

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33159.1.1 (B-3606)	1	17

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STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33159.1.1 (B-3606) F.A. PROJ. BRZ-1366(1)
 COUNTY ASHE
 PROJECT DESCRIPTION BRIDGE NUMBER 70 ON SR-1366 (ANDERSON HILL RD.) OVER BIG HORSE CREEK.

SITE DESCRIPTION _____

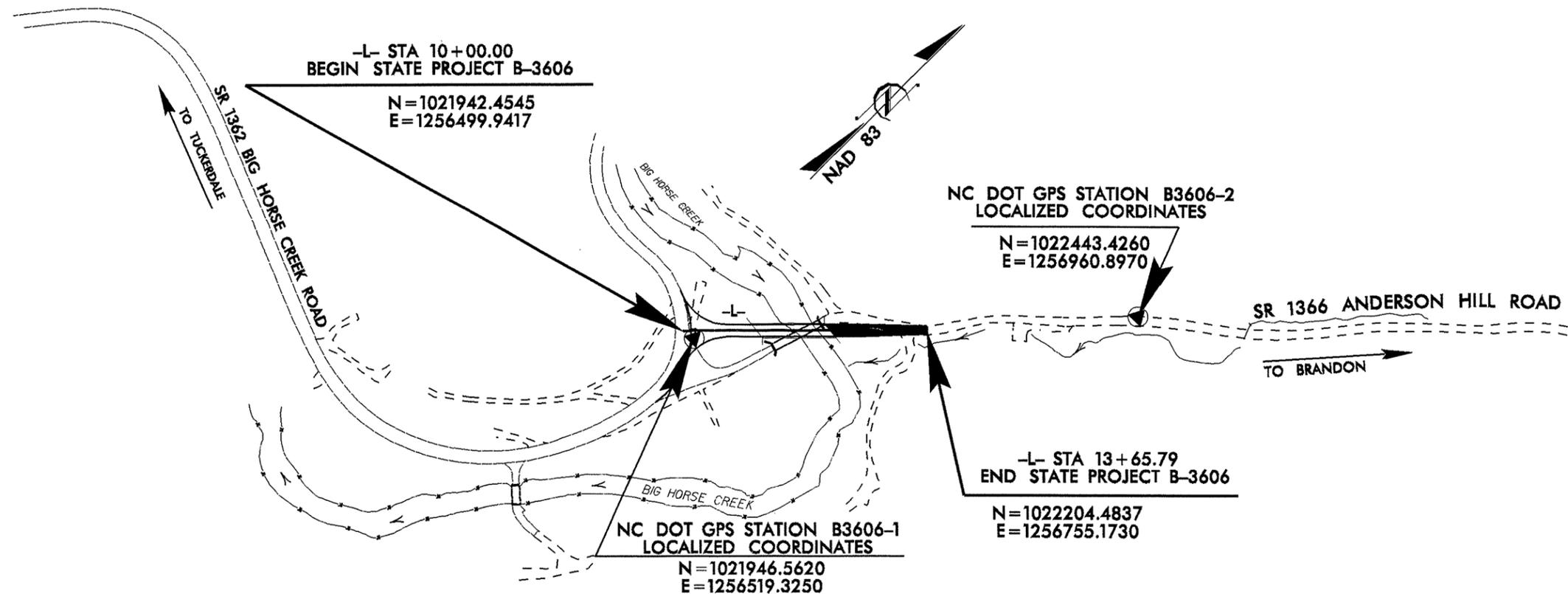
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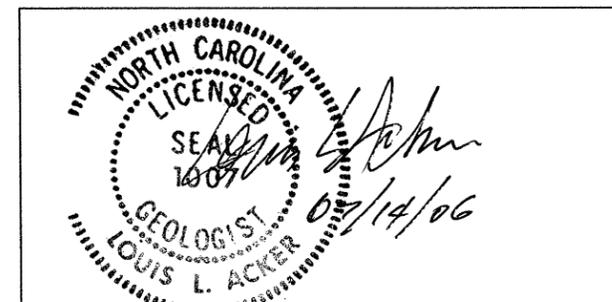
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PROJECT: 33159.1.1 ID: B-3606



PERSONNEL
L.L. ACKER, LG.
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 DATE **07-14-2006**



DRAWN BY: **M.M. HAGER, LG.**

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING 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 THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRN, 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) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS, IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:		ALLUVIUM (ALLUV.) - SOILS THAT 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 THAT 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 DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - 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 (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - 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 THAT 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, THAT 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 BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SRC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - 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 (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.					
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING							
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% 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) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)							
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-4, A-5, A-6, A-7		COMPRESSIBILITY SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE		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 KADLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, YIELDS SPT N VALUES > 100 BPF. SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KADLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL		FRESH, VERY SLIGHT, SLIGHT, MODERATE, MODERATELY SEVERE, SEVERE, VERY SEVERE, COMPLETE			
SYMBOL		GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP		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 KADLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, YIELDS SPT N VALUES > 100 BPF. SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KADLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		MUCK, FEAT					
% PASSING 10, 40, 200		LIQUID LIMIT PLASTIC INDEX		WEATHERING							
GROUP INDEX		USUAL TYPES OF MAJOR MATERIALS		ROCK DESCRIPTION							
GEN. RATING AS A SUBGRADE		FAIR TO POOR		ROCK DESCRIPTION							
PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30		FAIR TO POOR		ROCK DESCRIPTION							
CONSISTENCY OR DENSITY		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 (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD		VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT							
GENERAL GRANULAR MATERIAL (NON-COHESIVE) GENERAL SILT-CLAY MATERIAL (COHESIVE)		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD		VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT							
TEXTURE OR GRAIN SIZE		ABBREVIATIONS		INDURATION							
U.S. STD. SIEVE SIZE OPENING (MM) BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL) CLAY (CL)		HI. - HIGHLY MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY TCR - TRICONE REFUSAL		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.							
GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005		AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE. - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS		FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED							
SOIL MOISTURE - CORRELATION OF TERMS		EQUIPMENT USED ON SUBJECT PROJECT		INDURATION							
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST		FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED							
LL - LIQUID LIMIT PLASTIC RANGE (PI) PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT		ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG.-CARBIDE INSERTS CASING W/ ADVANCER TRICONE *STEEL TEETH TRICONE *TUNG.-CARB. CORE BIT		FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED							
PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY		HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B, N, XL, H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST		FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED							
COLOR DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.				FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED							



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

July 11, 2006

PROJECT NUMBER: 33159.1.1 (B-3606)
COUNTY: Ashe
DESCRIPTION: Bridge Number 70 on SR 1366 over Big Horse
Creek
SUBJECT: Geotechnical Report – Foundation Investigation

Site Description

This project is located in the northern part of Ashe County on SR 1366 (Anderson Hill Road), approximately 0.1 miles from the intersection with SR 1362 (Big Horse Creek Road) and 2.8 miles north of the intersection with NC 194 at the town of Lansing.

Big Horse Creek is a bold mountain stream with a pool and riffle flow over gravel, boulders and bedrock. The channel is 25 to 40 feet wide, set in a floodplain that is about 250 feet wide in the vicinity of the bridge. The bridge site is on a short, straight run of the creek between two right-hand bends, where the channel lies at the foot of the slope on the east side of the valley. A small tributary stream enters Big Horse Creek about 75 feet downstream of the bridge on the east bank. Hard crystalline rock crops out in the stream channel about 50 feet upstream of the bridge and on the stream bank 150 feet downstream.

