

CONTRACT: ID: B-4299

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 33636.1.1 I.D. NO. B-4299
F.A. PROJECT BRSTP-1006(14)
COUNTY WAKE
PROJECT DESCRIPTION BRIDGE NO. 255 ON
-L- (SR 1006) OVER ECHO BRANCH
CREEK AT STATION 22+70

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33636.1.1 (B-4299)	1	11
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		CONST.	

CONTENTS:

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	STRUCTURE INVENTORY REPORT
4	SITE PLAN
5	PROFILE
6	CROSS SECTIONS
7,8	BORING LOGS
9	SOIL TEST RESULTS
10	SCOUR REPORT
11	SITE PHOTOGRAPH

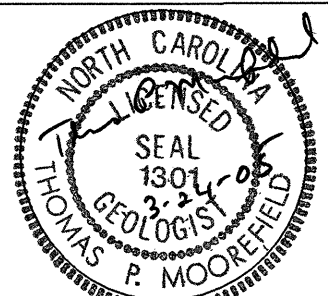
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INVESTIGATED BY T.P. MOOREFIELD PERSONNEL J.L. PEDRO
 CHECKED BY D.N. ARGENBRIGHT CONSULTANT: S&ME
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 DATE MARCH 2005 J. WHITE
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DRAWN BY: J.L. PEDRO

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-4299	33636.1.1	2	11

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 T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY SILTY CLAY, 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 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 (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 ELONGATED 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 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
SOIL LEGEND AND AASHTO CLASSIFICATION				MINERALOGICAL COMPOSITION				WEATHERING				ROCK HARDNESS			
GENERAL CLASS. GRANULAR MATERIALS (<85% 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.				VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.			
GROUP CLASS. A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-3 A-4, A-5 A-6, A-7				SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50				CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.				HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.			
SYMBOL				COMPRESSIBILITY				NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.				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.			
% PASSING 10 40 200				PERCENTAGE OF MATERIAL				COASTAL PLAIN SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.				MEDIUM HARD CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.			
LIQUID LIMIT PLASTIC INDEX				GROUND WATER				VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK 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				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.			
GROUP INDEX				MISCELLANEOUS SYMBOLS				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.				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.			
USUAL TYPES OF MAJOR MATERIALS				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
GEN. RATING AS A SUBGRADE				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
P.I. OF A-7-5 ≤ L.L. - 30 + P.I. OF A-7-6 > L.L. - 30				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
CONSISTENCY OR DENSENESS				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
PRIMARY SOIL TYPE COMPACTNESS OR RESISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
GENERAL GRANULAR MATERIAL (NON-COHESIVE)				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
GENERAL SILT-CLAY MATERIAL (COHESIVE)				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
TEXTURE OR GRAIN SIZE				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
U.S. STD. SIEVE SIZE OPENING (MM)				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F. SD.) SILT (SL.) CLAY (CL.)				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
GRAIN SIZE MM IN.				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
SOIL MOISTURE - CORRELATION OF TERMS				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
LL LIQUID LIMIT				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
PL PLASTIC LIMIT				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
OM OPTIMUM MOISTURE				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
SL SHRINKAGE LIMIT				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
PLASTICITY				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
COLOR				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			
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.				ROADWAY EMBANKMENT WITH SOIL DESCRIPTION				VERY HARD				TERM SPACING TERM THICKNESS			



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

March 24, 2005

STATE PROJECT: 33636.1.1 (B-4299)
F.A. PROJECT: BRSTP-1006(14)
COUNTY: Wake
DESCRIPTION: Bridge No. 255 on -L- (SR 1006) over Echo Branch Creek at Station 22+70
SUBJECT: Geotechnical Report – Foundation Investigation

Project Description

A single-span bridge, 70-feet in length with a 70° skew, is proposed on -L- (SR 1006) over Echo Branch Creek to replace the existing structure. The new bridge will be 18 feet longer than the existing structure. The project is located in southern Wake County within the town limits of Garner.

The subsurface investigation was conducted during March of 2005 using an ATV-mounted CME-750 drill machine. Two Standard Penetration Test borings were performed at each of the proposed end bent locations. All borings were advanced until crystalline rock was encountered. Representative soil samples were obtained for visual classification in the field and selected samples were sent to the Materials and Tests Unit for laboratory analysis.

Physiography and Geology

The project is located in relatively flat terrain of the Piedmont Physiographic province. The area is urban, with single-family homes and some businesses located along Old Stage Road. The area along Echo Branch Creek is wooded. Geologically, the project is located within the Raleigh Belt, and is underlain by biotite gneiss and schist.

