

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34365.1.3 (R-2000AF)	1	9

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34365.1.3 (R-2000AF) F.A. PROJ. NHF-0540(13)

COUNTY DURHAM

PROJECT DESCRIPTION I-540 NORTHERN WAKE EXPRESSWAY

SITE DESCRIPTION WIDENING BRIDGE NO. 340 ON -L- (I-40) OVER PAGE ROAD

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

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

NC DOT PERSONNEL
T.P. MOOREFIELD

SUBTECH PERSONNEL
RICK BUNKER

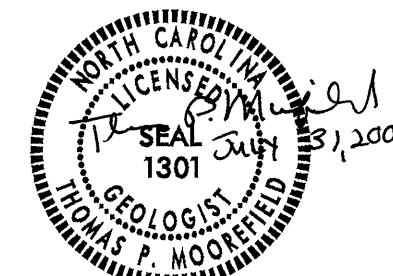
STEVE BUTREJ

INVESTIGATED BY **T.P. MOOREFIELD**

CHECKED BY **N.T. ROBERSON**

SUBMITTED BY **N.T. ROBERSON**

DATE **JULY 2008**



PROJECT: 34365.1.3 ID: R-2000AF

DRAWN BY: **C.D. CZAJKA, T.T. WALKER**

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

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

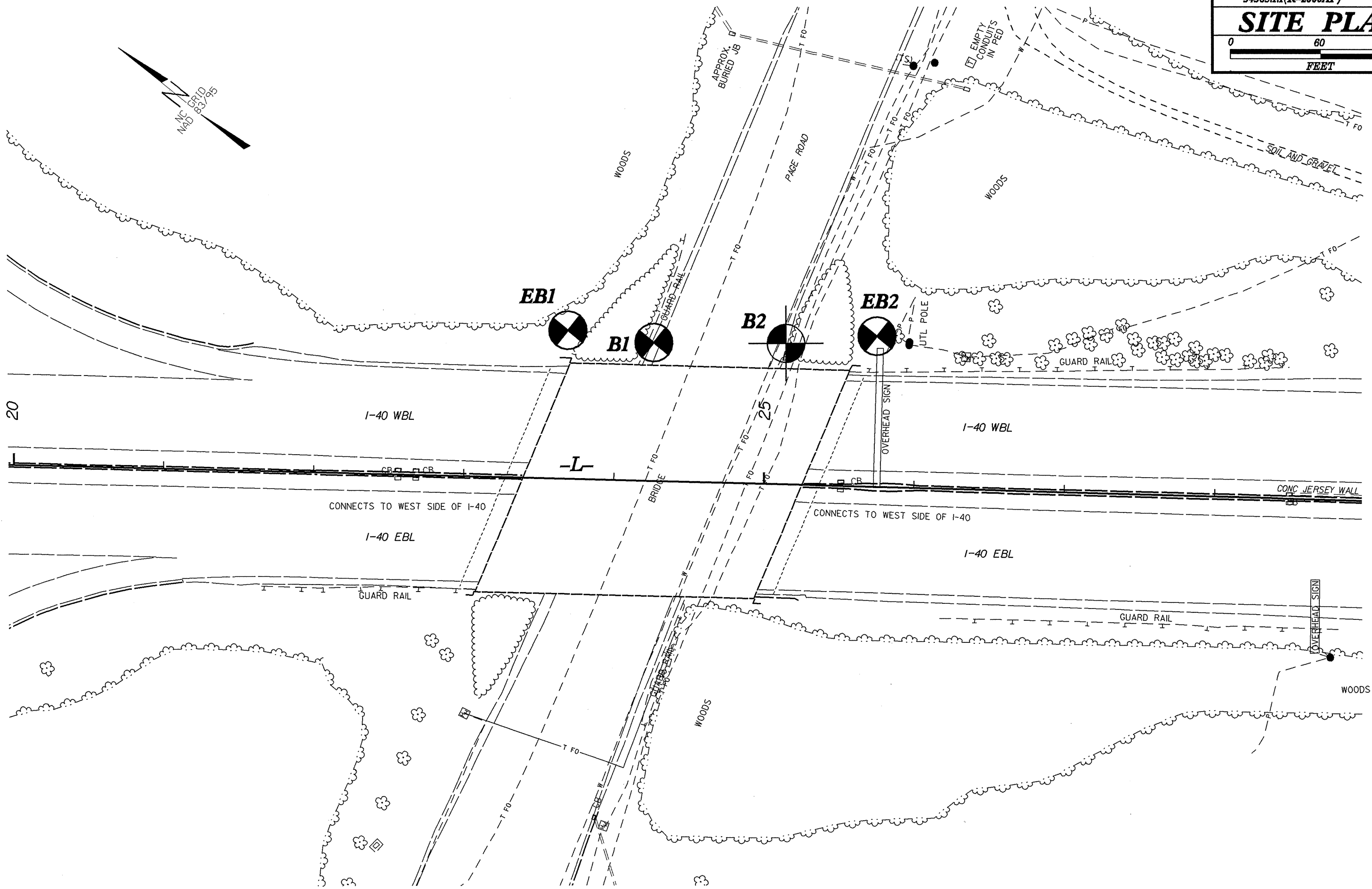
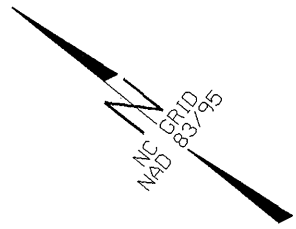
DIVISION OF HIGHWAYS
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

