

PROJECT: 8.2845001 ID: B-3813

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 8.2845001 I.D. NO. B-3813

F.A. PROJECT _____

COUNTY BUNCOMBE

PROJECT DESCRIPTION _____

SITE DESCRIPTION BRIDGE #250 ON SR-1742

OVER FLAT CREEK

STATE	STATE PROJECT REFERENCE NO.	SHEET	TOTAL SHEETS
N.C.	B-3813	1	18
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
8384001		P.E.	
		CONST.	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACED) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

INVESTIGATED BY P.O. LOCKAMY PERSONNEL J.T. WILLIAMS

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

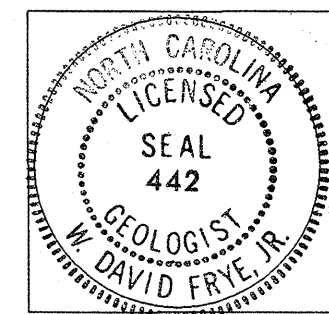
SUBMITTED BY W.D. FRYE T.P. DANIEL

DATE APRIL 2003

DRAWN BY: R.E. RIDDLE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.



SEAL
SIGNATURE W. David Frye, Jr.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

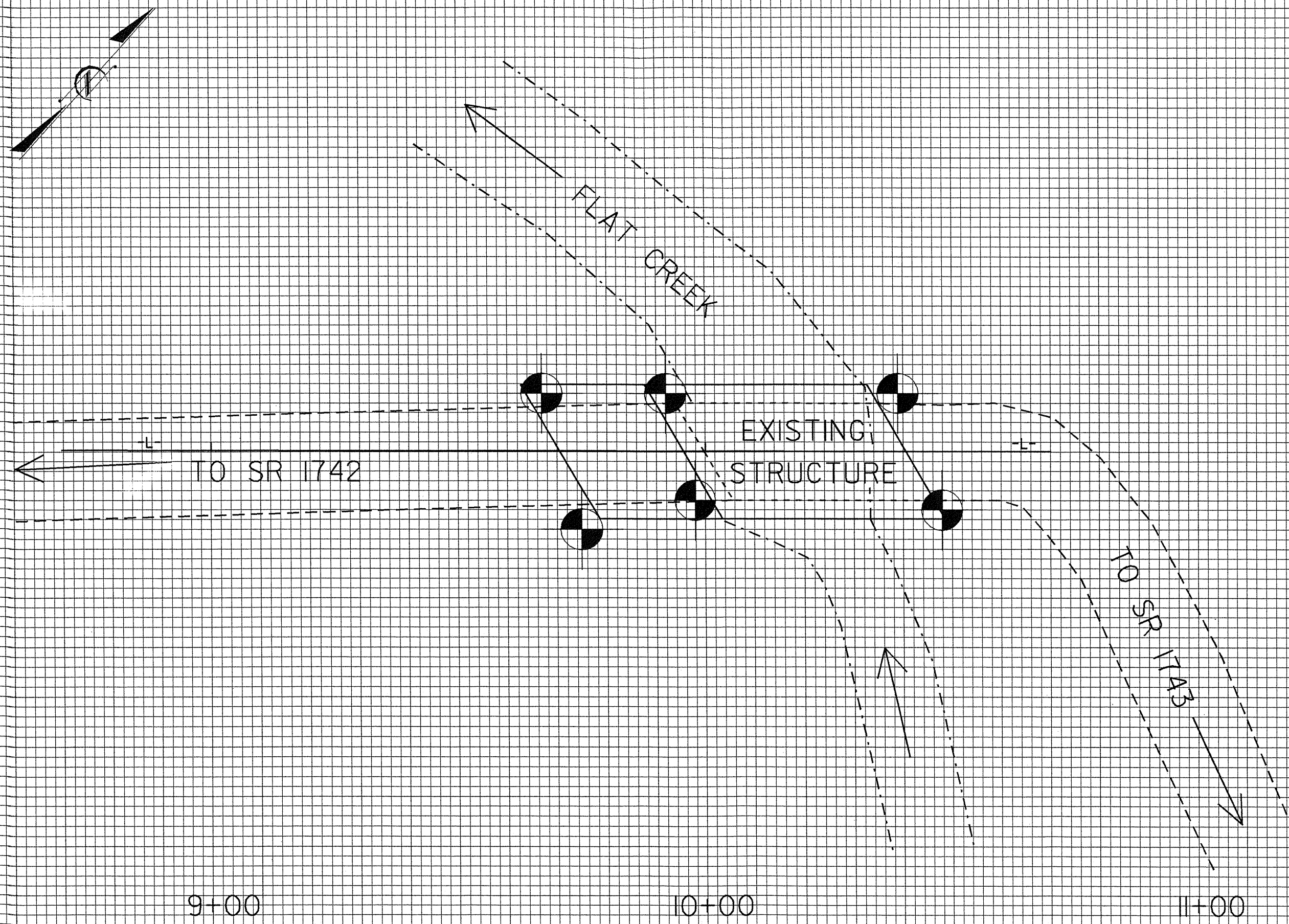
ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-3813	8.2845001	2	18

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

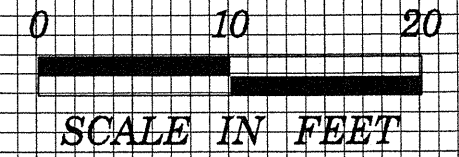
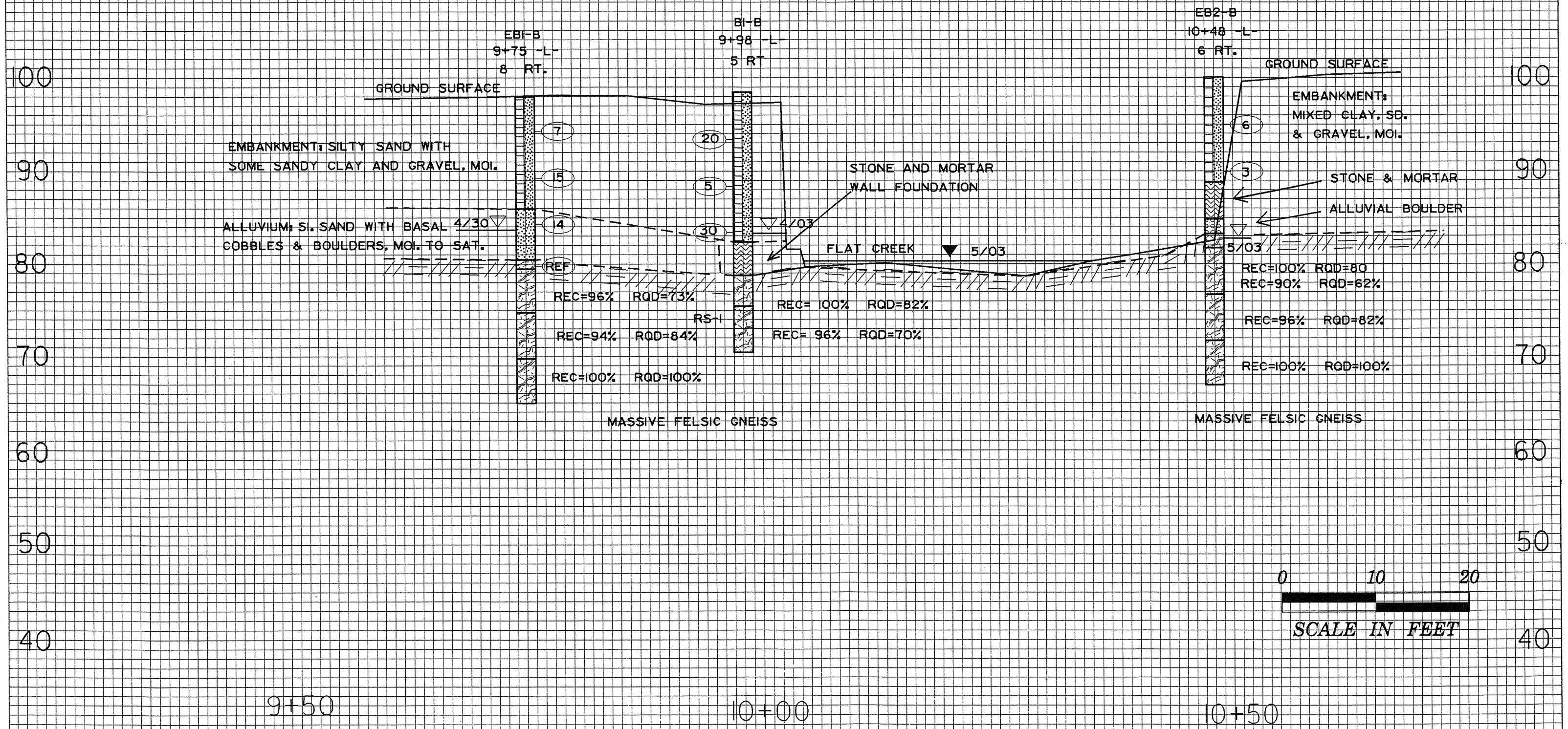
SOIL DESCRIPTION				GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS							
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T298, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i>				WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.				HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:				ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN 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 SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 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				WEATHERING							
GENERAL CLASS. GRANULAR MATERIALS (>35% PASSING #200) SILT-CLAY MATERIALS (>85% PASSING #200) ORGANIC MATERIALS				MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.				WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT.				CRSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.							
GROUP CLASS. A-1, A-1-b, A-2, A-2-4, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, A-7-5, A-7-6, A-1, A-2, A-3, A-4, A-5, A-6, A-7				COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50				NON-CRSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.				COASTAL PLAIN SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.							
SYMBOL				PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% LITTLE 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				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.							
% PASSING # 10 # 40 # 200				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 SEEPAGE.				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.							
LIQUID LIMIT PLASTIC INDEX GROUP INDEX				MISCELLANEOUS SYMBOLS ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS INFERRED SOIL BOUNDARIES ALLUVIAL SOIL BOUNDARY DIP/DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD				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 BPF.							
USUAL TYPES OF MAJOR MATERIALS STONE FRAGS, GRAVEL AND SAND FINE SAND SILTY OR CLAYEY GRAVEL AND SAND SILTY SOILS CLAYEY SOILS				SAMPLE DESIGNATIONS S- BULK SAMPLE SS- SPLIT SPOON SAMPLE ST- SHELBY TUBE SAMPLE RS- ROCK SAMPLE RT- RECOMPACTED TRIAXIAL SAMPLE CBR - CBR SAMPLE				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.							
GEN. RATING AS A SUBGRADE EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE				ABBREVIATIONS AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED FRAGS. - FRAGMENTS MED. - MEDIUM				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.							
CONSISTENCY OR DENSENESS PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)				EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: MOBILE B- BK-51 CME-45 CME-550 PORTABLE HOIST OTHER OTHER				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 OTHER				HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST OTHER				MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.			
TEXTURE OR GRAIN SIZE 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.)				FRACTURE SPACING TERM SPACING BEDDING TERM THICKNESS				SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.				VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.							
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION				INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.				VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.				FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.							
PLASTICITY NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY				FRACTURE SPACING TERM SPACING BEDDING TERM THICKNESS				MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.				MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.							
COLOR DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.				INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.				HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.				INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.							
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION				INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.				VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.							