The existing structure is a one-lane bridge approximately 12 feet wide and 78 feet long in two equal spans, which stand about 12 feet above the stream channel. It has concrete abutments and wing walls and a concrete interior bent with a strip footing founded on rock. Two small houses with outbuildings lie within 150 feet of the bridge on the west side of the stream, and a barn lies close beside the end bent on the east side of the stream.

Plans call for a new bridge 24 feet wide and 130 feet long, in 2 spans of 50 feet and 80 feet respectively. The new structure is to be built on a skew of 60 degrees.

The Geotechnical Engineering Unit conducted a foundation investigation in June, 2006. Two boring were made in the vicinity of each proposed bent. The borings were made with

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BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

a CME 550 power drilling machine using an NX casing advancer and NXWL diamond bit coring tools. Standard Penetration Tests (SPT's) were conducted at 5-foot intervals in soil and weathered rock. Five of the borings were rock core borings. Six rock core samples were submitted to a DOT laboratory for strength testing.

Soil and Rock Materials

Materials on this site are chiefly alluvium overlying hard crystalline rock. As much as 2 feet of saprolite and 7 feet of weathered rock have been found between the base of the alluvium and the top of the hard rock in some borings, while in other borings the alluvium directly overlies hard rock. Roadway embankment soils are found on the Left Side of End Bent Two.

The alluvial soils include 2 feet to about 4.5 feet of surficial, dark brown, soft or very soft, sandy silt (A-4) that grades downward in places to loose, silty sand (A-2-4). Those soils overlie 4.5 feet or less of coarse silty sand and gravel with boulders (A-1-b).

Thin saprolite soil, where found, consists of hard, gray or orange, sandy silt (A-4).

Weathered rock was identified by blow count and estimated from drilling rates. No samples were recovered for identification; however, it is likely that the parent lithologies of the weathered rock are the same as the crystalline lithologies described below.

The crystalline rock at this site is composed of two lithologies. The principal and most abundant lithology is dark gray-green, moderately hard, medium grained metagabbro that is composed of chlorite, feldspar, and black ferro-magnesian silicates. The rock is, in almost all occurrences, fresh and massive, with few fractures and only poorly to moderately developed foliation, which dips about 35 degrees.

The metagabbro is cut by white, hard, coarse granite in sills or veins that vary in thickness from a little less than 2 feet to a little more than 4 feet, as seen in the cores. The granite is fresh and massive.

Roadway embankment soil is composed of two layers. The upper layer consists of ABC roadway gravel placed over bouldery sand and gravel fill for a combined thickness of about 3 feet. The lower layer consists of 4.5 feet of soft to very soft, orange-brown, sandy, clayey silt (A-4).

Bent Descriptions

End Bent One (EB1)

This bent lies on the flood plain approximately 35 to 45 feet from the west bank of the stream. Borings near the Left and Right Sides (EB1-A and EB1-B, respectively) penetrated approximately 2 feet of alluvial silt overlying 4 to 5 feet of alluvial gravel. The boring at EB1-A encountered fresh hard rock immediately underlying the alluvium. The boring at EB1-B found approximately 5 feet of weathered rock between the base of

the alluvium and the hard rock line. The rock was composed of good to very good quality metagabbro with granite sills.

Interior Bent One (B-1)

This bent lies at the top of the bank on the west side of the creek. A boring on the Left Side (B1-A) was offset 10 feet back station from the bent, on the surface of the flood plain. The boring penetrated 6.5 feet of alluvium consisting of about 2 feet of surficial silt and 4.5 feet of alluvial gravel. Thin layers of hard saprolite and weathered rock, amounting to about 2 feet in thickness, were penetrated from the base of the alluvium to the hard rock line at a depth of 8.2 feet. The boring was advanced through hard rock with weathered rock seams to a depth of 12.7 feet, where coring was begun. Coring was carried from 12.7 feet to a final depth of 27.3 feet through fresh, very good quality metagabbro, with a few feet of granite at the base.

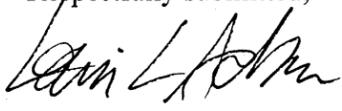
A boring on the Right Side (B1-B) penetrated almost 5 feet of alluvial silt and sand and 4 feet of basal gravel to encounter weathered rock at a depth of 9 feet and hard rock at 10.3 feet. Coring was begun at 10.7 feet and carried to a final depth of 28.9 feet. The rock consisted of 4.5 feet of granite overlying metagabbro. Both lithologies were fresh and good or very good quality, with the exception of about 1.5 feet of fractured rock at the base of the granite.

End Bent Two (EB2)

This boring is located about 15 feet from the east bank of the creek. The Left side of the bent is on the shoulder of the existing road, and the right side is on the flood plain.

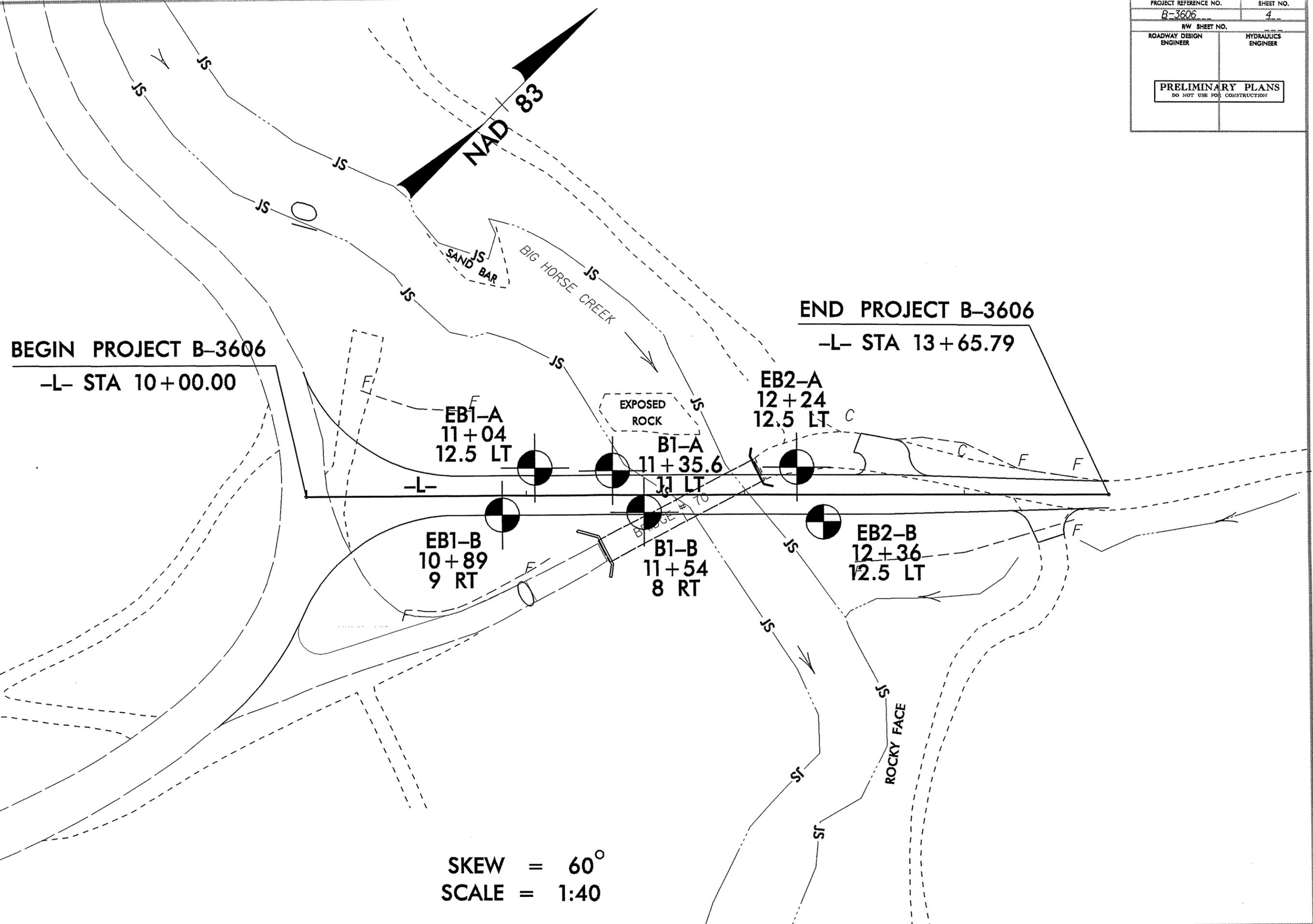
A boring on the Left Side (EB2-A) penetrated 7.5 feet of roadway embankment, including boulders in the upper 3 feet and sandy, clayey silt in the lower part. The boring continued through 4.5 feet of alluvial silt and sand with suspended small gravel. Weathered rock was encountered at the base of the alluvium at a depth of 12.1 feet. Hard rock was encountered at 15.2 feet and coring was begun at 15.8 feet. Coring was carried to a final depth of 24.1 feet in fair to very good quality granite and metagabbro.

