

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33355.1.1(B-3921) F.A. PROJ. BRZ-1600(7)
COUNTY WARREN
PROJECT DESCRIPTION BRIDGE NO. 45 ON -L- (SR 1600) OVER
FISHING CREEK AT -L- STATION 12+95

INVENTORY

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CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE MAY 2007



5/15/07

PROJECT: 33355.1.1 ID: B-3921

DRAWN BY: T.T. WALKER

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.

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. 33355.I.(KB-3921)	SHEET NO. 2
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION				GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS			
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE ASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, ASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY, SILEX CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HARD PLASTIC, A-7-6</i>				WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.				HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:				ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.			
SOIL LEGEND AND ASHTO CLASSIFICATION				MINERALOGICAL COMPOSITION				WEATHERING				ROCK HARDNESS			
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS				MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.				FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.				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 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50				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 GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.			
SYMBOL				PERCENTAGE OF MATERIAL				MODERATELY 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.				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.			
% PASSING # 10, # 40, # 200				ORGANIC MATERIAL GRANULAR SILT - CLAY OTHER MATERIAL				VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.				VERY SOFT			
LIQUID LIMIT PLASTIC INDEX				GROUND WATER				COMPLETE				FRACTURE SPACING			
GROUP INDEX				WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP				TERM SPACING				BEDDING THICKNESS			
USUAL TYPES OF MAJOR MATERIALS				MISCELLANEOUS SYMBOLS				TERM SPACING				BEDDING THICKNESS			
GENERATING AS A SUBGRADE				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD				TERM SPACING				BEDDING THICKNESS			
PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30				SPT DPT DMT VST TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL				TERM SPACING				BEDDING THICKNESS			
CONSISTENCY OR DENSITY				ABBREVIATIONS				INDURATION				INDURATION			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)				HI. - HIGHLY MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP. - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL				FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.				FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.			
TEXTURE OR GRAIN SIZE				EQUIPMENT USED ON SUBJECT PROJECT				FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.				FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.			
U.S. STD. SIEVE SIZE OPENING (MM)				DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: CORE SIZE: HAND TOOLS:				MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.				MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.			
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F. SD.) SILT (SL.) CLAY (CL.)				MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST				INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.				INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.			
SOIL MOISTURE - CORRELATION OF TERMS				INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.			
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION				INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.			
PLASTICITY				INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.			
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY				INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.			
COLOR				INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.			
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.				INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.				EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.			



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

May 14, 2007

STATE PROJECT: 33355.1.1 (B-3921)
F.A. PROJECT: BRZ-1600 (7)
COUNTY: Warren

DESCRIPTION: Bridge No. 45 on -L- (SR 1600) over Fishing Creek at Station 12+95

SUBJECT: Geotechnical Report – Structure Inventory

Project Description

A three-span bridge, 185-feet in length with a 105° skew, is proposed on -L- (SR 1600, Baltimore Road) over Fishing Creek. The project is located in central Warren County about 3 miles south of Warrenton.

The subsurface investigation was conducted during February and March of 2007 using an ATV-mounted CME-550 drill machine with a manual hammer. Standard Penetration Test borings were performed at each of the proposed bent locations. In addition, one location at each interior bent was cored using NQ core equipment. All borings were advanced to crystalline rock using hollow stem augers or N-casing with advancer. 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. Two rock core samples were submitted to the Materials and Tests Unit to determine Unit Weight and Compressive Strength.

Physiography and Geology

The project is located in the gently rolling terrain of the Piedmont Physiographic province. Geologically, the site is underlain by metamorphic rock from the Raleigh Belt. The area consists of a mixture of woods and pastures with scattered homes.

Soil Properties

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

Roadway embankment soils were encountered at all end bent locations except EB2-B. The embankment soils range in thickness from 8.0 to 10.5 feet. These soils consist of red-brown, moist, soft to stiff, sandy and clayey silt (A-4, A-5) and sandy clay (A-6). Alluvial soils underlie roadway embankment soils.

Alluvial soils range from 11.8 to 21.0 feet in thickness. These soils predominantly consist of red-brown and gray, moist to wet, very loose to very dense, sand and silty sand (A-3, A-2-4) and red-brown and brown, soft to very stiff, moist to wet, sandy and clayey silt (A-4, A-5) and sandy clay (A-6). Lessor amounts of brown, tan and gray, medium dense to very dense, coarse sand (A-1-b) with some quartz gravel is also present. The alluvial soils were deposited on residual soils and weathered rock.

Residual soils were present at all bent locations except for EB2 and range in thickness from 5.5 to 12.2 feet. These soils consist of tan, brown and white, moist to wet, medium dense to very dense, coarse and silty sand (A-1-b, A-2-4) and tan and brown, moist, very stiff to hard, saprolitic, sandy silt (A-4). Residual soils are underlain by weathered rock.

Rock Properties

Weathered rock was derived from the underlying metamorphic rock, and ranges in thickness from 1.3 feet at EB2-A, to 10.4 feet at EB2-B. Weathered rock was encountered in all of the borings. The top of weathered rock ranges in elevation from 198.2 feet at B2-B to 211.8 feet at EB2-B.

Crystalline rock was encountered at all bent locations. Rock present at the site consists of gray, white and brown, moderately severely weathered to fresh, hard to very hard, moderately closely to very closely fractured, metamorphic mica gneiss. Core Recovery (REC) values range per run from 86% to 100%, and Rock Quality Designation (RQD) values range per run from 22% to 100%. Laboratory tests show compressive strengths ranging from 5.47 ksi to 6.85 ksi and unit weights ranging from 185.0 lb/ft³ to 186.7 lb/ft³. More detailed rock descriptions can be found in the Core Boring Reports. The top of crystalline rock ranges in elevation from 189.9 feet at B2-B to 204.5 feet at EB2-A.

Groundwater

Groundwater was encountered at all bent locations. The groundwater elevations range from 220.8 feet at EB2-B to 225.2 feet at EB1-B. The water in Fishing Creek was at an elevation of 222.1 feet (4-17-06).