Soil Properties

Soils encountered at the project site include roadway embankment, alluvial, and residual soils.

Roadway embankment soils were present at both end bent locations and range in thickness from 6.0 to 9.0 feet. At End Bent 1, these soils consist of red-brown, medium stiff, moist, sandy clay (A-7-6) with medium plasticity, and red-brown, soft, moist, sandy silt (A-4). At End Bent 2, embankment soils consist of orange and red-brown, loose, moist, silty sand (A-2-4), and orange and red-brown, soft, moist, sandy clay (A-7-6) with medium plasticity. Embankment soils are underlain by alluvial soils.

Alluvial soils were encountered at both end bent locations. The alluvial soils range from 3.0 to 9.5 feet in thickness. These soils predominantly consist of gray, very loose to loose, wet, silty sand (A-2-4) and brown to gray, loose to medium dense, wet, coarse sand (A-1-b). Other alluvial soils present are gray, very soft, moist, silty sandy clay (A-6). The alluvial soils were deposited on residual soil and weathered rock.

Residual soils were encountered at End Bent 2 and range from 2.3 to 4.2 feet in thickness. The residual soils consist of green and white, dense, moist, sand (A-2-4) with some mica. The residual soils are underlain by weathered and/or crystalline rock.

Rock Properties

Weathered rock was derived from the underlying metamorphosed bedrock (biotite gneiss and schist), and ranges in thickness from 1.6 feet at boring EB1-B, to as much as 11.3 feet at boring EB2-B. Weathered rock was encountered in each of the borings except for EB2-A. The top of weathered rock ranges in elevation from 244.7 feet at EB2-B to 255.7 feet at EB1-B.

Crystalline rock was encountered at each boring location. The top of crystalline rock ranges in elevation from 233.4 feet at EB2-B to 254.1 feet at EB1-B.

Groundwater

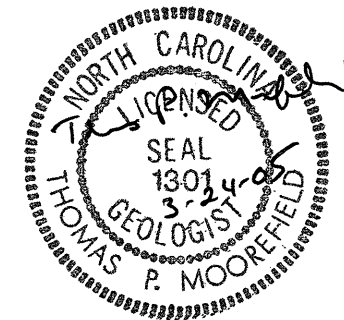
Groundwater was present in all of the borings. The groundwater elevations ranged from 256.4 feet at EB1-A to 258.3 feet at EB2-B. Surface water in Echo Branch Creek was at elevation 256.8 feet (4-20-04).