A boring on the Right Side (EB2-B) penetrated about 5 feet of alluvial silt and alluvial basal gravel overlying saprolite. The boring was carried through about 2 feet of saprolite and 7 feet of weathered rock to encounter hard rock at a depth of 14.2 feet. The boring continued through 2 feet of hard rock without coring, and was terminated in hard rock at a depth of 16.2 feet.

Respectfully submitted,

Louis L. Acker, PG
Project Geologist

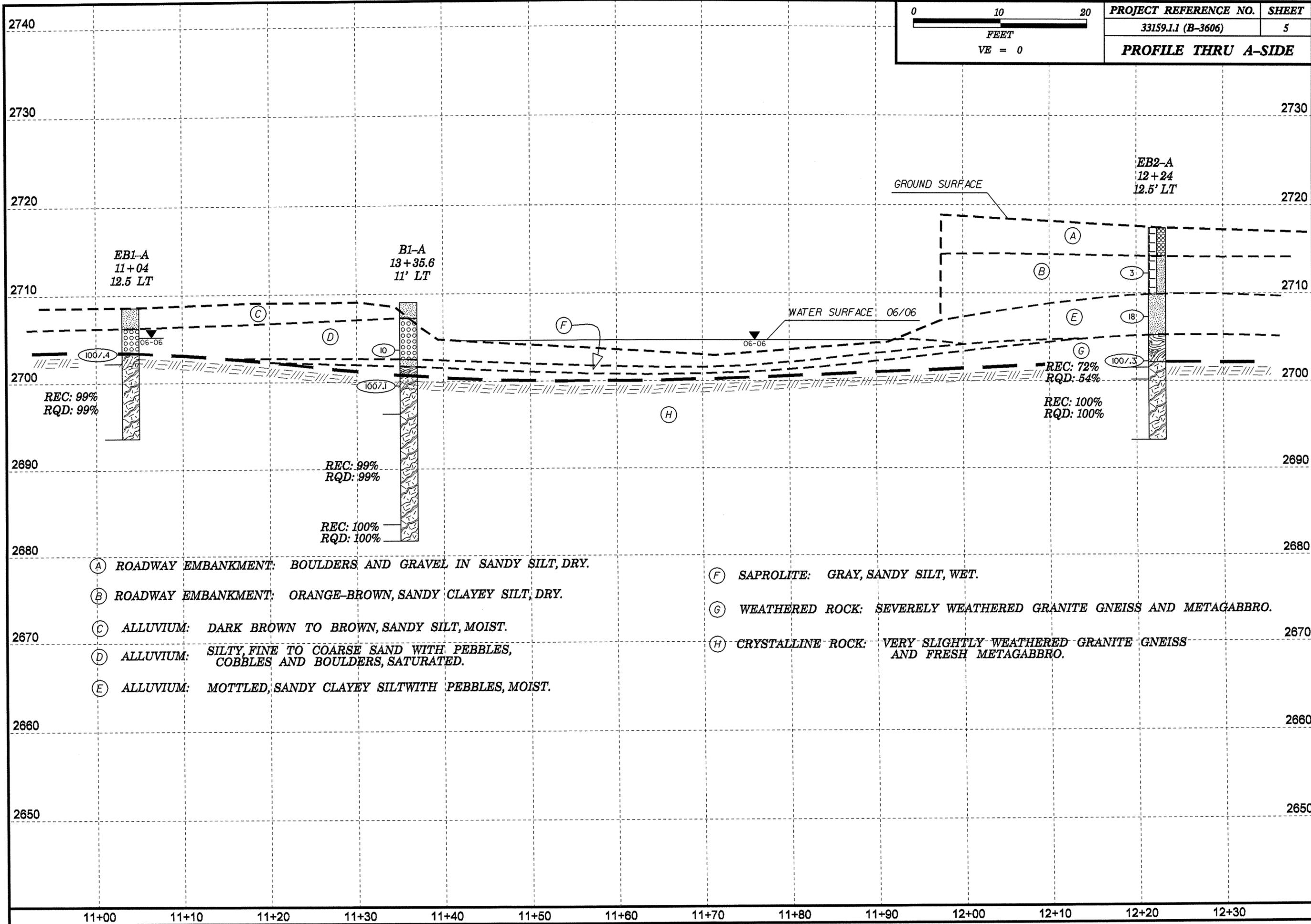
8/17/99

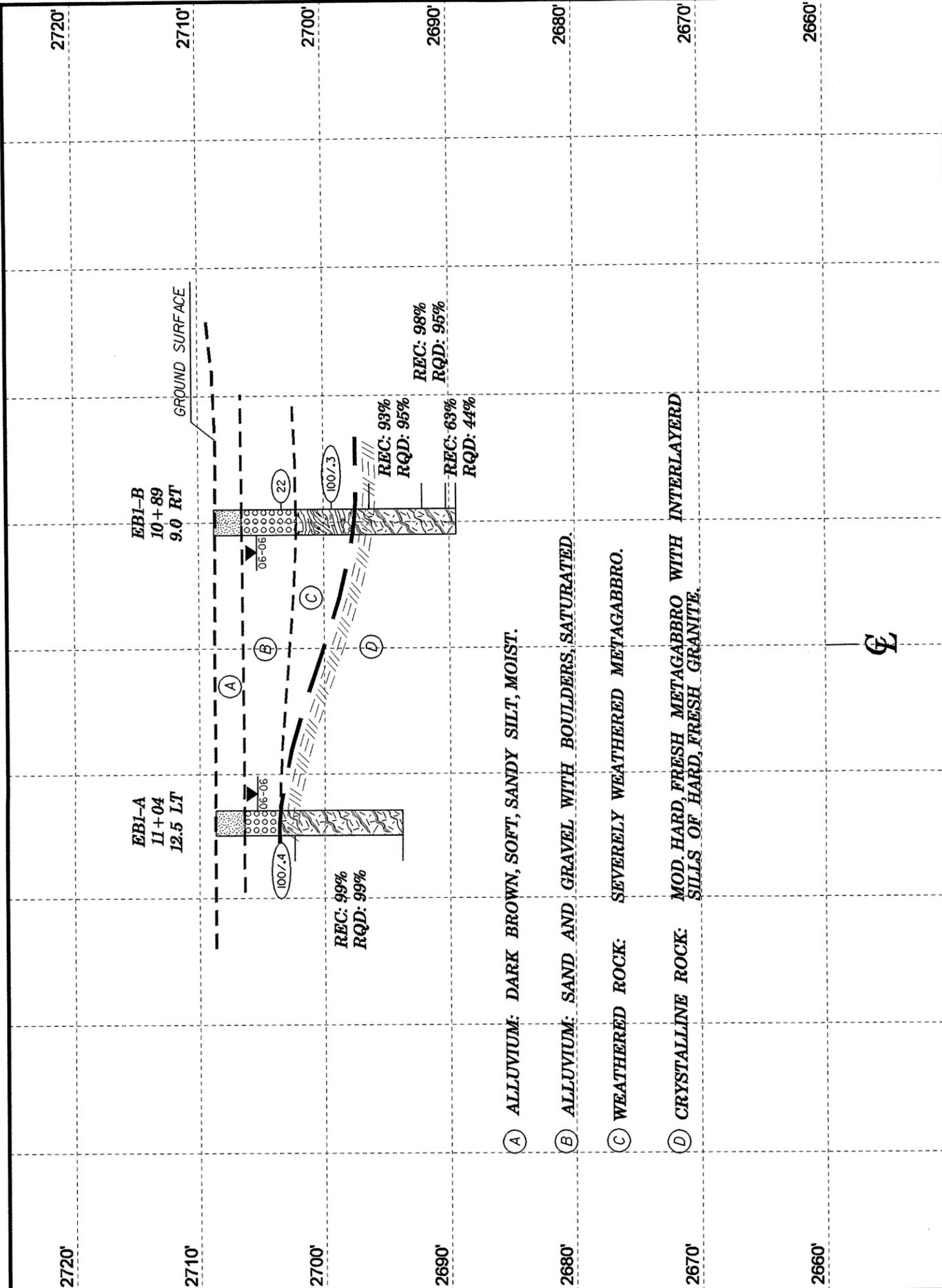
PROJECT REFERENCE NO. B-3606	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



