

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	38566.1.1 (B-4796)	1	10

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 38566.1.1 (B-4796) F.A. PROJ. BRZ-1114(4)  
COUNTY RANDOLPH  
PROJECT DESCRIPTION BRIDGE NO. 24 ON SR 1114 (PISGAH  
COVERED BRIDGE ROAD) OVER WEST FORK  
LITTLE RIVER

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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 WARRANT 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.

PERSONNEL

B.D. WORLEY

H. CONLEY

J. MATULA

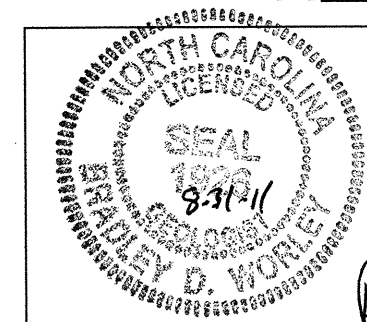
R.W. TODD

INVESTIGATED BY B.D. WORLEY

CHECKED BY C.M. WHALEN, Jr.

SUBMITTED BY K.B. MILLER

DATE AUGUST 2011



*Bradley D. Worley*

**PROJECT: 38566.1.1 ID: B-4796**

DRAWN BY: T.T. WALKER and B.D. WORLEY





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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.

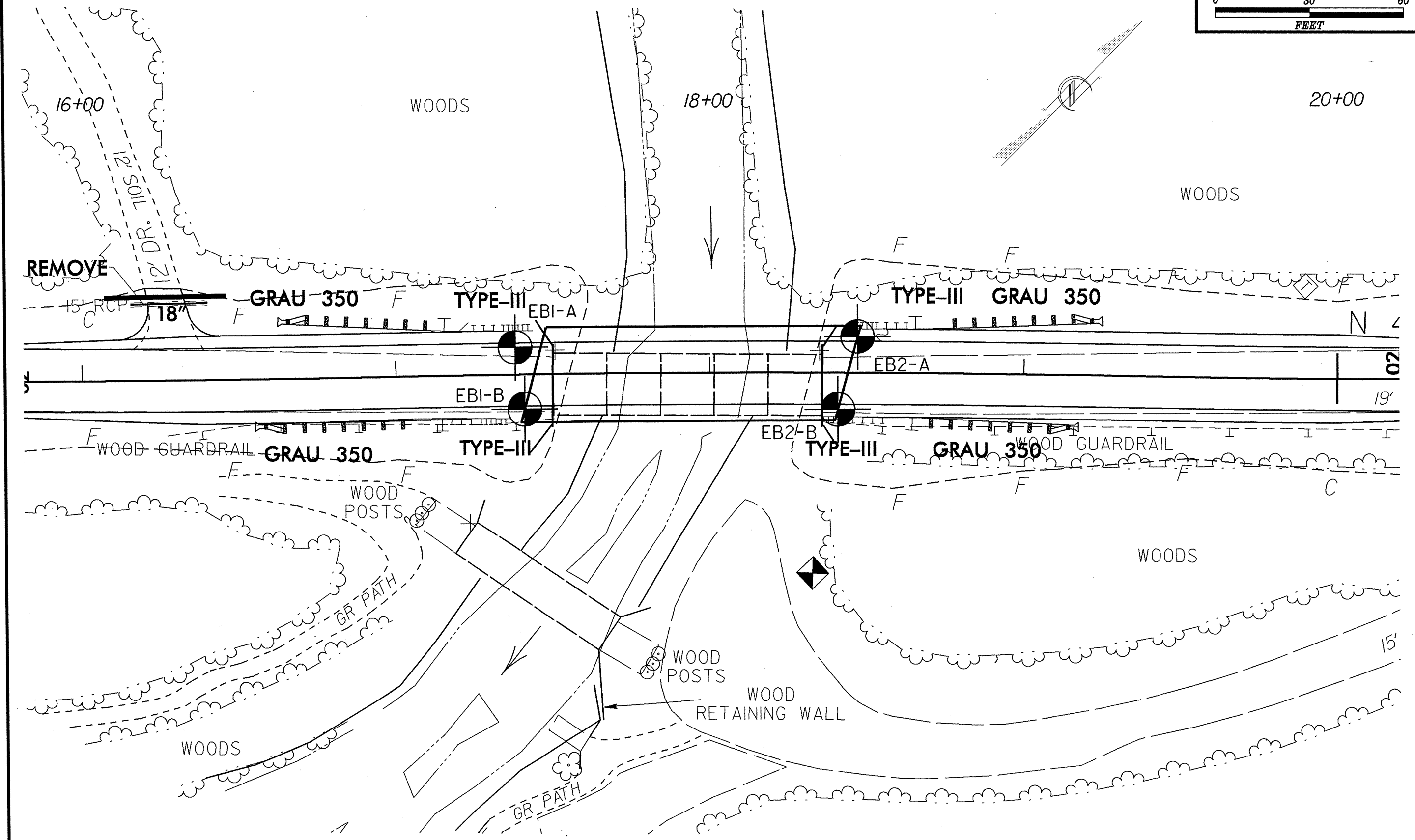
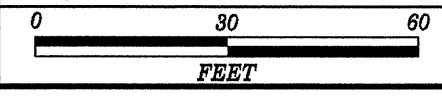
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
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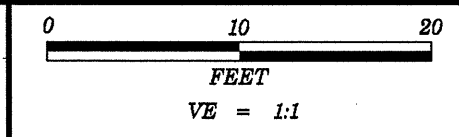
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