Notice

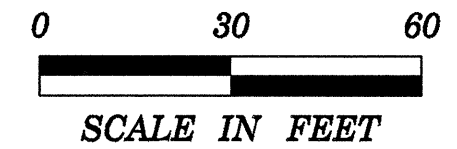
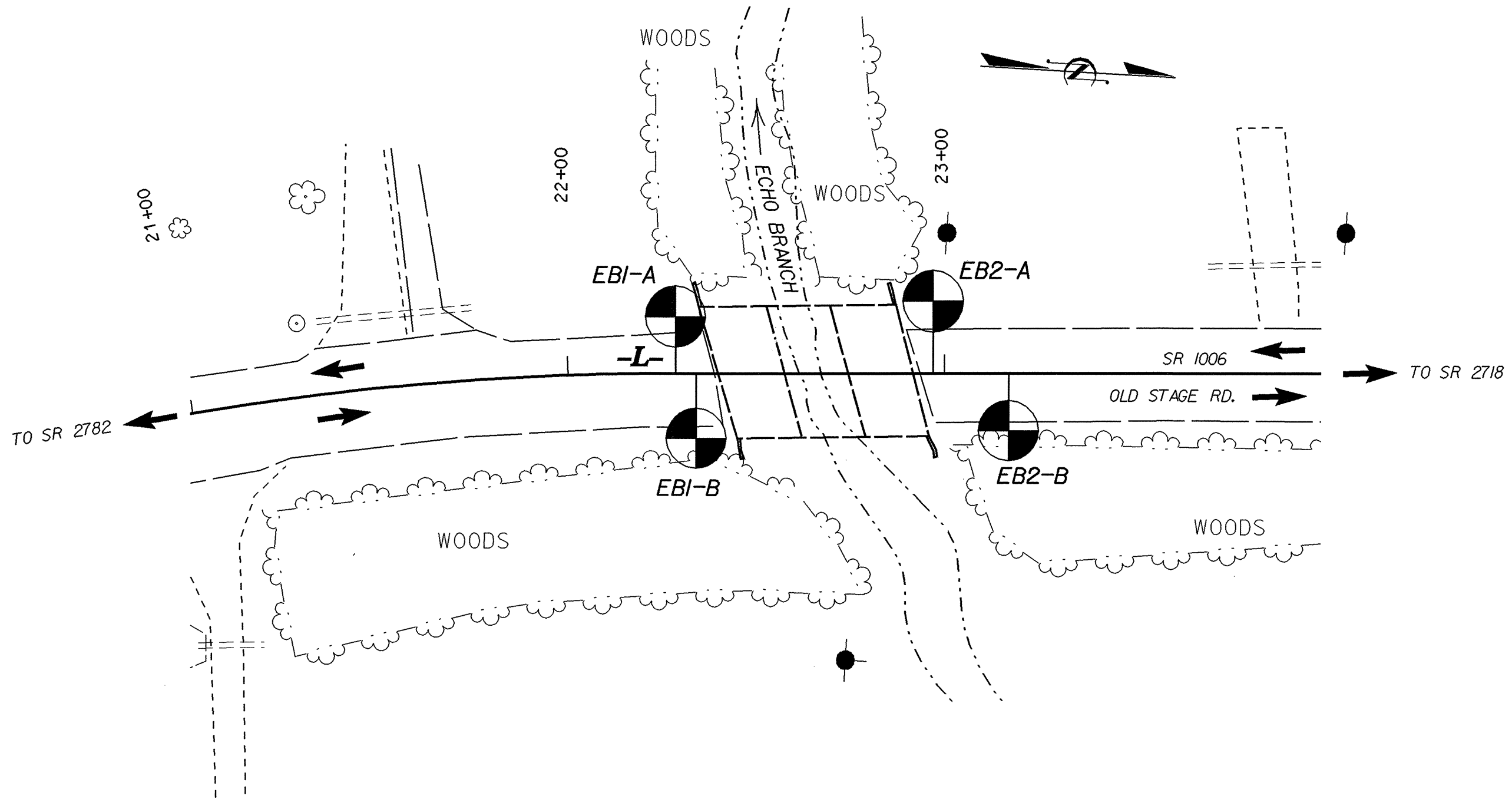
This Geotechnical foundation report is based on the bridge survey report for Echo Branch Creek dated October 5, 2004 and the Preliminary General Drawing dated November 24, 2004. If significant changes are made in the design or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

