

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33801.1.1(B-4622)	1	10

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33801.1.1(B-4622) F.A. PROJ. BRSTP-65(4)
COUNTY ROCKINGHAM
PROJECT DESCRIPTION BRIDGE NO. 54 OVER ROCK HOUSE CREEK
ON NC 65

INVENTORY

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE 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 ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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.

PROJECT: 33801.1.1 ID: B-4622

PERSONNEL

C.M. BRUINSMA

J.R. MATULA

H.R. CONLEY

INVESTIGATED BY C.M. BRUINSMA

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE FEBRUARY 2009



DRAWN BY: T.T. WALKER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR 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
GEOTECHNICAL ENGINEERING UNIT

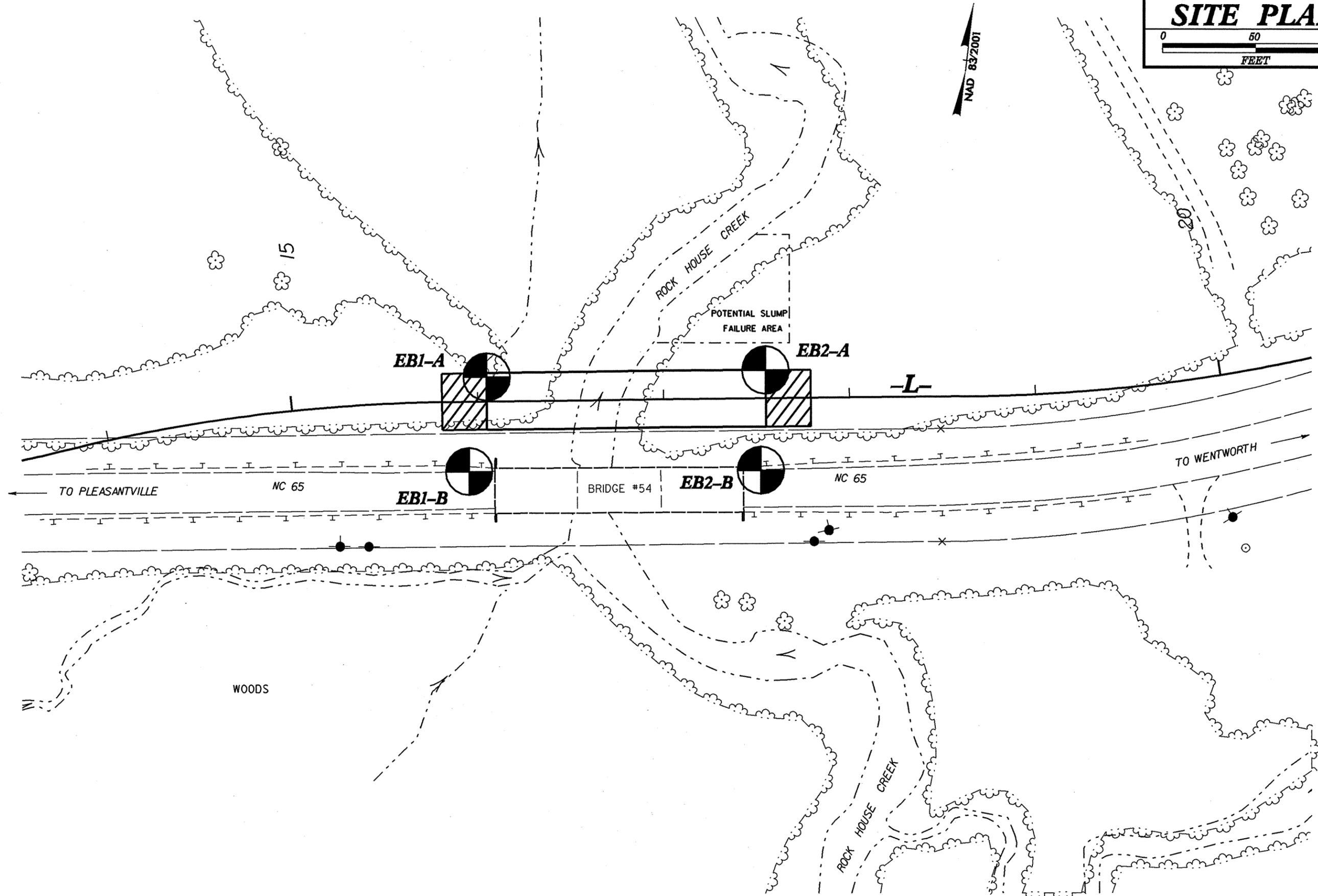
PROJECT REFERENCE NO. 33801.I(KB-4622) SHEET NO. 2

