

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33628.1.1	1	11

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

STRUCTURE
SUBSURFACE INVESTIGATION

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-7	CROSS SECTIONS
8-10	BORING LOGS
11	SCOUR REPORT

PROJ. REFERENCE NO. 33628.1.1 F.A. PROJ. BRZ-1324(2)
COUNTY TRANSYLVANIA
PROJECT DESCRIPTION BRIDGE NO. 93 ON SR 1324
(TANASEE GAP RD.) OVER NORTH FORK FRENCH BROAD
RIVER
SITE DESCRIPTION _____

CAUTION NOTICE

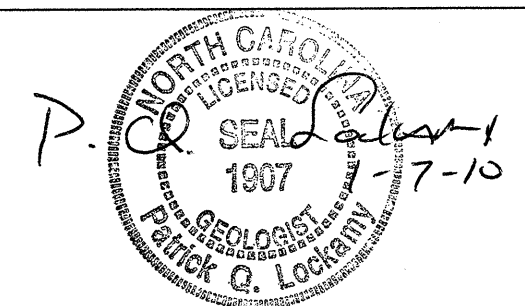
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING 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.

PERSONNEL
JT WILLIAMS
MM HAGER
RD CHILDERS
GK ROSE
PQ LOCKAMY

INVESTIGATED BY PQ LOCKAMY
CHECKED BY WD FRYE
SUBMITTED BY WD FRYE
DATE 01/07/10



PROJECT: 33628.1.1
ID: B-4289

DRAWN BY: PQ LOCKAMY

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.

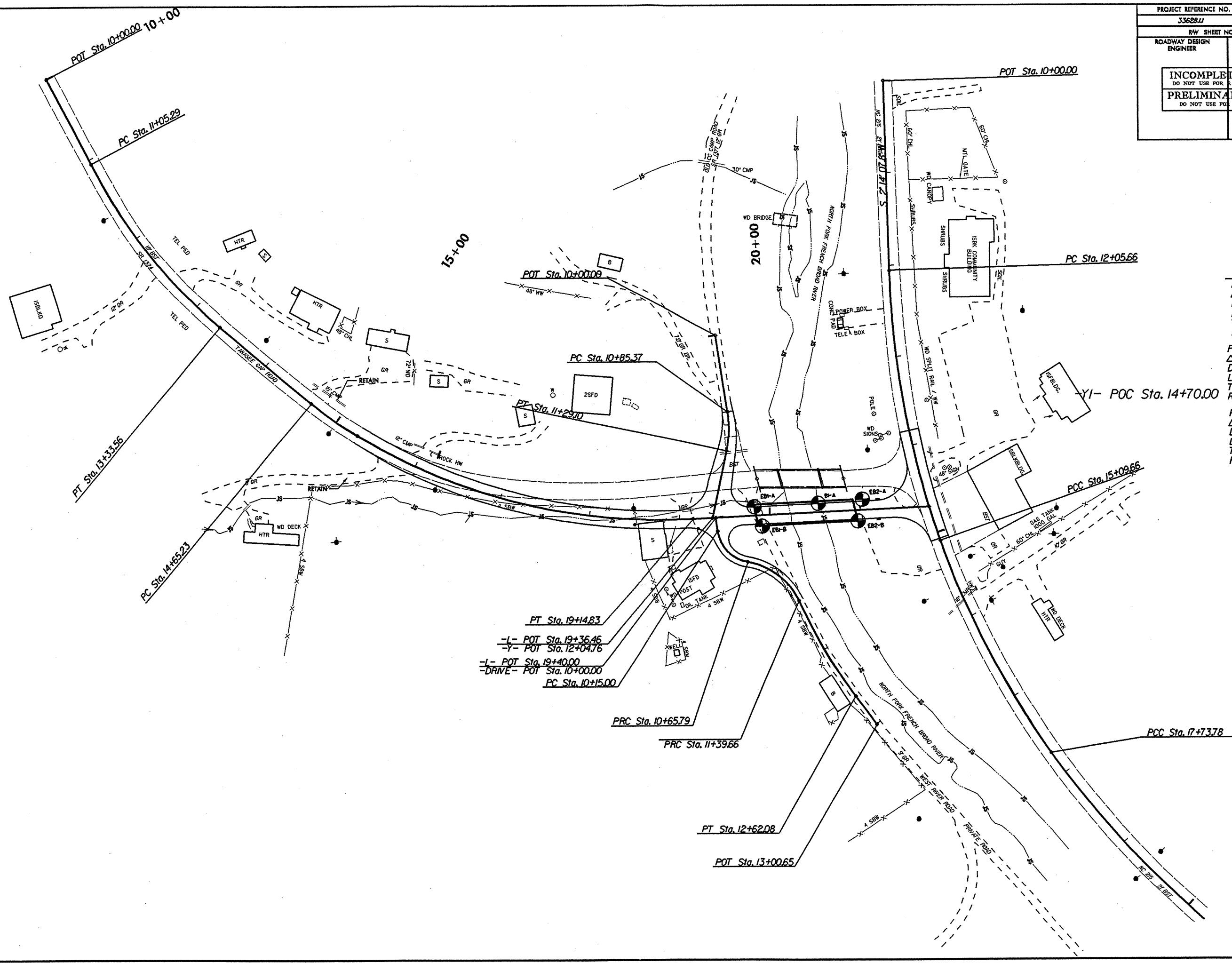
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