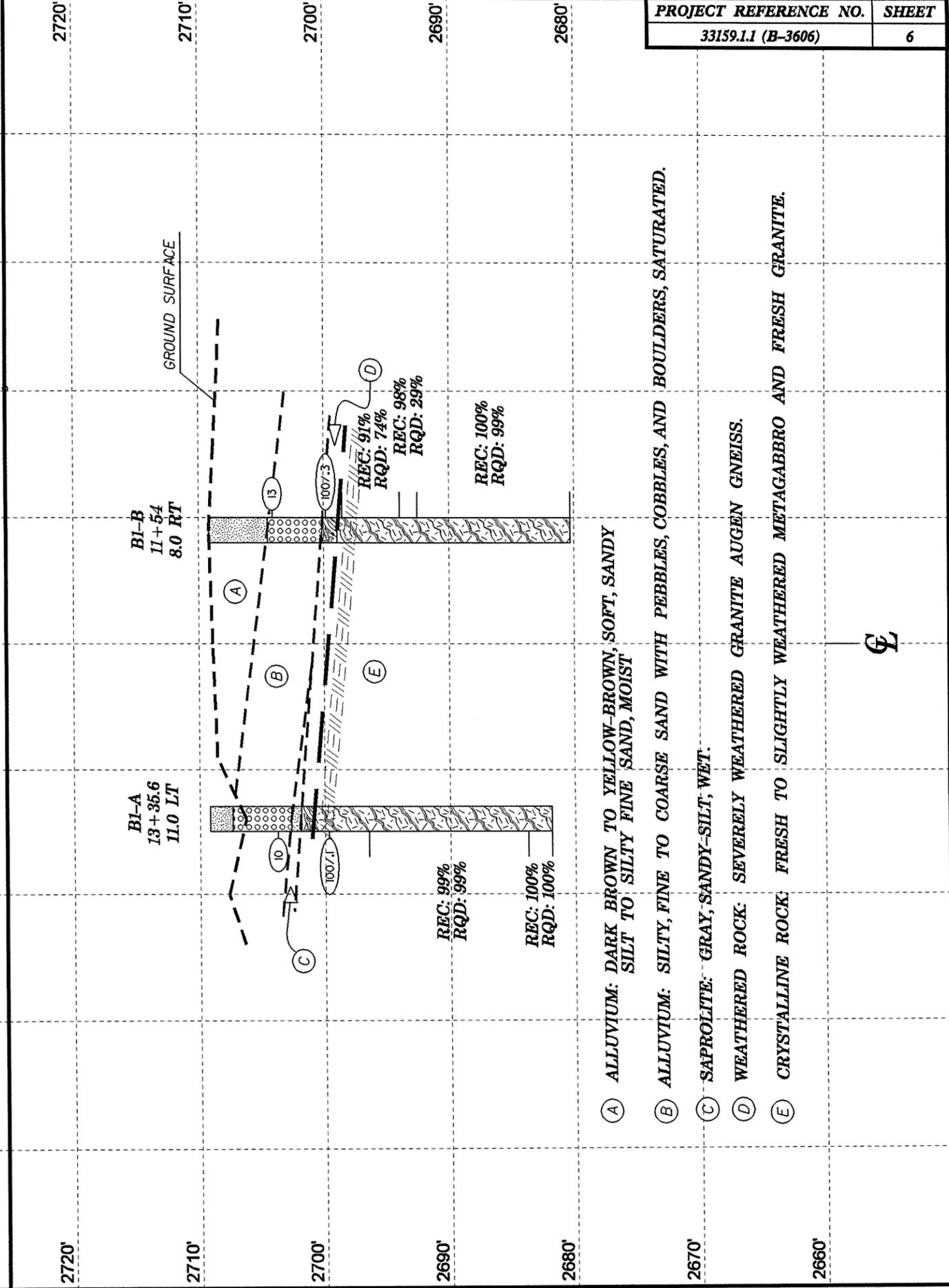
SKEW = 60°
 SCALE = 1:40

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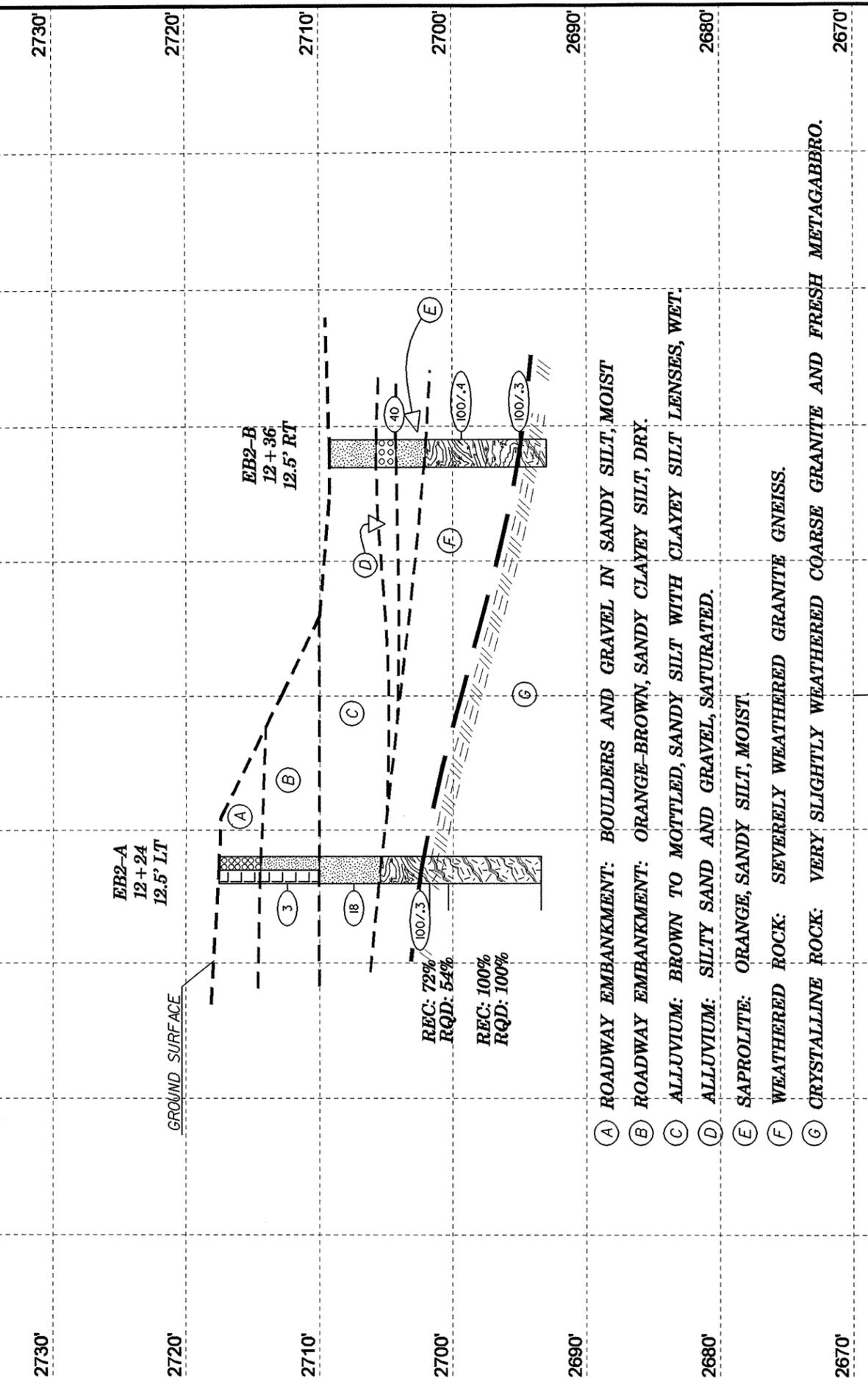




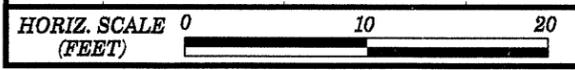
HORIZ. SCALE 0 10 20 (FEET) VE = 0 CROSS SECTION THRU EBI ALONG SKEW (60°)



HORIZ. SCALE 0 10 20 (FEET) VE = 0 CROSS SECTION THRU BI ALONG SKEW (60°)

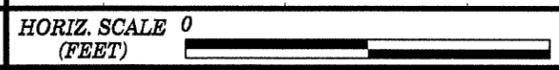


- (A) ROADWAY EMBANKMENT: BOULDERS AND GRAVEL IN SANDY SILT, MOIST
- (B) ROADWAY EMBANKMENT: ORANGE-BROWN, SANDY CLAYEY SILT, DRY.
- (C) ALLUVIUM: BROWN TO MOTTLED, SANDY SILT WITH CLAYEY SILT LENSES, WET.
- (D) ALLUVIUM: SILTY SAND AND GRAVEL, SATURATED.
- (E) SAPROLITE: ORANGE, SANDY SILT, MOIST.
- (F) WEATHERED ROCK: SEVERELY WEATHERED GRANITE GNEISS.
- (G) CRYSTALLINE ROCK: VERY SLIGHTLY WEATHERED COARSE GRANITE AND FRESH METAGABBRO.



VE = 0

**CROSS SECTION THRU EB2
ALONG SKEW (60°)**



VE =

title (1 or 2 lines)

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33159.1.1		ID B-3606		COUNTY ASHE		GEOLOGIST L. L. ACKER								
SITE DESCRIPTION BRIDGE NO. 70 ON SR 1366 OVER BIG HORSE CREEK							GND WATER							
BORING NO EB1-A		NORTHING 1022025.7		EASTING 1256563.6		0 HR N/A								
ALIGNMENT -L-		BORING LOCATION 11+04.000		OFFSET 12.50ft LT		24 HR 3.40ft								
COLLAR ELEV 2708.70ft		TOTAL DEPTH 14.90ft		START DATE 6/06/06		COMPLETION DATE 06/06/06								
DRILL MACHINE CME 550			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK 5.10ft			Log EB1-A, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
2708.70														
	4.80	100			0.4									Ground Surface
2700.00														ALLUVIUM: DARK BROWN, SOFT SANDY SILT
														ALLUVIUM: SAND AND GRAVEL WITH BOULDERS
														CRYSTALLINE ROCK: MOD. HARD, FRESH GREEN METAGABBRO REC=99 RQD=99
2693.80														TERMINATED BORING IN HARD CRYSTALLINE ROCK AT ELEVATION 2693.8 FEET.