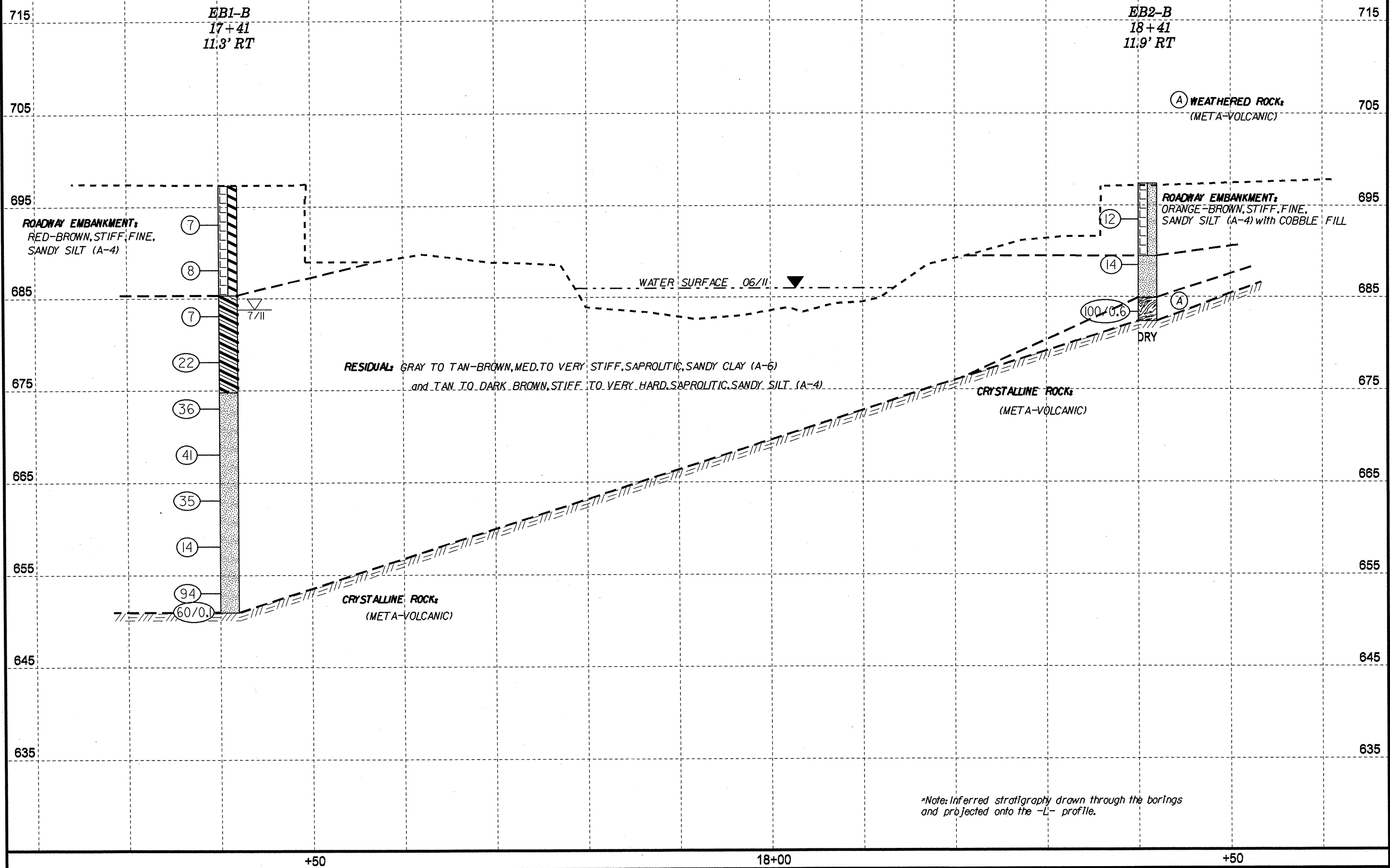
SOIL DESCRIPTION			GRADATION			ROCK DESCRIPTION			TERMS AND DEFINITIONS		
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE ASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, ASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <b>VERY STIFF, BROWN SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HARD PLASTIC, A-7-6</b>			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. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.			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:  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.  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 SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.			ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SRCR) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. 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. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.		
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>			<b>MINERALOGICAL COMPOSITION</b>			<b>WEATHERING</b>					
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS			MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.			FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.					
GROUP CLASS. A-1, A-3, A-2, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7			SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50			VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.					
SYMBOL			PERCENTAGE OF MATERIAL			MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.					
% PASSING #10, #40, #200			ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2-3% 3-5% 1-10% LITTLE ORGANIC MATTER 3-5% 5-12% LITTLE 10-20% MODERATELY ORGANIC 5-10% 12-20% SOME 20-35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE			SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, YIELDS SPT N VALUES > 100 BPF					
LIQUID LIMIT, PLASTIC INDEX, GROUP INDEX			GROUND WATER			SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF					
USUAL TYPES OF MAJOR MATERIALS			MISCELLANEOUS SYMBOLS			COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.					
GEN. RATING AS A SUBGRADE			ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION			ROCK HARDNESS					
EXCELLENT TO GOOD, FAIR TO POOR, POOR, UNSUITABLE			SOIL SYMBOL, ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT, INFERRED SOIL BOUNDARY, INFERRED ROCK LINE, ALLUVIAL SOIL BOUNDARY, DIP & DIP DIRECTION OF ROCK STRUCTURES			VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.					
PI OF A-7-5 SUBGROUP IS <= LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30			AUGER BORING, CORE BORING, MONITORING WELL, PIEZOMETER INSTALLATION, SLOPE INDICATOR INSTALLATION, CONE PENETROMETER TEST, SOUNDING ROD			HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.					