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 (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 style="text-align: center;"><i>VERY STIFF, SANDY CLAY, 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) POORLY GRADED GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-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>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 (CAL.C.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <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="3">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</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-7-8</th> <th>A-7-9</th> <th>A-7-10</th> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>% PASSING</th> <td>50 MX</td> <td>30 MX 50 MN</td> <td>10 MN</td> <td>10 MX 35 MN</td> <td>35 MN</td> <td>35 MN</td> <td>35 MN</td> <td>35 MN</td> <td>35 MN</td> <td>35 MN</td> <td>35 MN</td> <td>35 MN</td> </tr> <tr> <th>LIQUID LIMIT</th> <td>6 MX</td> <td>NP</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> <td>40 MX 41 MN</td> </tr> <tr> <th>PLASTIC INDEX</th> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>16 MX</td> <td>16 MX</td> <td>16 MX</td> <td>16 MX</td> <td>16 MX</td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td>STONE FRAGS. GRAVEL AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>GEN. RATING AS A SUBGRADE</th> <td colspan="3">EXCELLENT TO GOOD</td> <td colspan="3">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td colspan="4">UNSATURABLE</td> </tr> </table> <p style="text-align: center;">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p>	GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS			GROUP CLASS.	A-1	A-3	A-2	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-7-8	A-7-9	A-7-10	SYMBOL													% PASSING	50 MX	30 MX 50 MN	10 MN	10 MX 35 MN	35 MN	35 MN	35 MN	35 MN	35 MN	35 MN	35 MN	35 MN	LIQUID LIMIT	6 MX	NP	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	PLASTIC INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	16 MX	16 MX	16 MX	16 MX	16 MX	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS								GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE				<p style="text-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 style="text-align: center;">COMPRESSIBILITY</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>SLIGHTLY COMPRESSIBLE</th> <th>MODERATELY COMPRESSIBLE</th> <th>HIGHLY COMPRESSIBLE</th> <th>LIQUID LIMIT LESS THAN 31</th> <th>LIQUID LIMIT EQUAL TO 31-50</th> <th>LIQUID LIMIT GREATER THAN 50</th> </tr> </table> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY</td> </tr> </table> <p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p> <p style="text-align: center;">MISCELLANEOUS SYMBOLS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</th> <th>TEST BORING</th> <th>SAMPLE DESIGNATIONS</th> </tr> <tr> <td></td> <td></td> <td>S - BULK SAMPLE</td> </tr> <tr> <td></td> <td></td> <td>SS - SPLIT SPOON SAMPLE</td> </tr> <tr> <td></td> <td></td> <td>ST - SHELBY TUBE SAMPLE</td> </tr> <tr> <td></td> <td></td> <td>RS - ROCK SAMPLE</td> </tr> <tr> <td></td> <td></td> <td>RT - RECOMPACTED TRIAXIAL SAMPLE</td> </tr> <tr> <td></td> <td></td> <td>CR - CALIFORNIA BEARING RATIO SAMPLE</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table> <p style="text-align: center;">ABBREVIATIONS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>HI - HIGHLY</td> <td>W - MOISTURE CONTENT</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MD - MEDIUM</td> <td>V - VERY</td> </tr> <tr> <td>CL - CLAY</td> <td>MICA - MICACEOUS</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>MOD - MODERATELY</td> <td>WEA - WEATHERED</td> </tr> <tr> <td>CSE - COARSE</td> <td>NP - NON PLASTIC</td> <td>W - UNIT WEIGHT</td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>ORG - ORGANIC</td> <td>W_d - DRY UNIT WEIGHT</td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td></td> </tr> <tr> <td>e - VOID RATIO</td> <td>SAP - SAPROLITIC</td> <td></td> </tr> <tr> <td>F - FINE</td> <td>SD - SAND, SANDY</td> <td></td> </tr> <tr> <td>FOSS - FOSSILIFEROUS</td> <td>SL - SILT, SILTY</td> <td></td> </tr> <tr> <td>FRAC - FRACTURED, FRACTURES</td> <td>SLI - SLIGHTLY</td> <td></td> </tr> <tr> <td>FRAGS - FRAGMENTS</td> <td>TCR - TRICONE REFUSAL</td> <td></td> </tr> </table>	SLIGHTLY COMPRESSIBLE	MODERATELY COMPRESSIBLE	HIGHLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31	LIQUID LIMIT EQUAL TO 31-50	LIQUID LIMIT GREATER THAN 50	ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	HIGHLY ORGANIC	>10%	>20%	HIGHLY	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION	TEST BORING	SAMPLE DESIGNATIONS			S - BULK SAMPLE			SS - SPLIT SPOON SAMPLE			ST - SHELBY TUBE SAMPLE			RS - ROCK SAMPLE			RT - RECOMPACTED TRIAXIAL SAMPLE			CR - CALIFORNIA BEARING RATIO SAMPLE							AR - AUGER REFUSAL	HI - HIGHLY	W - MOISTURE CONTENT	BT - BORING TERMINATED	MD - MEDIUM	V - VERY	CL - CLAY	MICA - MICACEOUS	VST - VANE SHEAR TEST	CPT - CONE PENETRATION TEST	MOD - MODERATELY	WEA - WEATHERED	CSE - COARSE	NP - NON PLASTIC	W - UNIT WEIGHT	DMT - DILATOMETER TEST	ORG - ORGANIC	W _d - DRY UNIT WEIGHT	DPT - DYNAMIC PENETRATION TEST	PMT - PRESSUREMETER TEST		e - VOID RATIO	SAP - SAPROLITIC		F - FINE	SD - SAND, SANDY		FOSS - FOSSILIFEROUS	SL - SILT, SILTY		FRAC - FRACTURED, FRACTURES	SLI - SLIGHTLY		FRAGS - FRAGMENTS	TCR - TRICONE REFUSAL		<p style="text-align: center;">WEATHERING</p> <p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>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.</p> <p>SLIGHT (SL.) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>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.</p> <p>MODERATELY SEVERE (MOD. 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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i></p> <p>VERY 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. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>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.</p> <p style="text-align: center;">ROCK HARDNESS</p> <p>VERY HARD - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>MEDIUM HARD - CAN BE GROUDED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT - CAN BE GROUDED 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.</p> <p>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 FINGERNAIL.</p>	<p>BENCH MARK: BM #2 BINCH SPIKE IN BASE OF 24 INCH POPLAR TREE 48 LT -BY- STA 5+12 ELEVATION: 2829.39 FT.</p> <p>NOTES: BL3 CL -BL- STA 11+95.52 ELEVATION 2831.67 FEET</p>
GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS																																																																																																																																																																																										
GROUP CLASS.	A-1	A-3	A-2	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-7-8	A-7-9	A-7-10																																																																																																																																																																																							
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% PASSING	50 MX	30 MX 50 MN	10 MN	10 MX 35 MN	35 MN	35 MN	35 MN	35 MN	35 MN	35 MN	35 MN	35 MN																																																																																																																																																																																							
LIQUID LIMIT	6 MX	NP	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN	40 MX 41 MN																																																																																																																																																																																							
PLASTIC INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	16 MX	16 MX	16 MX	16 MX	16 MX																																																																																																																																																																																							
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS																																																																																																																																																																																														
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE																																																																																																																																																																																										
SLIGHTLY COMPRESSIBLE	MODERATELY COMPRESSIBLE	HIGHLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31	LIQUID LIMIT EQUAL TO 31-50	LIQUID LIMIT GREATER THAN 50																																																																																																																																																																																														
ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL																																																																																																																																																																																																
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE																																																																																																																																																																																																
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE																																																																																																																																																																																																
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME																																																																																																																																																																																																
HIGHLY ORGANIC	>10%	>20%	HIGHLY																																																																																																																																																																																																
ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION	TEST BORING	SAMPLE DESIGNATIONS																																																																																																																																																																																																	
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		SS - SPLIT SPOON SAMPLE																																																																																																																																																																																																	
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		CR - CALIFORNIA BEARING RATIO SAMPLE																																																																																																																																																																																																	
AR - AUGER REFUSAL	HI - HIGHLY	W - MOISTURE CONTENT																																																																																																																																																																																																	
BT - BORING TERMINATED	MD - MEDIUM	V - VERY																																																																																																																																																																																																	
CL - CLAY	MICA - MICACEOUS	VST - VANE SHEAR TEST																																																																																																																																																																																																	
CPT - CONE PENETRATION TEST	MOD - MODERATELY	WEA - WEATHERED																																																																																																																																																																																																	
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ARE USED TO DESCRIBE APPEARANCE.</p>	NONPLASTIC	LOW PLASTICITY	MED. PLASTICITY	HIGH PLASTICITY	DRY STRENGTH	0-5	6-15	16-25	26 OR MORE	VERY LOW					SLIGHT					MEDIUM					HIGH																																																																
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PROJECT REFERENCE NO. 33628.U	SHEET NO. 3/11
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