PLAN VIEW



PROFILE

14' RT. OF -L- BRIDGE NO. 250



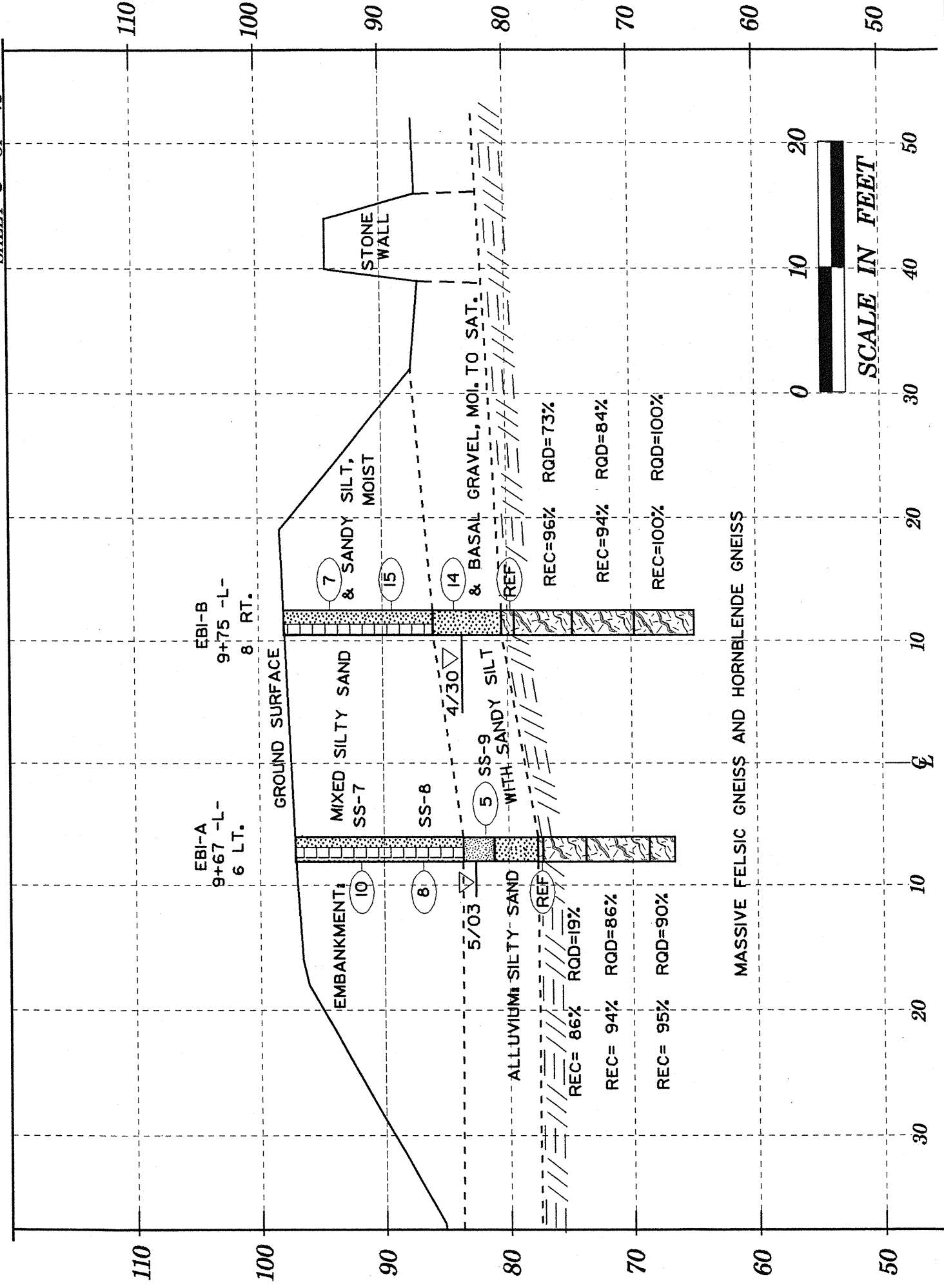
9+50

10+00

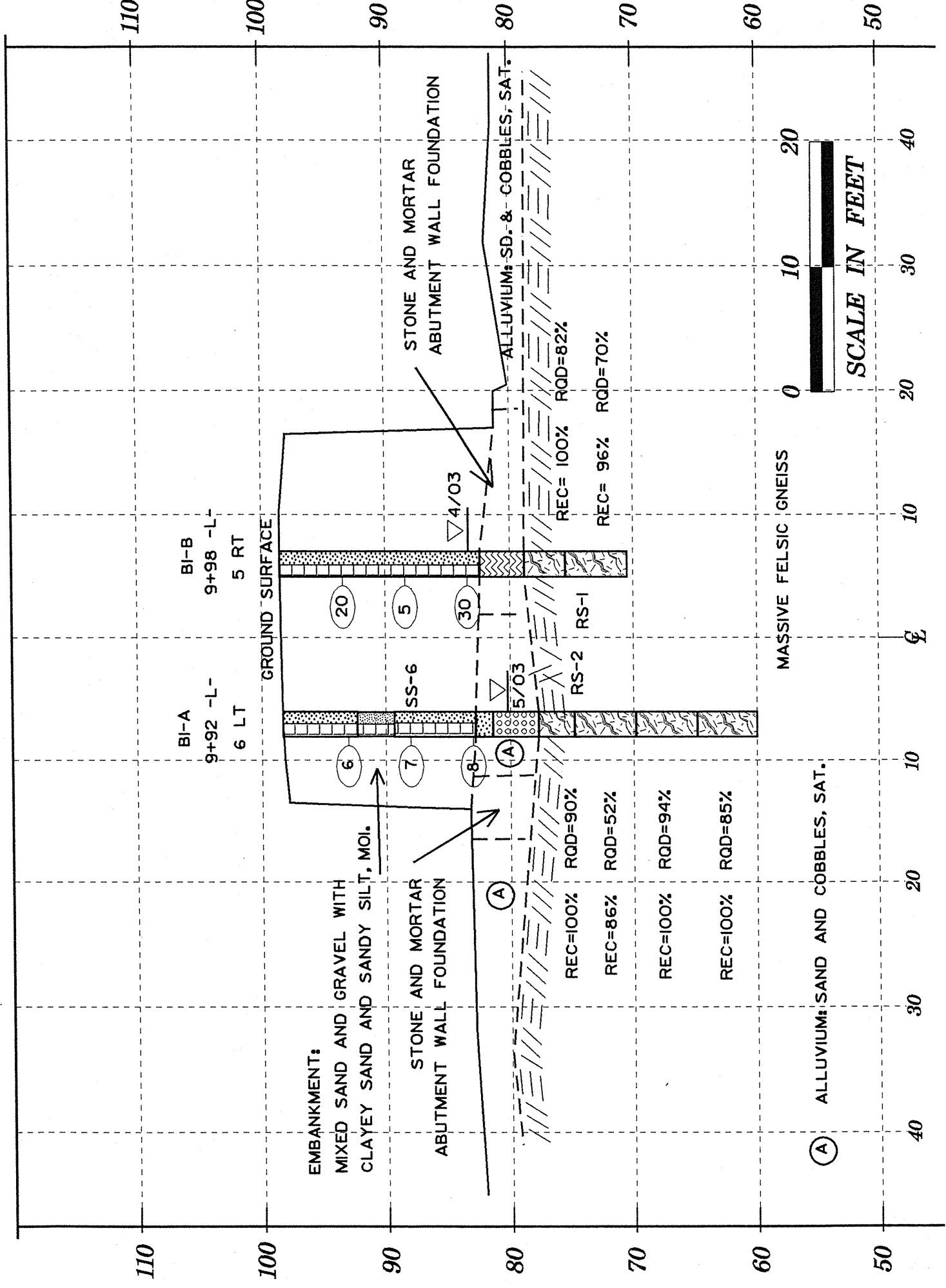
10+50

SECTION THROUGH EB-1 BORINGS

PROJECT 8.2845001 B-3813
COUNTY BUNCOMBE
SHEET 5 OF 18

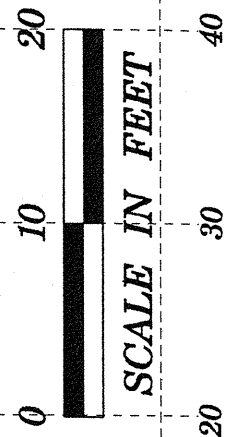
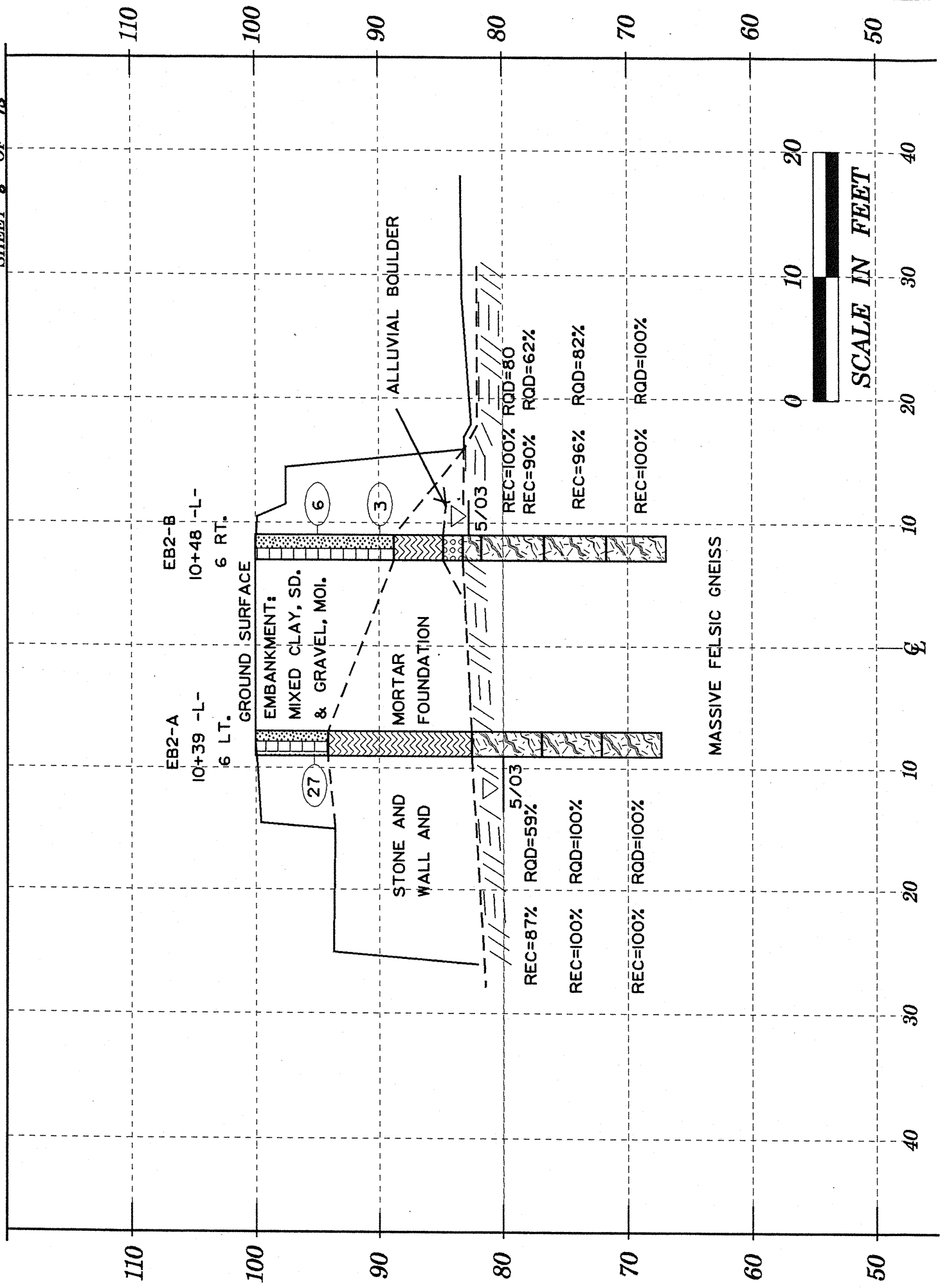


SECTION THROUGH B1 BORINGS



SECTION THROUGH EB-2 BORINGS

PROJECT 8,284,5001 B-3813
COUNTY BUNCOMBE
SHEET 6 OF 13



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 8.2845001	ID B-3813	COUNTY BUNCOMBE	GEOLOGIST TB DANIEL
SITE DESCRIPTION BR. 250 ON SR-1742 OVER FLAT CREEK			GND WATER
BORING NO EB1-A	NORTHING 0.00	EASTING 0.00	0 HR 14.50ft
ALIGNMENT -L-	BORING LOCATION 9+67.000	OFFSET 6.00ft LT	24 HR N/A
COLLAR ELEV 97.20ft	TOTAL DEPTH 30.50ft	START DATE 5/15/03	COMPLETION DATE 05/15/03
DRILL MACHINE CME-550X	DRILL METHOD SPT CORE BORING	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK N/A	

SHEET 7 OF 18

DATE 4/29/03

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG MOI	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75	100			
97.20													Ground Surface
90.00	4.80	4	5	5	1.0								EMBANKMENT: MIXED SILTY SAND AND SANDY SILT WITH GRAVEL, MOIST
	9.80	4	3	5	1.0								SS-7
	14.80	4	3	2	1.0								SS-8
80.00	19.80	60			0.1								SS-9
													ALLUVIUM: SANDY SILT
													ALLUVIUM: SILTY SAND GRADING TO COARSE SAND & GRAVEL
													CRYSTALLINE ROCK
													CORE 1: REC=86% RQD=19%
													CORE 2: REC=94% RQD=86%
													CORE 3: REC=95% RQD=90%
66.70													CORING TERMINATED AT A DEPTH OF 30.1 FEET IN CRYSTALLINE ROCK.

CORE BORING REPORT

PROJECT: 8.2845001 I. D. NO: B-3813 BORING NO: EB1-A GEOLOGIST: TB DANIEL
 DESCRIPTION: BUNCOMBE COUNTY BRIDGE # 250 ON SR-1742 OVER FLAT CREEK 9+67 -L- 6' LT
 COUNTY: BUNCOMBE COLLAR ELEVATION: 97.2 FT. TOTAL DEPTH: 30.5 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
77.3	19.9		3.6	3.1	0.7		HORNBLLENDE GNEISS NUMEROUS HORIZONTAL MACHINE BREAKS. HARD AND VERY SLIGHTLY WEATHERED
73.7	23.5			86	19		
73.7	23.5		5.0	4.7	4.3		FELSIC GNEISS. VERY HARD AND FRESH.
68.7	28.5			94	86		
68.7	28.5		2.0	1.9	1.8		HORNBLLENDE GNEISS VERY HARD AND FRESH.
66.7	30.5			95	90		

CORING TERMINATED AT
ELEVATION 66.7 FT.

DRILLER: JT WILLAIMS CORE SIZE: NX EQUIPMENT: CME 550

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG**

PROJECT NO 8.2845001		ID B-3813		COUNTY BUNCOMBE		GEOLOGIST TB DANIEL							
SITE DESCRIPTION BR. 250 ON SR-1742 OVER FLAT CREEK							GND WATER						
BORING NO EB1-B		NORTHING 0.00		EASTING 0.00		0 HR 14.30ft							
ALIGNMENT -L-		BORING LOCATION 9+75.000		OFFSET 8.00ft RT		24 HR N/A							
COLLAR ELEV 98.00ft		TOTAL DEPTH 33.00ft		START DATE 4/29/03		COMPLETION DATE 04/29/03							
DRILL MACHINE CME-550X			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC							
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB1-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				100
98.00													
	3.20	2	3	4	1.0								EMBANKMENT: MIXED SILTY SAND WITH SOME SANDY CLAY
90.00	8.20	7	8	7	1.0								
	13.20	5	2	12	1.0								ALLUVIUM: BROWN SLIGHTLY MICACEOUS SILTY SAND WITH BASAL GRAVEL & COBBLES
80.00	18.20	60			0.1								CRYSTALLINE ROCK CORE1 REC=96% RQD=73%
													CORE 2 REC=94% RQD=84%
													CORE 3 REC=100% RQD=100%
65.00													CORING TERMINATED AT A DEPTH OF 33.0 FEET IN CRYSTALLINE ROCK.

CORE BORING REPORT							DATE <u>4/29/03</u>
PROJECT: <u>8.2845001</u>		I. D. NO: <u>B-3813</u>		BORING NO: <u>EB1-B</u>		GEOLOGIST: <u>TB DANIEL</u>	
DESCRIPTION: <u>BUNCOMBE COUNTY BRIDGE # 250 ON SR-1742 OVER FLAT CREEK</u>							<u>9+75 -L- 8' RT</u>
COUNTY: <u>BUNCOMBE</u>			COLLAR ELEVATION: <u>98.0</u> FT.		TOTAL DEPTH: <u>33.0</u> FT.		
ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
79.3	18.7			4.3	3.3		MASSIVE FELSIC GNEISS WITH MIGMATITIC FELSIC GNEISS. NUMEROUS HORIZONTAL BREAKS, SLIGHTLY STAINED. HARD AND SLIGHTLY TO VERY SLIGHTLY WEATHERED
			4.5	96	73		
74.8	23.2						
74.8	23.2			4.7	4.2		MASSIVE FELSIC GNEISS WITH MIGMATITIC FELSIC GNEISS. SEVEN BREAKS VERY SLIGHTLY STAINED. HARD AND SLIGHTLY TO VERY SLIGHTLY WEATHERED
			5.0	94	84		
69.8	28.2						MASSIVE FELSIC GNEISS. VERY HARD AND FRESH.
69.8	28.2			4.8	4.8		
65.0	33.0			100	100		
CORING TERMINATED AT ELEVATION <u>65.0</u> FT.							
DRILLER: <u>JT WILLAIMS</u>		CORE SIZE: <u>NX</u>		EQUIPMENT: <u>CME 550</u>			

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 8.2845001	ID B-3813	COUNTY BUNCOMBE	GEOLOGIST TB DANIEL
SITE DESCRIPTION BR. 250 ON SR-1742 OVER FLAT CREEK			GND WATER
BORING NO B1-A	NORTHING 0.00	EASTING 0.00	0 HR 18.10ft
ALIGNMENT -L-	BORING LOCATION 9+92.000	OFFSET 6.00ft LT	24 HR N/A
COLLAR ELEV 98.30ft	TOTAL DEPTH 38.30ft	START DATE 5/13/03	COMPLETION DATE 05/13/03
DRILL MACHINE CME-550X	DRILL METHOD SPT CORE BORING	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK N/A	

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	100				
98.30														Ground Surface
4.80	4.80	4	4	2	1.0									EMBANKMENT: MIXED SAND AND GRAVEL WITH CLAYEY SAND, MOIST
90.00	9.80	3	3	4	1.0									EMBANKMENT: SANDY SILT, MOIST
	14.80	2	2	6	1.0									EMBANKMENT: SILTY SAND, MOI.
80.00														ALLUVIUM: SAND, MOIST
														COBBLES WITH SAND, MOIST TO SATURATED. CORED FROM DEPTH 16.9 - 20.6
														LAST 2.9 FEET OF CORE 2, REC=100% RQD=90%
														CORE 3 REC=86% RQD=52%
														CORE 4 REC=100% RQD=94%
														CORE 5 REC=100% RQD=85%
60.00														CORING TERMINATED AT A DEPTH OF 38.3 FEET IN CRYSTALLINE ROCK.

CORE BORING REPORT

DATE 4/29/03

PROJECT: 8.2845001 I. D. NO: B-3813 BORING NO: B1-A GEOLOGIST: TB DANIEL
 DESCRIPTION: BUNCOMBE COUNTY BRIDGE # 250 ON SR-1742 OVER FLAT CREEK 9+92 6' LT -L-
 COUNTY: BUNCOMBE COLLAR ELEVATION: 98.3 FT. TOTAL DEPTH: 38.3 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
81.4	16.9		1.6	0.5	NA		ALLUVIAL COBBLES AND SAND
79.8	18.5			31			
79.8	18.5		5.0	2.9	2.6	RS-2	18.5 - 20.6 ALLUVIAL COBBLES AND SAND 20.6 - 23.5 MASSIVE FELSIC GNEISS. REC AND RQD CALCULATED FROM 20.6 TO 23.5. HARD AND SLIGHTLY WEATHERED TO FRESH.
74.8	23.5			100	90		
74.8	23.5		5.0	4.3	2.6		MASSIVE FELSIC GNEISS VERY HARD AND FRESH. NO WEATHERING ON BREAKS.
69.8	28.5			86	52		
69.8	28.5		5.0	5.0	4.7		MASSIVE FELSIC GNEISS VERY HARD AND FRESH. NO WEATHERING ON BREAKS.
64.8	33.5			100	94		
64.8	33.5		4.8	4.8	4.1		MASSIVE FELSIC GNEISS VERY HARD AND FRESH. NO WEATHERING ON BREAKS.
60.0	38.3			100	85		

CORING TERMINATED AT ELEVATION 60.0 FT.

DRILLER: JT WILLAIMS CORE SIZE: NX EQUIPMENT: CME 550

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 8.2845001	ID B-3813	COUNTY BUNCOMBE	GEOLOGIST TB DANIEL
SITE DESCRIPTION BR. 250 ON SR-1742 OVER FLAT CREEK			GND WATER
BORING NO B1-B	NORTHING 0.00	EASTING 0.00	0 HR 15.20ft
ALIGNMENT -L-	BORING LOCATION 9+98.000	OFFSET 5.00ft RT	24 HR N/A
COLLAR ELEV 98.50ft	TOTAL DEPTH 28.00ft	START DATE 4/30/03	COMPLETION DATE 04/30/03
DRILL MACHINE CME-550X	DRILL METHOD SPT CORE BORING	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK N/A	

Log B1-B, Page 1 of 1

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	LOG MOI	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75	100				
98.50														Ground Surface
	4.60	5	7	13	1.0									EMBANKMENT: BROWN SILTY SAND AND GRAVEL WITH SOME CLAYEY SAND
90.00	9.60	2	3	2	1.0									
	14.60	21	17	13	1.0									
80.00														CORE 1 & 1.7 FEET OF CORE 2: STONE AND MORTAR ABUTMENT FOUNDATION CORE 2: LAST 3.3 FEET REC=100% RQD=82% CORE 3: REC=96% RQD=70%
70.50														
CORING TERMINATED AT A DEPTH OF 28.0 FEET IN CRYSTALLINE ROCK.														

CORE BORING REPORT

DATE 4/30/03

PROJECT: 8.2845001 I. D. NO: B-3813 BORING NO: B1-B GEOLOGIST: TB DANIEL

DESCRIPTION: BUNCOMBE COUNTY BRIDGE # 250 ON SR-1742 OVER FLAT CREEK 9+75 -L- 5' RT

COUNTY: BUNCOMBE COLLAR ELEVATION: 98.5 FT. TOTAL DEPTH: 28.0 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
82.4	16.1		1.9	1.9	NA		STONE AND MORTAR FOR ABUTMENT FOUNDATION.
80.5	18.0			100			
80.5	18.0		5.0	3.3	3		FIRST 1.7 FEET, STONE AND MORTAR FOR ABUTMENT FOUNDATION. REC & RQD CALCULATED FOR 3.3 FEET OF BEDROCK ONLY.
75.5	23.0			100	82	RS-1	19.7 - 23.0, MASSIVE FELSIC GNEISS WITH THIN MAFIC INTRUSION. 3 BREAKS SLIGHTLY STAINED.
75.5	23.0		5.0	4.8	3.5		SLIGHTLY WEATHERED, MODERATELY HARD TO HARD.
70.5	28.0			96	70		MASSIVE FELSIC GNEISS. NUMEROUS BREAKS ARE VERY SLIGHTLY WEATHERED
CORING TERMINATED AT ELEVATION 70.5 FT.							
DRILLER: <u>JT WILLAIMS</u>		CORE SIZE: <u>NX</u>		EQUIPMENT: <u>CME 550</u>			

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 8.2845001		ID B-3813		COUNTY BUNCOMBE		GEOLOGIST TB DANIEL								
SITE DESCRIPTION BR. 250 ON SR-1742 OVER FLAT CREEK						GND WATER								
BORING NO EB2-A		NORTHING 0.00		EASTING 0.00		0 HR 20.00ft								
ALIGNMENT -L-		BORING LOCATION 10+39.000		OFFSET 6.00ft LT		24 HR N/A								
COLLAR ELEV 100.00ft		TOTAL DEPTH 32.80ft		START DATE 5/19/03		COMPLETION DATE 05/19/03								
DRILL MACHINE CME-550			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC								
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log EB2-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				
100.00														Ground Surface
	4.30	14	11	16	1.0									EMBANKMENT: MIXED CLAYEY SAND AND SANDY CLAY WITH GRAVEL, MOIST
														STONE AND MORTAR FOUNDATION. CORE 1 & 2 WITH MOST OF CORE 3.
														CORE 4 & 0.2 FEET OF END OF CORE 3: REC=87% RQD=59%
														CORE 5: REC=100% RQD=100%
														CORE 6: REC=100% RQD=100%
														CORING TERMINATED AT A DEPTH OF 32.8 FEET IN CRYSTALLINE ROCK.

