

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	38459.1.1 (B-4666)	1	15

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 38459.1.1 (B-4666) F.A. PROJ. BRZ-1314(4)
COUNTY WARREN
PROJECT DESCRIPTION BRIDGE NO. 80 ON -L- (SR 1314) OVER
HAWTREE CREEK AT STA. 16+02.5

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE(S)
5-9	CROSS SECTION(S)
10-14	BORE LOG(S)
15	SITE PHOTOGRAPH(S)

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 1919 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

PROJECT: 38459.1.1 ID: B-4666

PERSONNEL

O. B. OTT

CONSULTANT:

F&R

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

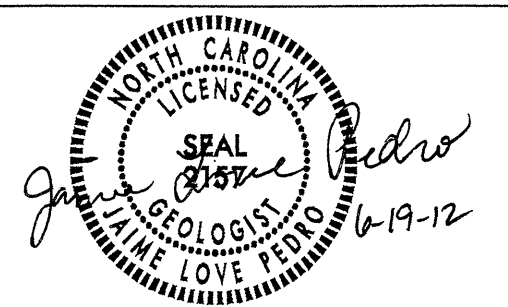
SUBMITTED BY J. L. PEDRO

DATE JUNE 2012

DRAWN BY: J. L. PEDRO

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

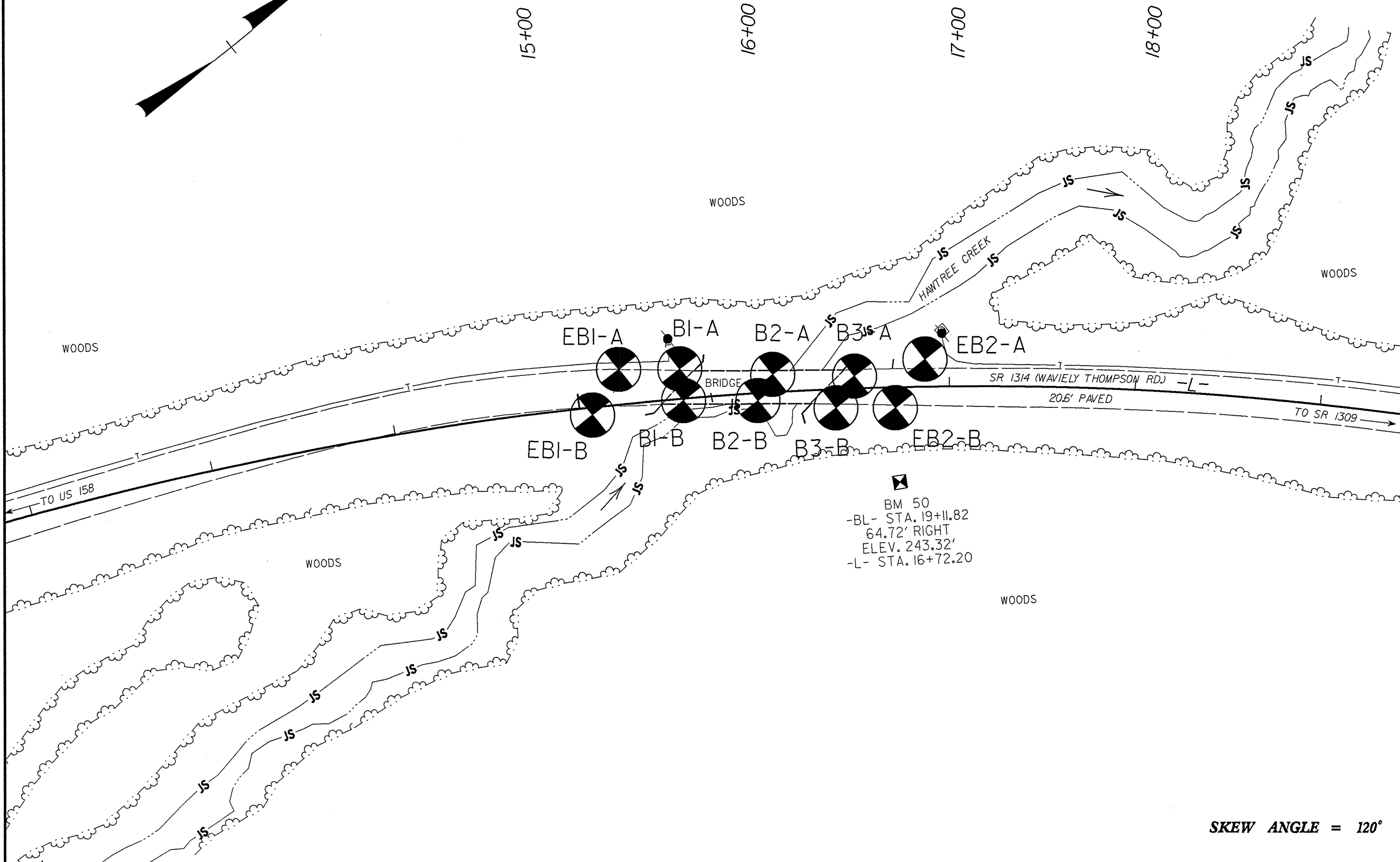
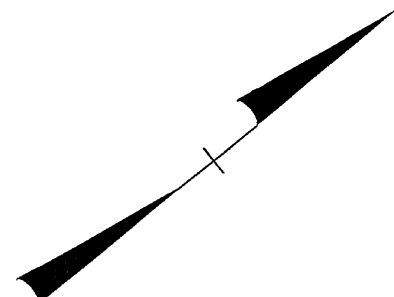
PROJECT REFERENCE NO. 38459.11(B-4666)	SHEET NO. 2
---	----------------

SUBSURFACE INVESTIGATION

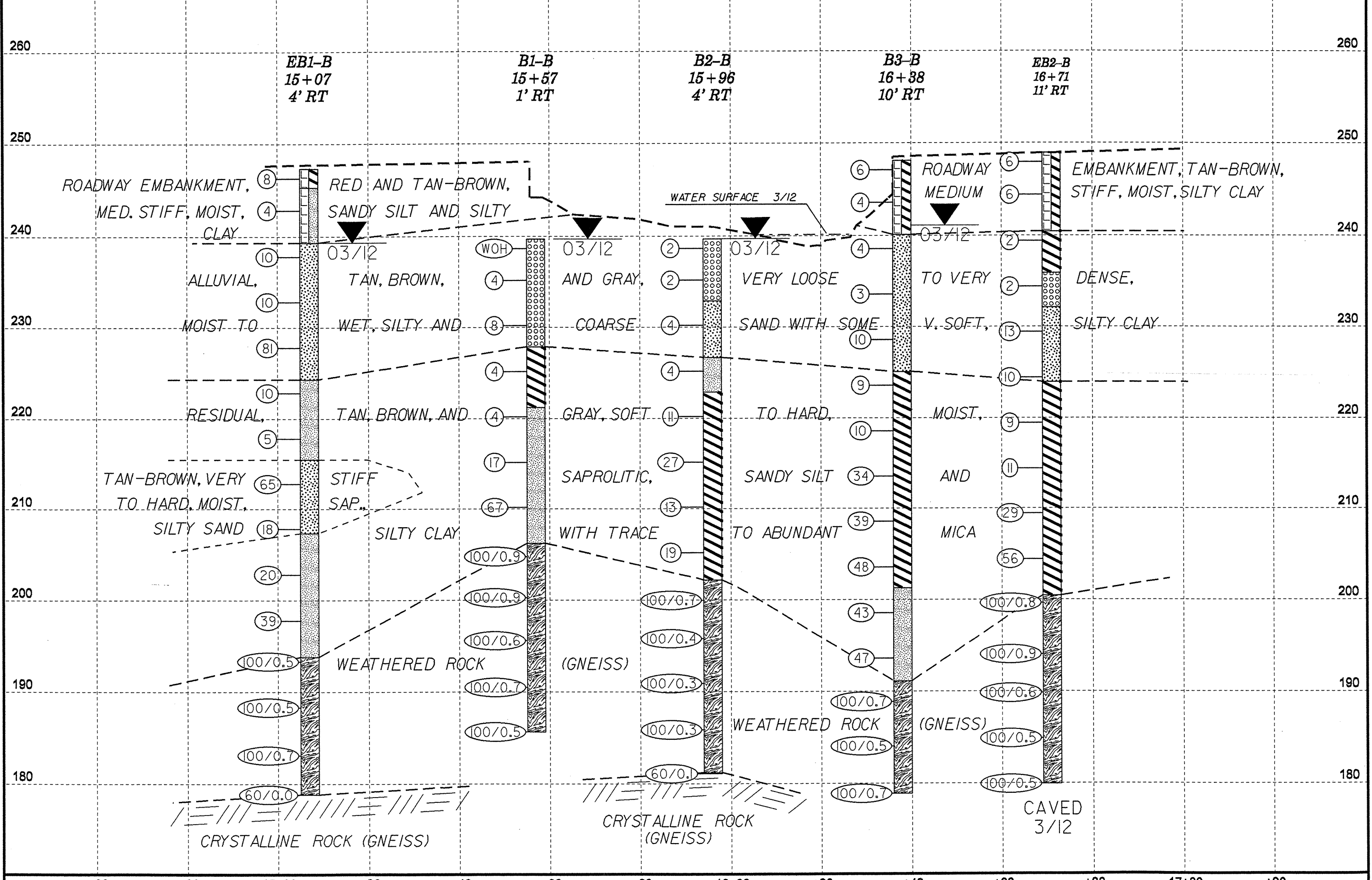
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