Prepared by,
Jaime Love Pedro
Jaime Love Pedro
Assistant Project Geologist

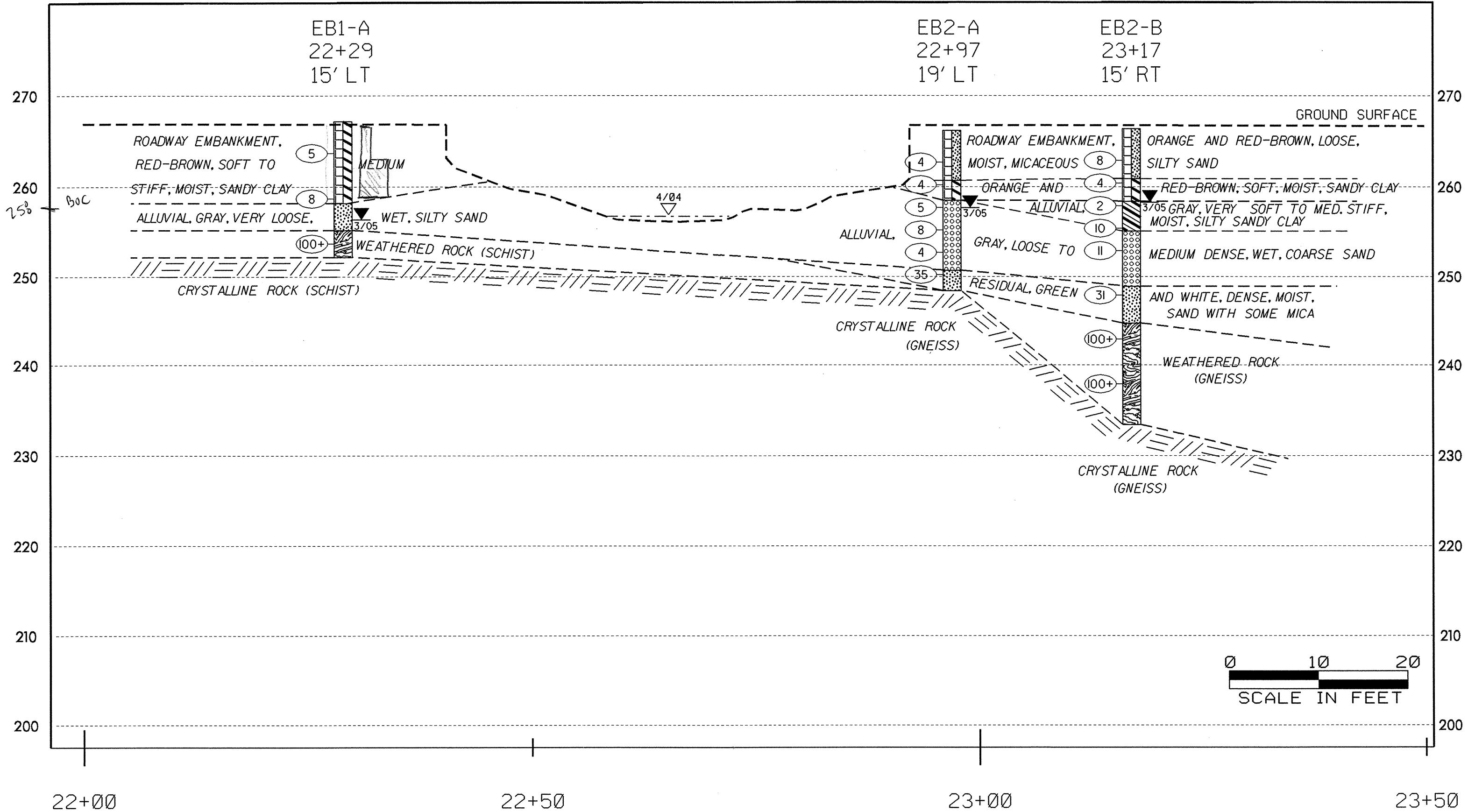
Prepared by,
Thomas P. Moorefield
Thomas P. Moorefield, LG
Project Geologist