CORE BORING REPORT

DATE 5/19/03

PROJECT: 8.2845001 I. D. NO: B-3813 BORING NO: EB2-A GEOLOGIST: TB DANIEL
 DESCRIPTION: BUNCOMBE COUNTY BRIDGE # 250 ON SR-1742 OVER FLAT CREEK 10+39 -L- 6' LT
 COUNTY: BUNCOMBE COLLAR ELEVATION: 100.0 FT. TOTAL DEPTH: 32.8 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
94.1	5.9			1.9			STONE AND MORTAR FOUNDATION
			2.5	76	N/A		
91.6	8.4						STONE AND MORTAR FOUNDATION
91.6	8.4		5.0	76	N/A		
86.6	13.4						STONE AND MORTAR FOUNDATION
86.6	13.4		4.4	4.2			FIRST 4.2 FEET STANE AND MORTAR FOUNDATION LAST 0.2 FEET BEDROCK. MASSIVE FELSIC GNEISS
				95	N/A		
82.2	17.8						MASSIVE FELSIC GNEISS. V. SLIGHTLY WEATHERED & MOD HARD. SOIL OR WEATHERED ROCK ZONE (AT 19.5 - 20.2) NO RECOVERY. MUD STAINS IN 3 BREAKS, 10 OTHER BREAKS.
82.2	17.8		5.4	4.7	3.2		
				87	59		
76.8	23.2						MASSIVE FELSIC, FRESH AND VERY HARD. ALL MACHINE BREAKS.
			4.8	4.8	4.8		
				100	100		
72.0	28.0						MASSIVE FELSIC, FRESH AND VERY HARD. ALL MACHINE BREAKS.
72.0	28.0		4.8	4.8	4.8		
				100	100		
67.2	32.8						

CORING TERMINATED AT ELEVATION 67.2 FT.

DRILLER: JT WILLAIMS CORE SIZE: NX EQUIPMENT: CME 550

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG**

PROJECT NO 8.2845001		ID B-3813		COUNTY BUNCOMBE		GEOLOGIST TB DANIEL						
SITE DESCRIPTION BR. 250 ON SR-1742 OVER FLAT CREEK							GND WATER					
BORING NO EB2-B		NORTHING 0.00		EASTING 0.00		0 HR 17.30ft						
ALIGNMENT -L-		BORING LOCATION 10+48.000		OFFSET 6.00ft RT		24 HR N/A						
COLLAR ELEV 100.00ft		TOTAL DEPTH 33.10ft		START DATE 5/20/03		COMPLETION DATE 05/20/03						
DRILL MACHINE CME-550X			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH N/A			DEPTH TO ROCK N/A			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			
100.00												Ground Surface
94.40	4.60	4	3	3	1.0	6						MIXED EMBANKMENT: SAND, GRAVEL AND CLAY, MOIST TO WET
90.80	9.60	2	1	2	1.0	3						STONE AND MORTAR FOUNDATION, CORED
												ALLUVIAL BOULDER
												LAST 1.5 FEET OF CORE 2: REC=100% RQD=80%
												CORE 3: REC=90% RQD=62%
												CORE 4: REC=96% RQD=82%
												CORE 5: REC=100 RQD=100
66.90												CORING TERMINATED AT A DEPTH OF 33.1 FEET IN CRYSTALLINE ROCK.

CORE BORING REPORT

DATE 5/20/03

PROJECT: 8.2845001 I. D. NO: B-3813 BORING NO: EB2-B GEOLOGIST: TB DANIEL

DESCRIPTION: BUNCOMBE COUNTY BRIDGE # 250 ON SR-1742 OVER FLAT CREEK 10+48 -L- 6 RT

COUNTY: BUNCOMBE COLLAR ELEVATION: 100.0 FT. TOTAL DEPTH: 33.1 FT.

ELEV. (FEET)	DEPTH (FEET)	DRILL RATE MIN./FT.	RUN (FEET)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
87.3	12.7		0.6	0.5	0.3		STONE AND MORTAR
86.7	13.3			83	50		
86.7	13.3		5.0	1.5	1.3		OVERALL RECOVERY OF STONE -MORTAR AND BEDROCK IS 43.4 FEET 13.3 - 16.8 STONE AND MORTAR 16.8 - 18.3 MASSIVE FELSIC GNEISS. V. HARD AND FRESH. RQD CALCULATED FROM 16.8 - 18.3.
81.7	18.3			100	87		ONE SOIL STAINED BREAK
81.7	18.3		5.0	4.5	3.1		MASSIVE FELSIC GNEISS. SLIGHTLY WEATHERED TO FRESH. HARD TO VERY HARD. NUMEROUS STAINED BREAKS
76.7	23.3			90	62		
76.7	23.3		5.0	4.8	4.1		MASSIVE FELSIC GNEISS. V. HARD AND FRESH. TWO NATURAL BREAKS.
71.7	28.3			96	82		
71.7	28.3		4.8	4.8	4.8		SOLID MASSIVE FELSIC GNEISS. VERY HARD AND FRESH.
66.9	33.1			100	100		

CORING TERMINATED AT ELEVATION 66.9 FT.

DRILLER: JT WILLAIMS CORE SIZE: NX EQUIPMENT: CME 550



8.2845001 B-3813
BUNCOMBE Co.
Bridge 250 on
SR-1742 OVER
FLAT CREEK



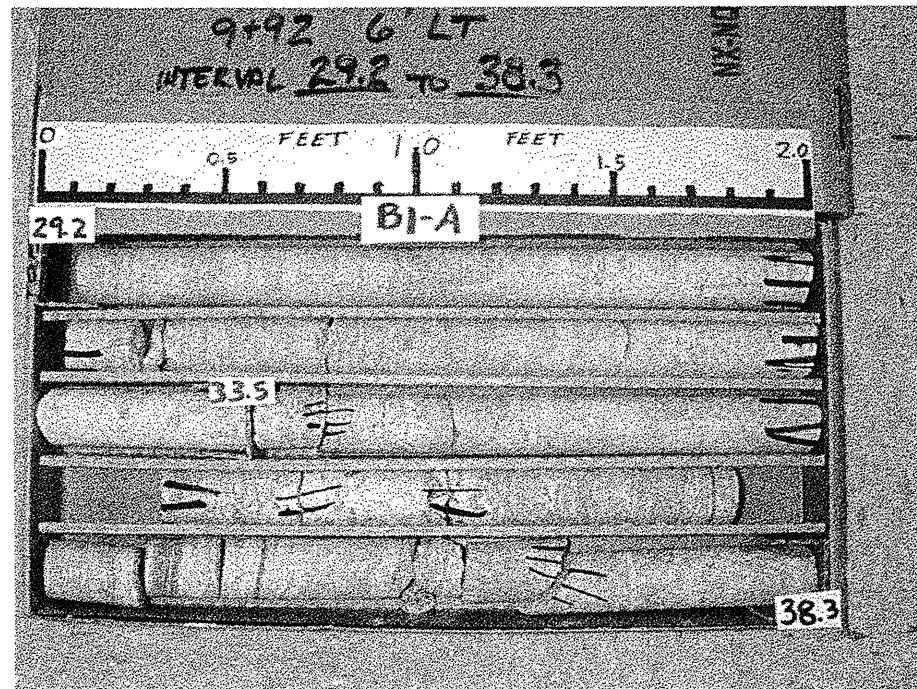
8.2845001 (B-3813)
BUNCOMBE COUNTY
BRIDGE # 250 ON SR 1742 OVER FLAT CREEK

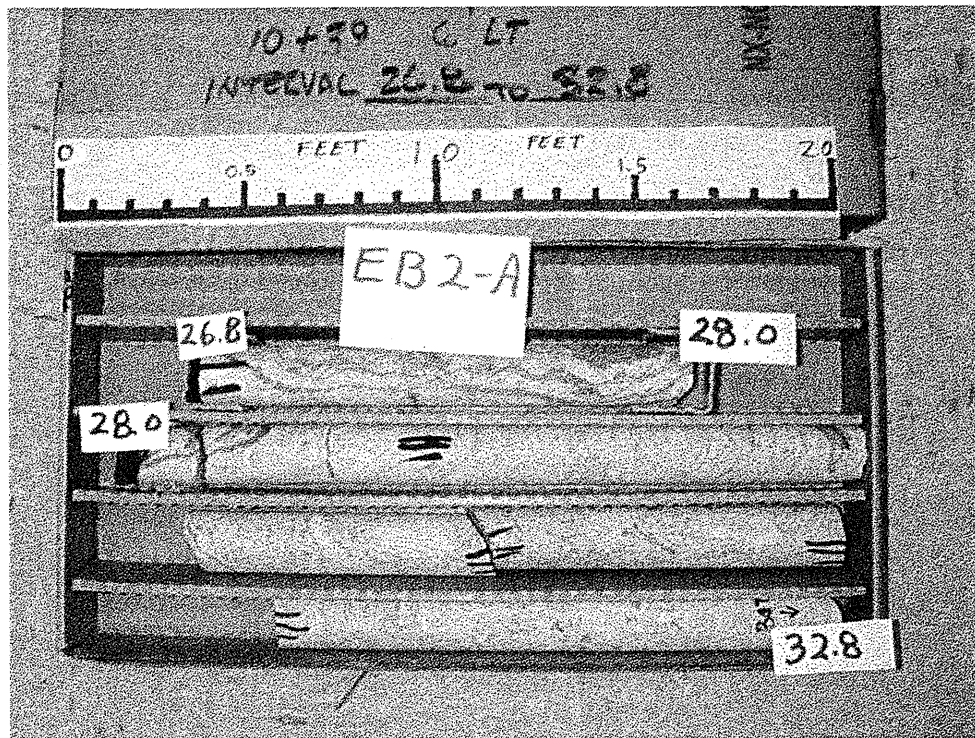


8.2845001 B-3813
BUNCOMBE Co.
Bridge 250 on
SR-1742 OVER
FLAT CREEK

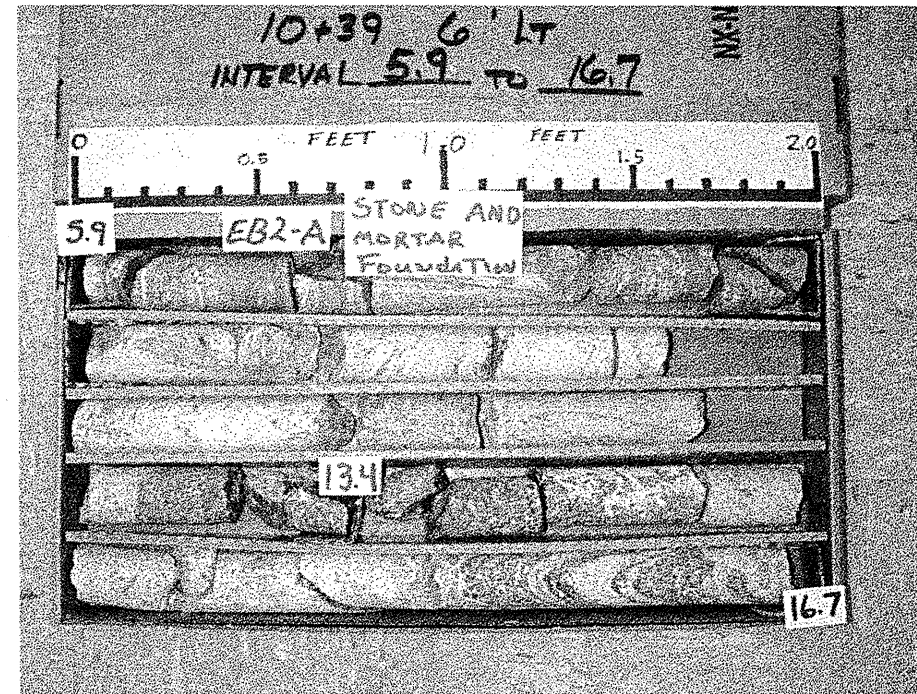


8.2845001 B-3813
BUNCOMBE Co.
Bridge 250 on
SR-1742 OVER
FLAT CREEK

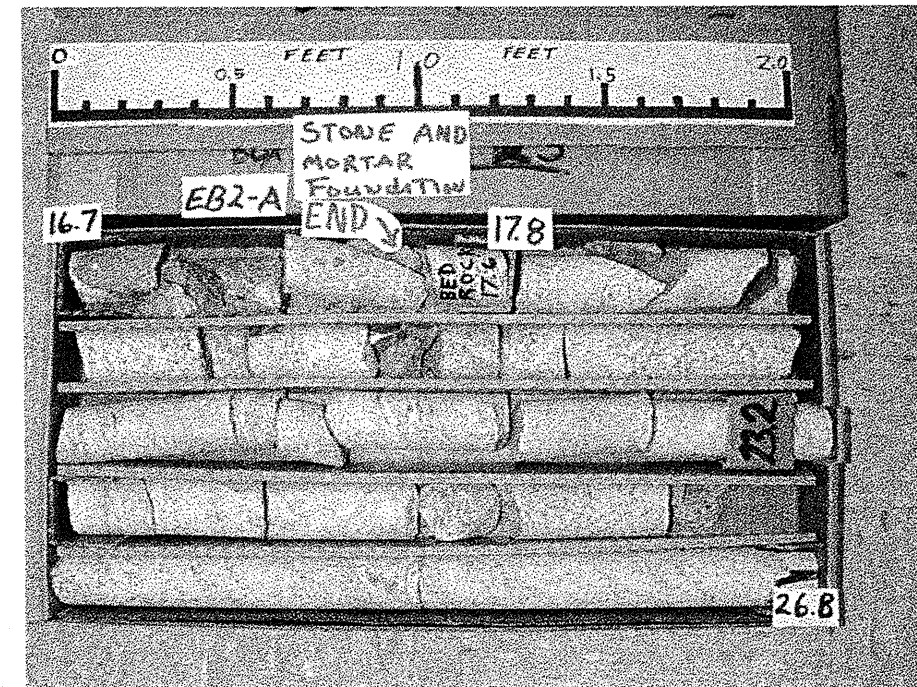


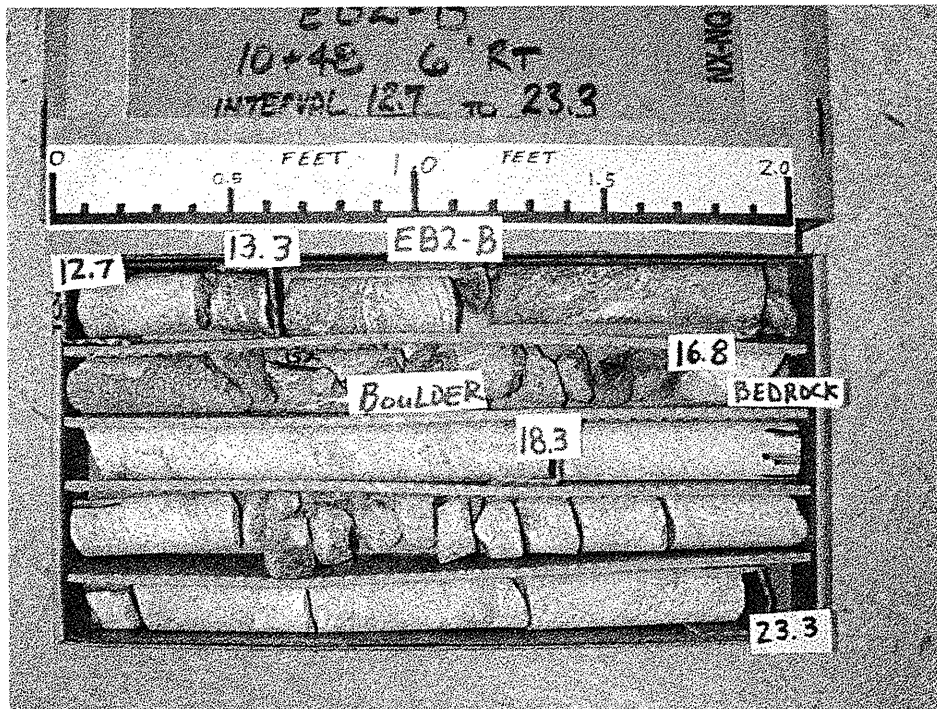


8.2845001 B-3813
BUNCOMBE Co.
Bridge 250 on
SR-1742 OVER
FLAT CREEK

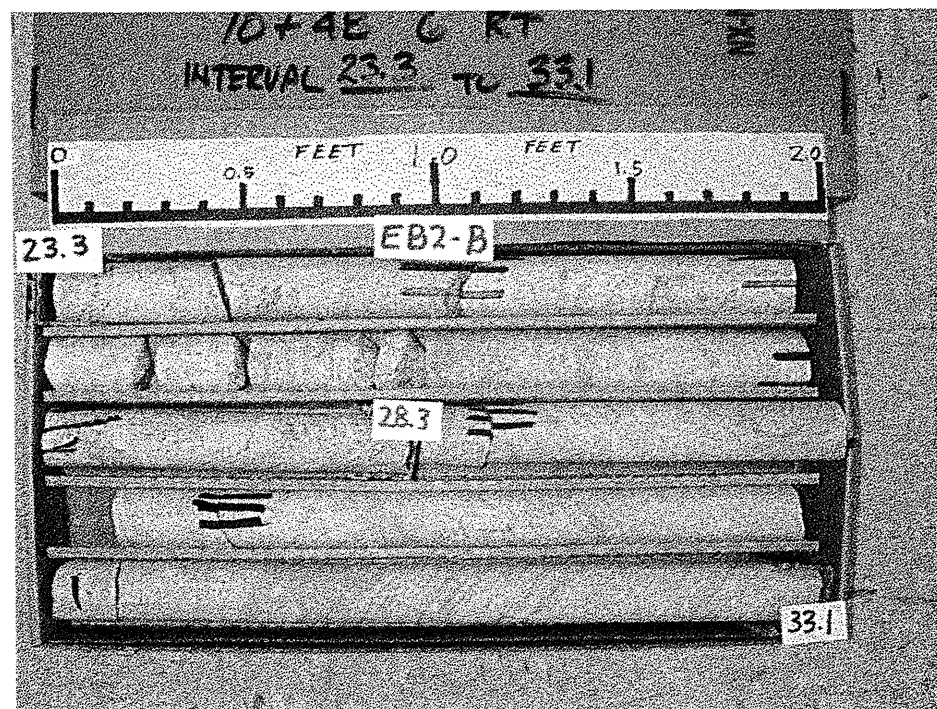


8.2845001 B-3813
BUNCOMBE Co.
Bridge 250 on
SR-1742 OVER
FLAT CREEK





8.2845001 B-3813
BUNCOMBE Co.
Bridge 250 on
SR-1742 OVER
FLAT CREEK



GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 8.2845001 B-3419 COUNTY: BUNCOMBE

DESCRIPTION(1): Bridge No. 250 on SR-1742 over the FlatCreek

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

COUNTY BRIDGE NO. 250 BRIDGE LENGTH 40.7 NO. BENTS IN: CHANNEL 0 FLOOD PLAIN 2

FOUNDATION TYPE: CONCRETE FOOTINGS ON BEDROCK

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: BOTH END BENTS HAVE BEEN REPAIRED ALL ALONG BASE

INTERIOR BENTS: None

CHANNEL BED: BOULDERS OVER BEDROCK

CHANNEL BANKS: DOWNSTREAM EB2 IS CUT BANK WITH EXPOSED ROCK CLIFF

EXISTING SCOUR PROTECTION:

TYPE(3): STONE ABUTMENT AND WINGS AT EB1, CONCRETE ABUTMENT AND WING AT EB2

EXTENT(4): CREEK BED TO ROAD, EB1-B WING ABOUT 35 FT LONG, EB2-B WING ABOUT 25 FT LONG

EFFECTIVENESS(5): VERY GOOD

OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): SOME BLAST ROCK UPSTREAM IN CREEK

DESIGN INFORMATION

CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): N/A BOULDERS AND COBBLES

CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): SS-9, SANDY SILT

FOUNDATION BEARING MATERIAL(9): BEDROCK, GENERALLY HARD AND FRESH AT SURFACE

CHANNEL BANK COVER(10): WEEDS AND TREES

FLOOD PLAIN WIDTH(11): APPROXIMATELY 80 FEET

FLOOD PLAIN COVER(12): TREES

DESIGN INFORMATION CONT.