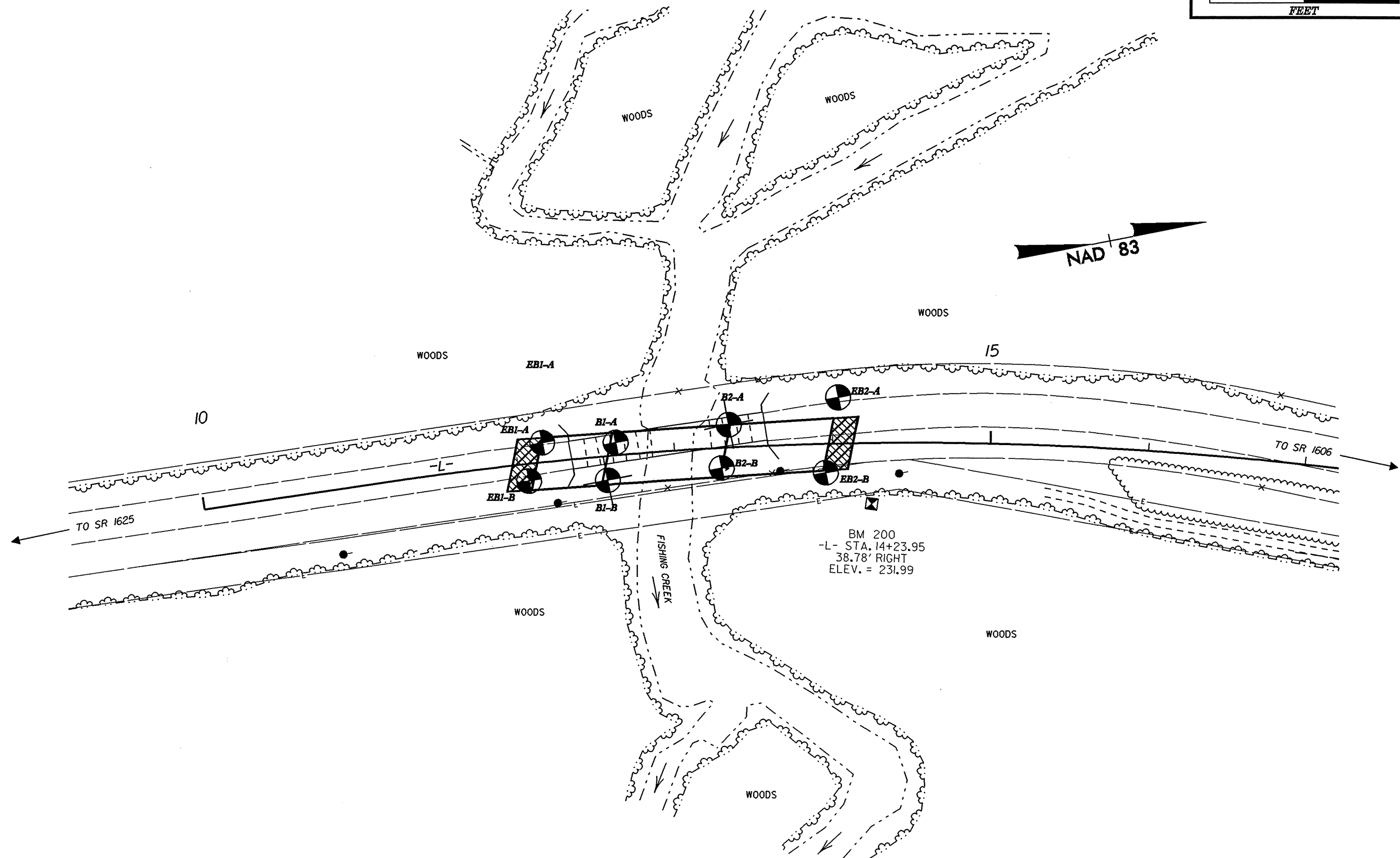
Notice

This Geotechnical foundation report is based on the Preliminary General Drawing dated October 2006 and the Hydraulics Bridge Report dated June 2006. If significant changes are made in the design or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

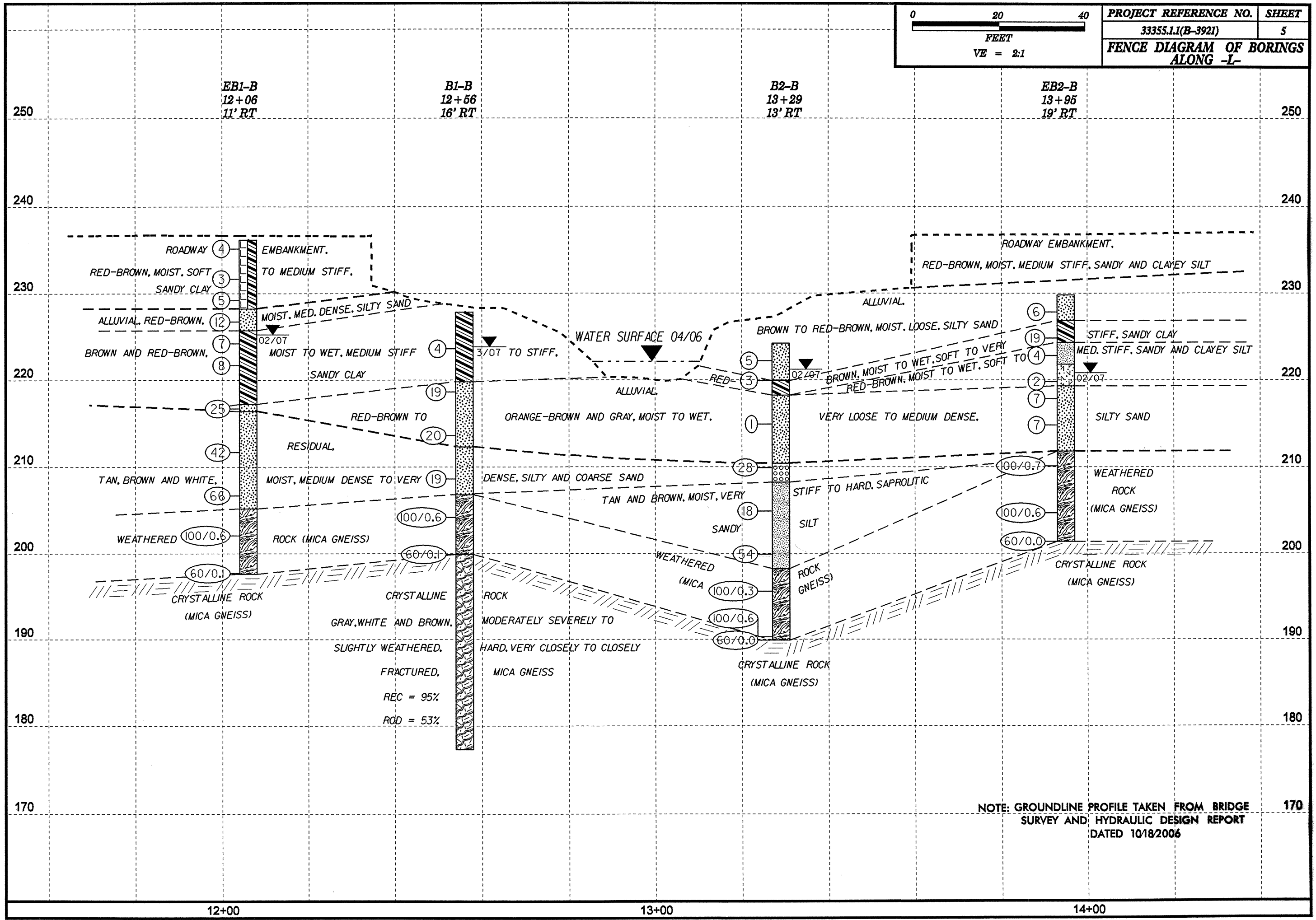
Prepared by,

A handwritten signature in black ink, appearing to read "Joseph I. Milkovits, Jr.".

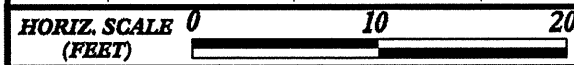
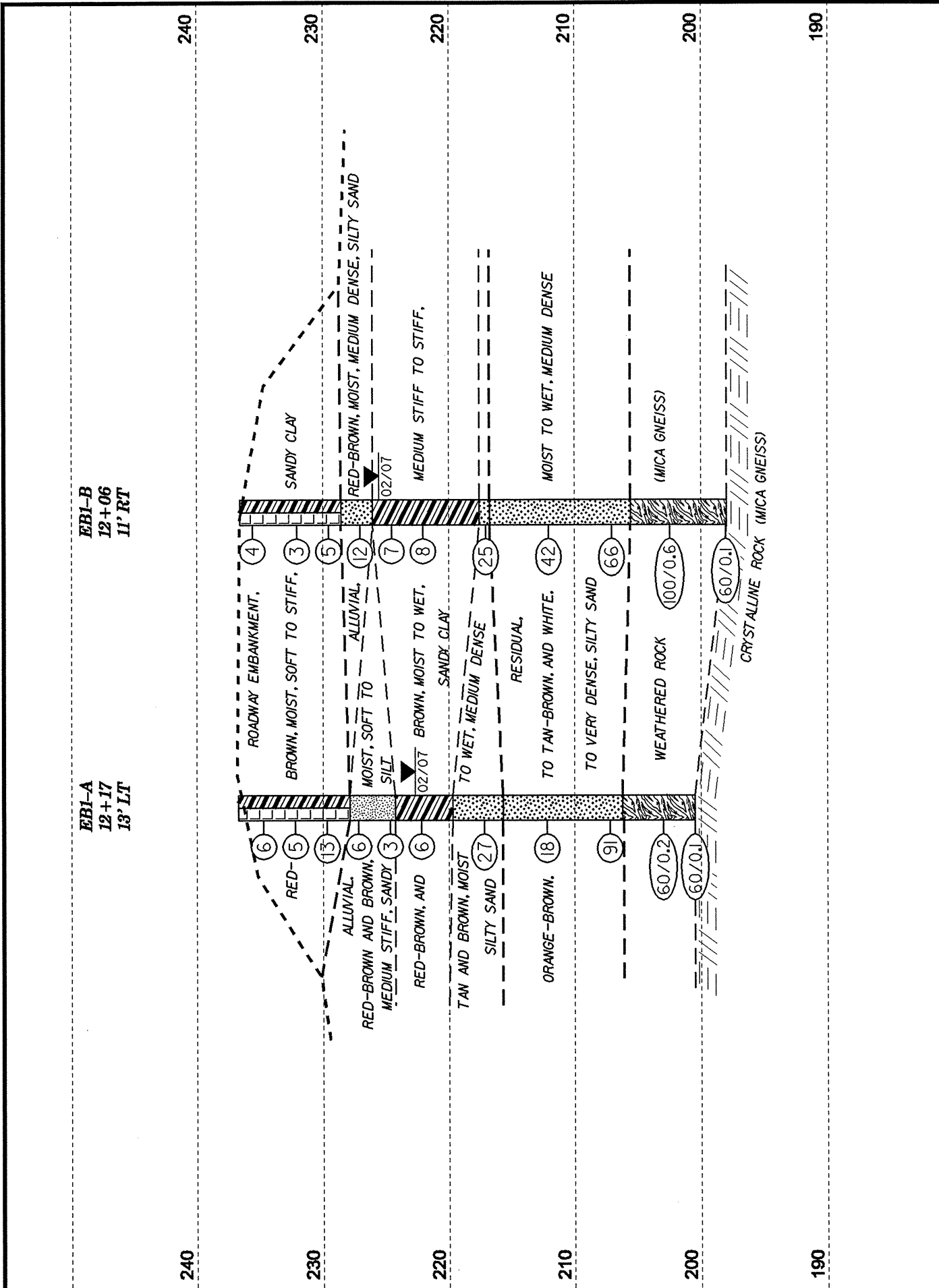
Joseph I. Milkovits, Jr.
Project Geological Engineer



