Six split-spoon samples and 1 grab sample were analyzed in our laboratory for Atterberg limits, and grain size with hydrometer analysis. One sample was tested to determine natural moisture. Two alluvial samples were analyzed for grain size determination to assist the NCDOT in theoretical scour elevations. Three rock core samples were analyzed in our laboratory for unconfined compression strength and Young's Modulus. All testing was performed in accordance with the following American Society for Testing and Materials (ASTM), NCDOT Modified and/or AASHTO procedures:

- AASHTO T-88-00 (As Modified) "Particle Size Analysis of Soil"
- AASHTO T-89-02 (As Modified) "Determining the Liquid Limits of Soil"
- AASHTO T-90-00 "Determining the Plastic Limit and Plasticity of Soils"
- AASHTO T-265-93 (2000) "Laboratory Determination of Moisture Content of Soils"
- ASTM D 1140-97 "Amount of Material in Soils Finer than the #200 Sieve"
- ASTM D 2938-95 "Unconfined Compressive Strength of Intact Rock Core"
- ASTM D 3148-02 "Elastic Moduli of Intact Rock Core in Uniaxial Compression"

5.0 SUBSURFACE AND GROUNDWATER CONDITIONS

5.1 End Bents

Soils beneath End Bent 1 and 2 consist of roadway embankment, alluvium deposits and residual material. Roadway embankment consists of 1.5 to 4.2 feet of medium dense gravelly silty sands (A-1-b, A-2-4). Alluvium deposits were encountered beneath EB2A, consisting of 2.6 feet of loose sands (A-1-b). Beneath End Bent 1, roadway embankment is underlain by residual soils, at approximate elevations of 1956 and 1954 feet Mean Sea Level (MSL). The average thickness of the residual layer is 12 feet beneath End Bent 1. Residual soils consist of medium dense to very dense silty sand (A-1-b) and stiff to very stiff sandy silt (A-4). Residual soils directly overlie weathered gneiss beneath EB1B at elevation 1940 feet (MSL).

A layer of boulders and concrete was penetrated in boring EB2B. This layer exists at approximately 2 feet beneath existing ground surfaces and is approximately 3.5 feet thick.

Crystalline rock, was encountered at varying elevations between 1956 and 1930 feet (MSL), consisting of felsic gneiss. Recoveries (REC) range from 91 to 100 percent. A majority of the rock is moderately severely weathered to fresh, soft to very hard, and very close to widely fractured. Strata rock quality designation (RQD) is between 12 and 100 percent and typically increases with depth.

The following table summarizes approximate (MSL) rock elevations across the end bents.

Location	Boring Elevation (ft)	WR Elevation (ft)	CR Elevation (ft)
EB1A	1958.0	N/A	1946.0
EB1B	1958.1	1939.8	1929.5
EB2A	1958.2	N/A	1955.6
EB2B	1958.6	N/A	1952.9

5.2 Interior Bents

Soils beneath Bent 1 consist of roadway embankment and residual material. Roadway embankment consists of 4.5 to 8.2 feet of dense to loose gravelly silty sand (A-1-b). A 0.5-foot residual layer, of dense gravelly sand (A-1-b) underlies roadway embankment in B1A. Residual material directly overlies a thin layer of weathered gneiss at elevation 1952.5 feet (MSL).

Soils beneath Bent 2 consist of alluvium deposits. The thickness of the alluvium layer is approximately 2 feet. Alluvium deposits consist of very loose gravelly sand (A-1-b). Alluvium deposits directly overlie (CR) gneiss, between elevations 1952 and 1949 feet (MSL).

Crystalline rock exists at varying elevations between elevation 1952 and 1949 feet (MSL) consisting of felsic gneiss with (REC) between 74 and 100 percent. A majority of the rock is moderately severely weathered to fresh, moderately hard to very hard, and very close to widely fractured. Rock quality is between 42 and 100 percent and typically increases with depth.

Location	Boring Elevation (ft)	WR Elevation (ft)	CR Elevation (ft)
B1A	1957.5	1952.5	1952.2
B1B	1958.1	N/A	1949.9
B2A	1953.9	N/A	1952.0
B2B	1951.0	N/A	1949.0

5.3 Detour Bents

Soils beneath End Bents 1 and 2 consist of alluvium and residual material. Alluvium soils vary in thickness from 6 feet at DET-1 to 0.5 feet at DET-2 and consist of loose to dense gravelly sand (A-1-b). Alluvial soils are underlain by residual soils beneath DET-1, at approximately 1949 feet (MSL). Residual soils consist of dense to very dense sand (A-1-b).

Crystalline rock (CR), was encountered at varying elevations between 1952 and 1944 feet (MSL) consisting of gneiss and pegmatite. Zones of weathered schist were typically penetrated between crystalline rock strata. Recoveries ranged from 95 to 100 percent. A majority of the rock is moderately severely weathered to fresh, moderately hard to very hard, and very close to widely fractured. Rock quality ranges from 40 to 86 percent and increases with depth.

Location	Boring Elevation (ft)	WR Elevation (ft)	CR Elevation (ft)
DET-1	1955.3	N/A	1944.5
DET-2	1953.1	N/A	1952.5

5.4 Groundwater

Groundwater across the site ranges in elevation between 1955 and 1944 feet (MSL). Surface water elevation within Stony Fork Creek, at the time of the investigation, was approximately 1949 feet (MSL).

6.0 NOTES TO DESIGNER

Based on our field exploration the following conditions may impact design and construction of the proposed structure. Therefore the designer should be aware of the following subsurface conditions:

- Boulders and concrete were penetrated at shallow depths in boring EB2B, between elevations 1956.4 and 1952.9 (MSL).
- Crystalline rock was penetrated within 3 feet of the existing ground surface, at elevation 1955.6 (MSL), in boring EB2A.
- Crystalline rock exists less than 1 foot beneath existing ground surface at DET-2, at elevation 1952.5 (MSL).

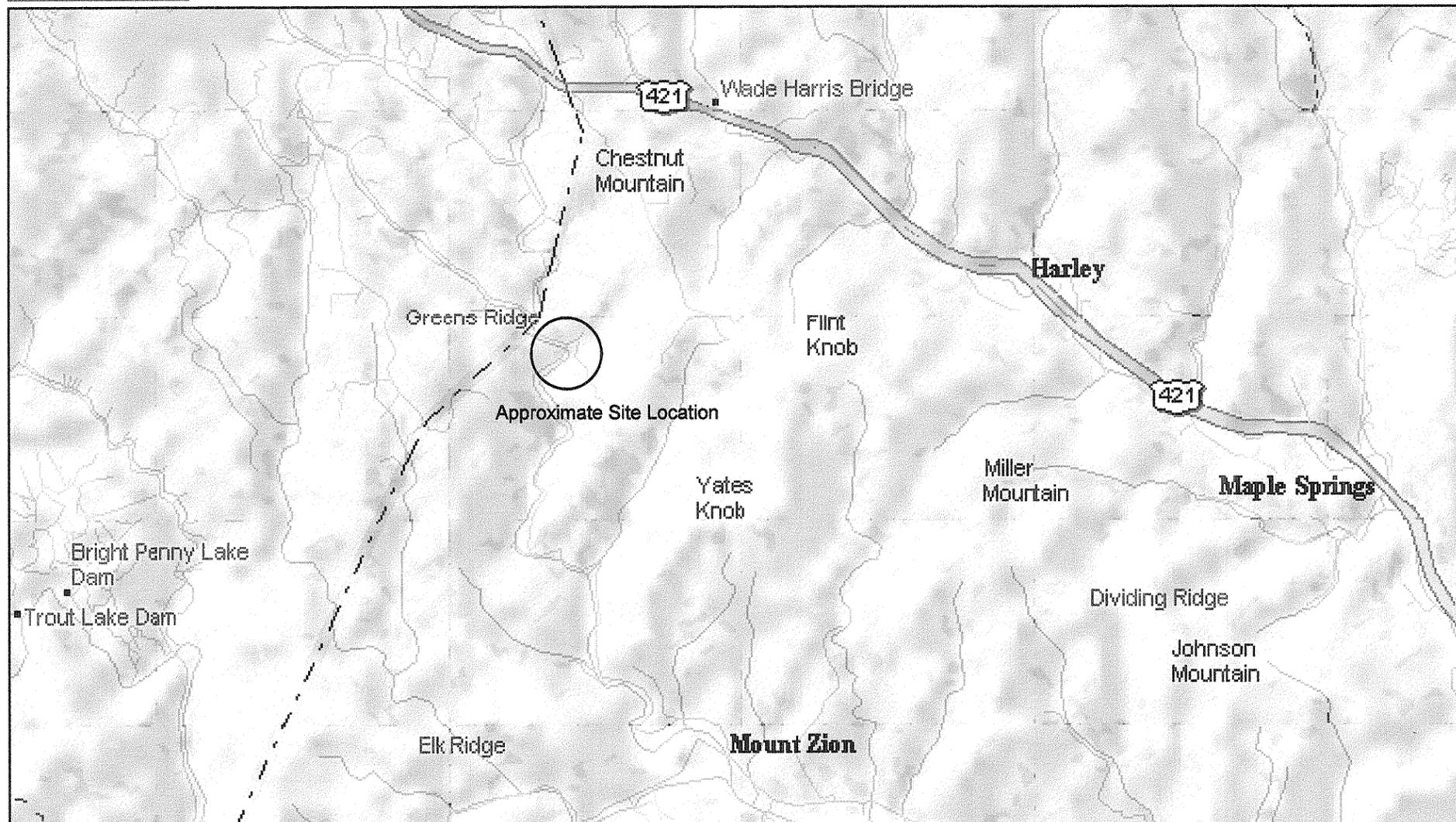
- Static groundwater was measured, near existing ground surfaces beneath Bent 2 and End Bent 2, between elevations 1954.9 and 1950.1 (MSL).

7.0 CLOSURE

Notes to the designer and evaluations provided by Tierra, Inc. are based on the Hydraulic Design Report dated March 3, 2005, provided by NCDOT. Modifications to our report may be required if there are changes to the design or location of the proposed structure. Notes to the designer in this report are based on data obtained from soil borings. The nature and extent of variations between borings may not become evident until construction.

DeLORME

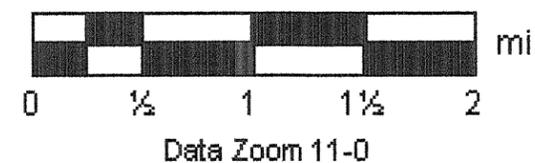
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Data use subject to license.

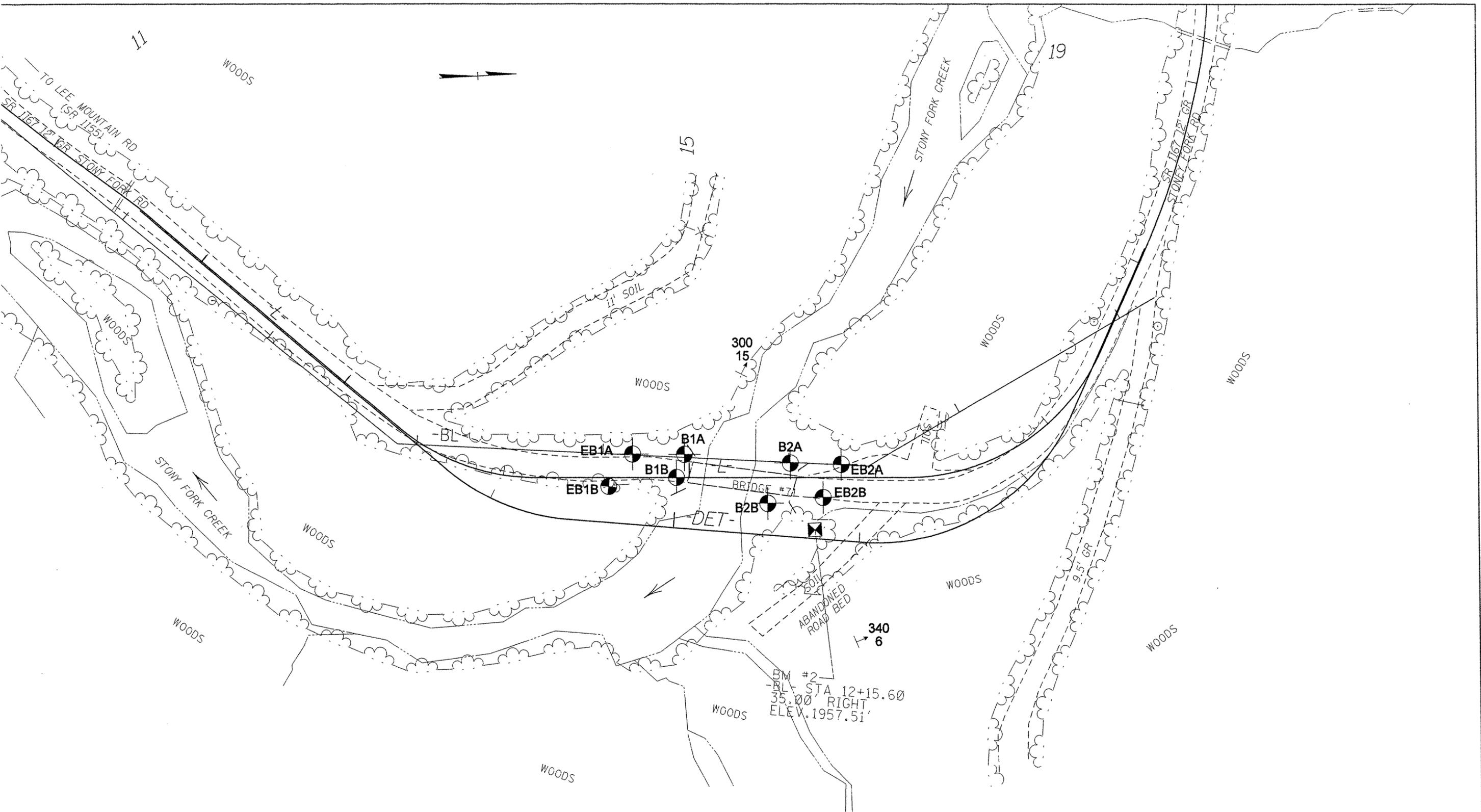
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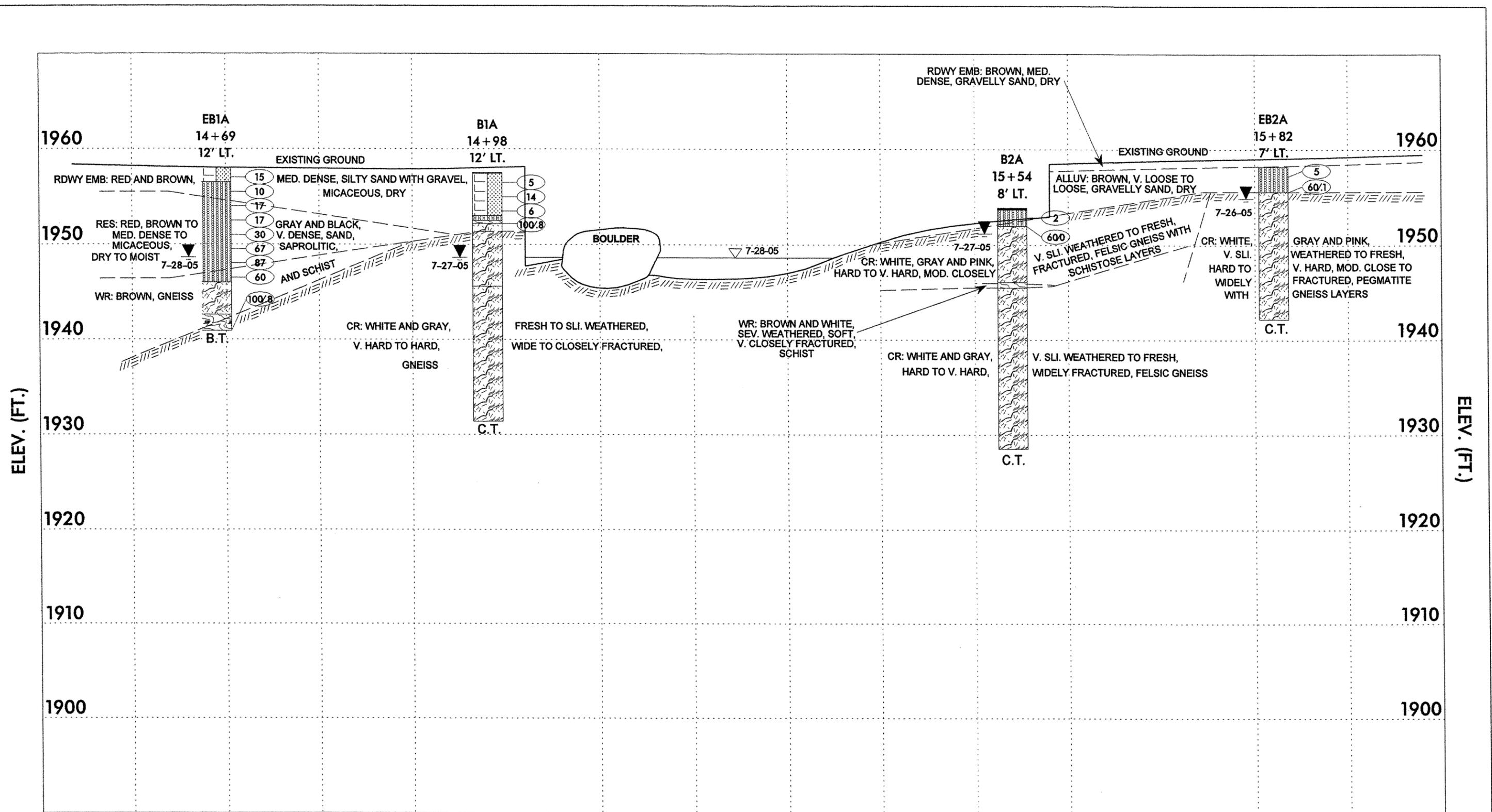
SITE VICINITY MAP

Bridge No. 71 Over Stony Fork Creek
 on SR 1167 (Stony Fork Road)
 Wilkes Co., North Carolina
 TIP: B-4322 State Project: 33659.1.1



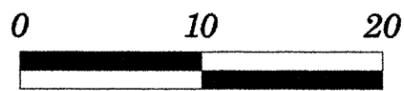
NOTES
 BENCH MARK: -BL- STA 12+15.60, 35.0' RIGHT, ELEVATION 1957.51'
 PLANS ADOPTED FROM FILES RECIEVED FROM NCDOT DATED 7-12-05
 PROPOSED BRIDGE SKEW: 120°

BORING LOCATION PLAN
 Bridge No. 71 over Stony Fork Creek
 on SR 1167 (Stony Fork Rd.)
 Wilkes County, North Carolina
 TIP No: B-4322 State Project: 33659.1.1
 Tierra Project No.: 6211-05-027

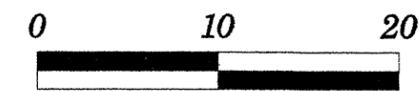


BENCH MARK: -BL- STA. 12+15.60, 35.0' RIGHT, ELEVATION 1957.61'

VERTICAL SCALE

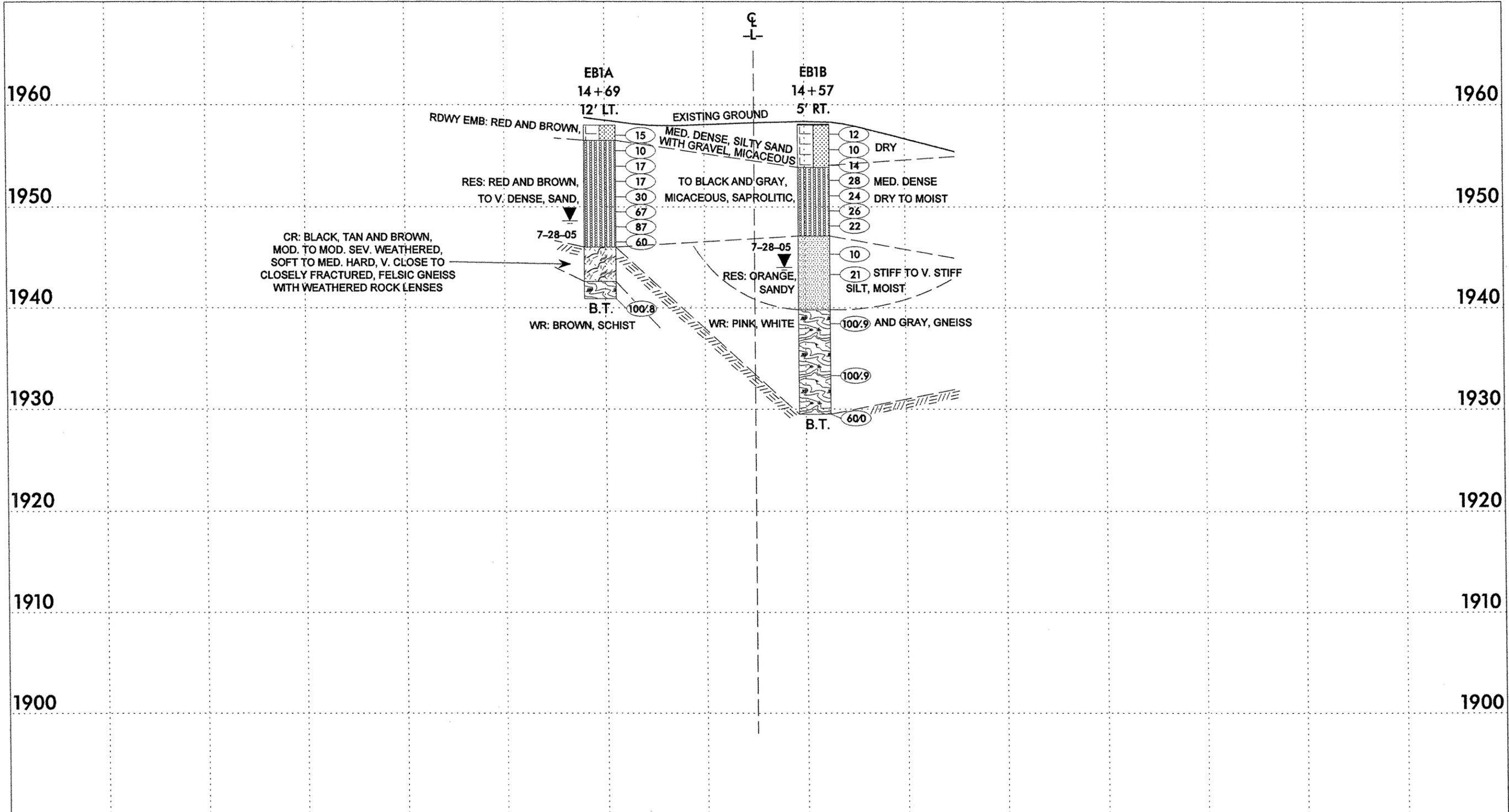


HORIZONTAL SCALE



Profile 7' Left of -L-

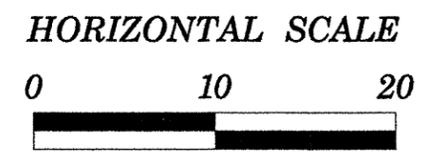
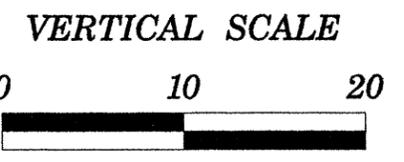
Bridge No. 71 Over Stony Fork Creek
 on SR 1167 (Stony Fork Road)
 Wilkes County, North Carolina
 TIP No: B-4322 State Project: 33659.1.1
 Tierra Project: 6211-05-027



ELEV. (FT.)