STREAM IS XXX DEGRADING AGGRADING (13)

OTHER OBSERVATIONS AND COMMENTS:

CHANNEL MIGRATION TENDENCY (14): TO THE SOUTHWEST (Proposed End Bent 1)

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (15): IS CONTROLLED BY BEDROCK ELEV.

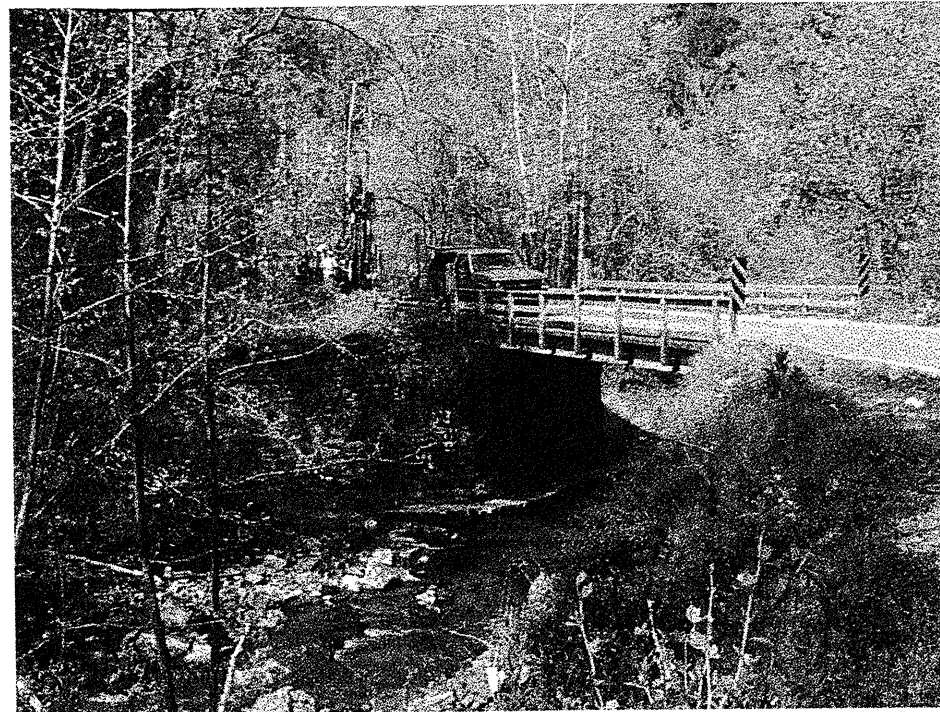
B1-A 77.7 B1-B 78.8

REPORTED BY: P. Q. Lockamy DATE: 5/1/03

INSTRUCTIONS

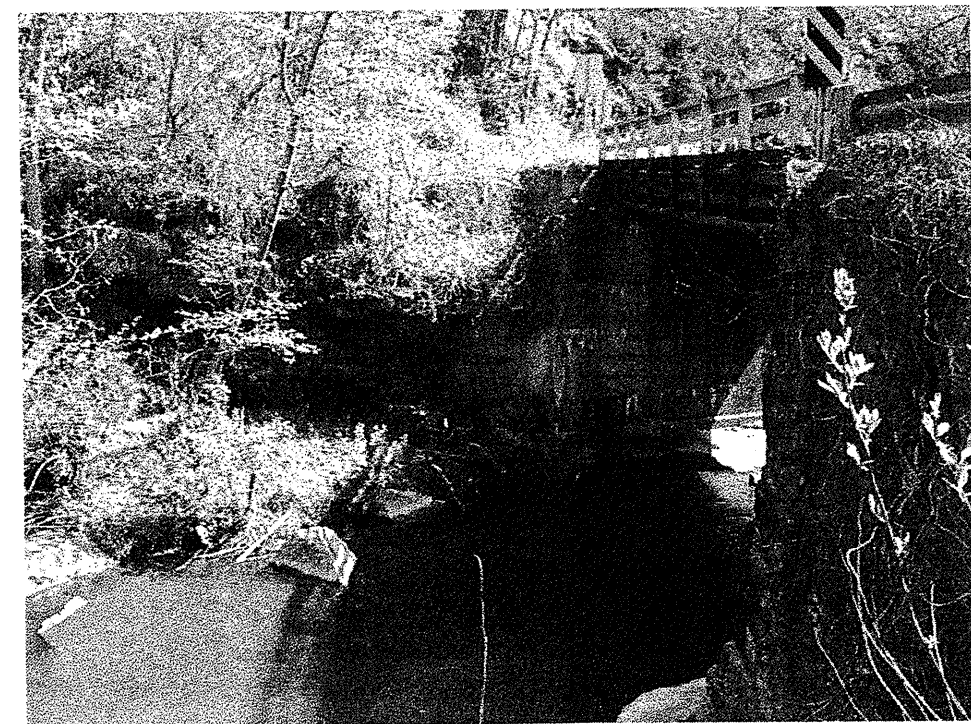
- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
(2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
(3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.)
(4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
(5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
(6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
(7) DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION. ATTACH LAB RESULTS.
(8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
(9) DESCRIBE THE FOUNDATION BEARING MATERIAL.
(10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
(11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
(12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
(13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
(14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
(15) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

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



8.2845001 B-3813
 BUNCOMBE Co.
 Bridge 250 on
 SR-1742 OVER
 FLAT CREEK

SET UP ON EB1-B



DOWN STREAM.
 CLIFFSIDE AT
 EB2-A

T.I.P. ID #:	B-3813
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REPORT ON SAMPLES OF:	Soils for Classification
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PROJECT:	8.2845001	COUNTY:	Buncombe	Owner:	--
DATE SAMPLED:	5-3-03	DATE RECEIVED:	5-20-03	DATE REPORTED:	6-17-03
SAMPLED FROM:	Roadway	SAMPLED BY:	P. Q. Lockamy		
SUBMITTED BY:	W. D. Frye	2002	STANDARD SPECIFICATION		
LABORATORY:	Asheville				

TEST RESULTS

Project Sample No.	SS-6	SS-7	SS-8	SS-9				
Lab Sample No. A	141538	141539	141540	141541				
HiCAMS Sample #	--	--	--	--				
Retained #4 Sieve %	--	--	--	--				
Passing #10 Sieve %	76	72	72	98				
Passing #40 Sieve %	59	61	52	90				
Passing #200 Sieve %	31	28	26	45				

MINUS #10 FRACTION

Soil Mortar - 100%								
Coarse Sand -Ret. #60	35	35	39	32				
Fine Sand - Ret. #270	31	34	32	32				
Silt 0.05-0.005 mm %	18	21	19	26				
Clay < 0.005 mm %	16	10	10	10				
Passing # 40 Sieve %	--	--	--	--				
Passing # 200 Sieve %	--	--	--	--				

Liquid Limit	23	26	25	30				
Plastic Index	4	NP	NP	NP				
AASHTO Classification	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)	A-4 (2)				
Quantity								
Texture								
Station	9+92 LT	9+67 LT	9+67 LT	9+67 LT				
Hole No.								
Depth (ft) From:	10.3	5.3	10.3	15.3				
To:	11.3	6.3	11.3	16.3				

Remarks:

A-141538 - A-141541

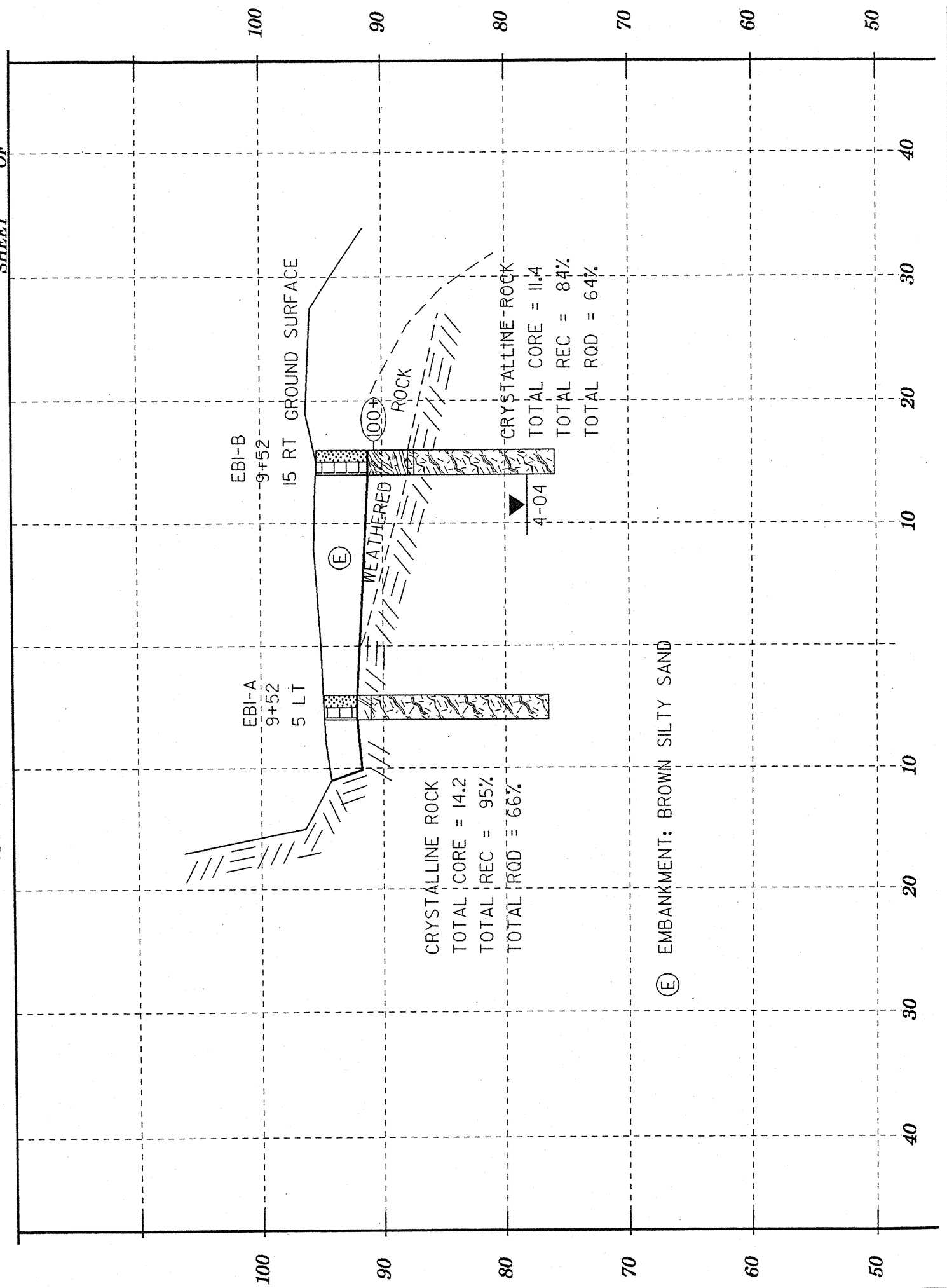
CC:

W. D. Frye

J. J. Lail

File

SOILS ENGINEER:



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33268.1.1		ID B-3813		COUNTY BUNCOMBE		GEOLOGIST TB DANIEL						
SITE DESCRIPTION RELOCATED EB1 AT BR 249 ON SR-1742 OVER FLAT CREEK.						GND WATER						
BORING NO EB1-A		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 9+52.000		OFFSET 5.00ft RT		24 HR N/A						
COLLAR ELEV 95.49ft		TOTAL DEPTH 18.20ft		START DATE 4/27/04		COMPLETION DATE 04/27/04						
DRILL MACHINE CME-550			DRILL METHOD SPT CORE BORING			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			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			
95.49												Ground Surface
90.00												EMBANKMENT: BROWN SILTY SAND
												CRYSTALLINE ROCK
												TOTAL CORE = 14.2, TOTAL REC = 95% TOTAL RQD = 66%
80.00												
77.29												
												BORING TERMINATED IN CRYSTALLINE ROCK AT A DEPTH OF 18.2 FEET

SHEET ____ OF ____
 DATE 4/27/04

CORE BORING REPORT

PROJECT:	33268.1.1	I. D. NO:	B-3813	BORING NO:	EB1-A	GEOLOGIST:	TB DANIEL
DESCRIPTION:	RELOCATED EB1 ON BR 249 ON SR-1742 OVER FLAT CREEK. 9+52 -L- 5 LT						
COUNTY:	BUNCOMBE	COLLAR ELEVATION:	95.49	FT	TOTAL DEPTH:	18.20	FT
ELEV. (FT)	DEPTH (FT)	DRILL RATE MIN./FT	RUN (FT)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
91.49	4.00		4.80	4.40 92	3.90 81		FRESH AND HARD HORNBLENDE GNEISS. NUMEROUS BREAKS ARE RUST STAINED W/ SLIGHT WEATHERING RIND. BREAKS MORE INTENSLEY WEATHERED 12.8 TO 13.4.
86.69	8.80			4.40 96	2.90 63		
82.09	13.40			4.80 100	2.70 56		
82.09	13.40						
77.29	18.20						
CORING TERMINATED AT ELEVATION 77.29 FT							
DRILLER: JT WILLIAMS		CORE SIZE: NWD-4		EQUIPMENT: CME-550			

Updated 7/26/95

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33268.1.1		ID B-3813		COUNTY BUNCOMBE		GEOLOGIST TB DANIEL						
SITE DESCRIPTION RELOCATED EB1 AT BR 249 ON SR-1742 OVER FLAT CREEK.							GND WATER					
BORING NO EB1-B		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT -L-		BORING LOCATION 9+52.000		OFFSET 15.00ft RT		24 HR 17.40ft						
COLLAR ELEV 96.04ft		TOTAL DEPTH 19.30ft		START DATE 4/23/04		COMPLETION DATE 04/23/04						
DRILL MACHINE CME-550				DRILL METHOD SPT CORE BORING		HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH				DEPTH TO ROCK N/A		Log EB1-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			
96.04												Ground Surface
90.00	4.70	50		0.3					50			EMBANKMENT: BROWN SILTY SAND
												WEATHERED ROCK
												CRYSTALLINE ROCK
												TOTAL CORE = 11.4 , TOTAL REC = 84% TOTAL RQD = 64%
76.74												CORING TERMINATED IN CRYSTALLINE ROCK AT A DEPTH OF 19.3 FEET.

CORE BORING REPORT

PROJECT:	33268.1.1	I. D. NO:	B-3813	BORING NO:	EB1-B	GEOLOGIST:	TB DANIEL;
DESCRIPTION:	RELOCATED EB1 ON BR 249 ON SR-1742 OVER FLAT CREEK. 9+52 -L- 15 RT						
COUNTY:	BUNCOMBE	COLLAR ELEVATION:	96.04 FT	TOTAL DEPTH:	19.30 FT		
ELEV. (FT)	DEPTH (FT)	DRILL RATE MIN./FT	RUN (FT)	REC. FEET %	RQD. FEET %	SAMP. #	FIELD CLASSIFICATION AND REMARKS
88.14	7.90		1.40	0.10	0.00		7.9 TO 8.8 . MODERATE SEVERELY WEATHERED MEDIUM HARD FELSIC GNEISS.
86.74	9.30			7	0		8.8 TO 13.0 FELSIC GNEISS, SOILED BREAK AT 10.8 OTHERWISE SLIGHT & MOD. HARD
86.74	9.30		4.30	4.80	3.50		13.0 TO 19.3 GABBROIC INTRUSION. SEVERLEY WEATHERED 13.0 TO 13.6, OTHERWISE HARD AND FRESH.
82.44	13.60			112	81		
82.44	13.60		5.70	4.70	3.70		
76.74	19.30			82	65		
CORING TERMINATED AT ELEVATION 76.74 FT							
DRILLER: JT WILLIAMS		CORE SIZE: NWD-4		EQUIPMENT: CME-550			

Updated 7/26/95

SHEET ___ OF ___
 DATE 4/23/04

ID No. B-3813 WBS ELE. 33268.1.1
REVISED EB1 ON SR-1742
OVER FLAT CREEK, BUNCOMBE CO.



ID No. B-3813 WBS ELE. 33268.1.1
REVISED EB1 ON SR-1742
OVER FLAT CREEK, BUNCOMBE CO.



STATE	WBS NO.	SHEET	TOTAL SHEETS
N.C.	37581	1A	25
NCMA ID	F.A. PROJ. NO.	DESCRIPTION	
MA13010B	N/A	P.E. CONST.	

