

PROJECT: 33663.1.1 ID: B-4326

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33663.1.1	1	29
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
B-4326	BRZ-1001(27)	P.E. CONST.	

LETTING

STRUCTURE SUBSURFACE INVESTIGATION

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STATE PROJECT 33663.1.1 I.D. NO. B-4326
 COUNTY WILSON F.A. NO. BRZ-1001(27)
 PROJECT DESCRIPTION BRIDGE NO. 79 OVER
BLOOMERY SWAMP ON SR 1001

SITE DESCRIPTION _____

CAUTION NOTICE

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

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

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

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.

DRAWN BY: R. RAHIE

INVESTIGATED BY MACTEC ENGINEERING AND CONSULTING, INC.
 CHECKED BY S. CRISCENZO
 SUBMITTED BY M. LEAR
 DATE 02/03/06
 REVISED 02/17/06

PERSONNEL M. LEAR
W. DEOBALD
T. HAHN
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NORTH CAROLINA
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1927
GEOLOGIST
MICHAEL B. LEAR

2/17/06
SEAL

MACTEC

MACTEC ENGINEERING AND CONSULTING, INC.
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RALEIGH, NORTH CAROLINA 27604
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Michael B. Lear
SIGNATURE

Subject: Geotechnical Report

Description: Bridge No. 79 over Bloomery Swamp on SR 1001
Project Number: 33663.1.1
Tip Number: B-4326
F.A. Number: BRZ-1001(27)
MACTEC Project Number: 6468-05-1286

Project Information

The purpose of this investigation was to obtain geotechnical information for foundation design and construction of the proposed replacement bridge over Bloomery Swamp on SR 1001, Wilson County, North Carolina (Drawings 1 and 2). Our understanding of this project comes from a site visit by MACTEC personnel; conversations with NCDOT Geotechnical Unit personnel; and from documents and drawings provided by the Geotechnical Unit, including a Request for Proposal dated December 13, 2005, a baseline survey, Bridge Survey and Hydraulic Design Report dated August 29, 2005, and electronic files of site plan drawings obtained via the NCDOT file transfer website.

The proposed structure is approximately 110 feet in length, 33.5 feet wide, and will be constructed at the approximate grade of the existing bridge. The proposed structure will consist of two spans (three bents) approximately 35 feet and 75 feet in length. The bents are skewed 100° to the alignment (-L-).

Field Testing

During January, 2006, MACTEC advanced 8 borings at locations shown on the Boring Location Plan (Drawing 3). The borings were drilled with a D-50 ATV-mounted drill rig. End Bent borings EB1-A, EB1-B, EB2-A, and EB2-B were drilled using hollow stem auger drilling techniques. Interior Bent borings B1-A and B1-B were advanced using rotary wash drilling and HQ-size rock coring techniques. Additional borings, EB1-B OS and EB2-A OS, were performed at the request of the NCDOT and were advanced using rotary wash drilling and HQ-size rock coring techniques to an elevation of at least 120 ft Mean Sea Level (MSL). All borings were drilled to depths that satisfy the minimum criteria for the NCDOT Ultimate Pile Capacity Chart for 12-inch steel "H" piles. Interior bent borings were drilled to depths that also satisfy the minimum NCDOT criteria for drilled shaft foundations.

Proposed boring locations were established at the project site utilizing GPS equipment. Three borings were drilled at End Bent 1. Three borings were drilled at End Bent 2. Two borings were drilled at Bent 1. All borings were performed along the shoulders of SR 1001 and were offset from proposed locations due to underground/overhead utilities, proximity to existing site features, or steep slopes along the east shoulder of SR 1001. Actual boring location coordinates were captured with GPS equipment.

Conventional survey techniques were used to establish the collar elevations at all boring locations and selected ground surface points depicted on the subsurface profile and cross section drawings

included with this report (Drawings 4 to 7). Reference Survey point BL-102, established at the project site by NCDOT personnel, was used as a benchmark.

Standard penetration tests (SPT) were conducted and soil samples collected at approximately five foot intervals. Samples were collected from within the soil profile using a split-barrel sampler and a 140 lb. manual hammer. SPT's were performed between core runs where warranted. Attempts were made at collecting undisturbed samples for NCDOT Erosion Function Apparatus testing but were not successful.

Laboratory Testing

Laboratory testing consisting of AASHTO classification and grain-size distribution tests were performed on split-barrel samples SS-1 through SS-10, and bulk samples S-1 and S-2 which were collected from Bloomery Swamp's channel bank and channel bed, respectively. Unconfined compressive strength testing was performed on rock sample RS-1.

Laboratory testing was performed in accordance with applicable ASTM/AASHTO/NCDOT specifications. Test results for AASHTO classification, grain-size distribution, and unconfined compressive strength of rock are included with this report.

Physiography

The project site is located in the Eastern Slate Belt of the Piedmont Physiographic Province. The roadway surface at the existing bridge is at elevation 140± feet MSL. The natural ground surface varies up to 7 feet below grade at the existing bridge. The creek bed is at elevation 129± feet MSL. The creek banks are moderately sloped to steep and are open to wooded with small to large trees both up- and down-stream. The natural ground surface is gently sloped towards Bloomery Swamp approaching the site from the south and rises moderately from the north side of Bloomery Swamp to an elevation of 160± feet MSL approximately 1000' north of the site.

Geology

The 1985 Geologic Map of North Carolina, compiled by the N.C. Geological Survey, indicates that Metavolcanic Rock of the Eastern Slate Belt is at or near the surface at the project site. Our investigation identified surficial soils consisting of roadway embankment fill and/or alluvium, underlain by residual soil. Weathered and Non-Crystalline Rock consisting of Metavolcanic Rock was found underlying residual soil.

Boring and coring logs describing subsurface conditions at each of the boring locations are included with this report. A generalized profile, Drawing 4, depicts subsurface conditions 18 feet left of alignment -L-. Generalized cross-sections, Drawings 5 to 7, depict subsurface conditions along each bent.

Soils

Roadway Embankment Fill was encountered at the surface of all borings, except boring EB2-B, and extends to elevations 134 to 132± feet MSL. Fill consists of very loose to medium dense, moist to wet, clayey, silty, fine to coarse sand and gravel (A-2-4/A-1-a) with trace organics and

asphalt fragments, and medium stiff, moist, clayey, fine to coarse sandy, silt (A-4). A surficial layer of rip-rap covers embankment slopes to the creek.

Alluvium was encountered at the surface in boring EB2-B and beneath roadway embankment fill at elevations 136 to 132± feet MSL, and extends to elevations 129 to 128± feet MSL. Alluvium consists of very loose to medium dense, moist to saturated, silty, fine to coarse sand (A-3/A-2-4) with trace roots, organics, and gravel. Alluvium was not encountered in borings EB2-A and EB2-A OS.

Residual soil was encountered beneath alluvium at elevations 134 to 128± feet MSL, and extends to elevations 131 to 123± feet MSL. Residual soil consists of loose to very dense, dry to moist, clayey, silty, fine sand and gravel (A-2-4/A-1-b) with relict rock fabric. Residual soil was not encountered in boring EB2-B.

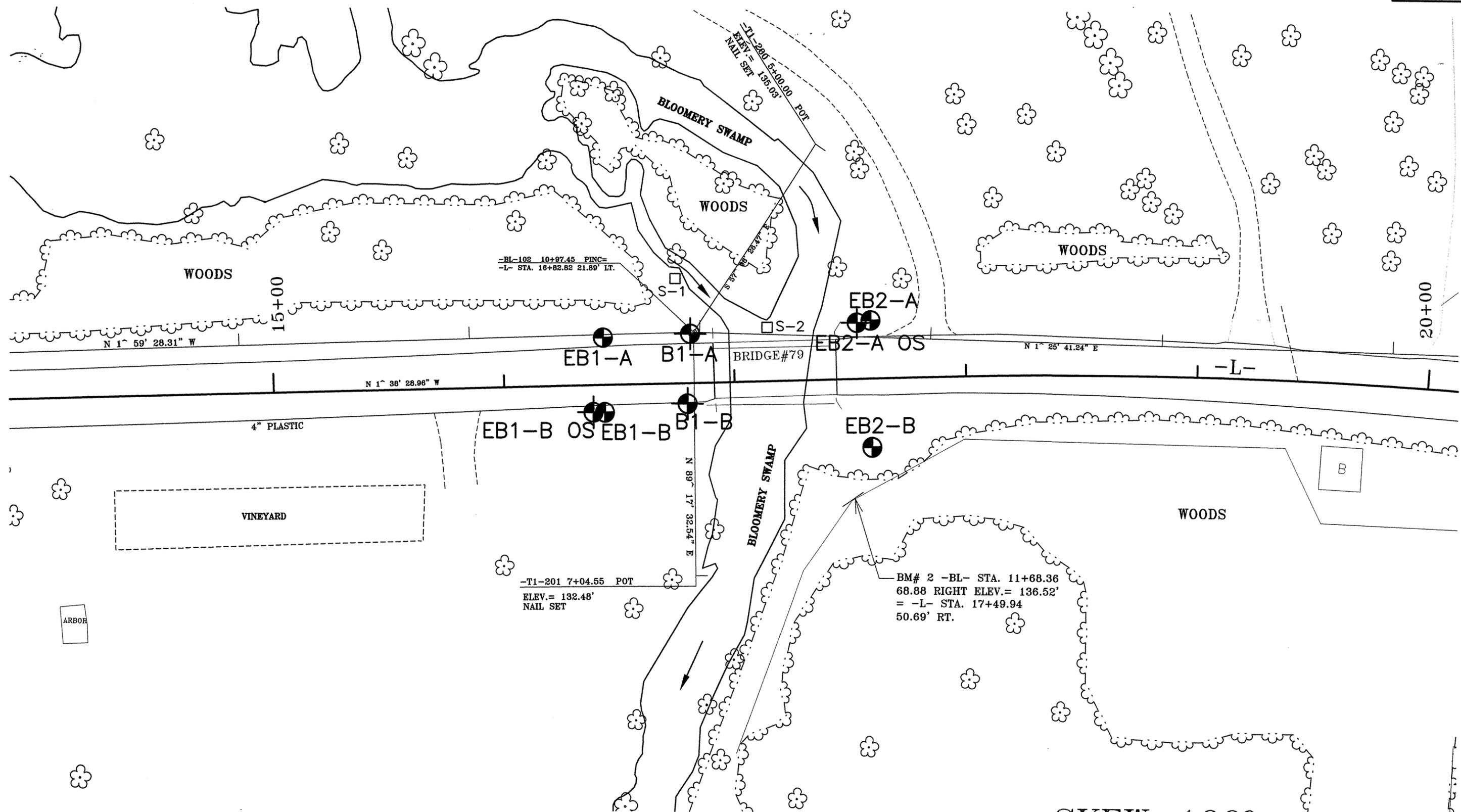
Rock

Weathered rock consisting of severely weathered meta-volcanic rock was encountered underlying residual soil or alluvium at elevations 131 to 123± feet MSL and extends to elevations 130 to 120± feet MSL. Weathered rock was encountered in all borings performed at the site. No weathered rock was recovered from the core borings performed at the site.

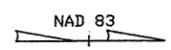
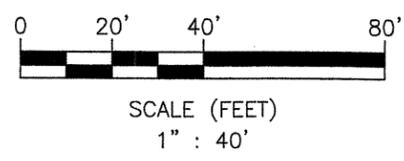
Non-crystalline rock consisting of moderately severe to slightly weathered, very close to moderately closely fractured, soft to hard, meta-volcanic rock was encountered beneath weathered rock. The top of non-crystalline rock ranges in elevation from 130 to 120± feet MSL. Fracture and joint orientations observed in the recovered core range from 0° to 90° relative to the core axis, with the most prevalent orientation being 60-70° to the core axis. The rock displays a well developed foliation that is also typically inclined at 60-70° to the core axis. No outcrops were identified in the vicinity of the site for field measurement of rock features. All borings performed at the site terminated in non-crystalline rock.

Groundwater

24-hour groundwater levels were measured at elevation 132± feet MSL in borings at End Bent 1 and Bent 1. 24-hour groundwater level elevations ranged from 132± feet MSL to 134± feet MSL in borings at End Bent 2. Surface water in Bloomery Swamp was measured at elevation 132.2 feet MSL on January 4, 2006.

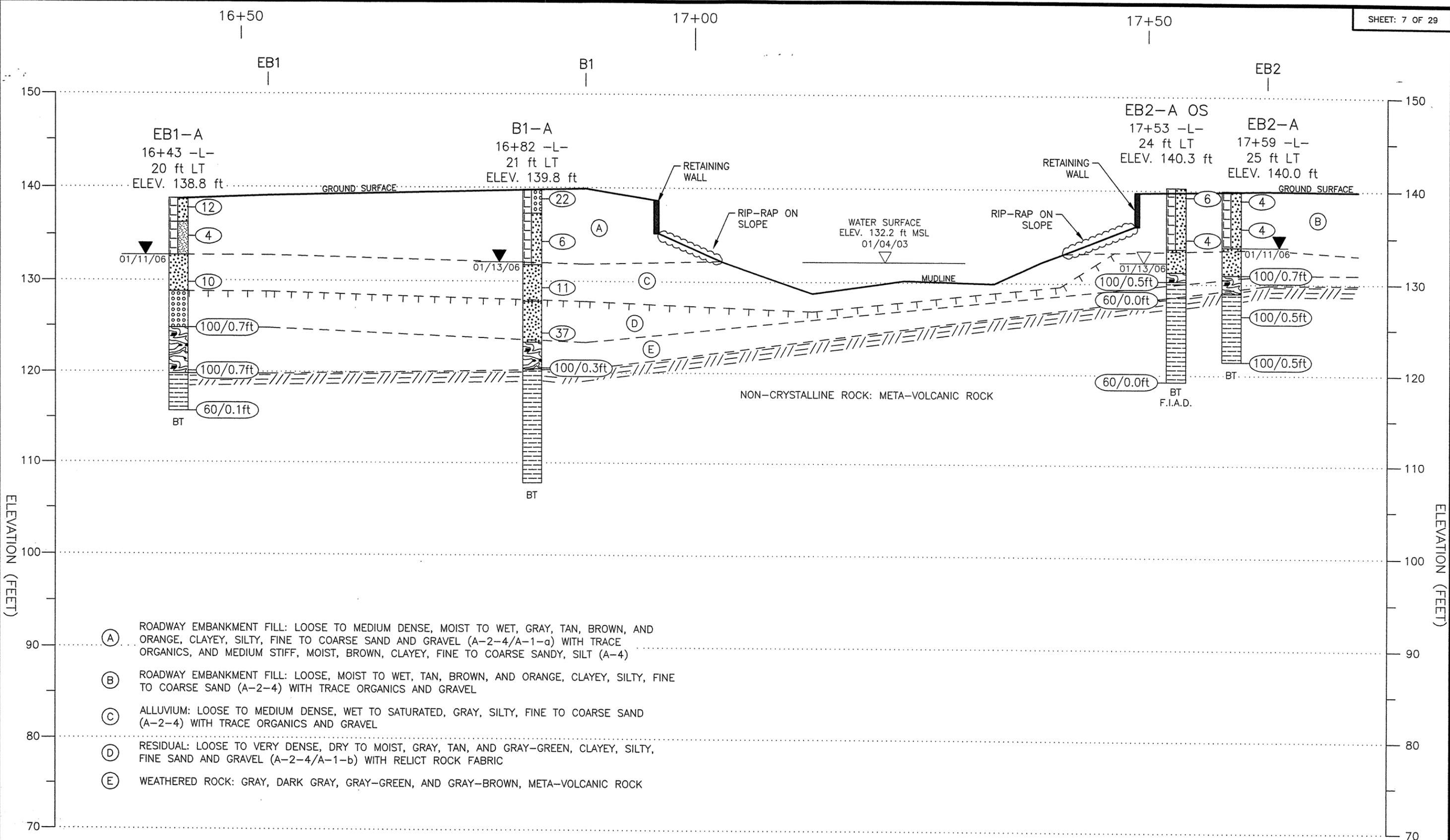


SKEW=100°

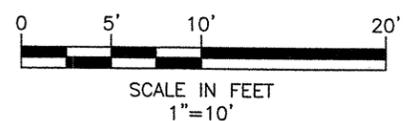


BORING LOCATION PLAN
 BRIDGE NO. 79 OVER BLOOMERY SWAMP ON SR 1001
 NCDOT PROJECT NO. 33663.1.1 (B-4326)
 F.A. No. BRZ-1001(27)
 WILSON COUNTY, NORTH CAROLINA