COMPACTNESS OR CONSISTENCY			ABBREVIATIONS			MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.					
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)			AR - AUGER REFUSAL, BT - BORING TERMINATED, CL - CLAY, CPT - CONE PENETRATION TEST, CSE - COARSE, DMT - DILATOMETER TEST, DPT - DYNAMIC PENETRATION TEST, e - VOID RATIO, F - FINE, FOSS - FOSSILIFEROUS, FRAC - FRACTURED, FRACTURES, FRAGS. - FRAGMENTS, HL - HIGHLY			MEDIUM HARD CAN BE GROVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.					
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )			MED. - MEDIUM, MICA - MICACEOUS, MOD. - MODERATELY, NP - NON PLASTIC, ORG. - ORGANIC, PMT - PRESSUREMETER TEST, SAP. - SAPROLITIC, SD. - SAND, SANDY, SL. - SILT, SILTY, SLI. - SLIGHTLY, TCR - TRICONE REFUSAL, w - MOISTURE CONTENT, v - VERY			SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.					
TEXTURE OR GRAIN SIZE			EQUIPMENT USED ON SUBJECT PROJECT			VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.					
U.S. STD. SIEVE SIZE OPENING (MM)			DRILL UNITS: MOBILE B, BK-51, CME-45C, CME-550, PORTABLE HOIST, CME-55			FRACTURE SPACING					
BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE, SD.), FINE SAND (F SD.), SILT (SL.), CLAY (CL.)			ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE * STEEL TEETH, TRICONE * TUNG-CARB., CORE BIT			TERM SPACING: VERY WIDE MORE THAN 10 FEET, WIDE 3 TO 10 FEET, MODERATELY CLOSE 1 TO 3 FEET, CLOSE 0.16 TO 1 FEET, VERY CLOSE LESS THAN 0.16 FEET					
SOIL MOISTURE - CORRELATION OF TERMS			HAMMER TYPE: AUTOMATIC, MANUAL			BEDDING					
SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION			CORE SIZE: B, N, H			TERM THICKNESS: VERY THICKLY BEDDED > 4 FEET, THICKLY BEDDED 1.5 - 4 FEET, THINLY BEDDED 0.16 - 1.5 FEET, VERY THINLY BEDDED 0.03 - 0.16 FEET, THICKLY LAMINATED 0.008 - 0.03 FEET, THINLY LAMINATED < 0.008 FEET					
LL - LIQUID LIMIT, PL - PLASTIC LIMIT, OM - OPTIMUM MOISTURE, SL - SHRINKAGE LIMIT			HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST			INDURATION					
PLASTICITY: PLASTICITY INDEX (PI), DRY STRENGTH						FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.					
NONPLASTIC, LOW PLASTICITY, MED. PLASTICITY, HIGH PLASTICITY						FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.					
COLOR						MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.					
DESCRPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY), MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.						INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.					
						EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.					

