

PROJECT: 8.1511701 ID: B-3509

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	8.1511701 (B-3509)	1	22

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

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STATE PROJECT 8.1511701 I.D. NO. B-3509
 F.A. PROJECT BRSTP-700(1)
 COUNTY ROCKINGHAM
 PROJECT DESCRIPTION BRIDGE NO. 75 ON
-L- (SR 3003) OVER SMITH RIVER AT
-L- STATION 15+67.5

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 (UN-PLACED) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

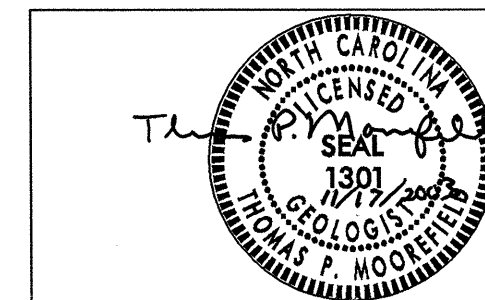
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT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

INVESTIGATED BY T.P. MOOREFIELD PERSONNEL J.L. LOVE
 CHECKED BY D.N. ARGENBRIGHT C.D. CZAJKA
 SUBMITTED BY D.N. ARGENBRIGHT H.R. CONLEY
 DATE NOVEMBER 2003 W.T. DUGGINS

DRAWN BY: T.T. WALKER, J.L. LOVE

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.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
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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 WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HEAVY PLASTIC, A-7-6		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. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER FOOT. CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.		ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOOGED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 0.1 FOOT PENETRATION WITH 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																																																																																																																																																																																																																																																																																																																																																																																																																								
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

Michael F. Easley
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

Lyndo Tippet
SECRETARY

November 13, 2003

STATE PROJECT: 8.1511701 (B-3509)
FEDERAL PROJECT: BRSTP-700(1)
COUNTY: Rockingham

DESCRIPTION: Bridge No. 75 on -L- (SR 3003) over Smith River

SUBJECT: Geotechnical Report – Structure Inventory

Project Description

This project consists of a 345-foot long four span bridge to be constructed over the Smith River along the existing -L- alignment on NC 700/SR 3003 (Meadow Road) in the town Eden. The proposed bridge has a 90° skew and will replace the existing 340-foot long structure. A temporary detour bridge is to be constructed north of the existing structure. The western end of the bridge is adjacent to an historic district which includes a textile mill and associated buildings, along with several more recent businesses. The eastern portion of the project consists of a wooded area left of -L-, and several businesses and parking areas to the right of -L-. A brick and concrete structure is located directly adjacent to the existing bridge on the east side of the river (see Site Photograph Sheet No. 21). Several large water lines lead out from the building, suggesting that the structure may have served as a water intake and pumping station in the past. In addition, a sewer line and easement is located beneath the bridge between existing Interior Bents 6 and 7.

The geotechnical field investigation was conducted in April and September, 2003. Borings were advanced using a BK-51 and CME-550 ATV-mounted drill machines with automatic hammers. All borings were advanced until non-crystalline rock was encountered. Borings B1-B, B2-A, and B3-A were cored using NXWL core equipment to recover rock samples from non-crystalline rock. Standard Penetration Tests were performed at selected locations and one additional boring was advanced using continuous flight augers. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit. Seven rock core samples were sent to the Materials and Test Unit to determine Unit Weight, Compressive Strength, and Young's Modulus.

Physiography and Geology

The project is located in gently rolling, moderately hilly terrain at the western edge of the Piedmont Physiographic Province. The project occurs within the Dan River Triassic Basin

geologic province. The underlying bedrock consists of sandstone, conglomeratic sandstone, and mudstone of the Cow Branch and Stoneville formations.

Soil Properties

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

Roadway embankment fill soil occurs at both ends of the existing bridge. Approximately fourteen feet of embankment fill soil occurs at End Bent 1. The fill soil consists of soft to medium stiff, dry to moist, silty sandy clay (AASHTO classification of A-6) and highly plastic sandy clay (A-7-6), and very loose to loose, dry clayey sand (A-2-6). The fill soil at End Bent 1 overlies alluvial soil. At End Bent 2, east of the river, ten of fifteen feet of embankment fill was encountered. The embankment fill soil consists of brown, medium stiff to very stiff, dry sandy silt (A-4) and sandy silty clay (A-6), as well as loose, dry silty sand (A-2-4) with gravel-size rock fragments. The embankment fill soil at End Bent 2 overlies either alluvial soil or weathered Triassic rock.

Alluvial soils occur at all bent locations on this project. At End Bent 1, eleven to thirteen feet of alluvial soil occurs beneath embankment fill soil and consists of soft to very stiff, sandy silt (A-4) overlying a thin zone of very loose, coarse sand (A-3) with gravel and cobbles. Thirteen to eighteen feet of alluvial soil was encountered at Bent 3 and End Bent 2. The majority of this alluvial soil consists of gray-brown, soft to very stiff, moist to wet, sandy silt (A-4). A zone of very soft, micaeous silty clay (A-7-5) occurs on the left side of Bent 3. One to two feet of very loose, coarse sand (A-3) with gravel and cobbles occurs in the river channel at Bents 1 and 2. The alluvial soils generally overlie weathered Triassic bedrock, except at End Bent 1 where the alluvial soils are underlain by residual Triassic soil.

Residual soil is present only at End Bent 1, and consists of loose to medium dense, silty sand (A-2-4) and coarse sand (A-2-4). These sandy residual soils are derived from the in-place weathering of the underlying Triassic sandstone. The residual soil grades into weathered rock with depth.

Rock Properties

Weathered rock, which is derived from the underlying Triassic sandstone and mudstone bedrock, varies in thickness from two feet or less in the river channel, to as much as 12 feet at End Bent 2.

Non-crystalline Triassic rock was encountered at each boring. Rock core was recovered from the B1-B, B2-A, and B3-A borings. Three general types of Triassic rock were noted in the rock core. The most common rock type is gray, interbedded sandstone and conglomeratic sandstone. These sandstones are generally fresh, moderately hard to hard, indurated, with close to widely spaced fractures. The sandstones are arkosic in nature, consisting of medium- to coarse-sand-sized quartz and feldspar grains. Three to four inch thick conglomeratic zones of slightly angular, gravel-sized quartz clasts are common. The second type of Triassic rock consists of interbedded sandstone and mudstone. The alternating sandstone and mudstone layers are generally 0.1 to 0.2 feet in thickness. This rock type tends to be slightly more fractured than the sandstone- and conglomerate-type. A third, less common rock type occurs as a nearly 3-foot thick mudstone in Core Run No. 2 in the B3-A boring.

Bedding dips in the rock cores range from 30 to 35 degrees, consistent with the measured dips in the rock outcrops east of the bridge. Core recovery ranged from 44% to 100%, with an average of 91%. Rock Quality Designation (RQD) values ranged from 0% to 100%, with an average of 63%. Ultimate compressive strength of the sandstone/conglomerate rock samples ranged from 11.8 to 17.6 ksi; whereas, the interbedded sandstone/mudstone samples ranged from 4.6 to 13.3 ksi. More detailed rock descriptions can be found in the Core Boring Reports.

The degree of fracturing, as well as the presence of slickensides, in the B2-A core suggest that bedrock in the vicinity of Bent 2 may have been deformed by faulting in the past. Core recovery and RQD values of the B2-A core are consistent lower than the values for B1-B and B3-A core.

Temporary Detour Structure

A temporary detour structure will be constructed approximately 55 feet north of the existing bridge at -L DETOUR- Sta. 15+49.75. The structure has a total length of 350 feet. Borings EB1-DET and EB2-DET (see Sheet No. 17 for borelogs) were drilled along the -L DETOUR- alignment to provide additional data for the detour structure. Geologic conditions along the -L DETOUR- alignment should correlate directly to those encountered along the main structure.

Groundwater

Groundwater was encountered at each bent location. Groundwater elevations ranged from 522 feet at boring EB2-A to 504 feet at boring EB1-B. The water elevation in the Smith River was measured at 503 feet on September 10, 2003.

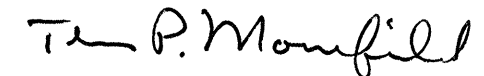
Potential Hazardous Site

A strong petroleum odor was detected in samples of the alluvial soil from the End Bent 1 borings. The GeoEnvironmental Section of the Geotechnical Unit was notified of the potential contamination in April, 2003.