MACTEC ENGINEERING AND CONSULTING, INC. RALEIGH, NORTH CAROLINA			
REVISIONS	DRAWN:	R.R.	DATE: 02/03/06
02/17/06	DFT CHECK:	W.B.D.	JOB : 6468-05-1286
	ENG CHECK:	J.E.V.	DWG: 3

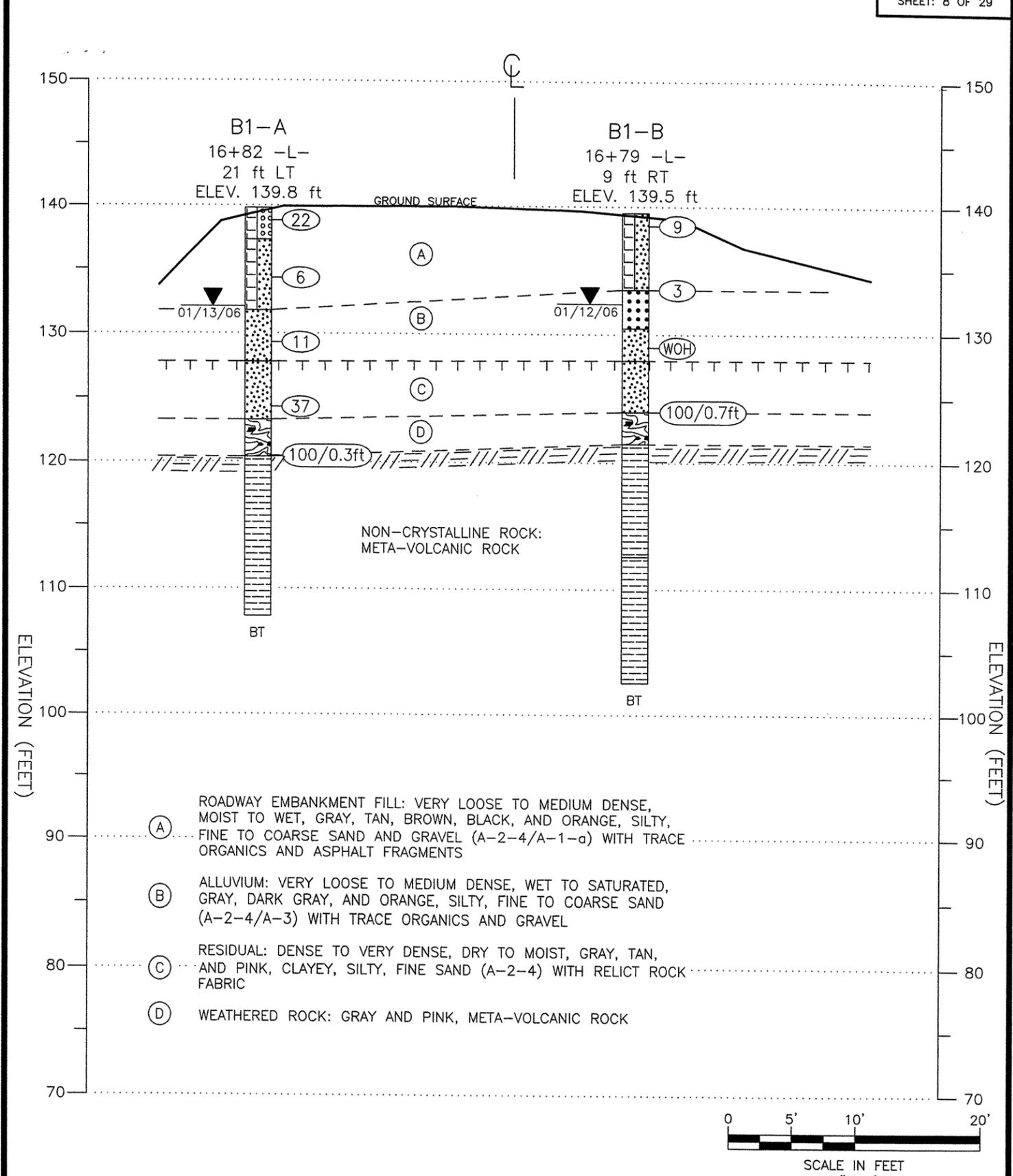
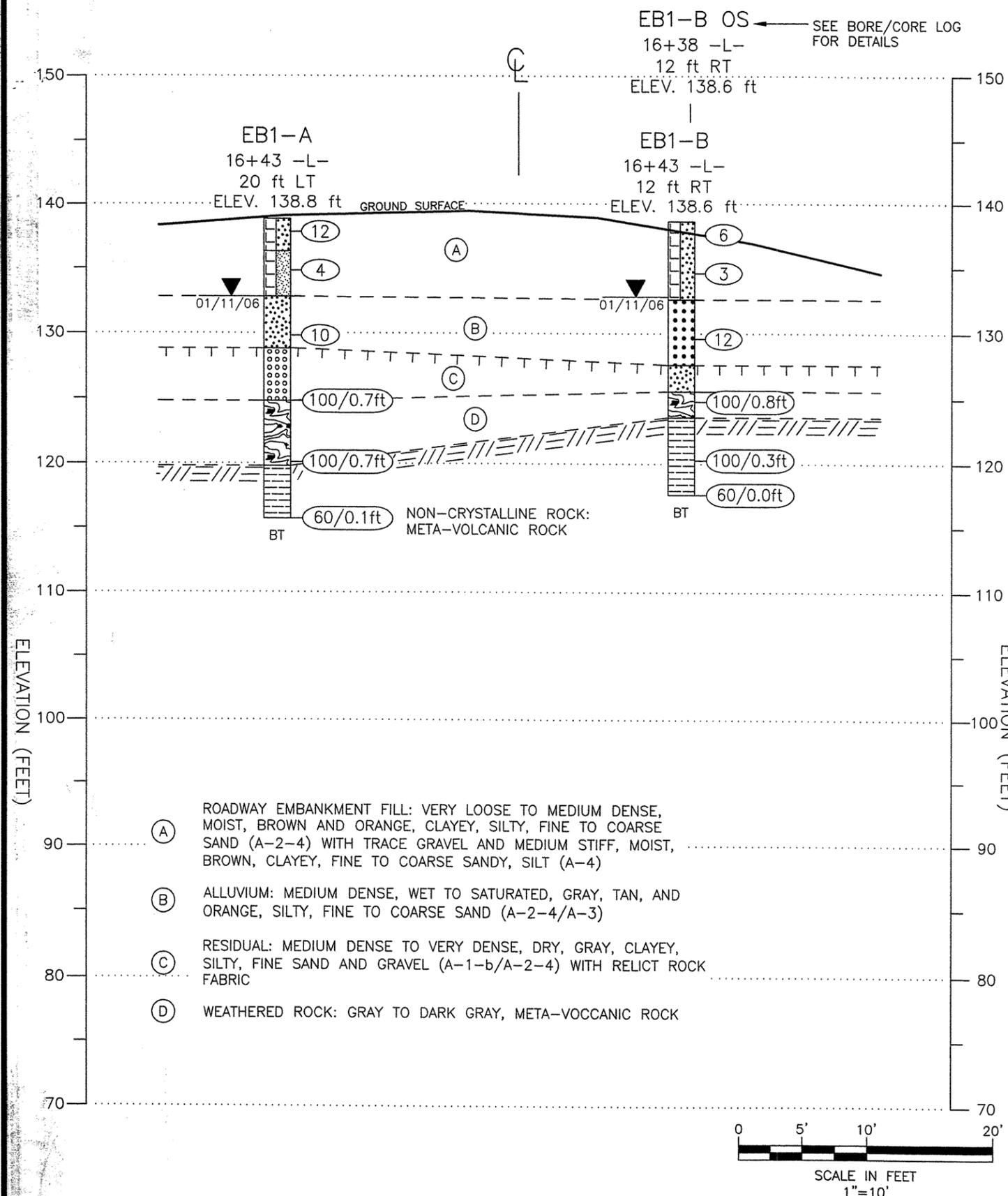


- (A) ROADWAY EMBANKMENT FILL: LOOSE TO MEDIUM DENSE, MOIST TO WET, GRAY, TAN, BROWN, AND ORANGE, CLAYEY, SILTY, FINE TO COARSE SAND AND GRAVEL (A-2-4/A-1-a) WITH TRACE ORGANICS, AND MEDIUM STIFF, MOIST, BROWN, CLAYEY, FINE TO COARSE SANDY, SILT (A-4)
- (B) ROADWAY EMBANKMENT FILL: LOOSE, MOIST TO WET, TAN, BROWN, AND ORANGE, CLAYEY, SILTY, FINE TO COARSE SAND (A-2-4) WITH TRACE ORGANICS AND GRAVEL
- (C) ALLUVIUM: LOOSE TO MEDIUM DENSE, WET TO SATURATED, GRAY, SILTY, FINE TO COARSE SAND (A-2-4) WITH TRACE ORGANICS AND GRAVEL
- (D) RESIDUAL: LOOSE TO VERY DENSE, DRY TO MOIST, GRAY, TAN, AND GRAY-GREEN, CLAYEY, SILTY, FINE SAND AND GRAVEL (A-2-4/A-1-b) WITH RELICT ROCK FABRIC
- (E) WEATHERED ROCK: GRAY, DARK GRAY, GRAY-GREEN, AND GRAY-BROWN, META-VOLCANIC ROCK



PROFILE 18 ft LT OF -L-
BRIDGE NO. 79 OVER BLOOMERY SWAMP ON SR 1001
NCDOT PROJECT NO. 33663.1.1 (B-4326)
F.A. No. BRZ-1001(27)
WILSON COUNTY, NORTH CAROLINA

MACTEC ENGINEERING AND CONSULTING, INC. RALEIGH, NORTH CAROLINA			
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02/17/06	DFT CHECK:	W.B.D.	JOB: 6468-05-1286
	ENG CHECK:	S.J.C.	DWG: 4



- (A) ROADWAY EMBANKMENT FILL: VERY LOOSE TO MEDIUM DENSE, MOIST, BROWN AND ORANGE, CLAYEY, SILTY, FINE TO COARSE SAND (A-2-4) WITH TRACE GRAVEL AND MEDIUM STIFF, MOIST, BROWN, CLAYEY, FINE TO COARSE SANDY, SILT (A-4)
- (B) ALLUVIUM: MEDIUM DENSE, WET TO SATURATED, GRAY, TAN, AND ORANGE, SILTY, FINE TO COARSE SAND (A-2-4/A-3)
- (C) RESIDUAL: MEDIUM DENSE TO VERY DENSE, DRY, GRAY, CLAYEY, SILTY, FINE SAND AND GRAVEL (A-1-b/A-2-4) WITH RELICT ROCK FABRIC
- (D) WEATHERED ROCK: GRAY TO DARK GRAY, META-VOLCANIC ROCK

- (A) ROADWAY EMBANKMENT FILL: VERY LOOSE TO MEDIUM DENSE, MOIST TO WET, GRAY, TAN, BROWN, BLACK, AND ORANGE, SILTY, FINE TO COARSE SAND AND GRAVEL (A-2-4/A-1-a) WITH TRACE ORGANICS AND ASPHALT FRAGMENTS
- (B) ALLUVIUM: VERY LOOSE TO MEDIUM DENSE, WET TO SATURATED, GRAY, DARK GRAY, AND ORANGE, SILTY, FINE TO COARSE SAND (A-2-4/A-3) WITH TRACE ORGANICS AND GRAVEL
- (C) RESIDUAL: DENSE TO VERY DENSE, DRY TO MOIST, GRAY, TAN, AND PINK, CLAYEY, SILTY, FINE SAND (A-2-4) WITH RELICT ROCK FABRIC
- (D) WEATHERED ROCK: GRAY AND PINK, META-VOLCANIC ROCK

CROSS SECTION ALONG END BENT 1
 BRIDGE NO. 79 OVER BLOOMERY SWAMP ON SR 1001
 NCDOT PROJECT NO. 33663.1.1 (B-4326)
 F.A. No. BRZ-1001(27)
 WILSON COUNTY, NORTH CAROLINA