PROJECT NO: 33159.1.1 (B-3606)
 COUNTY: Ashe

CORE BORING REPORT

EB1-A

CORE 1: 5.6 - 9.9

REC=98% RQD=98%

CORE 2: 9.9 - 14.9

REC=98% RQD=98%

LAYER 1: 5.6 - 6.3 Alluvial boulders

LAYER 2: 6.3 - 14.9 Moderately hard, fresh, grey-green metagabbro, no natural breaks. Poorly developed foliation at 35 degrees. REC= 99% RQD = 99%

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO: 33159.1.1 (B-3606)
 COUNTY: Ashe

PROJECT NO 33159.1.1		ID B-3606		COUNTY ASHE		GEOLOGIST L. L. ACKER								
SITE DESCRIPTION BRIDGE NO. 70 ON SR 1366 OVER BIG HORSE CREEK						GND WATER								
BORING NO EB1-B		NORTHING 1021999.9		EASTING 1256568.5		0 HR N/A								
ALIGNMENT -L-		BORING LOCATION 10+89.000		OFFSET 9.00R RT		24 HR 3.50ft								
COLLAR ELEV 2708.80ft		TOTAL DEPTH 19.30ft		START DATE 6/06/06		COMPLETION DATE 06/06/06								
DRILL MACHINE CME 550				DRILL METHOD SPT CORE BORING		HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH				DEPTH TO ROCK 11.20ft		Log EB1-B, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75					100
2708.80														
	4.40	5	13	9	1.0									ALLUVIUM: DARK BROWN SOFT, SANDY SILT
														ALLUVIUM: SAND AND GRAVEL WITH BOULDERS
														WEATHERED ROCK
2700.00	9.40	68	32		0.3									CRYSTALLINE ROCK NOT CORED
														CRYSTALLINE ROCK: MOD. HARD, FRESH METAGABBRO REC=93 RQD=88
														CRYSTALLINE ROCK: HARD, FRESH GRANITE REC=98 RQD=95
2689.90														CRYSTALLINE ROCK: MOD. HARD, FRESH METAGABBRO REC=63 RQD=44
														TERMINATED BORING IN HARD CRYSTALLINE ROCK AT ELEVATION 2689.5 FEET

CORE BORING REPORT

EB1-B

CORE 1: 12.4 - 14.3
 CORE 2: 14.3 - 19.3

REC=80% RQD=80%
 REC=96% RQD=86%

LAYER 1: 12.4 - 16.6 Moderately hard, dark gray metagabbro. 2 pieces, longest piece 3.8 feet. 1 joint at 35 degrees, moderately rough, clean (may be machine break). REC=93% RQD=88%