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE

SUBSURFACE INVESTIGATION

WBS NO. 37581 NCMA ID MA13010B
 F.A. PROJECT N/A
 COUNTY BUNCOMBE
 PROJECT DESCRIPTION REPLACEMENT OF
BRIDGE No. 193 OVER FLAT CREEK
ON NC 251

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 # 19191 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS PART OF THE CONTRACT.

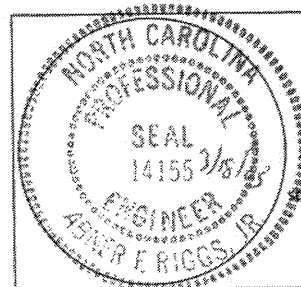
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND 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.

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

INVESTIGATED BY S&M.E., INC. PERSONNEL D. BENTS
 CHECKED BY A.F. RIGGS, JR. S. JOHNSON
 SUBMITTED BY S&M.E., INC. L. SHRADER
 DATE MARCH 11, 2005 J. WRIGHT
C. ODEM
P. PHELPS
T. PEREZ



A. F. Riggs, Jr.
 SIGNATURE

STATE	WBS NO.	SHEET	TOTAL SHEETS
N.C.	37581	1B	25
NCMA ID	F.A. PROJ. NO.	DESCRIPTION	
MA13010B	N/A	P.E. CONST.	

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE

SUBSURFACE INVESTIGATION

WBS NO. 37581 NCMA ID MA13010B
 F.A. PROJECT N/A
 COUNTY BUNCOMBE
 PROJECT DESCRIPTION REPLACEMENT OF
BRIDGE No. 193 OVER FLAT CREEK
ON NC 251

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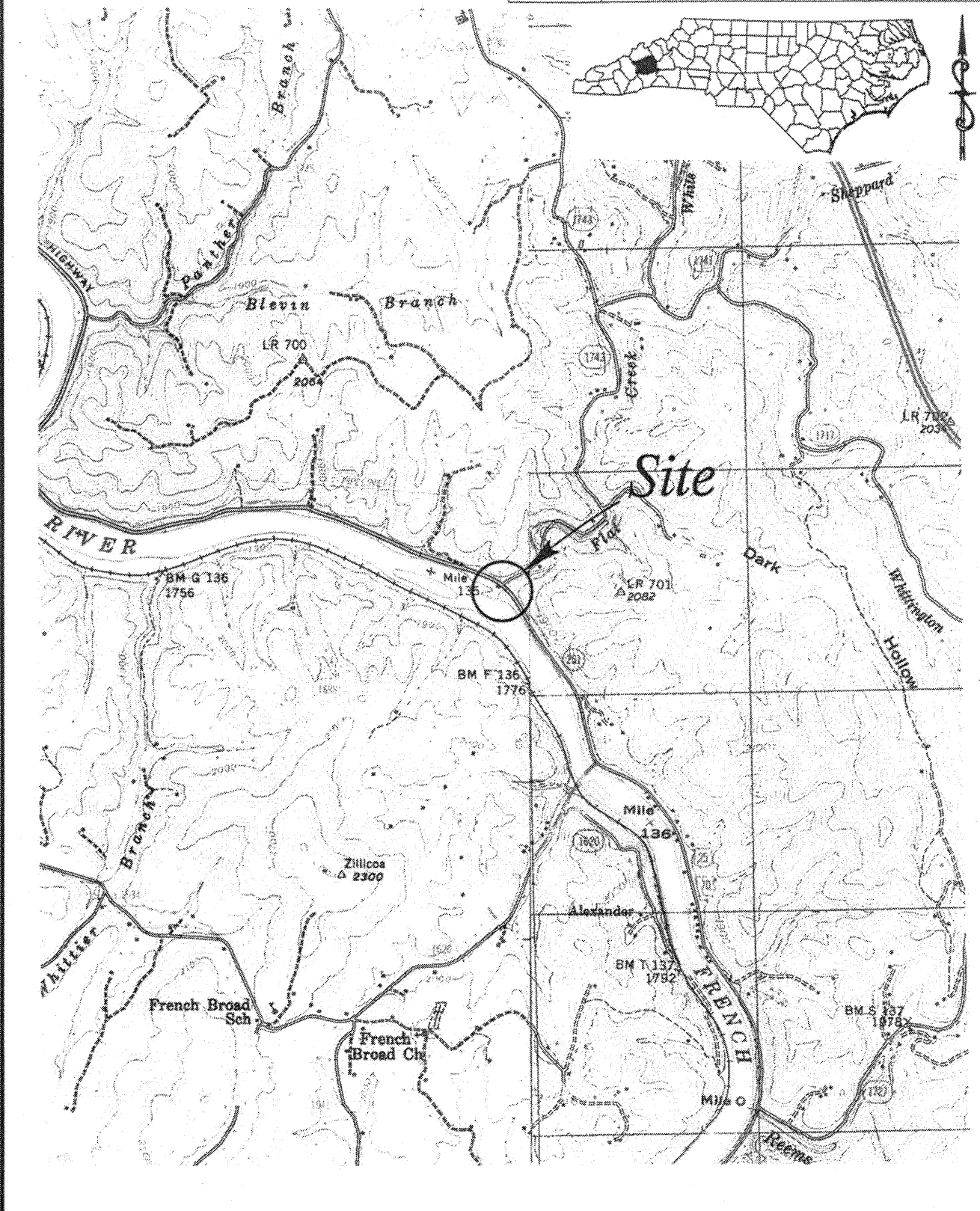
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GEOTECHNICAL UNIT
 SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION	
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 1296, ASTM 0-1585). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY SILTY CLAY WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTICITY, A-7-5</i>		WELL-GRADED: INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM-GRADED: 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.	
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION	
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.	
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7		SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	
SYMBOL		PERCENTAGE OF MATERIAL	
X PASSING: 10, 40, 200		ORGANIC MATERIAL GRANULAR SILT-CLAY OTHER MATERIAL TRACE OF ORGANIC MATTER 2-3% 3-5% TRACE 1-18% LITTLE ORGANIC MATTER 3-8% 5-12% LITTLE 10-20% MODERATELY ORGANIC 5-18% 12-28% SOME 20-25% HIGHLY ORGANIC >18% >28% HIGHLY 25% AND ABOVE	
LIQUID LIMIT, PLASTIC INDEX, GROUP INDEX		GROUND WATER	
USUAL TYPES OF MAJOR MATERIALS		WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING. STATIC WATER LEVEL AFTER 24 HOURS. PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA HOLE CAVE SPRING OR SEEPAGE	
GEN. RATING AS A SUBGRADE		MISCELLANEOUS SYMBOLS	
P.I. OF A-7-5 ≤ L.L. - 30 (P.I. OF A-7-6 > L.L. - 30)		ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS INFERRIED SOIL BOUNDARIES INFERRIED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP/DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD	
CONSISTENCY OR DENSENESS		SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE	
PRIMARY SOIL TYPE		ABBREVIATIONS	
GENERALY GRANULAR MATERIAL (NON-COHESIVE)		AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - VOID RATIO F - FINE FOSS - FOSSILIFEROUS FRAC - FRACTURED FRAGS - FRAGMENTS MED. - MEDIUM	
GENERALY SILT-CLAY MATERIAL (COHESIVE)		PMT - PRESSUREMETER TEST SO. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL U - UNIT WEIGHT U _d - DRY UNIT WEIGHT W - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST	
TEXTURE OR GRAIN SIZE		EQUIPMENT USED ON SUBJECT PROJECT	
U.S. STD. SIEVE SIZE OPENING (MM)		DRILL UNITS: MOBILE B- DIEDRICH 0-50 CHE-458 CHE-55 PORTABLE HOIST OTHER OTHER	
BOULDER (BOB), COBBLE (COB), GRAVEL (GRV), COARSE SAND (CS), FINE SAND (FS), SILT (SL), CLAY (CL)		ADVANCING TOOLS: 2-17/16" DRAG BIT 6" CONTINUOUS FLIGHT AUGER 6" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG-CARB. CORE BIT OTHER 2-1/4" HSA	
SOIL MOISTURE - CORRELATION OF TERMS		HAMMER TYPE: AUTOMATIC MANUAL	
SOIL MOISTURE SCALE (ATTERBERG LIMITS)		CORE SIZE: B N 0-2 H	
FIELD MOISTURE DESCRIPTION		HAND TOOLS: POST HOLE DICER HAND AUGER SOUNDING ROD VANE SHEAR TEST OTHER	
GUIDE FOR FIELD MOISTURE DESCRIPTION		INDURATION	
SATURATED - (SAT) WET - (W) MOIST - (M) DRY - (D)		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
LIQUID LIMIT PLASTIC LIMIT OPTIMUM MOISTURE SHRINKAGE LIMIT		FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED	
PLASTICITY		RUBBING WITH FINGER FREES NUMEROUS GRAINS GENTLE BLDW BY HAMMER DISINTEGRATES SAMPLE. GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	
COLOR			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY); MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.			

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GEOTECHNICAL UNIT
 SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL, AN INFERRIED 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 8.1 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 (ALLUM.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARGILLACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL, DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQ.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 IN OR B.P.F. OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 8.1 FOOT PENETRATION WITH 60 BLOWS. STRATA CORE RECOVERY (SCRC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQ.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.	
WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT.	
CRYSTALLINE ROCK (CR)		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	
NON-CRYSTALLINE ROCK (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLITE, SLATE, SANDSTONE, ETC.	
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	
WEATHERING			
FRESH		ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	
VERY SLIGHT (V.SL)		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 (SL)		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, WOULD YIELD 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, WOULD YIELD SPT N VALUES < 100 B.P.F.	
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.	
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. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	
MEDIUM HARD		CAN BE GROVED OR GOUGED 0.50 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 GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	
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 FINGERNAIL.	
FRACTURE SPACING		BEDDING	
TERM SPACING		TERM THICKNESS	
VERY WIDE MORE THAN 10 FEET		VERY THICKLY BEDDED > 4 FEET	
WIDE 3 TO 10 FEET		THICKLY BEDDED 1.5 - 4 FEET	
MODERATELY CLOSE 1 TO 3 FEET		THINLY BEDDED 0.16 - 1.5 FEET	
CLOSE 0.16 TO 1 FEET		VERY THINLY BEDDED 0.03 - 0.16 FEET	
VERY CLOSE LESS THAN 0.16 FEET		THICKLY LAMINATED 0.008 - 0.03 FEET	
		THINLY LAMINATED < 0.008 FEET	
INDURATION			
FRIABLE			
MODERATELY INDURATED			
INDURATED			
EXTREMELY INDURATED			
BENCH MARK: BM-1 30.47' LEFT OF STATION 11+31.97 -BL-			
ELEVATION: 1772.65'			
NOTES:			

NCMA ID.	WBS NO.	SHEET NO.	TOTAL SHEETS
MA13010B	37581	3	25

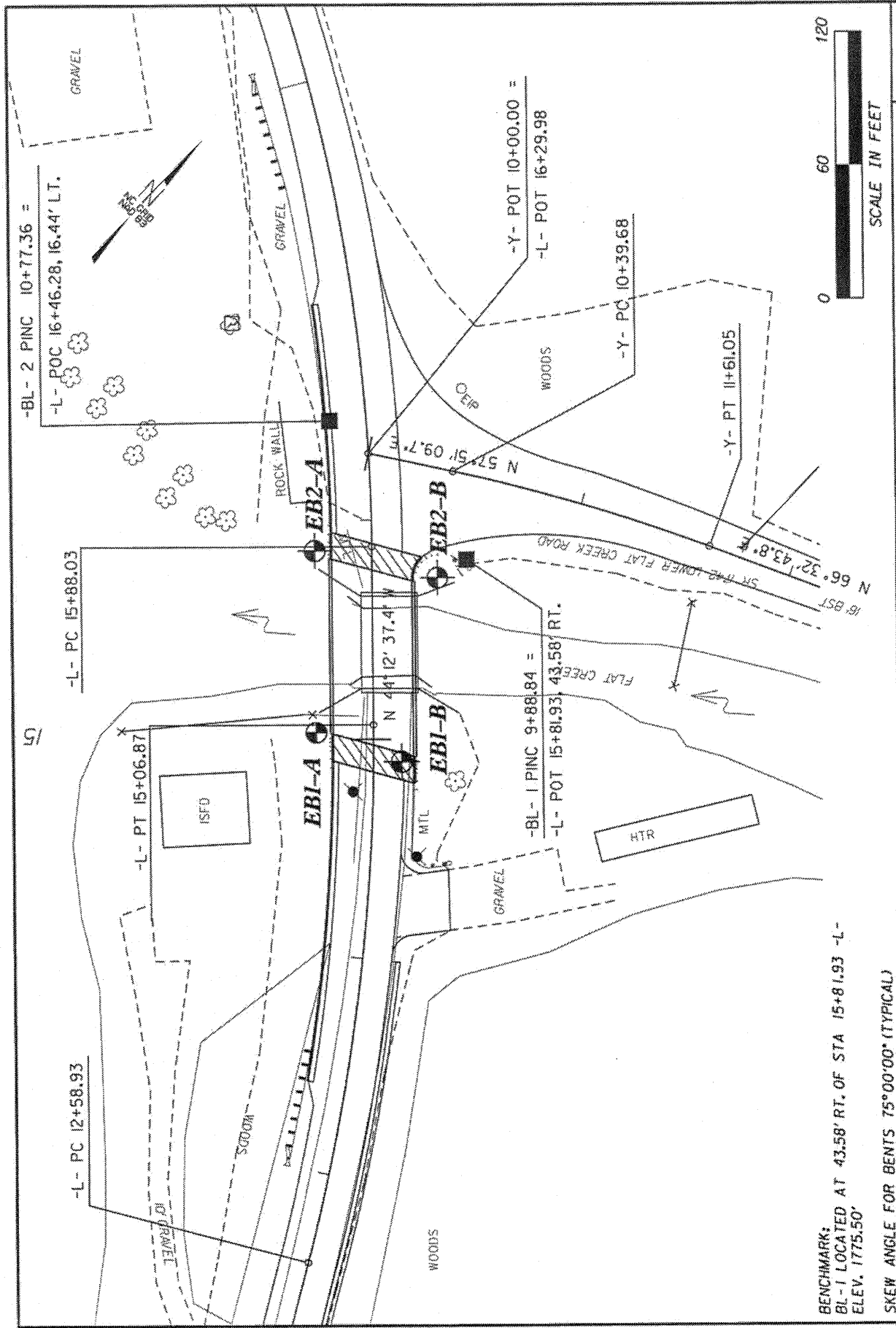


SCALE:	1:24,000
CHECKED BY:	AFR
DRAWN BY:	TRP
DATE:	MARCH 2005
JOB NO.	1051-05-029



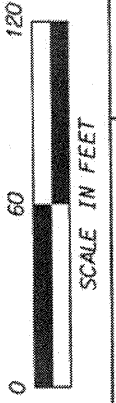
SITE VICINITY MAP
 REPLACEMENT OF BRIDGE No. 193
 OVER FLAT CREEK ON NC 251
 WBS NO. 37581 NCMA ID. MA13010B
 FEDERAL I.D. NO. N/A
 BUNCOMBE COUNTY, NORTH CAROLINA

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BENCHMARK:
 BL-1 LOCATED AT 43.58' RT. OF STA 15+81.93 -L-
 ELEV. 1775.50'

SKREW ANGLE FOR BENTS 75°00'00" (TYPICAL)



SCALE:	1" = 60'
CHECKED BY:	AFR
DRAWN BY:	TRP
DATE:	MARCH 2005
JOB NO.	1051-05-029

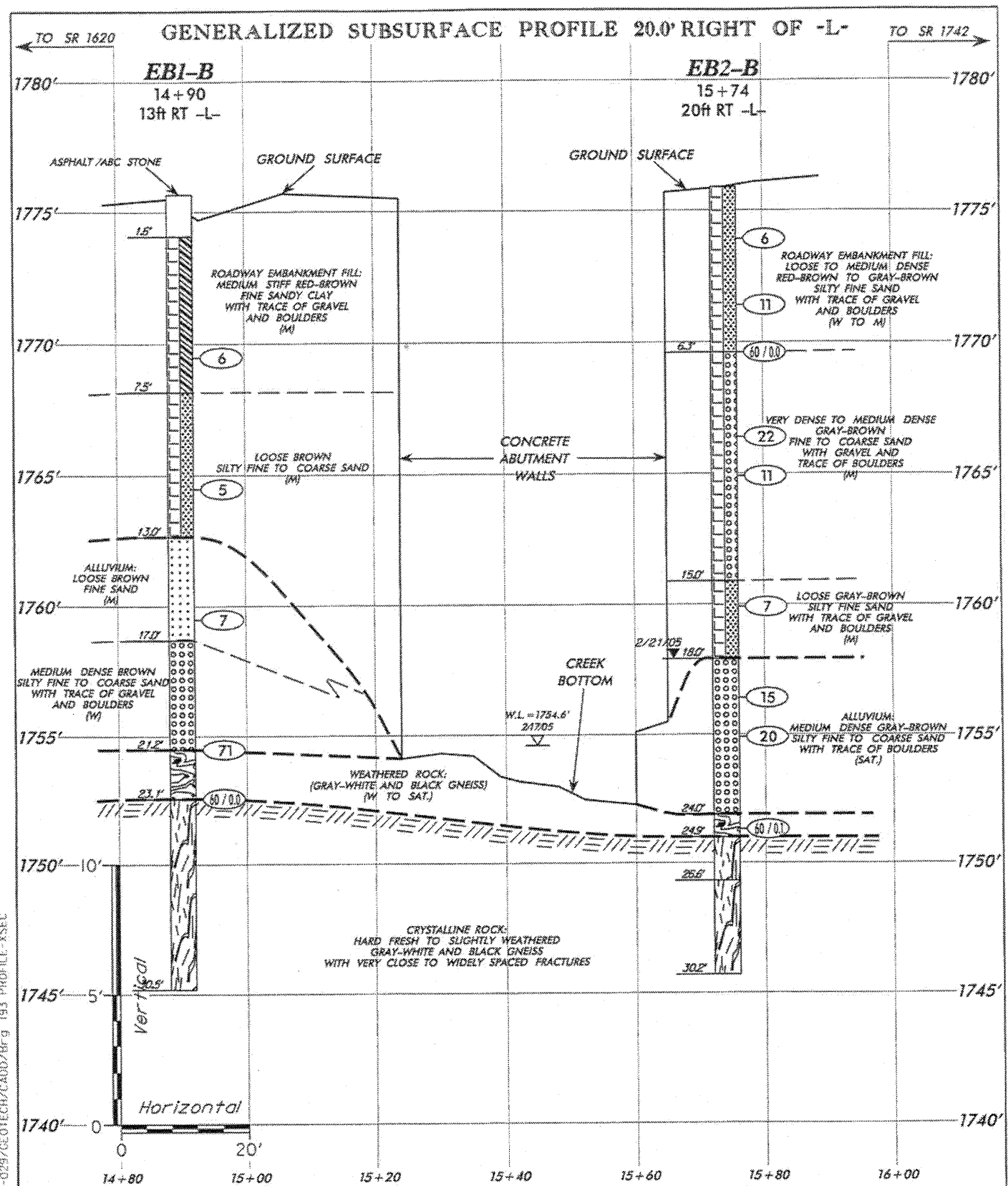


BORING LOCATION PLAN
 REPLACEMENT OF BRIDGE No. 193
 OVER FLAT CREEK ON NC 251
 WBS No. 37581 NCMA ID. MA13010B
 FEDERAL ID NO. N/A
 BUNCOMBE COUNTY, NORTH CAROLINA