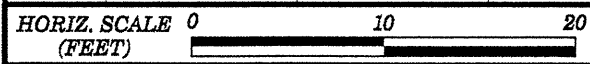
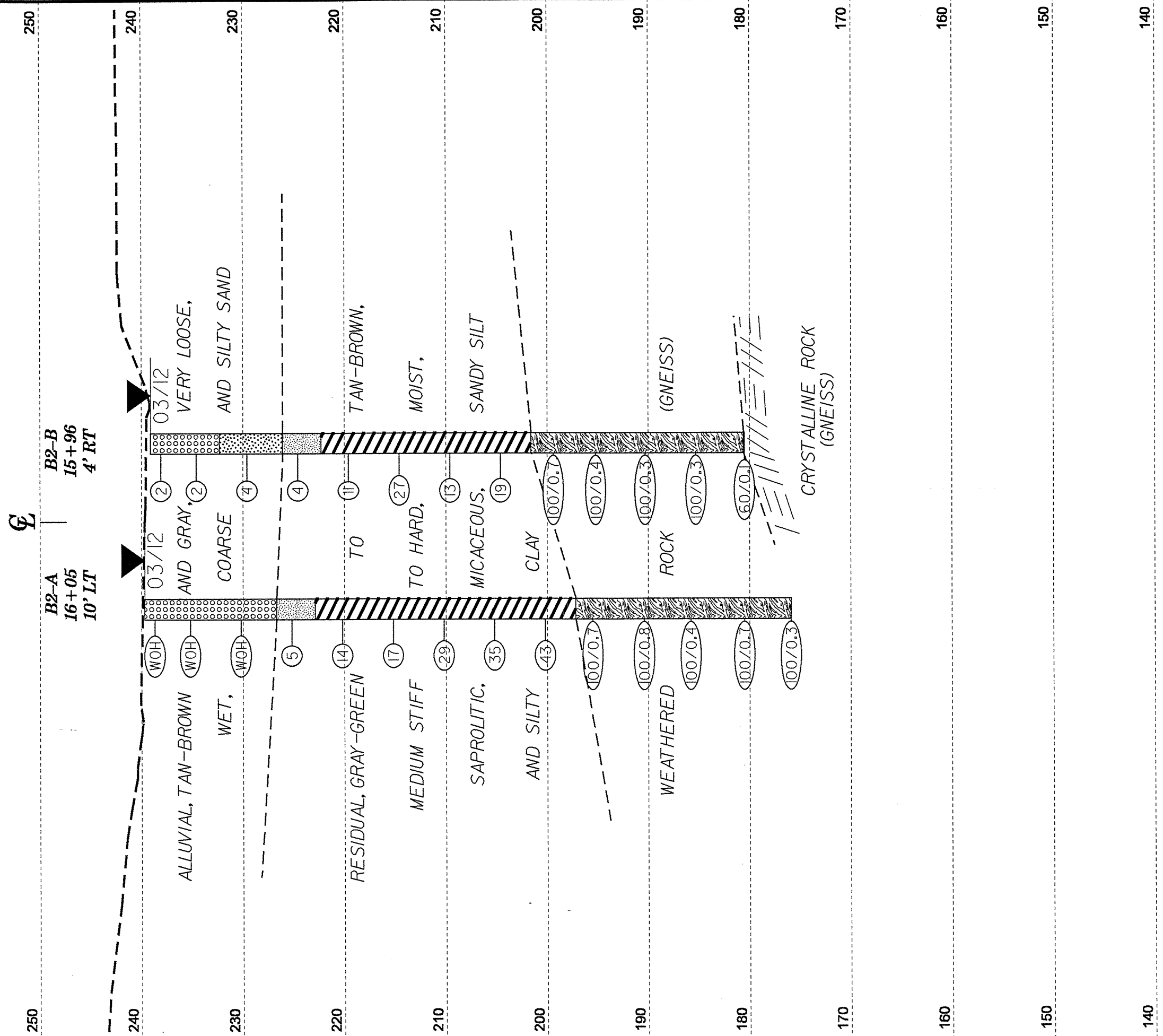
SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (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: VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH 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) POORLY GRADED GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p align="center">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>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 (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. 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 (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.</p>																																																																
<p align="center">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th>GENERAL CLASS.</th> <th>GROUP CLASS.</th> <th>SYMBOL</th> <th>% PASSING</th> <th>LIQUID LIMIT</th> <th>PLASTIC INDEX</th> <th>GROUP INDEX</th> <th>USUAL TYPES OF MAJOR MATERIALS</th> <th>GEN. RATING AS A SUBGRADE</th> </tr> <tr> <td>GRANULAR MATERIALS (<= 35% PASSING #200)</td> <td>A-1, A-2, A-3, A-4, A-5, A-6, A-7</td> <td>[Symbol]</td> <td>50, 30, 15, 10, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100</td> <td>0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96, 100</td> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100</td> <td>0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100</td> <td>EXCELLENT TO GOOD, FAIR TO POOR, POOR, UNSUITABLE</td> </tr> </table>		GENERAL CLASS.	GROUP CLASS.	SYMBOL	% PASSING	LIQUID LIMIT	PLASTIC INDEX	GROUP INDEX	USUAL TYPES OF MAJOR MATERIALS	GEN. RATING AS A SUBGRADE	GRANULAR MATERIALS (<= 35% PASSING #200)	A-1, A-2, A-3, A-4, A-5, A-6, A-7	[Symbol]	50, 30, 15, 10, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100	0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96, 100	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	EXCELLENT TO GOOD, FAIR TO POOR, POOR, UNSUITABLE	<p align="center">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p align="center">WEATHERING</p> <table border="1"> <tr> <th>WEATHERED ROCK (WR)</th> <th>CRYSTALLINE ROCK (CR)</th> <th>NON-CRYSTALLINE ROCK (NCR)</th> <th>COASTAL PLAIN SEDIMENTARY ROCK (CP)</th> </tr> <tr> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> <td>[Symbol]</td> </tr> </table>		WEATHERED ROCK (WR)	CRYSTALLINE ROCK (CR)	NON-CRYSTALLINE ROCK (NCR)	COASTAL PLAIN SEDIMENTARY ROCK (CP)	[Symbol]	[Symbol]	[Symbol]	[Symbol]																																								
GENERAL CLASS.	GROUP CLASS.	SYMBOL	% PASSING	LIQUID LIMIT	PLASTIC INDEX	GROUP INDEX	USUAL TYPES OF MAJOR MATERIALS	GEN. RATING AS A SUBGRADE																																																														
GRANULAR MATERIALS (<= 35% PASSING #200)	A-1, A-2, A-3, A-4, A-5, A-6, A-7	[Symbol]	50, 30, 15, 10, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100	0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96, 100	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	EXCELLENT TO GOOD, FAIR TO POOR, POOR, UNSUITABLE																																																															
WEATHERED ROCK (WR)	CRYSTALLINE ROCK (CR)	NON-CRYSTALLINE ROCK (NCR)	COASTAL PLAIN SEDIMENTARY ROCK (CP)																																																																			
[Symbol]	[Symbol]	[Symbol]	[Symbol]																																																																			
<p align="center">CONSISTENCY OR DENSENESS</p> <table border="1"> <tr> <th>PRIMARY SOIL TYPE</th> <th>COMPACTNESS OR CONSISTENCY</th> <th>RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)</th> <th>RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</th> </tr> <tr> <td>GENERALLY GRANULAR MATERIAL (NON-COHESIVE)</td> <td>VERY LOOSE, LOOSE, MEDIUM DENSE, DENSE, VERY DENSE</td> <td><4, 4 TO 10, 10 TO 30, 30 TO 50, >50</td> <td>N/A</td> </tr> <tr> <td>GENERALLY SILT-CLAY MATERIAL (COHESIVE)</td> <td>VERY SOFT, SOFT, MEDIUM STIFF, STIFF, VERY STIFF, HARD</td> <td><2, 2 TO 4, 4 TO 8, 8 TO 15, 15 TO 30, >30</td> <td><0.25, 0.25 TO 0.50, 0.5 TO 1.0, 1 TO 2, 2 TO 4, >4</td> </tr> </table>		PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)	GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE, LOOSE, MEDIUM DENSE, DENSE, VERY DENSE	<4, 4 TO 10, 10 TO 30, 30 TO 50, >50	N/A	GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT, SOFT, MEDIUM STIFF, STIFF, VERY STIFF, HARD	<2, 2 TO 4, 4 TO 8, 8 TO 15, 15 TO 30, >30	<0.25, 0.25 TO 0.50, 0.5 TO 1.0, 1 TO 2, 2 TO 4, >4	<p align="center">MISCELLANEOUS SYMBOLS</p> <table border="1"> <tr> <td>[Symbol]</td> <td>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td>[Symbol]</td> <td>SPT DPT DMT TEST BORING</td> <td>[Symbol]</td> <td>TEST BORING W/ CORE</td> </tr> <tr> <td>[Symbol]</td> <td>SOIL SYMBOL</td> <td>[Symbol]</td> <td>AUGER BORING</td> <td>[Symbol]</td> <td>SPT N-VALUE</td> </tr> <tr> <td>[Symbol]</td> <td>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td>[Symbol]</td> <td>CORE BORING</td> <td>[Symbol]</td> <td>SPT REFUSAL</td> </tr> <tr> <td>[Symbol]</td> <td>INFERRED SOIL BOUNDARY</td> <td>[Symbol]</td> <td>MONITORING WELL</td> <td>[Symbol]</td> <td></td> </tr> <tr> <td>[Symbol]</td> <td>INFERRED ROCK LINE</td> <td>[Symbol]</td> <td>PIEZOMETER INSTALLATION</td> <td>[Symbol]</td> <td></td> </tr> <tr> <td>[Symbol]</td> <td>ALLUVIAL SOIL BOUNDARY</td> <td>[Symbol]</td> <td>SLOPE INDICATOR INSTALLATION</td> <td>[Symbol]</td> <td></td> </tr> <tr> <td>[Symbol]</td> <td>DIP & DIP DIRECTION OF ROCK STRUCTURES</td> <td>[Symbol]</td> <td>CONE PENETROMETER TEST</td> <td>[Symbol]</td> <td></td> </tr> <tr> <td>[Symbol]</td> <td></td> <td>[Symbol]</td> <td>SOUNDING ROD</td> <td>[Symbol]</td> <td></td> </tr> </table>		[Symbol]	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION	[Symbol]	SPT DPT DMT TEST BORING	[Symbol]	TEST BORING W/ CORE	[Symbol]	SOIL SYMBOL	[Symbol]	AUGER BORING	[Symbol]	SPT N-VALUE	[Symbol]	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT	[Symbol]	CORE BORING	[Symbol]	SPT REFUSAL	[Symbol]	INFERRED SOIL BOUNDARY	[Symbol]	MONITORING WELL	[Symbol]		[Symbol]	INFERRED ROCK LINE	[Symbol]	PIEZOMETER INSTALLATION	[Symbol]		[Symbol]	ALLUVIAL SOIL BOUNDARY	[Symbol]	SLOPE INDICATOR INSTALLATION	[Symbol]		[Symbol]	DIP & DIP DIRECTION OF ROCK STRUCTURES	[Symbol]	CONE PENETROMETER TEST	[Symbol]		[Symbol]		[Symbol]	SOUNDING ROD	[Symbol]								
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)																																																																			
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE, LOOSE, MEDIUM DENSE, DENSE, VERY DENSE	<4, 4 TO 10, 10 TO 30, 30 TO 50, >50	N/A																																																																			