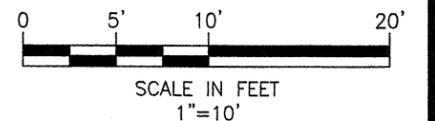
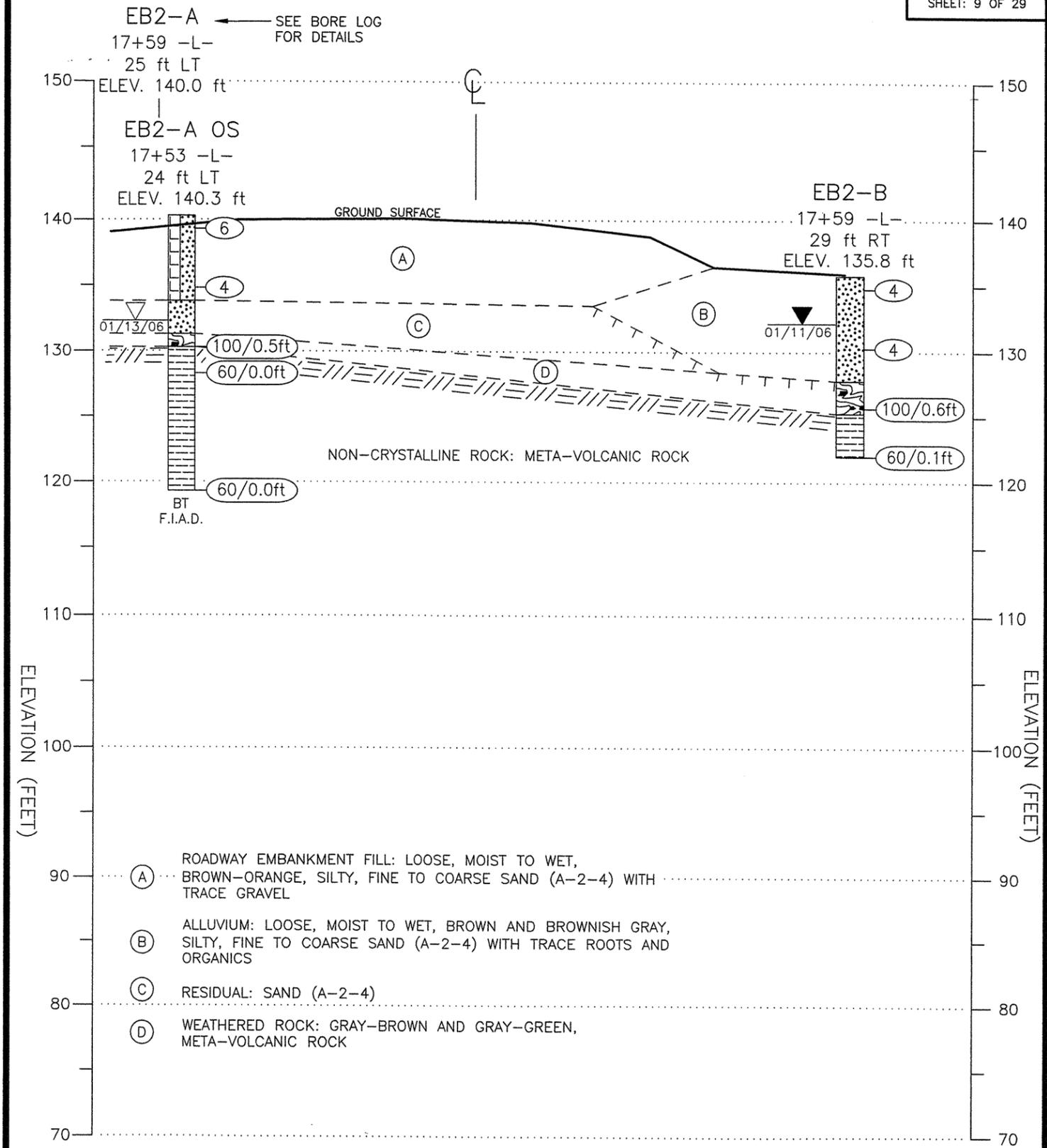
MACTEC ENGINEERING AND CONSULTING, INC.
 RALEIGH, NORTH CAROLINA

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02/17/06	DFT CHECK:	W.B.D.	JOB:	6468-05-1286
	ENG CHECK:	S.J.C.	DWG:	5

CROSS SECTION ALONG BENT 1
 BRIDGE NO. 79 OVER BLOOMERY SWAMP ON SR 1001
 NCDOT PROJECT NO. 33663.1.1 (B-4326)
 F.A. No. BRZ-1001(27)
 WILSON COUNTY, NORTH CAROLINA

MACTEC ENGINEERING AND CONSULTING, INC.
 RALEIGH, NORTH CAROLINA

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02/17/06	DFT CHECK:	W.B.D.	JOB:	6468-05-1286
	ENG CHECK:	S.J.C.	DWG:	6



CROSS SECTION ALONG END BENT 2
 BRIDGE NO. 79 OVER BLOOMERY SWAMP ON SR 1001
 NCDOT PROJECT NO. 33663.1.1 (B-4326)
 F.A. No. BRZ-1001(27)
 WILSON COUNTY, NORTH CAROLINA

MACTEC ENGINEERING AND CONSULTING, INC. RALEIGH, NORTH CAROLINA			
REVISIONS	DRAWN:	R.R.	DATE: 02/03/06
02/17/06	DFT CHECK:	W.B.D.	JOB: 6468-05-1286
	ENG CHECK:	S.J.C.	DWG: 7

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear								
SITE DESCRIPTION Bridge No. 79 over Bloomery Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)							GROUND WATER (ft)							
BORING NO. EB1-A		BORING LOCATION 16+43		OFFSET 20 ft LT		ALIGNMENT -L-	0 HR. 7.2							
COLLAR ELEV. 138.8 ft		NORTHING 736,319 US ft		EASTING 2,293,967 US ft			24 HR. 6.0							
TOTAL DEPTH 23.1 ft		DRILL MACHINE D-50 ATV		DRILL METHOD HSA-2.25" I.D.		HAMMER TYPE 140 lb. Manual								
DATE STARTED 1/10/06		COMPLETED 1/10/06		SURFACE WATER DEPTH N/A										
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80					100
138.8	0.0	4	5	7	Ground Surface								138.8	0.0
135.8	3.0	3	2	2	Roadway Embankment Fill: Brown and orange, clayey, silty, f. to cse. SAND (A-2-4)					SS-1	M		136.3	2.5
130.8	8.0	WOH	3	7	Roadway Embankment Fill: Brown, clayey, f. to cse. sandy, SILT (A-4)					SS-2	12.7%		132.8	6.0
125.8	13.0				Alluvium: Gray, silty, f. to cse. SAND (A-2-4)					SS-3	Sat.		128.8	10.0
120.8	18.0				Residual: Gray, clayey, f. sandy, silty, GRAVEL (A-1-b) w/ relict rock fabric					SS-4	D		124.8	14.0
115.8	23.0				Weathered Rock: Gray to dark gray, META-VOLCANIC ROCK								119.8	19.0
					Non-Crystalline Rock: Hard, META-VOLCANIC ROCK								115.7	23.1
					Boring terminated at SPT refusal at 23.1 ft (Elev. 115.7 ft) in NCR: Hard, META-VOLCANIC ROCK									
					Bits Used: HSA-2.25" I.D.									
					Note: Boring offset from proposed location due to underground utilities.									

NCDOT BORE SINGLE BRIDGE 79.GPJ NC_DOT.GDT 2/17/06

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear								
SITE DESCRIPTION Bridge No. 79 over Bloomery Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)							GROUND WATER (ft)							
BORING NO. EB1-B		BORING LOCATION 16+43		OFFSET 12 ft RT		ALIGNMENT -L-	0 HR. 7.0							
COLLAR ELEV. 138.6 ft		NORTHING 736,320 US ft		EASTING 2,293,999 US ft			24 HR. 5.8							
TOTAL DEPTH 21.0 ft		DRILL MACHINE D-50 ATV		DRILL METHOD HSA-2.25" I.D.		HAMMER TYPE 140 lb. Manual								
DATE STARTED 1/10/06		COMPLETED 1/10/06		SURFACE WATER DEPTH N/A										
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80					100
138.6	0.0	3	3	3	Ground Surface								138.6	0.0
135.6	3.0	3	2	1	Roadway Embankment Fill: Brown, silty, f. to cse. SAND (A-2-4) w/ trace gravel					M			132.6	6.0
130.6	8.0	4	5	7	Alluvium: Tan, orange, and gray, silty, f. to cse. SAND (A-3)					M			127.6	11.0
125.6	13.0	26	74/0.3'		Residual: Sand (A-2-4)-Not sampled, indicated by harder drilling					W			125.6	13.0
120.6	18.0				Weathered Rock: Gray to dark gray, META-VOLCANIC ROCK								123.6	15.0
117.6	21.0				Non-Crystalline Rock: Gray and pink, hard, META-VOLCANIC ROCK								117.6	21.0
					Boring terminated at Auger and SPT refusal at 21.0 ft (Elev. 117.6 ft) in NCR: Hard, META-VOLCANIC ROCK									
					Bits Used: HSA-2.25" I.D.									
					Note: Boring offset from proposed location due to underground utilities and steep slopes.									
					Note: Material described as Non-Crystalline Rock but with SPT values reflecting Weathered Rock are classified based on the recovered core in boring EB1-B OS.									

NCDOT BORE SINGLE BRIDGE 79.GPJ NC_DOT.GDT 2/17/06



MACTEC

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

SHEET 1 OF 1

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear								
SITE DESCRIPTION Bridge No. 79 over Bloomey Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)						GROUND WATER (ft)								
BORING NO. EB1-B OS		BORING LOCATION 16+38		OFFSET 12 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 138.6 ft		NORTHING 736,315 US ft		EASTING 2,293,999 US ft		0 HR. 6.1								
TOTAL DEPTH 19.2 ft		DRILL MACHINE D-50 ATV		DRILL METHOD Mud Rotary/Core		HAMMER TYPE 140 lb. Manual								
DATE STARTED 1/13/06		COMPLETED 1/13/06		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	
138.6	0.0	4	5	3	Ground Surface							138.6	0.0	Roadway Embankment Fill: Brown, silty, f. to cse. SAND (A-2-4) w/ trace gravel
134.6	4.0	2	2	2								132.6	6.0	Alluvium: Gray, silty, f. to cse. SAND (A-3) w/ trace gravel
129.6	9.0	7	9	12								127.6	11.0	Residual: Sand (A-2-4)-Not Sampled, indicated by harder drilling
125.1	13.5	100/0.5'										125.6	13.0	Weathered Rock: Gray, META-VOLCANIC ROCK
119.6	19.0	100/0.2'										123.6	15.0	Non-Crystalline Rock: Gray, mod. to mod. sev. weathered, closely to mod. closely fractured, mod. hard to soft, META-VOLCANIC ROCK (3 joints at 70-80° w/ clay)
		100/0.2'										119.4	19.2	Boring terminated at 19.2 ft (Elev. 119.4 ft) in NCR: Mod. hard to soft, META-VOLCANIC ROCK
Bits Used: 4" Roller Cone and HQ series 6 core bit														
Drilling Fluid Properties: 8.7 lbs/gal														

NCDOT BORE SINGLE BRIDGE 79.GPJ NC DOT.GDT 2/2/06



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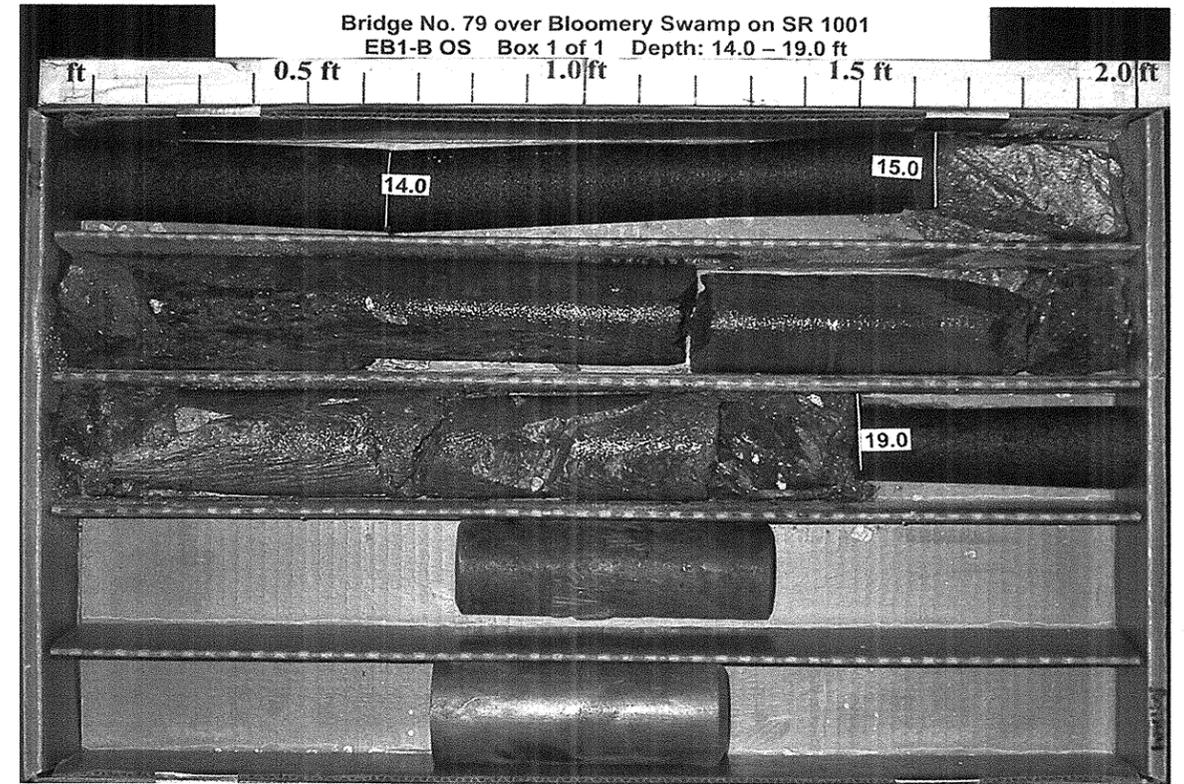
N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