SHEET NO. 4

S:\PROJECTS\2005\05-029\GEOTECH\CA00\B-r-g 193 SITEPLAN

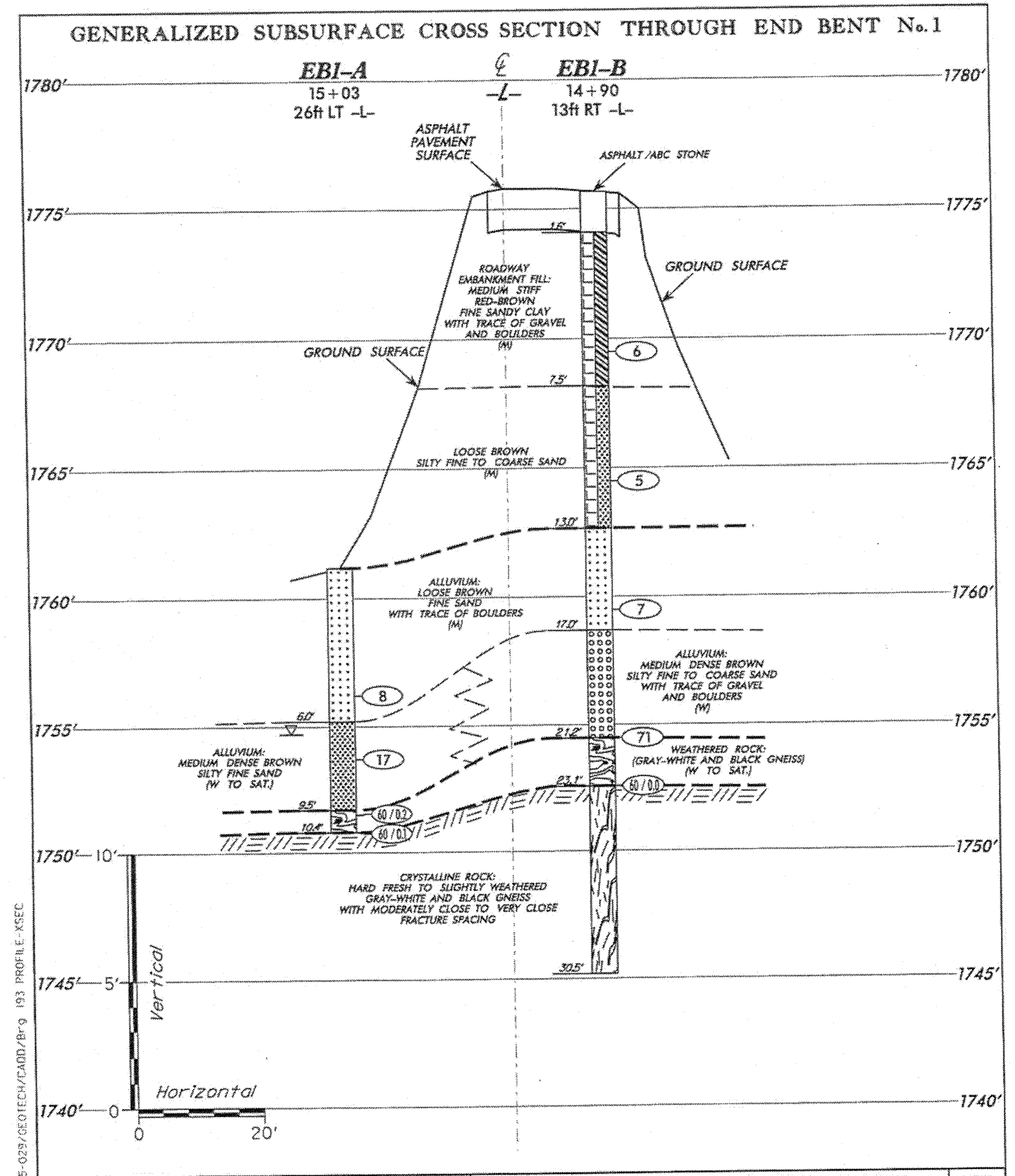
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SCALE: (V) 1" = 5' (H) 1" = 20'	GENERALIZED SUBSURFACE PROFILE 20.0' RIGHT OF -L- FROM STA. 14+70 TO STA. 16+10 REPLACEMENT OF BRIDGE No. 193 OVER FLAT CREEK ON NC 251 WBS No. 375B1 NCMA ID. MA 13010B FEDERAL ID No. N/A BUNCOMBE COUNTY, NORTH CAROLINA	SHEET NO.
CHECKED BY: AFR		5
DRAWN BY: TRP		
DATE: MARCH 2005		
JOB NO. 1051-05-029		



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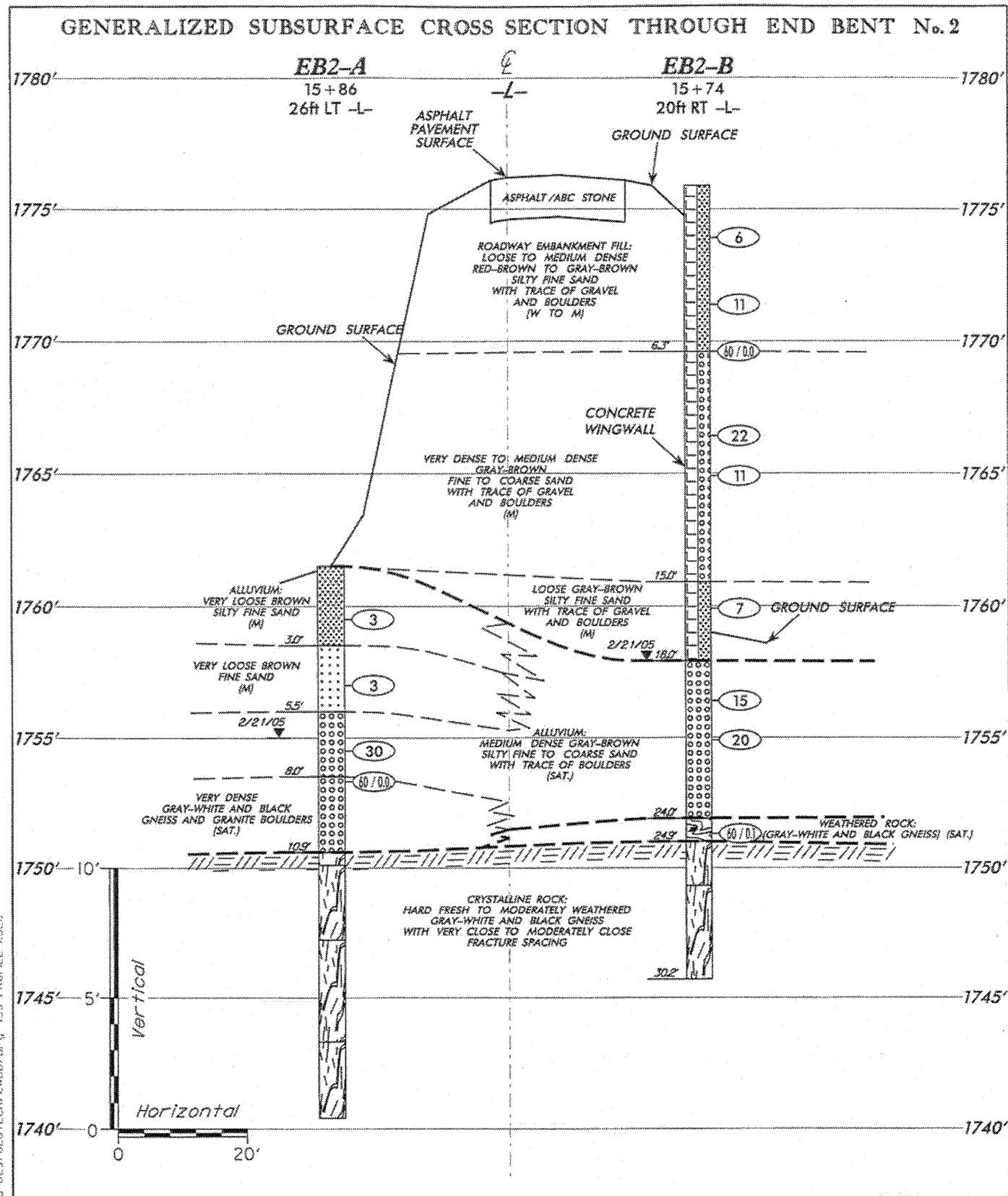
SCALE: (V) 1" = 5' (H) 1" = 20'	GENERALIZED SUBSURFACE CROSS SECTION THROUGH END BENT No. 1 REPLACEMENT OF BRIDGE No. 193 OVER FLAT CREEK ON NC 251 WBS No. 375B1 NCMA ID. MA 13010B FEDERAL ID No. N/A BUNCOMBE COUNTY, NORTH CAROLINA	SHEET NO.
CHECKED BY: AFR		6A
DRAWN BY: TRP		
DATE: MARCH 2005		
JOB NO. 1051-05-029		





PROJECT NO. MA13010B		ID. 37581		COUNTY Buncombe		GEOLOGIST D. BENTS										
SITE DESCRIPTION Replacement of Bridge No. 193 over Flat Creek on NC 251							GROUND WATER (ft)									
BORING NO. EB1-A		BORING LOCATION 15+03		OFFSET 26 ft LT	ALIGNMENT -L-		0 HR. 6.5									
COLLAR ELEV. 1,761.2 ft		NORTHING		EASTING		24 HR. N/M										
TOTAL DEPTH 10.4 ft		DRILL MACHINE Diedrich D-50		DRILL METHOD 2 1/4" HSA		HAMMER TYPE MANUAL										
DATE STARTED 2/21/05		COMPLETED 2/21/05		SURFACE WATER DEPTH N/A												
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION			
		0.5ft	0.5ft	0.5ft	0	20	40	60	80					100		
1,761.2					GROUND SURFACE								1,761.2	0.0		
1,757.2	4.0															ALLUVIUM: LOOSE BROWN FINE SAND (A-3) WITH TRACE OF BOULDERS
1,754.7	6.5	2	3	5												ALLUVIUM: MEDIUM DENSE BROWN SILTY FINE SAND (A-2-4)
1,752.2	9.0	4	7	10												WEATHERED ROCK: (GRAY-WHITE AND BLACK GNEISS) 1) ADVANCED 2-1/4" HSA TO 10.3 FEET.
1,750.9	10.3	10	60/0.2													
		60/0.1														
BORING TERMINATED WITH STANDARD PENETRATION TEST REFUSAL AT ELEV. 1750.3 FEET ON CRYSTALLINE ROCK: GRAY-WHITE AND BLACK GNEISS																

NCDOT BORE SINGLE 1051-05-029.GPJ NCDOT.GDT 3/2/05



SCALE: (V) 1" = 5' (H) 1" = 20'		GENERALIZED SUBSURFACE CROSS SECTION		SHEET NO.
CHECKED BY: AFR		THROUGH END BENT No. 2		6B
DRAWN BY: TRP		REPLACEMENT OF BRIDGE No. 193		
DATE: MARCH 2005		OVER FLAT CREEK ON NC 251		
JOB NO. 1051-05-029		WBS No. 37581 NCMA ID. MA13010B FEDERAL ID No. N/A BUNCOMBE COUNTY, NORTH CAROLINA		

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PROJECT NO. MA13010B		ID. 37581		COUNTY Buncombe		GEOLOGIST D. BENTS							
SITE DESCRIPTION Replacement of Bridge No. 193 over Flat Creek on NC 251							GROUND WATER (ft)						
BORING NO. EB1-B		BORING LOCATION 14+90		OFFSET 13 ft RT	ALIGNMENT -L-	0 HR. N/A	24 HR. N/M						
COLLAR ELEV. 1,775.6 ft		NORTHING		EASTING									
TOTAL DEPTH 30.5 ft		DRILL MACHINE Diedrich D-50	DRILL METHOD NW CASING ADVANCER/NQ-2 CORE BARREL		HAMMER TYPE MANUAL								
DATE STARTED 2/22/05		COMPLETED 2/22/05		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
1,775.6													GROUND SURFACE
													ASPHALT (0.8') / ABC STONE (0.8')
													ROADWAY EMBANKMENT FILL: MEDIUM STIFF RED-BROWN FINE SANDY CLAY (A-6) WITH TRACE OF GRAVEL AND BOULDERS
1,770.4	5.2	4	4	2									ROADWAY EMBANKMENT FILL: LOOSE BROWN SILTY FINE TO COARSE SAND (A-2-4)
1,765.4	10.2	2	2	3									ALLUVIUM: LOOSE BROWN FINE SAND (A-3)
1,760.4	15.2	3	4	3									ALLUVIUM: MEDIUM DENSE BROWN SILTY FINE TO COARSE SAND (A-1-b) WITH TRACE OF GRAVEL AND BOULDERS
1,755.4	20.2	14	11	80									WEATHERED ROCK: (GRAY-WHITE AND BLACK GNEISS) CRYSTALLINE ROCK: HARD FRESH TO SLIGHTLY WEATHERED GRAY-WHITE AND BLACK GNEISS WITH MODERATELY CLOSE TO VERY CLOSE FRACTURE SPACING
1,752.5	23.1	60/0.0											BORING TERMINATED AT ELEV. 1745.1 FEET IN CRYSTALLINE ROCK: HARD GRAY-WHITE AND BLACK GNEISS

NCDOT BORE SINGLE 1051-05-029.GPJ NCDOT.GDT 3/3/05



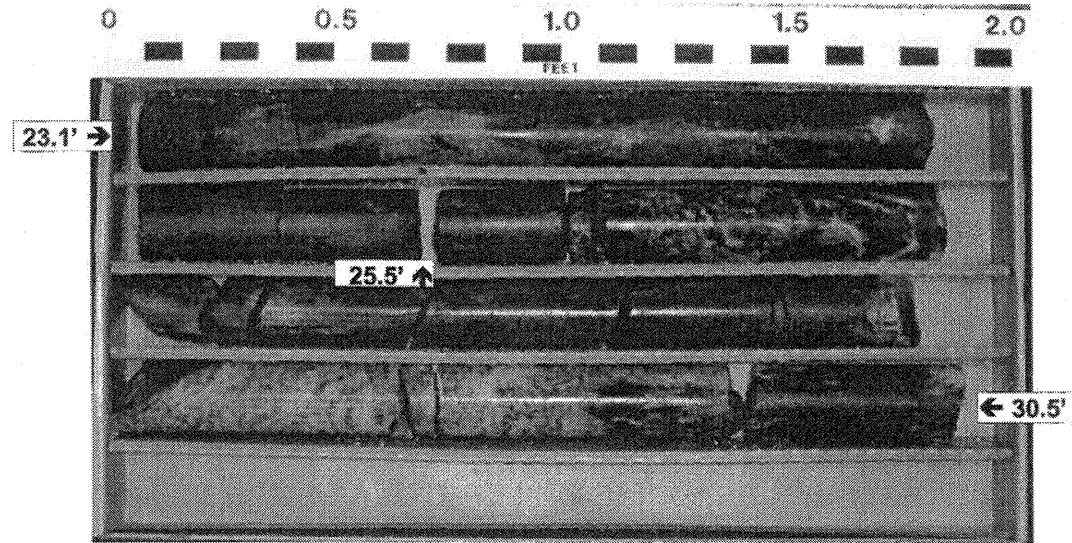
PROJECT NO. MA13010B		ID. 37581		COUNTY Buncombe		GEOLOGIST D. BENTS				
SITE DESCRIPTION Replacement of Bridge No. 193 over Flat Creek on NC 251							GROUND WATER (ft)			
BORING NO. EB1-B		BORING LOCATION 14+90		OFFSET 13 ft RT	ALIGNMENT -L-	0 HR. N/A	24 HR. N/M			
COLLAR ELEV. 1,775.6 ft		NORTHING		EASTING						
TOTAL DEPTH 30.5 ft		DRILL MACHINE Diedrich D-50	DRILL METHOD NW CASING ADVANCER/NQ-2 CORE BARREL		HAMMER TYPE MANUAL					
DATE STARTED 2/22/05		COMPLETED 2/22/05		SURFACE WATER DEPTH N/A						
CORE SIZE NQ-2		TOTAL RUN 7.4 ft		DRILLER L. SHRADER						
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
				REC. (%)	RQD (%)		REC. (%)	RQD (%)		
										Begin Coring @ 23.1 ft
1,752.5	23.1	2.4	1:30	(2.3)	(2.2)		(7.1)	(6.1)		CRYSTALLINE ROCK: HARD FRESH TO SLIGHTLY WEATHERED GRAY-WHITE AND BLACK GNEISS WITH MODERATELY CLOSE TO VERY CLOSE FRACTURE SPACING 4 JOINTS @ 0°, 5 JOINTS @ 10° 2 JOINTS @ 20°, AND 1 JOINT @ 45° BORING TERMINATED AT ELEV. 1745.1 FEET IN CRYSTALLINE ROCK: HARD GRAY-WHITE AND BLACK GNEISS
1,750.1	25.5		2:30	96%	92%		96%	82%		
		5.0	0:30/0.4	(4.8)	(3.9)					
			1:20							
			1:40							
1,745.1	30.5		1:20							
			1:10							