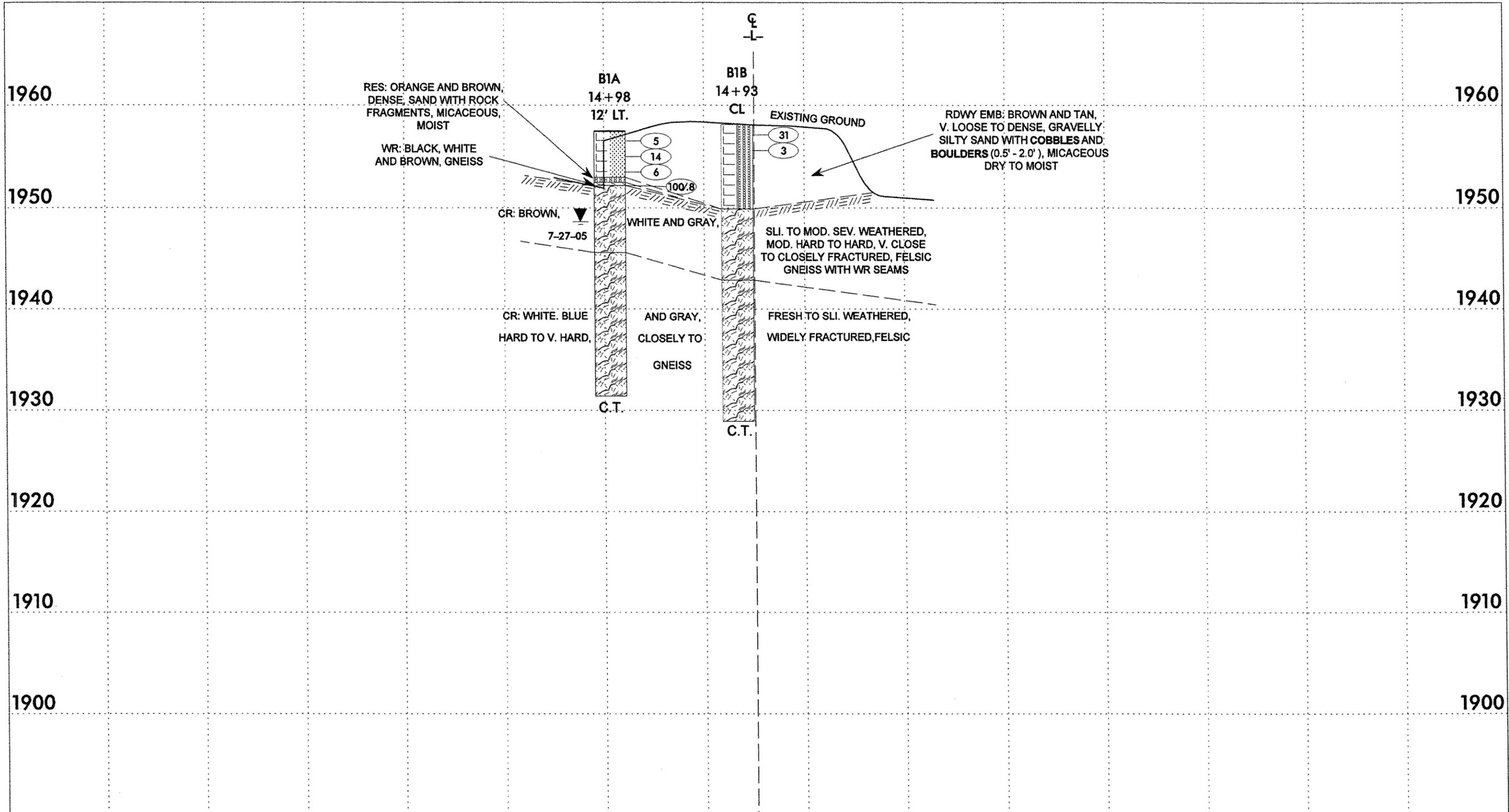
ELEV. (FT.)

BENCH MARK: -BL- STA. 12+15.60, 35.0' RIGHT,
ELEVATION 1957.61'



Cross Section End Bent 1

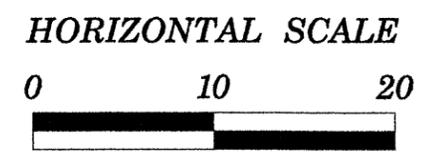
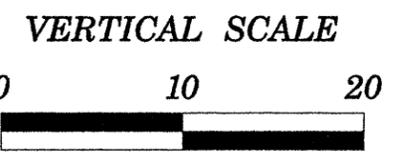
Bridge No. 71 Over Stony Fork Creek
on SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322 State Project: 33659.1.1
Tierra Project: 6211-05-027



ELEV. (FT.)

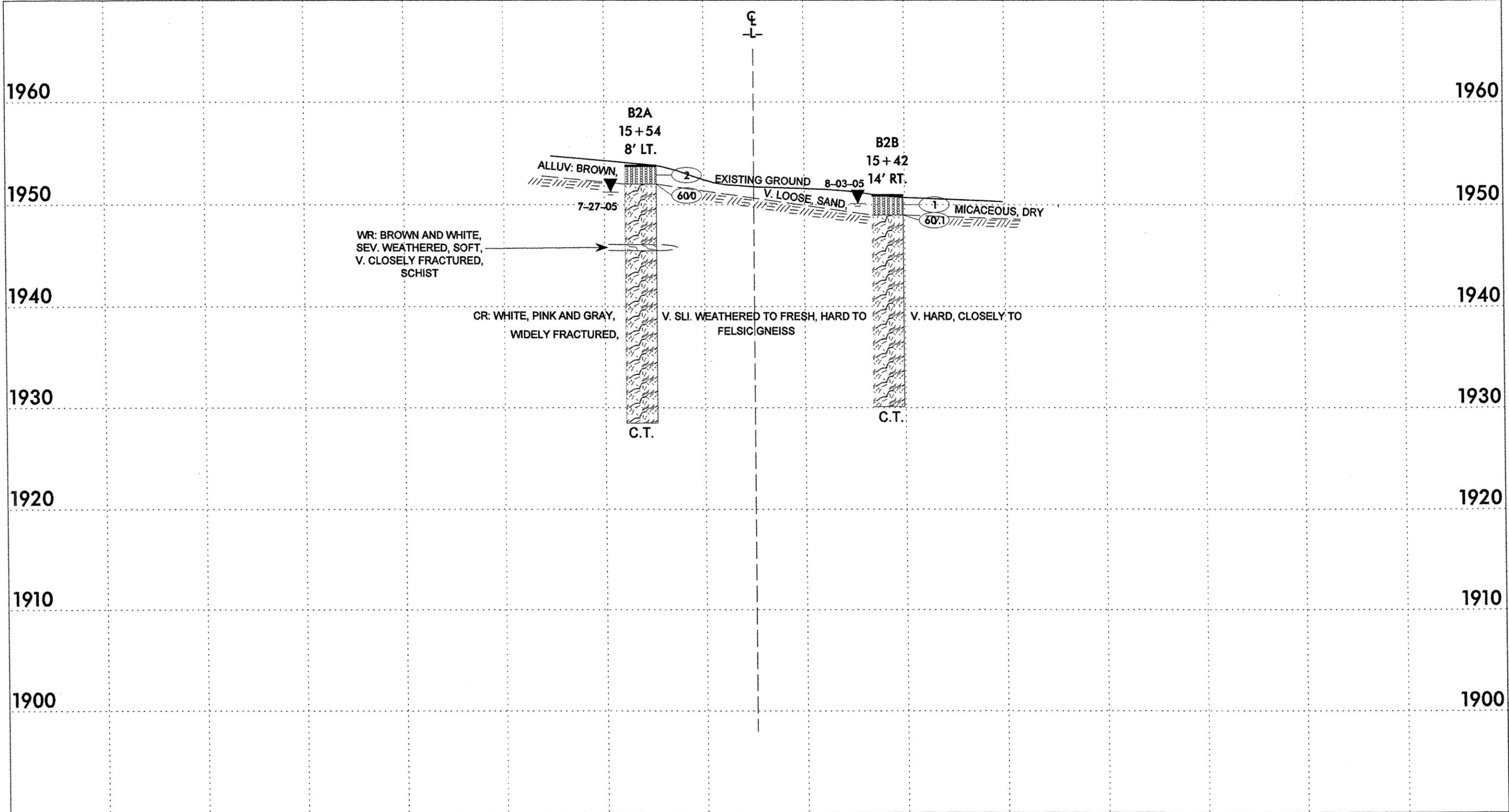
ELEV. (FT.)

BENCH MARK: -BL- STA. 12 + 15.60, 35.0' RIGHT,
ELEVATION 1957.61'



Cross Section Bent 1

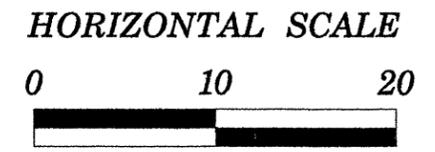
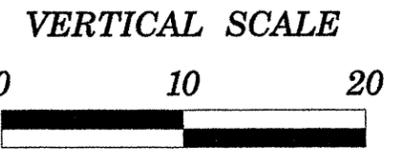
Bridge No. 71 Over Stony Fork Creek
on SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322 State Project: 33659.1.1
Tierra Project: 6211-05-027



ELEV. (FT.)

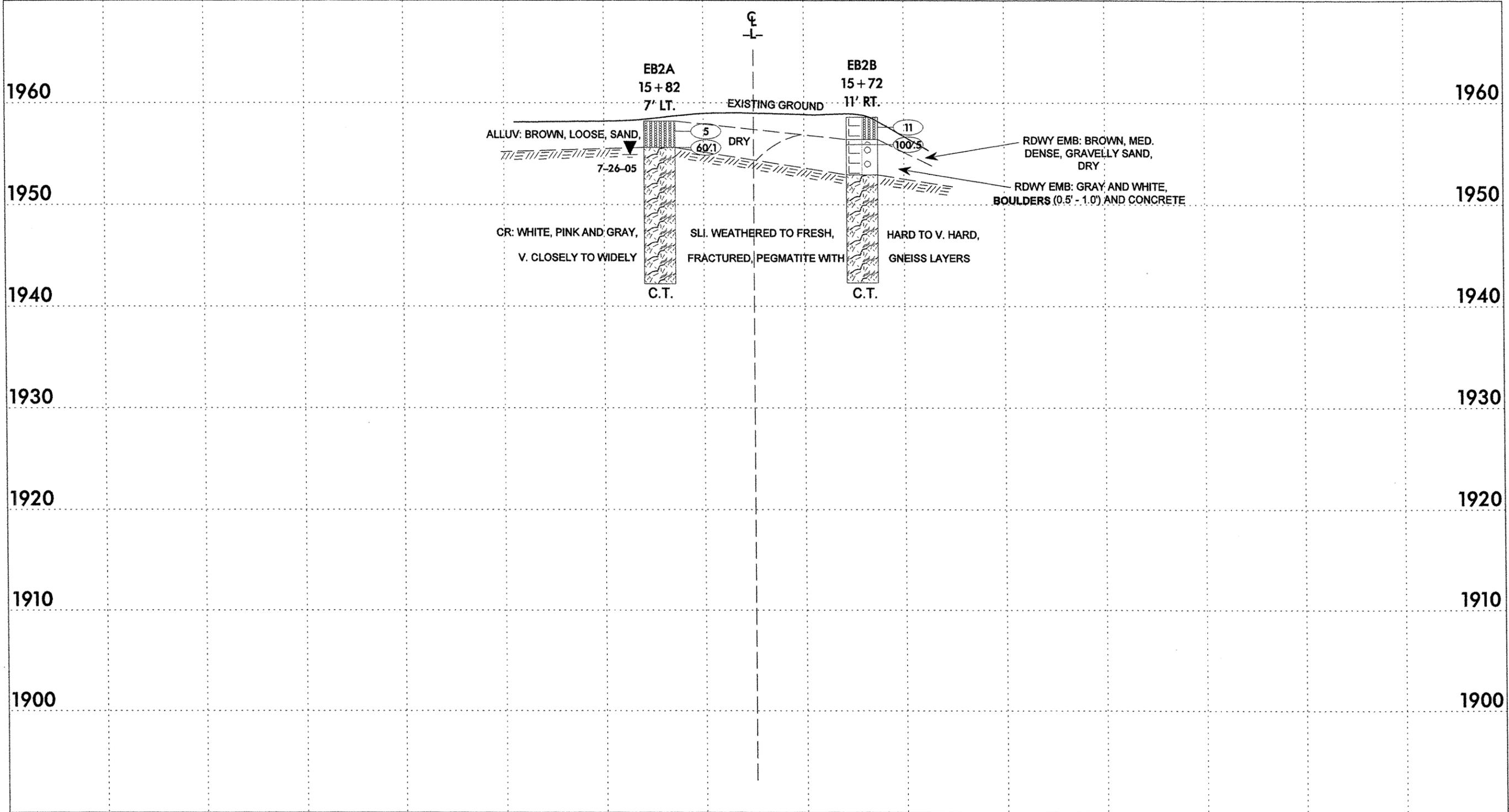
ELEV. (FT.)

BENCH MARK: -BL- STA. 12+15.60, 35.0' RIGHT,
ELEVATION 1957.61'



Cross Section Bent 2

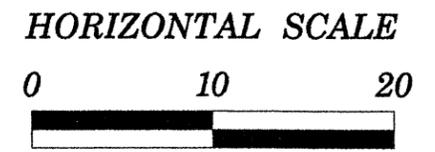
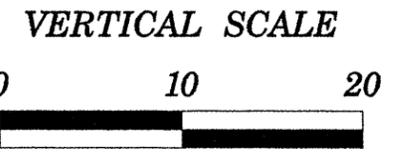
Bridge No. 71 Over Stony Fork Creek
on SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322 State Project: 33659.1.1
Tierra Project: 6211-05-027



ELEV. (FT.)

ELEV. (FT.)

BENCH MARK: -BL- STA. 12+15.60, 35.0' RIGHT,
ELEVATION 1957.61'



Cross Section End Bent 2

Bridge No. 71 Over Stony Fork Creek
on SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322 State Project: 33659.1.1
Tierra Project: 6211-05-027



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N.C.D.O.T. GEOTECHNICAL UNIT
 BORING LOG

SHEET 1 OF 1

PROJECT NO. 33659.1.1		ID. B-4322		COUNTY WILKES		GEOLOGIST C. BRUINSMA						
SITE DESCRIPTION BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)						GROUND WATER (ft)						
BORING NO. EB1A		BORING LOCATION 14+69		OFFSET 12' LT.		ALIGNMENT -L-						
COLLAR ELEV. 1958.0 ft		NORTHING 895,914.9		EASTING 1,273,228.1		0 HR. 7.2						
TOTAL DEPTH 17.1 ft		DRILL MACHINE DIEDRICH 50		DRILL METHOD WASH ROTARY		HAMMER TYPE AUTO						
DATE STARTED 7-27-05		COMPLETED 7-27-05		SURFACE WATER DEPTH N/A								
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION
		0.5ft	0.5ft	0.5ft	0	20	40	60	80			
1958.0	0.0	9	7	8	EXISTING GROUND					SS-1	D	RDWY EMB: RED AND BROWN, MED. DENSE, SILTY SAND (A-2-4) WITH GRAVEL, MICACEOUS
	1.5	5	5	5							D	RES: RED AND BROWN, MED. DENSE TO V. DENSE, SAND (A-1-b) MICACEOUS, SAPROLITIC
1955	3.0	7	7	10							M	
	4.5	7	8	9							M	
	6.0	7	13	17							M	
1950	7.5	24	42	25							M	
	9.0	16	14	73							M	
	10.5	31	16	44							M	
1945												CR: BLACK, TAN AND BROWN, MOD. TO MOD. SEV. WEATHERED, SOFT TO MOD. HARD, V. CLOSE TO CLOSELY FRACTURED, FELSIC GNEISS WITH WEATHERED ROCK LENSES
	16.3	42	58/3									WR: BROWN, SCHIST
												BORING TERMINATED AT ELEV. 1940.9' IN WR: BROWN, SCHIST

CORE BORING REPORT

DATE: 7-27-05

PROJECT: 33659.1.1 I.D. NO.: B-4322 BORING NO: EB1A GEOLOGIST: C. BRUINSMA

DESCRIPTION: BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)

COUNTY: WILKES COLLAR ELEV.: 1958.0 FT TOTAL DEPTH: 17.1 FT

ELEV. (FT)	DEPTH (FT)	DRILL RATE MIN/FT	RUN (FT)	REC FT %	RQD FT %	SAMP #	FIELD CLASSIFICATION AND REMARKS
1946.0	12.0	3:10	4.3	3.1/4.3	0.4/4.3		12.0-15.4 CR: BLACK, TAN AND BROWN, MOD. TO MOD. SEV. WEATHERED, SOFT TO MOD. HARD, V. CLOSE TO CLOSELY FRACTURED, FELSIC GNEISS WITH WEATHERED ROCK LENSES
		4:15					
		3:00					
		2:00					
1941.7	16.3	0:30/0.3		72.1%	9.3%		STRATA REC = 91.2% STRATA RQD = 11.8%
							15.4-16.3 WR: BROWN, SCHIST
							STRATA REC = 0.0% STRATA RQD = N/A