-YI-

PI Sta 13+58.87
 $\Delta = 17^{\circ} 36' 41.9" (LT)$
 $D = 5^{\circ} 47' 35.9"$
 $L = 304.00'$
 $T = 153.21'$
 $R = 989.00'$

PI Sta 16+42.65
 $\Delta = 16^{\circ} 33' 23.2" (LT)$
 $D = 6^{\circ} 16' 07.3"$
 $L = 264.11'$
 $T = 132.98'$
 $R = 914.00'$

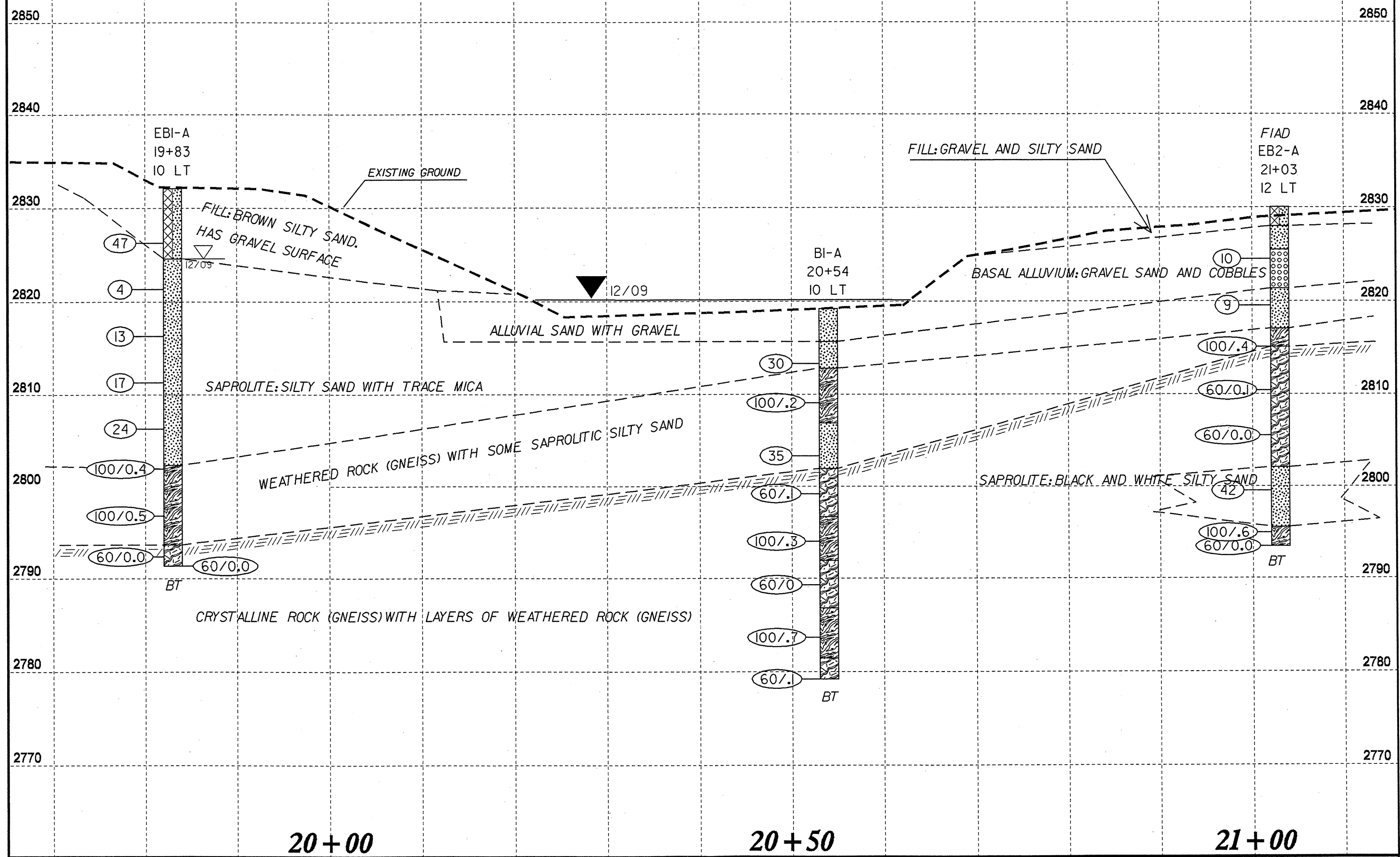
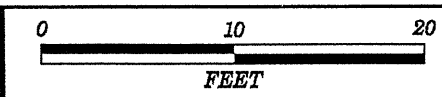
PI Sta 19+51.40
 $\Delta = 18^{\circ} 08' 03.8" (LT)$
 $D = 5^{\circ} 08' 52.3"$
 $L = 352.27'$
 $T = 177.62'$
 $R = 1,113.00'$

