

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 38232.1.1(B-2948) F.A. PROJ. BRSTP-1104(2)
COUNTY CUMBERLAND
PROJECT DESCRIPTION BRIDGE NO. 78 ON -L- (SR 1104)
OVER LITTLE ROCKFISH CREEK

INVENTORY

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CAUTION NOTICE

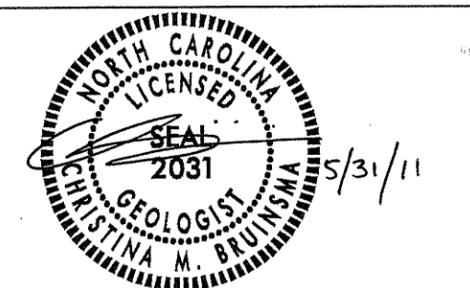
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN PLACE BY CONTACTING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

INVESTIGATED BY C.M. BRUINSMA
CHECKED BY N.T. ROBERSON
SUBMITTED BY N.T. ROBERSON
DATE MAY 2011



PROJECT: 38232.1.1
ID: B-2948

DRAWN BY: T.T. WALKER, C.M. BRUINSMA

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

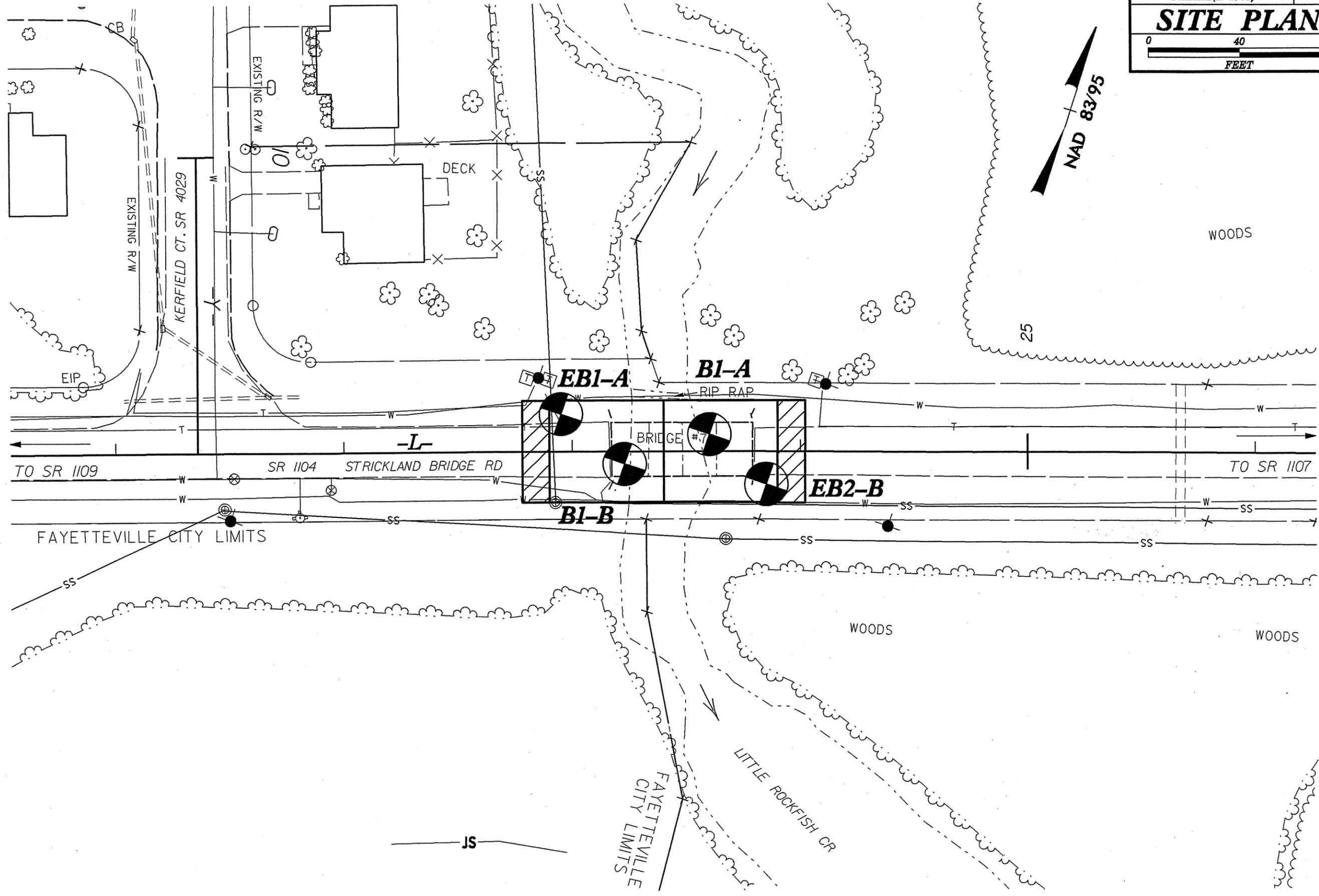
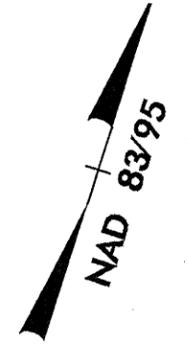
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. 38232.1(KB-2948)	SHEET NO. 2
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