Notice

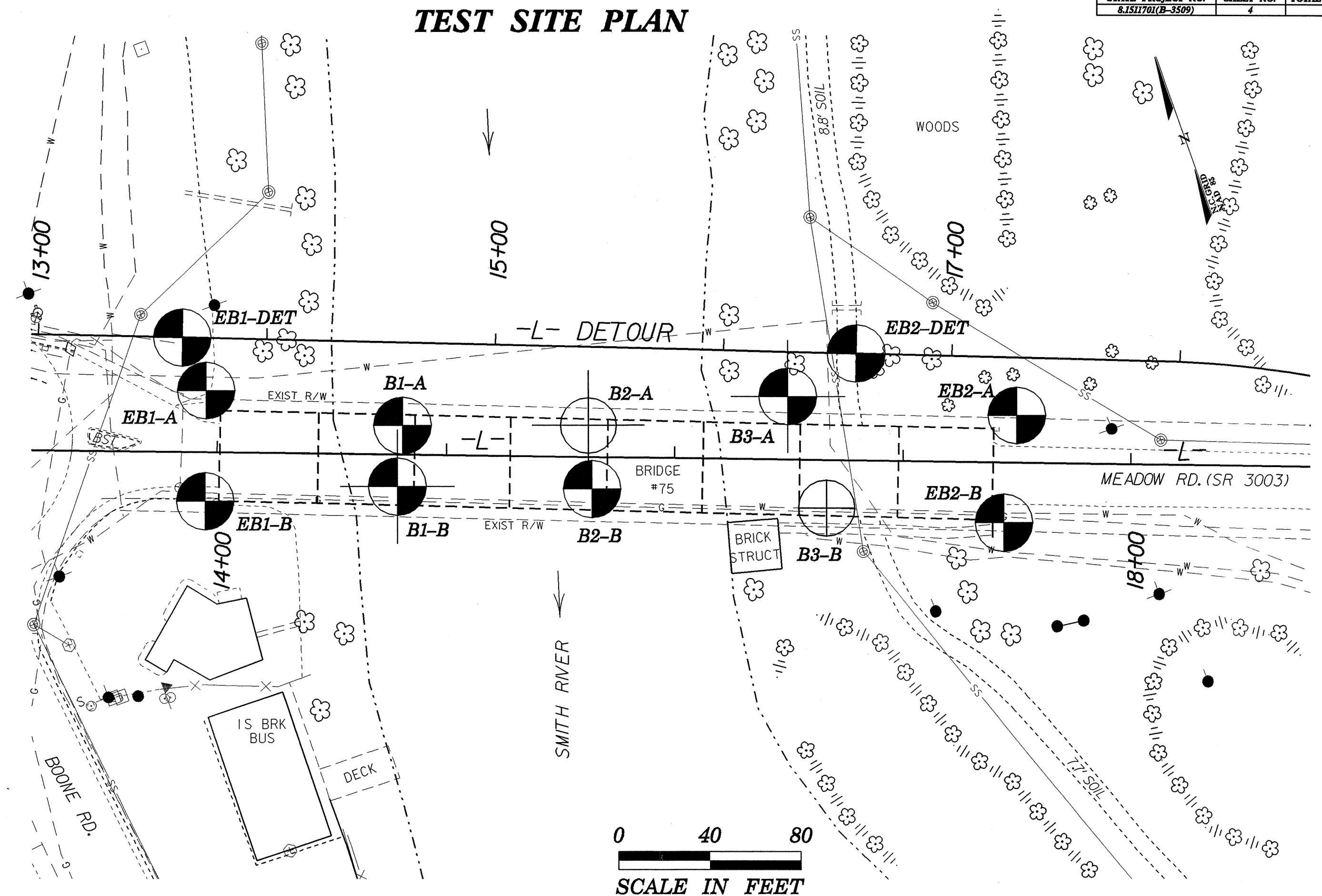
This Geotechnical foundation report is based on the bent locations provided in the memo "Verification of Bent Locations and Request for Foundation Recommendations", dated October 2, 2003, and the Hydraulic Bridge Survey Report dated October 1, 2003. If significant changes are made in the design, or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

Respectfully submitted,



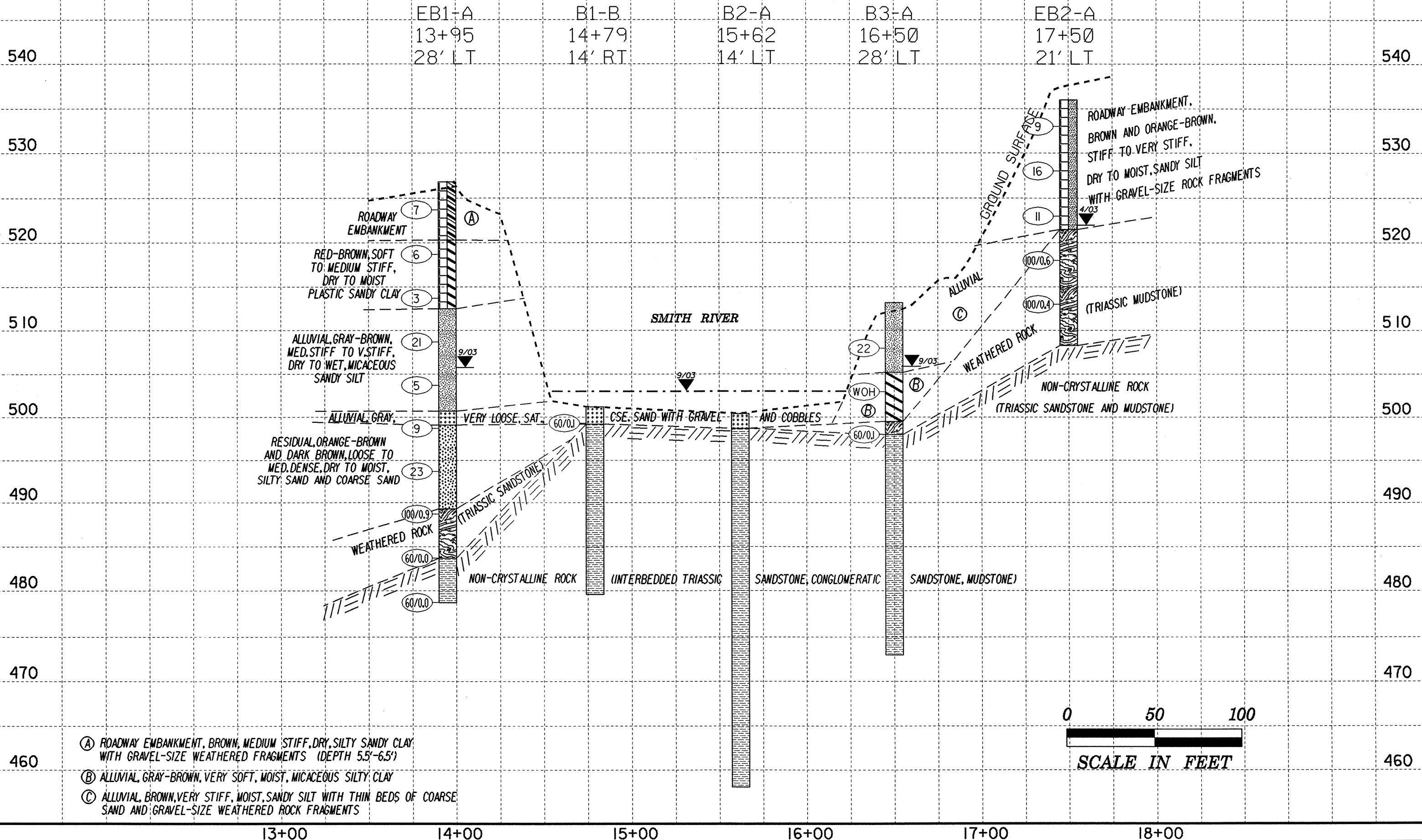
Thomas P. Moorefield, LG
Project Geologist