SKEW = 105°

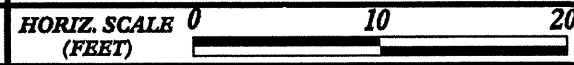
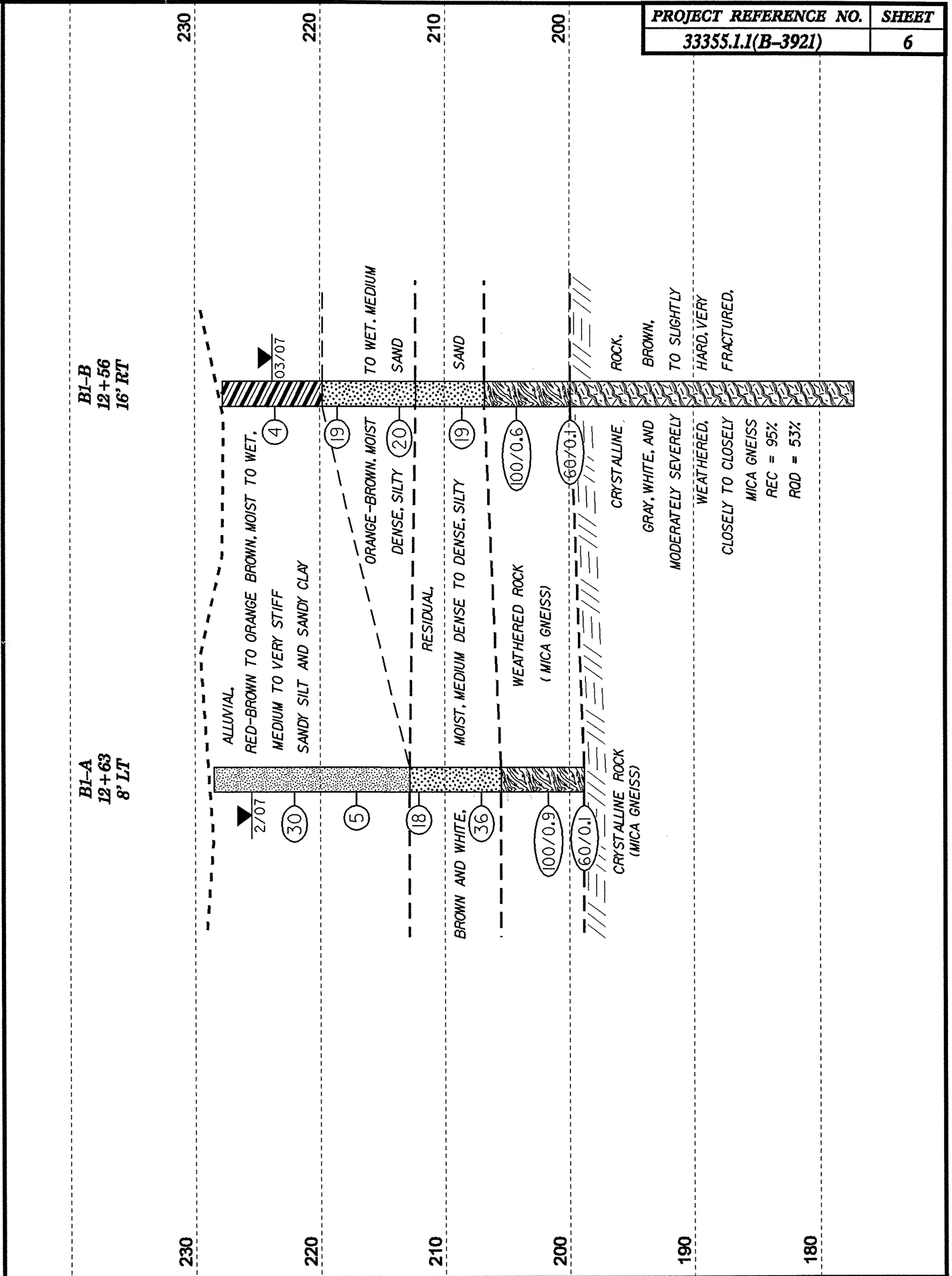


NOTE: GROUNDLINE PROFILE TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED 10/18/2006