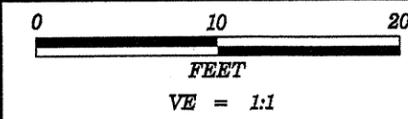
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																								
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER 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 style="text-align: center; font-size: small;">VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HEAVY PLASTIC, A-7-6</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)</p> <p>POORLY GRADED</p> <p>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.</p> <p>ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</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 DISLOADED 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 IN 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 style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <th>GENERAL CLASS.</th> <th colspan="2">GRANULAR MATERIALS (<= 35% PASSING #200)</th> <th colspan="2">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="2">ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1</td> <td>A-3</td> <td>A-2</td> <td>A-4</td> <td>A-5</td> <td>A-6</td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> </tr> <tr> <td>LIQUID LIMIT</td> <td>6</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> <td>10</td> </tr> <tr> <td>PLASTIC INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <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>SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> </tr> <tr> <td>GENERAL RATING AS A SUBGRADE</td> <td colspan="2">EXCELLENT TO GOOD</td> <td colspan="2">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> </tr> </table> <p style="text-align: center; font-size: x-small;">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	SYMBOL							% PASSING	10	10	10	10	10	10	LIQUID LIMIT	6	10	10	10	10	10	PLASTIC INDEX	0	0	0	0	0	0	GROUP INDEX	0	0	0	0	0	0	USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	GENERAL RATING AS A SUBGRADE	EXCELLENT TO GOOD		FAIR TO POOR		FAIR TO POOR	POOR	<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; font-size: x-small;"> <tr> <td>SLIGHTLY COMPRESSIBLE</td> <td>LIQUID LIMIT LESS THAN 31</td> </tr> <tr> <td>MODERATELY COMPRESSIBLE</td> <td>LIQUID LIMIT EQUAL TO 31-50</td> </tr> <tr> <td>HIGHLY COMPRESSIBLE</td> <td>LIQUID LIMIT GREATER THAN 50</td> </tr> </table> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <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>	SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31	MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50	HIGHLY COMPRESSIBLE	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	<p style="text-align: center;">WEATHERED ROCK (WR)</p> <p> NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p style="text-align: center;">CRYSTALLINE ROCK (CR)</p> <p> 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 style="text-align: center;">NON-CRYSTALLINE ROCK (NCR)</p> <p> 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 style="text-align: center;">COASTAL PLAIN SEDIMENTARY ROCK (CP)</p> <p> COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p> <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 GROVED 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 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.</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>