NCDOT CORE SINGLE 1051-05-029.GPJ NCDOT.GDT 3/3/05



CORE PHOTOS

WBS No: 37581	NCMA ID No: MA13010B	County: Buncombe	Boring No.: EB1-B
Site Description: Replacement of Bridge No. 193 over Flat Creek on NC 251		Driller: L. Shrader	
Collar Elev.: 1775.6 ft.	Core Size: NQ-2	Equipment: Diedrich D-50	Geologist: D. Bents
Elev. at T.D.: 1745.1 ft.	Total Depth: 30.5 ft.	Total Run: 7.4 ft.	Date: 2/22/05



Box 1 of 1
 Top of Box @ 23.1 feet; Bottom of Box @ 30.5 feet



PROJECT NO. MA13010B	ID. 37581	COUNTY Buncombe	GEOLOGIST D. BENTS											
SITE DESCRIPTION Replacement of Bridge No. 193 over Flat Creek on NC 251				GROUND WATER (ft)										
BORING NO. EB2-A	BORING LOCATION 15+86	OFFSET 26 ft LT	ALIGNMENT -L-	0 HR. N/A										
COLLAR ELEV. 1,761.5 ft	NORTHING	EASTING	24 HR. 6.5 on 2/21/05											
TOTAL DEPTH 21.1 ft	DRILL MACHINE Diedrich D-50	DRILL METHOD 2 1/4" HSA/NQ-2 CORE BARREL	HAMMER TYPE MANUAL											
DATE STARTED 2/16/05	COMPLETED 2/16/05	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	
1,761.5													GROUND SURFACE	0.0
1,760.5	1.0											M	ALLUVIUM: VERY LOOSE BROWN SILTY FINE SAND (A-2-4)	3.0
1,758.0	3.5	2	2	1								M	ALLUVIUM: VERY LOOSE BROWN FINE SAND (A-3)	5.5
1,755.5	6.0	2	2	1								W	ALLUVIUM: MEDIUM DENSE GRAY-BROWN SILTY FINE TO COARSE SAND (A-1-b)	8.0
1,753.3	8.2	15	15	15								No Rec.	TRACE OF GRAVEL AND BOULDERS	10.9
		60/0.0											ALLUVIUM: VERY DENSE GRAY-WHITE AND BLACK GNEISS AND GRANITE BOULDERS (A-1-b)	14.3
													CRYSTALLINE ROCK: HARD	18.2
													SLIGHTLY TO MODERATELY WEATHERED GRAY-WHITE AND BLACK-BROWN GNEISS WITH CLOSE TO VERY CLOSE FRACTURE SPACING	21.1
													CRYSTALLINE ROCK: HARD	
													FRESH TO VERY SLIGHTLY WEATHERED GRAY-WHITE AND BLACK GNEISS WITH CLOSE FRACTURE SPACING	
													CRYSTALLINE ROCK: HARD	
													SLIGHTLY WEATHERED GRAY-WHITE AND BLACK GNEISS WITH CLOSE TO VERY CLOSE FRACTURE SPACING	
													CRYSTALLINE ROCK: HARD	
													FRESH TO SLIGHTLY WEATHERED GRAY-WHITE AND BLACK GNEISS WITH MODERATELY CLOSE TO CLOSE FRACTURE SPACING	
BORING TERMINATED AT ELEV. 1740.4 FEET IN CRYSTALLINE ROCK: HARD GRAY-WHITE AND BLACK GNEISS														

N.C.D.O.T. BORE SINGLE 1051-05-029.GPJ N.C.D.O.T. GDT 3/11/05

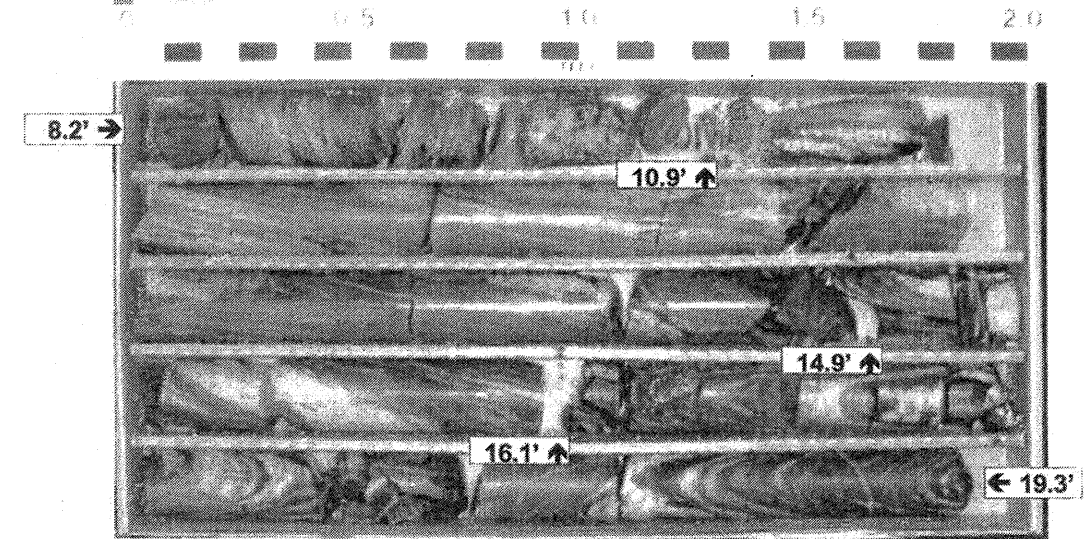
- 1) ADVANCED 2-1/4" HSA TO 8.2 FEET.
- 2) SET CASING TO 8.2 FEET BELOW GROUND SURFACE.
- 3) ADVANCED NQ-2 CORE BARREL FROM 8.2 TO 21.1 FEET.
- 4) CREEK WATER USED AS DRILLING FLUID.
- 5) DRILLING FLUID DENSITY APPROXIMATELY 62.4 PCF.
- 6) NO LOSS OF DRILLING FLUID OBSERVED.

PROJECT NO. MA13010B	ID. 37581	COUNTY Buncombe	GEOLOGIST D. BENTS							
SITE DESCRIPTION Replacement of Bridge No. 193 over Flat Creek on NC 251				GROUND WATER (ft)						
BORING NO. EB2-A	BORING LOCATION 15+86	OFFSET 26 ft LT	ALIGNMENT -L-	0 HR. N/A						
COLLAR ELEV. 1,761.5 ft	NORTHING	EASTING		24 HR. 6.5 on 2/21/05						
TOTAL DEPTH 21.1 ft	DRILL MACHINE Diedrich D-50	DRILL METHOD 2 1/2" HSA/NQ-2 CORE BARREL	HAMMER TYPE MANUAL							
DATE STARTED 2/16/05	COMPLETED 2/16/05	SURFACE WATER DEPTH N/A								
CORE SIZE NQ-2	TOTAL RUN 12.9 ft	DRILLER L. SHRADER								
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (%)	RUN ROD (%)	SAMP. NO.	STRATA REC. (%)	STRATA ROD (%)	LOG	DESCRIPTION AND REMARKS
										Begin Coring @ 8.2 ft
1,753.3	8.2	2.7	0:20	(1.2)	(0.3)		(N/A)	(N/A)	8.2	ALLUVIUM: VERY DENSE GRAY-WHITE AND BLACK GNEISS AND GRANITE BOULDERS (A-1-b)
1,750.6	10.9	4.0	0:20/0.7	(4.0)	(2.9)		(9.9)	(6.8)	10.9	
			1:10	100%	73%		97%	67%	14.3	CRYSTALLINE ROCK: HARD
1,746.6	14.9	1.2	1:30	(1.2)	(0.5)				14.3	SLIGHTLY TO MODERATELY WEATHERED GRAY-WHITE AND BLACK-BROWN GNEISS WITH CLOSE TO VERY CLOSE FRACTURE SPACING INDETERMINABLE JOINTS
1,745.4	16.1	5.0	0:10/0.2	(4.7)	(3.3)				18.2	
			1:00	100%	50%				21.1	CRYSTALLINE ROCK: HARD, FRESH TO VERY SLIGHTLY WEATHERED GRAY-WHITE AND BLACK GNEISS WITH CLOSE FRACTURE SPACING
1,740.4	21.1		1:00	(4.7)	(3.3)				21.1	1 JOINT @ 10°
			0:50							CRYSTALLINE ROCK: HARD, SLIGHTLY WEATHERED GRAY-WHITE AND BLACK GNEISS WITH CLOSE TO VERY CLOSE FRACTURE SPACING
			1:30							12 JOINTS @ 10°, 3 JOINTS @ 60°, AND 5 JOINTS @ 80°
										CRYSTALLINE ROCK: HARD
										FRESH TO SLIGHTLY WEATHERED GRAY-WHITE AND BLACK GNEISS WITH MODERATELY CLOSE TO CLOSE FRACTURE SPACING
										1 JOINT @ 10° AND 1 JOINT @ 20°
										BORING TERMINATED AT ELEV. 1740.4 FEET IN CRYSTALLINE ROCK: HARD GRAY-WHITE AND BLACK GNEISS

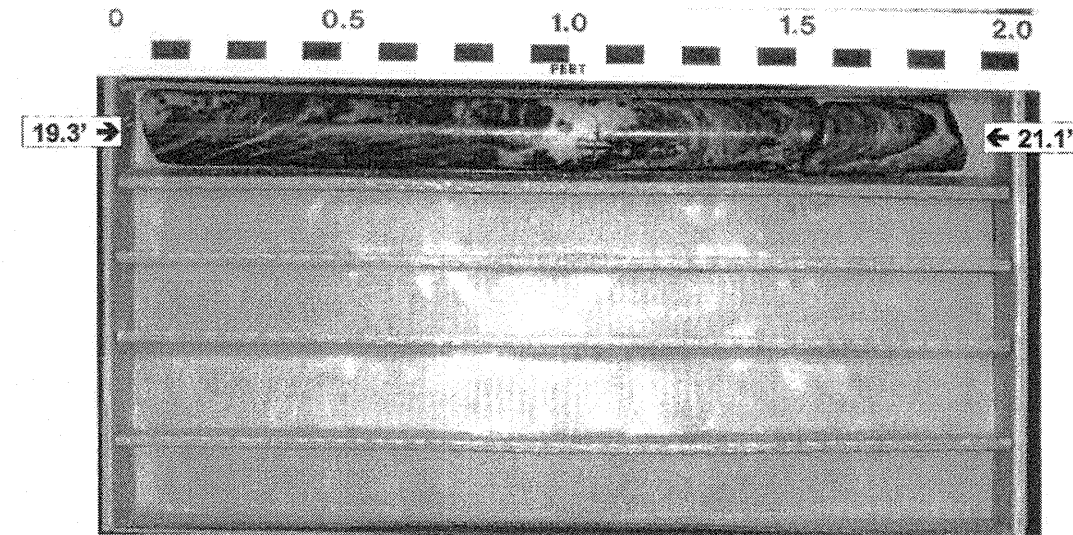
NCDOT CORE SINGLE 1051-05-028 GPJ NCDOT.GDT 3/11/05

CORE PHOTOS

WBS No: 37581	NCMA ID No: MA13010B	County: Buncombe	Boring No.: EB2-A
Site Description: Replacement of Bridge No. 193 on NC 251 over Flat Creek			Driller: L. Shrader
Collar Elev.: 1761.5 ft.	Core Size: NQ-2	Equipment: Diedrich D-50	Geologist: D. Bents
Elev. at T.D.: 1740.4 ft.	Total Depth: 21.1 ft.	Total Run: 12.9 ft.	Date: 2/16/05



Box 1 of 2
Top of Box @ 8.2 feet; Bottom of Box @ 19.3 feet



Box 2 of 2
Top of Box @ 19.3 feet; Bottom of Box @ 21.1 feet



PROJECT NO. MA13010B		ID. 37581		COUNTY Buncombe		GEOLOGIST D. BENTS							
SITE DESCRIPTION Replacement of Bridge No. 193 over Flat Creek on NC 251						GROUND WATER (ft)							
BORING NO. EB2-B		BORING LOCATION 15+74		OFFSET 20 ft RT		ALIGNMENT -L-							
COLLAR ELEV. 1,775.9 ft		NORTHING		EASTING		0 HR. N/A							
TOTAL DEPTH 30.2 ft		DRILL MACHINE Diedrich D-50		DRILL METHOD 2 1/4" HSA/NW CASING ADVANCER/NQ-2 CORE BARREL		HAMMER TYPE MANUAL							
DATE STARTED 2/16/05		COMPLETED 2/17/05		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
1,775.9													GROUND SURFACE
1,774.9	1.0	2	2	4								W	ROADWAY EMBANKMENT FILL: LOOSE TO MEDIUM DENSE RED-BROWN TO GRAY-BROWN SILTY FINE SAND (A-2-4)
1,772.4	3.5	8	6	5								M	WITH TRACE OF GRAVEL AND BOULDERS
1,769.6	6.3	60/0.0										No Rec.	ROADWAY EMBANKMENT FILL: VERY DENSE TO MEDIUM DENSE GRAY-BROWN FINE TO COARSE SAND (A-1-b)
1,767.4	8.5	6	7	4								M	WITH GRAVEL AND SOME BOULDERS
1,765.9	10.0	6	3	4								M	ROADWAY EMBANKMENT FILL: LOOSE GRAY-BROWN SILTY FINE SAND (A-2-4)
1,760.9	15.0	25	10	5								Sat.	WITH TRACE OF GRAVEL AND BOULDERS
1,757.4	18.5	32	12	8								Sat.	ALLUVIUM: MEDIUM DENSE GRAY-BROWN SILTY FINE TO COARSE SAND (A-1-b)
1,755.9	20.0	60/0.1										Sat.	WITH TRACE OF BOULDERS
1,751.4	24.5												WEATHERED ROCK: (GRAY-WHITE AND BLACK GNEISS)
													CRYSTALLINE ROCK: HARD
													VERY SLIGHTLY TO SLIGHTLY WEATHERED GRAY-WHITE AND BLACK GNEISS WITH CLOSE TO VERY CLOSE FRACTURE SPACING
													CRYSTALLINE ROCK: HARD FRESH GRAY-WHITE AND BLACK GNEISS WITH WIDELY SPACED FRACTURES
													BORING TERMINATED AT ELEV. 1745.7 FEET IN CRYSTALLINE ROCK: HARD GRAY-WHITE AND BLACK GNEISS

NCDOT BORE SINGLE 1051-05-028.GPJ NCDOT.GDT 3/18/05



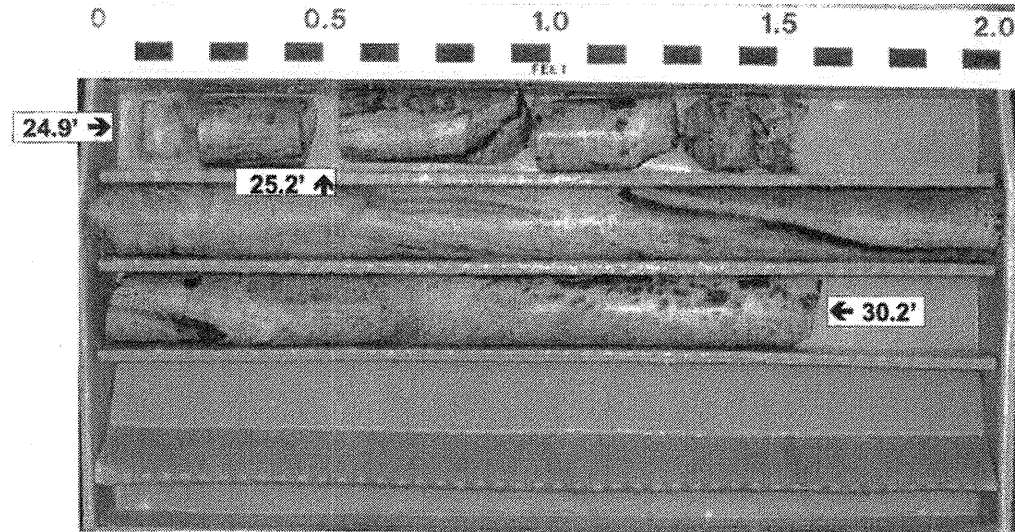
PROJECT NO. MA13010B		ID. 37581		COUNTY Buncombe		GEOLOGIST D. BENTS				
SITE DESCRIPTION Replacement of Bridge No. 193 over Flat Creek on NC 251						GROUND WATER (ft)				
BORING NO. EB2-B		BORING LOCATION 15+74		OFFSET 20 ft RT		ALIGNMENT -L-				
COLLAR ELEV. 1,775.9 ft		NORTHING		EASTING		0 HR. N/A				
TOTAL DEPTH 30.2 ft		DRILL MACHINE Diedrich D-50		DRILL METHOD 2 1/4" HSA/NW CASING ADVANCER/NQ-2 CORE BARREL		HAMMER TYPE MANUAL				
DATE STARTED 2/16/05		COMPLETED 2/17/05		SURFACE WATER DEPTH N/A						
CORE SIZE NQ-2		TOTAL RUN 5.3 ft		DRILLER L. SHRADER						
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
				REC. (%)	RQD (%)		REC. (%)	RQD (%)		
										Begin Coring @ 24.9 ft
1,751.0	24.9	0.3	0:40/0.3	(0.3)	(0.0)		(4.8)	(3.9)		CRYSTALLINE ROCK: HARD
1,750.7	25.2	5.0	1:10	100%	0%		91%	74%		VERY SLIGHTLY TO SLIGHTLY WEATHERED GRAY-WHITE AND BLACK GNEISS WITH CLOSE TO VERY CLOSE FRACTURE SPACING
1,745.7	30.2		1:30	90%	78%					CRYSTALLINE ROCK: HARD FRESH GRAY-WHITE AND BLACK GNEISS WITH WIDELY SPACED FRACTURES
			1:30							BORING TERMINATED AT ELEV. 1745.7 FEET IN CRYSTALLINE ROCK: HARD GRAY-WHITE AND BLACK GNEISS

NCDOT BORE SINGLE 1051-05-028.GPJ NCDOT.GDT 3/18/05



CORE PHOTOS

WBS No: 37581	NCMA ID No: MA13010B	County: Buncombe	Boring No.: EB2-B
Site Description: Replacement of Bridge No. 193 on NC 251 over Flat Creek		Driller: L. Shrader	
Collar Elev.: 1775.9 ft.	Core Size: NQ-2	Equipment: Diedrich D-50	Geologist: D. Bents
Elev. at T.D.: 1745.7 ft.	Total Depth: 30.2 ft.	Total Run: 5.3 ft.	Date: 2/17/05



Box 1 of 1
 Top of Box @ 24.9 feet; Bottom of Box @ 30.2 feet

GEOTECHNICAL UNIT FIELD SCOUR REPORT

WBS No.: 37581 NCMA ID: MA13010B COUNTY: Buncombe
 DESCRIPTION(1): REPLACEMENT OF BRIDGE NO. 193 OVER FLAT CREEK ON NC 251

INFORMATION ON EXISTING BRIDGES Information obtained from: field inspection
 microfilm(Reel: Pos:)
 other Bridge Survey and Hydraulic Design Report

COUNTY BRIDGE NO. 193 BRIDGE LENGT 41.7' NO. BENTS IN: CHANNEL 0 FLOOD PLAIN 2
 FOUNDATION TYPE: REINFORCED CONCRETE ABUTMENTS ON STRIP FOOTINGS

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: NO EVIDENCE OF SCOUR

INTERIOR BENTS: N/A

DESIGN INFORMATION:

CHANNEL BED: NONE OBSERVED

CHANNEL BANKS: MINOR SCOUR ALONG CHANNEL BANKS

EXISTING SCOUR PROTECTION:

TYPE(3): CONCRETE WINGWALLS

EXTENT(4): WINGWALLS EXTEND ABOUT 20 FT UP- AND DOWNSTREAM AT BOTH END BENTS.