SUBSURFACE INVESTIGATION

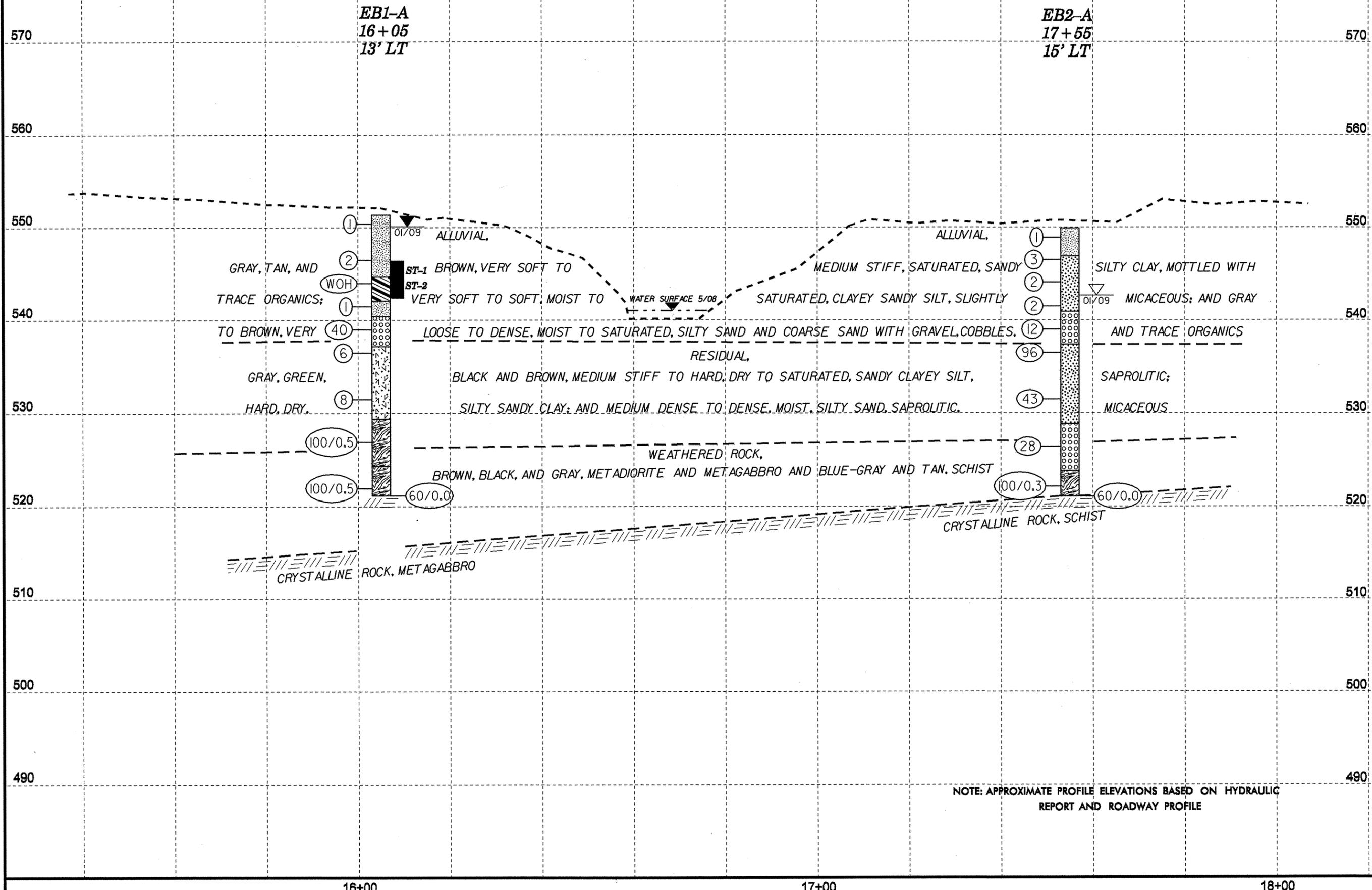
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																																																															
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p align="center"><i>VERY STIFF, GRN, SATY CLM, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i></p>		<p>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.</p> <p align="center">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p> <p>WEATHERED ROCK (WR)  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>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.</p> <p>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.</p> <p>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.</p>		<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>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.</p> <p>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.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.</p> <p>STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p>TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																															