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT, SOFT, MEDIUM STIFF, STIFF, VERY STIFF, HARD	<2, 2 TO 4, 4 TO 8, 8 TO 15, 15 TO 30, >30	<0.25, 0.25 TO 0.50, 0.5 TO 1.0, 1 TO 2, 2 TO 4, >4																																																																			
[Symbol]	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION	[Symbol]	SPT DPT DMT TEST BORING	[Symbol]	TEST BORING W/ CORE																																																																	
[Symbol]	SOIL SYMBOL	[Symbol]	AUGER BORING	[Symbol]	SPT N-VALUE																																																																	
[Symbol]	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT	[Symbol]	CORE BORING	[Symbol]	SPT REFUSAL																																																																	
[Symbol]	INFERRED SOIL BOUNDARY	[Symbol]	MONITORING WELL	[Symbol]																																																																		
[Symbol]	INFERRED ROCK LINE	[Symbol]	PIEZOMETER INSTALLATION	[Symbol]																																																																		
[Symbol]	ALLUVIAL SOIL BOUNDARY	[Symbol]	SLOPE INDICATOR INSTALLATION	[Symbol]																																																																		
[Symbol]	DIP & DIP DIRECTION OF ROCK STRUCTURES	[Symbol]	CONE PENETROMETER TEST	[Symbol]																																																																		
[Symbol]		[Symbol]	SOUNDING ROD	[Symbol]																																																																		
<p align="center">TEXTURE OR GRAIN SIZE</p> <table border="1"> <tr> <th>U.S. STD. SIEVE SIZE</th> <th>4</th> <th>10</th> <th>40</th> <th>60</th> <th>200</th> <th>270</th> </tr> <tr> <th>OPENING (MM)</th> <td>4.75</td> <td>2.00</td> <td>0.42</td> <td>0.25</td> <td>0.075</td> <td>0.053</td> </tr> </table> <table border="1"> <tr> <th>BOULDER (BLDR.)</th> <th>COBBLE (COB.)</th> <th>GRAVEL (GR.)</th> <th>COARSE SAND (CSE, SD.)</th> <th>FINE SAND (F SD.)</th> <th>SILT (SL.)</th> <th>CLAY (CL.)</th> </tr> <tr> <td>GRAIN SIZE MM IN.</td> <td>305 12</td> <td>75 3</td> <td>2.0</td> <td>0.25</td> <td>0.05</td> <td>0.005</td> </tr> </table>		U.S. STD. SIEVE SIZE	4	10	40	60	200	270	OPENING (MM)	4.75	2.00	0.42	0.25	0.075	0.053	BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE, SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)	GRAIN SIZE MM IN.	305 12	75 3	2.0	0.25	0.05	0.005	<p align="center">ABBREVIATIONS</p> <table border="1"> <tr> <td>AR - AUGER REFUSAL</td> <td>MED. - MEDIUM MICA - MICACEOUS</td> <td>VST - VANE SHEAR TEST</td> </tr> <tr> <td>BT - BORING TERMINATED</td> <td>MOD. - MODERATELY NP - NON PLASTIC</td> <td>WEA. - WEATHERED</td> </tr> <tr> <td>CL - CLAY</td> <td>ORG. - ORGANIC</td> <td>UNIT WEIGHT</td> </tr> <tr> <td>CPT - CONE PENETRATION TEST</td> <td>PMT - PRESSUREMETER TEST</td> <td>DRY UNIT WEIGHT</td> </tr> <tr> <td>CSE - COARSE</td> <td>SAP. - SAPROLITIC</td> <td>SAMPLE ABBREVIATIONS</td> </tr> <tr> <td>DMT - DILATOMETER TEST</td> <td>SD - SAND, SANDY</td> <td>S - BULK</td> </tr> <tr> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>SL - SILT, SILTY</td> <td>SS - SPLIT SPOON</td> </tr> <tr> <td>e - VOID RATIO</td> <td>SLI - SLIGHTLY</td> <td>ST - SHELBY TUBE</td> </tr> <tr> <td>F - FINE</td> <td>TCR - TRICONE REFUSAL</td> <td>RS - ROCK</td> </tr> <tr> <td>FOSS. - FOSSILIFEROUS</td> <td>W - MOISTURE CONTENT</td> <td>RT - RECOMPACTED TRIAXIAL</td> </tr> <tr> <td>FRAC. - FRACTURED, FRACTURES</td> <td></td> <td>CBR - CALIFORNIA BEARING RATIO</td> </tr> <tr> <td>FRAGS. - FRAGMENTS</td> <td></td> <td></td> </tr> <tr> <td>HL - HIGHLY</td> <td></td> <td></td> </tr> </table>		AR - AUGER REFUSAL	MED. - MEDIUM MICA - MICACEOUS	VST - VANE SHEAR TEST	BT - BORING TERMINATED	MOD. - MODERATELY NP - NON PLASTIC	WEA. - WEATHERED	CL - CLAY	ORG. - ORGANIC	UNIT WEIGHT	CPT - CONE PENETRATION TEST	PMT - PRESSUREMETER TEST	DRY UNIT WEIGHT	CSE - COARSE	SAP. - SAPROLITIC	SAMPLE ABBREVIATIONS	DMT - DILATOMETER TEST	SD - SAND, SANDY	S - BULK	DPT - DYNAMIC PENETRATION TEST	SL - SILT, SILTY	SS - SPLIT SPOON	e - VOID RATIO	SLI - SLIGHTLY	ST - SHELBY TUBE	F - FINE	TCR - TRICONE REFUSAL	RS - ROCK	FOSS. - FOSSILIFEROUS	W - MOISTURE CONTENT	RT - RECOMPACTED TRIAXIAL	FRAC. - FRACTURED, FRACTURES		CBR - CALIFORNIA BEARING RATIO	FRAGS. - FRAGMENTS			HL - HIGHLY		
U.S. STD. SIEVE SIZE	4	10	40	60	200	270																																																																
OPENING (MM)	4.75	2.00	0.42	0.25	0.075	0.053																																																																
BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE, SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)																																																																
GRAIN SIZE MM IN.	305 12	75 3	2.0	0.25	0.05	0.005																																																																
AR - AUGER REFUSAL	MED. - MEDIUM MICA - MICACEOUS	VST - VANE SHEAR TEST																																																																				
BT - BORING TERMINATED	MOD. - MODERATELY NP - NON PLASTIC	WEA. - WEATHERED																																																																				
CL - CLAY	ORG. - ORGANIC	UNIT WEIGHT																																																																				
CPT - CONE PENETRATION TEST	PMT - PRESSUREMETER TEST	DRY UNIT WEIGHT																																																																				
CSE - COARSE	SAP. - SAPROLITIC	SAMPLE ABBREVIATIONS																																																																				
DMT - DILATOMETER TEST	SD - SAND, SANDY	S - BULK																																																																				
DPT - DYNAMIC PENETRATION TEST	SL - SILT, SILTY	SS - SPLIT SPOON																																																																				
e - VOID RATIO	SLI - SLIGHTLY	ST - SHELBY TUBE																																																																				
F - FINE	TCR - TRICONE REFUSAL	RS - ROCK																																																																				
FOSS. - FOSSILIFEROUS	W - MOISTURE CONTENT	RT - RECOMPACTED TRIAXIAL																																																																				
FRAC. - FRACTURED, FRACTURES		CBR - CALIFORNIA BEARING RATIO																																																																				
FRAGS. - FRAGMENTS																																																																						
HL - HIGHLY																																																																						