TEST SITE PLAN

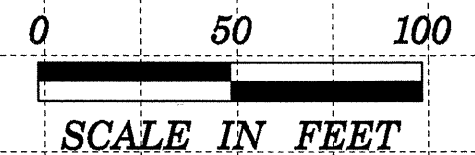


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SCALE IN FEET

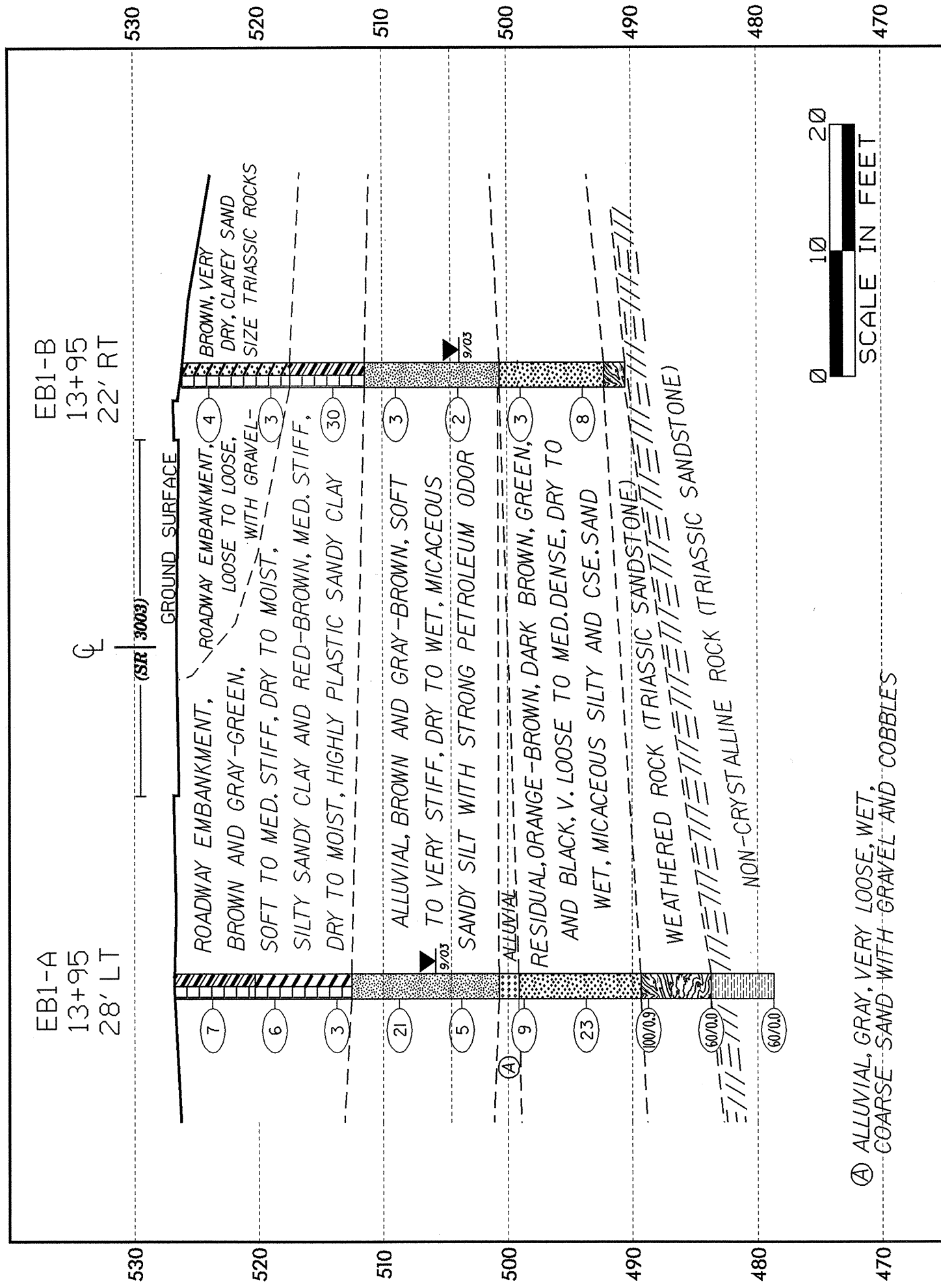
PROFILE THROUGH BORINGS PROJECTED ALONG -L-



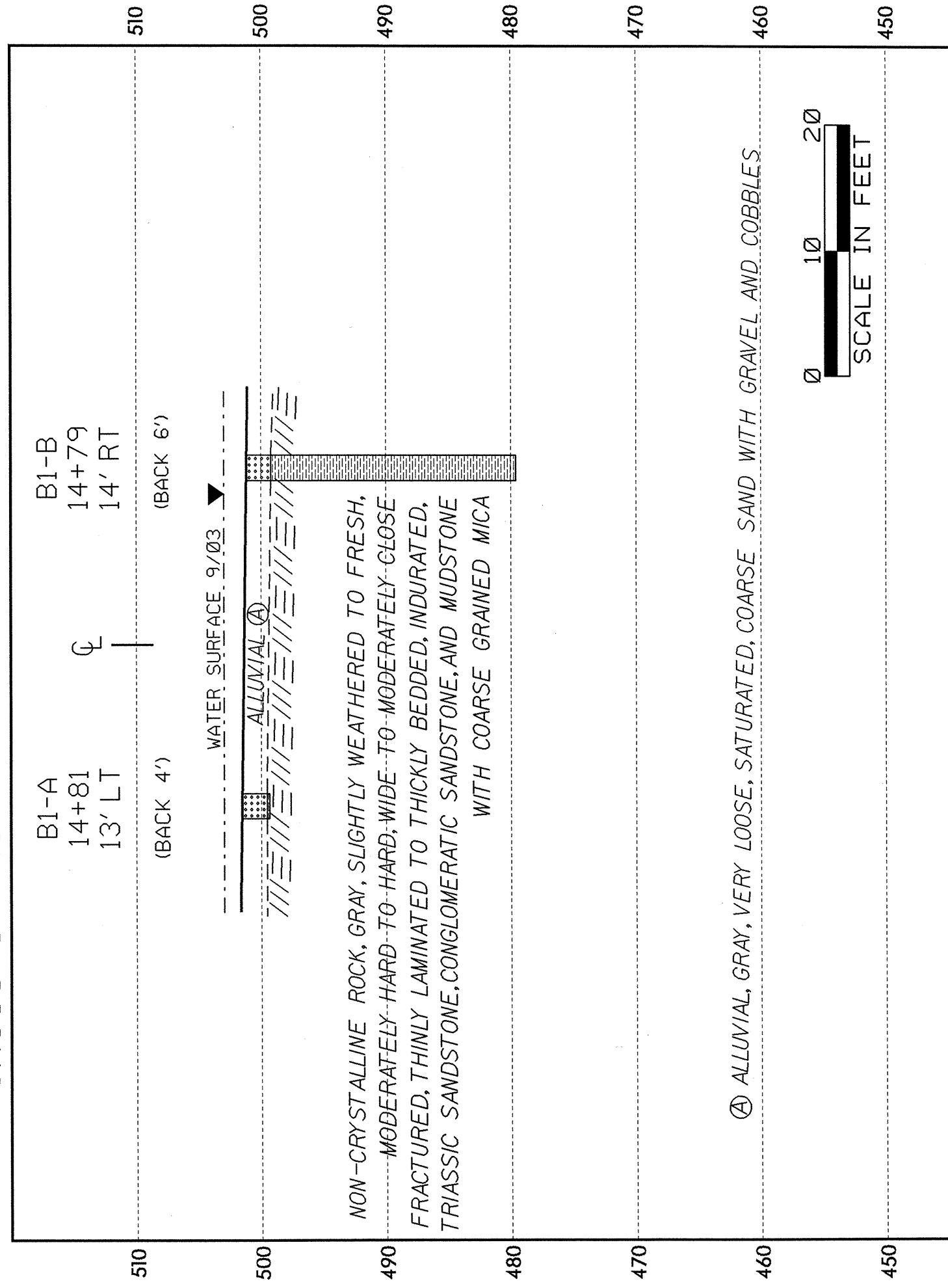
- (A) ROADWAY EMBANKMENT, BROWN, MEDIUM STIFF, DRY, SILTY SANDY CLAY WITH GRAVEL-SIZE WEATHERED FRAGMENTS (DEPTH 5.5'-6.5')
- (B) ALLUVIAL, GRAY-BROWN, VERY SOFT, MOIST, MICACEOUS SILTY CLAY
- (C) ALLUVIAL, BROWN, VERY STIFF, MOIST, SANDY SILT WITH THIN BEDS OF COARSE SAND AND GRAVEL-SIZE WEATHERED ROCK FRAGMENTS



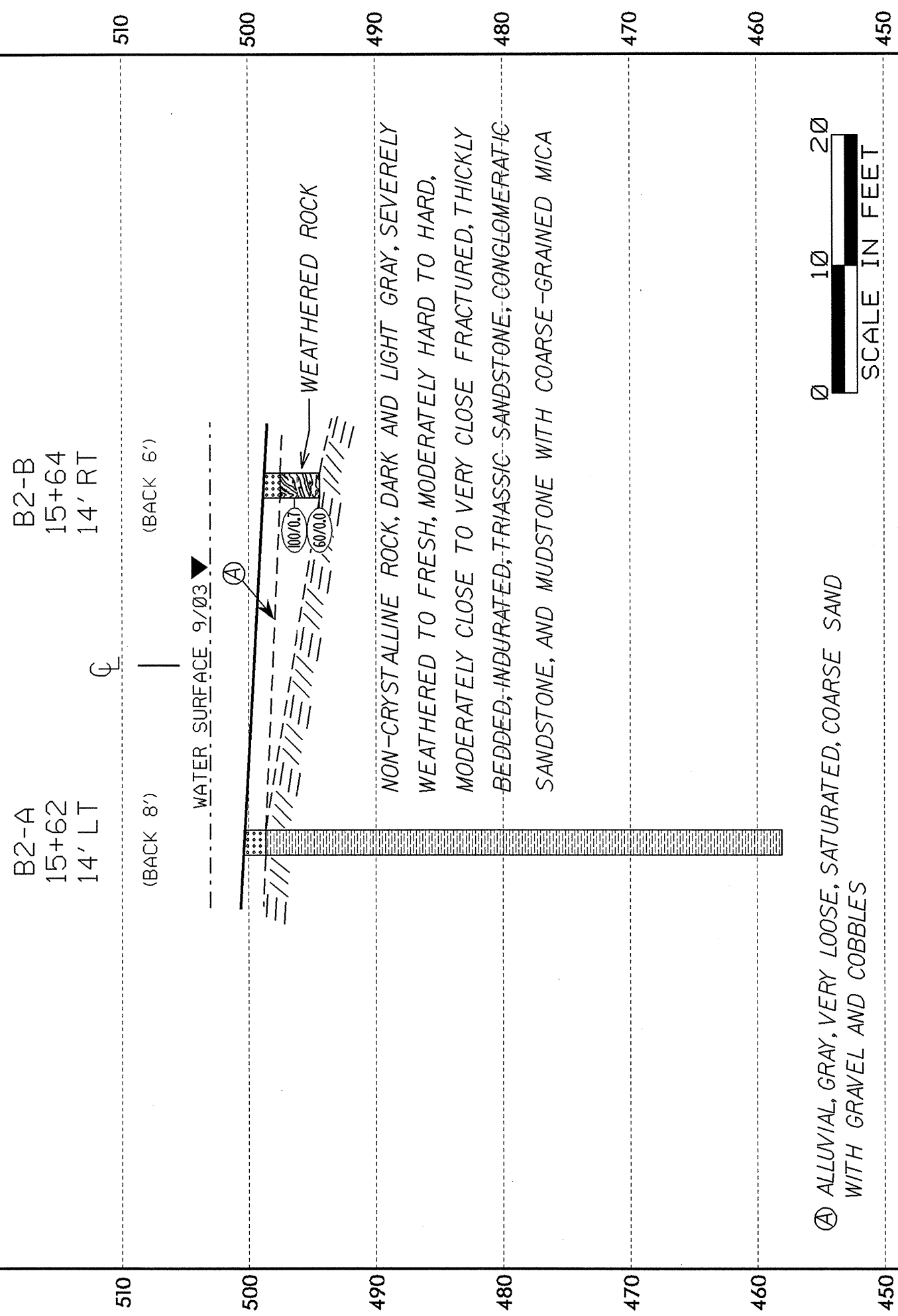
CROSS SECTION THROUGH END BENT I BRIDGE NO. 75, 8.1511701 (B-3509)