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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 GROVED 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 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. 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<p>DRILL UNITS:</p> <p><input type="checkbox"/> MOBILE B-_____</p> <p><input type="checkbox"/> BK-51</p> <p><input type="checkbox"/> CME-45C</p> <p><input type="checkbox"/> CME-550</p> <p><input type="checkbox"/> PORTABLE HOIST</p> <p><input type="checkbox"/> CME-45B</p>	<p>ADVANCING TOOLS:</p> <p><input type="checkbox"/> CLAY BITS</p> <p><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</p> <p><input type="checkbox"/> 8" HOLLOW AUGERS</p> <p><input type="checkbox"/> HARD FACED FINGER BITS</p> <p><input type="checkbox"/> TUNG-CARBIDE INSERTS</p> <p><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</p> <p><input type="checkbox"/> TRICONE _____ * STEEL TEETH</p> <p><input type="checkbox"/> TRICONE _____ * TUNG.-CARB.</p> <p><input type="checkbox"/> CORE BIT</p>	<p>HAMMER TYPE:</p> <p><input type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE:</p> <p><input type="checkbox"/> B _____</p> <p><input type="checkbox"/> N _____</p> <p><input type="checkbox"/> H _____</p> <p>HAND TOOLS:</p> <p><input type="checkbox"/> POST HOLE DIGGER</p> <p><input type="checkbox"/> HAND AUGER</p> <p><input type="checkbox"/> SOUNDING ROD</p> <p><input type="checkbox"/> VANE SHEAR TEST</p>																																																																																									
TERM	SPACING																																																																																										
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<p style="text-align: center;">PLASTICITY</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <th>NONPLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> <tr> <td>LOW PLASTICITY</td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td>MED. PLASTICITY</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>HIGH PLASTICITY</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </table>	NONPLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH	LOW PLASTICITY	0-5	VERY LOW	MED. PLASTICITY	6-15	SLIGHT	HIGH PLASTICITY	16-25	MEDIUM		26 OR MORE	HIGH	<p style="text-align: center;">COLOR</p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>	<p style="text-align: center;">FRAC. SPACING</p> <p>VERY WIDE: MORE THAN 10 FEET</p> <p>WIDE: 3 TO 10 FEET</p> <p>MODERATELY CLOSE: 1 TO 3 FEET</p> <p>CLOSE: 0.16 TO 1 FEET</p> <p>VERY CLOSE: LESS THAN 0.16 FEET</p> <p style="text-align: center;">BEDDING</p> <p>VERY THICKLY BEDDED: > 4 FEET</p> <p>THICKLY BEDDED: 1.5 - 4 FEET</p> <p>THINLY BEDDED: 0.16 - 1.5 FEET</p> <p>VERY THINLY BEDDED: 0.03 - 0.16 FEET</p> <p>THICKLY LAMINATED: 0.008 - 0.03 FEET</p> <p>THINLY LAMINATED: < 0.008 FEET</p> <p style="text-align: center;">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE: RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED: GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED: GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED: SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>																																																																										
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<p style="text-align: center;">NOTES:</p>			<p>BENCH MARK: BL-2, -BL-S STA. 6+73.91</p> <p>N:458771.5, E:1995130.3</p> <p style="text-align: right;">ELEVATION: 138.66 FT.</p>																																																																																								