VE = 1:1

CROSS SECTION THROUGH END BENT 1

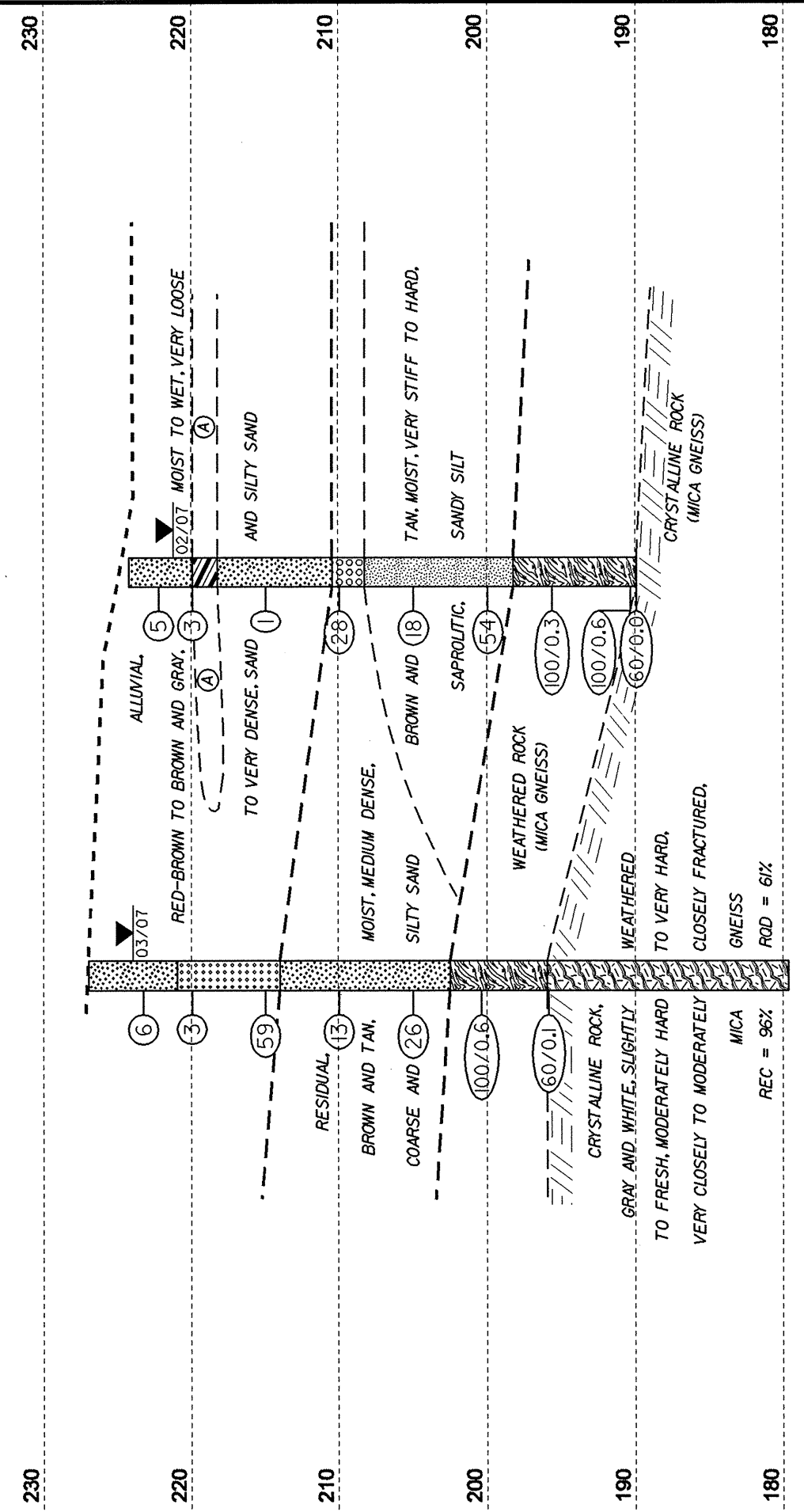


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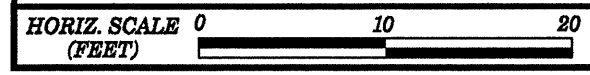
CROSS SECTION THROUGH BENT 1

B2-B
13+29
13' RT

B2-A
13+35
15' LT



① RED-BROWN, WET, SOFT, SANDY CLAY

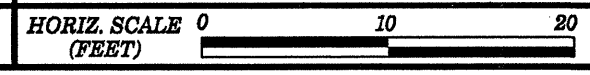
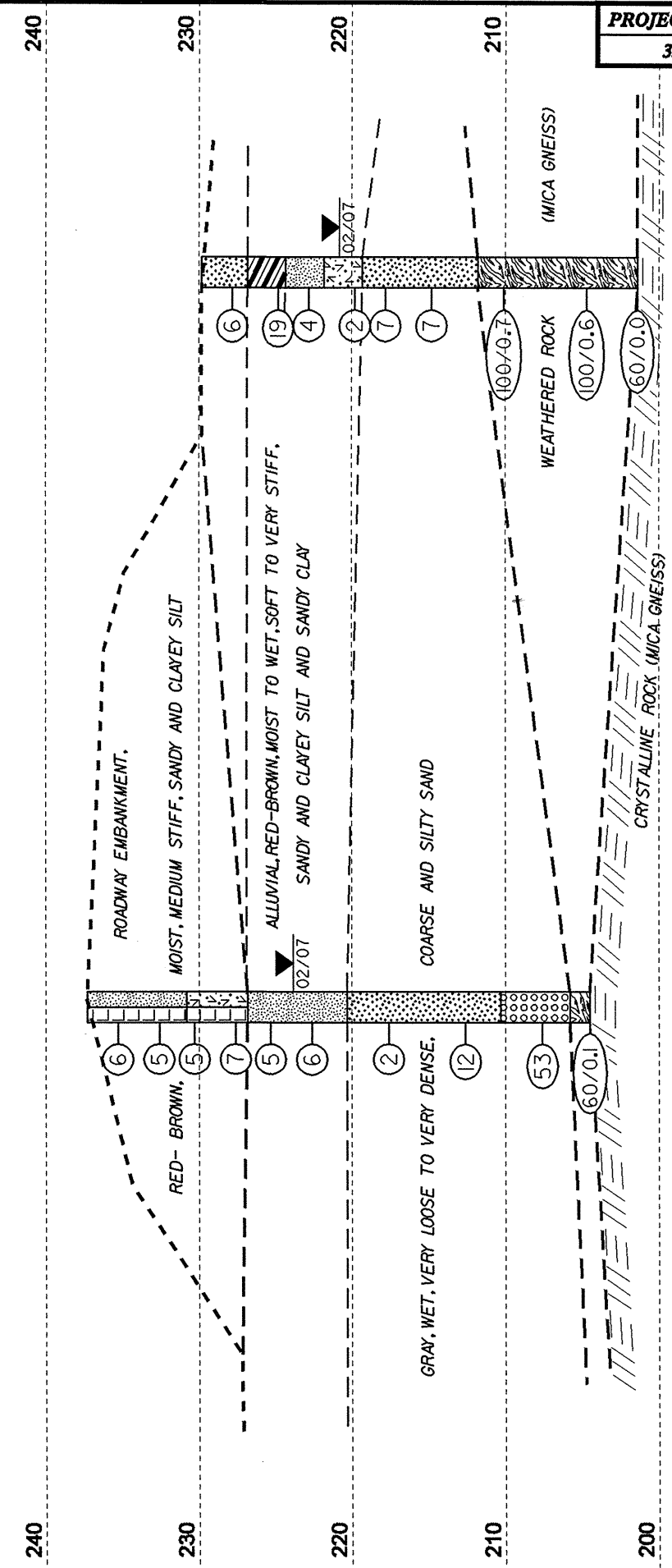