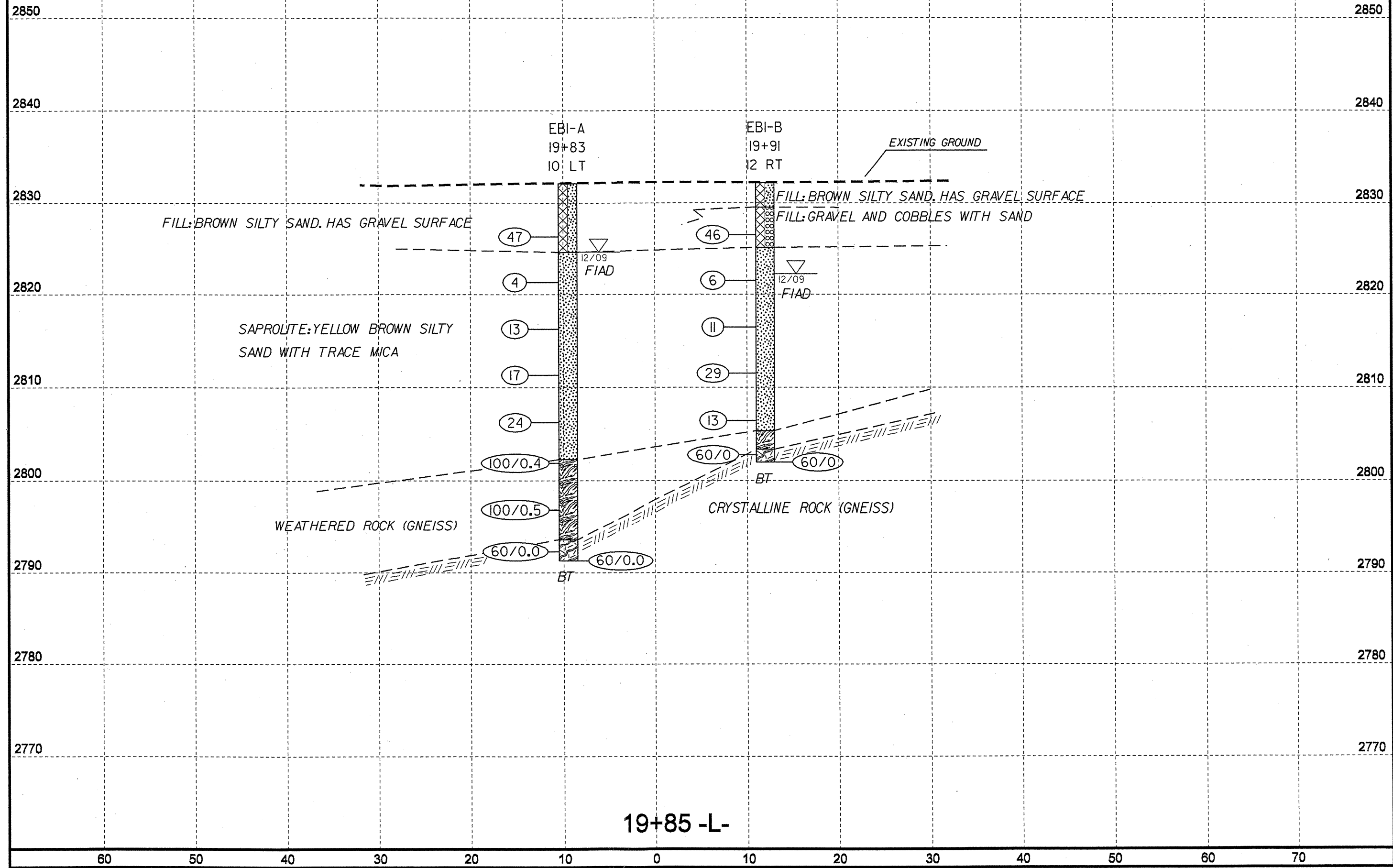
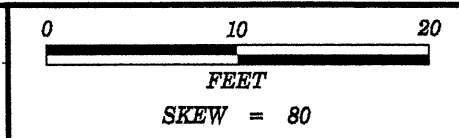
PT Sta. 19+14.83
 -L- POT Sta. 19+36.46
 -Y- POT Sta. 12+04.76
 -L- POT Sta. 19+40.00
 -DRIVE- POT Sta. 10+00.00
 PC Sta. 10+15.00

PRC Sta. 10+65.79
 PRC Sta. 11+39.66

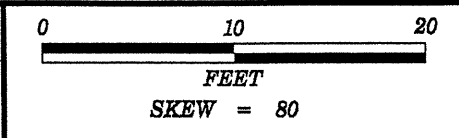
PT Sta. 12+62.08
 POT Sta. 13+00.65

PCC Sta. 17+73.78





19+85 -L-



PROJECT REFERENCE NO.	SHEET
33628.1.1	6/11
SECTION THRU B1	

2850 2850

2840 2840

2830 2830

2820 2820

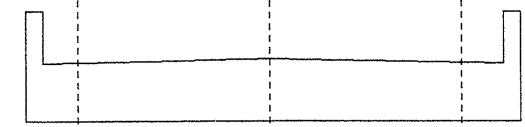
2810 2810

2800 2800

2790 2790

2780 2780

2770 2770



BI-A
20+54
10 LT

WATER SURFACE 12X09

CREEK BED

ALLUVIAL SAND WITH GRAVEL

CRYSTALLINE ROCK (GNEISS)

SAPROLITE: SILTY SAND WITH WEATHERED ROCK

30

100/.2

35

60/.1

100/.3

CRYSTALLINE ROCK (GNEISS) WITH LAYERS OF WEATHERED ROCK (GNEISS)