SHEET 11 OF 29

SHEET 1 OF 1

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear				
SITE DESCRIPTION Bridge No. 79 over Bloomey Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)						GROUND WATER (ft)				
BORING NO. EB1-B OS		BORING LOCATION 16+38		OFFSET 12 ft RT		ALIGNMENT -L-				
COLLAR ELEV. 138.6 ft		NORTHING 736,315 US ft		EASTING 2,293,999 US ft		0 HR. 6.1				
TOTAL DEPTH 19.2 ft		DRILL MACHINE D-50 ATV		DRILL METHOD Mud Rotary/Core		HAMMER TYPE 140 lb. Manual				
DATE STARTED 1/13/06		COMPLETED 1/13/06		SURFACE WATER DEPTH N/A						
CORE SIZE HQ			TOTAL RUN 5.0 ft			DRILLER T. Hahn				
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
				REC. (%)	RQD (%)		REC. (%)	RQD (%)		
										Begin Coring @ 14.0 ft
124.6	14.0	5.0	3:48 4:49 2:32 2:24 4:59	(4.0) 80%	(1.8) 36%		(0.0) 0%	(N/A) (1.8) (4.0) 45%		123.6 Weathered Rock: Gray, META-VOLCANIC ROCK (continued)
119.6	19.0						100%			119.6 Non-Crystalline Rock: Gray, mod. to mod. sev. weathered, closely to mod. closely fractured, mod. hard to soft, META-VOLCANIC ROCK (3 joints at 70-80° w/ clay)
										Coring terminated at 19.0 ft (Elev. 119.6 ft) in NCR: Mod. to mod. sev. weathered, closely to mod. closely fractured, mod. hard to soft, META-VOLCANIC ROCK

NCDOT BORE SINGLE BRIDGE 79.GPJ NC DOT.GDT 2/2/06





MACTEC

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

SHEET 1 OF 1

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear									
SITE DESCRIPTION Bridge No. 79 over Bloomey Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)						GROUND WATER (ft)									
BORING NO. B1-A		BORING LOCATION 16+82		OFFSET 21 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 139.8 ft		NORTHING 736,357 US ft		EASTING 2,293,965 US ft		0 HR. 7.1									
TOTAL DEPTH 32.0 ft		DRILL MACHINE D-50 ATV		DRILL METHOD Mud Rotary/Core		HAMMER TYPE 140 lb. Manual									
DATE STARTED 1/12/06		COMPLETED 1/12/06		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		
139.8	0.0	9	12	10									139.8	0.0	Ground Surface
135.3	4.5	2	3	3									137.3	2.5	Roadway Embankment Fill: Gray-tan, silty, sandy GRAVEL (A-1-a)
130.3	9.5	3	3	8									131.8	8.0	Roadway Embankment Fill: Tan-brown, silty, f. to cse. SAND (A-2-4) w/ trace gravel and organics
125.3	14.5	8	11	26									127.8	12.0	Alluvium: Gray, silty, f. to cse. SAND (A-2-4) w/ trace organics and gravel
120.8	19.0	100/0.3'											123.3	16.5	Residual: Gray and tan, clayey, silty, f. SAND (A-2-4) w/ relict rock fabric
													120.4	19.4	Weathered Rock: Gray, META-VOLCANIC ROCK
													107.8	32.0	Non-Crystalline Rock: Gray, mod. to sli. weathered, mod. closely fractured, mod. hard to hard, META-VOLCANIC ROCK
<p>Boring and coring terminated at 32.0 ft (Elev. 107.8 ft) in NCR: Mod. hard to hard, META-VOLCANIC ROCK</p> <p>Bits Used: 4" Roller Cone and HQ series 6 core bit</p> <p>Drilling Fluid Properties: 8.6 lbs/gal</p> <p>Note: Boring offset from proposed location due to proximity to existing structure.</p>															

NCDOT BORE SINGLE BRIDGE 79.GPJ NC_DOT.GDT 2/2/06



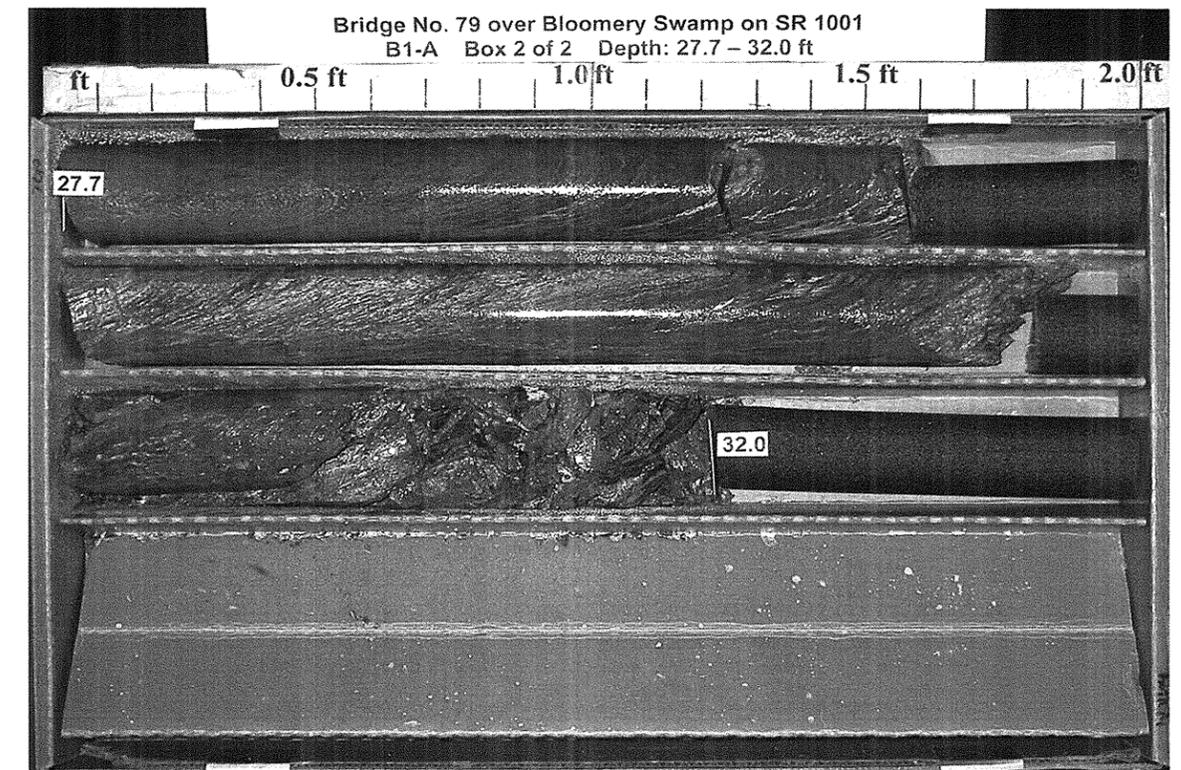
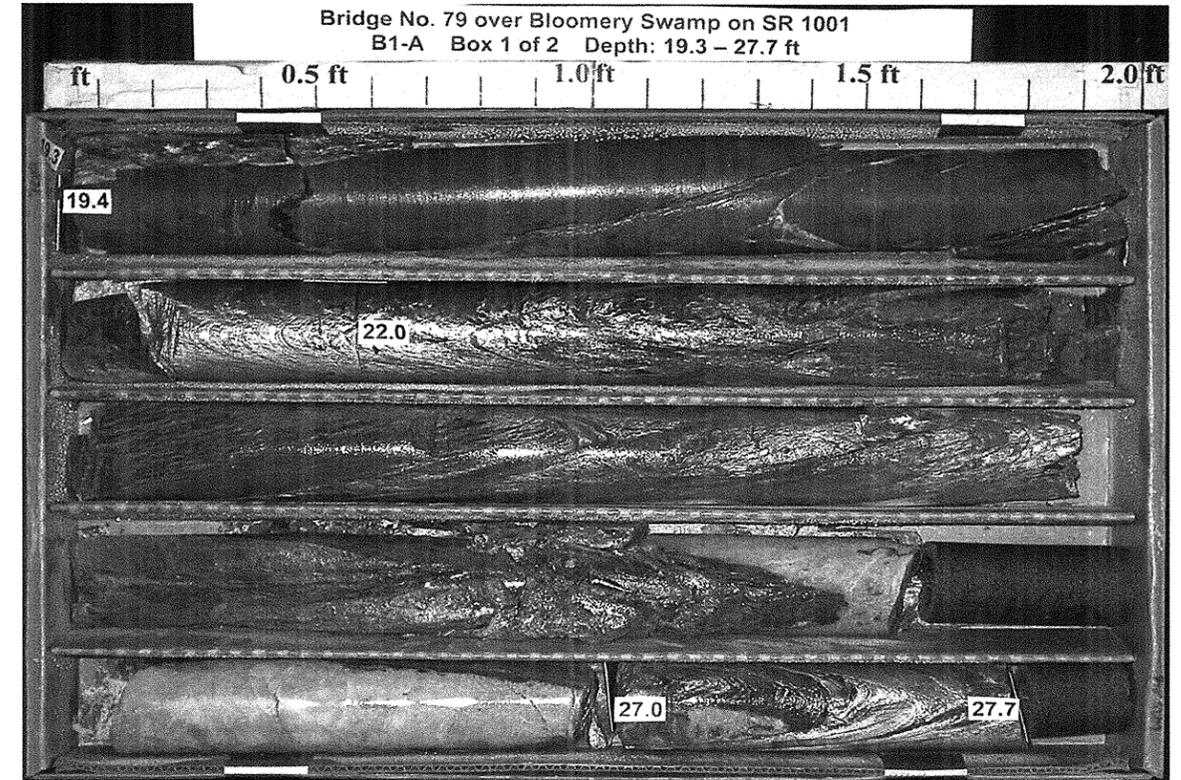
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N.C.D.O.T. GEOTECHNICAL UNIT
CORE BORING REPORT
SHEET 13 OF 29

SHEET 1 OF 1

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear				
SITE DESCRIPTION Bridge No. 79 over Bloomey Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)						GROUND WATER (ft)				
BORING NO. B1-A		BORING LOCATION 16+82		OFFSET 21 ft LT		ALIGNMENT -L-				
COLLAR ELEV. 139.8 ft		NORTHING 736,357 US ft		EASTING 2,293,965 US ft		0 HR. 7.1				
TOTAL DEPTH 32.0 ft		DRILL MACHINE D-50 ATV		DRILL METHOD Mud Rotary/Core		HAMMER TYPE 140 lb. Manual				
DATE STARTED 1/12/06		COMPLETED 1/12/06		SURFACE WATER DEPTH N/A						
CORE SIZE HQ		TOTAL RUN 12.7 ft		DRILLER T. Hahn						
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
				REC. (%)	RQD (%)		REC. (%)	RQD (%)		
										Begin Coring @ 19.3 ft
120.5	19.3	2.7	4:05	(2.6)	(2.6)		(0.0)	(N/A)		Weathered Rock: Gray, META-VOLCANIC ROCK (continued)
117.8	22.0		5:02	96%	96%		0%	(12.6)		Non-Crystalline Rock: Gray, mod. to sli. weathered, mod. closely fractured, mod. hard to hard, META-VOLCANIC ROCK
		5.0	4:57/0.7				100%	100%		2 joints at 60-70° w/ trace clay
			5:58	(5.0)	(5.0)					3 joints at 60-70° w/ trace clay; 0.1 ft wide pink Quartz vein at 70° from 25.5 to 27.0 ft
			6:12	100%	100%					
			6:15							
			7:01							
			11:03							
112.8	27.0		8:05	(5.0)	(5.0)	RS-1				2 joints at 60-70° w/ trace clay
			8:35	100%	100%					RS-1 Sampled from 27.7 to 28.3 ft
			8:15							
			9:20							
107.8	32.0		8:05							Coring terminated at 32.0 ft (Elev. 107.8 ft) in NCR: Sli. weathered, mod. closely fractured, mod. hard to hard, META-VOLCANIC ROCK

NCDOT CORE SINGLE BRIDGE 79.GPJ NC_DOT.GDT 2/2/06





MACTEC

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

SHEET 1 OF 1

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear									
SITE DESCRIPTION Bridge No. 79 over Bloomey Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)						GROUND WATER (ft)									
BORING NO. B1-B		BORING LOCATION 16+79		OFFSET 9 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 139.5 ft		NORTHING 736,356 US ft		EASTING 2,293,995 US ft		0 HR. 7.1									
TOTAL DEPTH 36.9 ft		DRILL MACHINE D-50 ATV		DRILL METHOD Mud Rotary/Core		HAMMER TYPE 140 lb. Manual									
DATE STARTED 1/11/06		COMPLETED 1/11/06		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		
139.5	0.0	3	5	4									139.5	0.0	Roadway Embankment Fill: Brown, black, and orange, silty, f. to cse. SAND (A-2-4) w/ little gravel and asphalt fragments
134.5	5.0	2	1	2									133.5	6.0	Alluvium: Orange and gray, f. to cse. SAND (A-3) w/ trace gravel
130.0	9.5	WOH	WOH	WOH									130.5	9.0	Alluvium: Dark gray, clayey, silty, f. to cse. SAND (A-2-4) w/ trace organics
125.0	14.5	22	61	39/0.2'									128.0	11.5	Attempted to push tube for EFA analysis at 11.5, unable to push tube on hard material (tube bent)
													124.0	15.5	Residual: Gray and pink, clayey, silty, f. SAND (A-2-4) w/ relict rock fabric
													121.5	18.0	Weathered Rock: Gray and pink, META-VOLCANIC ROCK
													112.6	26.9	Non-Crystalline Rock: Dark purplish-gray, mod. sev. to mod. weathered, v. closely to mod. closely fractured, soft to mod. hard, META-VOLCANIC ROCK
													102.6	36.9	Non-Crystalline Rock: Dark gray, mod. to sli. weathered, closely to mod. closely fractured, mod. hard to hard, META-VOLCANIC ROCK
Boring and coring terminated at 36.9 ft (Elev. 102.6 ft) in NCR: Mod. hard to hard, META-VOLCANIC ROCK															
Bits Used: 4" Roller Cone and HQ series 6 core bit															
Drilling Fluid Properties: 8.6 lbs/gal															
Note: Boring offset from proposed location due to underground and overhead utilities and steep slopes.															