VE = 1:1

CROSS SECTION THROUGH BENT 2

EB2-B
13+95
19' RT

EB2-A
14+04
29' LT

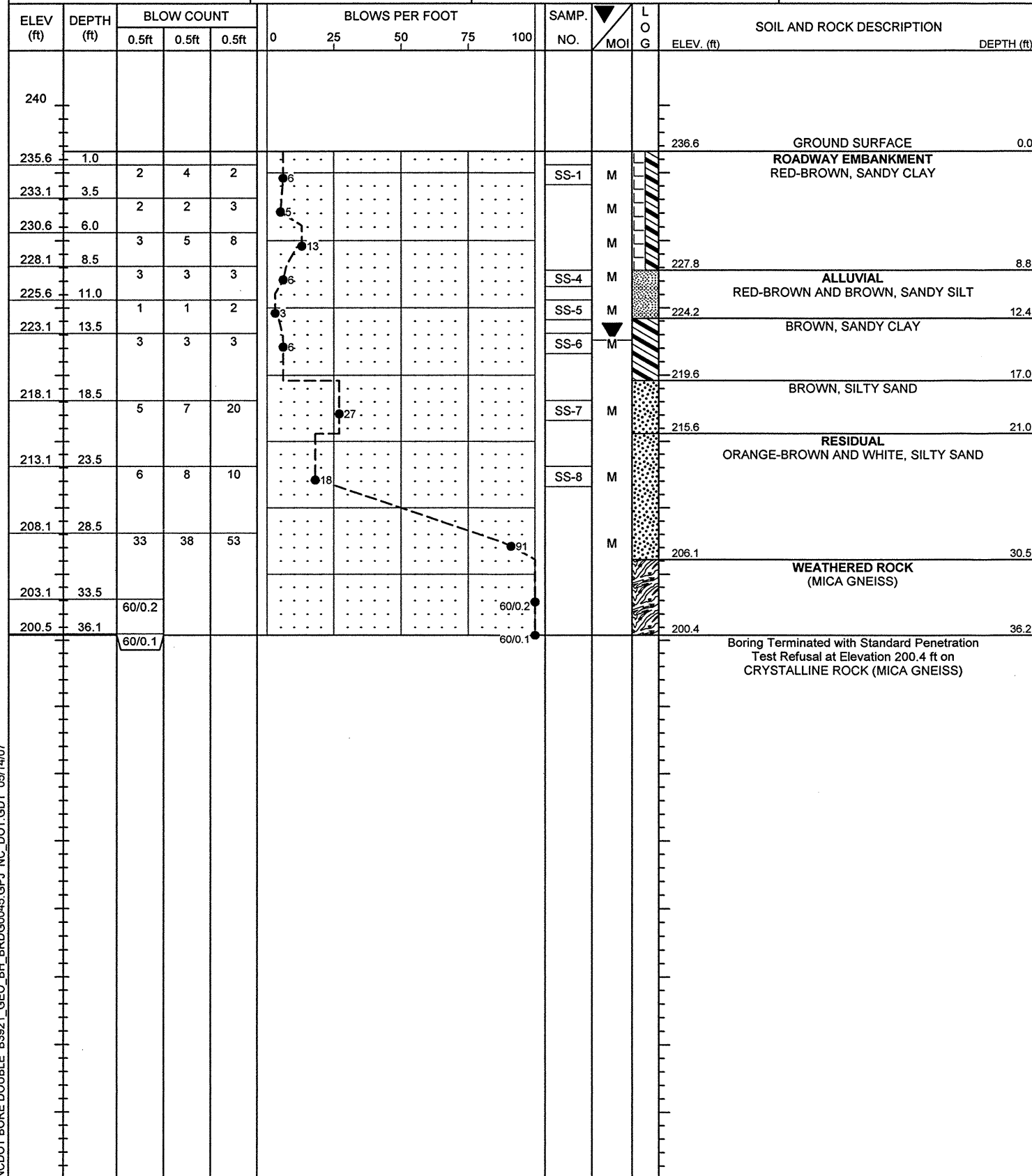


VE = 1:1

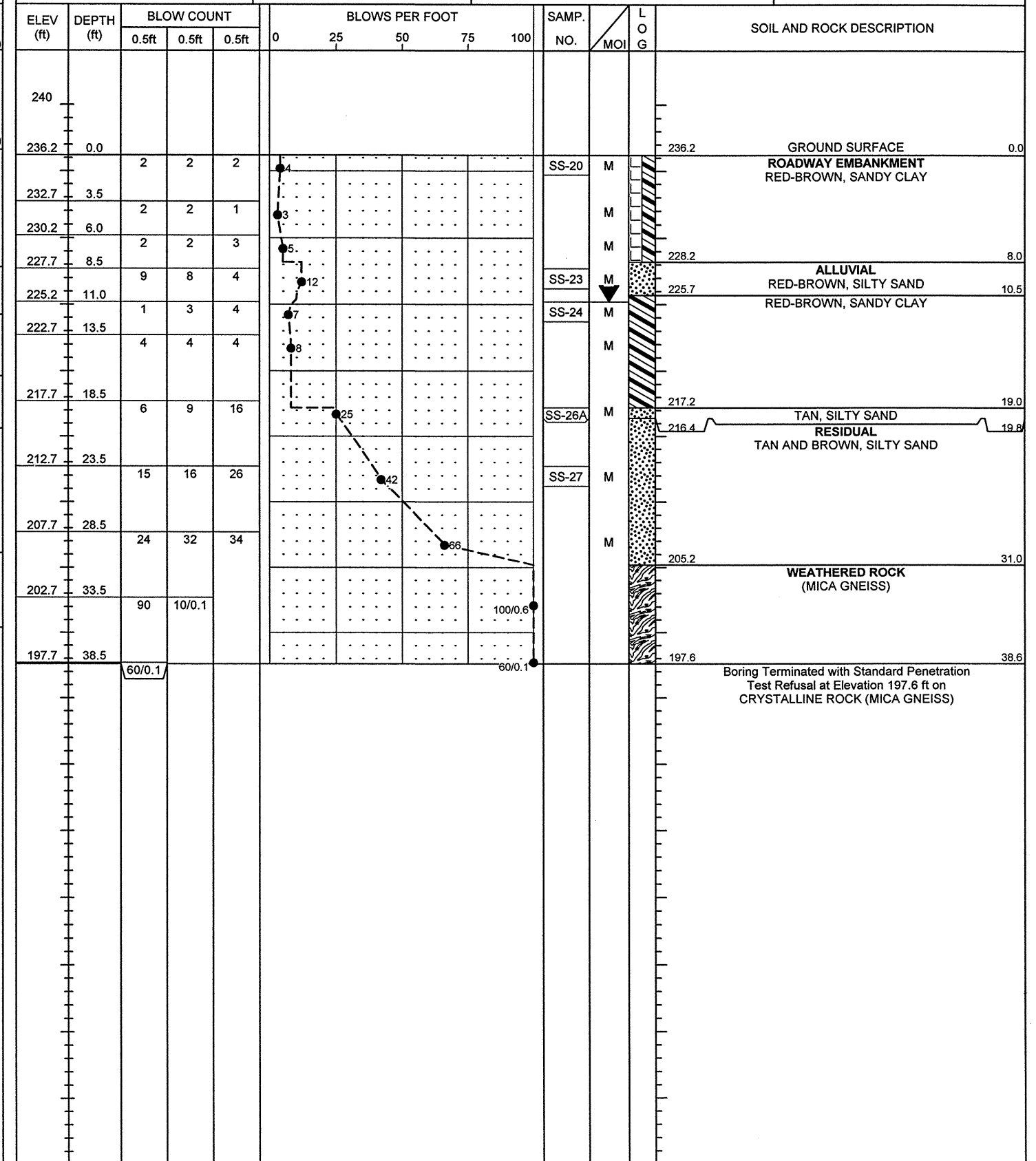
CROSS SECTION THROUGH END BENT 2



PROJECT NO. 33355.1.1	ID. B-3921	COUNTY WARREN	GEOLOGIST C.BRUINSMA
SITE DESCRIPTION BRIDGE NO. 45 ON -L- (SR 1600) BALTIMORE RD. OVER FISHING CREEK			GROUND WTR (ft)
BORING NO. EB1-A	STATION 12+17	OFFSET 13ft LT	ALIGNMENT -L-
COLLAR ELEV. 236.6 ft	TOTAL DEPTH 36.2 ft	NORTHING 950,041	EASTING 2,251,781
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 02/26/07	COMP. DATE 02/26/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 36.2 ft



PROJECT NO. 33355.1.1	ID. B-3921	COUNTY WARREN	GEOLOGIST C.BRUINSMA
SITE DESCRIPTION BRIDGE NO. 45 ON -L- (SR 1600) BALTIMORE RD. OVER FISHING CREEK			GROUND WTR (ft)
BORING NO. EB1-B	STATION 12+06	OFFSET 11ft RT	ALIGNMENT -L-
COLLAR ELEV. 236.2 ft	TOTAL DEPTH 38.6 ft	NORTHING 950,028	EASTING 2,251,803
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 02/26/07	COMP. DATE 02/26/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 38.6 ft



NCDOT BORE DOUBLE B3921_GEO_BH_BRD0045.GPJ NC_DOT.GDT_05/14/07

PROJECT NO. 33355.1.1		ID. B-3921		COUNTY WARREN		GEOLOGIST C.BRUINSMA							
SITE DESCRIPTION BRIDGE NO. 45 ON -L- (SR 1600) BALTIMORE RD. OVER FISHING CREEK							GROUND WTR (ft)						
BORING NO. B1-A		STATION 12+63		OFFSET 8ft LT		ALIGNMENT -L-	0 HR. 3.0						
COLLAR ELEV. 228.5 ft		TOTAL DEPTH 29.7 ft		NORTHING 950,086		EASTING 2,251,790	24 HR. 3.0						
DRILL MACHINE CME-550		DRILL METHOD H.S. Augers				HAMMER TYPE Manual							
START DATE 02/27/07		COMP. DATE 02/27/07		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 29.7 ft							
ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	25	50	75	100				
230													GROUND SURFACE 0.0
223.1	5.4										SS-30	W	ALLUVIAL RED-BROWN TO ORANGE-BROWN, SANDY SILT
218.1	10.4	1	25	5								W	
213.1	15.4	2	2	3									
208.1	20.4	6	8	10							SS-32	M	RESIDUAL BROWN AND WHITE, SILTY SAND
203.1	25.4	14	15	21								M	
198.9	29.6	28	46	54/0.4									WEATHERED ROCK (MICA GNEISS)
													100/0.9
													60/0.1
													60/0.1
													Boring Terminated with Standard Penetration Test Refusal at Elevation 198.8 ft on CRYSTALLINE ROCK (MICA GNEISS)