# SITE PLAN

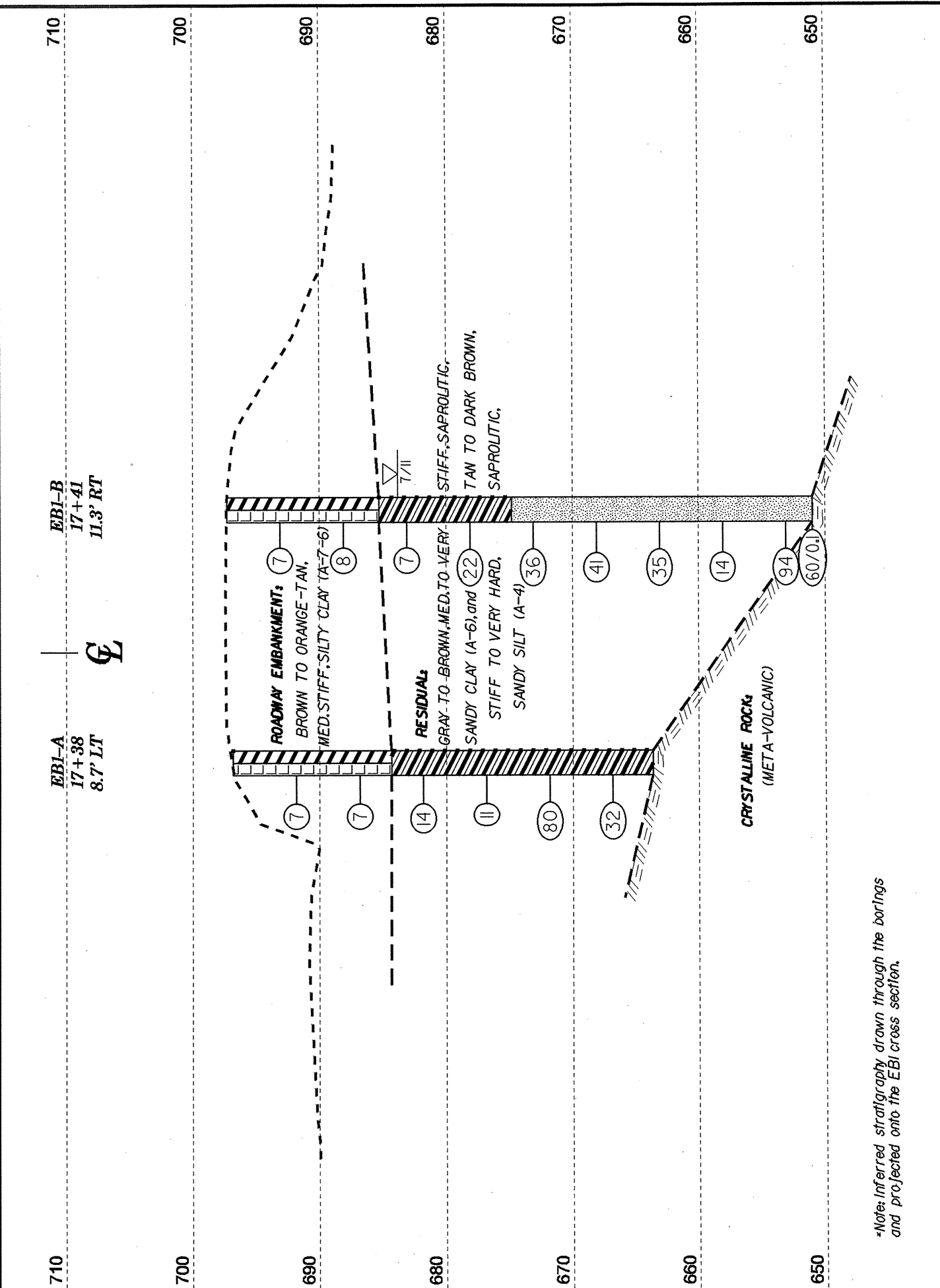




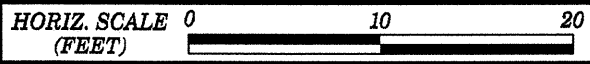
PROJECT REFERENCE NO.	SHEET
38566.L1(B-4796)	4
PROFILE BORINGS PROJECTED ALONG -L-	



\*Note: Inferred stratigraphy drawn through the borings and projected onto the -L- profile.