NCDOT BORE SINGLE BRIDGE 79.GPJ NC DOT.GDT 2/2/06



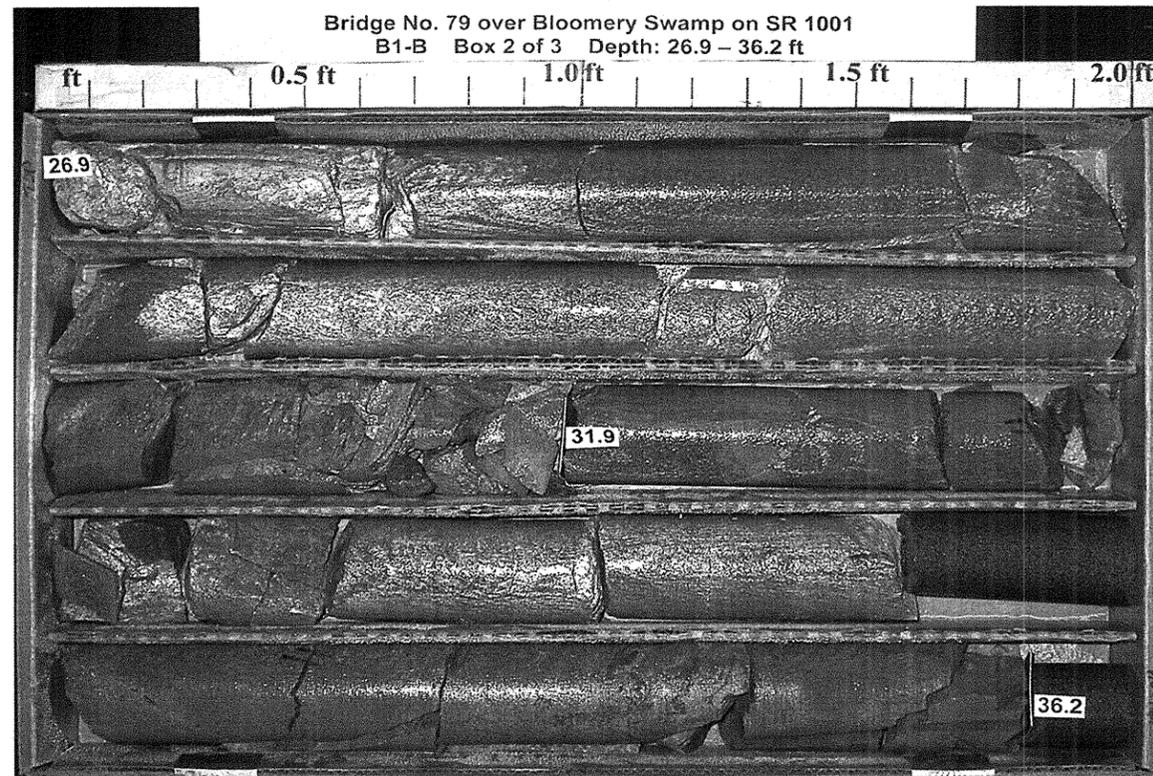
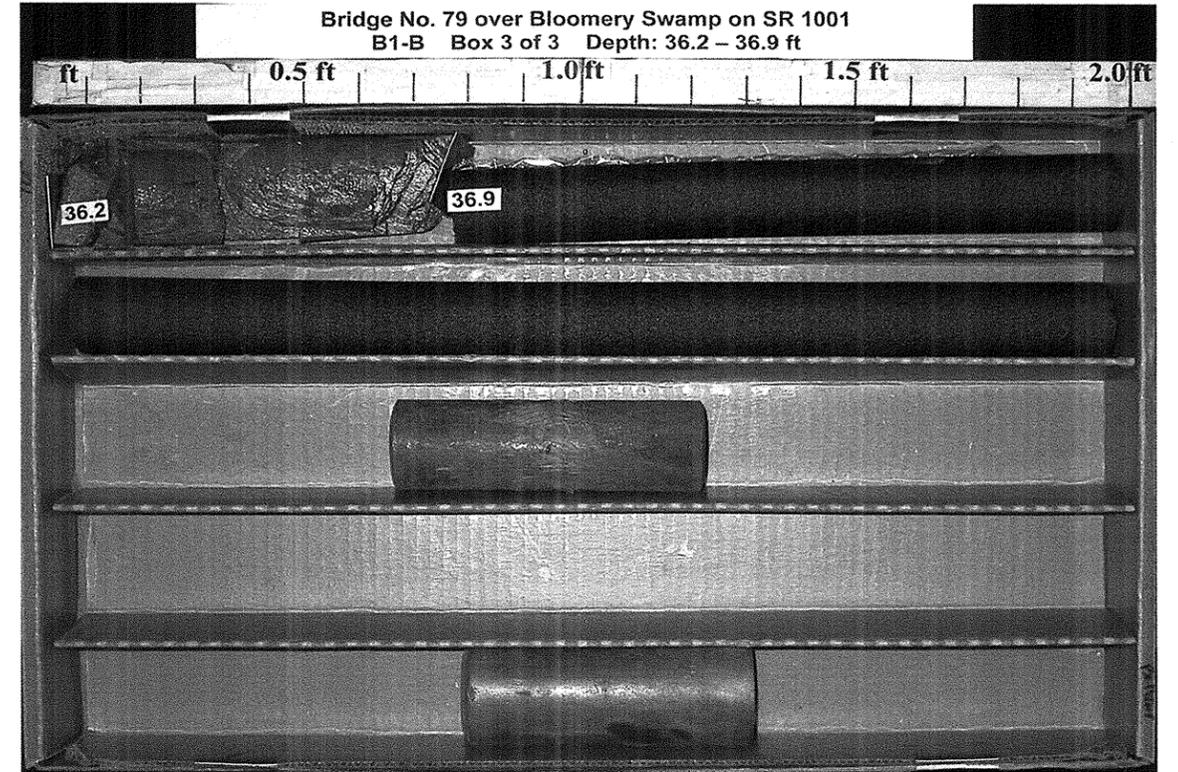
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N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT SHEET 15 OF 29

SHEET 1 OF 1

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear				
SITE DESCRIPTION Bridge No. 79 over Bloomey Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)						GROUND WATER (ft)				
BORING NO. B1-B		BORING LOCATION 16+79		OFFSET 9 ft RT		ALIGNMENT -L-				
COLLAR ELEV. 139.5 ft		NORTHING 736,356 US ft		EASTING 2,293,995 US ft		0 HR. 7.1				
TOTAL DEPTH 36.9 ft		DRILL MACHINE D-50 ATV		DRILL METHOD Mud Rotary/Core		HAMMER TYPE 140 lb. Manual				
DATE STARTED 1/11/06		COMPLETED 1/11/06		SURFACE WATER DEPTH N/A						
CORE SIZE HQ		TOTAL RUN 21.2 ft		DRILLER T. Hahn						
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
				REC. (%)	RQD (%)		REC. (%)	RQD (%)		
										Begin Coring @ 15.7 ft
123.8	15.7	1.2	4:46	(0.0)	(N/A)		(0.0)	(N/A)		Weathered Rock: Gray and pink, META-VOLCANIC ROCK (continued)
122.6	16.9	5.0	0:54/0.2	0%	(2.9)		0%			Non-Crystalline Rock: Dark purplish-gray, mod. sev. to mod. weathered, v. closely to mod. closely fractured, soft to mod. hard, META-VOLCANIC ROCK
			2:59	(3.9)	58%		(7.6)	(4.3)		5 joints at 0-10° w/ trace clay; Foliation at 60-70°
			3:47	78%			85%	48%		4 joints at 0-10° w/ clay; severely fractured along foliation-unable to recover bottom 1.3 ft of run, redrilled and washed away.
			4:01							
			4:05							
			4:01	(3.7)	(1.4)					
			4:07	74%	28%					
			4:07							
			3:36							
			3:33							
			3:44							
			4:10	(5.0)	(4.5)		(10.0)	(8.9)		Non-Crystalline Rock: Dark gray, mod. to sli. weathered, closely to mod. closely fractured, mod. hard to hard, META-VOLCANIC ROCK
			3:56	100%	90%		100%	89%		5 joints at 30-40° w/ trace clay; 1 joint at 65° w/ orange Fe stain
			4:06							
			3:54							
			3:38							
			3:41	(5.0)	(4.4)					5 joints at 10-20° w/ clay and orange Fe stain; 2 joints at 60-70° w/ orange Fe stain
			3:48	100%	88%					
			4:19							
			4:09							
			4:03							
										Coring terminated at 36.9 ft (Elev. 102.6 ft) in NCR: Mod. to sli. weathered, closely to mod. closely fractured, mod. hard to hard, META-VOLCANIC ROCK

NCDOT CORE SINGLE BRIDGE 79.GPJ NC DOT.GDT 2/2/06





MACTEC

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear							
SITE DESCRIPTION Bridge No. 79 over Bloomery Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)							GROUND WATER (ft)						
BORING NO. EB2-A		BORING LOCATION 17+59		OFFSET 25 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 140.0 ft		NORTHING 736,435 US ft		EASTING 2,293,959 US ft		0 HR. 8.5							
TOTAL DEPTH 18.5 ft		DRILL MACHINE D-50 ATV		DRILL METHOD HSA-2.25" I.D.		24 HR. 6.0							
DATE STARTED 1/10/06		COMPLETED 1/10/06		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
140.0					Ground Surface								
140.0	0.0	2	2	2								Roadway Embankment Fill: Tan-Brown, clayey, silty, f. to cse. SAND (A-2-4) w/ trace organics	
137.0	3.0	2	2	2									
132.0	8.0	42	54	46/0.2'								Residual: Gray-green, silty, f. SAND (A-2-4) w/ relict rock fabric	
127.0	13.0	83	17/0.0'								100/0.7'	Weathered Rock: Gray-green, META-VOLCANIC ROCK	
122.0	18.0	40	60/0.0'								100/0.5'	Non-Crystalline Rock: Gray-green, hard, META-VOLCANIC ROCK	
												100/0.5'	Boring terminated at SPT refusal at 18.5 ft (Elev. 121.5 ft) in NCR: Hard, META-VOLCANIC ROCK
													Bits Used: HSA-2.25" I.D.
													Note: Boring offset from proposed location due location of residential mailbox and utilities.
													Note: Material described as Non-Crystalline Rock but with SPT values reflecting Weathered Rock are classified based on the recovered core in boring EB2-A OS.

NCDOT BORE SINGLE BRIDGE 79.GPJ NC_DOT.GDT 2/17/06



MACTEC

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

SHEET 1 OF 1

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear							
SITE DESCRIPTION Bridge No. 79 over Bloomery Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)							GROUND WATER (ft)						
BORING NO. EB2-A OS		BORING LOCATION 17+53		OFFSET 24 ft LT		ALIGNMENT -L-	0 HR. 8.0						
COLLAR ELEV. 140.3 ft		NORTHING 736,429 US ft		EASTING 2,293,960 US ft			24 HR. FIAD						
TOTAL DEPTH 21.0 ft		DRILL MACHINE D-50 ATV		DRILL METHOD Mud Rotary/Core		HAMMER TYPE 140 lb. Manual							
DATE STARTED 1/13/06		COMPLETED 1/13/06		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
140.3													Ground Surface
140.3	0.0	3	3	3								M	Roadway Embankment Fill: Brown-orange, silty, f. to cse. SAND (A-2-4) w/ trace gravel
135.8	4.5											M-W	
130.8	9.5												Residual: Sand (A-2-4)-Not sampled, indicated by harder drilling
128.3	12.0	100/0.5'											Weathered Rock: Gray-brown, META-VOLCANIC ROCK
		60/0.0'											Non-Crystalline Rock: Gray, mod. to sli. weathered, mod. closely fractured, mod. hard to hard, META-VOLCANIC ROCK
119.3	21.0	60/0.0'											Boring terminated at SPT refusal at 21.0 ft (Elev. 119.3 ft) in NCR: Hard, META-VOLCANIC ROCK
													Bits Used: 4" Roller Cone and HQ series 6 core bit
													Drilling Fluid Properties: 8.6 lbs/gal