<p align="center">SOIL MOISTURE - CORRELATION OF TERMS</p> <table border="1"> <tr> <th>SOIL MOISTURE SCALE (ATTERBERG LIMITS)</th> <th>FIELD MOISTURE DESCRIPTION</th> <th>GUIDE FOR FIELD MOISTURE DESCRIPTION</th> </tr> <tr> <td>LL - LIQUID LIMIT</td> <td>- SATURATED - (SAT.)</td> <td>USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</td> </tr> <tr> <td>PL - PLASTIC LIMIT</td> <td>- WET - (W)</td> <td>SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</td> </tr> <tr> <td>OM - OPTIMUM MOISTURE</td> <td>- MOIST - (M)</td> <td>SOLID; AT OR NEAR OPTIMUM MOISTURE</td> </tr> <tr> <td>SL - SHRINKAGE LIMIT</td> <td>- DRY - (D)</td> <td>REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</td> </tr> </table>		SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION	LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	OM - OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE	SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	<p align="center">EQUIPMENT USED ON SUBJECT PROJECT</p> <table border="1"> <tr> <td>DRILL UNITS:</td> <td>ADVANCING TOOLS:</td> <td>HAMMER TYPE:</td> </tr> <tr> <td><input type="checkbox"/> MOBILE B-___</td> <td><input checked="" type="checkbox"/> CLAY BITS</td> <td><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</td> </tr> <tr> <td><input type="checkbox"/> BK-51</td> <td><input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</td> <td></td> </tr> <tr> <td><input type="checkbox"/> CME-45C</td> <td><input checked="" type="checkbox"/> 8" HOLLOW AUGERS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> CME-550</td> <td><input type="checkbox"/> HARD FACED FINGER BITS</td> <td></td> </tr> <tr> <td><input type="checkbox"/> PORTABLE HOIST</td> <td><input type="checkbox"/> TUNG-CARBIDE INSERTS</td> <td></td> </tr> <tr> <td></td> <td><input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</td> <td></td> </tr> <tr> <td></td> <td><input checked="" type="checkbox"/> TRICONE *STEEL TEETH</td> <td></td> </tr> <tr> <td><input checked="" type="checkbox"/> CME-55</td> <td><input type="checkbox"/> TRICONE *TUNG-CARB.</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/> CORE BIT</td> <td></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td></td> </tr> </table>		DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	<input type="checkbox"/> MOBILE B-___	<input checked="" type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL	<input type="checkbox"/> BK-51	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER		<input type="checkbox"/> CME-45C	<input checked="" type="checkbox"/> 8" HOLLOW AUGERS		<input type="checkbox"/> CME-550	<input type="checkbox"/> HARD FACED FINGER BITS		<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS			<input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER			<input checked="" type="checkbox"/> TRICONE *STEEL TEETH		<input checked="" type="checkbox"/> CME-55	<input type="checkbox"/> TRICONE *TUNG-CARB.		<input type="checkbox"/>	<input type="checkbox"/> CORE BIT		<input type="checkbox"/>	<input type="checkbox"/>																				
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION																																																																				
LL - LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																																																																				
PL - PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																																																																				
OM - OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE																																																																				
SL - SHRINKAGE LIMIT	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																																																																				
DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:																																																																				
<input type="checkbox"/> MOBILE B-___	<input checked="" type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL																																																																				
<input type="checkbox"/> BK-51	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER																																																																					
<input type="checkbox"/> CME-45C	<input checked="" type="checkbox"/> 8" HOLLOW AUGERS																																																																					
<input type="checkbox"/> CME-550	<input type="checkbox"/> HARD FACED FINGER BITS																																																																					
<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS																																																																					
	<input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER																																																																					
	<input checked="" type="checkbox"/> TRICONE *STEEL TEETH																																																																					
<input checked="" type="checkbox"/> CME-55	<input type="checkbox"/> TRICONE *TUNG-CARB.																																																																					
<input type="checkbox"/>	<input type="checkbox"/> CORE BIT																																																																					
<input type="checkbox"/>	<input type="checkbox"/>																																																																					
<p align="center">PLASTICITY</p> <table border="1"> <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 align="center">FRACTURE SPACING</p> <table border="1"> <tr> <th>TERM</th> <th>SPACING</th> </tr> <tr> <td>VERY WIDE</td> <td>MORE THAN 10 FEET</td> </tr> <tr> <td>WIDE</td> <td>3 TO 10 FEET</td> </tr> <tr> <td>MODERATELY CLOSE</td> <td>1 TO 3 FEET</td> </tr> <tr> <td>CLOSE</td> <td>0.16 TO 1 FEET</td> </tr> <tr> <td>VERY CLOSE</td> <td>LESS THAN 0.16 FEET</td> </tr> </table>		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																																								
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																																																																				
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																																																																					
<p 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 align="center">BEDDING</p> <table border="1"> <tr> <th>TERM</th> <th>THICKNESS</th> </tr> <tr> <td>VERY THICKLY BEDDED</td> <td>> 4 FEET</td> </tr> <tr> <td>THICKLY BEDDED</td> <td>1.5 - 4 FEET</td> </tr> <tr> <td>THINLY BEDDED</td> <td>0.16 - 1.5 FEET</td> </tr> <tr> <td>VERY THINLY BEDDED</td> <td>0.03 - 0.16 FEET</td> </tr> <tr> <td>THICKLY LAMINATED</td> <td>0.008 - 0.03 FEET</td> </tr> <tr> <td>THINLY LAMINATED</td> <td>< 0.008 FEET</td> </tr> </table>		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																																																					
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																																																																					
<p align="center">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>		<p align="center">NOTES:</p> <p>BENCH MARK: BM# 50 - -L- Sta. 16+72, Offset 50.5' Rt</p> <p align="right">ELEVATION: 243.32 FT.</p>																																																																				