LAYER 2: 16.6 - 18.5 Hard, fresh, white granite. 2 pieces, longest piece 1.8 feet. 1 joint at 45 degrees in sheared contact near base, moderately rough, coated with chlorite and mica. REC=98% RQD=95%

LAYER 3: 18.5 - 19.3 Moderately hard, fresh, metagabbro, 4 pieces, longest piece 1.8 feet. Foliated at 35 degrees. 4 joints on foliation, smooth to moderately rough, coated with chlorite. 1 joint at 45 degrees, very rough, coated with chlorite. REC=63% RQD=44%

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33159.1.1		ID B3606		COUNTY ASHE		GEOLOGIST L. L. ACKER						
SITE DESCRIPTION BRIDGE 70 ON SR 1366 OVER BIG HORSE CREEK						GND WATER						
BORING NO B1-A						0 HR N/A						
ALIGNMENT -L-		NORTHING 1022050.1		EASTING 1256589.5		24 HR N/A						
COLLAR ELEV 2709.21ft		BORING LOCATION 13+35.6		OFFSET 11.0 R/LT								
DRILL MACHINE CME 550		DRILL METHOD CORE BORING		COMPLETION DATE 06/13/06								
SURFACE WATER DEPTH		DEPTH TO ROCK 8.20ft		HAMMER TYPE AUTOMATIC								
				Log B1-A, Page 1 of 1								
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
2709.21												
	4.40	3	5	5	1.0							ALLUVIUM: BROWN, SOFT SANDY SILT
	9.40	100			0.1							ALLUVIUM: SILTY, FINE TO COARSE SAND WITH PEBBLES, COBBLES AND BOULDERS
												SAPROLITE: GRAY SANDY SILT
												WEATHERED ROCK
												CRYSTALLINE ROCK WITH WEATHERED ROCK SEAMS (NOT CORED)
												CRYSTALLINE ROCK: MODERATELY HARD, V. SLI. WEATHERED TO FRESH META-GABBRO REC=99 RQD=99
												CRYSTALLINE ROCK: HARD, FRESH GRANITE GNEISS REC=100 RQD = 100
												TERMINATED BORING IN HARD CRYSTALLINE ROCK AT ELEVATION 2681.9 FEET.

PROJECT NO: 33159.1.1 (B-3606)
 COUNTY: Ashe

CORE BORING REPORT

B1-A

CORE 1: 12.7 - 17.3 REC=98% RQD=98%
 CORE 2: 17.3 - 22.3 REC=100% RQD=98%
 CORE 3: 22.3 - 27.3 REC=98% RQD=98%

LAYER 1: 12.7 - 25.4 Moderately hard, fresh to very slightly weathered, green metagabbro. 3 pieces, longest piece 7.1 feet. Poorly foliated at 20 degrees. 1 joint at 50 degrees, rough, coated with Fe oxide.
 1 joint at 55 degrees opposite direction (2 close breaks), moderately rough, coated with chlorite, Fe oxide and a little Mn oxide.
 REC= 99% RQD=99%

LAYER 2: 25.4 - 27.3 Hard, fresh, white, coarse granite gneiss. 1 piece, no joints.
 REC=100% RQD=100%

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33159.1.1	ID B-3606	COUNTY ASHE	GEOLOGIST L. L. ACKER
SITE DESCRIPTION BRIDGE NO. 70 ON SR 1368 OVER BIG HORSE CREEK			GND WATER
BORING NO B1-B	NORTHING 1022047.2	EASTING 1256613.1	0 HR N/A
ALIGNMENT -L-	BORING LOCATION 11+54.000	OFFSET 8.00R RT	24 HR N/A
COLLAR ELEV 2709.20R	TOTAL DEPTH 28.90R	START DATE 6/08/06	COMPLETION DATE 06/08/06
DRILL MACHINE CME 550	DRILL METHOD SPT CORE BORING	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH	DEPTH TO ROCK 10.30R	Log B1-B, Page 1 of 1	

PROJECT NO: 33159.1.1 (B-3606)
 COUNTY: Ashe

CORE BORING REPORT

B1-B

CORE 1: 10.7 – 13.9 REC=98% RQD=34%
 CORE 2: 13.9 – 18.9 REC=100% RQD=88%
 CORE 3: 18.9 – 23.9 REC=100% RQD=99%
 CORE 4: 23.9 – 28.9 REC=100% RQD=100%

LAYER 1: 10.7 – 15.3 Hard, fresh white, coarse granite. 13 pieces plus rubble, longest piece 1.4 feet. Highly fractured from 11.7 to 12.5.

1 joint at 85 degrees, rough, with a little Fe oxide stain.
 Approx. 4 joints at 40 degrees in fracture zone, rough, coated with Fe oxide.
 Chlorite phyllite seam 14.7 – 14.9, intact. REC=91% RQD=74%

LAYER 2: 15.3 – 16.7 Hard, fresh, dark green, fine metagabbro. 18 pieces, longest piece 0.4 feet. Foliation dips 25 degrees.

6 joints on foliation, smooth, clean, ADS=0.21 feet.
 2 joints at 80 degrees, very rough, clean. REC=98% RQD=29%

LAYER 3: 16.7 – 28.9 Moderately hard, fresh, dark green metagabbro. 2 pieces, longer piece 8.8 feet. 1 foliation joint dipping 15 degrees in small proto-shear zone at 19.9 feet, smooth, clean. Otherwise very poorly foliated.

REC=100% RQD=99%

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
2709.20												Ground Surface
	4.10	1	7	6	1.0							ALLUVIUM: DARK BROWN TO YELLOW BROWN, SILTY, FINE TO COARSE SAND
	9.10	38	62		0.3							ALLUVIUM: SAND AND GRAVEL WITH BOULDERS
												WEATHERED ROCK
												CRYSTALLINE ROCK NOT CORED
												CRYSTALLINE ROCK: HARD, FRESH GRANITE GNEISS REC=91 RQD=74
												CRYSTALLINE ROCK: HARD FRESH METAGABBRO REC=98 RQD=29
												CRYSTALLINE ROCK: MOD. HARD, FRESH METAGABBRO REC=100 RQD=99
												TERMINATED BORING IN HARD CRYSTALLINE ROCK AT ELEVATION 2680.3 FEET

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33159.1.1		ID B3606		COUNTY ASHE		GEOLOGIST L. L. ACKER							
SITE DESCRIPTION BRIDGE 70 ON SR 1366 OVER BIG HORSE CREEK							GND WATER						
BORING NO EB2-A		NORTHING 1022111.6		EASTING 1256647.3		0 HR N/A							
ALIGNMENT -L-		BORING LOCATION 12+24.000		OFFSET 12.50R LT		24 HR N/A							
COLLAR ELEV 2717.55R		TOTAL DEPTH 24.10R		START DATE 6/13/06		COMPLETION DATE 06/13/06							
DRILL MACHINE CME 550			DRILL METHOD CORE BORING			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK 15.20R			Log EB2-A, Page 1 of 1							
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75				
2717.55													
	4.10	3	2	1	1.0	3							ROADWAY EMBANKMENT: BOULDERS AND GRAVEL IN SANDY SILT
2710.00	9.10	5	6	12	1.0	18							ROADWAY EMBANKMENT: ORANGE-BROWN SANDY, CLAYEY SILT
	14.10	100			0.3				100				ALLUVIUM: MOTTLED SANDY, CLAYEY SILT WITH PEBBLES
2700.00													WEATHERED ROCK
													HARD ROCK NOT CORED
													HARD ROCK: V. SLI. WEATHERED WHITE COARSE GRANITE GNEISS REC=72 RQD=54
2693.45													HARD ROCK: FRESH, GREEN META-GABBRO REC=100 RQD=100
													TERMINATED BORING IN HARD CRYSTALLINE ROCK AT ELEVATION 2693.45 FEET.