PROJECT NO. 33355.1.1	ID. B-3921	COUNTY WARREN	GEOLOGIST C.BRUINSMA
SITE DESCRIPTION BRIDGE NO. 45 ON -L- (SR 1600) BALTIMORE RD. OVER FISHING CREEK			GROUND WTR (ft)
BORING NO. B1-B	STATION 12+56	OFFSET 16ft RT	ALIGNMENT -L-
COLLAR ELEV. 227.8 ft	TOTAL DEPTH 50.5 ft	NORTHING 950,076	EASTING 2,251,812
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 03/01/07	COMP. DATE 03/01/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 27.9 ft

ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
		0.5ft	0.5ft	0.5ft	0	25	50	75	100						
230														227.8	GROUND SURFACE
224.6	3.2	2	2	2							SS-57	M	ALLUVIAL BROWN, SANDY CLAY	0.0	
219.6	8.2	4	3	16							SS-58	M	ORANGE-BROWN, SILTY SAND W/ BOULDER AND COBBLE LAYER FROM 9.7' TO 10.2' AND 11.2' TO 11.6'	8.0	
214.6	13.2	6	11	9								W	RESIDUAL BROWN AND WHITE, SILTY SAND	15.5	
209.6	18.2	7	6	13								M	WEATHERED ROCK (MICA GNEISS)	21.0	
204.8	23.0	84	16/0.1										CRYSTALLINE ROCK GRAY, WHITE AND BROWN, MODERATE SEVERE TO SLIGHTLY WEATHERED, HARD, VERY CLOSELY TO CLOSELY FRACTURED, MICA GNEISS	27.9	
200.0	27.8	60/0.1											REC=95% RQD=53%	199.9	
														177.3	Boring Terminated at Elevation 177.3 ft in CRYSTALLINE ROCK (MICA GNEISS)

CORE BORING REPORT

PROJECT: 33355.1.1 ID: B-3921 COUNTY: Warren BORING NO: B1-B
 DESCRIPTION: Bridge No. 45 on -L- (SR 1600) over Fishing Creek
 LOCATION OF BORING: -L- Sta. 12+56, Offset - 16' RT COMPLETION DATE: 3/1/07
 COLLAR or GROUND ELEVATION: 227.8 ft CORE SIZE: NQ GEOLOGIST: C. Bruinsma
 CORE EQUIPMENT: CME-550, N-Casing, NQ DRILLER: S. Gower

ELEV (ft)	DEPTH (ft)	DRILL RATE (min/ft)	RUN (ft)	REC (%)	RQD (%)	SAMPLE NUMBER	FIELD CLASSIFICATION and REMARKS
199.9	27.9	4:15					Gray, white and brown, slightly to moderately severely weathered, hard, very closely to closely fractured, mica gneiss
		4:30		2.3	0.8		
		2:00/0.6	2.6	(88%)	(31%)		
197.3	30.5	-					Gray, white and brown, slightly to moderately severely weathered, hard, very closely to closely fractured, mica gneiss
197.3	30.5	2:45		4.8	1.1		
		2:45					
		3:15	5.0	(96%)	(22%)		
192.3	35.5	4:00					Gray, white and brown, slightly to moderately severely weathered, hard, very closely to closely fractured, mica gneiss
192.3	35.5	3:00		4.3	1.7		
		2:45	5.0	(86%)	(34%)		
187.3	40.5	3:45					Gray and white, very slightly to freshly weathered, hard to very hard, very closely to moderately closely fractured, mica gneiss
187.3	40.5	1:45		5.0	3.8		
		1:45	5.0	(100%)	(76%)	RS-1	
		1:45				42.7'-43.3'	
182.3	45.5	2:00					Gray and white, very slightly to freshly weathered, hard to very hard, very closely to moderately closely fractured, mica gneiss
182.3	45.5	1:45		5.0	4.5		
		1:45	5.0	(100%)	(90%)		
		1:45					
177.3	50.5	2:15					

BOREHOLE TERMINATED AT ELEVATION OF 177.3 FEET, IN MICA GNEISS.

NCDOT BORE DOUBLE B3921_GEO_BH_BRD0045.GPJ NC_DOT.GDT 05/14/07

PROJECT NO. 33355.1.1		ID. B-3921		COUNTY WARREN		GEOLOGIST C.BRUINSMA							
SITE DESCRIPTION BRIDGE NO. 45 ON -L- (SR 1600) BALTIMORE RD. OVER FISHING CREEK							GROUND WTR (ft)						
BORING NO. B2-B		STATION 13+29		OFFSET 13ft RT		ALIGNMENT -L-	0 HR. 4.0						
COLLAR ELEV. 224.2 ft		TOTAL DEPTH 34.3 ft		NORTHING 950,150		EASTING 2,251,818	24 HR. 3.0						
DRILL MACHINE CME-550		DRILL METHOD H.S. Augers				HAMMER TYPE Manual							
START DATE 02/27/07		COMP. DATE 02/27/07		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 34.3 ft							
ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	25	50	75	100				
225													
223.2	1.0												224.2 GROUND SURFACE 0.0
220.9	3.3	2	3	2	5					SS-43	W	219.9 ALLOVIAL BROWN, SILTY SAND 4.3	
215.9	8.3	3	1	2	3					SS-44B	W	218.2 RED-BROWN, SANDY CLAY 6.0	
210.9	13.3	1	WOH	1	1					SS-45	W	210.4 GRAY, SILTY SAND 13.8	
205.9	18.3	7	15	13	28					SS-46A	M	208.2 RESIDUAL BROWN AND TAN, COARSE SAND 16.0	
200.9	23.3	8	7	11	18					SS-47	M	BROWN AND TAN, SAPROLITIC, SANDY SILT	
195.9	28.3	24	22	32	54						M	198.2 WEATHERED ROCK (MICA GNEISS) 26.0	
190.9	33.3	100/0.3			100/0.3								
189.9	34.3	56	44/0.1		60/0.0								189.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 189.9 ft on CRYSTALLINE ROCK (MICA GNEISS) 34.3



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

PROJECT NO. 33355.1.1	ID. B-3921	COUNTY WARREN	GEOLOGIST C.BRUINSMA
SITE DESCRIPTION BRIDGE NO. 45 ON -L- (SR 1600) BALTIMORE RD. OVER FISHING CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 14+04	OFFSET 29ft LT	ALIGNMENT -L- 0 HR. 14.0
COLLAR ELEV. 237.3 ft	TOTAL DEPTH 32.8 ft	NORTHING 950,230	EASTING 2,251,788 24 HR. 13.5
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 02/26/07	COMP. DATE 02/26/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 32.8 ft

ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0.5ft	0	25	50	75	100					
240													GROUND SURFACE	0.0
236.3	1.0												ROADWAY EMBANKMENT RED-BROWN, SANDY SILT	
233.6	3.7	3	4	2						SS-11	M			
231.3	6.0	3	2	3										
228.6	8.7	3	2	3						SS-13	M		RED-BROWN, CLAYEY SILT	6.5
226.3	11.0	7	4	3							M			
223.6	13.7	3	3	2						SS-15	M		ALLUVIAL RED-BROWN, SANDY SILT	10.5
218.6	18.7	3	3	3							M			
213.6	23.7	2	1	1						SS-17	W		GRAY, SILTY SAND	17.0
208.6	28.7	2	5	7						SS-18	W			
204.6	32.7	2	5	7						SS-19	W		GRAY, COARSE SAND	27.0
		25	24	29										
		60/0.1											WEATHERED ROCK (MICA GNEISS)	31.5
													Boring Terminated with Standard Penetration Test Refusal at Elevation 204.5 ft on CRYSTALLINE ROCK (MICA GNEISS)	32.8

PROJECT NO. 33355.1.1	ID. B-3921	COUNTY WARREN	GEOLOGIST C.BRUINSMA
SITE DESCRIPTION BRIDGE NO. 45 ON -L- (SR 1600) BALTIMORE RD. OVER FISHING CREEK			GROUND WTR (ft)
BORING NO. EB2-B	STATION 13+95	OFFSET 19ft RT	ALIGNMENT -L- 0 HR. 7.0
COLLAR ELEV. 229.8 ft	TOTAL DEPTH 28.4 ft	NORTHING 950,213	EASTING 2,251,833 24 HR. 9.0
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 02/27/07	COMP. DATE 02/27/07	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 28.4 ft

ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0.5ft	0	25	50	75	100					
230													GROUND SURFACE	0.0
228.8	1.0												RED-BROWN, SILTY SAND	229.8
225.8	4.0	4	3	3						SS-35	M			
223.8	6.0	2	4	15						SS-36	M		RED-BROWN, SANDY CLAY	226.8
220.8	9.0	4	3	1						SS-37	W		RED-BROWN, SANDY SILT	224.3
218.8	11.0	2	1	1									RED-BROWN, CLAYEY SILT	221.8
215.8	14.0	2	5	2						SS-39	W		GRAY, SILTY SAND	219.3
210.8	19.0	3	3	4						SS-40	W			
205.8	24.0	37	63/0.2										WEATHERED ROCK (MICA GNEISS)	211.8
201.4	28.4	13	47	53/0.1										
		60/0.0											Boring Terminated with Standard Penetration Test Refusal at Elevation 201.4 ft on CRYSTALLINE ROCK (MICA GNEISS)	201.4

NCDOT BORE DOUBLE B3921_GEO_BH_BRD0045.GPJ NC_DOT_GDT_05/14/07

EB1-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-20	11' RT	12+06	1.0-2.5	A-6(3)	37	13	22.6	32.9	16.3	28.2	94	83	47	-	-
SS-23	11' RT	12+06	8.5-10.0	A-2-4(0)	20	NP	31.9	45.8	10.3	12.1	93	77	26	-	-
SS-24	11' RT	12+06	11.0-12.5	A-6(7)	37	16	5.6	42.5	13.5	38.3	100	98	58	-	-
SS-26A	11' RT	12+06	19.0-19.8	A-2-4(0)	25	NP	29.2	55.0	9.7	6.0	98	87	19	-	-
SS-27	11' RT	12+06	23.5-25.0	A-2-4(0)	36	NP	33.7	41.9	16.3	8.1	97	83	30	-	-

EB1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	13' LT	12+17	1.0-2.5	A-6(2)	31	12	24.0	31.7	14.0	30.3	91	80	45	-	-
SS-4	13' LT	12+17	8.8-10.0	A-4(1)	29	8	23.2	34.5	16.0	26.2	96	84	46	-	-
SS-5	13' LT	12+17	11.0-12.4	A-4(1)	26	7	11.3	47.0	13.5	28.2	100	96	48	-	-
SS-6	13' LT	12+17	13.5-15.0	A-6(5)	37	15	13.1	38.9	11.7	36.3	100	93	53	-	-
SS-7	13' LT	12+17	18.5-20.0	A-2-4(0)	25	NP	35.7	45.0	5.2	14.1	100	87	23	-	-
SS-8	13' LT	12+17	23.5-25.0	A-2-4(0)	36	NP	20.4	53.6	20.0	6.0	100	94	34	-	-

BI-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-57	16' RT	12+56	3.2-4.7	A-6(2)	33	12	8.7	53.2	11.9	26.2	100	99	46	-	-
SS-58	16' RT	12+56	8.2-9.7	A-2-4(0)	32	7	14.1	57.3	12.5	16.1	91	86	32	-	-

BI-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-30	8' LT	12+63	5.4-6.9	A-4(0)	26	7	8.3	58.5	9.1	24.2	100	98	41	-	-
SS-32	8' LT	12+63	15.7-16.9	A-2-4(0)	30	NP	38.1	44.6	13.3	4.0	94	75	21	-	-

B2-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-43	13' RT	13+29	1.0-2.5	A-2-4(0)	25	3	37.7	37.1	9.1	16.1	94	79	27	-	-
SS-44B	13' RT	13+29	4.3-4.8	A-6(4)	36	11	21.6	29.0	17.1	32.3	100	89	53	-	-
SS-45	13' RT	13+29	8.3-9.8	A-2-4(0)	24	NP	26.8	58.9	6.3	8.1	76	73	13	-	-
SS-46A	13' RT	13+29	13.8-14.8	A-1-b(0)	25	NP	67.7	26.0	4.2	2.0	69	33	6	-	-
SS-47	13' RT	13+29	18.3-19.8	A-4(0)	35	NP	28.4	41.7	19.8	10.1	97	84	36	-	-

B2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-52	15' LT	13+35	6.0-7.5	A-2-4(0)	24	NP	10.5	73.4	12.1	4.0	100	99	24	-	-
SS-53A	15' LT	13+35	11.0-12.5	A-3(0)	29	NP	25.6	70.2	2.2	2.0	100	97	6	-	-
SS-54	15' LT	13+35	16.0-17.5	A-2-4(0)	36	NP	33.5	49.0	13.5	4.0	94	74	23	-	-

EB2-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-35	19' RT	13+95	1.0-2.5	A-2-4(0)	24	NP	43.5	34.9	9.5	12.1	91	68	23	-	-
SS-36	19' RT	13+95	4.0-5.5	A-6(4)	35	12	19.2	28.4	22.2	30.2	94	84	54	-	-
SS-37	19' RT	13+95	6.0-7.5	A-4(0)	32	10	26.6	38.3	12.9	22.2	95	81	38	-	-
SS-39	19' RT	13+95	11.0-12.5	A-5(1)	41	7	11.1	47.4	15.3	26.2	95	92	43	-	-
SS-40	19' RT	13+95	14.0-15.5	A-2-4(0)	24	NP	12.9	67.1	9.9	10.1	100	98	25	-	-

EB2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%	%
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-11	29' LT	14+04	1.0-2.5	A-4(1)	30	10	29.8	32.1	11.9	26.2	91	75	39	-	-
SS-13	29' LT	14+04	6.5-7.5	A-5(1)	41	9	31.7	29.4	16.7	22.2	95	75	41	-	-
SS-15	29' LT	14+04	11.0-12.5	A-4(2)	32	10	27.2	32.7	13.9	26.2	96	81	45	-	-
SS-17	29' LT	14+04	18.7-20.2	A-2-4(0)	23	NP	7.5	76.0	10.5	6.0	100	100	24	-	-
SS-18	29' LT	14+04	23.7-25.2	A-2-4(0)	26	NP	39.3	49.6	5.0	6.0	91	72	13	-	-
SS-19	29' LT	14+04	28.7-30.2	A-1-b(0)	24	NP	77.8	17.1	4.0	1.0	92	37	6	-	-



**FIELD
 SCOUR REPORT**

WBS: 33355.1.1 TIP: B-3921 COUNTY: Warren

DESCRIPTION(1): Bridge No. 45 on -L- (SR 1600) over Fishing Creek

EXISTING BRIDGE

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

Bridge No.: 45 Length: 124' Total Bents: 12 Bents in Channel: 1 Bents in Floodplain: 11
 Foundation Type: N/A

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: None

Interior Bents: None

Channel Bed: Some scour in middle of stream, appears minor

Channel Bank: Evident on upstream side of bridge, predominately on EB2 side

EXISTING SCOUR PROTECTION

Type(3): Rip rap up to 2-3' diameter, placed under bridge on both banks

Extent(4): Timber wing walls extend 8' out from bridge

Effectiveness(5): Effective

Obstructions(6): None

INSTRUCTIONS

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

DESIGN INFORMATION

Channel Bed Material(7): Alluvial, gray and orange-brown, very loose to medium dense, silty sand (SS-45, SS-58)

Channel Bank Material(8): Alluvial, brown and red-brown, soft to medium stiff, sandy clay (SS-44, SS-57)
Alluvial, brown, loose, silty sand (SS-43)

Channel Bank Cover(9): Shrubs, grass, large and small trees

Floodplain Width(10): Approximately 500 feet

Floodplain Cover(11): trees, shrubs, grass

Stream is(12): Aggrading Degrading Static

Channel Migration Tendency(13): Slight tendency to the south

Observations and Other Comments: Channel seems very stable at bridge site. Futher downstream and upstream becomes multi-channeled

DESIGN SCOUR ELEVATIONS(14)

Feet Meters

Interior Bent One - Elevation 210.0
 Interior Bent Two - Elevation 207.0

Comparison of DSE to Hydraulics Unit theoretical scour:

The DSE is 7.0 feet higher at Bent 1 and 4.0 feet higher at Bent 2 than the theoretical scour for the overtopping event as reported in the Bridge Survey and Hydraulic Design report dated 6/26/06