EFFECTIVENESS(5): MOSTLY EFFECTIVE

OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): SOME DEBRIS OBSERVED ON BOULDER IN MIDDLE OF CREEK ABOUT 50 FEET DOWNSTREAM FROM BRIDGE. SOME DEBRIS ALSO OBSERVED ALONG BANKS.

DESIGN INFORMATION:

CHANNEL BED MATERIAL(7): GRAY-BROWN SILTY FINE TO COARSE SAND (A-1-B) WITH TRACE GRAVEL AND BOULDERS.

CHANNEL BANK MATERIAL(8): GRAY-BROWN TO BROWN FINE SAND (A-3), AND SILTY FINE SAND (A-2-4)

FOUNDATION BEARING MATERIAL WEATHERED ROCK AND CRYSTALLINE ROCK: (GNEISS)

CHANNEL BANK COVER(10): GRASS, UNDERBRUSH, SMALL TO LARGE TREES +/- 75 FEET SOUTH OF BRIDGE, +/- 0 FEET NORTH OF BRIDGE, LT SIDE OF

FLOOD PLAIN WIDTH(11): BRIDGE IS IN FLOOD PLAIN OF FRENCH BROAD RIVER

FLOOD PLAIN COVER(12): MOSTLY GRASS, SOME UNDERBRUSH AND SMALL TO LARGE TREES, RESIDENTIAL HOUSES ON SOUTH BANK, BOTH SIDES OF ROADWAY.

DESIGN INFORMATION CONT.

STREAM IS x DEGRADING AGGRADING (13)
 SINKHOLE OBSERVED IN EMBANKMENT AT APPROXIMATE
 OTHER OBSERVATIONS AND COMMENTS: STATION 15+73, 5 FT LEFT. TWO STRIP FOOTINGS ARE IN
 CREEK BED UNDER BRIDGE. LARGE BOULDER IS IN CENTER OF CREEK DOWNSTREAM OF BRIDGE. LARGE
 SANDBAR WITH SIGNIFICANT DEBRIS (TREES, ETC.) AT FLAT CREEK MOUTH INTO FRENCH BROAD.
 ABUTMENT WALLS LOCATED ON SOUTH BANK APPROXIMATELY 100 TO 150 FEET UPSTREAM OF BRIDGE.

CHANNEL MIGRATION TENDENCY (14): MIGRATION TENDENCY TO THE NORTH.

REPORTED BY: Duane D. Bents *[Signature]* DATE: 2/22/2005
 S&ME, Inc.

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (15):

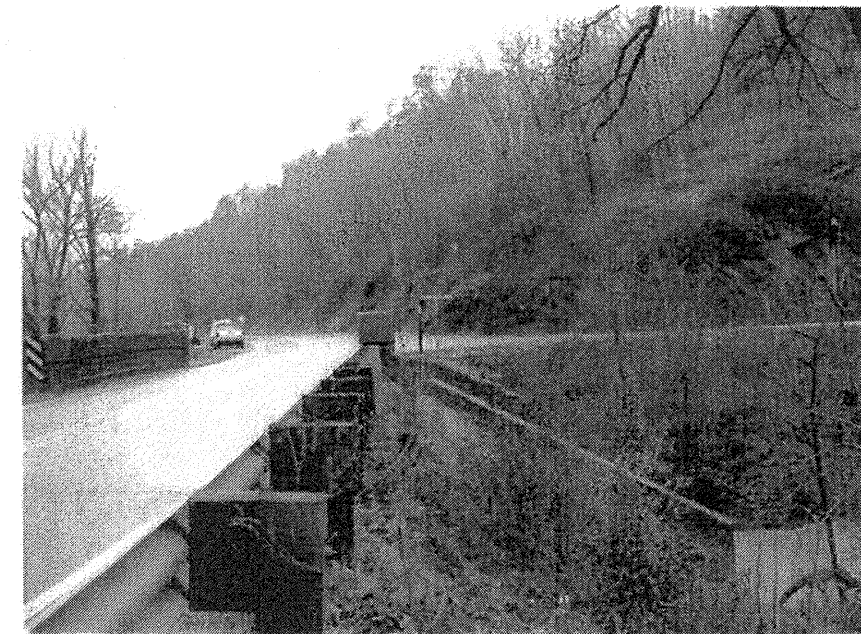
REPORTED BY: DATE:

INSTRUCTIONS

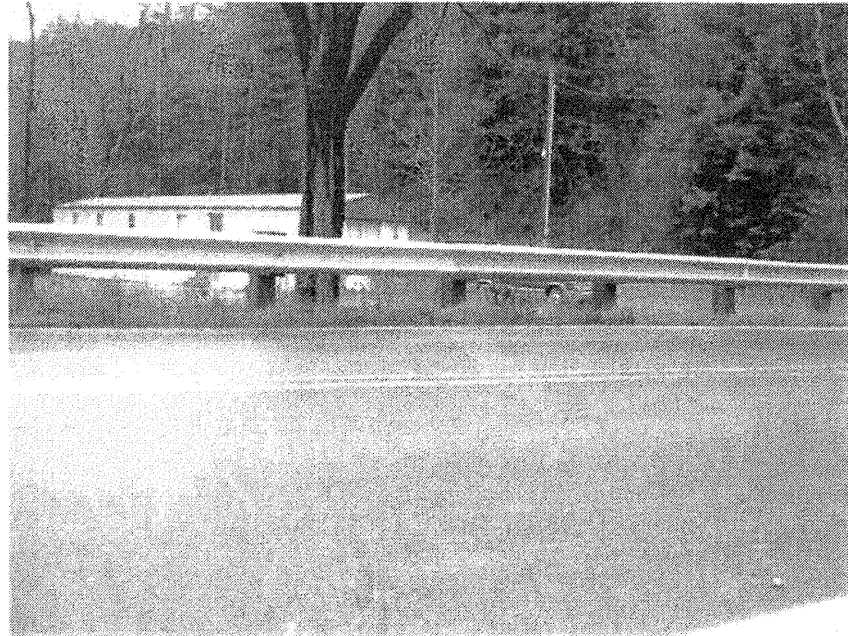
- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE FOUNDATION BEARING MATERIAL.
- (10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
- (11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
- (14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (15) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.



Photograph No. 1:
 This photograph was taken from the southeast approach along the centerline of the -L- alignment, looking northwest.



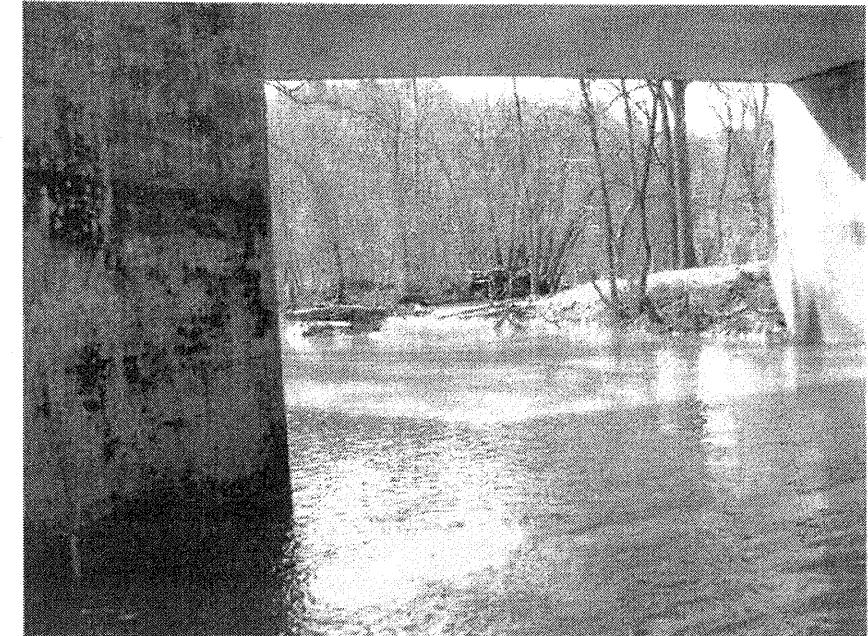
Photograph No. 2:
 This photograph was taken from the right side of the -L- alignment, at proposed End Bent No. 1, looking northwest.



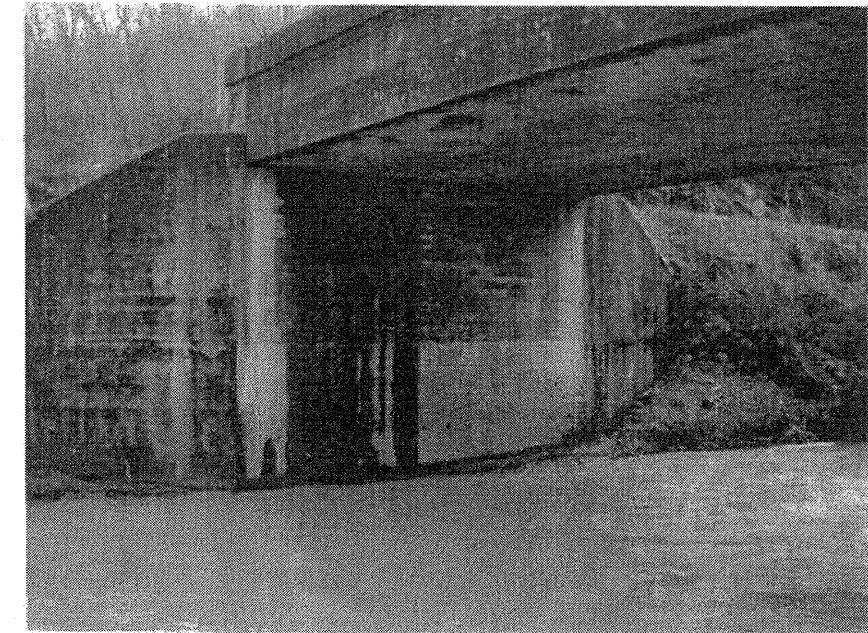
Photograph No. 3:
This photograph was taken from 5' left of the -L- alignment, looking east, across proposed End Bent No. 1.



Photograph No. 4:
This photograph was taken from the left side of the -L- alignment, looking east, across proposed End Bent No. 1.



Photograph No. 5:
This photograph was taken from the right side of the -L- alignment, looking southwest, across existing End Bent No. 1.



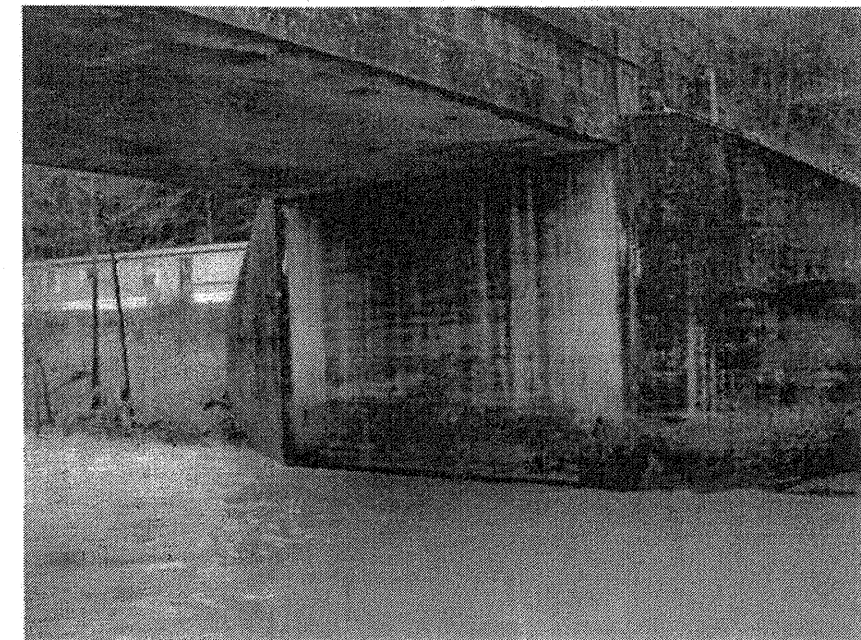
Photograph No. 6:
This photograph was taken from the left side of the -L- alignment, looking north at existing End Bent No. 2.



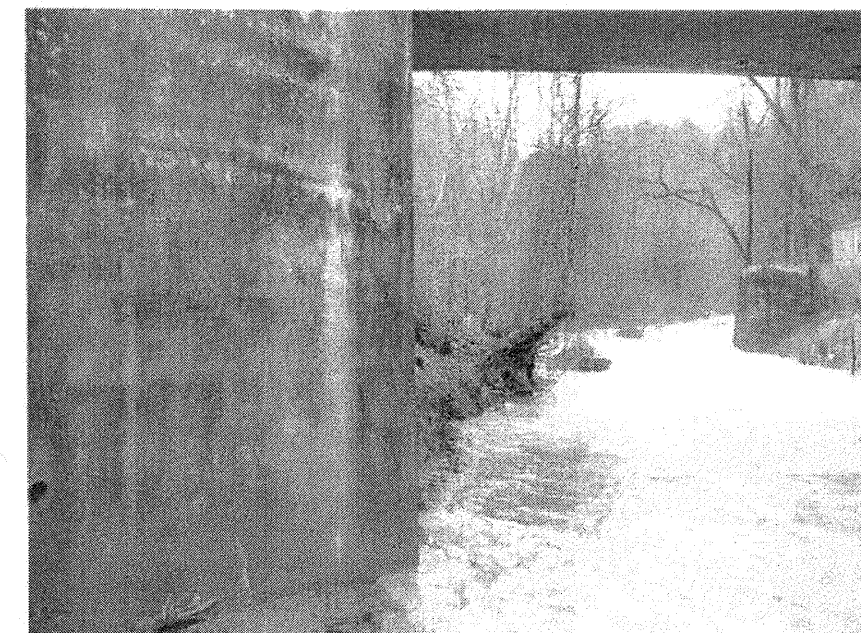
Photograph No. 7:
This photograph was taken from the existing bridge, looking northeast (upstream).



Photograph No. 8:
This photograph was taken from the existing bridge, looking southwest (downstream).



Photograph No. 9:
This photograph was taken from the left side of the -L- alignment, looking east at existing End Bent No. 1.



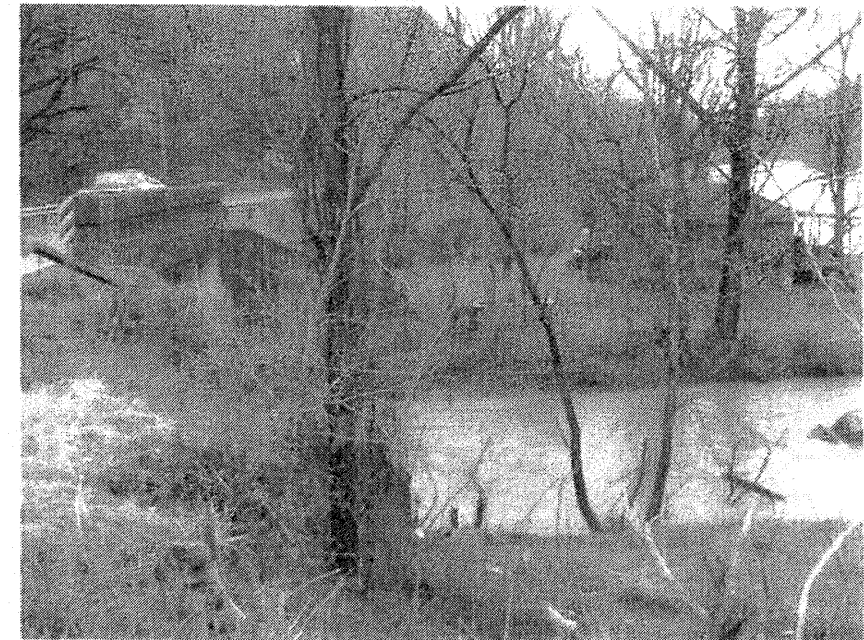
Photograph No. 10:
This photograph was taken from the left side of the -L- alignment, looking east, across existing End Bent No. 2.



Photograph No. 11:
This photograph was taken from the left side of the -L- alignment, looking east, across proposed End Bent No. 2.



Photograph No. 12:
This photograph was taken from 6' left of the -L- alignment, looking east, across proposed End Bent No. 2.



Photograph No. 13:
This photograph was taken from the left side of the -L- alignment, at proposed End Bent No. 2, looking southeast.



Photograph No. 14:
This photograph was taken from the northwest approach along the centerline of the -L- alignment, looking southeast.