60/0

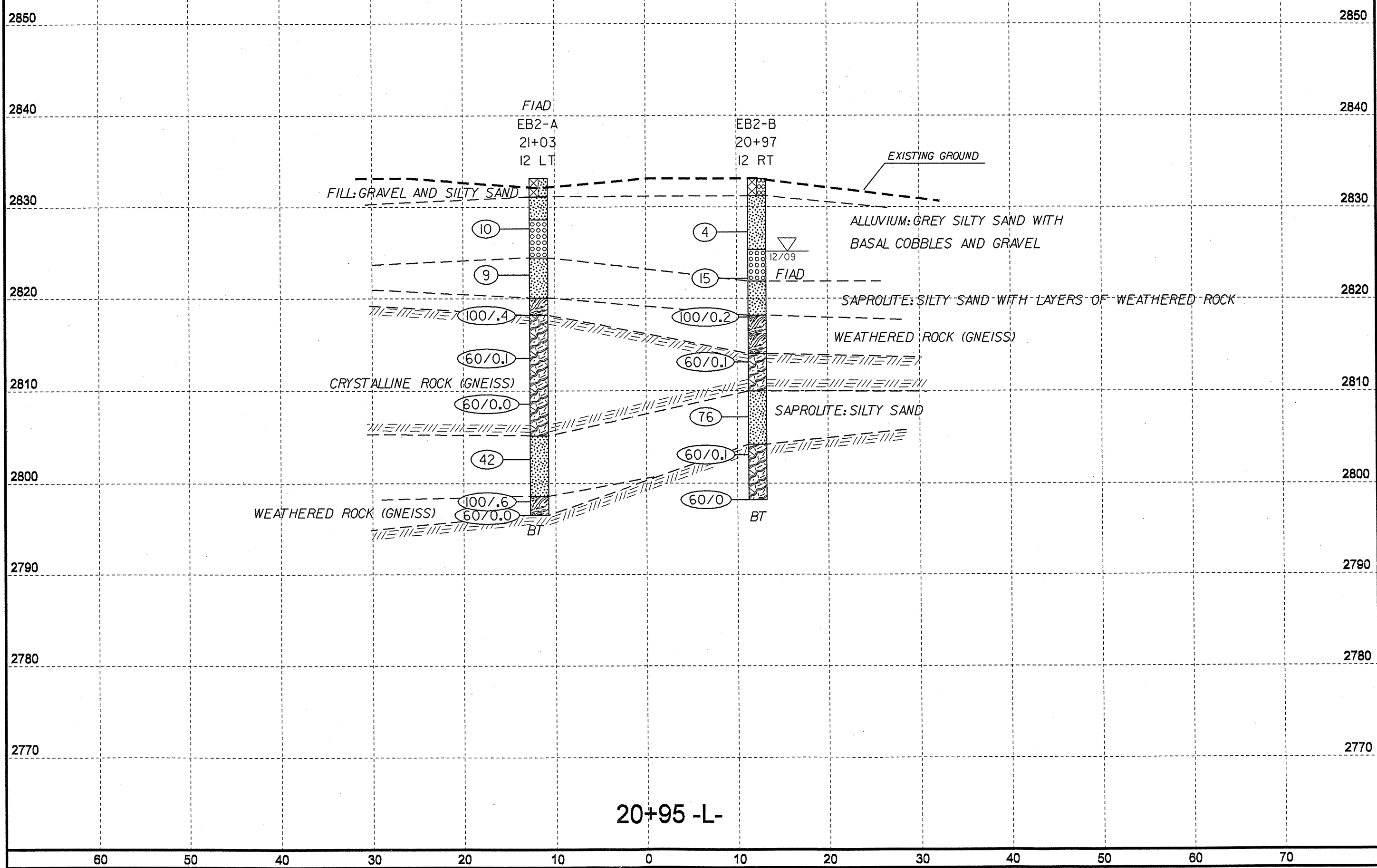
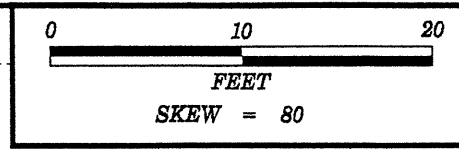
100/.7

60/.1

BT

20+55 -L-

60 50 40 30 20 10 0 10 20 30 40 50 60 70



PROJECT NO. 33628.1.1	ID. B-4289	COUNTY Transylvania	GEOLOGIST Hager, M. M.
SITE DESCRIPTION TRANSYLVANIA CO. BR. 93 ON SR-1324 (TANASEE GAP RD.0 OVER N. FORK FRENCH BROAD RIVER)			GROUND WTR (ft)
BORING NO. EB1-A	STATION 19+83	OFFSET 10ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,832.1 ft			TOTAL DEPTH 40.8 ft
DRILL MACHINE CME-550		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
START DATE 12/07/09	COMP. DATE 12/07/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 38.5 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
2835														
2830													2,832.1 GROUND SURFACE 0.0	
													FILL: BROWN SILTY SAND. HAS GRAVEL SURFACE	
2825	2,827.3	4.8		19	28	19							2,824.6 SAPROLITE: YELLOW BROWN SILTY SAND WITH TRACE MICA 7.5	
2820	2,822.3	9.8		1	1	3								
2815	2,817.3	14.8		4	5	8								
2810	2,812.3	19.8		7	9	8								
2805	2,807.3	24.8		5	10	14								
2800	2,802.3	29.8		100/0.4									2,802.3 WEATHERED ROCK (GNEISS) 29.8	
2795	2,797.3	34.8		100/0.5										
2790	2,792.3	39.8		60/0									2,793.6 CRYSTALLINE ROCK (GNEISS) 38.5	
	2,791.3	40.8		60/0									2,791.3 CRYSTALLINE ROCK (GNEISS) 40.8	
													Boring Terminated at Elevation 2,791.3 ft IN CRYSTALLINE ROCK (GNEISS)	