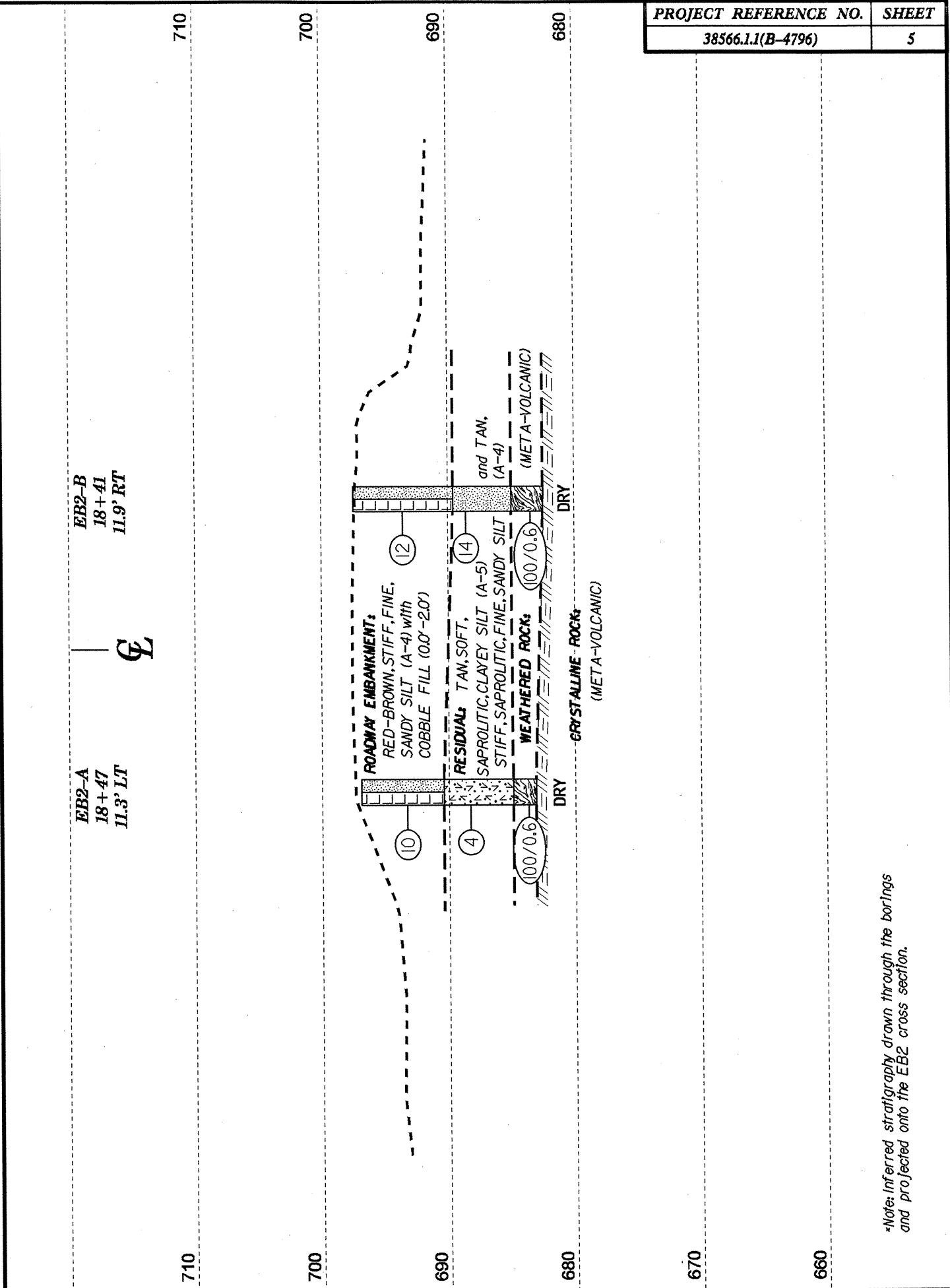


-Note: Inferred stratigraphy drawn through the borings and projected onto the EB1 cross section.

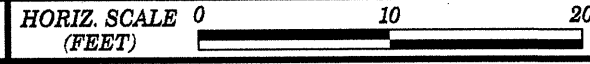


VE = 1:1

CROSS SECTION THROUGH END BENT 1



-Note: Inferred stratigraphy drawn through the borings and projected onto the EB2 cross section.