PROJECT REFERENCE NO.	SHEET
38459.1.1 (B-4666)	3
SITE PLAN	



SKEW ANGLE = 120°





VE = 1:1

CROSS SECTION THROUGH BENT 2

140
130
120

250
240

250
240

230

230

220

220

210

210

200

200

190

190

180

180

170

170

160

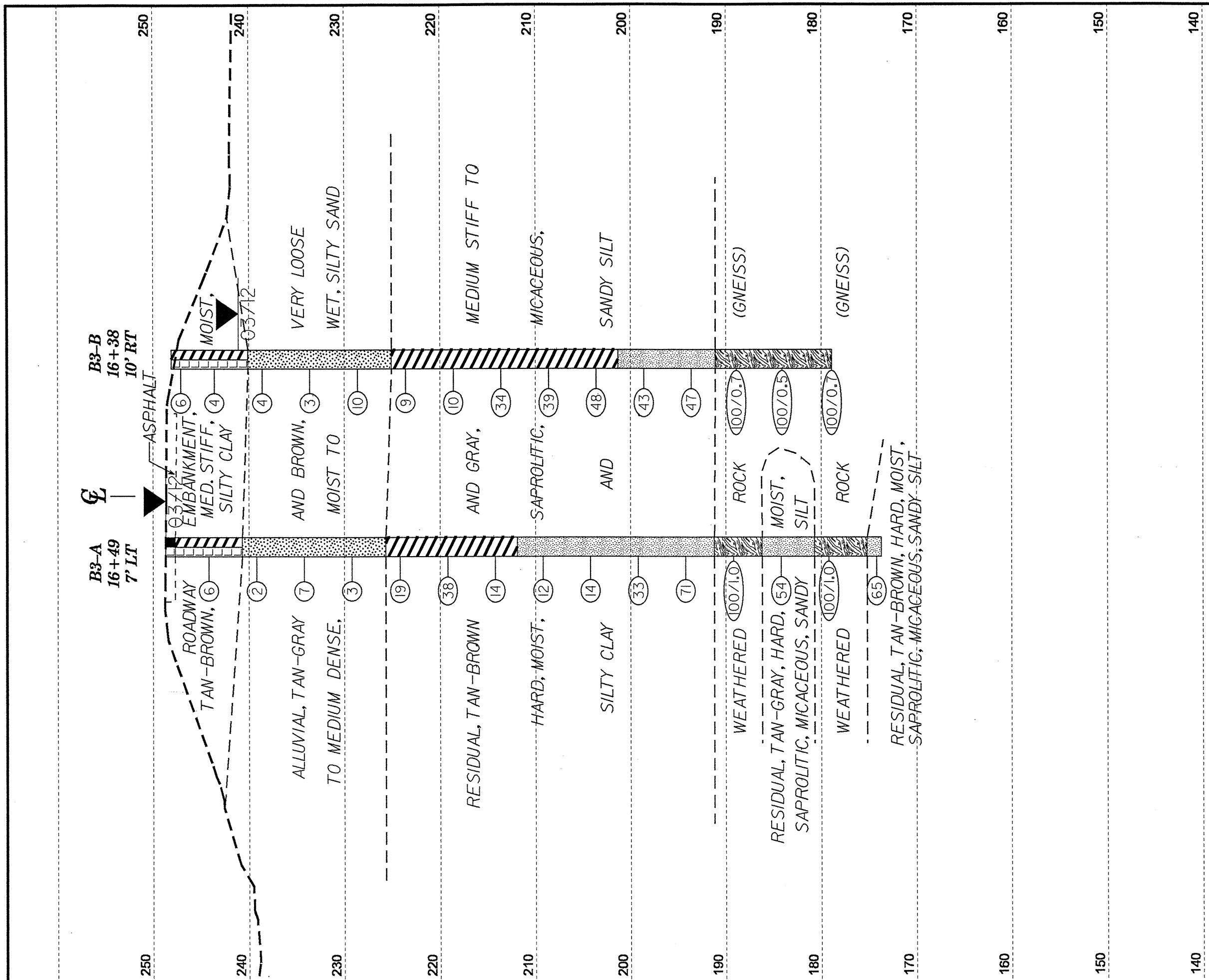
160

150

150

140

140

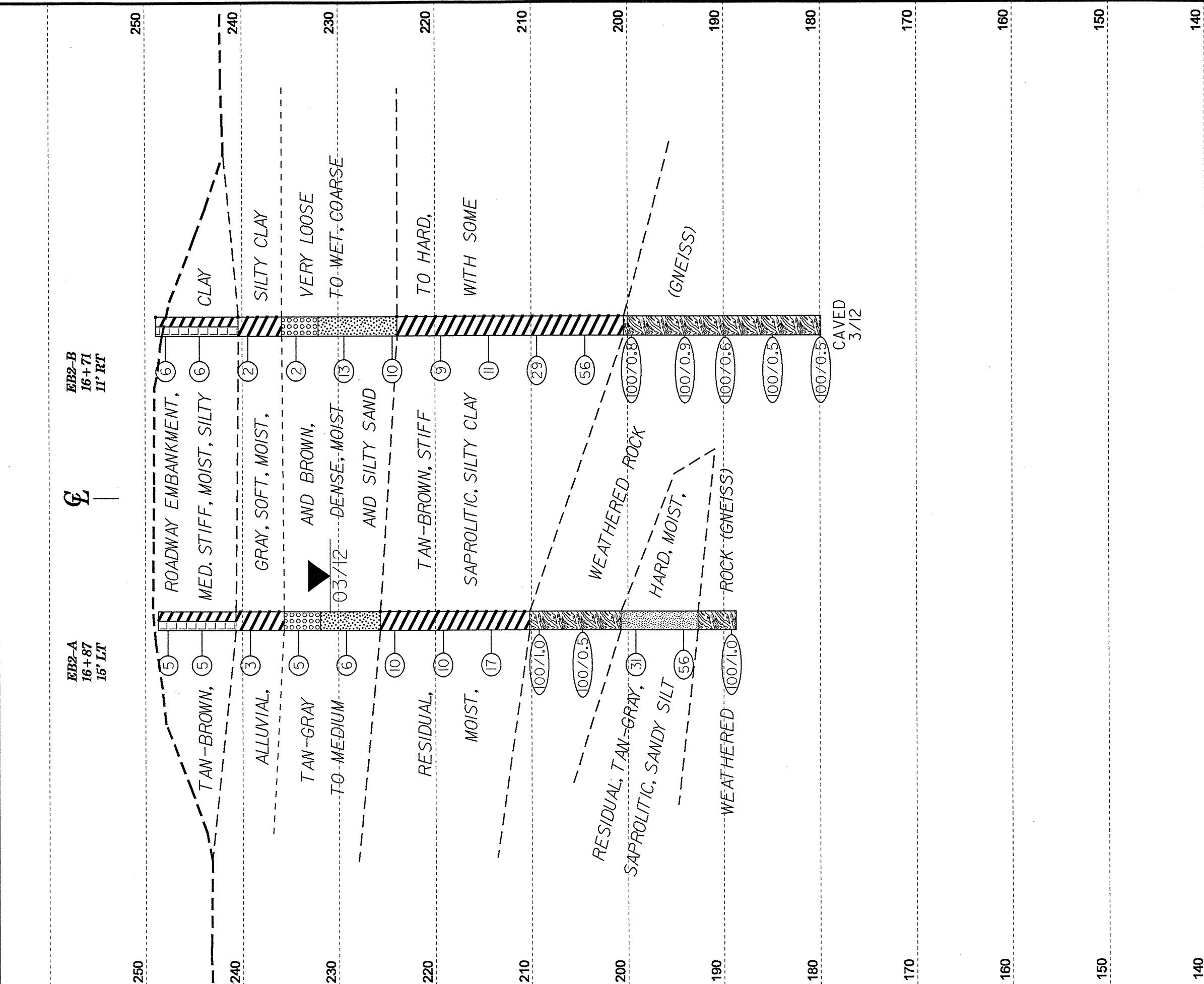


HORIZ. SCALE 0 (FEET) 10 20

VE = 1:1

CROSS SECTION THROUGH BENT 3

140
130
120



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 38459.1.1		TIP B-4666		COUNTY WARREN		GEOLOGIST Oti, O. B.									
SITE DESCRIPTION BRIDGE NO. 80 ON -L- (SR 1314) OVER HAWTREE CREEK							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 15+23		OFFSET 19 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 248.0 ft		TOTAL DEPTH 73.9 ft		NORTHING 991,688		EASTING 2,257,808									
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 1 2/15/2011		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER Contract Driller		START DATE 03/21/12		COMP. DATE 03/21/12		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	
250	248.0	0.0											248.0	GROUND SURFACE	0.0
245	244.5	3.5	4	4	4								246.0	ROADWAY EMBANKMENT RED-BROWN, SILTY CLAY TAN-BROWN, SANDY SILT	2.0
240	239.5	8.5	2	3	2								240.0	ALLUVIAL TAN-GRAY, SILTY SAND	8.0
235	234.5	13.5	1	2	3										
230	229.5	18.5	2	3	4										
225	224.5	23.5	4	5	6										
220	219.5	28.5	2	4	9								223.0	RESIDUAL TAN-BROWN, SAPROLITIC, SANDY SILT	25.0
215	214.5	33.5	3	3	6										
210	209.5	38.5	3	6	8										
205	204.5	43.5	2	4	9								205.0	TAN-BROWN, SILTY SAND WITH TRACE MICA	43.0
200	199.5	48.5	11	23	25								198.0	WEATHERED ROCK (GNEISS)	50.0
195	194.5	53.5	7	16	22										
190	189.5	58.5	100/0.3												
185	184.5	63.5	100/0.5												
180	179.5	68.5	100/0.4												
175	174.5	73.5	100/0.4										174.1	Boring Terminated at Elevation 174.1 ft IN WEATHERED ROCK (GNEISS)	73.9

WBS 38459.1.1		TIP B-4666		COUNTY WARREN		GEOLOGIST Oti, O. B.									
SITE DESCRIPTION BRIDGE NO. 80 ON -L- (SR 1314) OVER HAWTREE CREEK							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 15+07		OFFSET 4 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 247.3 ft		TOTAL DEPTH 68.5 ft		NORTHING 991,662		EASTING 2,257,819									
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 1 2/15/2011		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Contract Driller		START DATE 03/19/12		COMP. DATE 03/19/12		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	