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

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

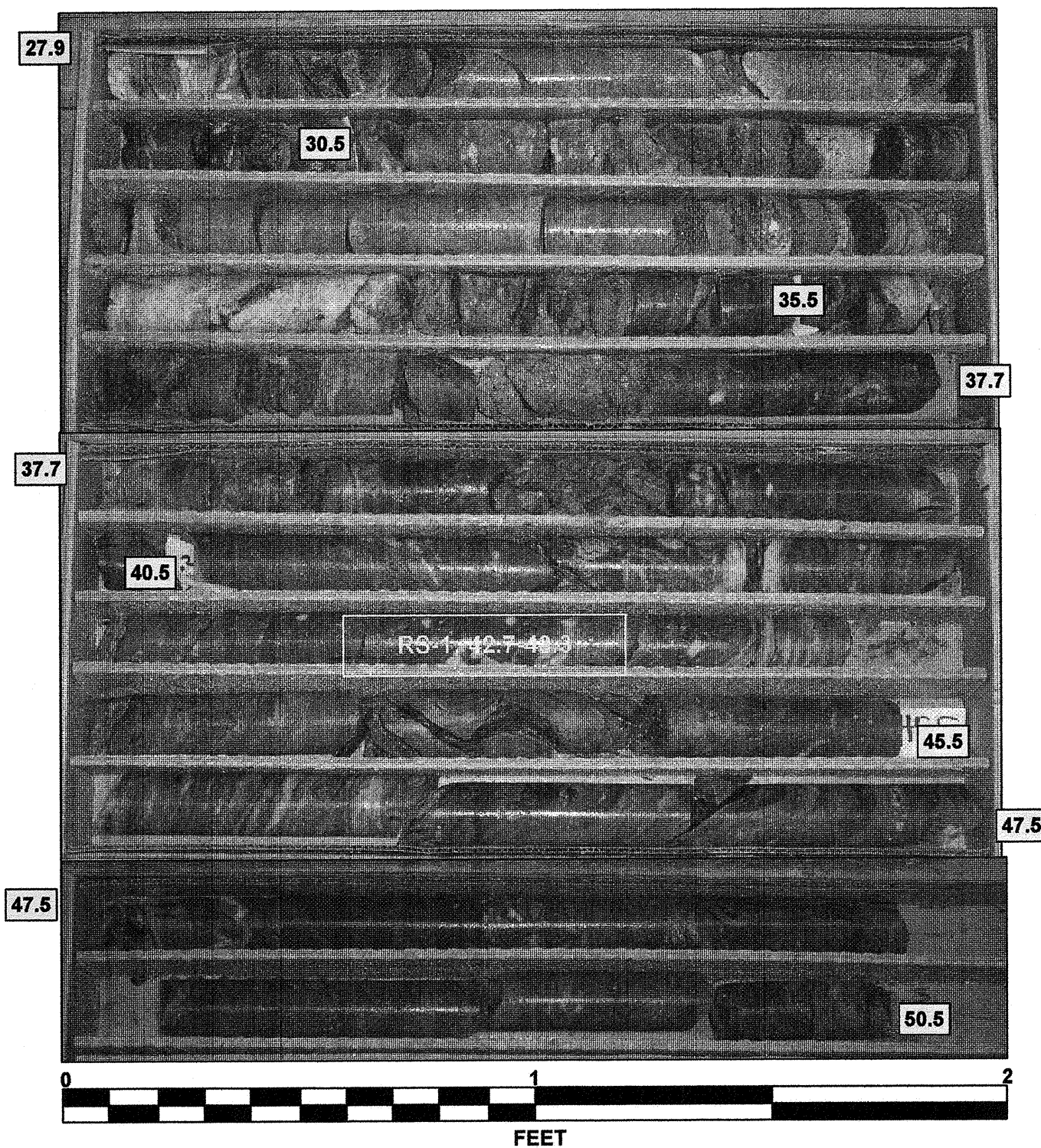
See Sheet 14,
 "Soil Test Results",
 for samples:
 SS-45, SS-58
 SS-43, SS-44, SS-57

Reported by: for: J. I. Milkovits, Jr. Date: 4/2/2007

CORE PHOTOGRAPHS

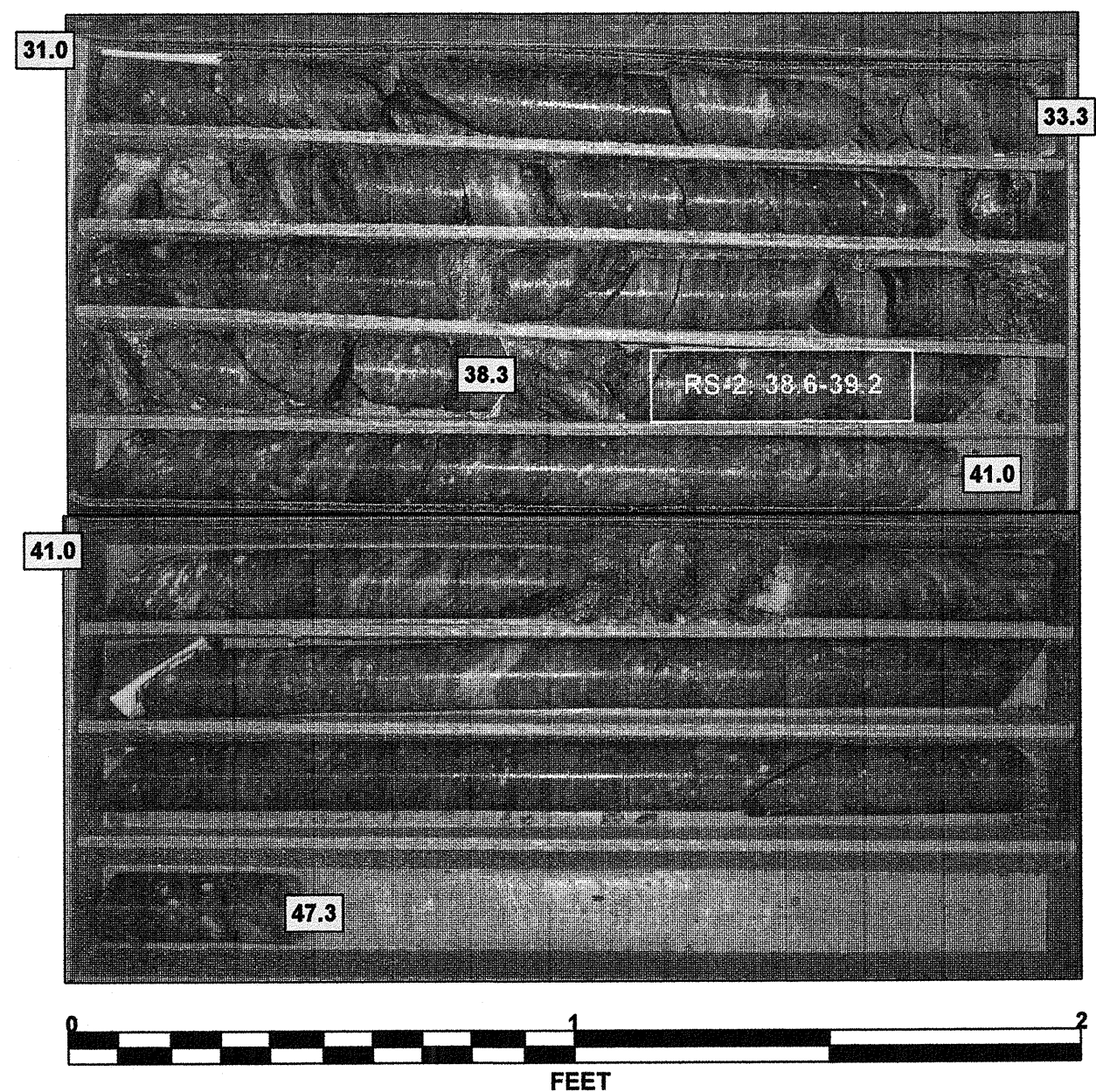
B1-B

BOXES 1 & 2 & 3: 27.9 - 50.5 FEET



B2-A

BOXES 1 & 2: 31.0 - 47.3 FEET



SITE PHOTOGRAPH

Bridge No. 45 on -L- (SR 1600) over Fishing Creek