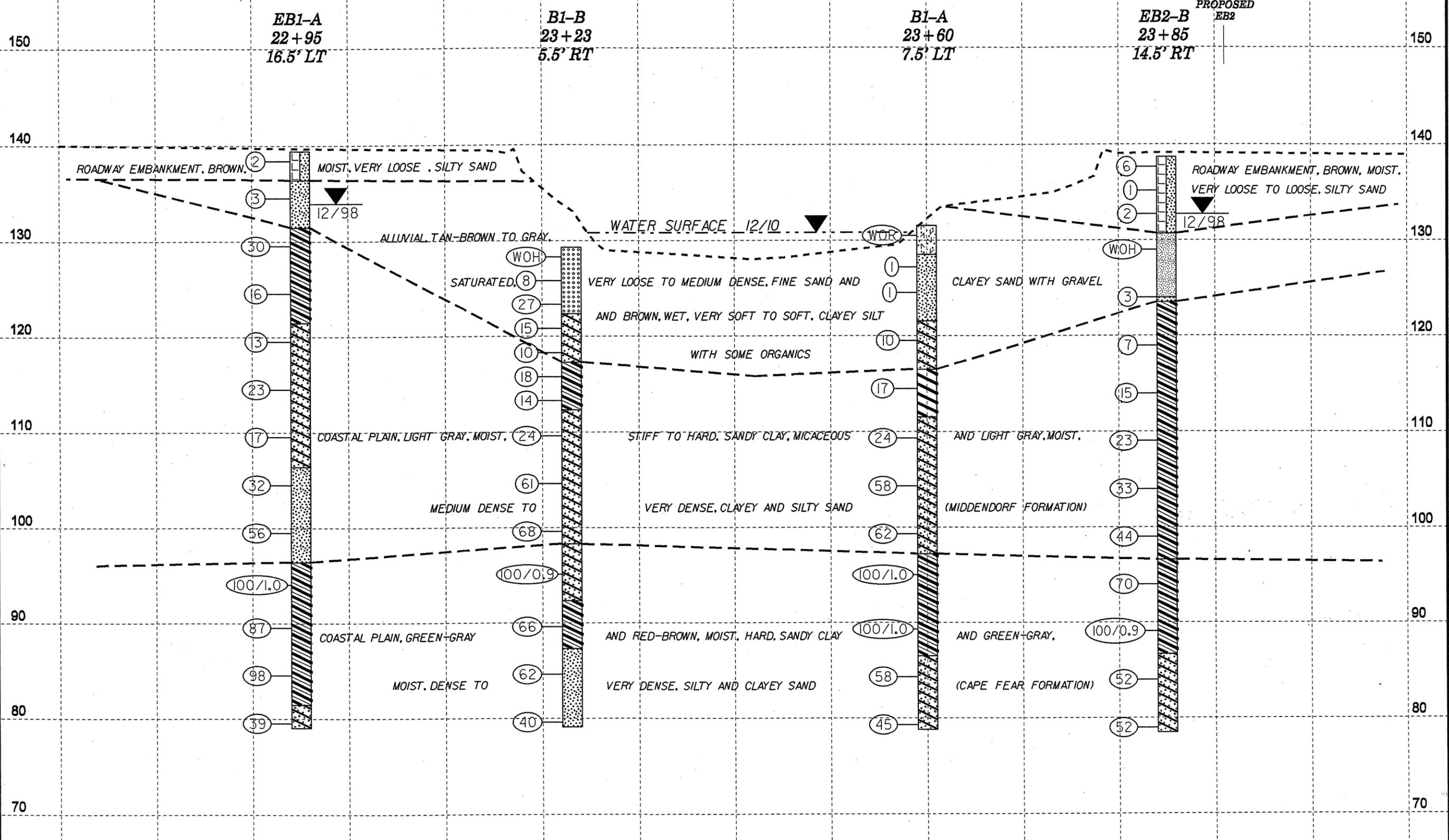
JS

PROPOSED
EB1

PROPOSED
BI



PROJECT REFERENCE NO.	SHEET
38232.1.1(B-2948)	4
PROFILE BORINGS PROJECTED ALONG -L-	



EB1-A
22+95
16.5' LT

B1-B
23+23
5.5' RT

B1-A
23+60
7.5' LT

EB2-B
23+85
14.5' RT

PROPOSED
EB2

ROADWAY EMBANKMENT, BROWN,

MOIST, VERY LOOSE, SILTY SAND

ROADWAY EMBANKMENT, BROWN, MOIST,

VERY LOOSE TO LOOSE, SILTY SAND

WATER SURFACE 127.10

ALLUVIAL TAN-BROWN TO GRAY

VERY LOOSE TO MEDIUM DENSE, FINE SAND AND
AND BROWN, WET, VERY SOFT TO SOFT, CLAYEY SILT
WITH SOME ORGANICS

CLAYEY SAND WITH GRAVEL

COASTAL PLAIN, LIGHT GRAY, MOIST,

STIFF TO HARD, SANDY CLAY, MICACEOUS

AND LIGHT GRAY, MOIST,

MEDIUM DENSE TO VERY DENSE, CLAYEY AND SILTY SAND

(MIDDENDORF FORMATION)

COASTAL PLAIN, GREEN-GRAY

AND RED-BROWN, MOIST, HARD, SANDY CLAY

AND GREEN-GRAY,

MOIST, DENSE TO VERY DENSE, SILTY AND CLAYEY SAND

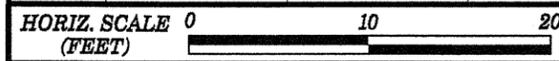
(CAPE FEAR FORMATION)