NCDOT BORE SINGLE BRIDGE 79.GPJ NC DOT.GDT 2/2/06



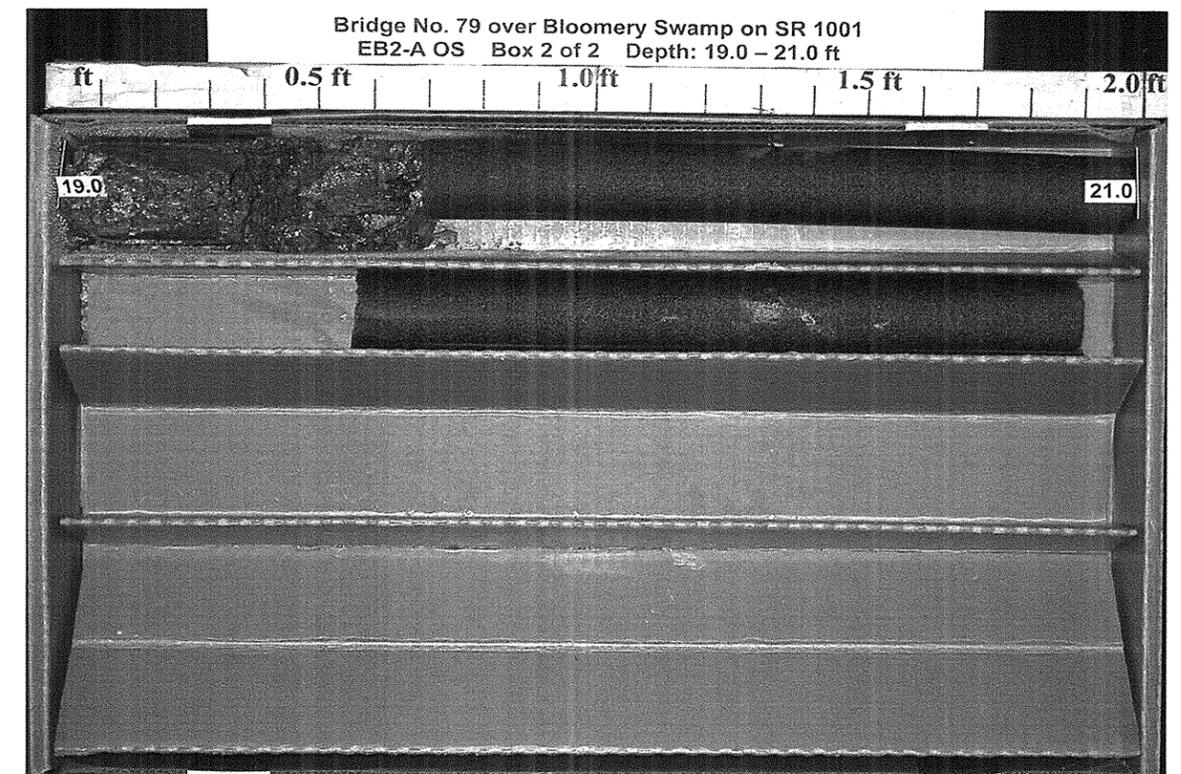
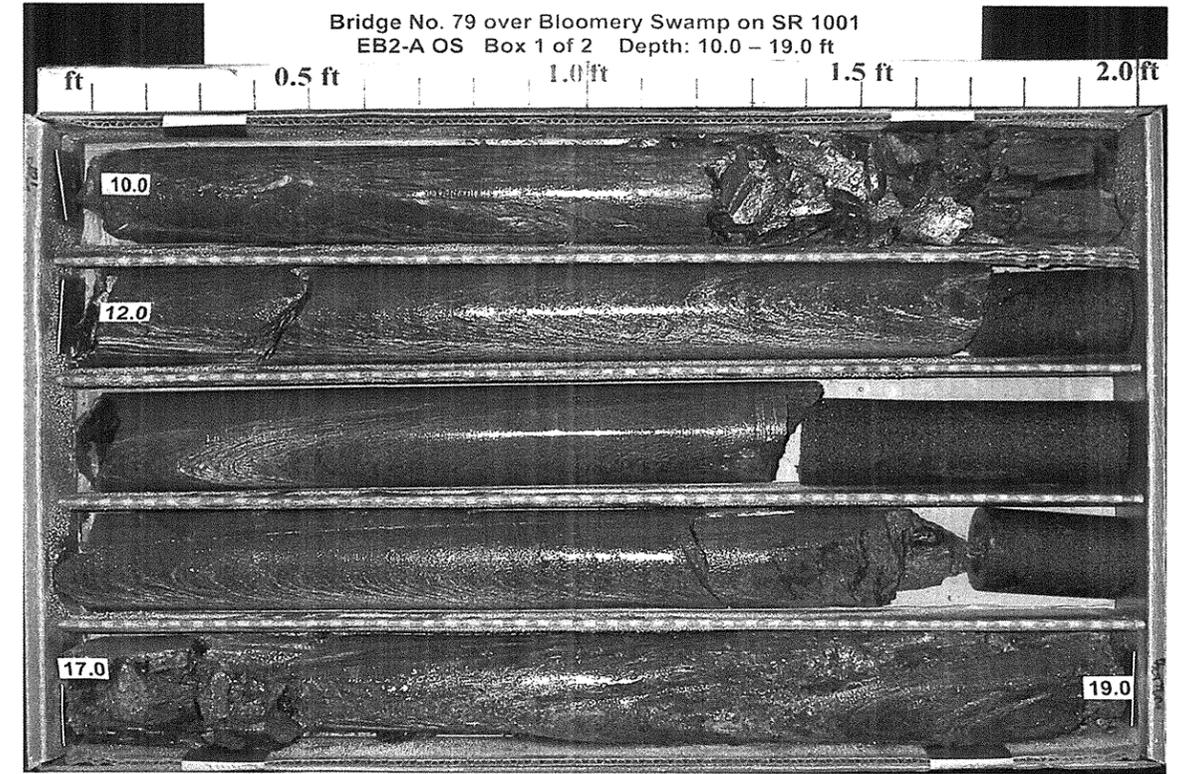
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N.C.D.O.T. GEOTECHNICAL UNIT
CORE BORING REPORT
SHEET 18 OF 29

SHEET 1 OF 1

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear				
SITE DESCRIPTION Bridge No. 79 over Bloomery Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)							GROUND WATER (ft)			
BORING NO. EB2-A OS		BORING LOCATION 17+53		OFFSET 24 ft LT		ALIGNMENT -L-	0 HR. 8.0			
COLLAR ELEV. 140.3 ft		NORTHING 736,429 US ft		EASTING 2,293,960 US ft			24 HR. FIAD			
TOTAL DEPTH 21.0 ft		DRILL MACHINE D-50 ATV		DRILL METHOD Mud Rotary/Core		HAMMER TYPE 140 lb. Manual				
DATE STARTED 1/13/06		COMPLETED 1/13/06		SURFACE WATER DEPTH N/A						
CORE SIZE HQ				TOTAL RUN 11.0 ft		DRILLER T. Hahn				
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
				REC. (ft)	RQD (%)		REC. (ft)	RQD (%)		
										Begin Coring @ 10.0 ft
130.3	10.0	2.0	4:07	(2.0)	(2.0)		(9.3)	(9.3)		Non-Crystalline Rock: Gray, mod. to sli. weathered, mod. closely fractured, mod. hard to hard, META-VOLCANIC ROCK 2 joints at 90° w/ trace clay 3 joints at 10-20° w/ brown Fe stain; 0.2 ft not recovered-left in hole
128.3	12.0	5.0	4:14 4:23 4:50 4:33 4:43	100% (4.8) 96%	100% (4.8) 96%		85%	85%		
123.3	17.0									Bottom 1.5 ft of run washed away due to core jamming in inner barrel, run completely blocked off at 21.0 ft.
		4.0	5:20 5:33 7:03 10:25	(2.5) 63%	(2.5) 63%					
119.3	21.0									Coring terminated at 21.0 ft (Elev. 119.3 ft) in NCR: Mod. to sli. weathered, mod. closely fractured, mod. hard to hard, META-VOLCANIC ROCK

NCDOT CORE SINGLE BRIDGE 79.GPJ NC DOT.GDT 2/2/06





MACTEC

PROJECT NO. 33663.1.1		ID. B-4326		COUNTY Wilson		GEOLOGIST M. Lear								
SITE DESCRIPTION Bridge No. 79 over Bloomery Swamp on SR 1001 (MACTEC Proj. No. 6468-05-1286)							GROUND WATER (ft)							
BORING NO. EB2-B		BORING LOCATION 17+59		OFFSET 29 ft RT		ALIGNMENT -L-		0 HR. 5.3						
COLLAR ELEV. 135.8 ft		NORTHING 736,436 US ft		EASTING 2,294,013 US ft				24 HR. 3.6						
TOTAL DEPTH 13.8 ft		DRILL MACHINE D-50 ATV		DRILL METHOD HSA-2.25" I.D.		HAMMER TYPE 140 lb. Manual								
DATE STARTED 1/10/06		COMPLETED 1/10/06		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
135.8					Ground Surface									
135.8	0.0	2	2	2							SS-9	M		135.8 0.0
131.3	4.5	2	2	2							SS-10			
126.3	9.5	51		49/0.1'										127.8 8.0
														125.3 10.5
122.1	13.7	60/0.1'												122.0 13.8

NCDOT BORE SINGLE BRIDGE 79.GPJ NC DOT.GDT 2/2/06

Boring terminated at SPT refusal at 13.8 ft (Elev. 122.0 ft) in NCR: Hard, META-VOLCANIC ROCK

Bits Used: HSA-2.25" I.D.

Note: Boring offset from proposed location due to underground and overhead utilities.



MACTEC ENGINEERING AND CONSULTING, INC.
3301 ATLANTIC AVENUE
RALEIGH, NORTH CAROLINA 27604

N.C.D.O.T./AASHTO CLASSIFICATIONS

REPORT ON SAMPLES OF: SOILS FOR QUALITY

MACTEC PROJECT NAME AND NUMBER: Bridge No. 79 over Bloomery Swamp on SR 1001 (6468-05-1286)

PROJECT: 33663.1.1 (B-4326) COUNTY: WILSON OWNER: N.C.D.O.T.
DATE SAMPLED: January, 2006 RECEIVED: 1/16/06 REPORTED BY: MACTEC
SAMPLED FROM: EB1-A, B1-A
SUBMITTED BY: MACTEC ENGINEERING AND CONSULTING, INC.

1992 STANDARD SPECIFICATIONS

TEST RESULTS

Lab Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6
Retained 4.75 mm Sieve (%)	1.1	5.1	0.0	26.8	43.2	4.9
Passing 2.00 mm Sieve (%)	96.3	87.9	100.0	54.4	44.6	93.1
Passing 425 µm Sieve (%)	74.4	63.9	97.5	31.8	25.9	83.4
Passing 75 µm Sieve (%)	30.3	36.7	13.6	17.7	10.8	12.6

MINUS 2.00mm FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - 250 µm (%)	43.9	40.3	33.8	52.4	55.2	41.5
Fine Sand Ret - 53 µm (%)	26.2	21.2	55.3	18.0	24.7	48.0
Silt 0.05 - 0.005 mm (%)	7.4	19.8	3.3	16.2	11.4	4.1
Clay < 0.005 mm (%)	22.5	18.8	7.6	13.4	8.7	6.4

Moisture Content (%)	ND	12.7	ND	6.0	ND	ND
Liquid Limit, L.L.	20	28	18	25	18	14
Plasticity Index, P.I.	3	5	NP	6	NP	NP
AASHTO Classification	A-2-4(0)	A-4 (0)	A-2-4 (0)	A-1-b	A-1-a	A-2-4 (0)
Organic Content (%)	ND	ND	ND	ND	ND	ND

Boring No.	EB1-A	EB1-A	EB1-A	EB1-A	B1-A	B1-A
Station	16+43	16+43	16+43	16+43	16+82	16+82
Offset	20 ft LT	20 ft LT	20 ft LT	20 ft LT	21 ft LT	21 ft LT
Alignment	-L-	-L-	-L-	-L-	-L-	-L-
Depth (ft) From	0.0	3.0	8.0	13.0	0.0	9.5
to	1.5	4.5	9.5	14.0	1.5	11.0

REMARKS: ND=Not Determined, NP=Non-Plastic

Submitted by: Andrew Hartel
Laboratory Manager



MACTEC ENGINEERING AND CONSULTING, INC.
3301 ATLANTIC AVENUE
RALEIGH, NORTH CAROLINA 27604

N.C.D.O.T./AASHTO CLASSIFICATIONS

REPORT ON SAMPLES OF: SOILS FOR QUALITY

MACTEC PROJECT NAME AND NUMBER: Bridge No. 79 over Bloomery Swamp on SR 1001 (6468-05-1286)

PROJECT: 33663.1.1 (B-4326) COUNTY: WILSON OWNER: N.C.D.O.T.
DATE SAMPLED: January, 2006 RECEIVED: 1/16/06 REPORTED BY: MACTEC
SAMPLED FROM: B1-A, B1-B, EB2-B, Channel Bank, Channel Bed
SUBMITTED BY: MACTEC ENGINEERING AND CONSULTING, INC.

1992 STANDARD SPECIFICATIONS

TEST RESULTS

Lab Sample No.	SS-7	SS-8	SS-9	SS-10	S-1	S-2
Retained 4.75 mm Sieve (%)	5.8	0.4	2.5	0.0	0.1	0.3
Passing 2.00 mm Sieve (%)	79.3	99.4	95.8	100.0	99.8	99.6
Passing 425 µm Sieve (%)	53.3	94.5	74.3	99.2	96.3	92.6
Passing 75 µm Sieve (%)	33.8	35.1	19.8	22.0	20.9	16.9

MINUS 2.00mm FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - 250 µm (%)	41.9	23.7	43.2	13.4	27.6	42.8
Fine Sand Ret - 53 µm (%)	19.4	44.4	39.7	69.7	54.1	42.1
Silt 0.05 - 0.005 mm (%)	21.1	11.6	7.7	15.0	7.6	2.5
Clay < 0.005 mm (%)	17.7	20.3	9.4	1.9	10.7	12.7

Moisture Content (%)	17.1	25.4	ND	21.4	ND	ND
Liquid Limit, L.L.	29	20	15	15	30	23
Plasticity Index, P.I.	2	3	NP	NP	NP	NP
AASHTO Classification	A-2-4 (0)					
Organic Content (%)	ND	ND	ND	ND	ND	ND

Boring No.	B1-A	B1-B	EB2-B	EB2-B	Bank	Bed
Station	16+82	16+79	17+59	17+59	16+75	17+15
Offset	21 ft LT	9 ft RT	29 ft RT	29 ft RT	45 ft LT	23 ft LT
Alignment	-L-	-L-	-L-	-L-	-L-	-L-
Depth (ft) From	14.5	9.5	0.0	4.5	0.0	0.0
to	16.0	11.0	1.5	6.0	1.0	1.0

REMARKS: ND=Not Determined, NP=Non-Plastic

Submitted by: Andrew Hartel
Laboratory Manager



**FIELD
 SCOUR REPORT**

WBS: 33663.1.1 TIP: B-4326 COUNTY: Wilson

DESCRIPTION(1): Bridge No. 79 over Bloomery Swamp on SR 1001

EXISTING BRIDGE

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

Bridge No.: 79 Length: 52' Total Bents: 4 Bents in Channel: 2 Bents in Floodplain: 2
 Foundation Type: Timber piles, caps, and decking with concrete and asphalt desk

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: None observed

Interior Bents: Scour holes/pockets at base of piles

Channel Bed: Some scour holes and bar deposits

Channel Bank: Minor undercutting of channel bank downstream of structure

EXISTING SCOUR PROTECTION

Type(3): Timber wing walls and rip-rap, concrete re-enforcement around some interior bent piles

Extent(4): Along end bent abutments and slopes

Effectiveness(5): Appears to be working

Obstructions(6): Some debris lodged along interior bent piles

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): Silty SAND (A-2-4)

Channel Bank Material(8): Silty SAND (A-2-4)

Channel Bank Cover(9): Small to large trees, brush, and grass

Floodplain Width(10): 150'

Floodplain Cover(11): Small to large trees, brush, and grass

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tendency(13): To the north

Observations and Other Comments: _____

Reported by: Michael B. W. Date: 1/23/2006
 MACTEC Engineering and Consulting, Inc.