CROSS SECTION THROUGH BENT I BRIDGE NO. 75, 8.1511701 (B-3509)

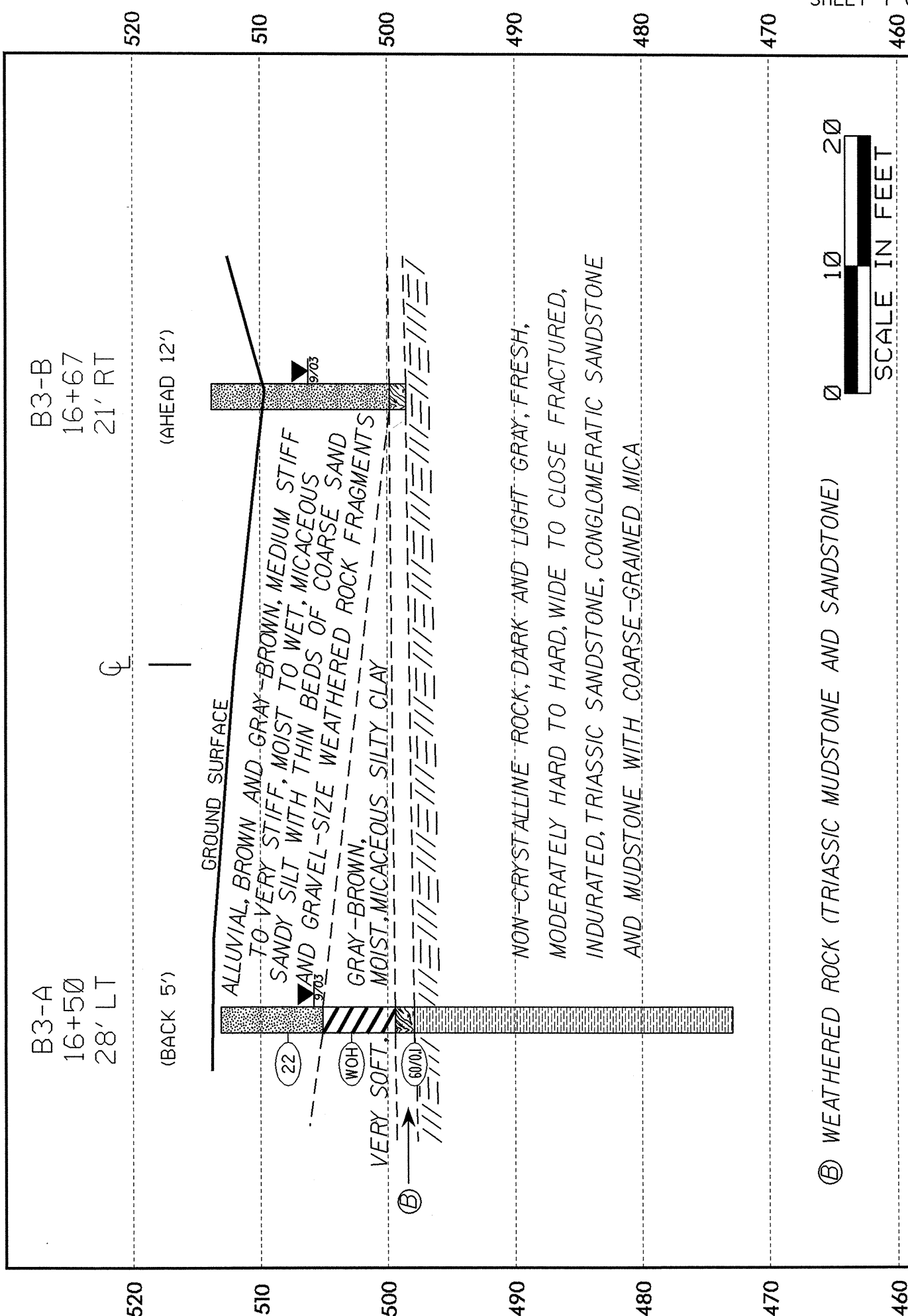


CROSS SECTION THROUGH BENT 2 BRIDGE NO. 75, 8.1511701 (B-3509)



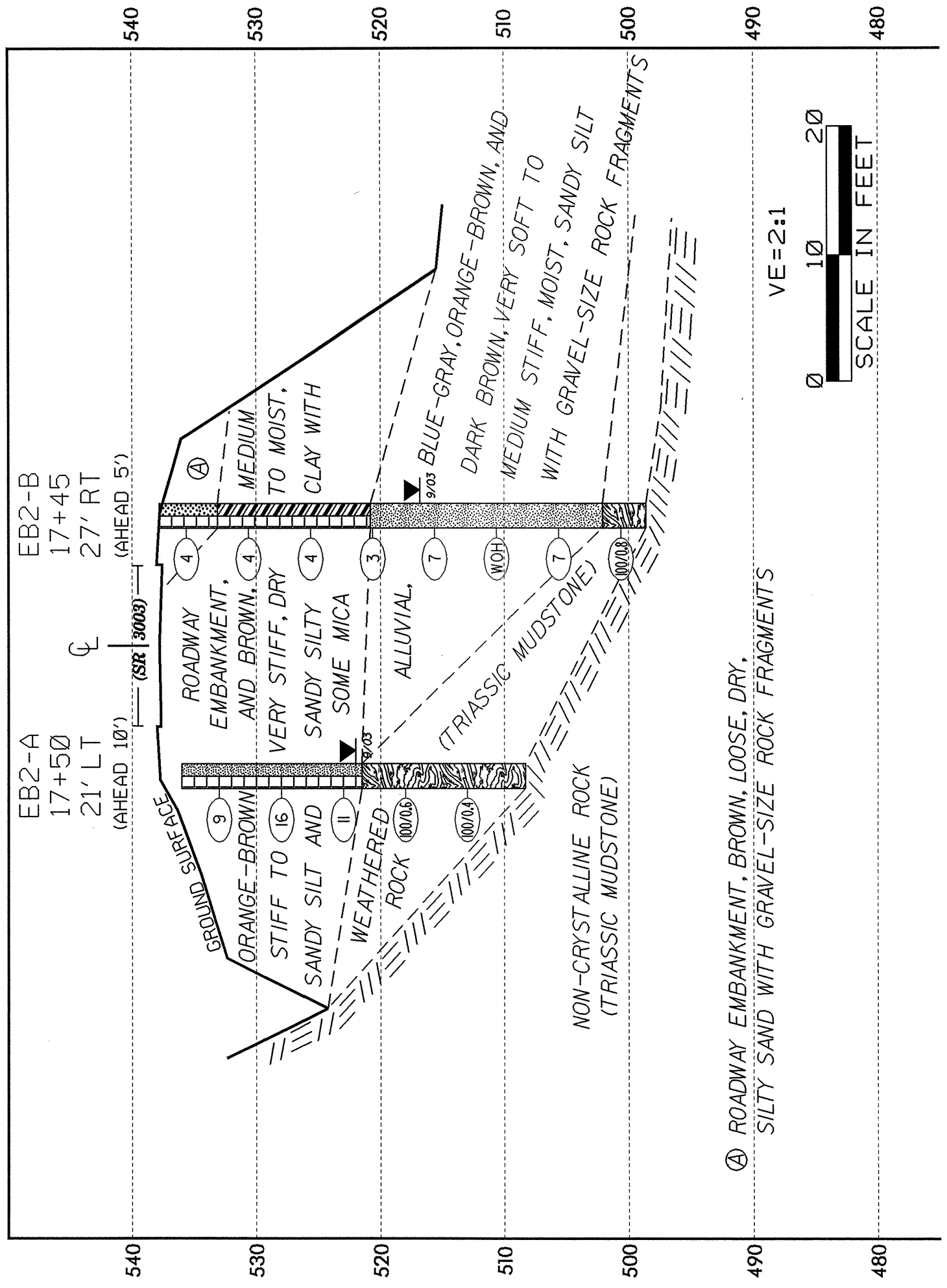
Ⓐ ALLUVIAL, GRAY, VERY LOOSE, SATURATED, COARSE SAND WITH GRAVEL AND COBBLES

CROSS SECTION THROUGH BENT 3 BRIDGE NO. 75, 8.1511701 (B-3509)