-L-

NOTE: GROUNDLINE PROFILE TAKEN FROM
HYDRAULIC REPORT TIN DATED 05/17/2011

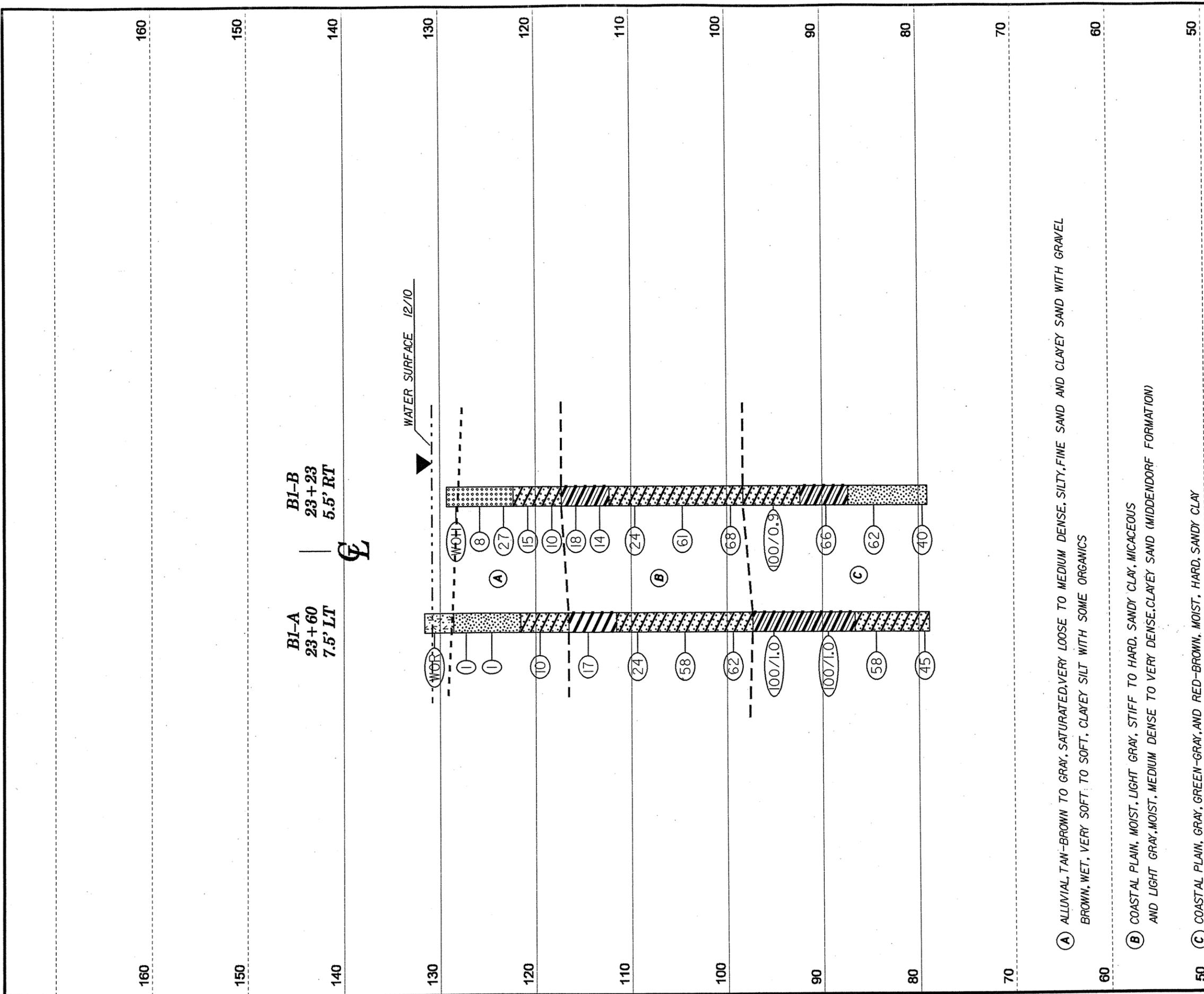
23+00

24+00



VE = 1:1

CROSS SECTION THROUGH BENT 1



- (A) ALLUVIAL, TAN-BROWN TO GRAY, SATURATED, VERY LOOSE TO MEDIUM DENSE, SILTY, FINE SAND AND CLAYEY SAND WITH GRAVEL BROWN, WET, VERY SOFT, TO SOFT, CLAYEY SILT WITH SOME ORGANICS
- (B) COASTAL PLAIN, MOIST, LIGHT GRAY, STIFF TO HARD, SANDY CLAY, MICACEOUS AND LIGHT GRAY, MOIST, MEDIUM DENSE TO VERY DENSE, CLAYEY SAND (MIDDENDORF FORMATION)
- (C) COASTAL PLAIN, GRAY, GREEN-GRAY, AND RED-BROWN, MOIST, HARD, SANDY CLAY AND GREEN-GRAY, DENSE TO VERY DENSE, SILTY AND CLAYEY SAND (CAPE FEAR FORMATION)