250	247.3	0.0											247.3	GROUND SURFACE	0.0
245	243.8	3.5	3	3	5								245.3	ROADWAY EMBANKMENT RED-BROWN, SILTY CLAY TAN-BROWN, SANDY SILT	2.0
240	238.8	8.5	2	2	2								239.3	ALLUVIAL TAN-GRAY, SILTY SAND	8.0
235	233.8	13.5	4	5	5										
230	228.8	18.5	4	5	5										
225	223.8	23.5	26	40	41								224.3	RESIDUAL TAN-BROWN, SANDY SILT WITH TRACE MICA	23.0
220	218.8	28.5	3	4	6										
215	213.8	33.5	2	2	3								215.5	TAN-BROWN, SAPROLITIC, SILTY SAND	31.8
210	208.8	38.5	20	33	32								207.3	TAN, GRAY, AND BROWN, SAPROLITIC, SANDY SILT WITH SOME MICA	40.0
205	203.8	43.5	6	8	10								193.8	WEATHERED ROCK (GNEISS)	53.5
200	198.8	48.5	7	7	13										
195	193.8	53.5	12	15	24										
190	188.8	58.5	100/0.5												
185	183.8	63.5	40	60/0.2											
180	178.8	68.5	100/0.7										178.8	Boring Terminated with Standard Penetration Test Refusal at Elevation 178.8 ft ON CRYSTALLINE ROCK (GNEISS)	68.5

NCDOT BORE DOUBLE B4666 GEO BH.GPJ NC_DOT.GDT 6/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 38459.1.1	TIP B-4666	COUNTY WARREN	GEOLOGIST Oti, O. B.
SITE DESCRIPTION BRIDGE NO. 80 ON -L- (SR 1314) OVER HAWTREE CREEK			GROUND WTR (ft)
BORING NO. B1-A	STATION 15+56	OFFSET 16 ft LT	ALIGNMENT -L-
COLLAR ELEV. 248.2 ft	TOTAL DEPTH 64.7 ft	NORTHING 991,714	EASTING 2,257,829
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 1 2/15/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Contract Driller	START DATE 03/27/12	COMP. DATE 03/27/12	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	
250													248.2	GROUND SURFACE	0.0
	248.2	0.0											248.2	ROADWAY EMBANKMENT TAN-BROWN, SILTY CLAY	
245	244.7	3.5											240.2	ALLUVIAL TAN-GRAY, SILTY CLAY	8.0
240	239.7	8.5											234.2	GRAY, SILTY SAND	14.0
235	234.7	13.5											225.2	RESIDUAL TAN, BROWN, AND GRAY, SAPROLITIC, MICACEOUS, SANDY SILT	23.0
230	229.7	18.5											216.4	TAN, BROWN, SAPROLITIC, MICACEOUS, SILTY CLAY	31.8
225	224.7	23.5											204.7	WEATHERED ROCK (GNEISS)	43.5
220	219.7	28.5													
215	214.7	33.5													
210	209.7	38.5													
205	204.7	43.5													
200	199.7	48.5													
195	194.7	53.5													
190	189.7	58.5													
185	184.7	63.5													
													183.5	Boring Terminated at Elevation 183.5 ft IN WEATHERED ROCK (GNEISS)	64.7