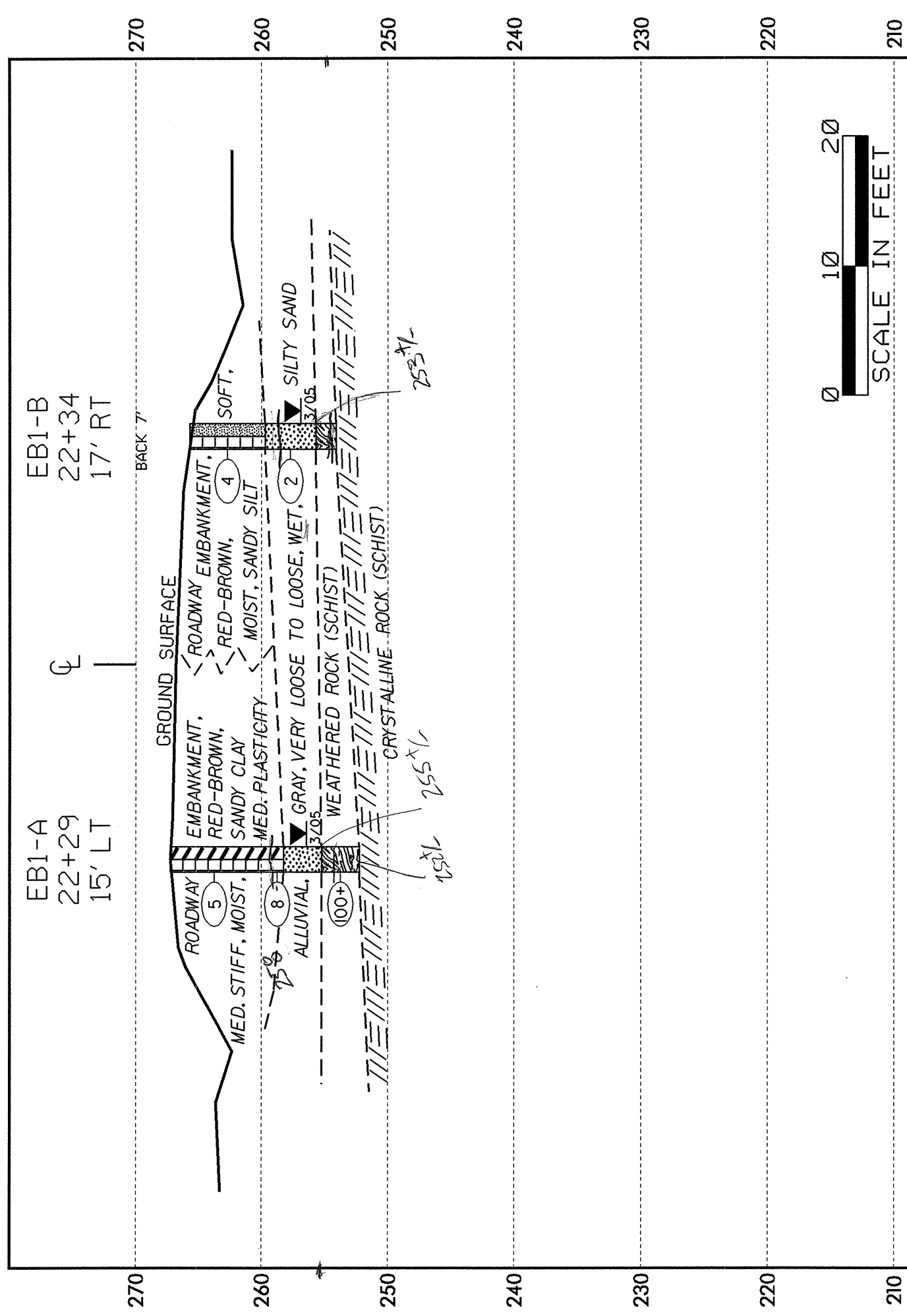
TEST SITE PLAN



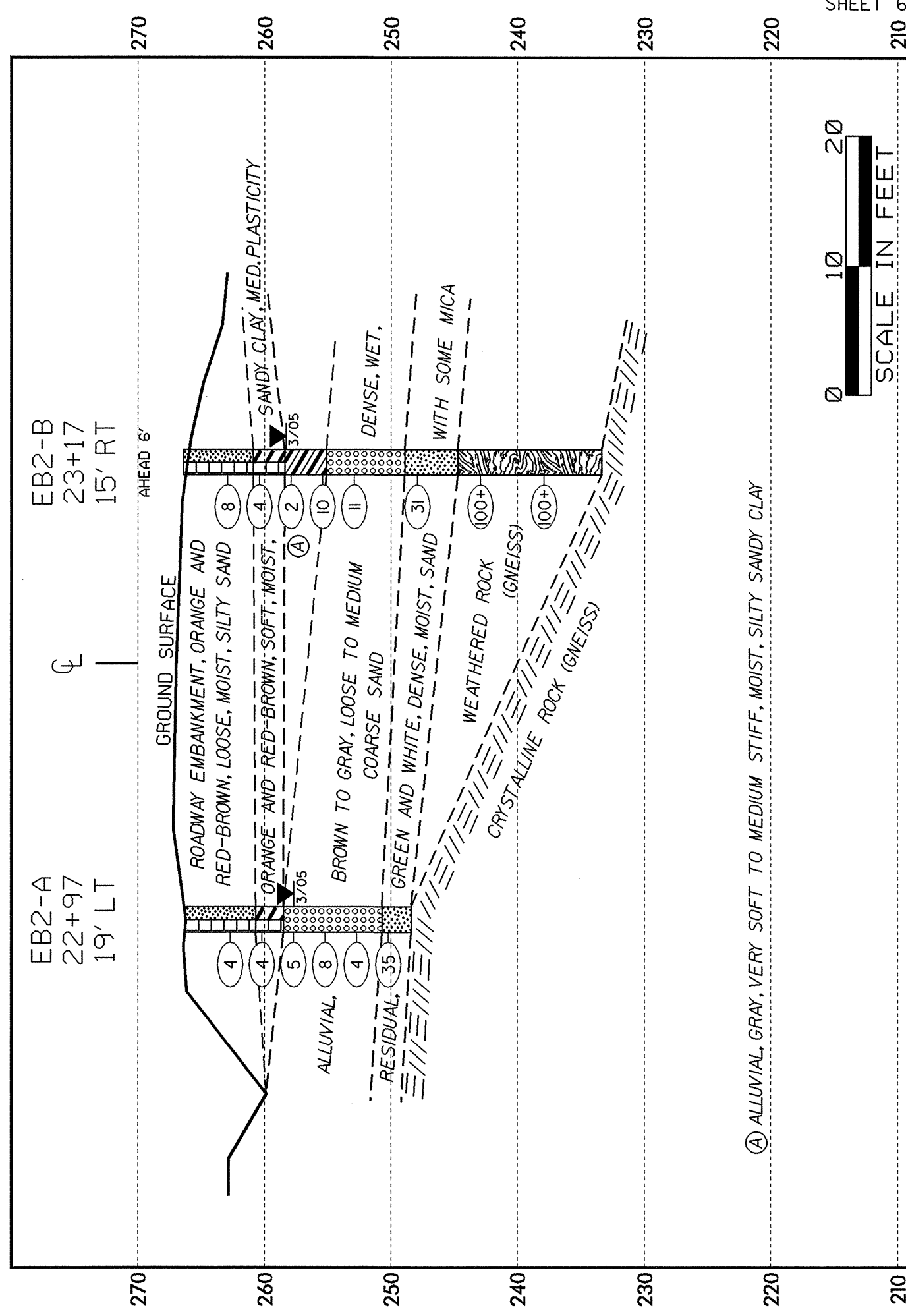
PROFILE THROUGH BORINGS PROJECTED ALONG -L-