DESIGN SCOUR ELEVATIONS(14)

Feet x Meters

BENTS

B1																			
Lt	127																		
Rt	127.3																		

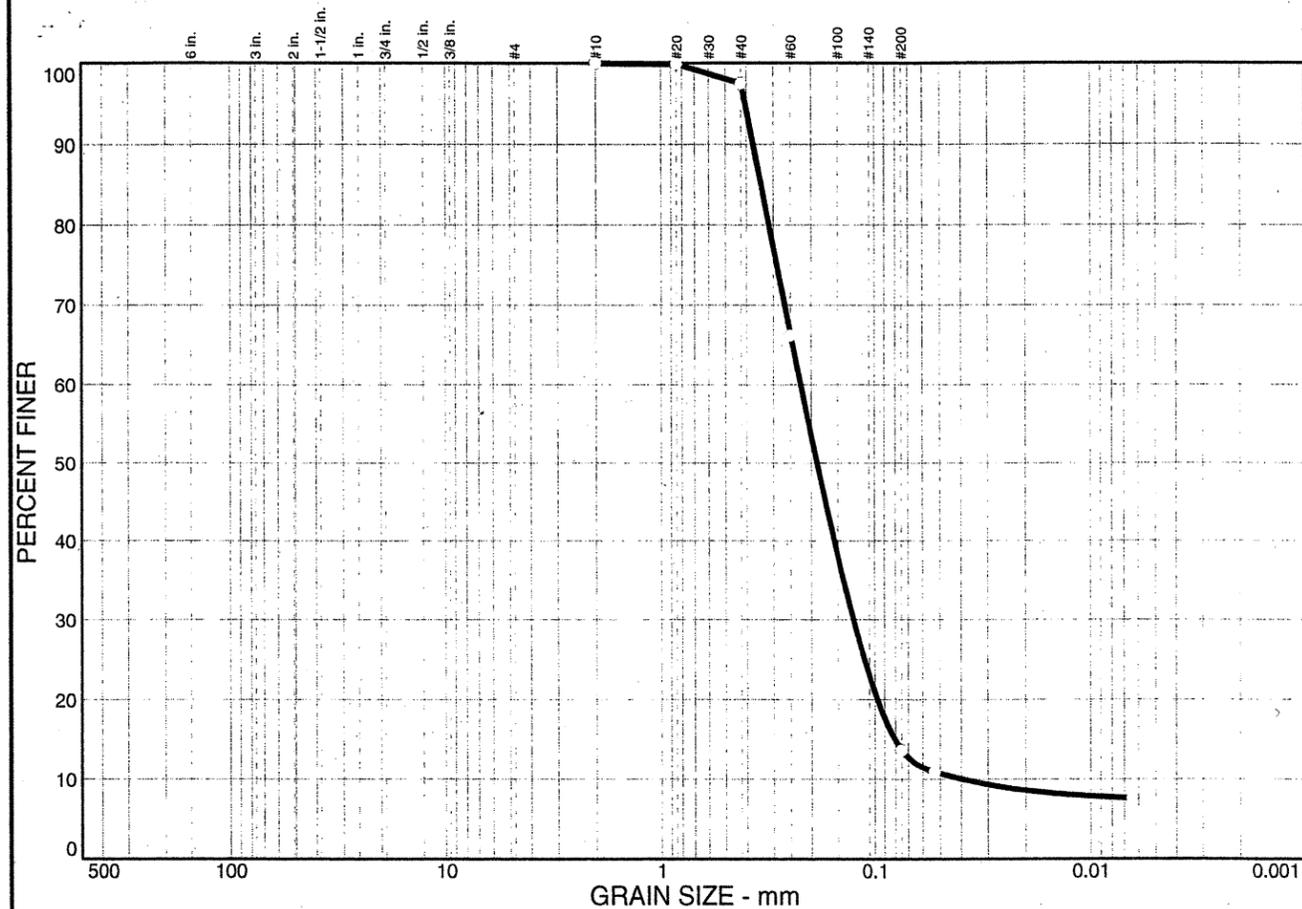
Comparison of DSE to Hydraulics Unit theoretical scour: _____

DSE determined by: Chad M. Whalen Date: 2/6/2006
 Michael Whalen

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank	BANK	BED																	
Sample No.	S-1	S-2																	
Retained #4	0.1	0.3																	
Passed #10	99.8	99.6																	
Passed #40	96.3	92.6																	
Passed #200	20.9	16.9																	
Coarse Sand	27.6	42.8																	
Fine Sand	54.1	42.1																	
Silt	7.6	2.5																	
Clay	10.7	12.7																	
LL	30	23																	
PI	NP	NP																	
AASHTO	A-2-4(0)	A-2-4(0)																	
Station	16+75	17+15																	
Offset	45 ft LT	23 ft LT																	
Depth	0.0-1.0	0.0-1.0																	

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	89.1	10.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	97.5		
#60	66.2		
#200	13.6		
#270	10.9		

Soil Description

PL= ND Atterberg Limits PI= NP
 LL= 18

Coefficients

D₈₅= 0.344 D₆₀= 0.225 D₅₀= 0.188
 D₃₀= 0.127 D₁₅= 0.0809 D₁₀= 0.0398
 C_u= 5.65 C_c= 1.80

Classification

USCS= ND AASHTO= A-2-4(0)

Remarks

ND=NOT DETERMINED.
 NP=NON-PLASTIC.
 SPECIFIC GRAVITY IS ASSUMED.

* (no specification provided)

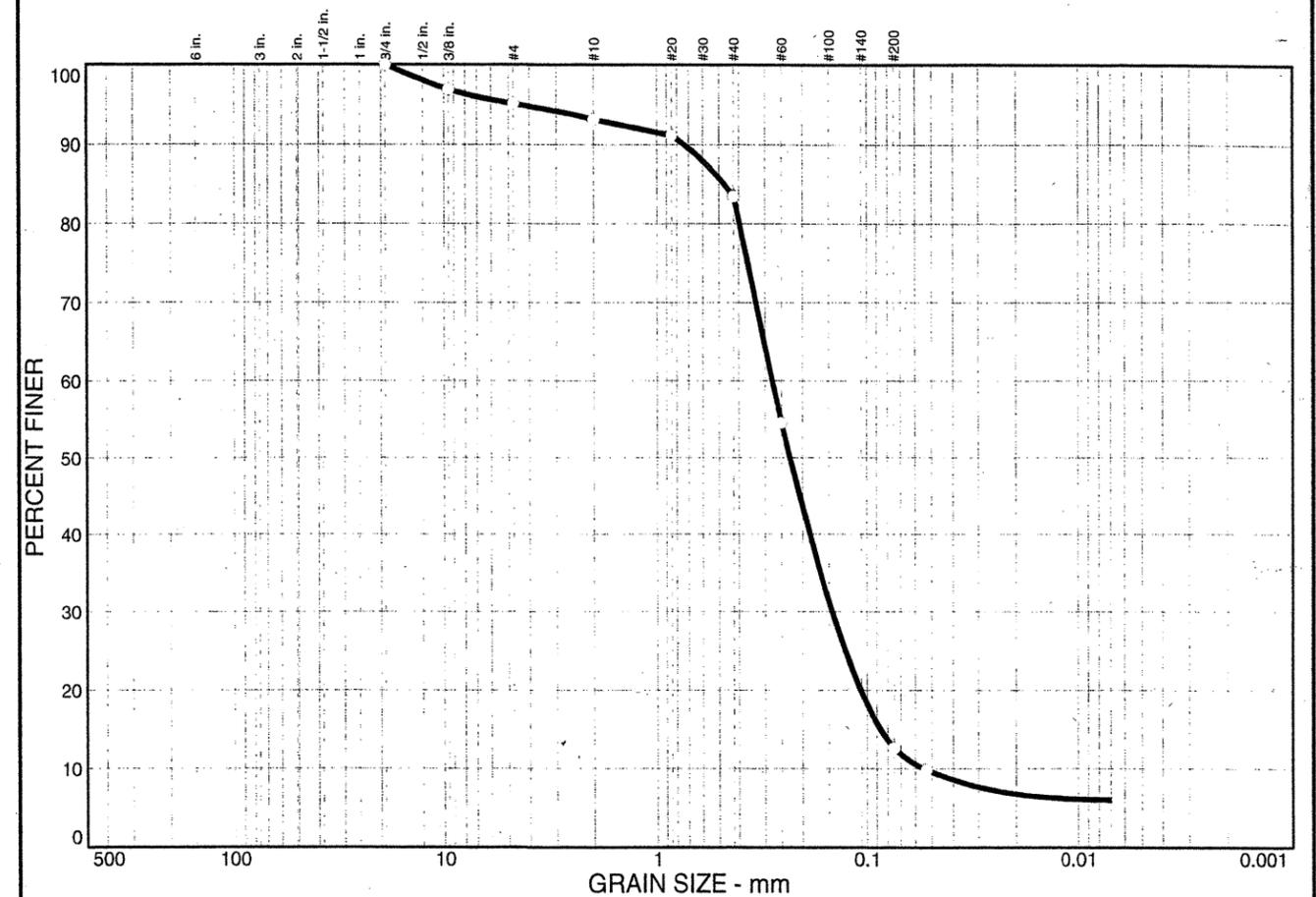
Sample No.: SS-3 Source of Sample: Date: 01-27-06
 Location: EB1-A SS-3 8.0-9.5' Elev./Depth:

MACTEC
ENGINEERING & CONSULTING, INC.

Client:
 Project: BRIDGE #79 OVER BLOOMERY SWAMP ON SR 1001

Project No: 6468-05-1286

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	6.9	83.3	9.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.375 in.	96.9		
#4	95.1		
#10	93.1		
#20	91.1		
#40	83.4		
#60	54.5		
#200	12.6		
#270	9.8		

Soil Description

PL= ND Atterberg Limits PI= NP
 LL= 14

Coefficients

D₈₅= 0.475 D₆₀= 0.277 D₅₀= 0.229
 D₃₀= 0.146 D₁₅= 0.0868 D₁₀= 0.0551
 C_u= 5.04 C_c= 1.38

Classification

USCS= ND AASHTO= A-2-4(0)

Remarks

ND=NOT DETERMINED.
 NP=NON-PLASTIC.
 SPECIFIC GRAVITY IS ASSUMED.

* (no specification provided)

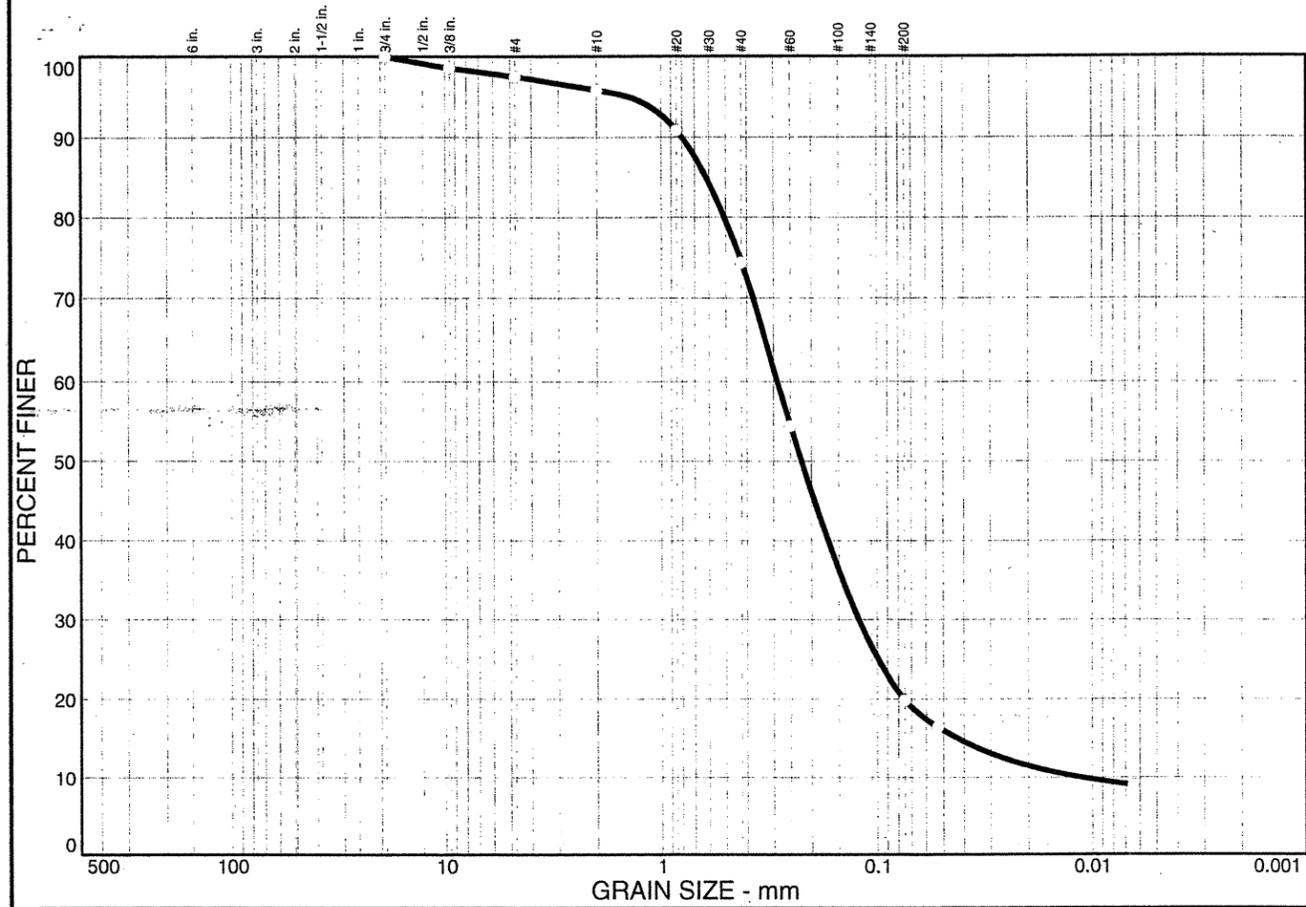
Sample No.: SS-6 Source of Sample: Date: 01-27-06
 Location: B1-A SS-6 9.5-11.0' Elev./Depth:

MACTEC
ENGINEERING & CONSULTING, INC.