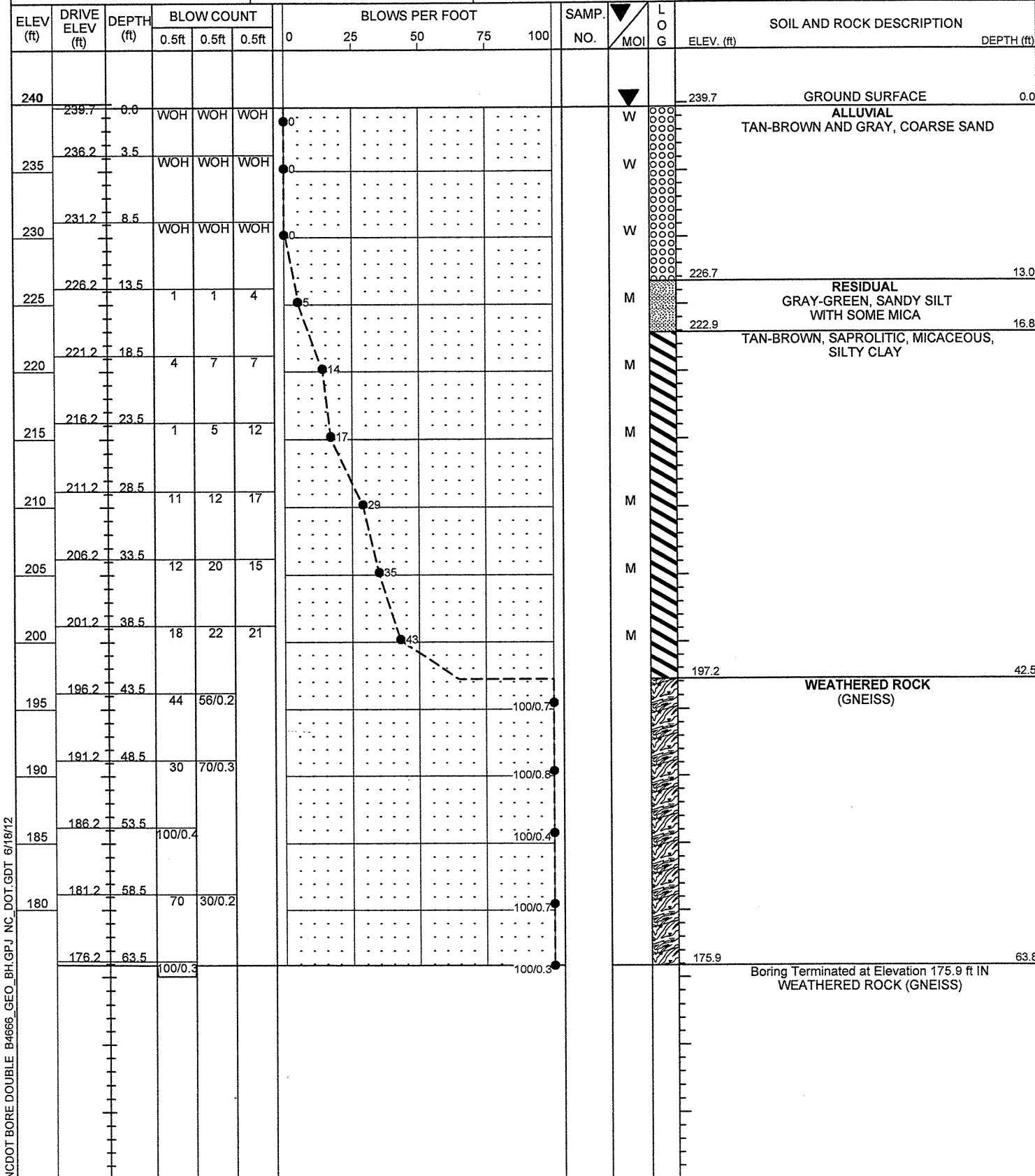
WBS 38459.1.1	TIP B-4666	COUNTY WARREN	GEOLOGIST Oti, O. B.
SITE DESCRIPTION BRIDGE NO. 80 ON -L- (SR 1314) OVER HAWTREE CREEK			GROUND WTR (ft)
BORING NO. B1-B	STATION 15+57	OFFSET 1 ft RT	ALIGNMENT -L-
COLLAR ELEV. 239.7 ft	TOTAL DEPTH 54.0 ft	NORTHING 991,705	EASTING 2,257,843
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 1 2/15/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER Contract Driller	START DATE 03/28/12	COMP. DATE 03/28/12	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	
240	239.7	0.0											239.7	GROUND SURFACE	0.0
	238.2	3.5											227.9	ALLUVIAL TAN-BROWN, COARSE SAND WITH SOME GRAVEL	
235	231.2	8.5											221.2	TAN-GRAY, SILTY CLAY	11.8
230	226.2	13.5											221.2	RESIDUAL TAN-BROWN, SAPROLITIC, SANDY SILT	18.5
225	221.2	18.5											205.7	WEATHERED ROCK (GNEISS)	34.0
220	216.2	23.5													
215	211.2	28.5													
210	206.2	33.5													
205	201.2	38.5													
200	196.2	43.5													
195	191.2	48.5													
190	186.2	53.5													
													185.7	Boring Terminated at Elevation 185.7 ft IN WEATHERED ROCK (GNEISS)	54.0

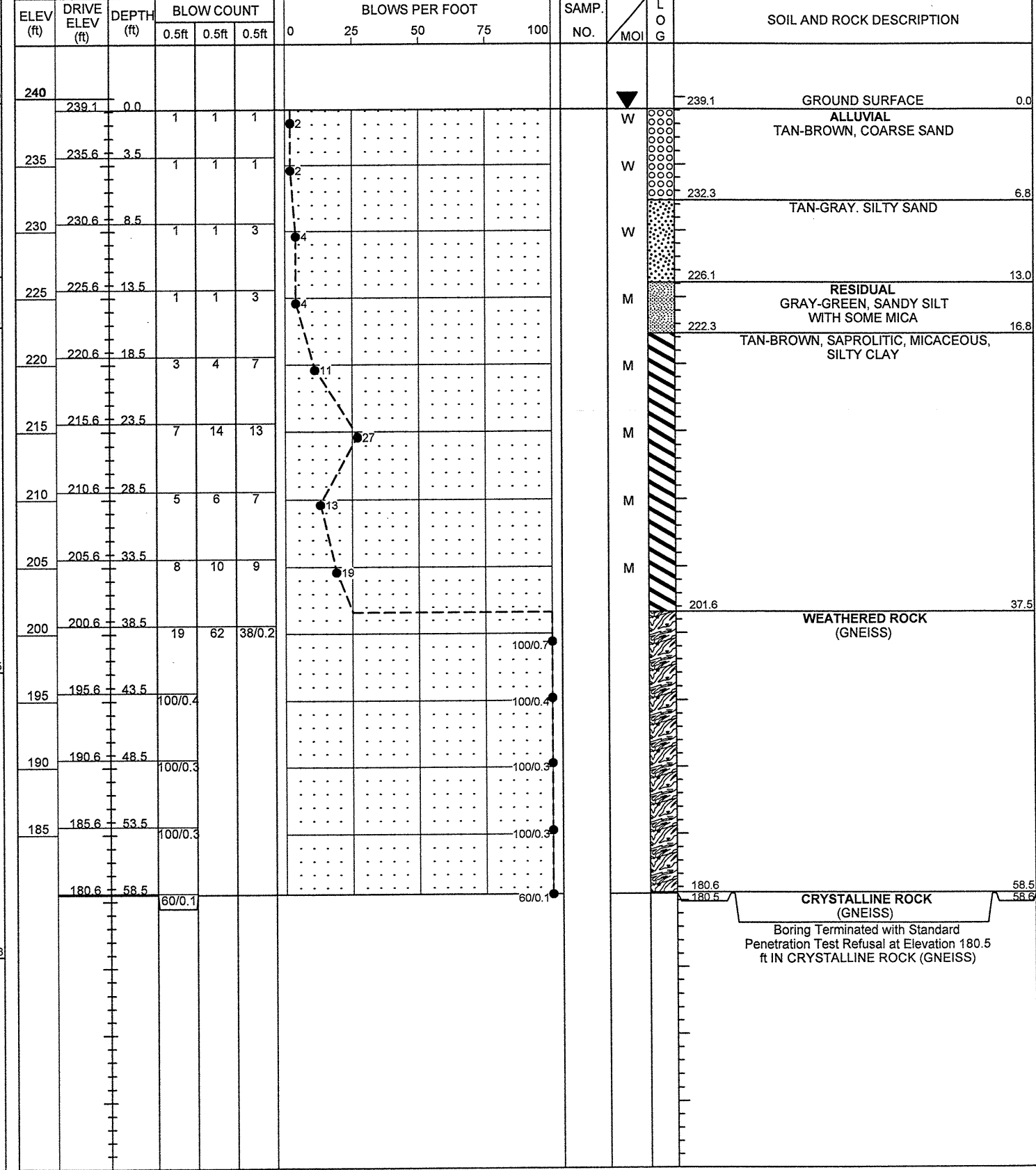
NCDOT BORE DOUBLE B4666 GEO. BH.GPJ NC DOT GDT 6/19/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 38459.1.1	TIP B-4666	COUNTY WARREN	GEOLOGIST Oti, O. B.	
SITE DESCRIPTION BRIDGE NO. 80 ON -L- (SR 1314) OVER HAWTREE CREEK				GROUND WTR (ft)
BORING NO. B2-A	STATION 16+05	OFFSET 10 ft LT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 239.7 ft	TOTAL DEPTH 63.8 ft	NORTHING 991,751	EASTING 2,257,862	24 HR. 0.0
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 12/15/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	START DATE 03/26/12	COMP. DATE 03/26/12	SURFACE WATER DEPTH N/A	