Ⓑ WEATHERED ROCK (TRIASSIC MUDSTONE AND SANDSTONE)

CROSS SECTION THROUGH END BENT 2 BRIDGE NO. 75, 8.1511701 (B-35009)



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 8.1511701		ID. B-3509		COUNTY ROCKINGHAM		GEOLOGIST J. L. LOVE				
SITE DESCRIPTION BRIDGE NO. 75 ON -L- (SR 3003) OVER SMITH RIVER							GROUND WATER			
BORING NO. EBI-A		BORING LOCATION 13+95		OFFSET 28' LT		ALIGNMENT -L-				
COLLAR ELEVATION 526.8'		NORTHING 1003363		EASTING 1777120		0 HR. DRY				
TOTAL DEPTH 48.1'		DRILL MACHINE CME-550		DRILL METHOD H.S. AUGERS		HAMMER TYPE AUTOMATIC				
START DATE 9/3/03		COMPLETION DATE 9/3/03		SURFACE WATER DEPTH		DEPTH TO ROCK 43.1'				
ELEV.	DEPTH (FT.)	BLOW COUNT	PEN. (FT.)	BLOWS PER FOOT				SAMPLE NUMBER	LOG	SOIL AND ROCK DESCRIPTION
		0.5	1.0	0	25	50	75	100	MOI.	
526.8										
525.0	3.1'	3	4						D	ROADWAY EMBANKMENT, BROWN, SILTY SANDY CLAY
520.0	8.1'	2	4						M	RED-BROWN, HIGHLY PLASTIC SANDY CLAY WITH SOME MICA
515.0	13.1'	1	1						D	
510.0	18.1'	7	10						D	ALLUVIAL, GRAY-BROWN, MICACEOUS SANDY SILT
505.0	23.1'	1	2						W	
500.0	28.1'	2	5						M	GRAY, CSE. SAND WITH GRAVEL
495.0	33.1'	7	13						D	RESIDUAL, ORANGE-BROWN AND DARK BROWN, SILTY AND COARSE SAND
490.0	38.1'	23	58					100+X		WEATHERED ROCK (TRIASSIC SANDSTONE)
485.0	43.1'	60	0.0					60/0.0X		NON-CRYSTALLINE ROCK (TRIASSIC SANDSTONE)
480.0	48.1'	60	0.0					60/0.0X		NON-CRYSTALLINE ROCK (TRIASSIC SANDSTONE)
475.0				BORING TERMINATED AT ELEVATION 478.7 FEET IN NON-CRYSTALLINE ROCK (TRIASSIC SANDSTONE)						
470.0										
465.0										
460.0										
455.0										
450.0										

PROJECT NO. 8.1511701		ID. B-3509		COUNTY ROCKINGHAM		GEOLOGIST J. L. LOVE				
SITE DESCRIPTION BRIDGE NO. 75 ON -L- (SR 3003) OVER SMITH RIVER							GROUND WATER			
BORING NO. EBI-B		BORING LOCATION 13+95		OFFSET 22' RT		ALIGNMENT -L-				
COLLAR ELEVATION 526.1'		NORTHING 1003317		EASTING 1777103		0 HR. DRY				
TOTAL DEPTH 35.6'		DRILL MACHINE CME-550		DRILL METHOD H.S. AUGERS		HAMMER TYPE AUTOMATIC				
START DATE 9/2/03		COMPLETION DATE 9/2/03		SURFACE WATER DEPTH		DEPTH TO ROCK 35.6'				
ELEV.	DEPTH (FT.)	BLOW COUNT	PEN. (FT.)	BLOWS PER FOOT				SAMPLE NUMBER	LOG	SOIL AND ROCK DESCRIPTION
		0.5	1.0	0	25	50	75	100	MOI.	
526.1										
525.0	2.2'	3	2						D	ROADWAY EMBANKMENT, BROWN, CLAYEY SAND WITH WEATHERED ROCK FRAGMENTS
520.0	7.2'	2	2						D	
515.0	12.2'	2	26						M	GRAY-GREEN, SILTY SANDY CLAY WITH WEATHERED TRIASSIC SANDSTONE BOULDER FROM 13.2' TO 14.7'
510.0	17.2'	1	2						D	ALLUVIAL, BROWN AND GRAY-BROWN, MICACEOUS SANDY SILT
505.0	22.2'	1	1						W	
500.0	27.2'	1	2						W	RESIDUAL, GREEN, BLACK, AND TAN-BROWN, MICACEOUS SILTY SAND
495.0	32.3'	5	4						M	
490.0				AUGER REFUSAL AT ELEVATION 490.5 FEET ON NON-CRYSTALLINE ROCK (TRIASSIC SANDSTONE)						
485.0				NON-CRYSTALLINE ROCK (TRIASSIC SANDSTONE)						
480.0				NON-CRYSTALLINE ROCK (TRIASSIC SANDSTONE)						
475.0										
470.0										
465.0										
460.0										
455.0										
450.0										

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 8.1511701		ID. B-3509		COUNTY ROCKINGHAM		GEOLOGIST C.D. CZAJKA				
SITE DESCRIPTION BRIDGE NO. 75 ON -L- (SR 3003) OVER SMITH RIVER							GROUND WATER			
BORING NO. BI-B		BORING LOCATION 14+79		OFFSET 14' RT		ALIGNMENT -L-				
COLLAR ELEVATION 501.2'		NORTHING 1003294		EASTING 1777184		0 HR. N/A				
TOTAL DEPTH 21.6'		DRILL MACHINE CME-550		DRILL METHOD NW-CASING/CORE		HAMMER TYPE AUTOMATIC				
START DATE 9/8/03		COMPLETION DATE 9/8/03		SURFACE WATER DEPTH 1.7'		DEPTH TO ROCK 2.0'				
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT	PEN. (FT.)	BLOWS PER FOOT				SAMPLE NUMBER	LOG	SOIL AND ROCK DESCRIPTION
				0	25	50	75			
501.2										
500.0	1.9'	60	0.1						S	ALLUVIAL, GRAY, COARSE SAND, GRAVEL, AND COBBLES
495.0										NON-CRYSTALLINE ROCK, GRAY AND DARK GRAY, SLIGHTLY WEATHERED TO FRESH, MODERATELY HARD TO HARD, WIDE TO MOD. CLOSE FRACTURED, THICKLY BEDDED, MOD. INDURATED
490.0									RS-6	INDURATED, TRIASSIC SANDSTONE, CONGLOMERATE SANDSTONE, AND MUDSTONE
485.0									RS-7	AVG REC=95% AVG RQD=88%
480.0										CORING TERMINATED AT ELEVATION 479.6 FEET IN NON-CRYSTALLINE ROCK (TRIASSIC MUDSTONE/SANDSTONE)
475.0										
470.0										
465.0										
460.0										
455.0										
450.0										
445.0										
440.0										
435.0										
430.0										
425.0										

CORE BORING REPORT							
PROJECT: 8.1511701		ID: B-3509		COUNTY: Rockingham		BORING NO: B1-B	
DESCRIPTION: Bridge No. 75 on -L- (SR 3003) over Smith River							
LOCATION OF BORING: -L- Sta. 14+79, Offset 14' RT				COMPLETION DATE: 9/8/03			
COLLAR or GROUND ELEVATION: 501.2 ft		CORE SIZE: NXWL		GEOLOGIST: C. D. Czajka			
CORE EQUIPMENT: CME-550, NW- Casing, NXWL				DRILLER: H. R. Conley			
ELEV (ft)	DEPTH (ft)	DRILL RATE (min/ft)	RUN (ft)	REC (%)	RQD (%)	SAMPLE NUMBER	FIELD CLASSIFICATION and REMARKS
497.2	4.0	1:55					(5.1'-6.6') Gray, slightly weathered to fresh, hard, moderately close fractured, thickly bedded, indurated, interbedded Triassic sandstone and conglomeratic sandstone with one vertical fracture
		1:47		2.0	1.5		
		1:08/0.5	2.6	(77%)	(58%)		Washed away 1.1'
494.6	6.6						
494.6	6.6	1:49					Gray, fresh, hard, wide fractured, thickly bedded, indurated, Triassic sandstone and conglomeratic sandstone, 40 degree fracture at 9.6', 30 degree bedding dip
		1:49		4.8	4.8		
		2:06	5.0				
		1:36		(96%)	(96%)		
489.6	11.6	1:35					
489.6	11.6	0:55				RS-6	(11.6'-12.9') Gray to dark gray, fresh, moderately hard, thinly laminated, moderately indurated, Triassic mudstone
		1:34		5.0	4.2	12.6-13.3	
		1:50	5.0				(12.9'-16.6') Gray, fresh, hard, wide fractured, thickly bedded, indurated, Triassic sandstone and conglomeratic sandstone
		1:55		(100%)	(84%)		
484.6	16.6	1:24					
484.6	16.6	1:48				RS-7	Gray, fresh, hard, wide fractured, thickly bedded, indurated, Triassic sandstone and conglomeratic sandstone, one vertical fracture at 21.3'-21.6'
		1:58		5.0	5.0	20.1-20.7	
		2:15	5.0				
		2:14		(100%)	(100%)		
479.6	21.6	1:27					
BOREHOLE TERMINATED AT ELEVATION OF 479.6 FEET, IN NCR.							