VE = 1:1

CROSS SECTION THROUGH END BENT 2



# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 38566.1.1	TIP B-4796	COUNTY RANDOLPH	GEOLOGIST Todd, R. W.
SITE DESCRIPTION Bridge No. 24 on SR 1114 (Pisgah Covered Bridge Rd.) over West Fork Little River			GROUND WTR (ft) 0 HR. N/A
BORING NO. EB1-A	STATION 17+38	OFFSET 9 ft LT	ALIGNMENT -L-
COLLAR ELEV. 697.0 ft	TOTAL DEPTH 33.2 ft	NORTHING 653,468	EASTING 1,734,042
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER N/A	START DATE 08/31/07	COMP. DATE 08/31/07	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
700													GROUND SURFACE	0.0
695	693.0	4.0	2	3	4						SS-1	M	ROADWAY EMBANKMENT Brown, medium stiff, SILTY CLAY (A-7-6)	
690	688.0	9.0	4	5	2							M		
685	683.0	14.0	7	7	7						SS-2	M	RESIDUAL Tan, stiff to hard, SANDY CLAY (A-6)	12.5
680	678.0	19.0	4	4	7							M		
675	673.0	24.0	8	10	70							M		
670	668.0	29.0	7	11	21							M		
665													Boring Terminated by Auger Refusal at Elevation 663.8 ft on crystalline rock (meta-volcanic)	33.2

WBS 38566.1.1	TIP B-4796	COUNTY RANDOLPH	GEOLOGIST Worley, B. D.
SITE DESCRIPTION Bridge No. 24 on SR 1114 (Pisgah Covered Bridge Rd.) over West Fork Little River			GROUND WTR (ft) 0 HR. 13.5
BORING NO. EB1-B	STATION 17+41	OFFSET 11 ft RT	ALIGNMENT -L-
COLLAR ELEV. 697.3 ft	TOTAL DEPTH 46.3 ft	NORTHING 653,457	EASTING 1,734,059
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Conley, H. R.	START DATE 07/14/11	COMP. DATE 07/14/11	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
700													GROUND SURFACE	0.0
695	694.1	3.2	3	3	4							D	ROADWAY EMBANKMENT Brown to orange-brown and tan, medium stiff, SILTY CLAY (A-7-6)	
690	689.1	8.2	3	3	5							D		
685	684.1	13.2	3	2	5							M	RESIDUAL Gray-tan to tan-brown, medium to very stiff, saprolitic, SANDY CLAY (A-6)	12.0
680	679.1	18.2	6	11	11							M		
675	674.1	23.2	10	18	18							M	Tan to very dark brown and orange-brown, stiff to very hard, saprolitic, SANDY SILT (A-4)	22.5
670	669.1	28.2	18	19	22							M		
665	664.1	33.2	17	18	17							D		
660	659.1	38.2	4	5	9							D		
655	654.1	43.2	10	42	52							D		
	651.1	46.2											Boring Terminated with Standard Penetration Test Refusal at Elevation 651.0 ft on crystalline rock (meta-volcanic)  Auger refusal (46.2') verified with SPT refusal @ 46.3'	46.3

NCDOT BORE DOUBLE COPY OF B4796\_GEO\_BRDG0024.GPJ NC DOT.GDT 9/1/11



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 38566.1.1		TIP B-4796		COUNTY RANDOLPH		GEOLOGIST Worley, B. D.									
SITE DESCRIPTION Bridge No. 24 on SR 1114 (Pisgah Covered Bridge Rd.) over West Fork Little River							GROUND WTR (ft)								
BORING NO. EB2-A		STATION 18+47		OFFSET 11 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 697.3 ft		TOTAL DEPTH 13.8 ft		NORTHING 653,549		EASTING 1,734,115									
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Conley, H. R.		START DATE 07/15/11		COMP. DATE 07/15/11		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
700														GROUND SURFACE	0.0
695	694.7	2.6	4	5	5								D	ROADWAY EMBANKMENT Red-brown, stiff, fine SANDY SILT (A-4)	
690	689.7	7.6	1	2	2								D	RESIDUAL Tan, soft, saprolitic, CLAYEY SILT (A-5)	6.5
685	684.7	12.6	65	35/0.1										WEATHERED ROCK White to tan (meta-volcanic)	13.8
														Boring Terminated by Auger Refusal at Elevation 683.5 ft on crystalline rock (meta-volcanic)	