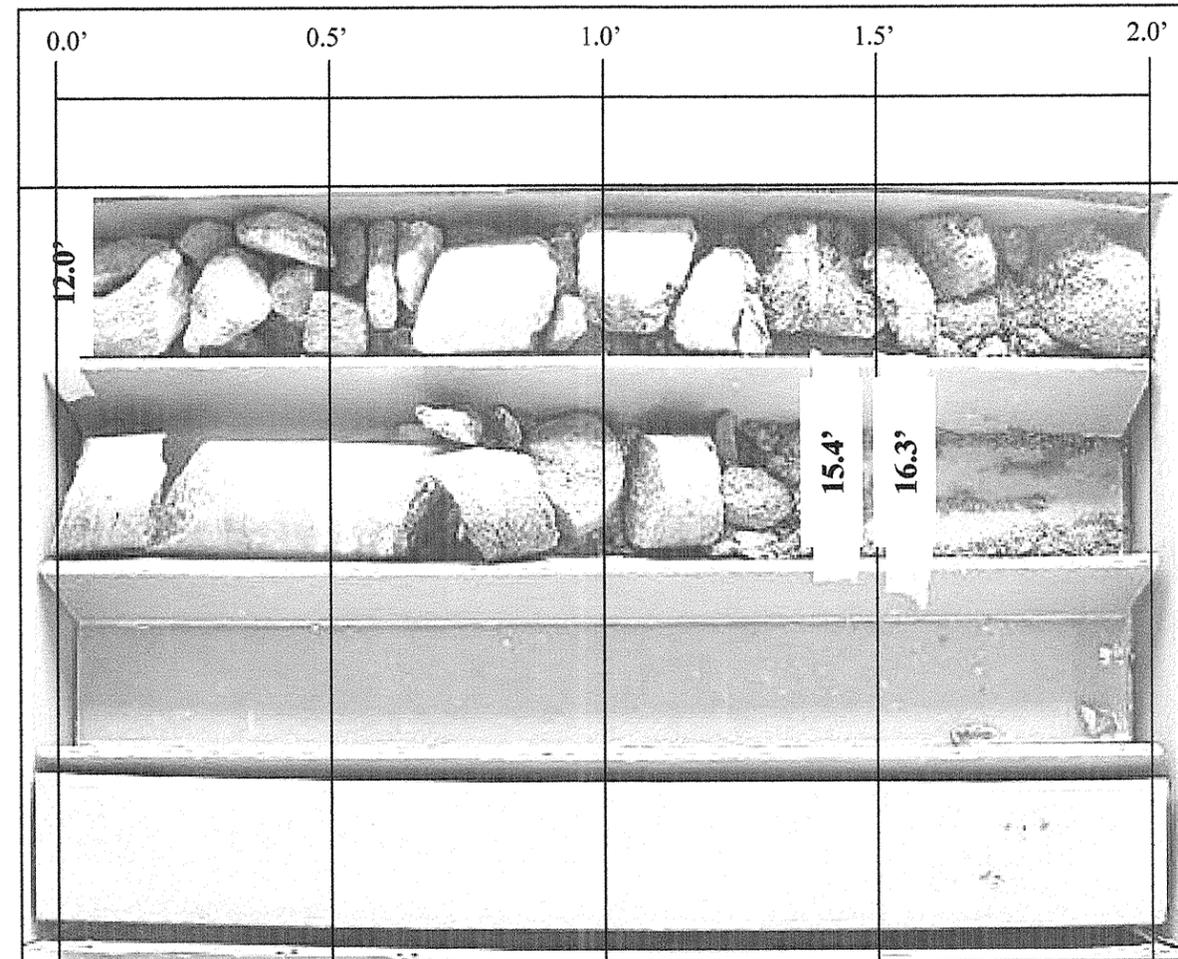
CORING TERMINATED AT 16.3 FT
 ELEVATION 1941.7 FT

DRILLER: F. COX

CORE SIZE: HQ

EQUIPMENT: DIEDRICH 50

NCDOT_BORE_VARIABLE_DEPTH_05-027_BR_71_WILKES_CO.GPJ - NCDOT.GDT_8/29/05

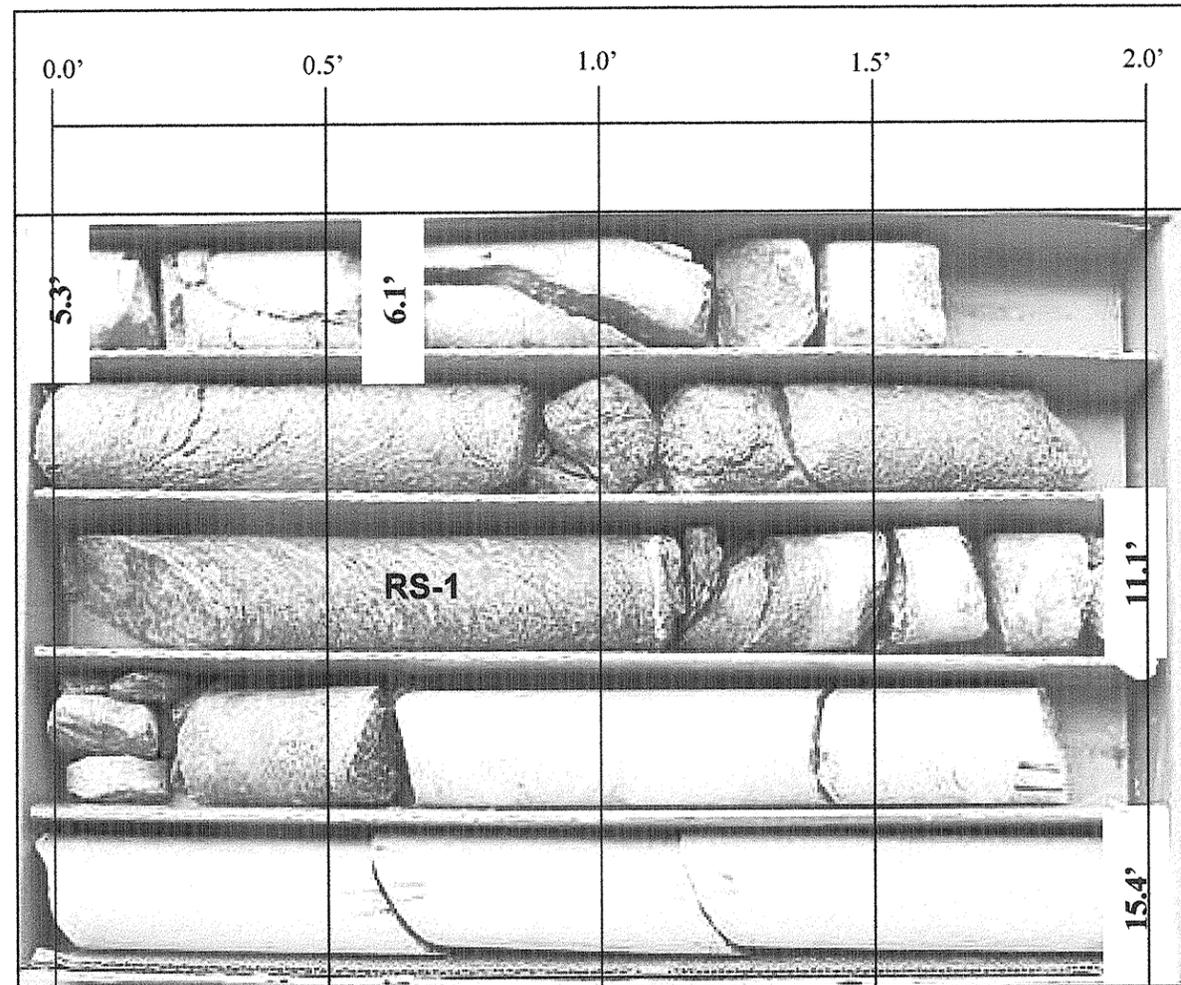


Boring EB1A, Box 1 of 1, 12.0 feet to 16.3 feet.

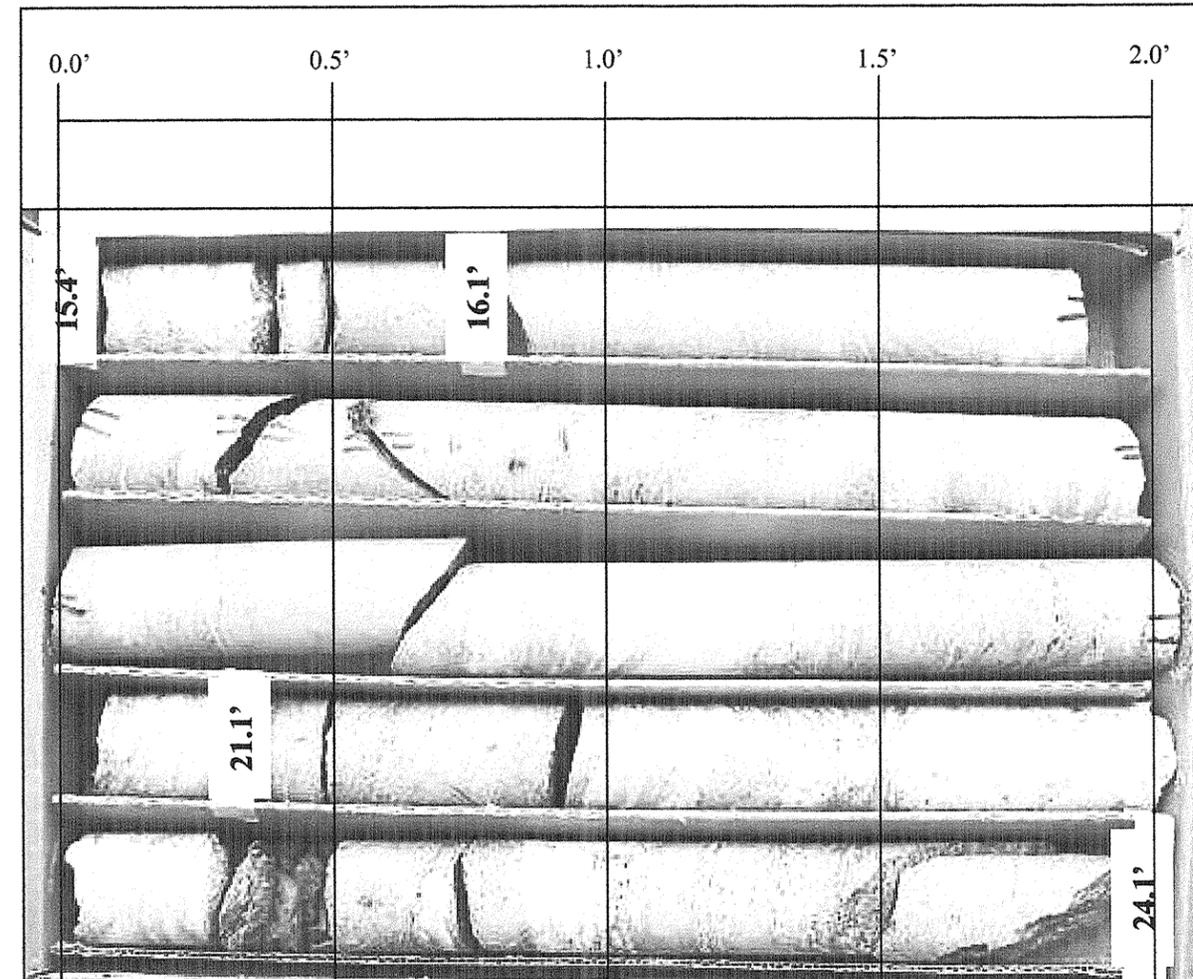
SCALE 1:40 (1"=4")

Rock Core Photographs

**Bridge Number 71 Over Stony Fork Creek
On SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322, State Project No: 33659.1.1**



Boring B1A, Box 1 of 3, 5.3 feet to 15.4 feet.

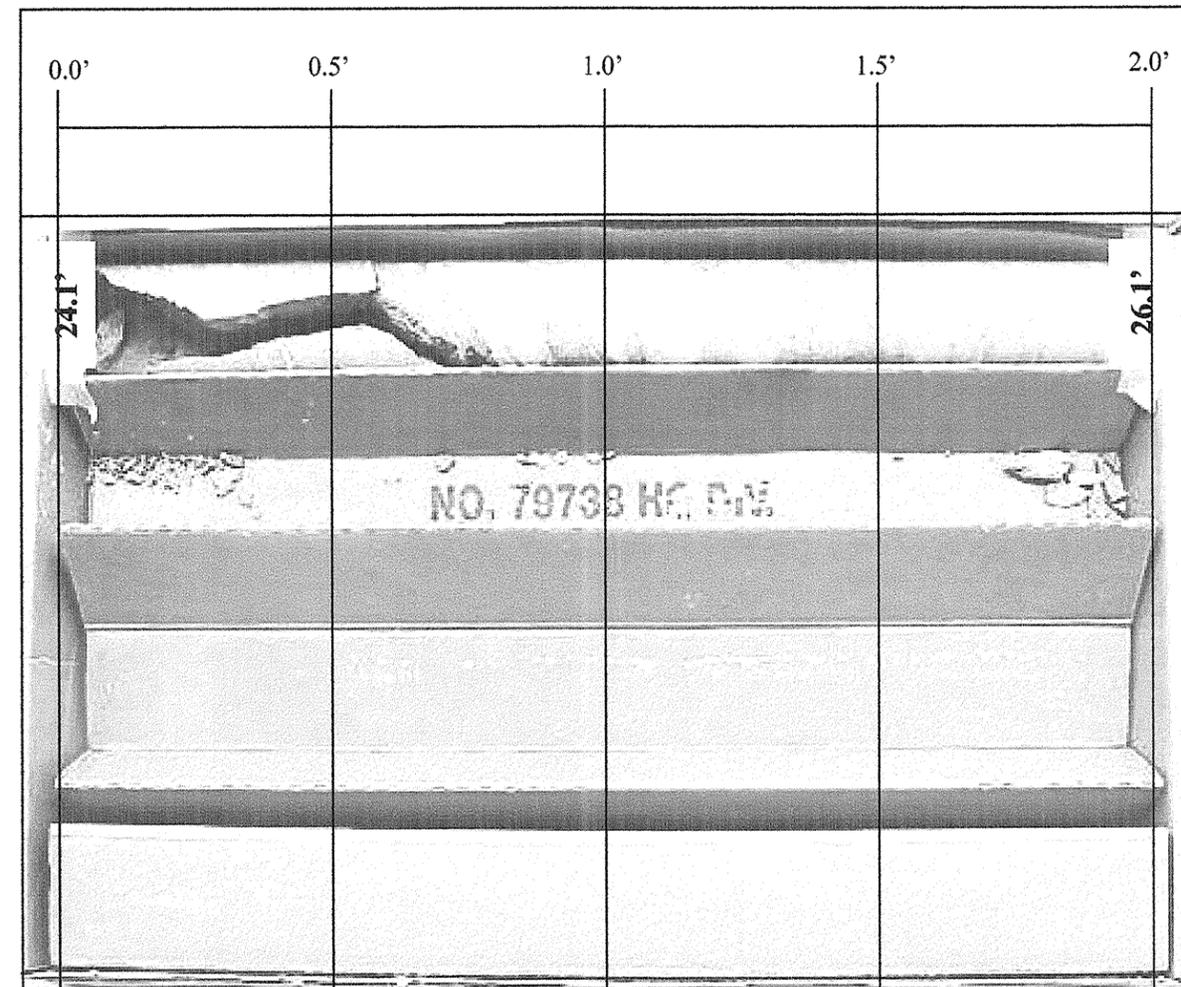


Boring B1A, Box 2 of 3, 15.4 feet to 24.1 feet.

SCALE 1:40 (1"=4")

Rock Core Photographs

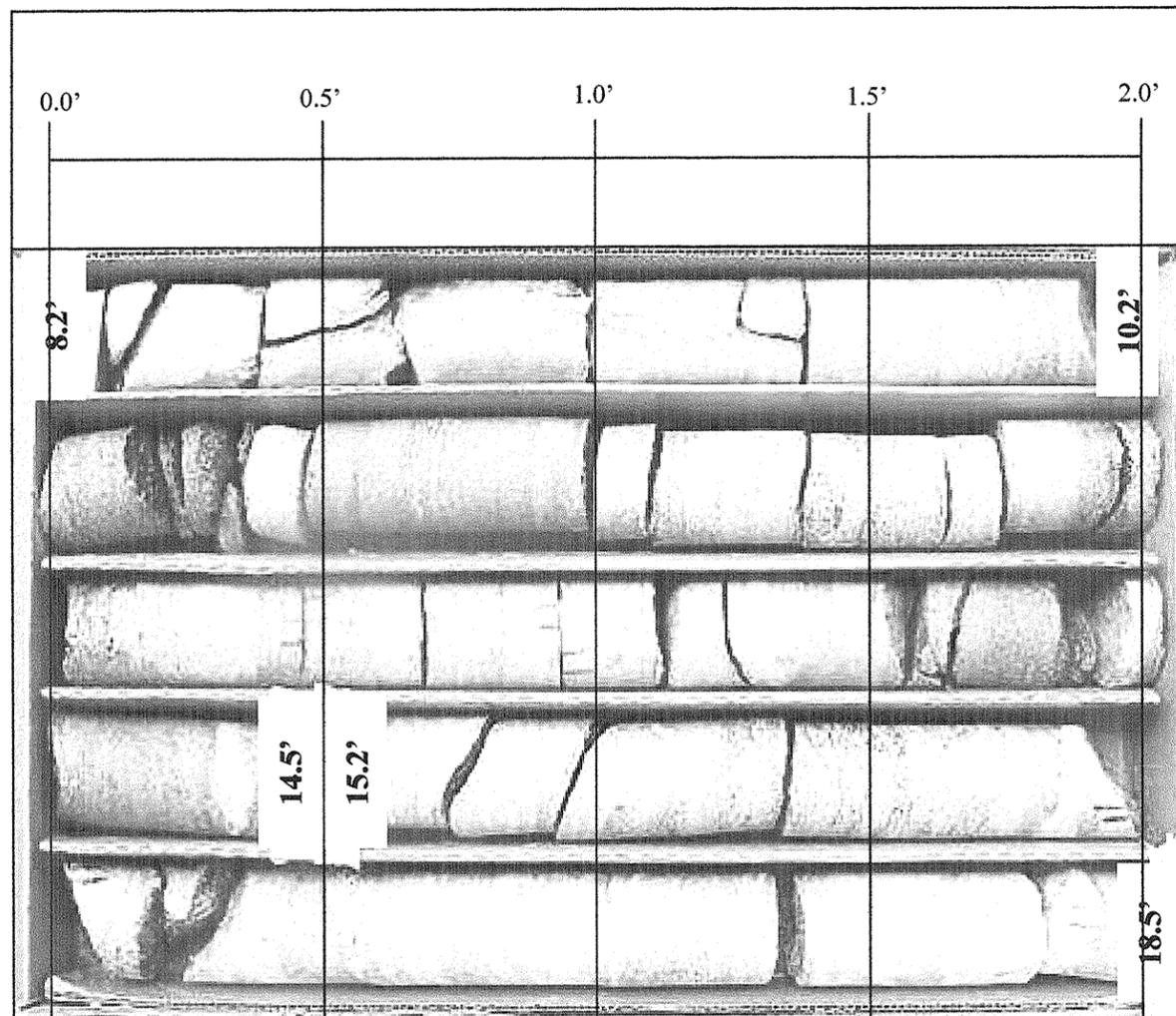
**Bridge Number 71 Over Stony Fork Creek
 On SR 1167 (Stony Fork Road)
 Wilkes County, North Carolina
 TIP No: B-4322, State Project No: 33659.1.1**



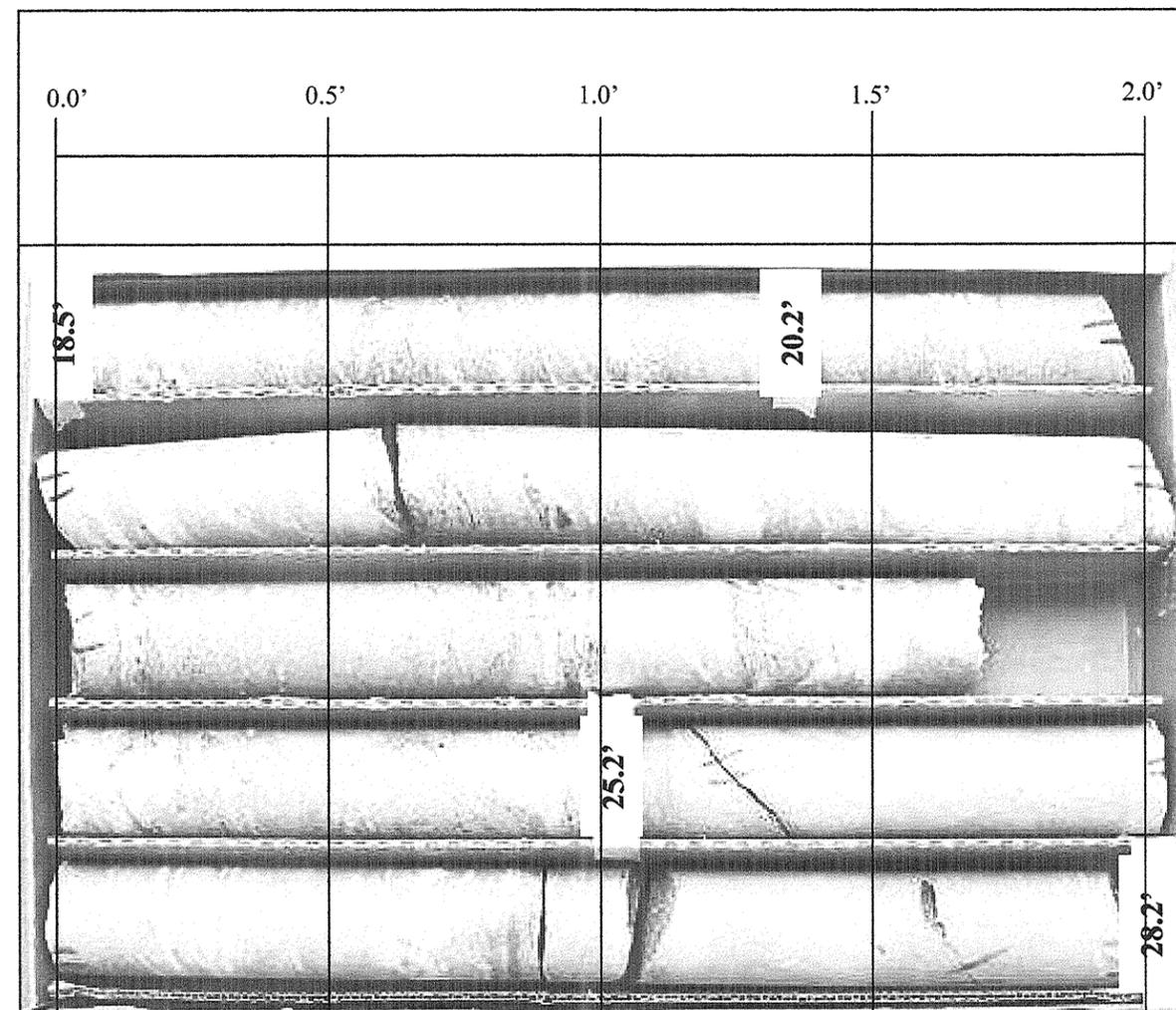
Boring B1A, Box 3 of 3, 24.1 feet to 26.1 feet.