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

PROJECT NO. 8.1511701		ID. B-3509		COUNTY ROCKINGHAM		GEOLOGIST C.D. CZAJKA					
SITE DESCRIPTION BRIDGE NO. 75 ON -L- (SR 3003) OVER SMITH RIVER							GROUND WATER				
BORING NO. B2-A		BORING LOCATION 15+62		OFFSET 14' LT		ALIGNMENT -L-					
COLLAR ELEVATION 500.4'		NORTHING 1003291		EASTING 1777271		0 HR. N/A					
TOTAL DEPTH 42.3'		DRILL MACHINE CME-550		DRILL METHOD NW-CASING/CORE		HAMMER TYPE AUTOMATIC					
START DATE 9/10/03		COMPLETION DATE 9/11/03		SURFACE WATER DEPTH 2.7'		DEPTH TO ROCK 1.7'					
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT 0.5 1.0 1.5 2.0	PEN. (FT.)	BLOWS PER FOOT					SAMPLE NUMBER	LOG MOI. G	SOIL AND ROCK DESCRIPTION
				0	25	50	75	100			
500.4											
500.0											ALLUVIAL, GRAY, COARSE SAND, GRAVEL AND COBBLES
495.0											
490.0										RS-3	
485.0											
480.0											NON-CRYSTALLINE ROCK, GRAY, SEVERELY WEATHERED TO FRESH, MODERATELY HARD TO HARD, MOD. CLOSE TO CLOSE FRACTURED, THICKLY BEDDED, INDURATED, TRIASSIC SANDSTONE, CONGLOMERATIC SANDSTONE, AND MUDSTONE WITH COARSE-GRAINED MICA
475.0											
470.0										RS-4	
465.0											
460.0										RS-5	
455.0											CORING TERMINATED AT ELEVATION 458.1 FEET IN TRIASSIC SANDSTONE AND MUDSTONE
450.0											
445.0											
440.0											
435.0											
430.0											
425.0											

CORE BORING REPORT

PROJECT: 8.1511701 ID: B-3509 COUNTY: Rockingham BORING NO: B2-A

DESCRIPTION: Bridge No. 75 on -L- (SR 3003) over Smith River

LOCATION OF BORING: -L- Sta. 15+62, Offset 14' LT COMPLETION DATE: 9/11/03

COLLAR or GROUND ELEVATION: 500.4 ft CORE SIZE: NXWL GEOLOGIST: C. D. Czajka

CORE EQUIPMENT: CME-550, NW-Casing, NXWL DRILLER: H. R. Conley

ELEV (ft)	DEPTH (ft)	DRILL RATE (min/ft)	RUN (ft)	REC (%)	RQD (%)	SAMPLE NUMBER	FIELD CLASSIFICATION and REMARKS
498.7	1.7	1:15/0.9'		0.4	0.0		Gray, severely weathered to fresh, hard, close fractured, thickly bedded, indurated, Triassic conglomeratic sandstone
			0.9	(44%)	(0%)		
497.8	2.6						
497.8	2.6	2:15		4.0	0.0		Gray, very slightly weathered to fresh, moderately hard to hard, close to very close fractured, thickly bedded, indurated, Triassic conglomeratic sandstone with coarse-grained mica and some fractures filled with calcite, fractures run from 75 degrees to near vertical
		1:11					
		1:10	5.0	(80%)	(0%)		
		0:49					
492.8	7.6	1:49					
492.8	7.6	2:14		3.6	2.7	RS-3 8.9-9.4	Gray, fresh, hard, moderately close to close fractured, thickly bedded, indurated, Triassic conglomeratic sandstone with thinly laminated mudstone and coarse-grained mica, fractures occur at 50 degrees at 9.7', 25 degrees at 10.3', and 45 degrees at 10.6'
		1:38					
		0:54	5.0	(72%)	(54%)		
		0:52					
487.8	12.6	0:46					
487.8	12.6	0:56		3.0	0.0		Gray, fresh, hard, close to very close fractured, thickly bedded indurated, Triassic sandstone with dark gray, fresh, moderately hard, very close fractured, thinly laminated, indurated, Triassic mudstone from 13.5 to 14.2', some weathering in fractures, trace slickensides
		0:50					
		0:56	4.7	(64%)	(0%)		
		1:55					
483.1	17.3	1:13					
483.1	17.3	0:54		4.9	2.3		Gray, fresh, hard, close fractured, thickly bedded, indurated, Triassic conglomeratic sandstone with coarse grained mica and some thin mudstone laminae (18.1'-18.9' and 21.4'-21.7')
		0:40					
		0:49	5.0	(98%)	(46%)		
		0:47					
478.1	22.3	0:56					
478.1	22.3	1:25		4.8	2.1		Gray, fresh, hard, close to very close fractured, thickly bedded, indurated, Triassic sandstone and conglomeratic sandstone with coarse-grained mica
		1:04					
		0:59	5.0	(96%)	(42%)		
		0:46					
473.1	27.3	0:39					
473.1	27.3	2:24		4.3	3.1	RS-4 27.5-28.0	Gray, fresh, hard, moderately close to close fractured, thickly bedded, indurated, Triassic sandstone and conglomeratic sandstone with coarse-grained mica and thin mudstone laminae
		1:25					
		6:09	5.0	(86%)	(62%)	RS-5 31.5-31.9	
		1:31					
468.1	32.3	2:09					
468.1	32.3	1:35		5.0	2.9		Dark and light gray, fresh, moderately hard to hard, moderately close to close fractured, thickly laminated, indurated, Triassic sandstone and mudstone with coarse grained mica, one 30 degree fracture at 33.9', four 45 degree fractures at 33.5', 35.1', 35.6', and 35.9', and one nearly vertical fracture at 35.9'-37.0' with slickensides present in the vertical fracture
		1:41					
		1:19	5.0	(100%)	(58%)		
		1:45					
463.1	37.3	1:25					
463.1	37.3	1:34		5.0	4.1		Gray, fresh, hard, moderately close to close fractured, thickly bedded, indurated, Triassic sandstone and conglomeratic sandstone with coarse-grained mica, two 30 degree fractures at 41.4' and 41.8', two 40 degree fractures at 38.3' and 39.2', and one 45 degree fracture at 39.6', one healed fracture from 38.2'-40.9' filled with calcite
		1:56					
		1:45	5.0	(100%)	(82%)		
		1:49					
458.1	42.3	1:38					
BOREHOLE TERMINATED AT ELEVATION OF 458.1 FEET, IN TRIASSIC SANDSTONE.							

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: 8.1511701 ID: B-3509 COUNTY: Rockingham

DESCRIPTION(1): Bridge No. 75 on -L- (SR 3003) over Smith River

INFORMATION ON EXISTING BRIDGE

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

BR. NO.: 75 BR. LENGTH: 340 NO. BENTS: 9 NO. BENTS IN: CHANNEL: 5 FLOODPLAIN: 2

FOUNDATION TYPE: Uncertain

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: None

INTERIOR BENTS: Floodplain soils are being scoured around bents 5 and 6 during flood events.

CHANNEL BED: River bed submerged during the investigation, no scour could be discerned.

CHANNEL BANKS: Channel banks in the vicinity of the brick building and interior bents 5 & 6 are eroding during flood events. 3 to 4' deep scour holes have formed in floodplain soils around bents 5 & 6, as well as behind the brick building.

EXISTING SCOUR PROTECTION:

TYPE(3): Large rocks and concrete chunks appear to have been placed haphazardly on EB1 slope.

EXTENT(4): Area approximately 30' x 40', directly underneath bridge.

EFFECTIVENESS(5): May provide some protection during flooding.

OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): Two large tree trunks lodged against bent 5 pier.

DESIGN INFORMATION

CHANNEL BED MATERIAL(7): Gray, very loose, coarse sand with gravel and cobbles (Sample No. S-34)

CHANNEL BANK MATERIAL(8): Alluvial, brown, very stiff, moist sandy silt (Sample No. SS-32) and gray-brown, very soft, moist micaecous silty clay (Sample No. SS-33).

CHANNEL BANK COVER(9): Trees, grass and brush

FLOOD PLAIN WIDTH(10): 300 ft. +/-

FLOOD PLAIN COVER(11): Trees, grass and brush

DESIGN INFORMATION CONT.

STREAM IS: Slight DEGRADING AGGRADING (12)

OTHER OBSERVATIONS AND COMMENTS: Several old timber piles protrude from abutment slope beneath east end of bridge. Old concrete bridge abutment and approach slab located left of east end of bridge.

CHANNEL MIGRATION TENDENCY (13): Very little migration, tendency to east, if any at all.

GEOTECHNICALLY ADJUSTED SCOUR ELEVATIONS(14):

	Elevation (feet)
Bent 1	498.2
Bent 2	496.6
Bent 3	503.5

The elevations for Bent 1 and Bent 2 are approximately 10 feet higher than the Hydraulic Unit's predicted scour elevations.