40
30



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 38232.1.1		TIP B-2948		COUNTY CUMBERLAND		GEOLOGIST Hart, W.T.											
SITE DESCRIPTION BRIDGE NO. 78 ON -L- (SR 1104) OVER LITTLE ROCKFISH CREEK							GROUND WTR (ft)										
BORING NO. B1-B		STATION 23+23		OFFSET 6 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 129.3 ft		TOTAL DEPTH 50.2 ft		NORTHING 458,789		EASTING 1,995,143											
DRILL RIG/HAMMER EFF./DATE GFO0062 CME-45B 83% 12/12/2005				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Contract Driller		START DATE 12/14/98		COMP. DATE 12/15/98		SURFACE WATER DEPTH 1.5ft											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
130	129.3	0.0													129.3	0.0	WATER SURFACE (12/14/98)
															129.3	0.0	GROUND SURFACE
	126.8	2.5	2	1	7												ALLUVIAL TAN-BROWN, FINE SAND
125	124.3	5.0	11	16	11												
	121.8	7.5															
120	119.3	10.0	4	4	6												GRAY, CLAYEY SAND WITH GRAVEL
	116.8	12.5	4	8	10												COASTAL PLAIN LIGHT GRAY, SANDY CLAY (MIDDENDORF FORMATION)
115	114.3	15.0	5	6	8												
	110.6	18.7	6	10	14												LIGHT GRAY, CLAYEY SAND
110	105.6	23.7	17	27	34												
	100.6	28.7	16	29	39												
100	95.6	33.7	50/0.5	50/0.4													COASTAL PLAIN LIGHT GRAY, CLAYEY SAND (CAPE FEAR FORMATION)
95	90.6	38.7	16	27	39												GRAY AND RED-BROWN, SANDY CLAY
90	85.6	43.7	18	26	36												GRAY, SILTY SAND
85	80.6	48.7	11	19	21												Boring Terminated at Elevation 79.1 ft in COASTAL PLAIN: SILTY SAND (CAPE FEAR FORMATION)

WBS 38232.1.1		TIP B-2948		COUNTY CUMBERLAND		GEOLOGIST Hart, W.T.											
SITE DESCRIPTION BRIDGE NO. 78 ON -L- (SR 1104) OVER LITTLE ROCKFISH CREEK							GROUND WTR (ft)										
BORING NO. EB2-B		STATION 23+85		OFFSET 15 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 138.7 ft		TOTAL DEPTH 60.2 ft		NORTHING 458,801		EASTING 1,995,204											
DRILL RIG/HAMMER EFF./DATE GFO0062 CME-45B 83% 12/12/2005				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Contract Driller		START DATE 12/17/98		COMP. DATE 12/15/98		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
140	138.7	0.0	1	3	3										138.7	0.0	GROUND SURFACE
	136.2	2.5	1	0	1												ROADWAY EMBANKMENT YELLOW-TAN AND GRAY-BROWN, SILTY SAND
135	133.7	5.0	1	1	1												
	130.0	8.7	WOH	WOH	WOH												ALLUVIAL DARK BROWN, ORGANIC, CLAYEY SILT
130	125.0	13.7	WOH	1	2												TAN-BROWN, SILTY SAND
125	120.0	18.7	1	3	4												COASTAL PLAIN LT. GRAY, SLIGHTLY MICACEOUS, SANDY CLAY (MIDDENDORF FORMATION)
120	115.0	23.7	5	7	8												
115	110.0	28.7	6	12	11												
110	105.0	33.7	14	17	16												
105	100.0	38.7	18	22	22												
100	95.0	43.7	22	27	43												COASTAL PLAIN GRAY-GREEN AND RED-BROWN, SLIGHTLY MICACEOUS, SANDY CLAY (CAPE FEAR FORMATION)
95	90.0	48.7	32	68/0.4													
90	85.0	53.7	16	21	31												GRAY-GREEN, SLIGHTLY MICACEOUS, CLAYEY SAND
85	80.0	58.7	16	23	29												Boring Terminated at Elevation 78.5 ft in COASTAL PLAIN: CLAYEY SAND (CAPE FEAR FORMATION)

NCDOT BORE DOUBLE B2948_GEO_BH_BRD0078.GPJ NC_DOT.GDT 5/31/11

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-15	17 LT	22+95	4.7-5.4	A-2-4(0)	23	NP	35.4	53.5	9.1	2.0	100	81	14	-	-
SS-16	17 LT	22+95	8.9-10.4	A-6(13)	35	13	1.0	7.5	41.0	50.5	100	99	96	17.5	-
SS-17	17 LT	22+95	18.9-20.4	A-2-6(0)	27	12	58.6	19.0	8.3	14.1	97	67	23	-	-
SS-18	17 LT	22+95	33.9-35.4	A-2-4(0)	36	3	63.6	23.0	11.3	2.0	98	58	15	-	-
SS-19	17 LT	22+95	43.9-44.3	A-6(7)	35	16	20.0	24.6	37.2	18.2	100	88	61	17.2	-
SS-20	17 LT	22+95	58.9-60.4	A-2-6(0)	35	14	42.4	34.7	10.7	12.1	94	74	25	-	-