SCALE 1:40 (1"=4")

Rock Core Photographs
Bridge Number 71 Over Stony Fork Creek On SR 1167 (Stony Fork Road) Wilkes County, North Carolina TIP No: B-4322, State Project No: 33659.1.1



Boring B1B, Box 1 of 3, 8.2 feet to 18.5 feet.

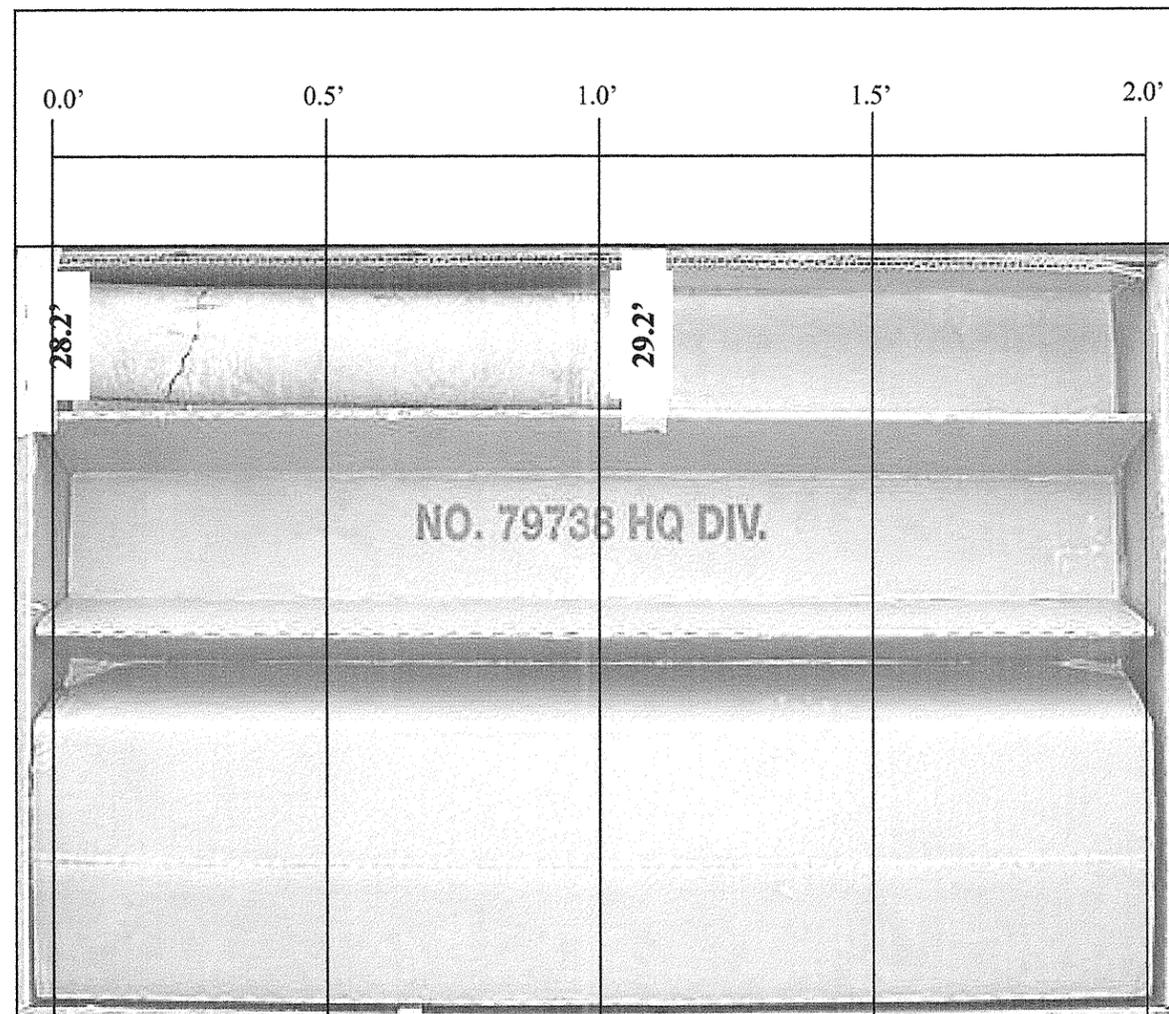


Boring B1B, Box 2 of 3, 18.5 feet to 28.2 feet.

SCALE 1:40 (1"=4")

Rock Core Photographs

**Bridge Number 71 Over Stony Fork Creek
On SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322, State Project No: 33659.1.1**



Boring B1B, Box 3 of 3, 28.2 feet to 29.2 feet.

SCALE 1:40 (1"=4")

Rock Core Photographs

**Bridge Number 71 Over Stony Fork Creek
On SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322, State Project No: 33659.1.1**



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 BORING LOG

SHEET 1 OF 1

PROJECT NO. 33659.1.1		ID. B-4322		COUNTY WILKES		GEOLOGIST C. BRUINSMA						
SITE DESCRIPTION BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)							GROUND WATER (ft)					
BORING NO. B2A		BORING LOCATION 15+54		OFFSET 8' LT.	ALIGNMENT -L-	0 HR. 1.9						
COLLAR ELEV. 1953.9 ft		NORTHING 895,999.3		EASTING 1,273,239.3		24 HR. 2.7						
TOTAL DEPTH 25.4 ft		DRILL MACHINE DIEDRICH 50		DRILL METHOD WASH ROTARY		HAMMER TYPE AUTO						
DATE STARTED 7-26-05		COMPLETED 7-26-05		SURFACE WATER DEPTH N/A								
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION
		0.5ft	0.5ft	0.5ft	0	20	40	60	80			
1953.90	0.00	1	1	1	EXISTING GROUND							
	1.90	60/0			60/0					SS-4	D	1953.70 ROOTMAT ALLUV: BROWN, V. LOOSE, GRAVELLY SAND (A-1-b) 1952.00
1950												CR: WHITE, GRAY AND PINK, V. SLI. WEATHERED TO FRESH, HARD TO V. HARD, MOD. CLOSELY FRACTURED, FELSIC GNEISS WITH SCHISTOSE LAYERS
1945										RS-2		1946.10 WR: BROWN AND WHITE, SEV. WEATHERED, SOFT, V. CLOSELY FRACTURED, SCHIST 1945.50 CR: WHITE AND GRAY, V. SLI. WEATHERED TO FRESH, HARD TO V. HARD, WIDELY FRACTURED, FELSIC GNEISS
1940												
1935												
1930												
												1928.50 CORING TERMINATED AT ELEV. 1928.5' IN CR: WHITE AND GRAY, FELSIC GNEISS

CORE BORING REPORT

DATE: 7-26-05

PROJECT: 33659.1.1 I.D. NO.: B-4322 BORING NO: B2A GEOLOGIST: C. BRUINSMA

DESCRIPTION: BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)

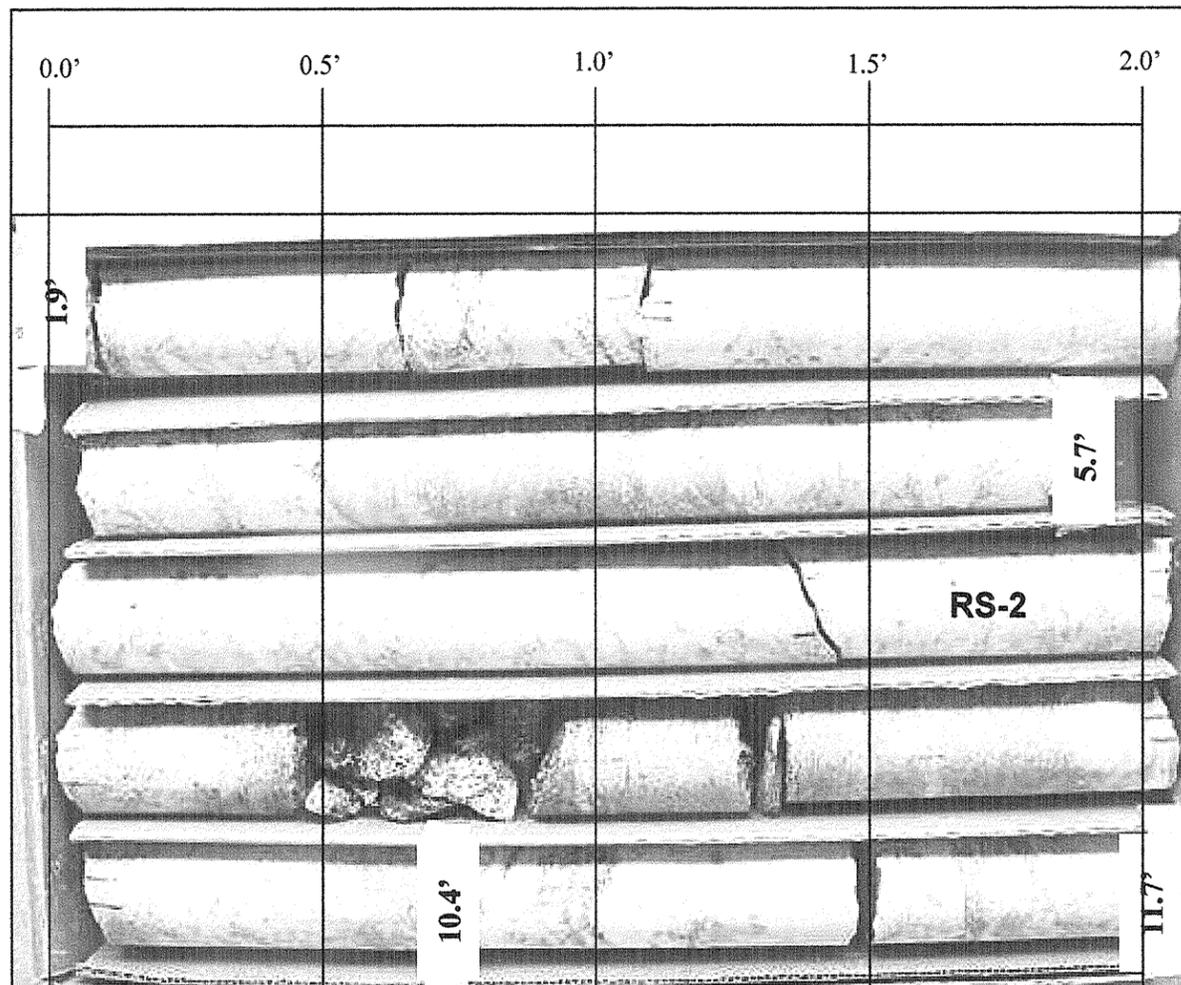
COUNTY: WILKES COLLAR ELEV.: 1953.9 FT TOTAL DEPTH: 25.4 FT

ELEV. (FT)	DEPTH (FT)	DRILL RATE MIN/FT	RUN (FT)	REC FT %	RQD FT %	SAMP #	FIELD CLASSIFICATION AND REMARKS
1952.0	1.9	7:45					1.9-7.8 CR: WHITE, GRAY AND PINK, V. SLI. WEATHERED TO FRESH, HARD TO V. HARD, MOD. CLOSELY FRACTURED, FELSIC GNEISS WITH SCHISTOSE LAYERS
		5:45		3.8/3.8	3.5/3.8		
		4:50	3.8	100%	92.1%		
		3:55/0.8					
1948.2	5.7						7.8-8.4 WR: BROWN AND WHITE, SEV. WEATHERED, SOFT, V. CLOSELY FRACTURED, SCHIST STRATA REC = 100% STRATA RQD = 98.3%
1948.2	5.7	6:10		4.7/4.7	4.1/4.7		
		6:00	4.7	100%	87.2%	RS-2	
		2:40					
1943.5	10.4	3:52/0.7					8.4-25.4 CR: WHITE AND GRAY, V. SLI. WEATHERED TO FRESH, HARD TO V. HARD, WIDELY FRACTURED, FELSIC GNEISS STRATA REC = 100% STRATA RQD = N/A
1943.5	10.4	6:30		5.0/5.0	5.0/5.0		
		6:15	5.0	100%	100%		
		6:10					
1938.5	15.4	11:20					STRATA REC = 100% STRATA RQD = 100%
1938.5	15.4	2:30		5.0/5.0	5.0/5.0		
		3:15	5.0	100%	100%		
		4:00					
1933.5	20.4	3:15					
1933.5	20.4	3:40		5.0/5.0	5.0/5.0		
		2:45	5.0	100%	100%		
		3:00					
1928.5	25.4	3:00					

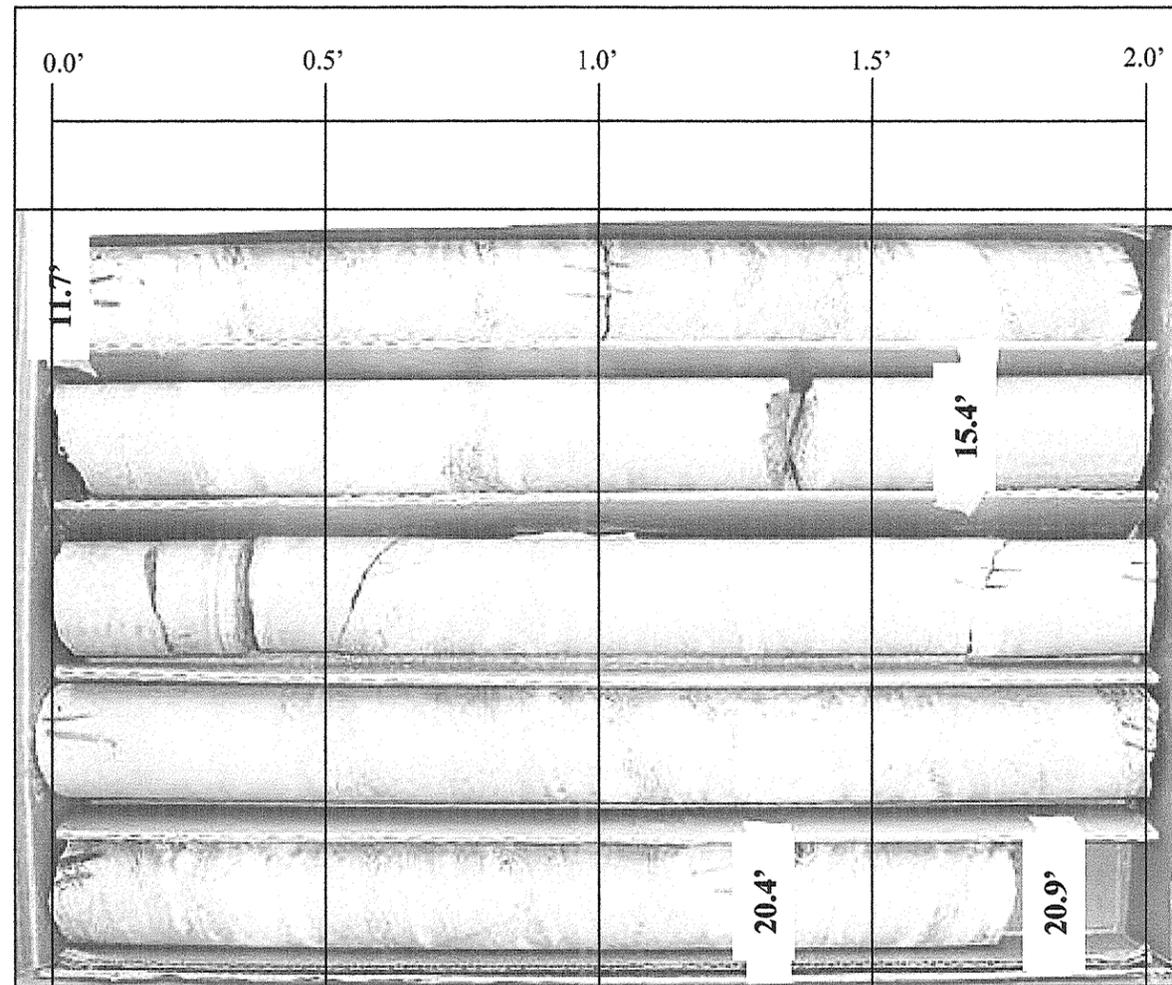
CORING TERMINATED AT 25.4 FT
 ELEVATION: 1928.5 FT

DRILLER: F. COX CORE SIZE: HQ EQUIPMENT: DIEDRICH 50

NCDOT_BORE_05-027_BR_71_WILKES_CO.GPJ NCDOT.GDT 8/26/05



Boring B2A, Box 1 of 3, 1.9 feet to 11.7 feet.

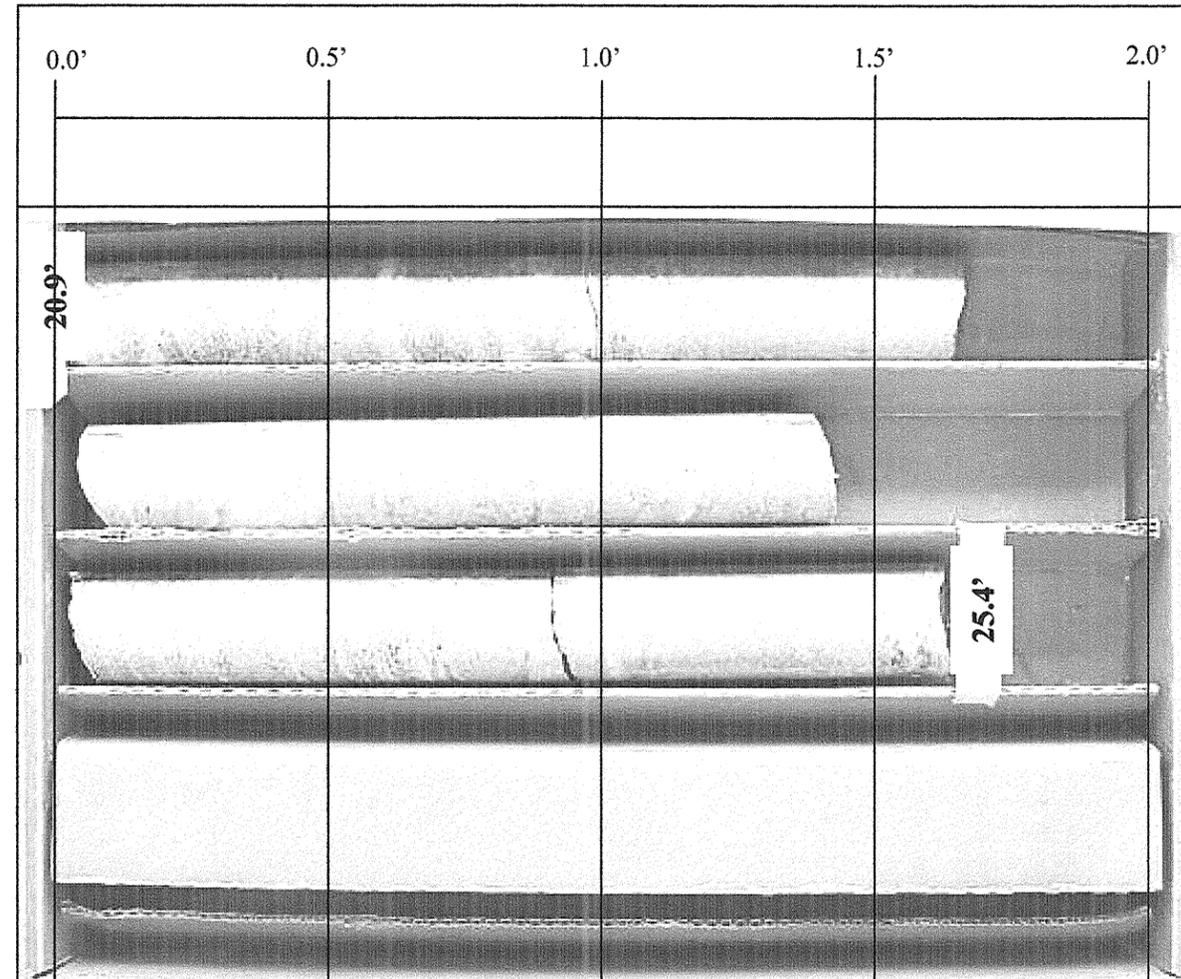


Boring B2A, Box 2 of 3, 11.7 feet to 20.9 feet.