PROJECT NO: 33159.1.1 (B-3606)
 COUNTY: Ashe

CORE BORING REPORT

EB2-A

CORE 1: 15.8 - 19.1
 CORE 2: 19.1 - 24.1

REC=85% RQD=79%
 REC=100% RQD=100%

LAYER 1: 15.8 - 17.2 Hard, very slightly weathered, white, coarse granite gneiss. 2 pieces, longest piece 0.8 feet. Poorly developed foliation at 30 degrees. 2 joints on foliation, smooth to moderately rough, coated with chlorite and Fe oxide. REC=72% RQD=54%

LAYER 2: 17.2 - 24.1 Moderately hard, fresh, dark green metagabbro grading to chlorite phyllite. 2 pieces, longer piece 4.4 feet. Foliated at 30 degrees. 1 joint on foliation, smooth, coated with Fe oxide. REC=100% RQD=100%

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33159.1.1		ID B3606		COUNTY ASHE		GEOLOGIST L. L. ACKER						
SITE DESCRIPTION BRIDGE 70 ON SR 1366 OVER BIG HORSE CREEK							GND WATER					
BORING NO EB2-B		NORTHING 1022102.8		EASTING 1256673.6		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 12+36.000		OFFSET 12.50ft RT		24 HR 3.90ft						
COLLAR ELEV 2709.25ft		TOTAL DEPTH 16.20ft		START DATE 6/14/06		COMPLETION DATE 06/14/06						
DRILL MACHINE CME 550			DRILL METHOD ROTARY W/O MUD			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH N/A			DEPTH TO ROCK 14.20ft			Log EB2-B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
2709.25												
	3.90	22	13	27	1.0							ALLUVIUM: BROWN SANDY SILT
	8.90	100			0.4							ALLUVIUM: SILTY SAND AND GRAVEL
2700.00												SAPROLITE: ORANGE SANDY SILT
	13.90	100			0.3							WEATHERED ROCK
2693.05												CRYSTALLINE ROCK NOT CORED
						TERMINATED BORING IN HARD CRYSTALLINE ROCK AT ELEVATION 2693.05 FEET.						



**FIELD
 SCOUR REPORT**

WBS: 33159.1.1 TIP: B-3606 COUNTY: ASHE

DESCRIPTION(1): Bridge No. 70 on SR 1366 over Big Horse Creek

EXISTING BRIDGE

Information from: Field Inspection Microfilm (reel pos:)
 Other (explain) _____

Bridge No.: 70 Length: 81 Total Bents: 3 Bents in Channel: 1 Bents in Floodplain: 2
 Foundation Type: Concrete footings

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: None

Interior Bents: Minor scour on upstream side - possibly undermining footing

Channel Bed: None

Channel Bank: None

EXISTING SCOUR PROTECTION

Type(3): Concrete wing walls, boulder armor on upstream embankment

Extent(4): Walls 5 feet in up- and downstream directions, armor 15 feet.

Effectiveness(5): Yes

Obstructions(6): None

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): boulders, outcropping rock

Channel Bank Material(8): sand, gravel and cobbles

Channel Bank Cover(9): grass, brush

Floodplain Width(10): 250 feet

Floodplain Cover(11): grass, trees

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tendency(13): West, towards EB1

Observations and Other Comments: _____

DESIGN SCOUR ELEVATIONS(14)

Feet x Meters

BENTS

		B1							
LT	RT	2699.8							
		2698							

Comparison of DSE to Hydraulics Unit theoretical scour:
 Not within 5 feet of theoretical scour - material is weathered rock and hard rock

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

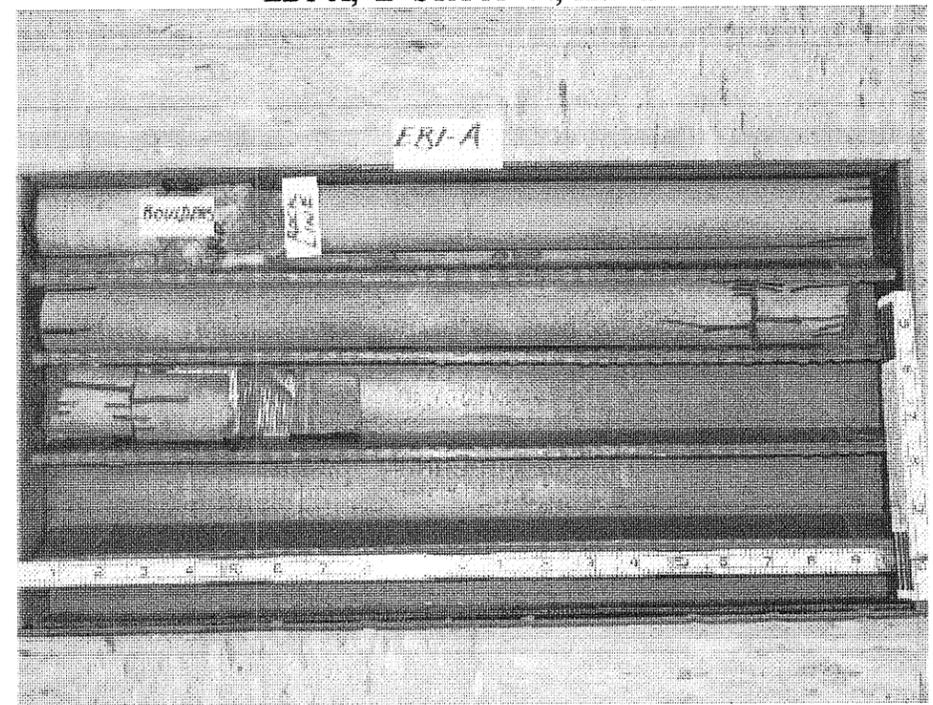
Bed or Bank						
Sample No.						
Retained #4						
Passed #10						
Passed #40						
Passed #200						
Coarse Sand						
Fine Sand						
Silt						
Clay						
LL						
PI						
AASHTO						
Station						
Offset						
Depth						

Reported by: M. M. Hager, LG

Date: 6/7/2006

33159.1.1 (B-3606) Ashe Co. Bridge No. 70 on SR-1366 Over Big Horse Creek.

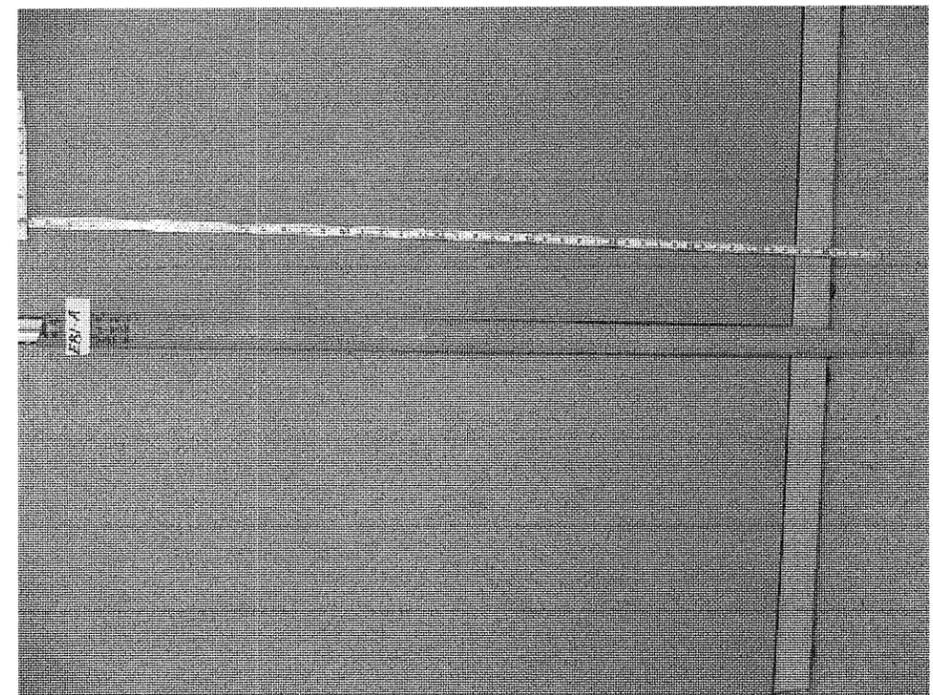
EB1-A; -L- STA 11+04, 12.5' LT



33159.1.1 (B-3606) Ashe Co. Bridge No. 70 on SR-1366 Over Big Horse Creek.