B1-A (PREVIOUSLY B2-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-8	8 LT	23+60	0.0-1.5	A-5(2)	55	NP	10.1	41.6	40.2	8.1	98	92	56	-	-
SS-9	8 LT	23+60	3.3-4.8	A-2-4(0)	33	NP	19.8	66.1	12.1	2.0	100	96	19	-	-
SS-10	8 LT	23+60	11.0-12.5	A-2-6(0)	30	13	40.6	30.9	10.3	18.2	98	78	29	-	-
SS-11	8 LT	23+60	16.0-17.5	A-7-6(16)	43	29	18.6	20.6	22.4	38.4	100	89	65	-	-
SS-12	8 LT	23+60	21.2-22.7	A-2-6(2)	39	23	54.3	13.9	9.5	22.2	100	68	33	-	-
SS-13	8 LT	23+60	36.2-37.0	A-6(11)	39	18	15.6	22.6	17.4	44.4	100	91	68	-	-
SS-14	8 LT	23+60	46.2-47.7	A-2-6(0)	30	11	45.3	33.1	17.6	4.0	97	73	25	-	-

B1-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-1	6 RT	23+23	5.0-6.5	A-3(0)	20	NP	44.8	50.7	2.4	2.0	100	85	6	-	-
SS-2	6 RT	23+23	10.0-11.5	A-2-6(1)	31	17	62.4	14.7	6.7	16.2	96	59	23	-	-
SS-3	6 RT	23+23	12.5-14.0	A-6(4)	29	13	13.5	36.4	20.8	30.3	99	92	54	12.2	-
SS-4	6 RT	23+23	18.7-20.2	A-2-6(1)	31	17	57.6	16.4	18.0	8.1	100	63	28	-	-
SS-5	6 RT	23+23	28.7-30.2	A-2-7(2)	42	19	36.4	35.2	22.4	6.1	99	76	33	21.2	-
SS-6	6 RT	23+23	38.7-40.2	A-6(5)	38	12	16.0	32.1	39.8	12.1	100	92	59	22.5	-
SS-7	6 RT	23+23	43.7-45.2	A-2-4(0)	34	5	38.0	34.1	23.8	4.0	98	79	32	-	-

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	15 RT	23+85	2.5-4.0	A-2-4(0)	21	NP	35.2	47.7	13.1	4.0	98	81	20	-	-
SS-22	15 RT	23+85	8.7-9.2	A-4(2)	31	17	2.6	51.1	34.1	12.1	100	100	55	55.3	-
SS-23	15 RT	23+85	18.7-20.2	A-6(2)	32	14	14.5	47.1	16.2	22.2	100	91	43	-	-
SS-24	15 RT	23+85	33.7-35.2	A-6(4)	35	18	37.8	22.6	27.5	12.1	97	73	43	-	-
SS-25	15 RT	23+85	43.7-45.2	A-6(7)	34	17	20.2	31.7	36.0	12.1	100	88	57	16	-
SS-26	15 RT	23+85	53.7-55.2	A-2-6(0)	30	12	46.7	26.1	15.2	12.1	99	71	31	-	-



**FIELD
 SCOUR REPORT**

WBS: 38232.1.1 TIP: B-2948 COUNTY: Cumberland

DESCRIPTION(1): Bridge No. 78 on -L- (SR 1104) over Little Rockfish Creek

EXISTING BRIDGE

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

Bridge No.: 78 Length: 62 Total Bents: 5 Bents in Channel: 2 Bents in Floodplain: 3
 Foundation Type: Timber piles replaced with steel H-pile crutch bents.

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: none visible

Interior Bents: none visible

Channel Bed: none visible

Channel Bank: none visible

EXISTING SCOUR PROTECTION

Type(3): Timber Abutments and wingwalls

Extent(4): Width of embankment

Effectiveness(5): Effective

Obstructions(6): Rip-rap placed over buried water line immediately upstream of bridge.

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): fine to coarse sands with occasional gravel

Channel Bank Material(8): clayey silt with organics

Channel Bank Cover(9): Grass and brush

Floodplain Width(10): approximately 300 feet

Floodplain Cover(11): grass, trees, and brush

Stream is(12): Aggrading _____ Degrading _____ Static

Channel Migration Tend.(13): none apparent

Observations and Other Comments: Three utility lines cross above the creek surface, downstream of the existing structure.