CROSS SECTION THROUGH END BENT 1



CROSS SECTION THROUGH END BENT 2



(A) ALLUVIAL, GRAY, VERY SOFT TO MEDIUM STIFF, MOIST, SILTY SANDY CLAY

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

SHEET 7 OF 11

PROJECT NO. 33636.1.1		ID. B-4299		COUNTY WAKE		GEOLOGIST J. L. PEDRO									
SITE DESCRIPTION BRIDGE NO. 255 ON -L- (SR 1006) OVER ECHO BRANCH CREEK							GROUND WATER								
BORING NO. EBI-A		BORING LOCATION 22+29		OFFSET 15' LT		ALIGNMENT -L-									
COLLAR ELEVATION 267.2'		NORTHING 711648		EASTING 2102028		0 HR. DRY									
TOTAL DEPTH 15.0'		DRILL MACHINE CME-750		DRILL METHOD H.S. AUGERS		HAMMER TYPE AUTOMATIC									
START DATE 3/10/05		COMPLETION DATE 3/10/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 15.0'									
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT			PEN. (FT.)	BLOWS PER FOOT					SAMPLE NUMBER	LOG MOI.	LOG G	SOIL AND ROCK DESCRIPTION	
		0.5'	0.5'	0.5'		0	25	50	75	100					
267.2															
265.0	3.5	2	2	3	1.0	X5					SS-1	M		ROADWAY EMBANKMENT, RED-BROWN, SANDY CLAY, MEDIUM PLASTICITY	
260.0	8.5	2	3	5	1.0	X8					SS-2	M		ALLUVIAL, GRAY, SILTY SAND	
255.0	13.5	22	45	55	0.7				100+X					WEATHERED ROCK (SCHIST)	
250.0						AUGER REFUSAL AT ELEVATION 252.2 FEET ON CRYSTALLINE ROCK (SCHIST)									
245.0															
240.0															
235.0															
230.0															
225.0															
220.0															
215.0															
210.0															
205.0															
200.0															
195.0															
190.0															

PROJECT NO. 33636.1.1		ID. B-4299		COUNTY WAKE		GEOLOGIST J. L. PEDRO									
SITE DESCRIPTION BRIDGE NO. 255 ON -L- (SR 1006) OVER ECHO BRANCH CREEK							GROUND WATER								
BORING NO. EBI-B		BORING LOCATION 22+34		OFFSET 17' RT		ALIGNMENT -L-									
COLLAR ELEVATION 265.7'		NORTHING 711656		EASTING 2102059		0 HR. DRY									
TOTAL DEPTH 11.6'		DRILL MACHINE CME-750		DRILL METHOD H.S. AUGERS		HAMMER TYPE AUTOMATIC									
START DATE 3/10/05		COMPLETION DATE 3/10/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 11.6'									
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT			PEN. (FT.)	BLOWS PER FOOT					SAMPLE NUMBER	LOG MOI.	LOG G	SOIL AND ROCK DESCRIPTION	
		0.5'	0.5'	0.5'		0	25	50	75	100					
265.7															
265.0															
260.0	3.0	2	2	2	1.0	X4					SS-3	M		ROADWAY EMBANKMENT, RED-BROWN, SANDY SILT	
255.0	8.0	WOH	WOH	2	1.0	X2					SS-4	W		ALLUVIAL, GRAY, SILTY SAND	
250.0						AUGER REFUSAL AT ELEVATION 254.1 FEET ON CRYSTALLINE ROCK (SCHIST)									
245.0															
240.0															
235.0															
230.0															
225.0															
220.0															
215.0															
210.0															
205.0															
200.0															
195.0															
190.0															