NCDOT BORE SINGLE B4289_GEO_BRDG_TRANSYLVANIA0093.GPJ NC_DOT_GDT 2/4/10

PROJECT NO. 33628.1.1	ID. B-4289	COUNTY Transylvania	GEOLOGIST Hager, M. M.
SITE DESCRIPTION TRANSYLVANIA CO. BR. 93 ON SR-1324 (TANASEE GAP RD.0 OVER N. FORK FRENCH BROAD RIVER)			GROUND WTR (ft)
BORING NO. EB1-B	STATION 19+91	OFFSET 12ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,832.2 ft			TOTAL DEPTH 30.2 ft
DRILL MACHINE CME-550		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
START DATE 12/04/09	COMP. DATE 12/04/09	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.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
2835														
2830													2,832.2 GROUND SURFACE 0.0	
													FILL: BROWN SILTY SAND. HAS GRAVEL SURFACE	
2825	2,827.5	4.7		39	31	15							2,829.5 FILL: GRAVEL AND COBBLES WITH SAND 2.7	
2820	2,822.5	9.7		3	2	4							2,825.1 SAPROLITE: YELLOW BROWN SILTY SAND WITH TRACE MICA 7.1	
2815	2,817.5	14.7		2	7	4								
2810	2,812.5	19.7		7	10	19								
2805	2,807.5	24.7		3	7	6								
2800	2,802.8	29.4		60/0									2,805.4 WEATHERED ROCK (GNEISS) 26.8	
	2,802.0	30.2		60/0									2,803.4 WEATHERED ROCK (GNEISS) 28.8	
													2,802.0 CRYSTALLINE ROCK (GNEISS) 30.2	
													Boring Terminated at Elevation 2,802.0 ft IN CRYSTALLINE ROCK (GNEISS)	

NCDOT BORE SINGLE B4289_GEO_BRDG_TRANSYLVANIA0093.GPJ NC_DOT_GDT 2/4/10



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

SHEET

9/11

PROJECT NO. 33628.1.1	ID. B-4289	COUNTY Transylvania	GEOLOGIST Hager, M. M.
SITE DESCRIPTION TRANSYLVANIA CO. BR. 93 ON SR-1324 (TANASEE GAP RD.0 OVER N. FORK FRENCH BROAD RIVER)			GROUND WTR (ft)
BORING NO. B1-A	STATION 20+54	OFFSET 10ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,819.2 ft	TOTAL DEPTH 40.0 ft	NORTHING N/A	EASTING N/A
DRILL MACHINE CME-550	DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic	
START DATE 12/10/09	COMP. DATE 12/10/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 17.3 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2820														2,819.2	GROUND SURFACE	0.0
															ALLUVIAL SAND WITH GRAVEL	
2815	2,814.3	4.9	1	3	27									2,815.7	SAPROLITE: BROWN SILTY SAND	3.5
														2,812.8	WEATHERED ROCK (GNEISS)	6.4
2810	2,809.3	9.9	100/2											2,806.9	SAPROLITE: BLACK AND WHITE SILTY SAND	12.3
2805	2,804.3	14.9	16	11	24									2,801.9	CRYSTALLINE ROCK (GNEISS)	17.3
2800	2,799.3	19.9	60/1											2,796.7	WEATHERED ROCK (GNEISS)	22.5
2795	2,794.3	24.9	100/3											2,791.9	CRYSTALLINE ROCK (GNEISS)	27.3
2790	2,789.3	29.9	60/0											2,786.8	WEATHERED ROCK (GNEISS)	32.4
2785	2,784.3	34.9	100/7											2,781.4	CRYSTALLINE ROCK (GNEISS)	37.8
2780	2,779.3	39.9	60/1											2,779.2	CRYSTALLINE ROCK (GNEISS)	40.0
2775															Boring Terminated at Elevation 2,779.2 ft IN CRYSTALLINE ROCK (GNEISS)	
2770																
2765																
2760																
2755																
2750																
2745																
2740																

NCDOT BORE SINGLE B4289 GEO BRDG TRANSYLVANIA0093.GPJ NC_DOT_GDT 2/4/10

PROJECT NO. 33628.1.1		ID. B-4289		COUNTY Transylvania		GEOLOGIST Hager, M. M.									
SITE DESCRIPTION TRANSYLVANIA CO. BR. 93 ON SR-1324 (TANASEE GAP RD.0 OVER N. FORK FRENCH BROAD RIVER)						GROUND WTR (ft)									
BORING NO. EB2-A		STATION 21+03		OFFSET 12ft LT		ALIGNMENT -L-									
COLLAR ELEV. 2,830.0 ft		TOTAL DEPTH 36.6 ft		NORTHING N/A		EASTING N/A									
DRILL MACHINE CME-550		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
START DATE 10/03/09		COMP. DATE 12/03/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 14.9 ft									
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					
2835															
2830														2,830.0	GROUND SURFACE 0.0
														2,828.0	FILL: GRAVEL AND SILTY SAND 2.0
2825	2,825.5	4.5	0	3	7									2,825.5	ALLUVIUM: BROWN SILTY SAND WITH SUBROUNDED GRAVEL 4.5
														2,821.3	BASAL ALLUVIUM: GRAVEL SAND AND COBBLES 8.7
2820	2,820.5	9.5	2	4	5									2,817.0	SAPROLITE: BLACK AND WHITE SILTY SAND 13.0
														2,815.1	WEATHERED ROCK (GNEISS) 14.9
2815	2,815.5	14.5	100/4												CRYSTALLINE ROCK (GNEISS)
2810	2,810.5	19.5	60/1												
2805	2,805.5	24.5	60/0												
2800	2,800.5	29.5	26	22	20									2,802.0	SAPROLITE: BLACK AND WHITE SILTY SAND 28.0
														2,795.5	WEATHERED ROCK - GRADES TO CRYSTALLINE ROCK (GNEISS) 34.5
2795	2,795.5	34.5	100/6	36										2,793.4	CRYSTALLINE ROCK (GNEISS) 36.6
															Boring Terminated at Elevation 2,793.4 ft ON CRYSTALLINE ROCK (GNEISS)
2790															
2785															
2780															
2775															
2770															
2765															
2760															
2755															