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

B1									
116.0									

Comparison of DSE to Hydraulics Unit theoretical scour:
 The DSE has been raised to 116 feet, 4 feet above the Hydraulic Unit theoretical scour.

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									

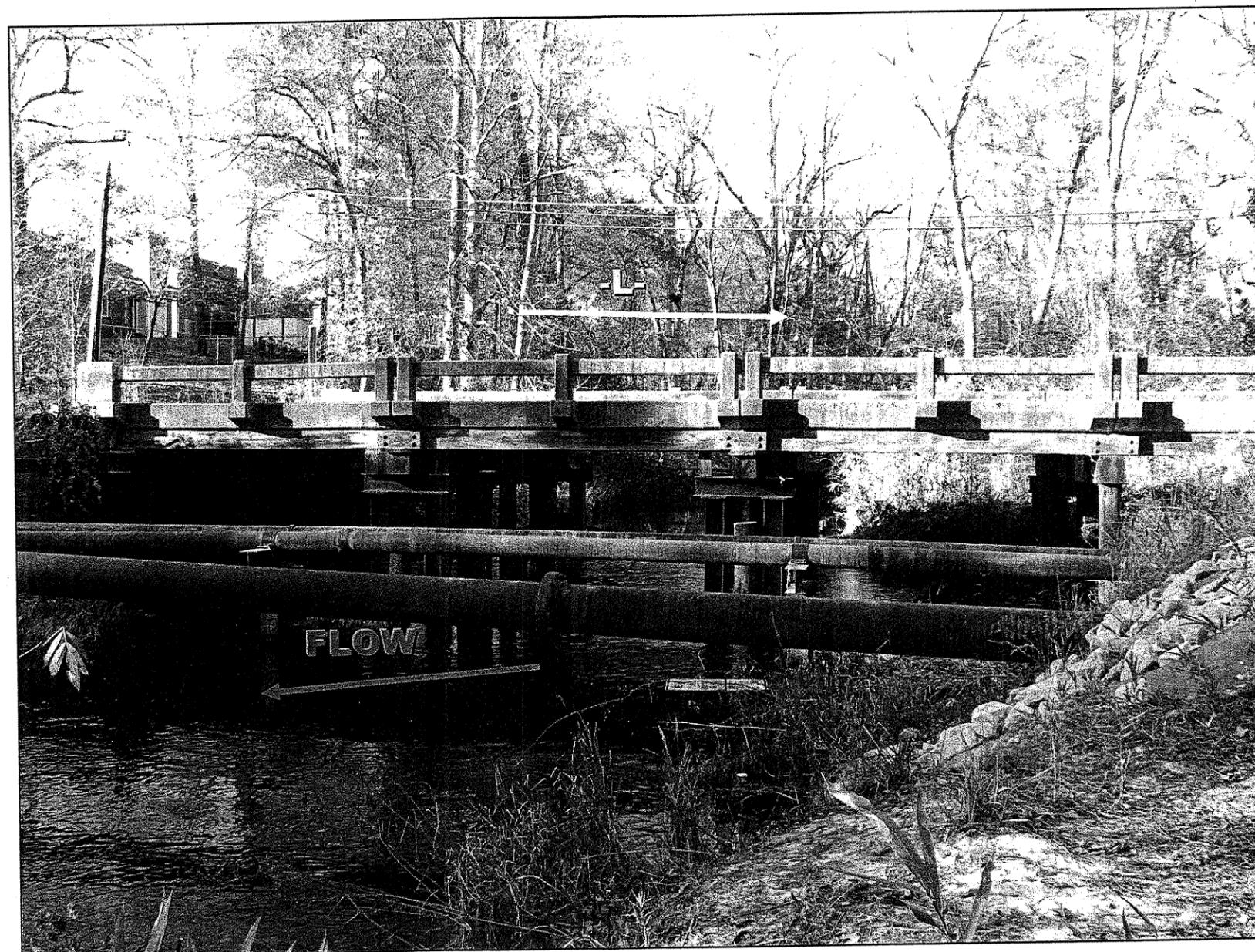
See Sheet 8,
 "Soil Test Results",
 for samples:
 SS-1
 SS-2
 SS-22

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

Date: 5/18/2011

SITE PHOTOGRAPH

Bridge No. 78 on -L- (SR 1104) over Little Rockfish Creek



Looking West towards Bent 1