<p align="center">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <thead> <tr> <th>GENERAL CLASS.</th> <th colspan="4">GRANULAR MATERIALS (<= 35% PASSING #200)</th> <th colspan="4">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="2">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1-a</th> <th>A-1-b</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> </thead> <tbody> <tr> <td>SYMBOL</td> <td></td> </tr> <tr> <td>% PASSING</td> <td>100</td> </tr> <tr> <td>LIQUID LIMIT</td> <td>≤ 5</td> </tr> <tr> <td>PLASTIC INDEX</td> <td>≤ 4</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> </tr> </tbody> </table>		GENERAL CLASS.	GRANULAR MATERIALS (<= 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		GROUP CLASS.	A-1-a	A-1-b	A-2	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7	SYMBOL															% PASSING	100	100	100	100	100	100	100	100	100	100	100	100	100	100	LIQUID LIMIT	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	PLASTIC INDEX	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	GROUP INDEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<p align="center">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p align="center">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE - LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE - LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE - LIQUID LIMIT GREATER THAN 50</p>		<p align="center">PERCENTAGE OF MATERIAL</p> <table border="1"> <thead> <tr> <th></th> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT-CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </tbody> </table>			ORGANIC MATERIAL	GRANULAR SOILS	SILT-CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	>20%	HIGHLY
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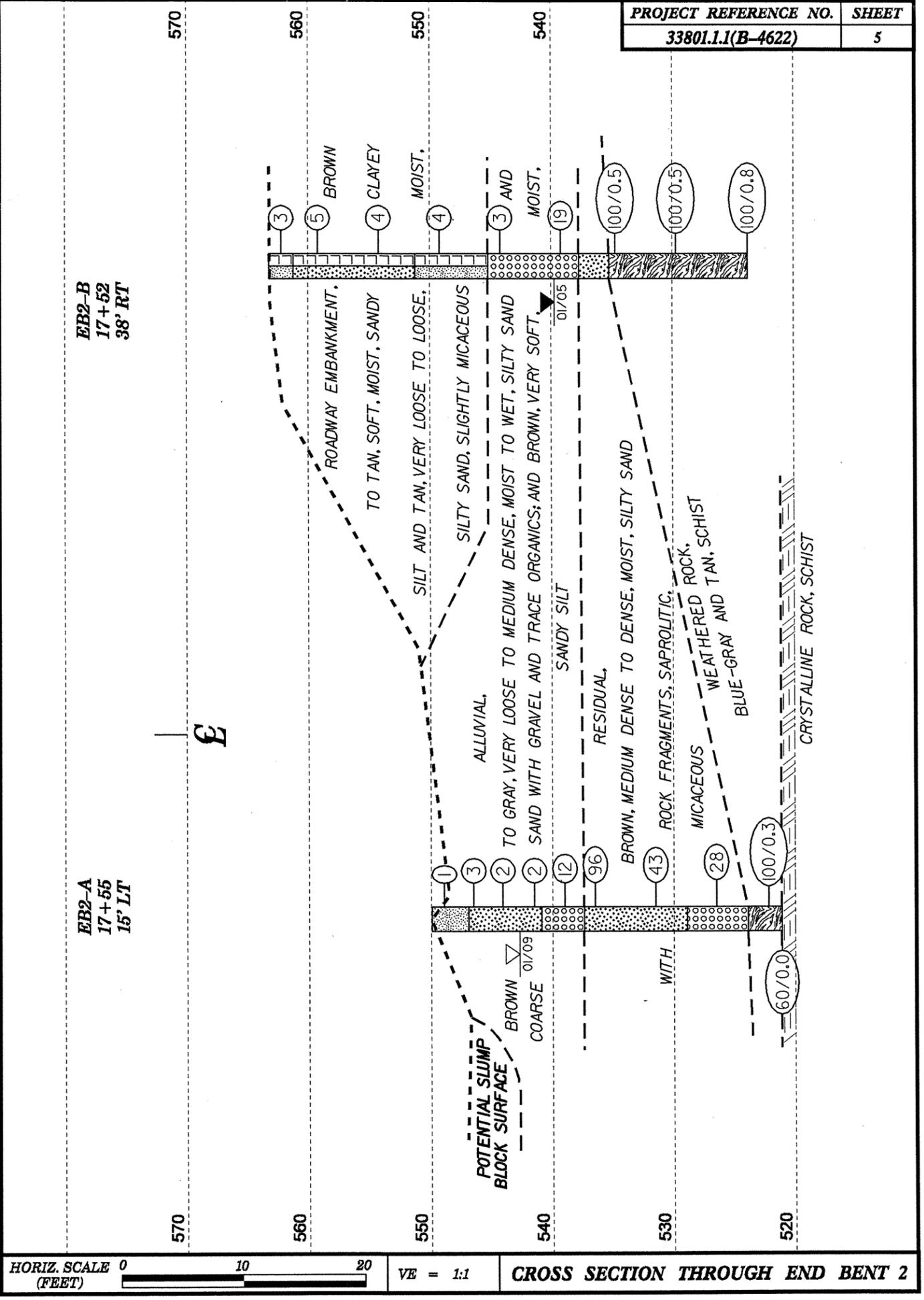
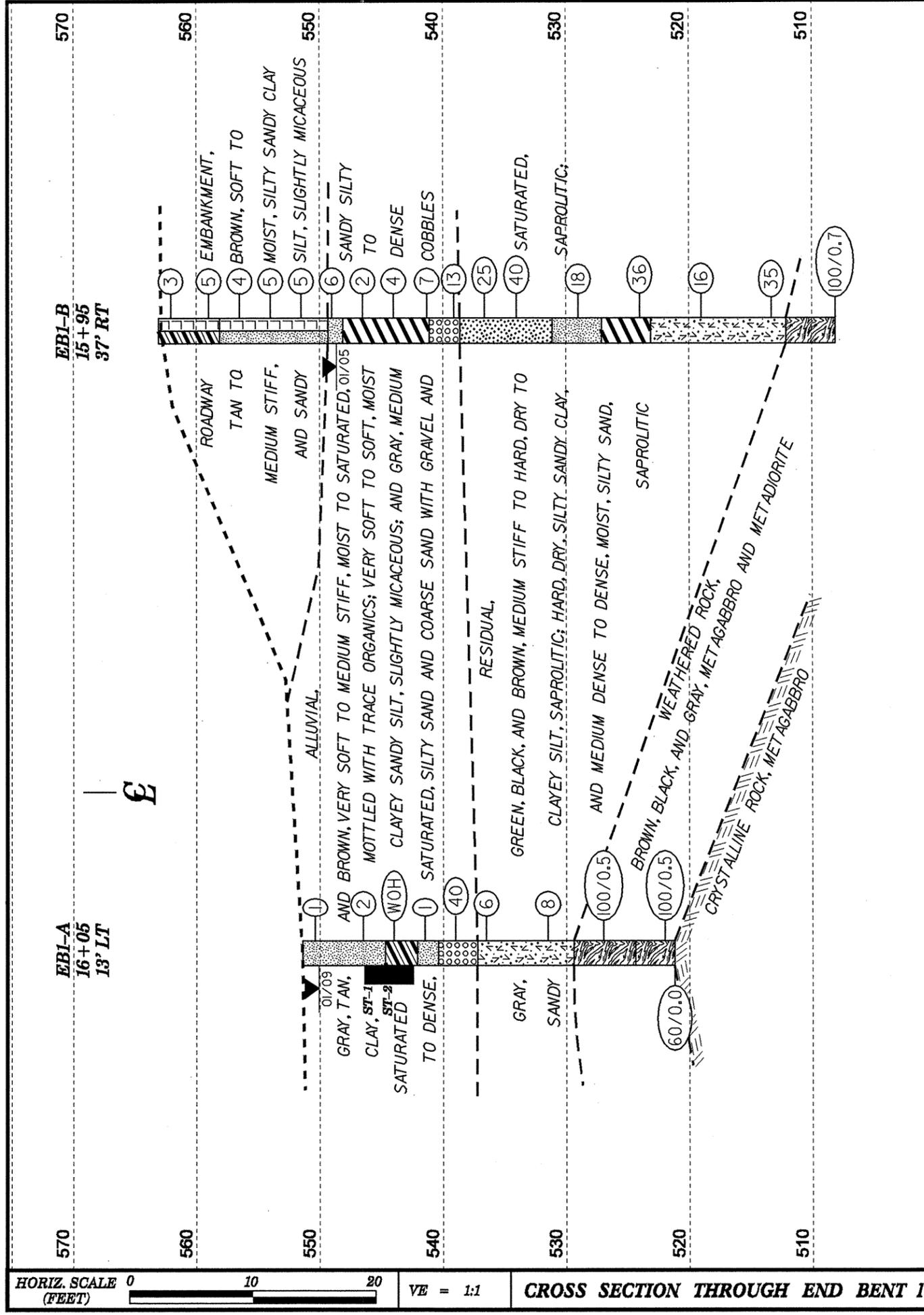
PROJECT REFERENCE NO.	SHEET
33801.11(B-4622)	3
SITE PLAN	