Client:
 Project: BRIDGE #79 OVER BLOOMERY SWAMP ON SR 1001

Project No: 6468-05-1286

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	4.2	79.4	16.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.375 in.	98.6		
#4	97.5		
#10	95.8		
#20	90.8		
#40	74.3		
#60	54.4		
#200	19.8		
#270	16.4		

Soil Description

PL= 17 **Atterberg Limits** LL= 15 PI= NP

Coefficients

D₈₅= 0.621 D₆₀= 0.289 D₅₀= 0.223
 D₃₀= 0.122 D₁₅= 0.0430 D₁₀= 0.0113
 C_u= 25.45 C_c= 4.52

Classification

USCS= ND AASHTO= A-2-4(0)

Remarks

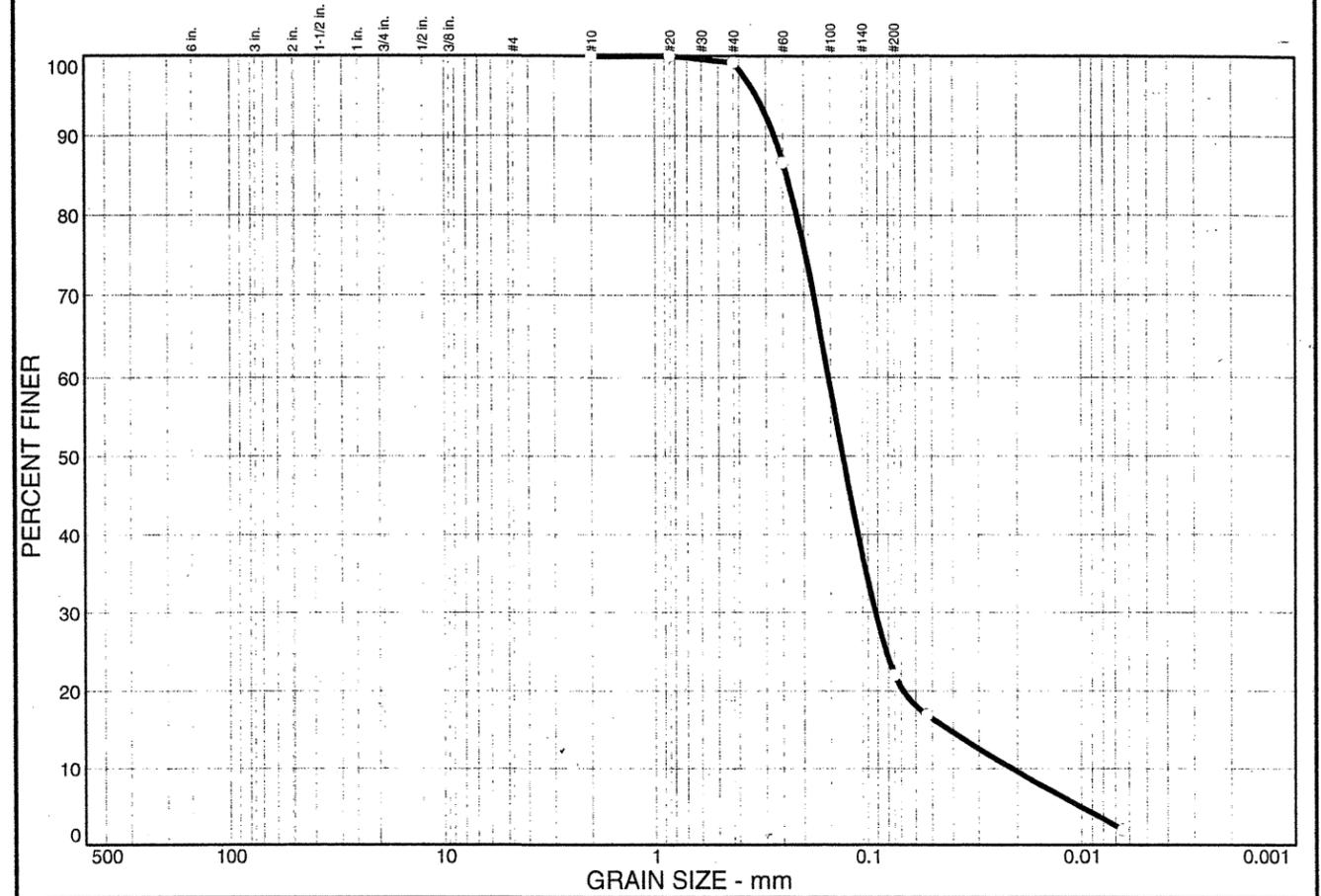
ND=NOT DETERMINED.
 NP=NON-PLASTIC.
 SPECIFIC GRAVITY IS ASSUMED.

* (no specification provided)

Sample No.: SS-9 Source of Sample: Date: 01-27-06
 Location: EB2-B SS-9 0-1.5' Elev./Depth:

MACTEC ENGINEERING & CONSULTING, INC.	Client: Project: BRIDGE #79 OVER BLOOMERY SWAMP ON SR 1001
	Project No: 6468-05-1286

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	83.1	16.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.2		
#60	86.6		
#200	22.0		
#270	16.9		

Soil Description

PL= 17 **Atterberg Limits** LL= 15 PI= NP

Coefficients

D₈₅= 0.241 D₆₀= 0.154 D₅₀= 0.132
 D₃₀= 0.0926 D₁₅= 0.0418 D₁₀= 0.0213
 C_u= 7.22 C_c= 2.61

Classification

USCS= ND AASHTO= A-2-4(0)

Remarks

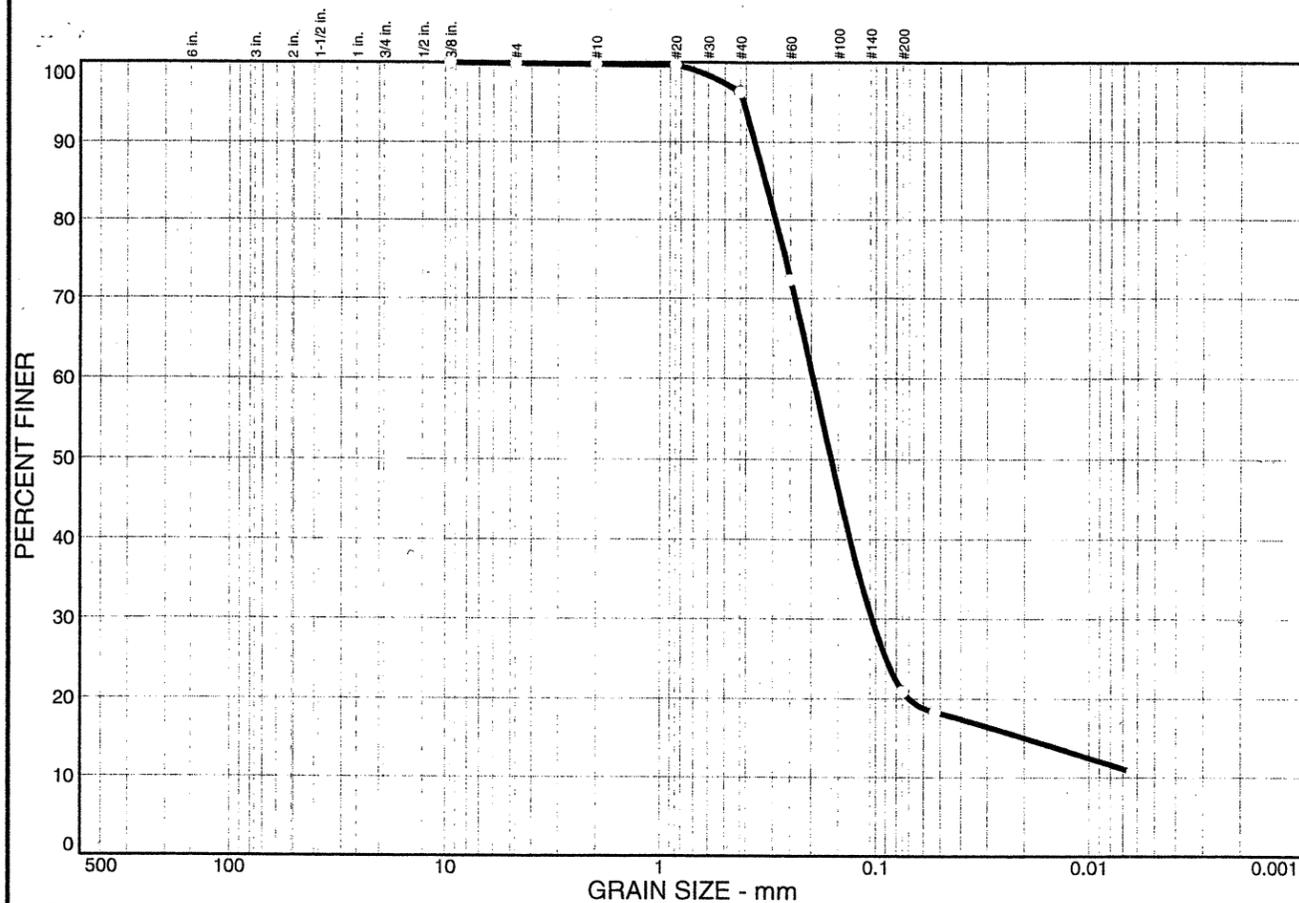
ND=NOT DETERMINED.
 NP=NON-PLASTIC.
 SPECIFIC GRAVITY IS ASSUMED.

* (no specification provided)

Sample No.: SS-10 Source of Sample: Date: 01-27-06
 Location: EB2-B SS-10 4.5-6.0' Elev./Depth:

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	Project No: 6468-05-1286

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.2	81.5	18.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.9		
#10	99.8		
#20	99.7		
#40	96.3		
#60	72.3		
#200	20.9		
#270	18.3		

Soil Description

PL= ND **Atterberg Limits** PI= NP
 LL= 30

Coefficients

D₈₅= 0.328 D₆₀= 0.197 D₅₀= 0.162
 D₃₀= 0.104 D₁₅= 0.0201 D₁₀=
 C_u= C_c=

Classification

USCS= ND AASHTO= A-2-4(0)

Remarks

ND=NOT DETERMINED.
 NP=NON-PLASTIC.

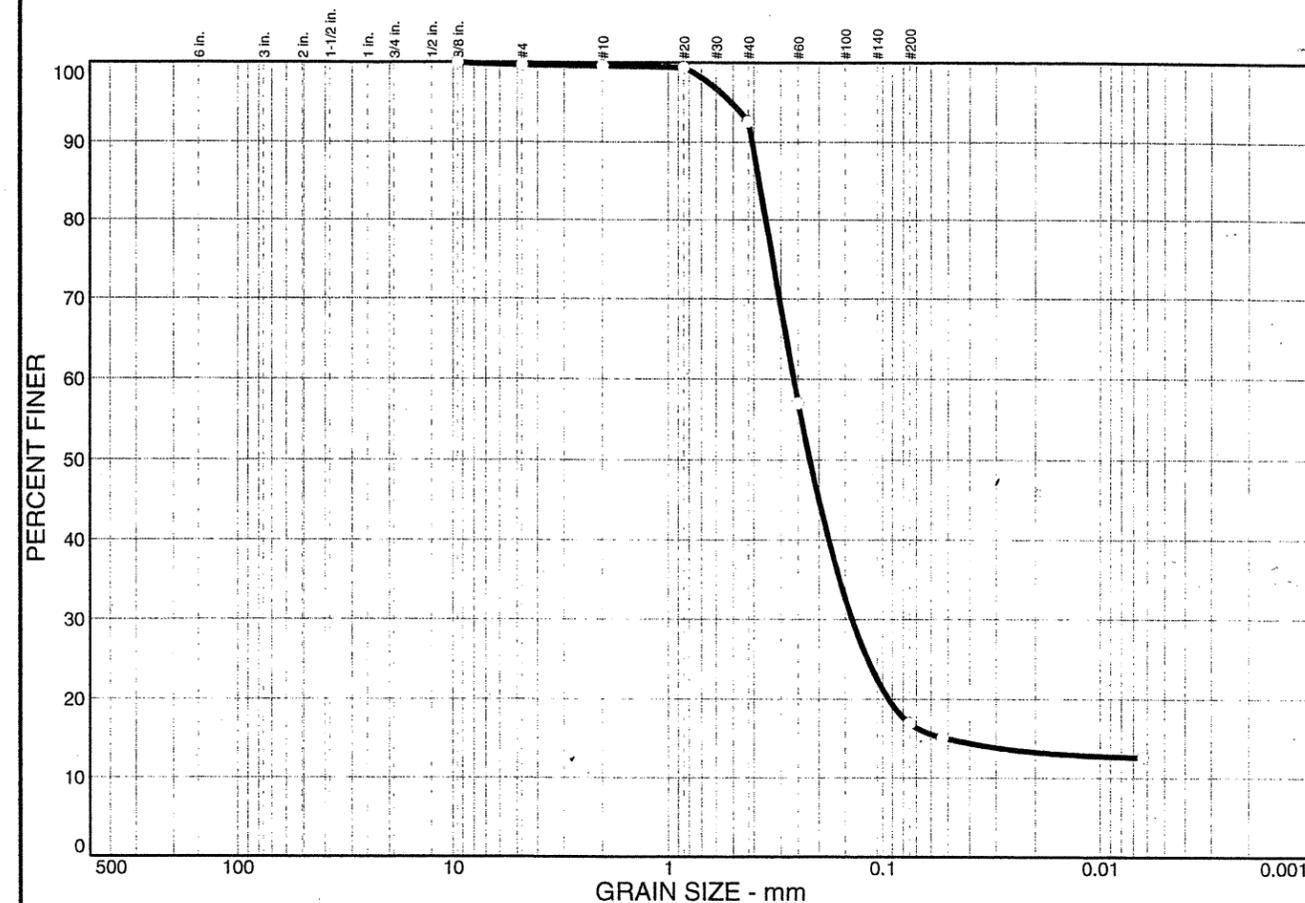
* (no specification provided)

Sample No.: S-1 CHANNEL BANK
 Location: S-1 CHANNEL BANK 0.0-0.5'

Date: 01-25-06
 Elev./Depth:

MACTEC ENGINEERING & CONSULTING, INC.	Client: Project: BRIDGE #79 OVER BLOOMERY SWAMP
	Project No: 6468-05-1286

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.4	84.5	15.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.7		
#10	99.6		
#20	99.4		
#40	92.6		
#60	57.0		
#200	16.9		
#270	15.1		

Soil Description

PL= ND **Atterberg Limits** PI= NP
 LL= 23

Coefficients

D₈₅= 0.381 D₆₀= 0.263 D₅₀= 0.221
 D₃₀= 0.139 D₁₅= 0.0511 D₁₀=
 C_u= C_c=

Classification

USCS= ND AASHTO= A-2-4(0)

Remarks

ND=NOT DETERMINED.
 NP=NON-PLASTIC.

* (no specification provided)

Sample No.: S-2 CHANNEL BED
 Location: S-2 CHANNEL BED 0.0-0.5'

Date: 01-25-06
 Elev./Depth:

MACTEC ENGINEERING & CONSULTING, INC.	Client: Project: BRIDGE #79 OVER BLOOMERY SWAMP ON SR 1001
	Project No: 6468-05-1286

Site Photos
MACTEC Proj. No. 6468-05-1286



View looking north from vicinity of boring EB1-A towards EB2-A.



View looking west from -L- along line of End Bent One.



View looking south from vicinity of boring EB2-A towards EB1-A.



View looking west along line of End Bent One.



View looking west from -L- towards vicinity of boring B1-A.



View looking east towards vicinity of EB2-A and EB2-A OS.



View looking west along line of Bent One.



View looking west along line of End Bent Two.



View looking southeast and downstream from north side of creek.



View looking northwest and upstream from south side of creek.