REPORTED BY: *Th. Morefield* DATE: 9-4-03
(field observations by J. L. Love)

INSTRUCTIONS

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

PROJ. NO. - 8.1511701
ID NO. - B-3509
COUNTY - Rockingham

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-24	28' LT	13+95	3.1-4.6	A-6(5)	38	14	21.3	28.5	25.8	24.4	95	80	54
SS-25	28' LT	13+95	8.1-9.6	A-7-6(17)	51	33	14.6	22.6	12.0	50.8	90	83	60
SS-26	28' LT	13+95	33.1-34.6	A-2-4(0)	38	NP	60.6	24.0	11.4	4.1	93	53	18

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	22' RT	13+95	2.2-3.7	A-2-6(0)	33	12	31.3	27.0	19.3	22.4	62	48	29
SS-21	22' RT	13+95	12.2-13.7	A-6(9)	39	17	14.8	29.1	17.5	38.6	100	91	62
SS-22	22' RT	13+95	17.2-18.7	A-4(0)	28	NP	12.0	58.1	19.7	10.2	100	98	41
SS-23	22' RT	13+95	27.2-28.7	A-2-5(0)	48	NP	44.3	32.5	19.1	4.1	93	68	27

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
S-34	14' RT	15+64	0.0-1.3	A-3(0)	25	NP	60.6	36.6	0.8	2.0	94	64	6

B3-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-32	28' LT	16+50	5.2-6.7	A-4(1)	33	10	23.0	29.1	21.5	26.4	75	63	41
SS-33	28' LT	16+50	10.2-11.7	A-7-5(15)	49	13	1.0	19.9	46.5	32.5	100	100	86

B3-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
S-35	21' RT	16+67	1.0-2.5	A-4(0)	24	NP	13.2	57.7	18.9	10.2	94	89	37
S-36	21' RT	16+67	10.0-12.0	A-4(1)	31	5	5.7	53.0	18.9	22.4	100	99	51

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-2	21' LT	17+50	3.0-4.5	A-4(0)	30	9	35.9	24.5	19.2	20.4	82	59	36
SS-3	21' LT	17+50	13.0-14.5	A-4(3)	28	10	13.7	37.6	20.2	28.4	100	94	56

EB2-B

SOIL TEST RESULTS														
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE
							C.SAND	F.SAND	SILT	CLAY	10	40	200	
SS-27	27' RT	17+45	2.2-3.7	A-2-4(0)	33	10	37.0	25.8	16.9	20.3	63	47	27	-
SS-28	27' RT	17+45	7.2-8.7	A-6(7)	38	16	23.6	21.5	22.4	32.5	95	78	57	-
SS-29	27' RT	17+45	17.2-18.7	A-4(1)	28	5	13.8	33.1	22.6	30.5	99	92	59	-
SS-30	27' RT	17+45	27.2-28.2	A-4(5)	32	9	3.7	44.5	25.4	26.4	100	98	68	35.4
SS-31	27' RT	17+45	32.2-33.7	A-4(7)	33	10	7.7	30.3	29.5	32.5	100	96	75	-

EB1-DET

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-4	CL	13+63	3.7-5.2	A-6(1)	32	11	25.9	25.5	24.1	24.5	76	61	42
SS-5	CL	13+63	8.7-10.2	A-7-6(15)	48	27	16.3	23.1	17.8	42.9	97	88	63
SS-6	CL	13+63	18.7-20.2	A-2-4(0)	23	NP	28.0	59.8	8.2	4.1	100	92	18

EB2-DET

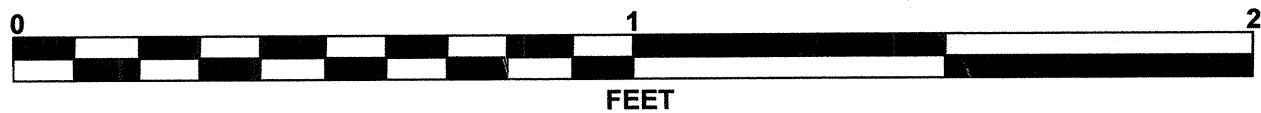
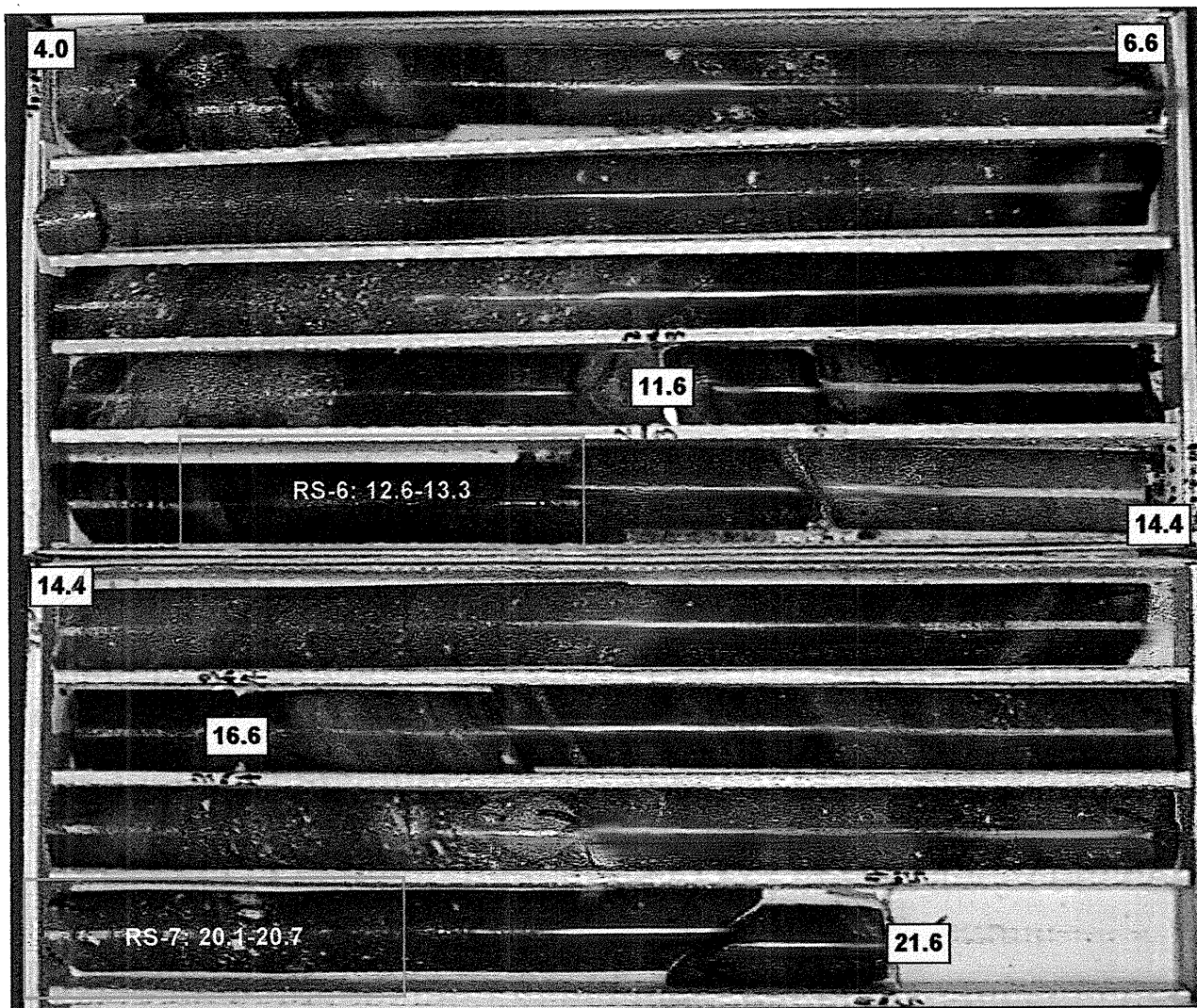
SOIL TEST RESULTS													
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)		
							C.SAND	F.SAND	SILT	CLAY	10	40	200
SS-1	CL	16+58	3.2-4.7	A-4(1)	31	9	24.7	36.5	22.4	16.3	85	70	41