SKEW 90°



NOTE: APPROXIMATE PROFILE ELEVATIONS BASED ON HYDRAULIC REPORT AND ROADWAY PROFILE



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33801.1.1	ID. B-4622	COUNTY Rockingham	GEOLOGIST Bruinsma, C. M.
SITE DESCRIPTION Bridge No. 54 over Rock Bridge Creek on NC 65			GROUND WTR (ft) 0 HR. 7.2
BORING NO. EB2-A	STATION 17+55	OFFSET 15ft LT	ALIGNMENT -L-
COLLAR ELEV. 549.9 ft	TOTAL DEPTH 28.8 ft	NORTHING 964,276	EASTING 1,767,587
DRILL MACHINE CME-550X		DRILL METHOD H.S. Augers	
START DATE 01/08/09		COMP. DATE 01/09/09	
SURFACE WATER DEPTH N/A		DEPTH TO ROCK 28.8 ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
550	549.9	0.0	WOH	WOH	1						SS-7	M		GROUND SURFACE Brown, sandy silt	0.0
	547.5	2.4	1	2	1							M		Brown, silty fine sand with trace organics and silt layers to Gray, silty coarse sand with occasional gravel	3.0
545	545.1	4.8	1	1	1							M			
	542.5	7.4	1	1	1						SS-8	W			
540	540.0	9.9	2	4	8						SS-9	W		Gray to brown, slightly silty coarse sand with gravel up to 0.5" diameter, Gravel layer from 11.5 to 12.5 feet	12.5
	537.5	12.4	24	43	53						SS-10	M		RESIDUAL Brown, silty sand with rock fragments, saprolitic, micaceous	
535	532.5	17.4	4	18	25						SS-11	M			
530	527.5	22.4	13	12	16						SS-12	M		Brown, silty sand with abundant rock fragments, saprolitic	21.0
525	522.5	27.4												WEATHERED ROCK Blue gray, schist	26.0
520	521.1	28.8	100/0.3											Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 521.1 ft on CR: Schist	28.8