WBS 38459.1.1	TIP B-4666	COUNTY WARREN	GEOLOGIST Oti, O. B.	
SITE DESCRIPTION BRIDGE NO. 80 ON -L- (SR 1314) OVER HAWTREE CREEK				GROUND WTR (ft)
BORING NO. B2-B	STATION 15+96	OFFSET 4 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 239.1 ft	TOTAL DEPTH 58.6 ft	NORTHING 991,736	EASTING 2,257,868	24 HR. 0.0
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 12/15/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	START DATE 03/22/12	COMP. DATE 03/22/12	SURFACE WATER DEPTH N/A	



NCDOT BORE DOUBLE B4666_GEO_BH.GPJ NC DOT.GDT 6/18/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 38459.1.1		TIP B-4666		COUNTY WARREN		GEOLOGIST Oti, O. B.										
SITE DESCRIPTION BRIDGE NO. 80 ON -L- (SR 1314) OVER HAWTREE CREEK							GROUND WTR (ft)									
BORING NO. B3-A		STATION 16+49		OFFSET 7 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 248.7 ft		TOTAL DEPTH 75.0 ft		NORTHING 991,785		EASTING 2,257,890										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 12/15/2011			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 03/23/12		COMP. DATE 03/23/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
250															248.7	0.0
															247.7	1.0
245	245.2	3.5	8	4	2											
240	240.2	8.5	1	1	1										240.7	8.0
235	235.2	13.5	6	4	3											
230	230.2	18.5	1	1	2											
225	225.2	23.5	5	9	10										225.7	23.0
220	220.2	28.5	10	19	19											
215	215.2	33.5	5	6	8											
210	210.2	38.5	3	5	7										211.9	36.8
205	205.2	43.5	3	5	9											
200	200.2	48.5	4	13	20											
195	195.2	53.5	14	28	43											
190	190.2	58.5	10	24	76										191.2	57.5
185	185.2	63.5	10	11	43										186.2	62.5
180	180.2	68.5	24	46	54/0.5										180.7	68.0
175	175.2	73.5	15	20	45										175.2	73.5
															173.7	75.0

WBS 38459.1.1		TIP B-4666		COUNTY WARREN		GEOLOGIST Oti, O. B.										
SITE DESCRIPTION BRIDGE NO. 80 ON -L- (SR 1314) OVER HAWTREE CREEK							GROUND WTR (ft)									
BORING NO. B3-B		STATION 16+38		OFFSET 10 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 248.1 ft		TOTAL DEPTH 69.2 ft		NORTHING 991,767		EASTING 2,257,898										
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 12/15/2011			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 03/27/12		COMP. DATE 03/27/12		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
250															248.1	0.0
245	244.6	3.5	1	2	2											
240	239.6	8.5	1	2	2										240.1	8.0
235	234.6	13.5	1	2	1											
230	229.6	18.5	2	4	6											
225	224.6	23.5	2	4	5										225.1	23.0
220	219.6	28.5	3	5	5											
215	214.6	33.5	7	14	20											
210	209.6	38.5	13	17	22											
205	204.6	43.5	19	23	25											
200	199.6	48.5	34	17	26											
195	194.6	53.5	12	14	33											
190	189.6	58.5	41	59/0.2											191.1	57.0
185	184.6	63.5	100/0.5													
180	179.6	68.5	71	29/0.2											178.9	69.2

NCDOT BORE DOUBLE B4666_GEO_BH.GPJ NC_DOT_GDT_6/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 38459.1.1	TIP B-4666	COUNTY WARREN	GEOLOGIST Oti, O. B.	
SITE DESCRIPTION BRIDGE NO. 80 ON -L- (SR 1314) OVER HAWTREE CREEK				GROUND WTR (ft)
BORING NO. EB2-A	STATION 16+87	OFFSET 15 ft LT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 248.7 ft	TOTAL DEPTH 60.0 ft	NORTHING 991,820	EASTING 2,257,907	24 HR. 17.8
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 1 2/15/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	START DATE 03/20/12	COMP. DATE 03/20/12	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				
250	248.7	0.0											GROUND SURFACE	0.0
245	245.2	3.5	2	2	3	5						M	ROADWAY EMBANKMENT TAN-BROWN, SILTY CLAY	
240	240.2	8.5	1	1	2							M	ALLUVIAL TAN-GRAY, SILTY CLAY	8.0
235	235.2	13.5	1	3	2							M	TAN-BROWN, COARSE SAND WITH SOME PEA-SIZED GRAVEL	13.0
230	230.2	18.5	2	3	3							M	DARK GRAY, SILTY SAND	16.8
225	225.2	23.5	2	4	6							M	RESIDUAL TAN-BROWN AND GRAY, SAPROLITIC, SILTY CLAY WITH TRACE MICA	23.0
220	220.2	28.5	3	4	6							M		
215	215.2	33.5	2	7	10							M		
210	210.2	38.5	23	77/0.5								M	WEATHERED ROCK (GNEISS)	38.5
205	205.2	43.5	100/0.5									M		
200	200.2	48.5	9	14	17							M	RESIDUAL TAN-GRAY, SAPROLITIC, SANDY SILT WITH SOME MICA	48.0
195	195.2	53.5	9	19	37							M		
190	190.2	58.5	30	34	66/0.5							M	WEATHERED ROCK (GNEISS)	56.0
												M	Boring Terminated at Elevation 188.7 ft IN WEATHERED ROCK (GNEISS)	60.0

WBS 38459.1.1	TIP B-4666	COUNTY WARREN	GEOLOGIST Oti, O. B.	
SITE DESCRIPTION BRIDGE NO. 80 ON -L- (SR 1314) OVER HAWTREE CREEK				GROUND WTR (ft)
BORING NO. EB2-B	STATION 16+71	OFFSET 11 ft RT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 248.9 ft	TOTAL DEPTH 69.0 ft	NORTHING 991,792	EASTING 2,257,917	24 HR. Caved
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 76% 1 2/15/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic	
DRILLER Contract Driller	START DATE 03/22/12	COMP. DATE 03/22/12	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				
250	248.9	0.0											GROUND SURFACE	0.0
245	245.4	3.5	3	3	3	6						M	ROADWAY EMBANKMENT TAN-BROWN, SILTY CLAY	
240	240.4	8.5	4	3	3							M	ALLUVIAL GRAY, SILTY CLAY	8.5
235	235.4	13.5	1	1	1							M	TAN-BROWN, COARSE SAND WITH SOME GRAVEL	13.0
230	230.4	18.5	6	7	6							M	TAN-GRAY, SILTY SAND	16.8
225	225.4	23.5	6	5	5							M	RESIDUAL TAN-BROWN, SAPROLITIC, SILTY CLAY WITH SOME MICA	25.0
220	220.4	28.5	3	4	5							M		
215	215.4	33.5	3	5	6							M		
210	210.4	38.5	9	13	16							M	WEATHERED ROCK (GNEISS)	38.5
205	205.4	43.5	11	20	36							M		
200	200.4	48.5	49	51/0.3								M	RESIDUAL TAN-GRAY, SAPROLITIC, SANDY SILT WITH SOME MICA	48.5
195	195.4	53.5	21	34	66/0.4							M	WEATHERED ROCK (GNEISS)	56.0
190	190.4	58.5	73	27/0.1								M	Boring Terminated at Elevation 179.9 ft IN WEATHERED ROCK (GNEISS)	69.0
185	185.4	63.5	100/0.5									M		
180	180.4	68.5	100/0.5									M		

NCDOT BORE DOUBLE B4666_GEO_BH.GPJ_NC_DOT.GDT_6/20/12

SITE PHOTOGRAPH

Bridge No. 80 on -L- (SR 1314) over Hawtree Creek



Looking North towards End Bent 2