NCDOT BORE SINGLE B4289_GEO BRDG_TRANSYLVANIA0093.GPJ NC_DOT.GDT 2/4/10

PROJECT NO. 33628.1.1		ID. B-4289		COUNTY Transylvania		GEOLOGIST Hager, M. M.									
SITE DESCRIPTION TRANSYLVANIA CO. BR. 93 ON SR-1324 (TANASEE GAP RD.0 OVER N. FORK FRENCH BROAD RIVER)						GROUND WTR (ft)									
BORING NO. EB2-B		STATION 20+97		OFFSET 12ft RT		ALIGNMENT -L-									
COLLAR ELEV. 2,828.1 ft		TOTAL DEPTH 34.9 ft		NORTHING N/A		EASTING N/A									
DRILL MACHINE CME-550		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
START DATE 12/01/09		COMP. DATE 12/01/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 19.1 ft									
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					
2830															
														2,828.1	GROUND SURFACE 0.0
														2,826.2	FILL: GRAVEL AND SILTY SAND 1.9
2825															ALLUVIUM: GREY SILTY SAND
	2,823.2	4.9	1	2	2									2,820.3	ALLUVIUM: BASAL COBBLES SAND AND GRAVEL 7.8
2820														2,816.9	SAPROLITE: SILTY SAND WITH LAYERS OF WEATHERED ROCK 11.2
	2,818.2	9.9	13	11	4									2,813.2	WEATHERED ROCK (GNEISS) 14.9
2815														2,813.2	WEATHERED ROCK (GNEISS) 14.9
	2,813.2	14.9	100/2											2,809.0	CRYSTALLINE ROCK (GNEISS) 19.1
2810														2,808.2	CRYSTALLINE ROCK (GNEISS) 19.1
	2,808.2	19.9	60/0.1											2,805.0	SAPROLITE: SILTY SAND 23.1
2805														2,803.2	SAPROLITE: SILTY SAND 23.1
	2,803.2	24.9	20	33	43									2,799.2	CRYSTALLINE ROCK (GNEISS) 28.9
2800														2,798.2	CRYSTALLINE ROCK (GNEISS) 28.9
	2,798.2	29.9	60/0.1											2,793.2	Boring Terminated at Elevation 2,793.2 ft IN CRYSTALLINE ROCK (GNEISS) 34.9
2795															
	2,793.2	34.9	60/0												
2790															
2785															
2780															
2775															
2770															
2765															
2760															
2755															
2750															

NCDOT BORE SINGLE B4289_GEO BRDG_TRANSYLVANIA0093.GPJ NC_DOT.GDT 2/4/10



**FIELD
SCOUR REPORT**

WBS: 33628.1.1 TIP: B-4289 COUNTY: TRANSYLVANIA

DESCRIPTION(1): BR 93 ON SR-1324 (TANASEE GAP ROAD) OVER NORTH FORK FRENCH BROAD RIVER

EXISTING BRIDGE

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

Bridge No.: 93 Length: 95.5 Total Bents: 3 Bents in Channel: 2 Bents in Floodplain: 2
Foundation Type: TIMBER SILLS? WITH OLDER TIMBER BEAMS SUPPLEMENTED WITH FEW STEEL BEAMS

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: N/A

Interior Bents: N/A

Channel Bed: INTERMITTENT BEDROCK EXPOSED IN RIVER BED

Channel Bank: BEDROCK EXPOSED DOWNSTREAM ON WEST BANK

EXISTING SCOUR PROTECTION

Type(3): TIMBER WING WALLS

Extent(4): N/A

Effectiveness(5): GOOD

Obstructions(6): N/A

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

11/11

Channel Bed Material(7): GRAVEL, SAND, COBBLES

Channel Bank Material(8): SILTY SAND AND GRAVEL

Channel Bank Cover(9): WEEDS TREES

Floodplain Width(10): 450 FEET

Floodplain Cover(11): GRASS. PAVEMENT, TREES, STRUCTURES

Stream is(12): Aggrading Degrading XX Static

Channel Migration Tendency(13): TO THE WEST

Observations and Other Comments: THIN COARSE ALLUVIUM OVER SHALLOW BEDROCK.
HIGH ENERGY WATER HAS LOTS OF COBBLES.

Reported by: P. Q. Lockamy Date: 1/7/2010
PQ LOCKAMY

DESIGN SCOUR ELEVATIONS(14)

Feet XX Meters

BENTS

B1

2812.5														

Comparison of DSE to Hydraulics Unit theoretical scour:
**THE GEOTECHNICAL ENGINEERING UNIT AGREES WITH SCOUR DEPTHS CALCULATED ON THE
BSR DATED 10/05/09**

DSE determined by: Date:

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														