SCALE 1:40 (1"=4")

Rock Core Photographs

**Bridge Number 71 Over Stony Fork Creek
On SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322, State Project No: 33659.1.1**

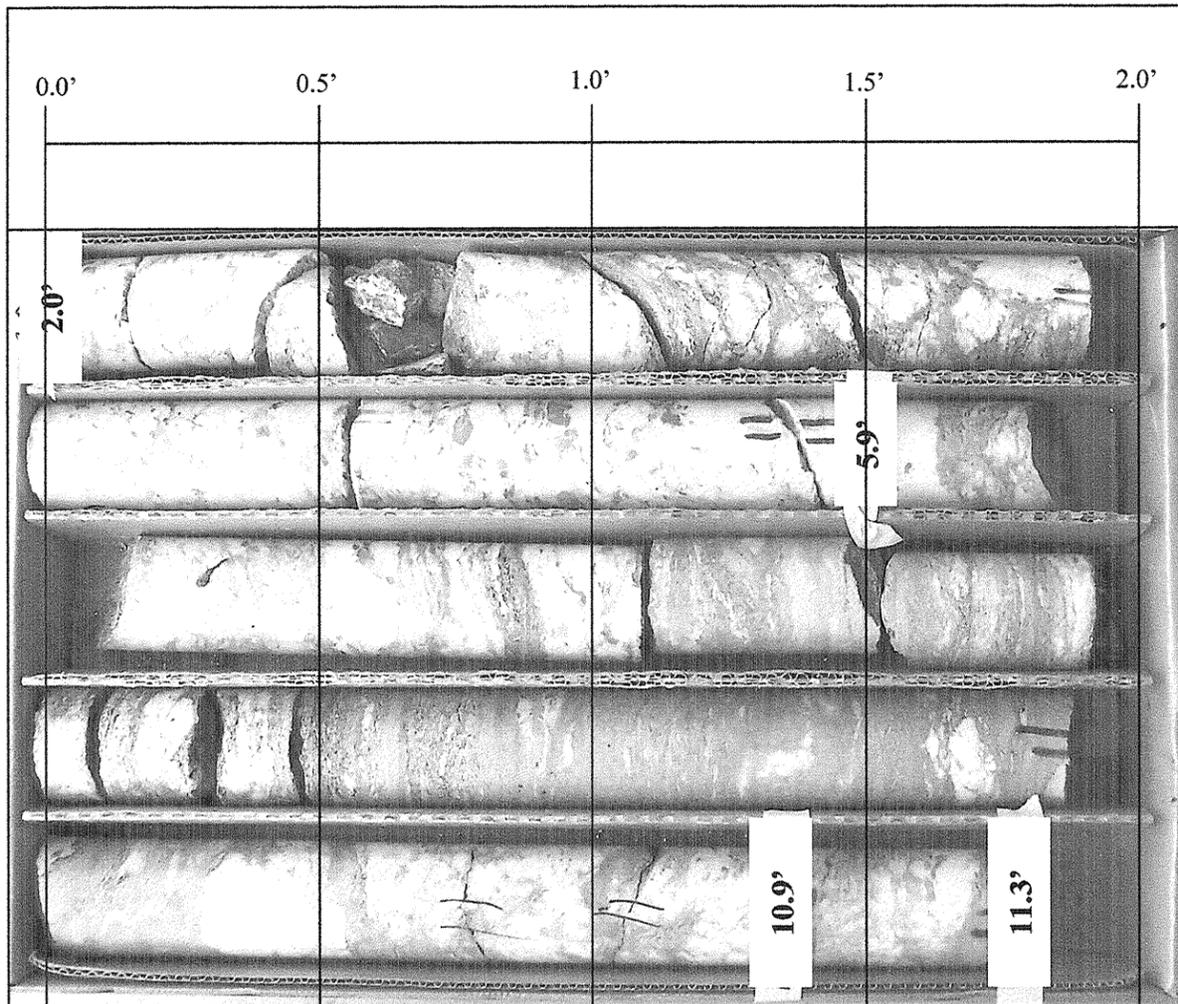


Boring B2A, Box 3 of 3, 20.9 feet to 25.4 feet.

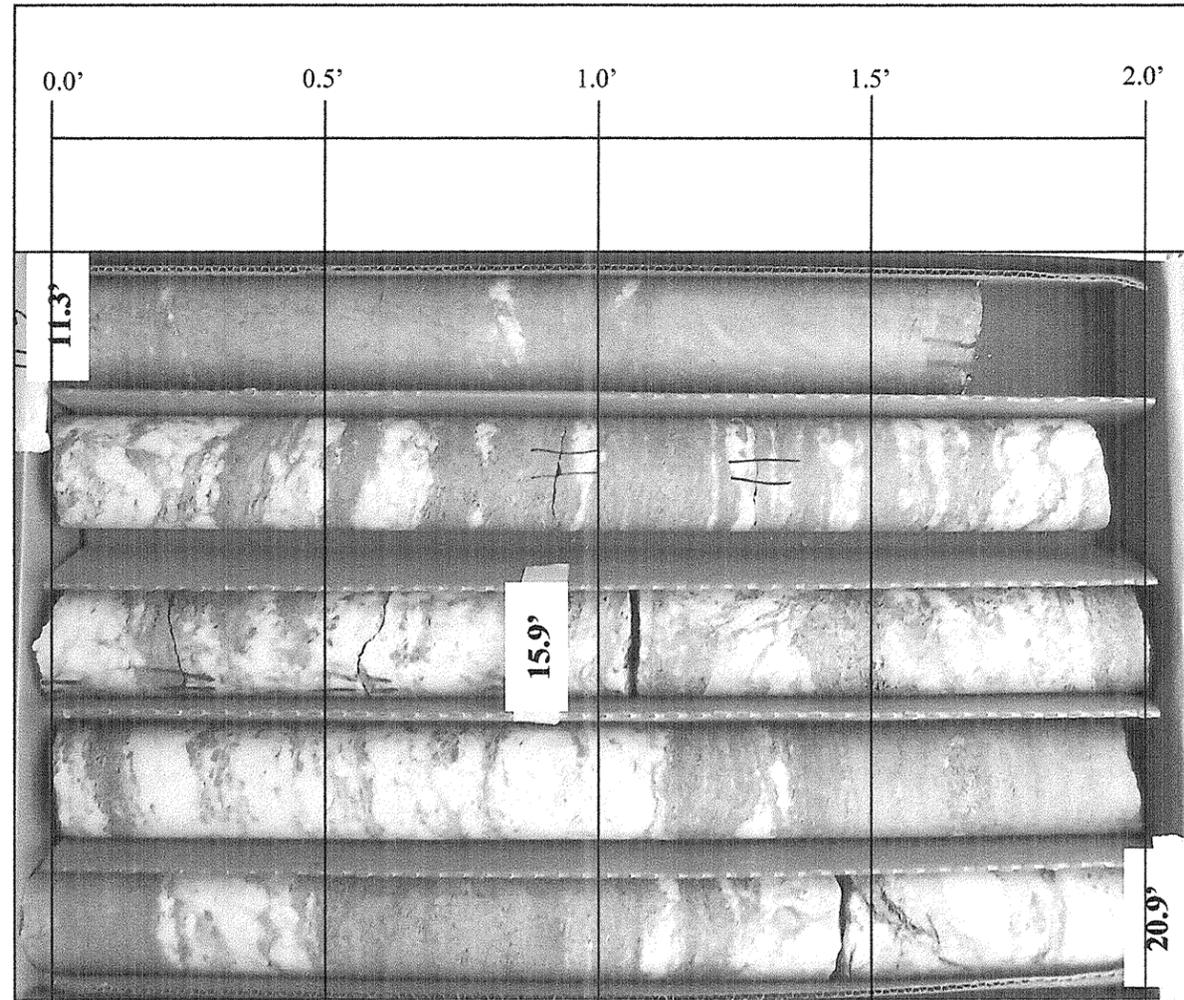
SCALE 1:40 (1"=4")

Rock Core Photographs

**Bridge Number 71 Over Stony Fork Creek
On SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322, State Project No: 33659.1.1**



Boring B2B, Box 1 of 2, 2.0 feet to 11.3 feet.



Boring B2B, Box 2 of 2, 11.3 feet to 20.9 feet.

SCALE 1:40 (1"=4")

Rock Core Photographs
Bridge Number 71 Over Stony Fork Creek On SR 1167 (Stony Fork Road) Wilkes County, North Carolina TIP No: B-4322, State Project No: 33659.1.1

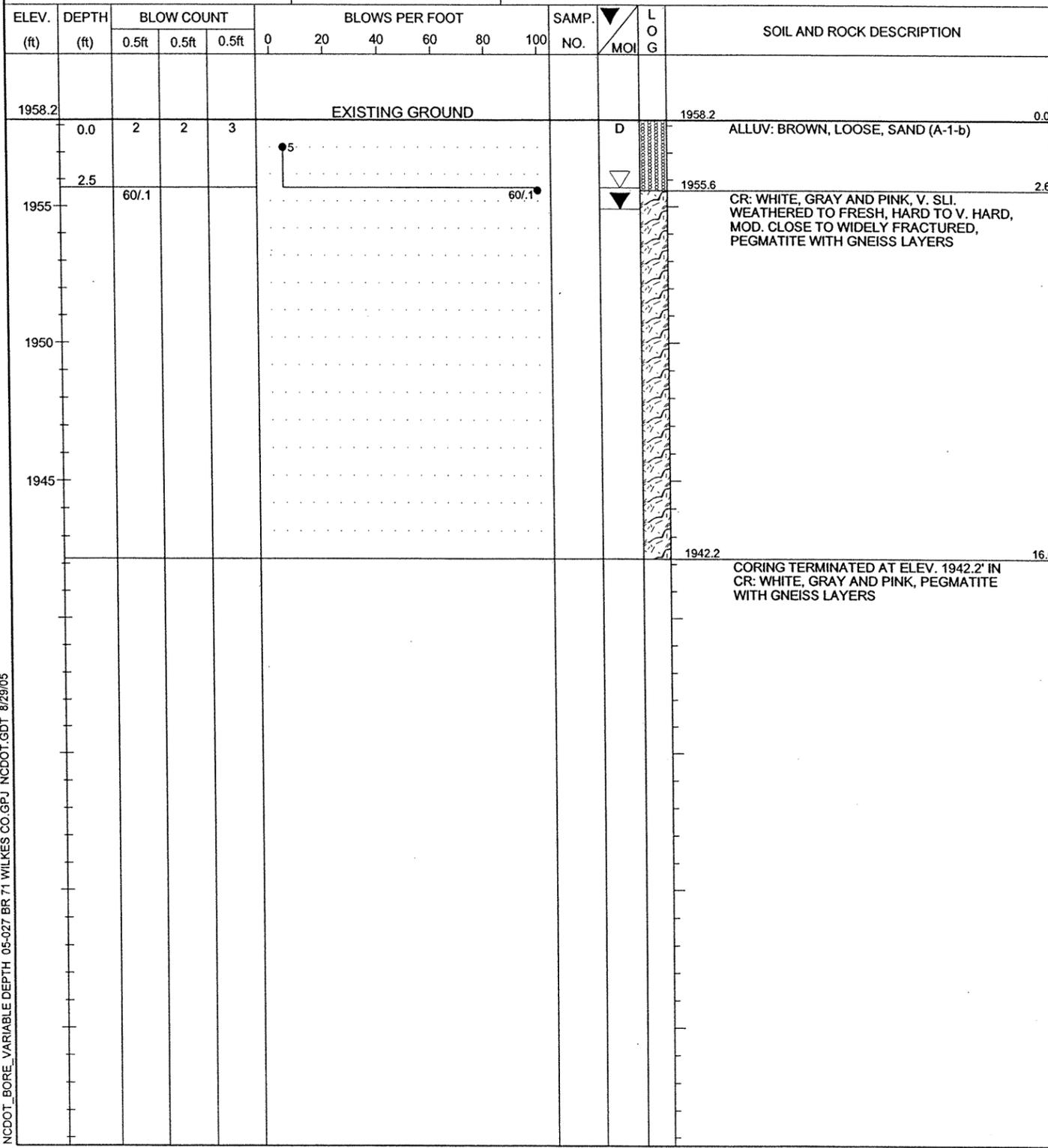


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BORING LOG

SHEET 1 OF 1

PROJECT NO. 33659.1.1	ID. B-4322	COUNTY WILKES	GEOLOGIST C. BRUINSMA
SITE DESCRIPTION BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)			GROUND WATER (ft)
BORING NO. EB2A	BORING LOCATION 15+82	OFFSET 7' LT.	ALIGNMENT -L-
COLLAR ELEV. 1958.2 ft	NORTHING 896,026.4	EASTING 1,273,242.1	0 HR. 2.5 24 HR. 3.3
TOTAL DEPTH 16.0 ft	DRILL MACHINE DIEDRICH 50	DRILL METHOD WASH ROTARY	HAMMER TYPE AUTO
DATE STARTED 7-25-05	COMPLETED 7-25-05	SURFACE WATER DEPTH N/A	



CORE BORING REPORT

DATE: 7-25-05

PROJECT: 33659.1.1 I.D. NO.: B-4322 BORING NO: EB2A GEOLOGIST: C. BRUINSMA

DESCRIPTION: BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)

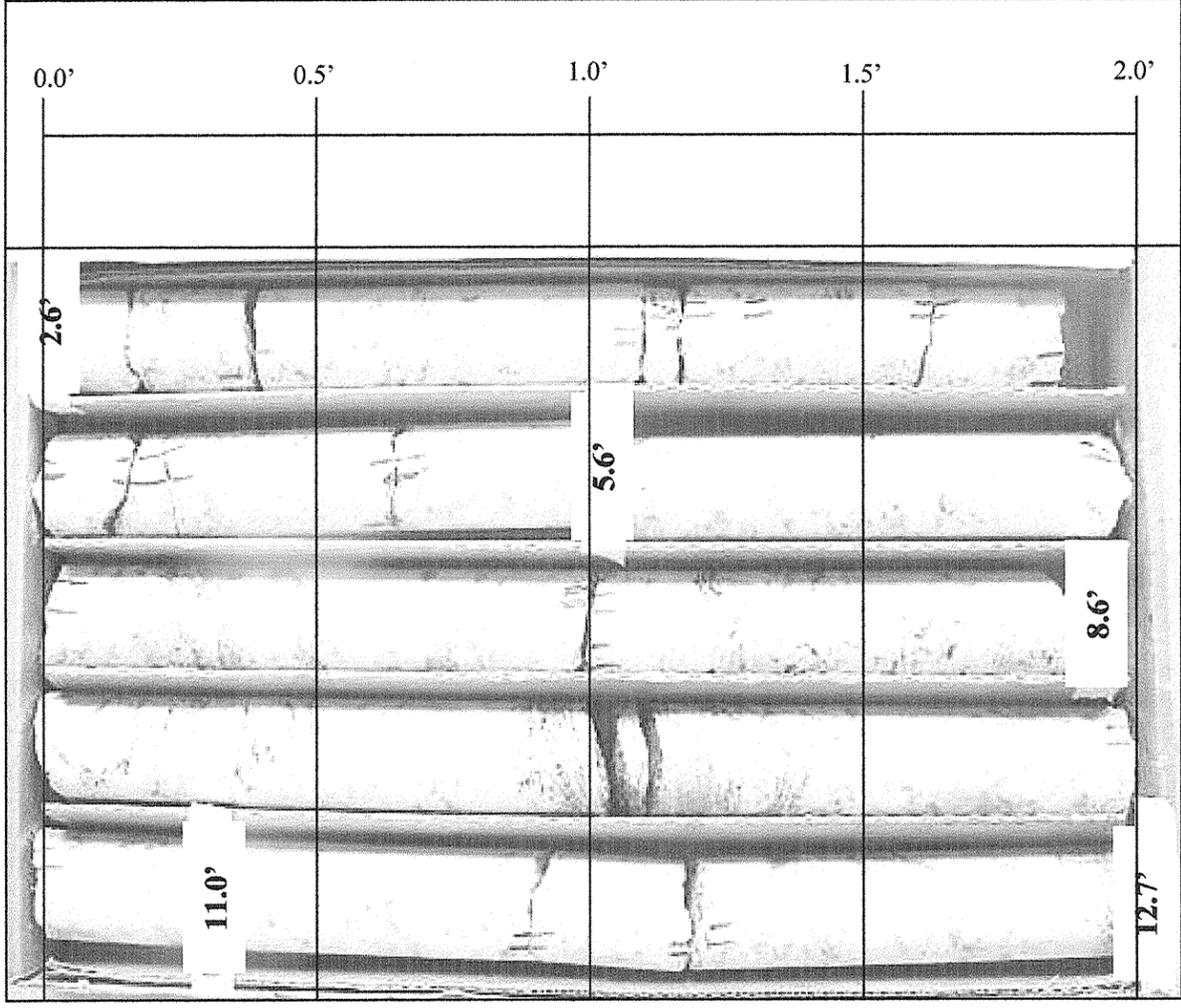
COUNTY: WILKES COLLAR ELEV.: 1958.2 FT TOTAL DEPTH: 16.0 FT

ELEV. (FT)	DEPTH (FT)	DRILL RATE MIN/FT	RUN (FT)	REC FT %	RQD FT %	SAMP #	FIELD CLASSIFICATION AND REMARKS
1958.2	0.0						EXISTING GROUND
1955.6	2.6	4:45	3.0	3.0/3.0	3.0/3.0		2.6-15.1 CR: WHITE, GRAY AND PINK, V. SLI. WEATHERED TO FRESH, HARD TO V. HARD, MOD. CLOSE TO WIDELY FRACTURED, PEGMATITE WITH GNEISS LAYERS
		6:00		100%	100%		
		10:20					
1952.6	5.6		3.0	3.0/3.0	3.0/3.0		
1952.6	5.6	11:45		100%	100%		
		14:00					
		15:50					
1949.6	8.6		2.4	2.4/2.4	2.4/2.4		
1949.6	8.6	5:20		100%	100%		
		5:40					
		2:30/0.4					
1947.2	11.0		5.0	5.0/5.0	5.0/5.0		
1947.2	11.0	8:15		100%	100%		
		7:00					
		7:00					
		6:30					
1942.2	16.0	8:00					STRATA REC = 100% STRATA RQD = 100%

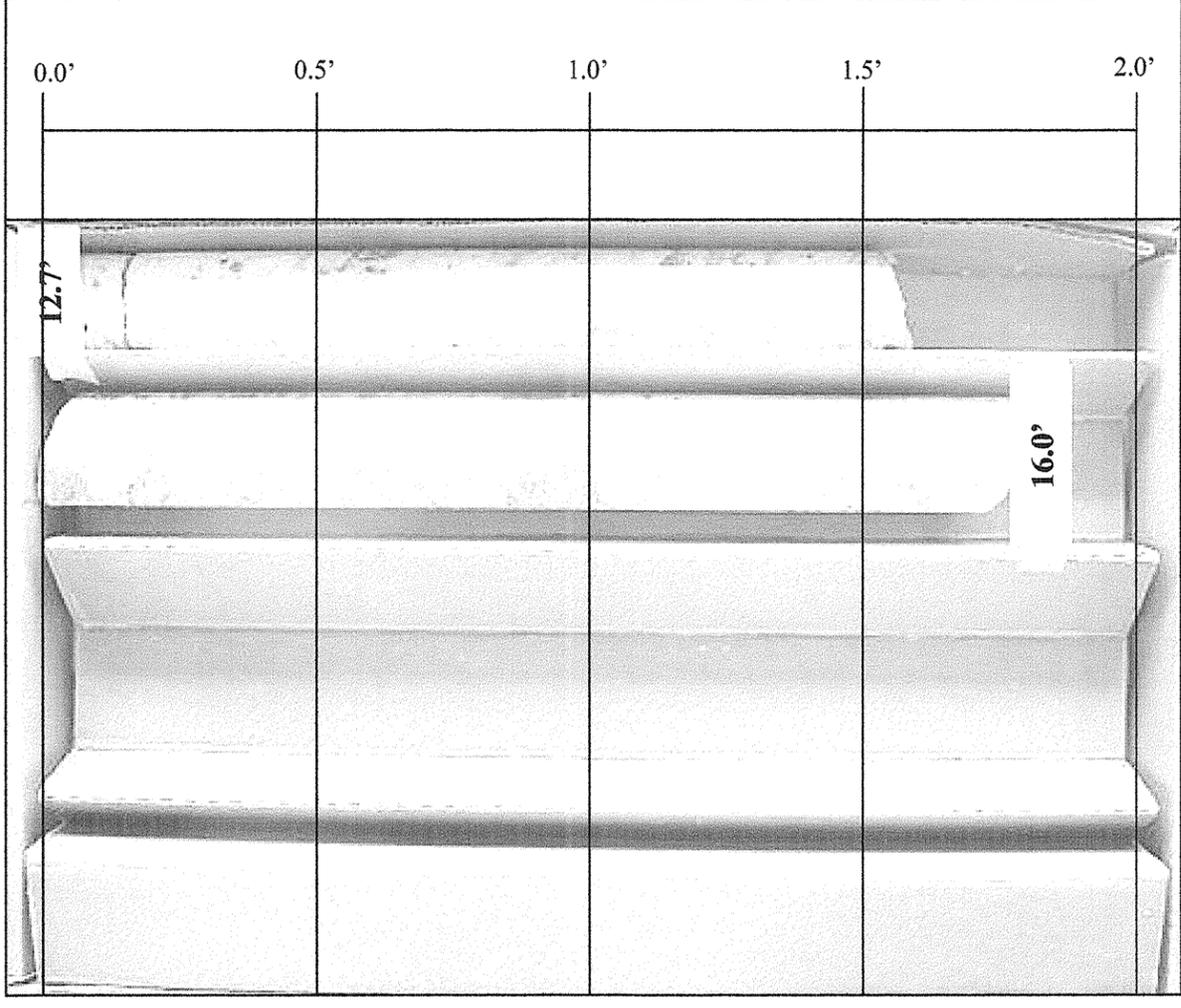
CORING TERMINATED AT 16.0 FT
ELEVATION 1942.2 FT

DRILLER: F. COX CORE SIZE: HQ EQUIPMENT: DIEDRICH 50

NCDOT_BORE_VARIABLE_DEPTH 05-027 BR 71 WILKES CO.GPJ NCDOT.GDT 8/29/05



Boring EB2A, Box 1 of 2, 2.6 feet to 12.7 feet.