PROJECT NO. 33801.1.1	ID. B-4622	COUNTY Rockingham	GEOLOGIST Keaney, B.
SITE DESCRIPTION Bridge No. 54 over Rock Bridge Creek on NC 65			GROUND WTR (ft) 0 HR. 21.3
BORING NO. EB2-B	STATION 17+52	OFFSET 38ft RT	ALIGNMENT -L-
COLLAR ELEV. 563.2 ft	TOTAL DEPTH 39.4 ft	NORTHING 964,223	EASTING 1,767,585
DRILL MACHINE CME-45B		DRILL METHOD H.S. Augers	
START DATE 01/20/05		COMP. DATE 01/20/05	
SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
565	563.2	0.0												GROUND SURFACE	0.0
	560.2	3.0	1	2	1						SS-21	M		ROADWAY EMBANKMENT Brown, sandy clayey silt	2.0
560	560.2	3.0	3	2	3						SS-22	M		Tan, silty sand, slightly micaceous	
	555.2	8.0	1	2	2							M			
555	555.2	8.0													
550	550.2	13.0	1	2	2						SS-23	W		Tan, sandy silt, slightly micaceous	12.0
545	545.2	18.0	1	1	2						SS-24	W		ALLUVIAL Brown-tan to gray, fine sand, with wood fragments. Gravel layer from 24.5 to 25.5'	18.0
540	540.2	23.0	1	3	16							M			
535	535.2	28.0	100/0.5											RESIDUAL Brown silty sand	25.5
	530.2	33.0	100/0.5											WEATHERED ROCK Tan, schist	28.0
530	530.2	33.0	100/0.5												
525	524.6	38.6	35	65/0.3										Boring Terminated at Elevation 523.8 ft in WR: Schist	39.4
520														Boring originally investigated as EB1A in 1995 (Project No. 5.5151190)	

NCDOT BORE DOUBLE B4622_GEO_BH_54.GPJ NC_DOT_GDT_02/12/09

EB1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	13' LT	16+05	0.0-1.5	A-4(2)	35	6	7.9	48.5	25.5	18.1	100	98	56	34.1	-
SS-2	13' LT	16+05	3.9-5.4	A-4(5)	29	8	2.0	34.4	31.3	32.2	100	99	78	32.6	-
SS-3	13' LT	16+05	6.7-7.9	A-6(14)	39	15	1.4	21.3	37.0	40.3	100	99	87	40.6	-
SS-4	13' LT	16+05	9.3-10.4	A-4(0)	24	NP	9.9	62.2	15.8	12.1	100	99	39	-	-
SS-5	13' LT	16+05	11.4-12.9	A-1-b(0)	24	NP	53.4	31.0	9.6	6.0	58	36	12	-	-
SS-6	13' LT	16+05	14.2-15.4	A-5(0)	44	3	30.4	34.4	25.1	10.1	96	77	43	69.8	-

EB1-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-13	37' RT	15+95	0.0-1.5	A-6(4)	33	12	11.1	42.0	20.6	26.3	94	89	55	-	-
SS-14	37' RT	15+95	5.6-7.1	A-4(2)	34	7	8.7	47.9	21.2	22.2	97	94	55	-	-
SS-15	37' RT	15+95	13.8-14.6	A-4(3)	34	7	17.2	36.2	36.6	10.1	98	88	59	-	-
SS-16	37' RT	15+95	15.6-17.1	A-7-6(24)	48	21	0.2	8.7	42.6	48.5	100	100	96	-	-
SS-17	37' RT	15+95	25.5-27.0	A-2-4(0)	25	NP	34.5	36.0	19.4	10.1	99	83	34	-	-
SS-18	37' RT	15+95	33.1-34.6	A-4(0)	27	NP	35.4	31.7	22.8	10.1	100	83	37	-	-
SS-19	37' RT	15+95	38.1-39.6	A-7-5(3)	46	12	22.8	36.2	30.9	10.1	100	90	47	-	-
SS-20	37' RT	15+95	43.1-44.6	A-5(5)	50	8	7.7	45.7	34.5	12.1	100	98	59	-	-