EB1-B; -L- STA 10+89, 9' RT

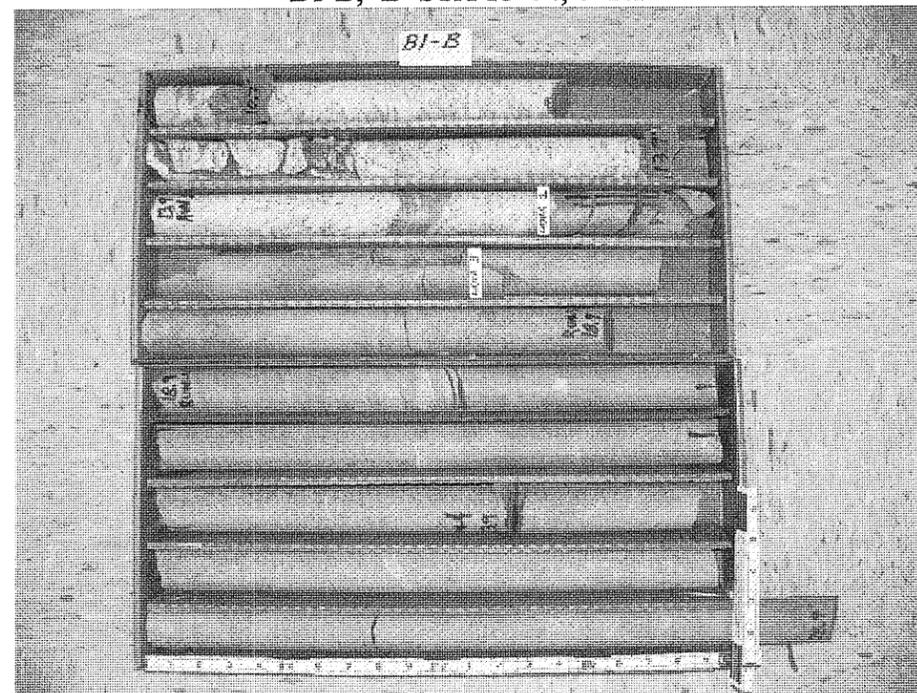


33159.1.1 (B-3606) Ashe Co. Bridge No. 70 on SR-1366 Over Big Horse Creek.

B1-A; -L- STA 11+35.6, 11' LT

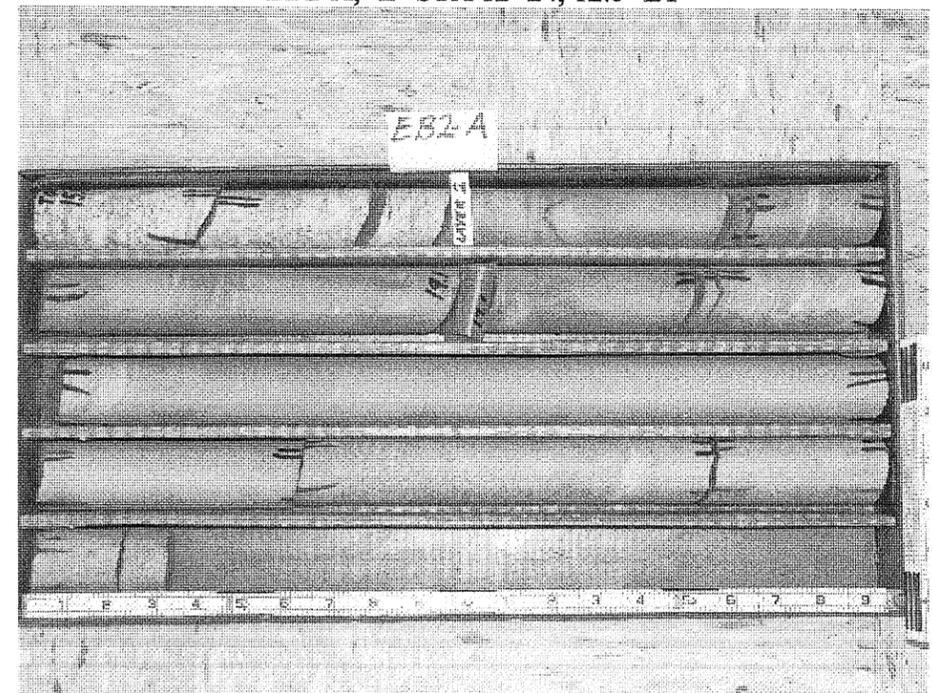


B1-B; -L- STA 11+54, 8' RT



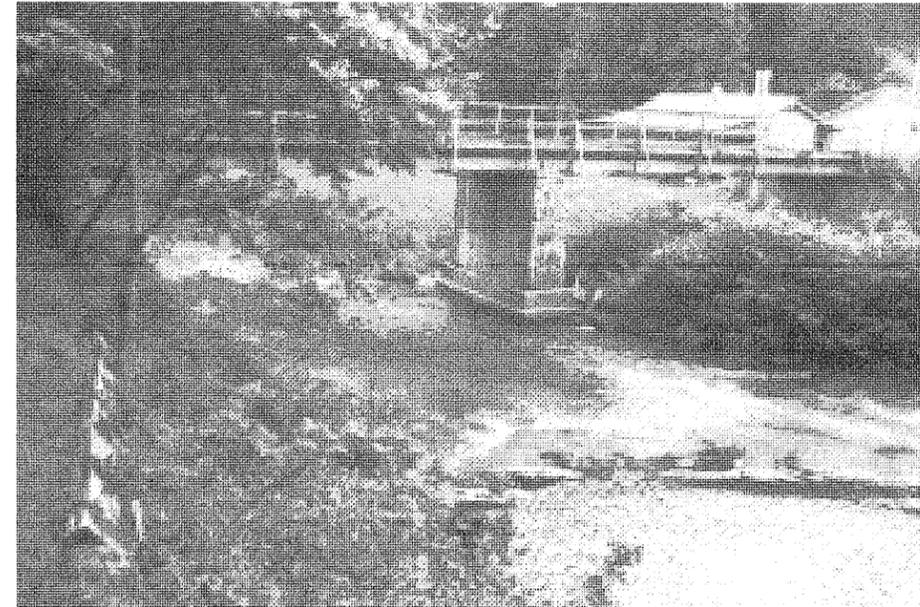
33159.1.1 (B-3606) Ashe Co. Bridge No. 70 on SR-1366 Over Big Horse Creek.

EB2-A; -L- STA 12+24, 12.5' LT



33159.1.1 (B-3606) Ashe Co. Bridge No. 70 on SR-1366 Over Big Horse Creek.

View Looking Downstream



View Looking Upstream