CORE PHOTOGRAPHS

8.1511701 (B-3509)/BRDG #75

B1-B

BOXES 1 & 2: 4.0 - 21.6 FEET

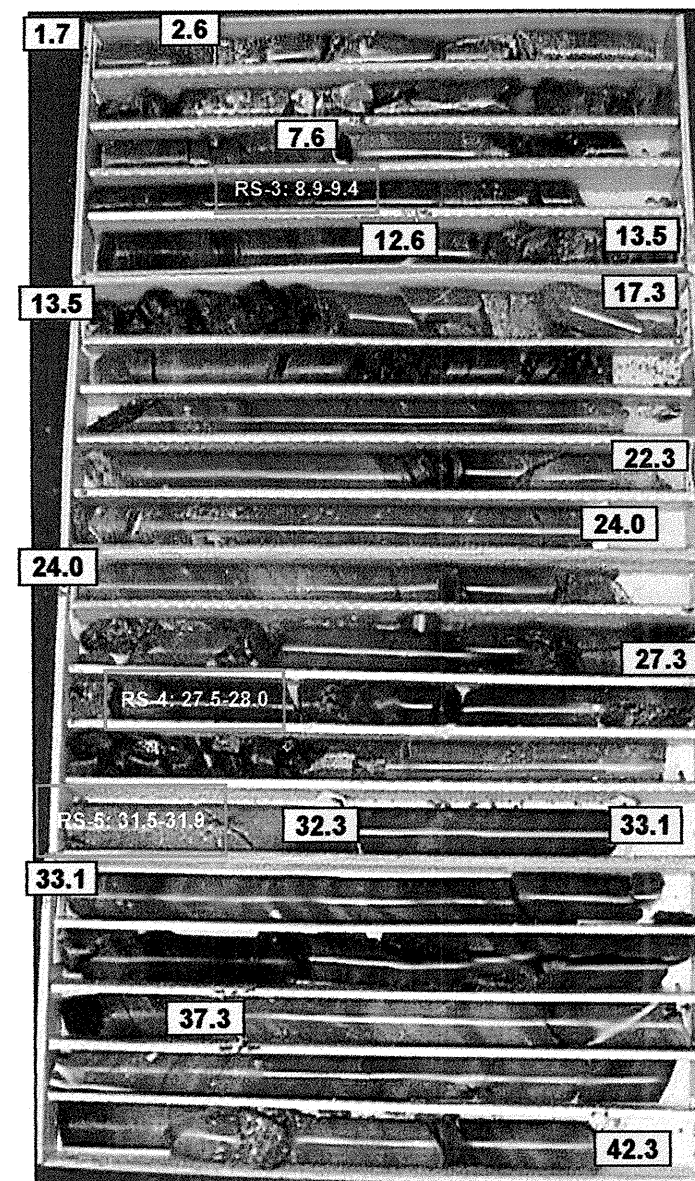


CORE PHOTOGRAPHS

8.1511701 (B-3509)/BRDG #75

B2-A

BOXES 1,2,3 & 4: 1.7 - 42.3 FEET

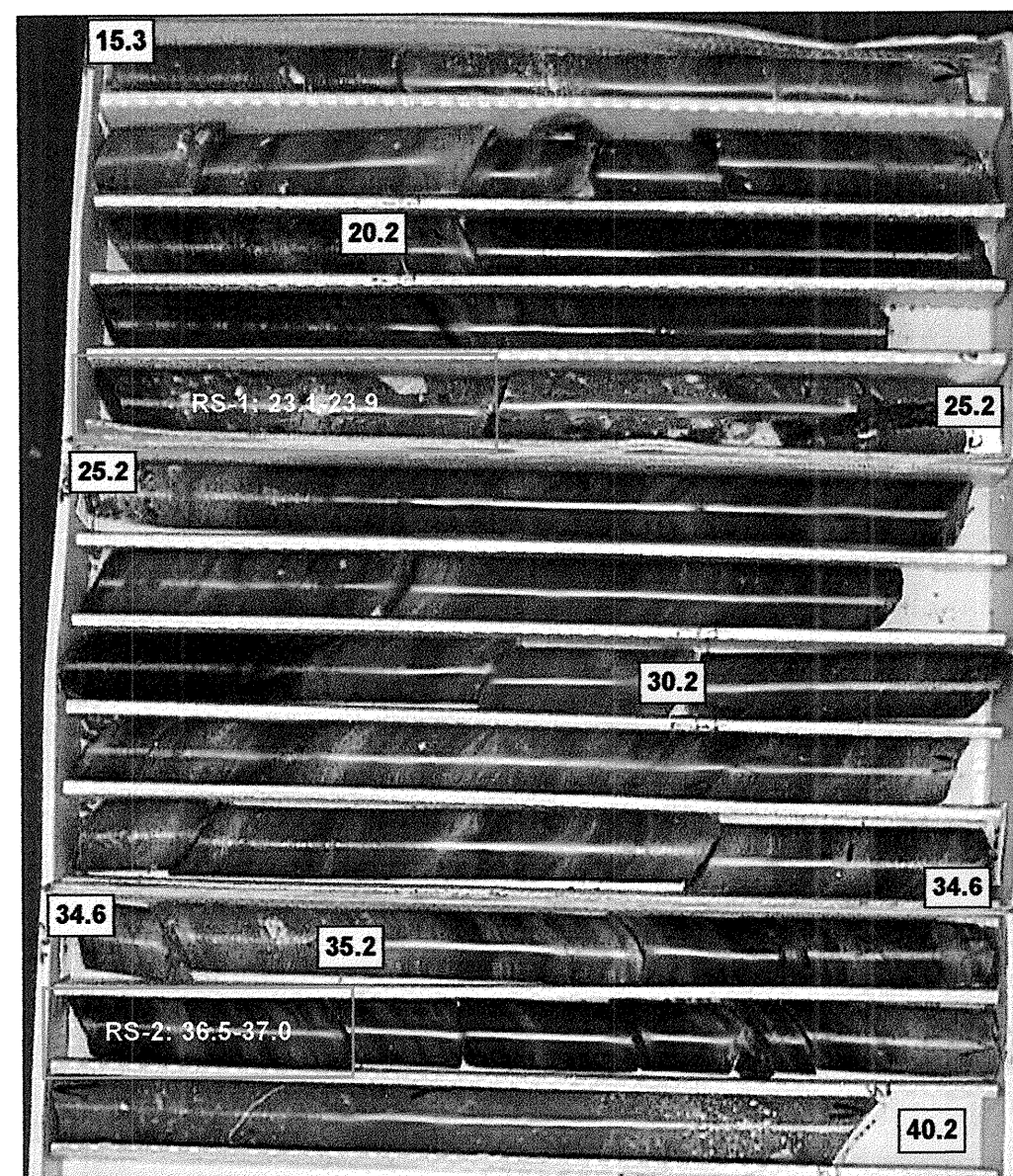


CORE PHOTOGRAPHS

8.1511701 (B-3509)/BRDG #75

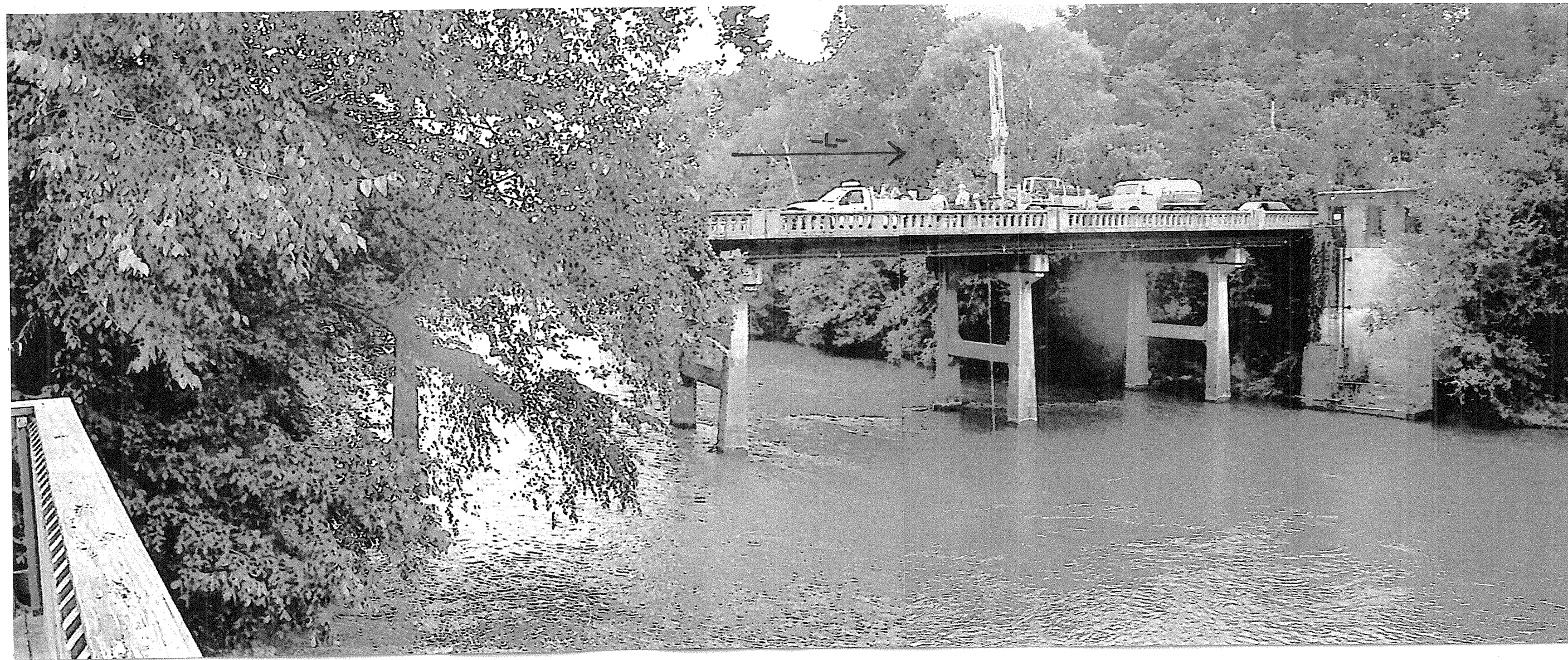
B3-A

BOXES 1,2 & 3: 15.3 - 40.2 FEET



SITE PHOTOGRAPH
(BRIDGE NO. 75 ON SR 3003 OVER SMITH RIVER)

SHEET 22 OF 22
8.1511701 (B-3509)



View looking North and upstream on Smith River