PROJECT REFERENCE NO. 34365.I.3 (R-2000AF)	SHEET NO. 2
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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>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. LIQUIDITY - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p>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 DISLOGGED 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 (ROD) - 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>SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <tr> <th>GENERAL CLASS.</th> <th colspan="2">GRANULAR MATERIALS (<= 35% PASSING #200)</th> <th colspan="4">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> <td>A-7</td> <td>A-1, A-2</td> <td>A-4, A-5</td> </tr> <tr> <td>SYMBOL</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td>A-7-a</td> <td>A-3</td> <td>A-6, A-7</td> </tr> <tr> <td>% PASSING</td> <td>10</td> <td>40</td> <td>10</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>5</td> <td>10</td> <td>10</td> <td>10</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> <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> <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 colspan="2">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> </tr> <tr> <td>GEN. RATING AS A SUBGRADE</td> <td colspan="3">EXCELLENT TO GOOD</td> <td colspan="2">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSUITABLE</td> <td>MUCK, PEAT</td> </tr> </table> <p>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	SYMBOL	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-7-a	A-3	A-6, A-7	% PASSING	10	40	10	10	10	10	10	10	10	LIQUID LIMIT	5	10	10	10	10	10	10	10	10	PLASTIC INDEX	0	0	0	0	0	0	0	0	0	GROUP INDEX	0	0	0	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		GRANULAR SOILS	SILT-CLAY SOILS	GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR		FAIR TO POOR	POOR	UNSUITABLE	MUCK, PEAT	<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p>COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p> <p>PERCENTAGE OF MATERIAL</p> <table border="1"> <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 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>>10%</td> <td>>20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table>		ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%	MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%	HIGHLY ORGANIC	>10%	>20%	HIGHLY 35% AND ABOVE	<p>WEATHERED ROCK (WR)</p> <p>CRYSTALLINE ROCK (CR)</p> <p>NON-CRYSTALLINE ROCK (NCR)</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP)</p> <p>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 SLI) 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 (SLI) 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. IF TESTED, WOULD YIELD SPT REFUSAL.</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. IF TESTED, YIELDS SPT N VALUES > 100 BPF.</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. IF TESTED, YIELDS SPT N VALUES < 100 BPF.</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>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 FINGER NAIL.</p>	
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<p>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>NOTES:</p> <p>BENCH MARK: BM #296 -BL- STA 23+87.45, I30.37' LT</p> <p>ELEVATION: 349.59 FT.</p>																																																																																																																