10' to hard rock

11 piles
batter @ least 3
piles

7' to hard rock

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

SHEET 8 OF 11

PROJECT NO. 33636.1.1		ID. B-4299		COUNTY WAKE		GEOLOGIST J. L. PEDRO		GROUND WATER		
SITE DESCRIPTION BRIDGE NO. 255 ON -L- (SR 1006) OVER ECHO BRANCH CREEK								GROUND WATER		
BORING NO. EB2-A		BORING LOCATION 22+97		OFFSET 19' LT		ALIGNMENT -L-		0 HR. 8.8'		
COLLAR ELEVATION 266.2'		NORTHING 711716		EASTING 2102020				24 HR. 8.5'		
TOTAL DEPTH 17.8'		DRILL MACHINE CME-750		DRILL METHOD H.S. AUGERS		HAMMER TYPE AUTOMATIC				
START DATE 3/10/05		COMPLETION DATE 3/10/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 17.8'				
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT	PEN. (FT.)	BLOWS PER FOOT	SAMPLE NUMBER	LOG	SOIL AND ROCK DESCRIPTION			
		0.5' 0.5' 0.5'		0 25 50 75 100						
266.2										
265.0	3.5	2	2	2	1.0	X 4	ROADWAY EMBANKMENT, ORANGE-BROWN, MICACEOUS SILTY SAND	SS-5	M	
260.0	6.0	WOH	2	2	1.0	X 4	ORANGE-BROWN, SANDY CLAY, MEDIUM PLASTICITY	SS-6	M	
	8.5	2	2	3	1.0	X 5		SS-7	W	
255.0	11.0	WOH	3	5	1.0	X 8	ALLUVIAL, BROWN TO GRAY, COARSE SAND		W	
	13.5	1	2	2	1.0	X 4			W	
250.0	16.0	22	21	14	1.0	X 35	RESIDUAL, GREEN AND WHITE, SILTY SAND WITH SOME MICA	SS-8	M	
245.0	AUGER REFUSAL AT ELEVATION 248.4 FEET ON CRYSTALLINE ROCK (GNEISS)									
240.0										
235.0										
230.0										
225.0										
220.0										
215.0										
210.0										
205.0										
200.0										
195.0										
190.0										

PROJECT NO. 33636.1.1		ID. B-4299		COUNTY WAKE		GEOLOGIST J. L. PEDRO		GROUND WATER		
SITE DESCRIPTION BRIDGE NO. 255 ON -L- (SR 1006) OVER ECHO BRANCH CREEK								GROUND WATER		
BORING NO. EB2-B		BORING LOCATION 23+17		OFFSET 15' RT		ALIGNMENT -L-		0 HR. 8.3'		
COLLAR ELEVATION 266.4'		NORTHING 711738		EASTING 2102052				24 HR. 8.1'		
TOTAL DEPTH 33.0'		DRILL MACHINE CME-750		DRILL METHOD H.S. AUGERS		HAMMER TYPE AUTOMATIC				
START DATE 3/10/05		COMPLETION DATE 3/10/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 33.0'				
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT	PEN. (FT.)	BLOWS PER FOOT	SAMPLE NUMBER	LOG	SOIL AND ROCK DESCRIPTION			
		0.5' 0.5' 0.5'		0 25 50 75 100						
266.4										
265.0	3.5	2	3	5	1.0	X 8	ROADWAY EMBANKMENT, RED-BROWN, SILTY SAND	SS-9	M	
260.0	6.0	2	2	2	1.0	X 4	RED-BROWN, SANDY CLAY, MEDIUM PLASTICITY		M	
	8.5	WOH	WOH	2	1.0	X 2	ALLUVIAL, GRAY, SILTY CLAY		M	
255.0	11.0	3	4	6	1.0	X 10		SS-10	W	
	13.5	4	5	6	1.0	X 11	TAN AND BROWN, COARSE SAND		W	
250.0	18.5	9	11	20	1.0	X 31	RESIDUAL, GREEN AND WHITE, SILTY SAND WITH SOME MICA		M	
245.0	23.5	30	70		0.8					
240.0	28.5	100			0.4		WEATHERED ROCK (GNEISS)			
235.0	AUGER REFUSAL AT ELEVATION 233.4 FEET ON CRYSTALLINE ROCK (GNEISS)									
230.0										
225.0										
220.0										
215.0										
210.0										
205.0										
200.0										
195.0										
190.0										