WBS 38566.1.1		TIP B-4796		COUNTY RANDOLPH		GEOLOGIST Worley, B. D.									
SITE DESCRIPTION Bridge No. 24 on SR 1114 (Pisgah Covered Bridge Rd.) over West Fork Little River							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 18+41		OFFSET 12 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 697.4 ft		TOTAL DEPTH 15.0 ft		NORTHING 653,529		EASTING 1,734,127									
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Conley, H. R.		START DATE 07/15/11		COMP. DATE 07/15/11		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
700														GROUND SURFACE	0.0
695	694.5	2.9	5	5	7								D	ROADWAY EMBANKMENT Orange-brown, stiff, fine SANDY SILT (A-4) (0.0-2.5) cobble/boulder fill	
690	689.5	7.9	2	5	9								D	RESIDUAL Tan, stiff, saprolitic, fine SANDY SILT (A-4)	7.9
685	684.5	12.9	6	50	50/0.1									WEATHERED ROCK Gray to tan-gray (meta-volcanic)	12.5
														Boring Terminated by Auger Refusal at Elevation 682.4 ft on crystalline rock (meta-volcanic)	

**Soil Test Results**

## 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	9' RT	17+38	4.0'-5.5'	A-7-6(20)	54	30	6.1	6.1	33.3	54.5	76	73	68		
SS-2	9' RT	17+38	14.0'-15.5'	A-6(13)	38	13	2.6	7.9	53.1	36.4	98	96	91		





# FIELD SCOUR REPORT

WBS: 38566.1.1 TIP: B-4796 COUNTY: Randolph

DESCRIPTION(1): Bridge No. 24 on SR 1114 (Pisgah Covered Bridge Rd) over West Fork Little River

### EXISTING BRIDGE

Information from: Field Inspection  Microfilm \_\_\_\_\_ (reel \_\_\_\_\_ pos: \_\_\_\_\_)  
Other (explain) BSR (6/1/11)

Bridge No.: 24 Length: 86' Total Bents: 6 Bents in Channel: 2 Bents in Floodplain: 4  
Foundation Type: \_\_\_\_\_

### EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: Very minor at the abutment walls.

Interior Bents: Major scour pockets around B-1 and B-5.

Channel Bed: Minor scour pockets around B-2 and B-3.

Channel Bank: Minor bank scour noted upstream.

### EXISTING SCOUR PROTECTION

Type(3): none observed

Extent(4): n/a

Effectiveness(5): n/a

Obstructions(6): Boulders (origin unknown) downstream at the historic covered bridge.

### INSTRUCTIONS

- Describe the specific site's location, including route number and body of water crossed.
- Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- Note existing scour protection (e.g. rip rap).
- Describe extent of existing scour protection.
- Describe whether or not the scour protection appears to be working.
- Note obstructions such as dams, fallen trees, debris at bents, etc.
- Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- Determine the approximate floodplain width from field observation or a topographic map.
- Describe the material covering the floodplain (e.g. grass, trees, crops).
- Use professional judgement to specify if the stream is degrading, aggrading, or static.
- Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 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), cobbles and boulders

Channel Bank Material(8): Fine sandy silt (A-4)

Channel Bank Cover(9): Brush and trees

Floodplain Width(10): Approx. 350 ft along existing alignment.

Floodplain Cover(11): Brush, trees, little grass and weeds.

Stream is(12): Aggrading \_\_\_\_\_ Degrading  Static \_\_\_\_\_

Channel Migration Tendency(13): Slight towards the northeast.

Observations and Other Comments: \_\_\_\_\_

### DESIGN SCOUR ELEVATIONS(14)

Feet \_\_\_\_\_ Meters \_\_\_\_\_

#### BENTS


Design Scour Elevations were not calculated because scour does not impact the proposed end bents.

Comparison of DSE to Hydraulics Unit theoretical scour:  
N/A

### SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

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

The only soil samples tested at this location were sampled/tested during the PDEA investigation in 2007. Two SPT samples were tested from EB1-A, but are not indicative of channel bed or bank material.

Reported by:

Date: 8-31-11

# Site Photographs



View looking north



View looking south



View looking west (down station)