20

I-40 WBL

I-40 WBL

CONNECTS TO WEST SIDE OF I-40

CONNECTS TO WEST SIDE OF I-40

I-40 EBL

I-40 EBL

GUARD RAIL

GUARD RAIL

OVERHEAD SIGN

WOODS

-L-

25

B1

B2

EB1

EB2

GUARD RAIL

GUARD RAIL

WOODS

WOODS

PAGE ROAD

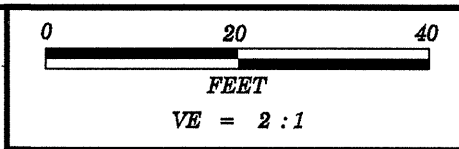
WOODS

APPROX. BURIED JB

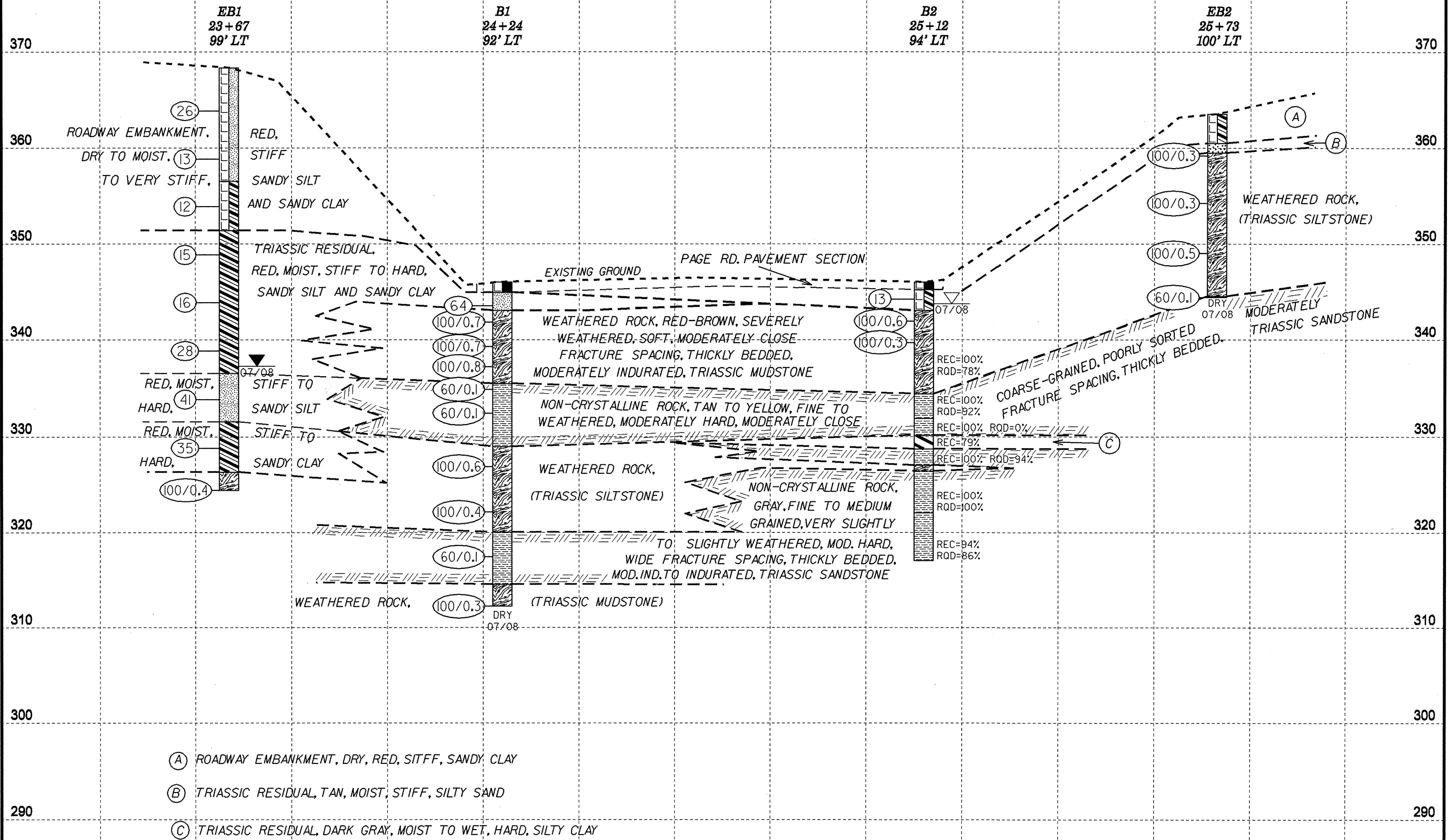
EMPTY CONDUITS IN PED

SOIL AND GRAVEL

GROUNDLINE PROFILE SURVEYED BY GEU AT 92' LEFT OF -L- ON 07/22/08



PROJECT REFERENCE NO.	SHEET
34365.1.3 (R-2000AF)	4



- (A) ROADWAY EMBANKMENT, DRY, RED, STIFF, SANDY CLAY
- (B) TRIASSIC RESIDUAL, TAN, MOIST, STIFF, SILTY SAND
- (C) TRIASSIC RESIDUAL, DARK GRAY, MOIST TO WET, HARD, SILTY CLAY

-L-

INFERRED STRATIGRAPHY IS DRAWN AT THE PROFILE OFFSET WITH THE BORINGS PROJECTED ONTO THE PROFILE.