Boring EB2A, Box 2 of 2, 12.7 feet to 16.0 feet.

SCALE 1:40 (1"=4")

Rock Core Photographs
Bridge Number 71 Over Stony Fork Creek On SR 1167 (Stony Fork Road) Wilkes County, North Carolina TIP No: B-4322, State Project No: 33659.1.1



2736 ROWLAND ROAD
 RALEIGH, NORTH CAROLINA 27615
 Phone (919) 871-0800 Fax (919) 871-0803

N.C.D.O.T. GEOTECHNICAL UNIT
 BORING LOG

SHEET 1 OF 1

PROJECT NO. 33659.1.1		ID. B-4322		COUNTY WILKES		GEOLOGIST C. BRUINSMA						
SITE DESCRIPTION BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)						GROUND WATER (ft)						
BORING NO. EB2B		BORING LOCATION 15+72		OFFSET 11' RT.		ALIGNMENT -L-						
COLLAR ELEV. 1958.6 ft		NORTHING 896,015.3		EASTING 1,273,259.0		0 HR. 0.5						
TOTAL DEPTH 16.3 ft		DRILL MACHINE DIEDRICH 50		DRILL METHOD		24 HR. BACKFILL						
DATE STARTED 8-02-05		COMPLETED 8-02-05		SURFACE WATER DEPTH N/A		HAMMER TYPE AUTO						
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION
		0.5ft	0.5ft	0.5ft	0	20	40	60	80			
1958.6	0.0	7	6	5								EXISTING GROUND
	1.7											RDWY EMB: BROWN, MED. DENSE, GRAVELLY SAND (A-1-b)
	5	65	35/0									RDWY EMB: GRAY AND WHITE, CONCRETE AND BOULDERS (0.5' - 1.0')
1955												RDWY EMB: GRAY AND WHITE, CONCRETE AND BOULDERS (0.5' - 1.0')
												CR: WHITE, PINK AND GRAY, SLI. WEATHERED TO FRESH, HARD TO V. HARD, V. CLOSELY TO WIDELY FRACTURED, PEGMATITE WITH GNEISS LAYERS
1950												
1945												
												CORING TERMINATED AT ELEV. 1942.3' IN CR: WHITE, PINK AND GRAY, PEGMATITE WITH GNEISS LAYERS

CORE BORING REPORT

DATE: 8-02-05

PROJECT: 33659.1.1 I.D. NO.: B-4322 BORING NO: EB2B GEOLOGIST: C. BRUINSMA

DESCRIPTION: BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)

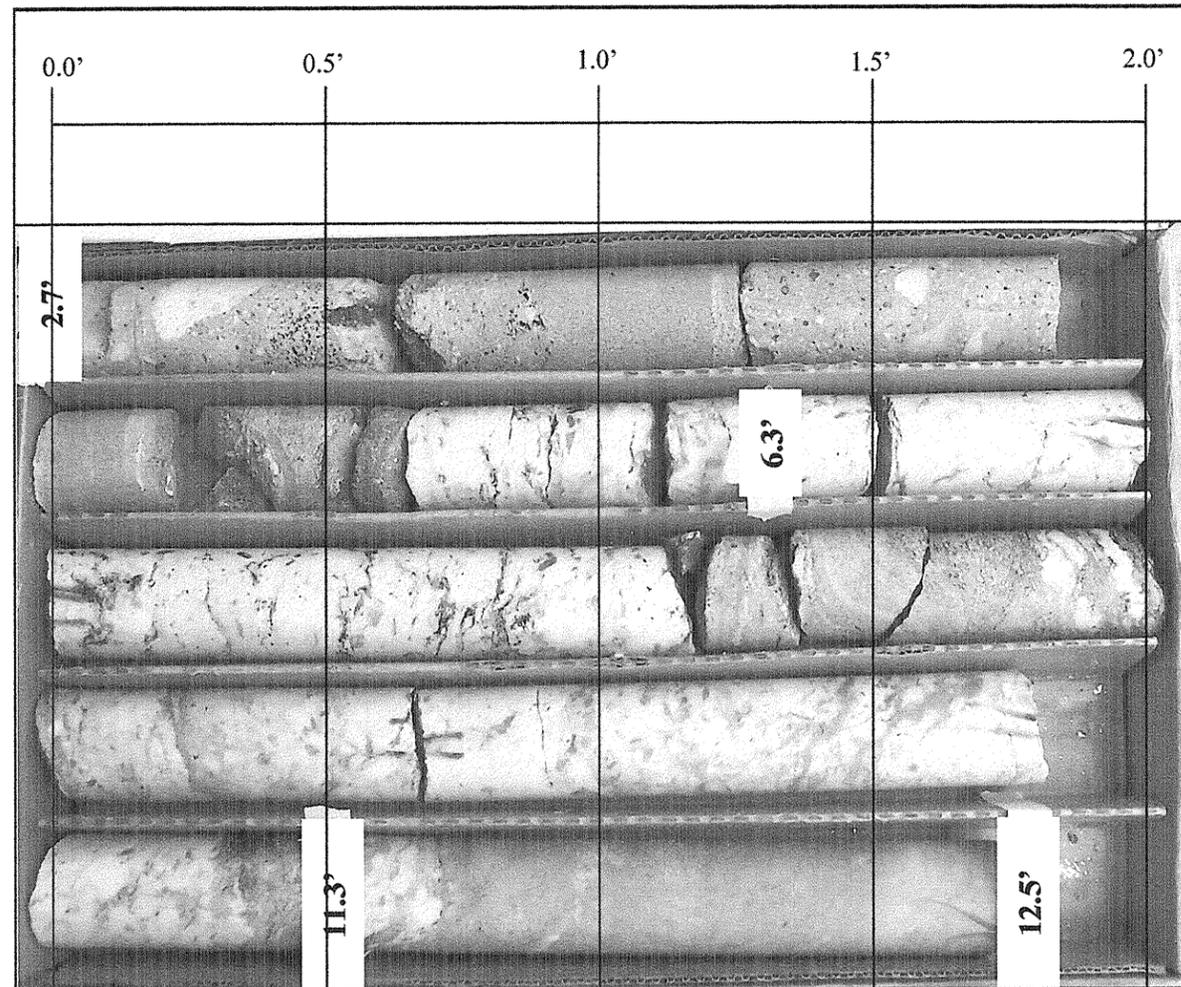
COUNTY: WILKES COLLAR ELEV.: 1958.6 FT TOTAL DEPTH: 16.3 FT

ELEV. (FT)	DEPTH (FT)	DRILL RATE MIN/FT	RUN (FT)	REC FT %	RQD FT %	SAMP #	FIELD CLASSIFICATION AND REMARKS
1955.9	2.7	4:30	3.6	3.3/3.6	0.35/3.6		2.7-5.7 RDWY EMB: GRAY AND WHITE, CONCRETE AND BOULDERS (0.5' - 1.0')
		3:45					
		3:30					
		1:30/0.6					
1952.3	6.3		5.0	5.0/5.0	4.3/5.0		5.7-16.3 CR: WHITE, PINK AND GRAY, SLI. WEATHERED TO FRESH, HARD TO V. HARD, V. CLOSELY TO WIDELY FRACTURED, PEGMATITE WITH GNEISS LAYERS
1952.3	6.3	4:00					
		3:45					
		3:30					
1947.3	11.3	4:15	5.0	4.5/5.0	4.5/5.0		STRATA REC = 95.3% STRATA RQD = 85.9%
1947.3	11.3	4:00					
		5:00					
		6:15					
1942.3	16.3	9:30					

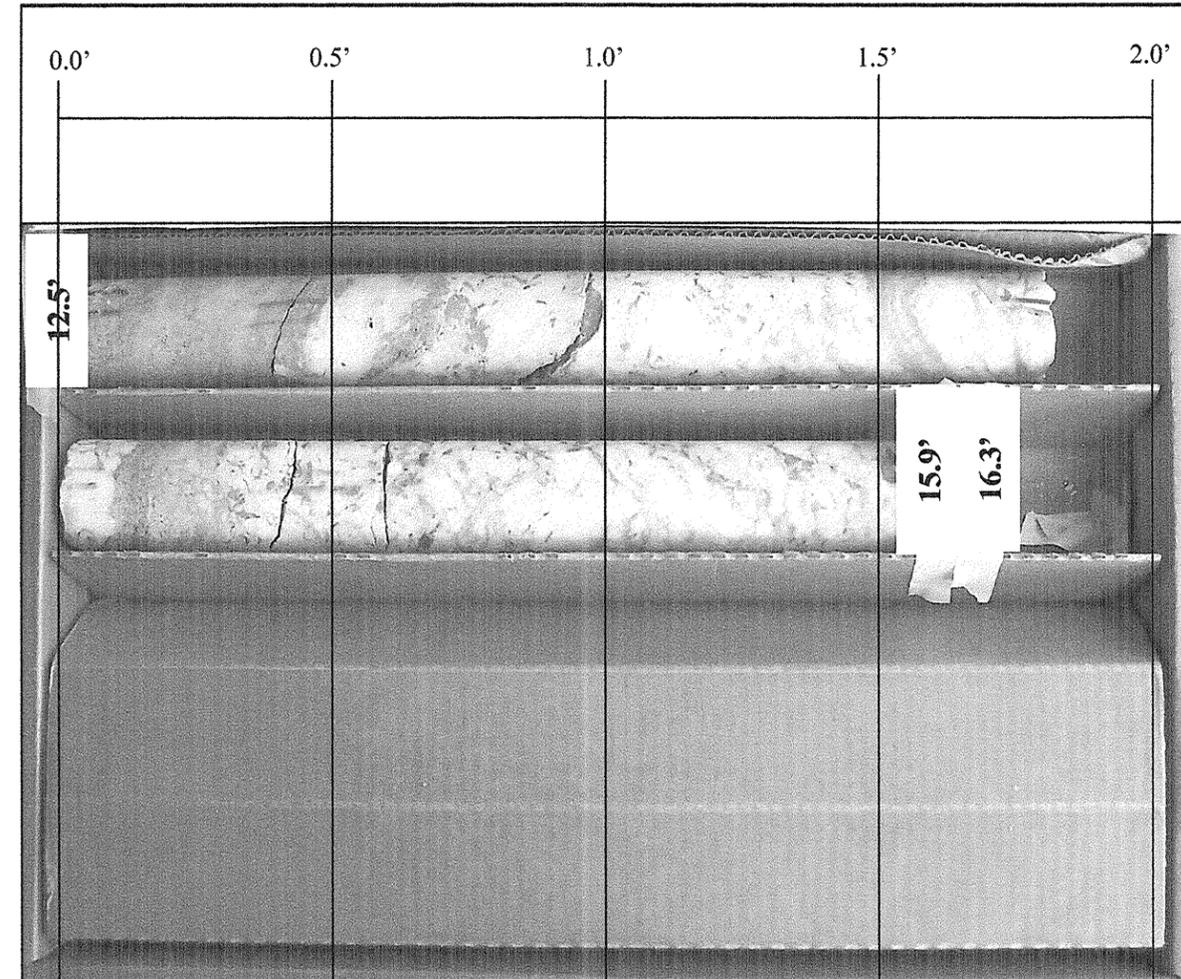
CORING TERMINATED AT 16.3 FT
 ELEVATION 1942.3 FT

DRILLER: F. COX CORE SIZE: HQ EQUIPMENT: DIEDRICH 50

NCDOT_BORE_VARIABLE_DEPTH_05-027 BR 71 WILKES CO.GPJ NCDOT.GDT 8/29/05



Boring EB2B, Box 1 of 2, 2.7 feet to 12.5 feet.



Boring EB2B, Box 2 of 2, 12.5 feet to 16.3 feet.

SCALE 1:40 (1"=4")

Rock Core Photographs

**Bridge Number 71 Over Stony Fork Creek
On SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322, State Project No: 33659.1.1**

TIERRA, INC.

2736 ROWLAND ROAD, RALEIGH, NORTH CAROLINA 27615

SOIL CLASSIFICATION AND GRADATION SHEET

BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK ROAD)

NCDOT Project No: 33659.1.1 - T.I.P. No: B-4322

WILKES COUNTY

TIERRA, INC. PROJECT NO: 6211-05-027

BORING #		SAMPLE #	TOTAL SAMPLE			MINUS 2.00 mm FRACTION				Atterberg Limits		MC
AASHTO Classification			PERCENT PASSING			PERCENT RETAINED						
STATION #	OFFSET (FEET)	DEPTH (FEET)	#10	#40	#200	Coarse Sand	Fine Sand	SILT	CLAY	LL	PI	%
EB1A		SS-1										
A-2-4			77	55	22	43	32	7	18	26	2	-
14+69	12 LT	0.0-1.5										
EB1B		SS-2										
A-4			84	59	36	39	22	28	11	31	0	31.2
14+57	5 RT	11.8-13.3										
B1B		SS-3										
A-1-b			43	33	13	39	35	20	6	38	NP	-
14+93	CL	0.0-1.5										
B2A		SS-4										
A-1-b			51	34	9	52	35	6	7	31	NP	-
15+54	8 LT	0.0-1.5										
CHANNEL		S-1										
A-1-b			99	42	3	87	11	0	2	34	NP	-
15+10	5 RT	0.0-1.0										

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

PROJECT NO.: 33659.1.1 (B-4322)

F.A. NO.: BRZ-1167(1)

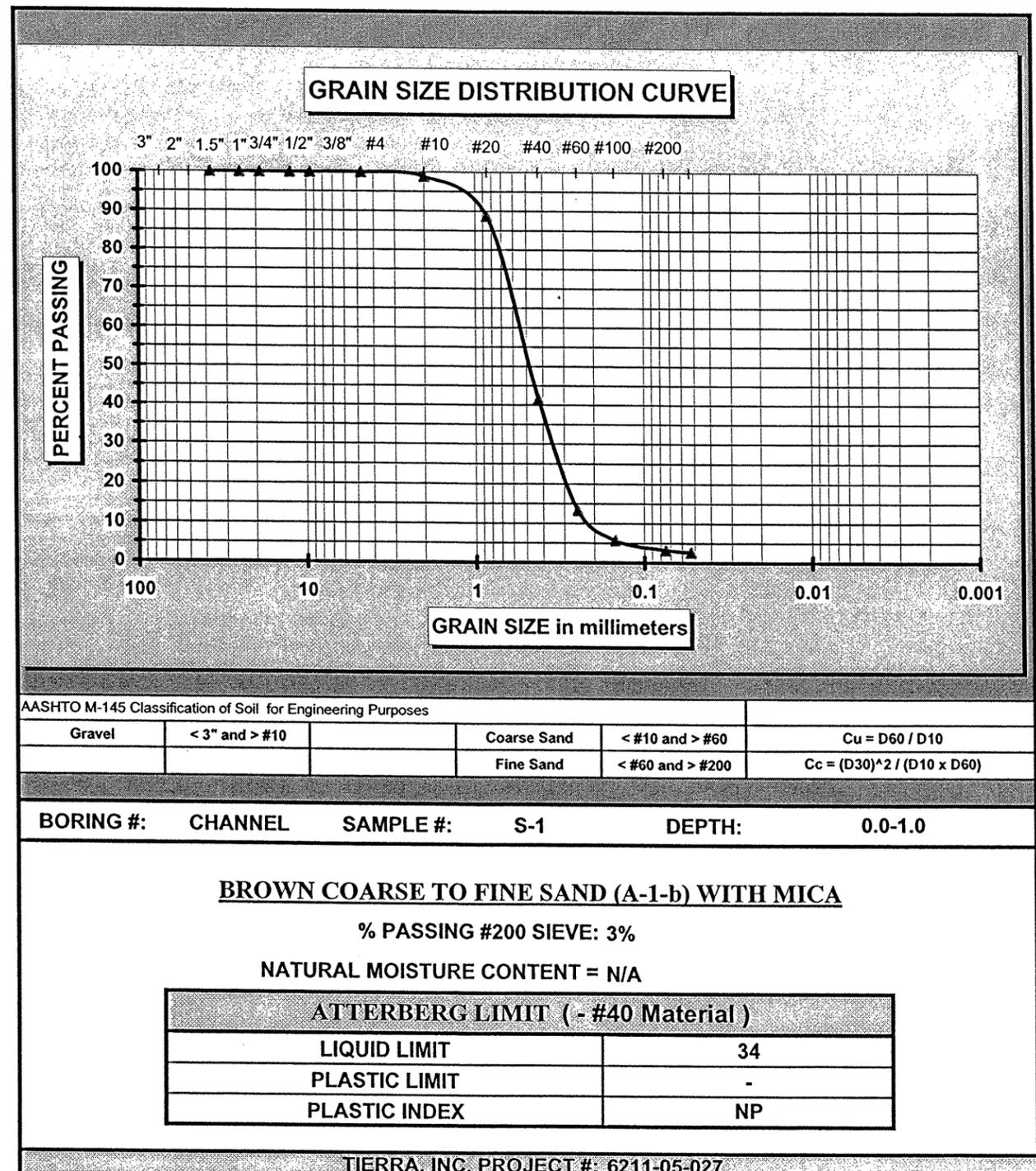
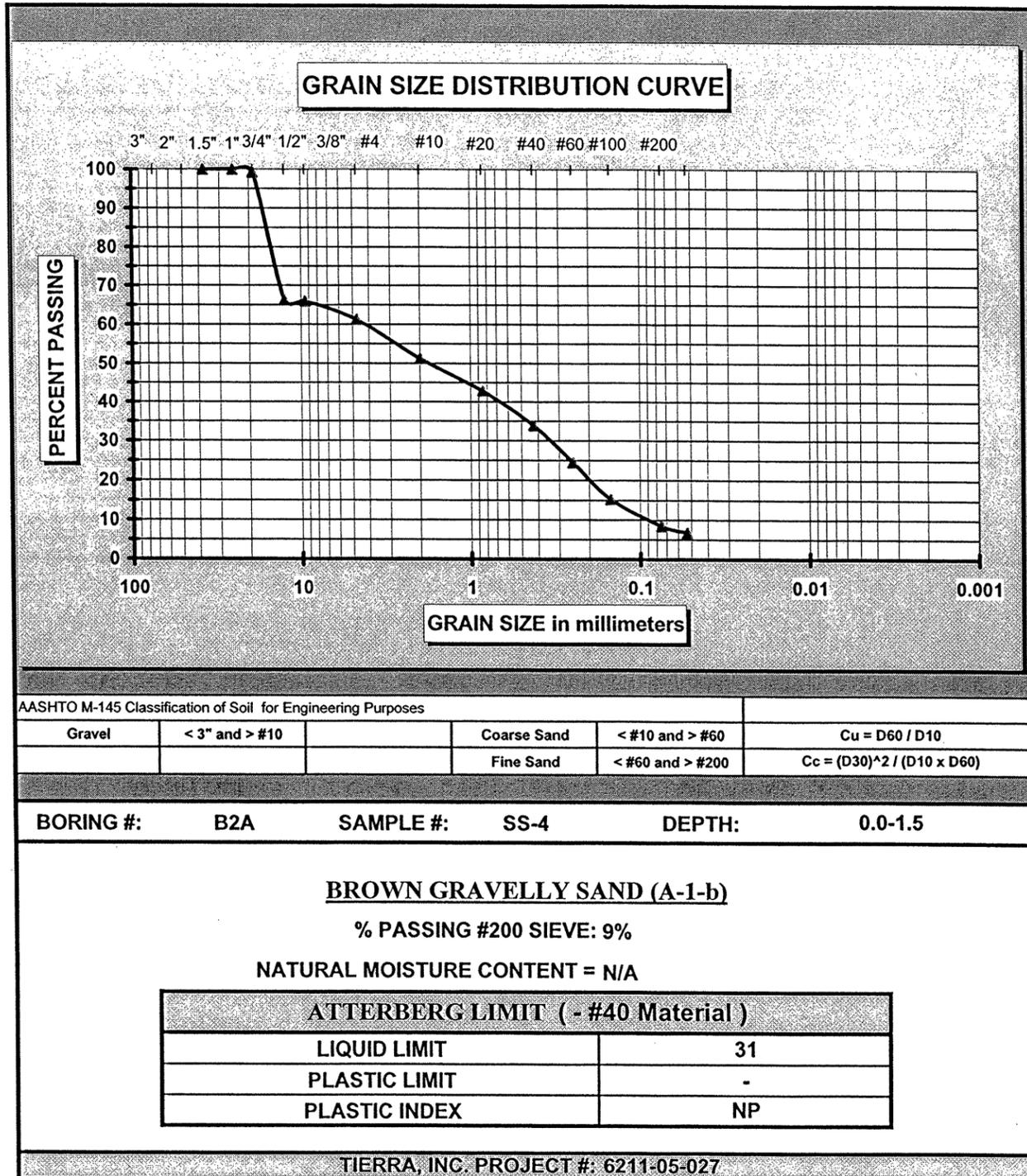
COUNTY: WILKES

BRIDGE NO. 71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)

Sample #	Boring #	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (ft)	Diameter (ft)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Young's Modulus (PSI)	Splitting Tensile Strength (PSI)	Remarks
RS-1	B1A	9.4-10.2	Felsic Gneiss	Zabg	50.0%	0.27	0.21	159.4	1,249.8	90,483		
RS-2	B2A	6.7-7.7	Felsic Gneiss	Zabg	87.2%	0.28	0.21	164.7	8,340.7	368,660		

BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK ROAD)
 WILKES COUNTY
 NCDOT Project No: 33659.1.1 - T.I.P. No: B-4322

BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK ROAD)
 WILKES COUNTY
 NCDOT Project No: 33659.1.1 - T.I.P. No: B-4322



GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 33659.1.1 ID: B-4322 COUNTY: WILKES

DESCRIPTION(1): BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONK FORK ROAD)

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

COUNTY BRIDGE NO. 71 BRIDGE LENGTH 56 NO. BENTS IN: CHANNEL 1 FLOOD PLAIN 2

FOUNDATION TYPE: SPREAD FOOTINGS

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: NONE

INTERIOR BENTS: ALONG DOWNSTREAM PORTION

CHANNEL BED: NONE VISIBLE

CHANNEL BANKS: ON UPSTREAM SIDE OF END BENT 1

EXISTING SCOUR PROTECTION:

TYPE(3): NONE

EXTENT(4): N/A

EFFECTIVENESS(5): N/A

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

DESIGN INFORMATION

CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): GRAVELLY SAND, COBBLES AND BOULDERS (1' TO 10')

CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): GRAVELLY SAND

CHANNEL BANK COVER(9): GRASSES AND SHRUBS

FLOOD PLAIN WIDTH(10): 125 FEET

FLOOD PLAIN COVER(11): GRASSES, SHRUBS AND SMALL TO LARGE TREES

DESIGN INFORMATION CONT.