EB2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-7	15' LT	17+55	0.0-1.5	A-4(0)	23	NP	17.1	57.6	15.2	10.1	100	94	36	-	-
SS-8	15' LT	17+55	7.4-8.9	A-2-4(0)	24	NP	26.8	45.7	15.4	12.1	88	77	33	-	-
SS-9	15' LT	17+55	9.9-11.4	A-1-b(0)	19	NP	68.9	23.4	3.7	4.0	66	32	7	-	-
SS-10	15' LT	17+55	12.5-13.9	A-2-4(0)	24	NP	42.7	37.7	15.6	4.0	98	72	27	-	-
SS-11	15' LT	17+55	17.4-18.9	A-2-4(0)	32	3	36.7	37.9	19.4	6.0	92	70	30	-	-
SS-12	15' LT	17+55	22.4-12.9	A-1-b(0)	27	NP	38.5	34.6	20.8	6.0	47	35	16	-	-

EB2-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-21	38' RT	17+52	0.0-1.5	A-4(0)	26	7	22.0	39.8	18.0	20.2	83	74	37	-	-
SS-22	38' RT	17+52	3.0-4.5	A-2-4(0)	27	NP	13.7	66.7	13.5	6.1	100	96	34	-	-
SS-23	38' RT	17+52	13.0-14.5	A-4(0)	21	NP	13.3	59.6	19.0	8.1	98	94	40	-	-
SS-24	38' RT	17+52	18.0-19.5	A-3(0)	17	NP	51.9	40.4	5.7	2.0	96	73	10	-	-



**FIELD
 SCOUR REPORT**

WBS: 33801.1.1 TIP: B-4622 COUNTY: ROCKINGHAM

DESCRIPTION(1): Br. No. 54 on NC 65 over Rock House Creek

EXISTING BRIDGE

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

Bridge No.: 54 Length: 134 Total Bents: 4 Bents in Channel: 1 Bents in Floodplain: 3
 Foundation Type: concrete pier on footing

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: Evidence on upstream side of EB1 and EB2

Interior Bents: none evident

Channel Bed: none evident

Channel Bank: slumping and failure of east and west banks. Banks are 3 to 6 feet vertical.

EXISTING SCOUR PROTECTION

Type(3): rip rap on both end bent slopes, some concreting around drainage areas

Extent(4): adjacent to end bents, within some drainage ditches adjacent to the slopes

Effectiveness(5): effective. Concrete has been undermined by run-off drainage, but does not effect structure

Obstructions(6): none

INSTRUCTIONS

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

DESIGN INFORMATION

Channel Bed Material(7): sand with gravel up to 2 inch in diameter, some cobble sized material may be present, occasional boulders up to 1' diameter observed under current structure

Channel Bank Material(8): clay and silt on western bank, sand on eastern bank

Channel Bank Cover(9): young to old trees, bushes

Floodplain Width(10): approximately 500 feet

Floodplain Cover(11): young to old trees, bushes

Stream is(12): Aggrading _____ Degrading X Static _____

Channel Migration Tendency(13): west

Observations and Other Comments: multiple drainage channels on eastern floodplain along -L-. Tributary scour extensive approx 150' downstream of -L-. Slump block evident 20 to 60' left of -L- on east bank

DESIGN SCOUR ELEVATIONS(14) Feet x Meters _____

Comparison of DSE to Hydraulics Unit theoretical scour:
 The Geotechnical Engineering Unit agrees with the Hydraulic Unit's theoretical scour elevation of 539.2 feet.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank						
Sample No.						
Retained #4	See Sheet 8, "Soil Test Results", for samples: SS-2 (BANK) SS-3 (BANK) SS-5 (CHANNEL) SS-8 (BANK) SS-16 (BANK) SS-24 (CHANNEL)					
Passed #10						
Passed #40						
Passed #200						
Coarse Sand						
Fine Sand						
Silt						
Clay						
LL						
PI						
AASHTO						
Station						
Offset						
Depth						

Template Revised 02/07/06

Reported by: 
 Christina M. Bruinsma, L.G.

Date: 12/9/2009

SITE PHOTO

BRIDGE NO. 54 OVER ROCK HOUSE CREEK ON NC 65 AT -L- 17+50



LOOKING SOUTHWEST