PROJ. NO. - 33636.1.1
ID NO. - B-4299
COUNTY - WAKE

EB1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	15' LT	22+29	3.5-5.0	A-7-6(6)	45	19	22.0	21.2	14.3	42.4	82	72	49	-	-
SS-2	15' LT	22+29	9.0-10.0	A-2-4(0)	16	NP	32.1	42.2	13.5	12.1	91	69	28	-	-

EB1-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-3	17' RT	22+34	3.0-4.5	A-4(0)	28	9	25.9	35.6	14.3	24.2	86	73	38	-	-
SS-4	17' RT	22+34	8.0-9.5	A-2-4(0)	26	8	25.5	42.6	9.7	22.2	92	80	34	-	-

EB2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-5	19' LT	22+97	3.5-5.0	A-2-4(0)	29	5	40.0	32.3	11.5	16.2	89	68	28	-	-
SS-6	19' LT	22+97	6.0-7.5	A-7-6(5)	42	17	19.2	30.3	16.2	34.3	90	81	49	-	-
SS-7	19' LT	22+97	8.5-10.0	A-1-b(0)	25	NP	73.7	18.2	0.0	8.1	81	35	8	-	-
SS-8	19' LT	22+97	16.0-17.5	A-2-4(0)	28	NP	40.4	45.5	8.1	6.1	99	83	18	-	-

EB2-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-9	15' RT	23+17	8.5-10.0	A-6(2)	30	13	23.4	32.9	17.4	26.3	95	85	45	-	-
SS-10	15' RT	23+17	11.3-12.5	A-1-b(0)	24	NP	70.1	23.4	0.4	6.1	77	43	6	-	-

PROJECT: 33636.1.1 ID: B-4299 COUNTY: Wake

DESCRIPTION(1): Bridge No. 255 on -L- (SR 1006) over Echo Branch Creek
at -L- Station 22+70

INFORMATION ON EXISTING BRIDGE

Information obtained from: field inspection
 microfilm (Reel: _____ Pos: _____)
 other: Hydro Report

BR. NO.: 255 BR. LENGTH: 52' NO. BENTS: 4 NO. BENTS IN: CHANNEL: 2 FLOODPLAIN: 2

FOUNDATION TYPE: Timber Piles

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: None

INTERIOR BENTS: Bent 1 has some scour around the piles

CHANNEL BED: None

CHANNEL BANKS: None

EXISTING SCOUR PROTECTION:

TYPE(3): Rip-rap at End Bent 2 and Bent 1; some piles on Bent 1 and 2 have poured concrete box at base

EXTENT(4): End Bent 2 rip-rap covers 40'x6', Bent 1 rip-rap is scattered, concrete around 2 or 3 piles

EFFECTIVENESS(5): Effective

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

DESIGN INFORMATION

CHANNEL BED MATERIAL(7): Alluvial, gray and brown, silty and coarse sand (SS-2 and SS-10)

CHANNEL BANK MATERIAL(8): Alluvial, brown to gray, loose, sand (SS-7)

CHANNEL BANK COVER(10): Grass, brush, and trees

FLOOD PLAIN WIDTH(11): +/- 150 feet

FLOOD PLAIN COVER(12): Grass, brush, and trees

DESIGN INFORMATION CONT.

STREAM IS: X DEGRADING AGGRADING (13)

OTHER OBSERVATIONS AND COMMENTS: _____

CHANNEL MIGRATION TENDENCY (14): South toward End Bent 1

GEOTECHNICALLY ADJUSTED SCOUR ELEVATIONS(15):

Geotechnical analysis indicates the maximum anticipated scour elevation occurs at an elevation of 252.5 feet.

This is 2.7 feet higher than the Hydraulic Unit's predicted scour elevation.

REPORTED BY: Jaime Love Pedro DATE: 3-10-05
Jaime Love Pedro

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.
- (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 THE RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. IF THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS DEPENDENT ON SCOUR COUNTER MEASURES, EXPLAIN. (RIPRAP ARMORING ON SLOPES, ETC.) 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.

SITE PHOTOGRAPH
(BRIDGE NO. 255 ON -L- (SR 1006) OVER ECHO BRANCH CREEK)

SHEET 11 OF 11
33636.1.1 (B-4299)



View looking due east and upstream