STREAM IS DEGRADING AGGRADING (12)

OTHER OBSERVATIONS AND COMMENTS: _____

CHANNEL MIGRATION TENDENCY (13): TOWARD EB1 (UPSTREAM), TOWARDS EB2 (DOWNSTREAM)

REPORTED BY: DATE: 7/27/2005
 TIERRA, INC

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (14):

	B1-A	B1-B	B2-A	B2-B
100-year	1951.3'	1949.5'	1949.5'	1948.9'
500-Year	1951.1'	1949.3'	1951.7'	1948.7'

REPORTED BY: DATE: 8-31-05
 KCDOT GEOTECHNICAL UNIT

- 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 BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
 - (10) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
 - (11) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
 - (12) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
 - (13) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE LATERALLY DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
 - (14) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS 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.

PROJECT #: 33659.1.1 (B-4322)

COUNTY: WILKES

DESCRIPTION: BRIDGE # 71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK ROAD)

	CHANNEL BED MATERIAL			CHANNEL BANK MATERIAL			
SAMPLE #	S-1			SS-4			
RETAINED #4	0			38.7			
PASSING #10	98.9			51.3			
PASSING #40	41.6			33.9			
PASSING #200	3.3			8.5			
COARSE SAND	85.6			26.7			
FINE SAND	10.6			17.8			
SILT	0.0			3.1			
CLAY	2.7			3.7			
LL	34			31			
PL	-			-			
AASHTO CLASSIFICATION	A-1-b			A-1-b			
STATION	15+10			15+54			
OFFSET	5' RT			8' LT			
DEPTH	0.0-1.0			0.0-1.5			



CENTERLINE PROFILE (-L-), LOOKING UPSTATION FROM STATION 14+50 (-L-)

SITE PHOTOS	
Bridge No. 71 Over Stony Fork Creek on SR 1167 (Stony Fork Road) Wilkes Co., North Carolina TIP: B-4322 State Project: 33659.1.1	
	<small>TIERRA, INC. 2736 ROWLAND RD. RALEIGH, NC 27615 PHONE (919) 871-0800 FAX (919) 871-0803</small>



END BENT 1, LOOKING FROM EB1B TO EB1A



BENT 1, LOOKING FROM B1A TO B1B

SITE PHOTOS	
Bridge No. 71 Over Stony Fork Creek on SR 1167 (Stony Fork Road) Wilkes Co., North Carolina TIP: B-4322 State Project: 33659.1.1	
	TIERRA, INC. 2736 ROWLAND RD. RALEIGH, NC 27615 PHONE (919) 871-0800 FAX (919) 871-0803



BENT 2, LOOKING FROM B2A TO B2B



END BENT 2, LOOKING FROM EB2A TO EB2B

SITE PHOTOS	
Bridge No. 71 Over Stony Fork Creek on SR 1167 (Stony Fork Road) Wilkes Co., North Carolina TIP: B-4322 State Project: 33659.1.1	
	TIERRA, INC. 2736 ROWLAND RD. RALEIGH, NC 27615 PHONE (919) 871-0800 FAX (919) 871-0803

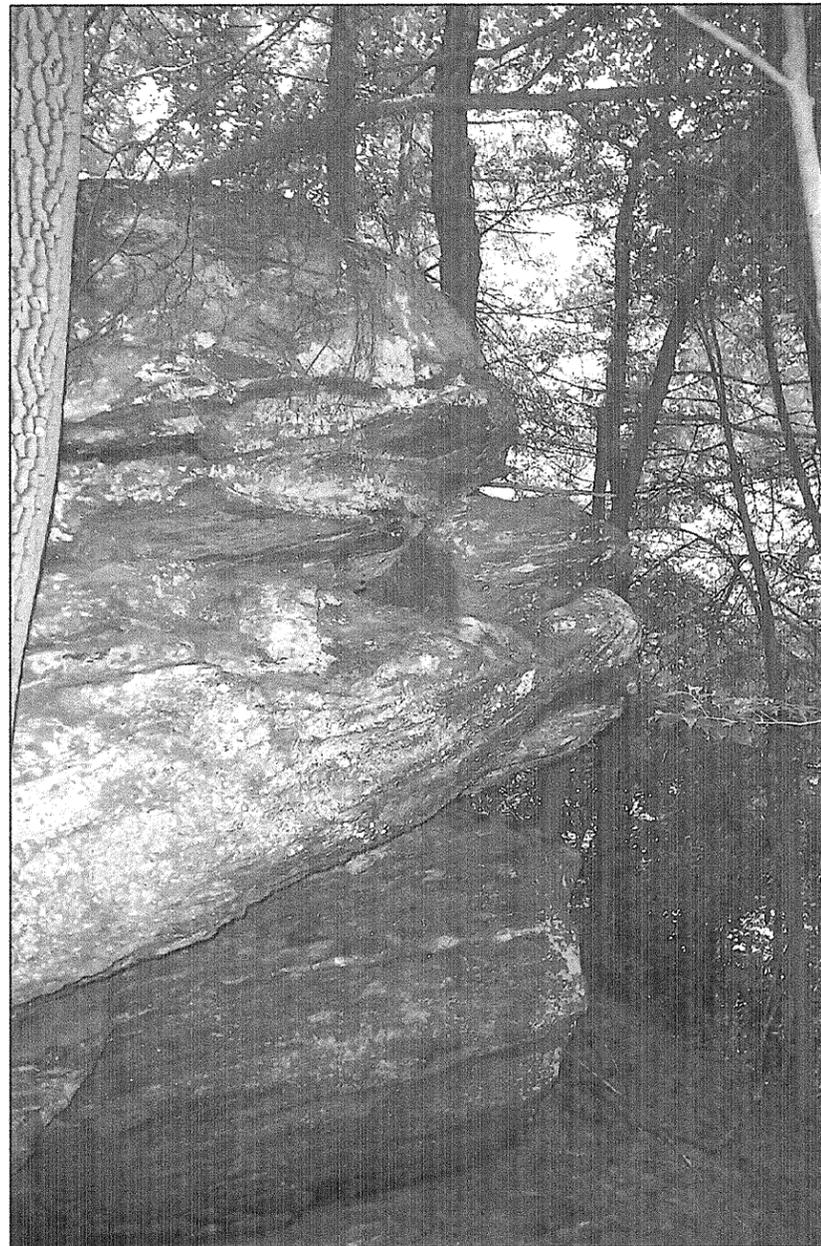


STONY FORK CREEK, LOOKING UPSTREAM



STONY FORK CREEK, LOOKING DOWNSTREAM

SITE PHOTOS	
Bridge No. 71 Over Stony Fork Creek on SR 1167 (Stony Fork Road) Wilkes Co., North Carolina TIP: B-4322 State Project: 33659.1.1	
 TIERRA GEOTECHNICAL • MATERIALS ENGINEERING	TIERRA, INC. 2736 ROWLAND RD. RALEIGH, NC 27615 PHONE (919) 871-0800 FAX (919) 871-0803

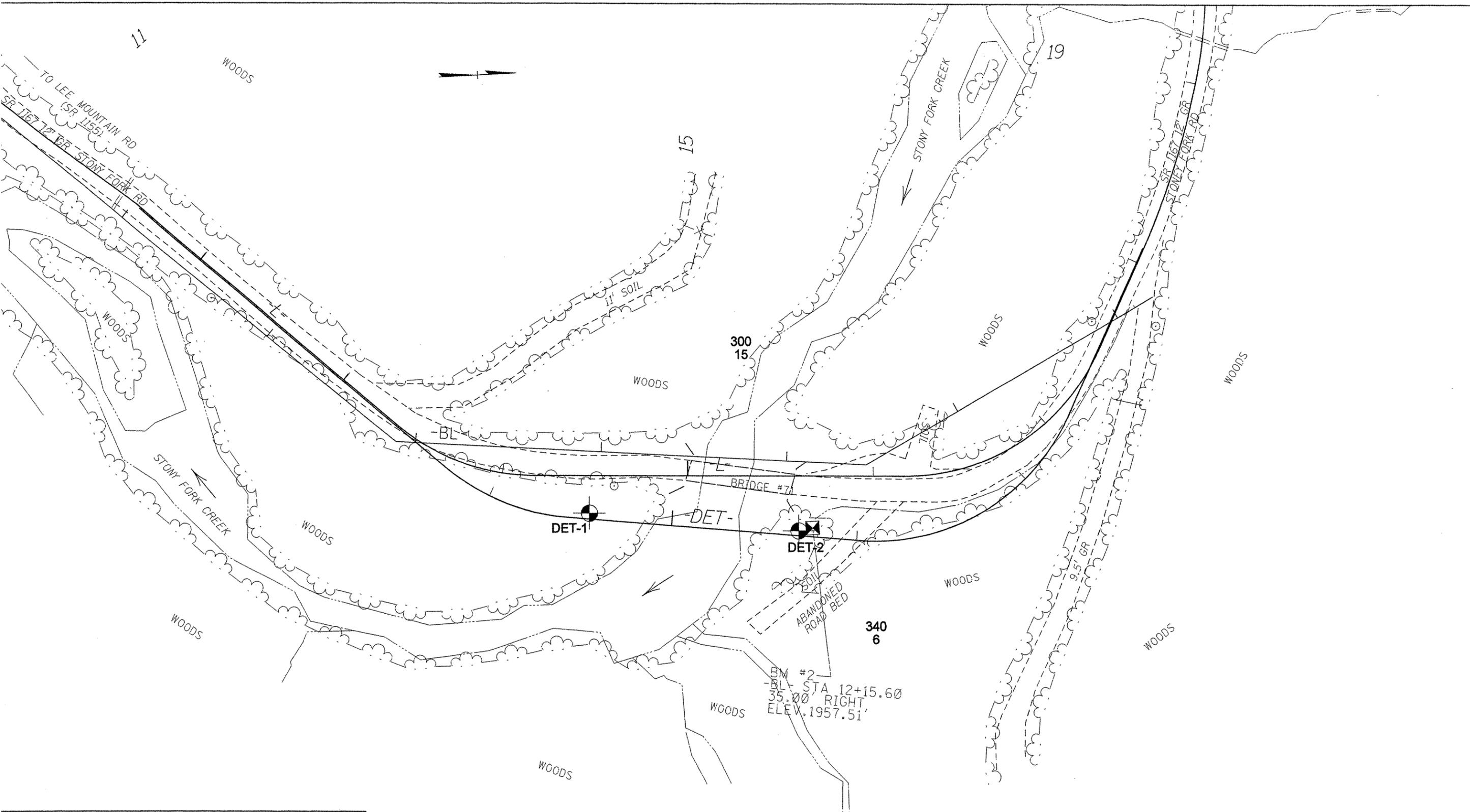


OUTCROP LOCATED AT STATION 15+89, 88' RIGHT OF -L-

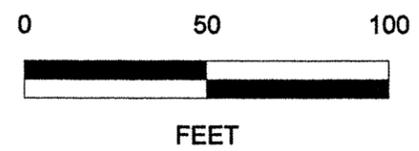


OUTCROP LOCATED AT STATION, 15+28, 55' LEFT OF -L-

SITE PHOTOS	
Bridge No. 71 Over Stony Fork Creek on SR 1167 (Stony Fork Road) Wilkes Co., North Carolina TIP: B-4322 State Project: 33659.1.1	
 TIERRA GEOTECHNICAL • MATERIALS ENGINEERING	TIERRA, INC. 2736 ROWLAND RD. RALEIGH, NC 27615 PHONE (919) 871-0800 FAX (919) 871-0803

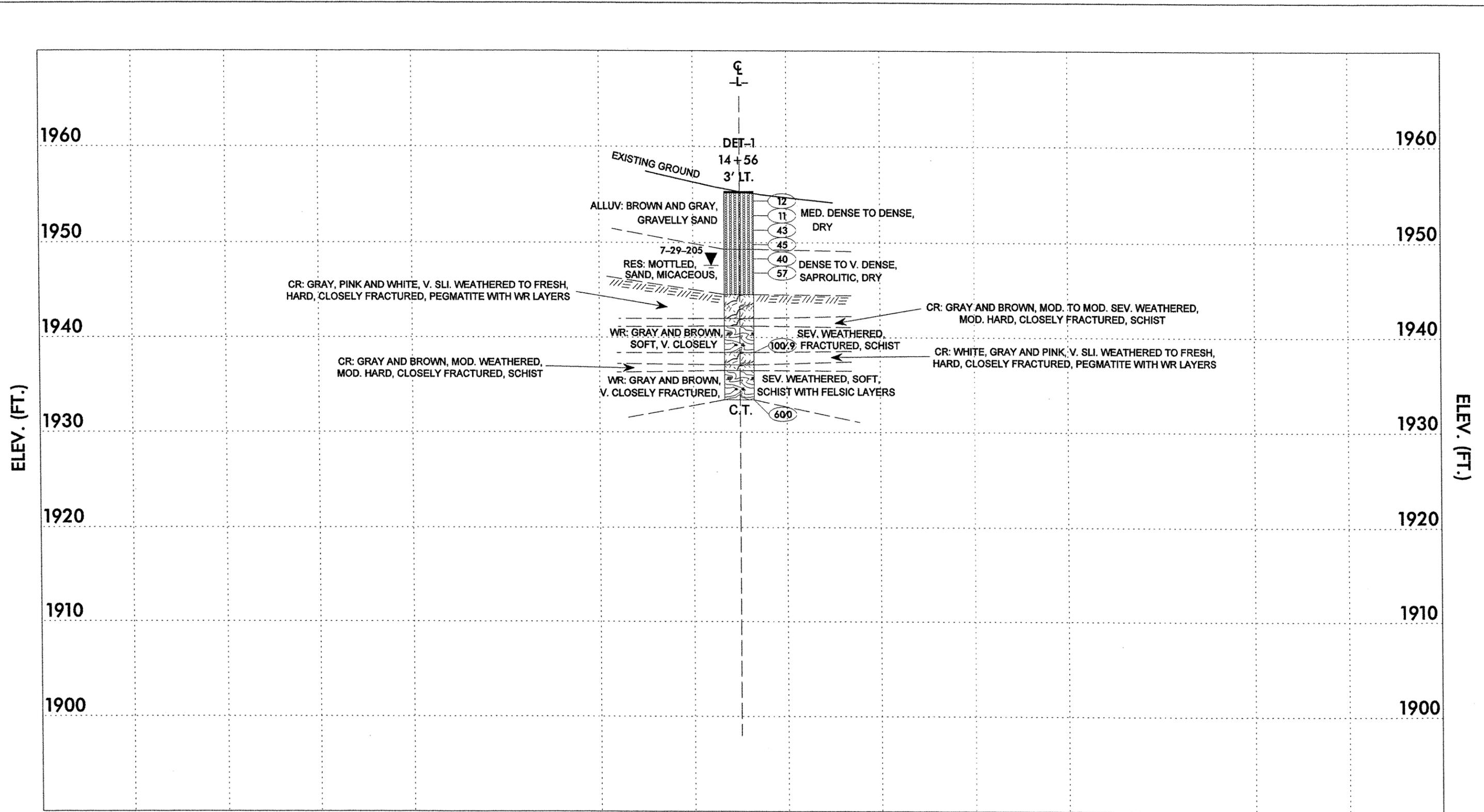


NOTES
 BENCH MARK: -BL- STA 12+15.60, 35.0' RIGHT,
 ELEVATION 1957.51'
 PLANS ADOPTED FROM FILES RECIEVED FROM NCDOT
 DATED 7-12-05
 PROPOSED BRIDGE SKEW: 120°



BORING LOCATION PLAN

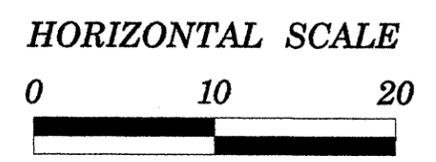
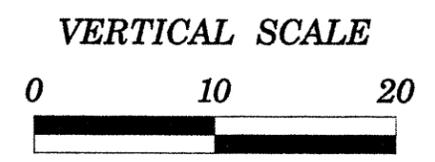
Bridge No. 71 over Stony Fork Creek
 on SR 1167 (Stony Fork Rd.)
 Wilkes County, North Carolina
 TIP No: B-4322 State Project: 33659.1.1
 Tierra Project No.: 6211-05-027



ELEV. (FT.)

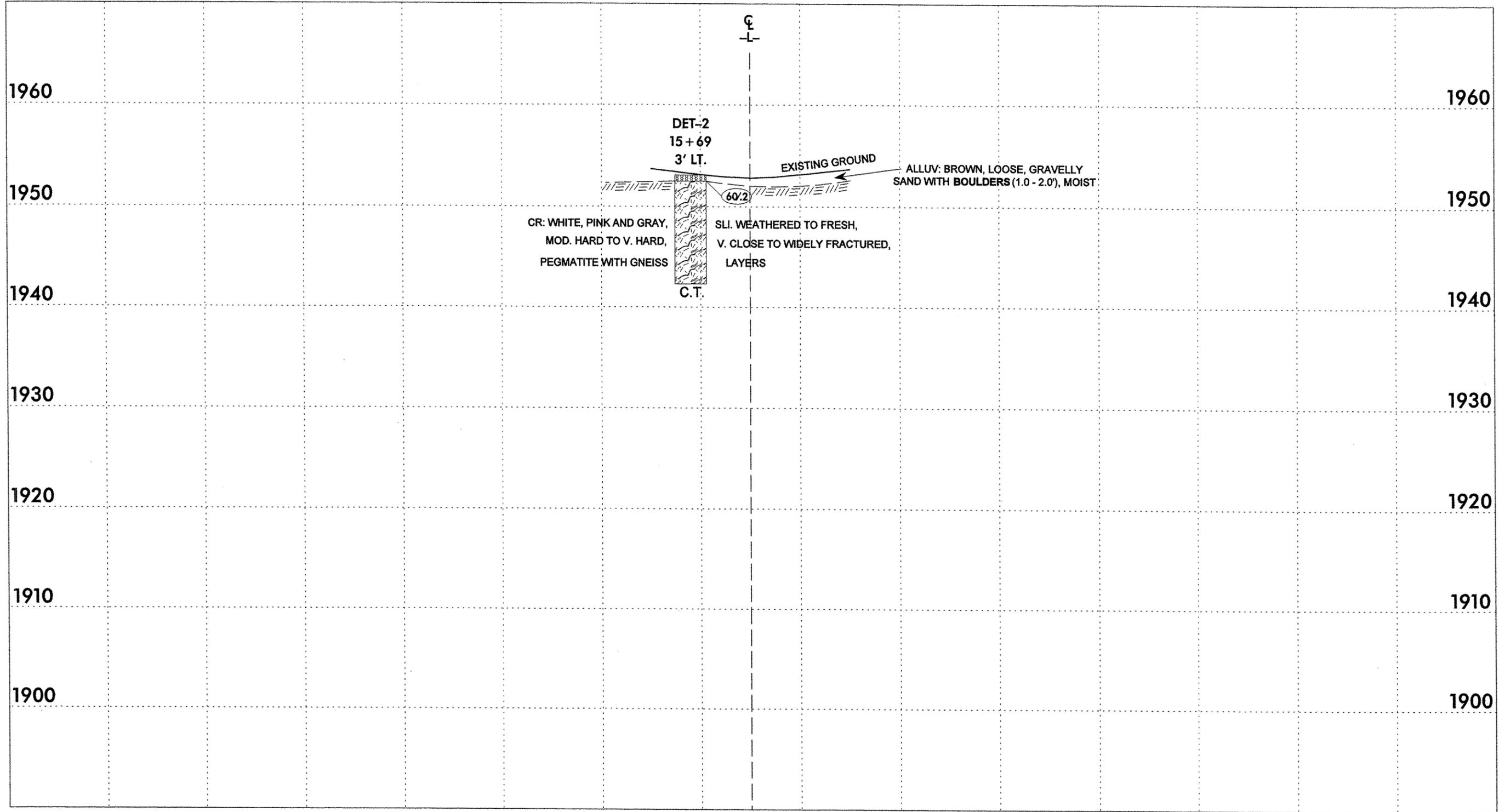
ELEV. (FT.)

BENCH MARK: -BL- STA. 12 + 15.60, 35.0' RIGHT,
ELEVATION 1957.61'



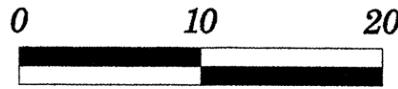
Cross Section Detour End Bent 1

Bridge No. 71 Over Stony Fork Creek
on SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322 State Project: 33659.1.1
Tierra Project: 6211-05-027

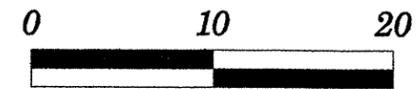


BENCH MARK: -BL- STA. 12+15.60, 35.0' RIGHT,
ELEVATION 1957.61'

VERTICAL SCALE



HORIZONTAL SCALE



Cross Section Detour End Bent 2

Bridge No. 71 Over Stony Fork Creek
on SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322 State Project: 33659.1.1
Tierra Project: 6211-05-027



2736 ROWLAND ROAD
 RALEIGH, NORTH CAROLINA 27615
 Phone (919) 871-0800 Fax (919) 871-0803

N.C.D.O.T. GEOTECHNICAL UNIT
 BORING LOG

SHEET 1 OF 1

PROJECT NO. 33659.1.1		ID. B-4322		COUNTY WILKES		GEOLOGIST C. BRUINSMA						
SITE DESCRIPTION BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)							GROUND WATER (ft)					
BORING NO. DET-1		BORING LOCATION 14+56		OFFSET 3' LT.	ALIGNMENT -DET-	0 HR. 7.7						
COLLAR ELEV. 1955.3 ft		NORTHING 895,890.1		EASTING 1,273,258.8		24 HR. 7.7						
TOTAL DEPTH 21.9 ft		DRILL MACHINE DIEDRICH 50		DRILL METHOD CONTINUOUS SAMPLE		HAMMER TYPE AUTO						
DATE STARTED 7-28-05		COMPLETED 7-28-05		SURFACE WATER DEPTH N/A								
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION
		0.5ft	0.5ft	0.5ft	0	20	40	60	80			
1955.3					EXISTING GROUND							
1955.0	0.0	8	7	5								1955.1 ROOTMAT
	1.5	3	5	6								ALLUV. BROWN AND GRAY, MED. DENSE TO DENSE, GRAVELLY SAND (A-1-b)
	3.0	8	12	31								
	4.5											
1950.0	6.0	18	14	26								1949.3
	7.5	20	25	32								RES: MOTTLED, DENSE TO V. DENSE, SAND (A-1-b) MICACEOUS, SAPROLITIC
1945.0												1944.5
												CR: GRAY, PINK AND WHITE, V. SLI. WEATHERED TO FRESH, HARD, CLOSELY FRACTURED, PEGMATITE WITH WEATHERED ROCK LAYERS
												1942.0
												CR: GRAY AND BROWN, MOD. TO MOD. SEV. WEATHERED, MOD. HARD, CLOSELY FRACTURED, SCHIST
												1941.2
												WR: GRAY AND BROWN, SEV. WEATHERED, SOFT, V. CLOSELY FRACTURED, SCHIST
1940.0	16.0	8	92/4									1938.4
												CR: WHITE, GRAY AND PINK, V. SLI. WEATHERED TO FRESH, HARD, CLOSELY FRACTURED, PEGMATITE WITH WEATHERED ROCK LAYERS
												1937.1
												CR: GRAY AND BROWN, MOD. WEATHERED, MOD. HARD, CLOSELY FRACTURED, SCHIST
												1936.5
												WR: GRAY AND BROWN, SEV. WEATHERED, SOFT, V. CLOSELY FRACTURED, SCHIST WITH FELSIC LAYERS
1935.0	21.9	60/0										1933.4
												CORING TERMINATED AT ELEV. 1933.4' ON CR: PEGMATITE

CORE BORING REPORT

DATE: 7-28-05

PROJECT: 33659.1.1 I.D. NO.: B-4322 BORING NO: DET-1 GEOLOGIST: C. BRUINSMA

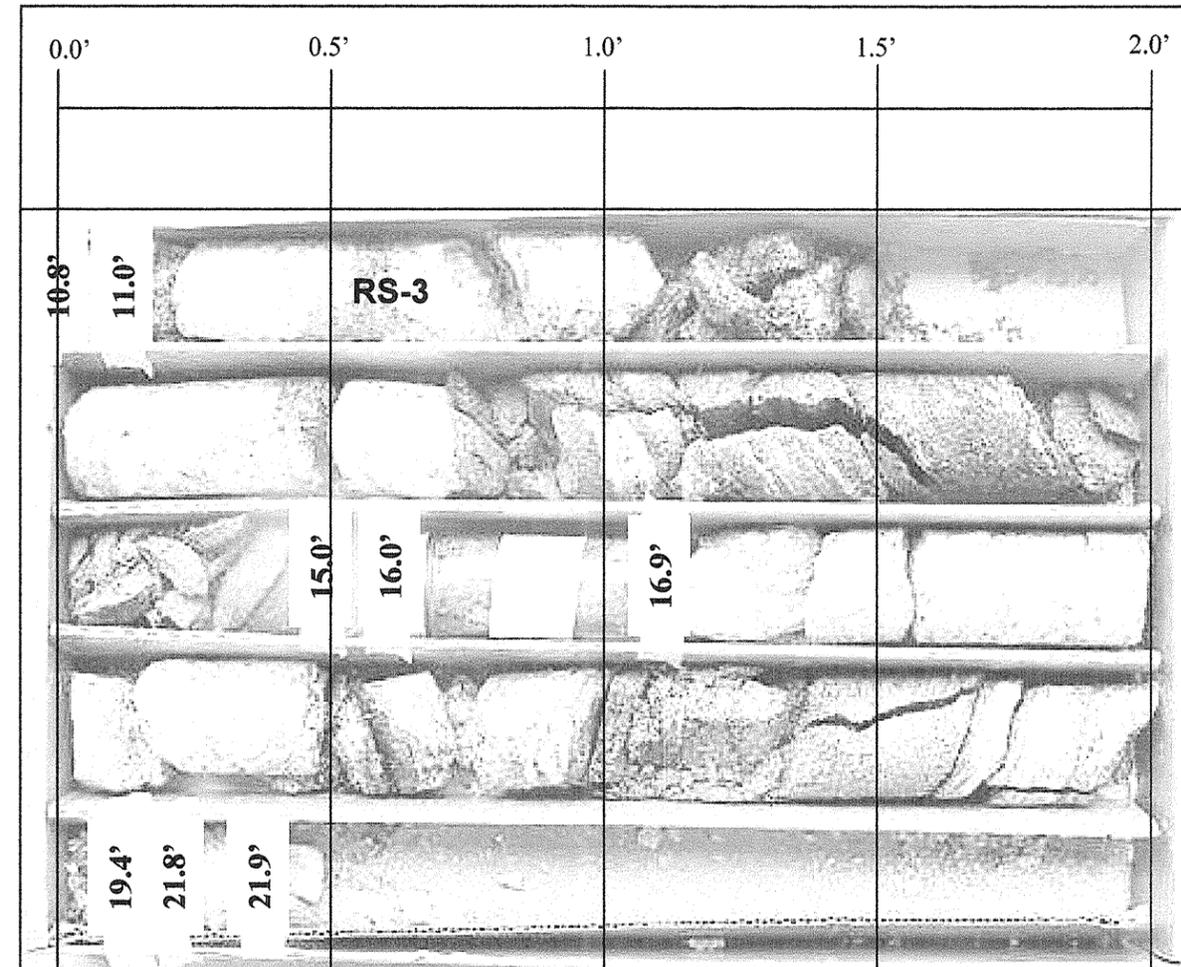
DESCRIPTION: BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)

COUNTY: WILKES COLLAR ELEV.: 1955.3 FT TOTAL DEPTH: 21.9 FT

ELEV. (FT)	DEPTH (FT)	DRILL RATE MIN/FT	RUN (FT)	REC FT %	RQD FT %	SAMP #	FIELD CLASSIFICATION AND REMARKS
1944.5	10.8	1:00/2		0.2/0.2	0.0/0.0		10.8-13.3 CR: GRAY, PINK AND WHITE, V. SLI. WEATHERED TO FRESH, HARD, CLOSELY FRACTURED, PEGMATITE WITH WEATHERED ROCK LAYERS
			0.2	100%	0%		
1944.3	11.0						
1944.3	11.0	4:00		4.0/5.0	1.0/5.0		STRATA REC = 100% STRATA RQD = 40%
		3:00	5.0	80%	20%	RS-3	13.3-14.1 CR: GRAY AND BROWN, MOD. TO MOD. SEV. WEATHERED, MOD. HARD, CLOSELY FRACTURED, SCHIST
		2:30					
		6:10					
1939.3	16.0	2:00					STRATA REC = 100% STRATA RQD = 0%
1938.4	16.9	1:20					
		4:00	5.0	3.5/5.0	0.5/5.0		14.1-16.9 WR: GRAY AND BROWN, SEV. WEATHERED, SOFT, V. CLOSELY FRACTURED, SCHIST
		3:30					
		2:10		70%	10%		STRATA REC = 47.4% STRATA RQD = N/A
1933.4	21.9	2:45					16.9-18.2 CR: WHITE, GRAY AND PINK, V. SLI. WEATHERED TO FRESH, HARD, CLOSELY FRACTURED, PEGMATITE WITH WEATHERED ROCK LAYERS
							STRATA REC = 100% STRATA RQD = 44%
							18.2-18.8 CR: GRAY AND BROWN, MOD. WEATHERED, MOD. HARD, CLOSELY FRACTURED, SCHIST
							STRATA REC = 100% STRATA RQD = 0%
							18.8-21.9 WR: GRAY AND BROWN, SEV. WEATHERED, SOFT, V. CLOSELY FRACTURED, SCHIST WITH FELSIC LAYERS
							STRATA REC = 51.6% STRATA RQD = N/A

CORING TERMINATED AT 21.9 FT
 ELEVATION 1933.4 FT

DRILLER: F. COX CORE SIZE: HQ EQUIPMENT: DIEDRICH 50



Boring DET-1, Box 1 of 1, 10.8 feet to 21.9 feet.

SCALE 1:40 (1"=4")

Rock Core Photographs

**Bridge Number 71 Over Stony Fork Creek
On SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322, State Project No: 33659.1.1**



2736 ROWLAND ROAD
 RALEIGH, NORTH CAROLINA 27615
 Phone (919) 871-0800 Fax (919) 871-0803

N.C.D.O.T. GEOTECHNICAL UNIT
 BORING LOG

SHEET 1 OF 1

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PROJECT NO. 33659.1.1		ID. B-4322		COUNTY WILKES		GEOLOGIST C. BRUINSMA						
SITE DESCRIPTION BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)						GROUND WATER (ft)						
BORING NO. DET-2		BORING LOCATION 15+69		OFFSET 3' LT.		ALIGNMENT -DET-						
COLLAR ELEV. 1953.1 ft		NORTHING 896,001.9		EASTING 1,273,276.5		0 HR. 1.9						
TOTAL DEPTH 10.8 ft		DRILL MACHINE DIEDRICH 50		DRILL METHOD		24 HR. BACKFILL						
DATE STARTED 8-02-05		COMPLETED 8-02-05		SURFACE WATER DEPTH N/A								
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION
		0.5ft	0.5ft	0.5ft	0	20	40	60	80	100		
1953.10												EXISTING GROUND
	0.40	60/2									M	1952.50 ALLUV: BROWN, LOOSE, GRAVELLY SAND (A-1-b) WITH BOULDERS (1.0' - 2.0') CR: WHITE, PINK AND GRAY, SLI. WEATHERED TO FRESH, MOD. HARD TO V. HARD, V. CLOSELY TO WIDELY FRACTURED, PEGMATITE WITH GNEISS LAYERS
1950												
1945												
												1942.30 CORING TERMINATED AT ELEV. 1942.3' IN CR: WHITE, PINK AND GRAY, PEGMATITE WITH GNEISS LAYERS

CORE BORING REPORT

DATE: 8-02-05

PROJECT: 33659.1.1 I.D. NO.: B-4322 BORING NO: DET-2 GEOLOGIST: C. BRUINSMA

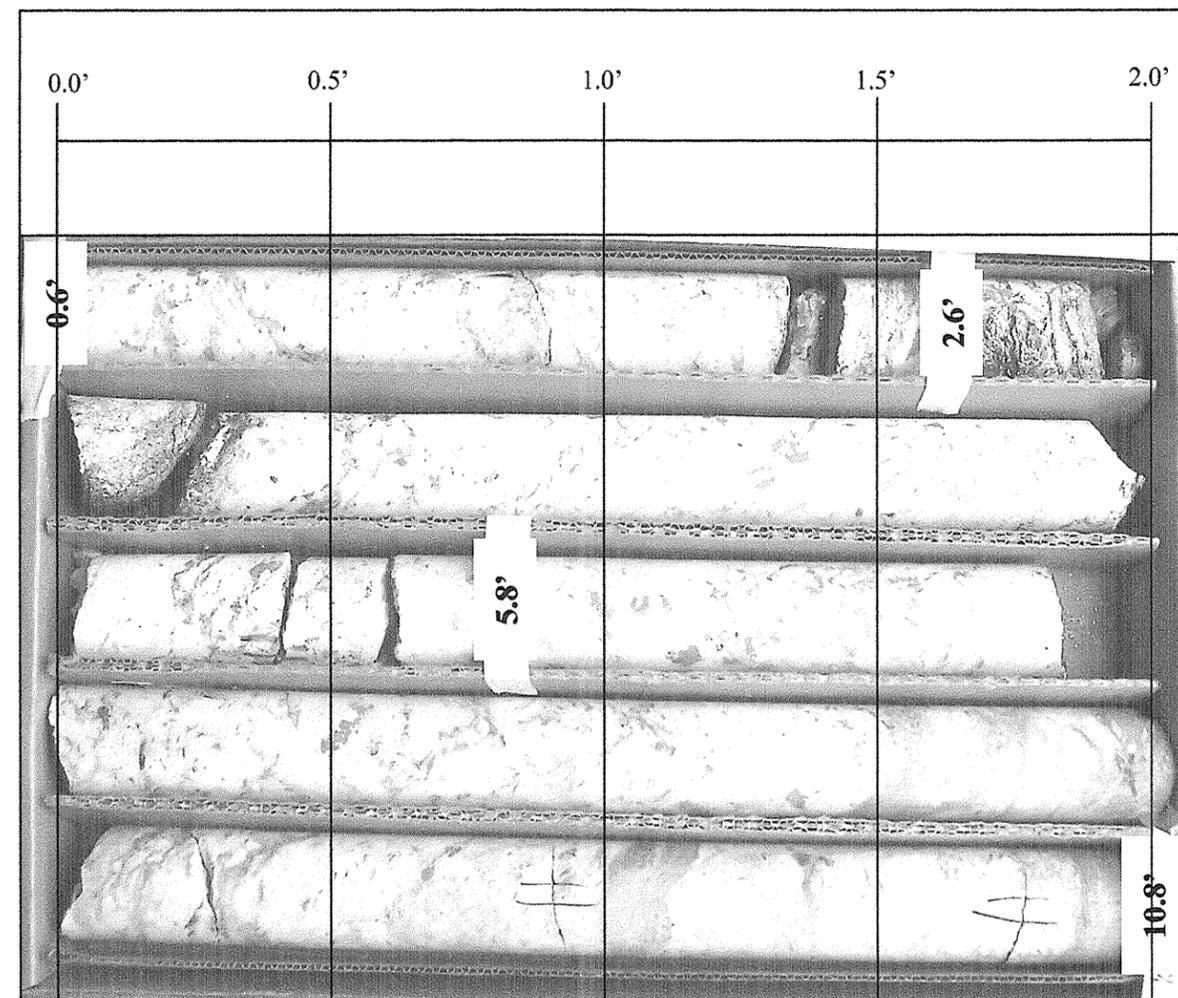
DESCRIPTION: BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)

COUNTY: WILKES COLLAR ELEV.: 1953.1 FT TOTAL DEPTH: 10.8 FT

ELEV. (FT)	DEPTH (FT)	DRILL RATE MIN/FT	RUN (FT)	REC FT %	RQD FT %	SAMP #	FIELD CLASSIFICATION AND REMARKS
1952.5	0.6	9:00	2.0	1.6/2.0	1.3/2.0		0.6-10.8 CR: WHITE, PINK AND GRAY, SLI. WEATHERED TO FRESH, MOD. HARD TO V. HARD, V. CLOSELY TO WIDELY FRACTURED, PEGMATITE WITH GNEISS LAYERS
		2:45					
1950.5	2.6			80%	65%		
1950.5	2.6	5:00	3.2	3.1/3.2	2.5/3.2		
		5:30					
		3:45					
		0:15/0.2					
1947.3	5.8			96.9%	78.1%		
1947.3	5.8	4:00	5.0	5.0/5.0	5.0/5.0		
		4:00					
		4:30					
		6:30					
1942.3	10.8	8:00		100%	100%		
							STRATA REC = 95.1% STRATA RQD = 86.3%

CORING TERMINATED AT 10.8 FT
 ELEVATION 1942.3 FT

DRILLER: F. COX CORE SIZE: HQ EQUIPMENT: DIEDRICH 50



Boring DET-2, Box 1 of 1, 0.6 feet to 10.8 feet.

SCALE 1:40 (1"=4")

Rock Core Photographs

**Bridge Number 71 Over Stony Fork Creek
On SR 1167 (Stony Fork Road)
Wilkes County, North Carolina
TIP No: B-4322, State Project No: 33659.1.1**

TIERRA, INC.

2736 ROWLAND ROAD, RALEIGH, NORTH CAROLINA 27615

SOIL CLASSIFICATION AND GRADATION SHEET

BRIDGE #71 OVER STONY FORK CREEK ON SR 1167 (STONY FORK ROAD)
 NCDOT Project No: 33659.1.1 - T.I.P. No: B-4322

WILKES COUNTY

TIERRA, INC. PROJECT NO: 6211-05-027

BORING #		SAMPLE #	TOTAL SAMPLE			MINUS 2.00 mm FRACTION				Atterberg Limits		MC
AASHTO Classification			PERCENT PASSING			PERCENT RETAINED						
STATION #	OFFSET (FEET)	DEPTH (FEET)	#10	#40	#200	Coarse Sand	Fine Sand	SILT	CLAY	LL	PI	%
DET-1		SS-5	64	33	9	66	23	7	4	24	NP	-
A-1-b												
14+56	3 LT	1.5-3.0										
DET-1		SS-6	74	39	14	62	22	10	6	24	NP	-
A-1-b												
14+56	3 LT	7.5-9.0										

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

PROJECT NO.: 33659.1.1 (B-4322)

F.A. NO.: BRZ-1167(1)

COUNTY: WILKES

DETOUR BRIDGE OVER STONY FORK CREEK ON SR 1167 (STONY FORK RD.)

Sample #	Boring #	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (ft)	Diameter (ft)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Young's Modulus (PSI)	Splitting Tensile Strength (PSI)	Remarks
RS-3	DET-1	11.1-11.6	Pegmatite	Zabg	20.0%	0.23	0.21	158.1	3,140.9	133,995		



DETOUR CENTERLINE PROFILE (-DET-), LOOKING DOWNSTATION FROM STATION 15+80 (-DET-)

SITE PHOTOS	
Bridge No. 71 Over Stony Fork Creek on SR 1167 (Stony Fork Road) Wilkes Co., North Carolina TIP: B-4322 State Project: 33659.1.1	
	TIERRA GEOTECHNICAL • MATERIALS ENGINEERING
<small>TIERRA, INC. 2736 ROWLAND RD. RALEIGH, NC 27615 PHONE (919) 871-0800 FAX (919) 871-0803</small>	



DETOUR END BENT 1, LOOKING FROM RIGHT TO LEFT



DETOUR END BENT 2, LOOKING FROM RIGHT TO LEFT

SITE PHOTOS	
Bridge No. 71 Over Stony Fork Creek on SR 1167 (Stony Fork Road) Wilkes Co., North Carolina TIP: B-4322 State Project: 33659.1.1	
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