NC DOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34365.1.3	ID. R-2000AF	COUNTY Durham	GEOLOGIST Moorefield, T. P.
SITE DESCRIPTION Widening of Bridge No. 340 on -L- (I-40) over Page Rd.			GROUND WTR (ft)
BOHRING NO. EB1	STATION 23+67	OFFSET 99ft LT	ALIGNMENT -L-
COLLAR ELEV. 368.3 ft	TOTAL DEPTH 43.9 ft	NORTHING 776,034	EASTING 2,047,622
DRILL MACHINE D-50	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 07/07/08	COMP. DATE 07/07/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75					
370													GROUND SURFACE ROADWAY EMBANKMENT Red, Sandy Silt	0.0
365	364.8	3.5	16	13	13					SS-1	D			
360	359.8	8.5	6	7	6					M				
355	354.8	13.5	5	6	6					SS-2	M		Red, Sandy Clay	11.8
350	349.8	18.5	5	7	8					SS-3	M		TRIASSIC RESIDUAL Red, Sandy Clay	17.0
345	344.8	23.5	6	7	9					M				
340	339.8	28.5	7	13	15					M				
335	334.8	33.5	11	20	21					SS-4	15%		Red, Sandy Silt	31.8
330	329.8	38.5	9	15	20					SS-5	M		Red-Brown, Sandy Clay	36.8
325	324.8	43.5								SS-6	D		WEATHERED ROCK (Triassic Mudstone)	43.9
Boring Terminated at Elevation 324.4 ft in Weathered Rock (Triassic Mudstone)														

PROJECT NO. 34365.1.3	ID. R-2000AF	COUNTY Durham	GEOLOGIST Moorefield, T. P.
SITE DESCRIPTION Widening of Bridge No. 340 on -L- (I-40) over Page Rd.			GROUND WTR (ft)
BOHRING NO. B1	STATION 24+24	OFFSET 92ft LT	ALIGNMENT -L-
COLLAR ELEV. 346.0 ft	TOTAL DEPTH 33.8 ft	NORTHING 775,984	EASTING 2,047,652
DRILL MACHINE D-50	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 07/07/08	COMP. DATE 07/07/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 10.5 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75					
350													GROUND SURFACE	0.0
345	344.5	1.5	47	11	53					SS-7	D		4" Asphalt and 9" ABC	1.1
340	342.5	3.5	38	62/0.2									TRIASSIC RESIDUAL Light Red, Sandy Silt WEATHERED ROCK (Triassic Mudstone and Silty Sandstone)	3.0
335	340.0	6.0	34	66/0.2										
330	338.0	8.0	49	51/0.3										
325	335.0	11.0	60/0.1										NON-CRYSTALLINE ROCK (Triassic Sandy Siltstone)	10.5
320	332.5	13.5	60/0.1											
315	327.5	18.5	74	26/0.1									WEATHERED ROCK (Triassic Siltstone)	17.0
310	322.5	23.5	100/0.4											
305	317.5	28.5	60/0.1										NON-CRYSTALLINE ROCK (Triassic Mudstone)	26.0
300	312.5	33.5	100/0.3										WEATHERED ROCK (Triassic Mudstone)	31.5
Boring Terminated at Elevation 312.2 ft in Weathered Rock (Triassic Mudstone)														

NC DOT BORE DOUBLE R2000AF GEO_BRD0340_BH.GPJ NC_DOT.GDT 07/30/08

PROJECT NO. 34365.1.3	ID. R-2000AF	COUNTY Durham	GEOLOGIST Moorefield, T. P.
SITE DESCRIPTION Widening of Bridge No. 340 on -L- (I-40) over Page Rd.			GROUND WTR (ft)
BORING NO. B2	STATION 25+12	OFFSET 94ft LT	ALIGNMENT -L-
COLLAR ELEV. 346.0 ft	TOTAL DEPTH 29.0 ft	NORTHING 775,915	EASTING 2,047,707
DRILL MACHINE D-50	DRILL METHOD NW Casing w/ Core	HAMMER TYPE Manual	
START DATE 07/08/08	COMP. DATE 07/08/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 11.6 ft

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					
350															
345	345.2	0.8	4	6	7									346.0 GROUND SURFACE 0.0	
														345.2 3.5" Asphalt and 6" ABC 0.8	
	342.5	3.5												343.0 ROADWAY EMBANKMENT 3.0	
			90	10/0.1										Red-brown, Sandy Clay	
340	340.0	6.0												WEATHERED ROCK (Triassic Siltstone) 7.0	
			100/0.3											WEATHERED ROCK (Triassic Mudstone) 11.6	
335														NON-CRYSTALLINE ROCK (Triassic Sandstone) 14.2	
														Triassic Sandstone 15.9	
330														TRIASSIC RESIDUAL Dark gray, hard Silty Clay 17.3	
														NON-CRYSTALLINE ROCK (Triassic Sandy Siltstone) 19.0	
325														WEATHERED ROCK (Triassic Siltstone) 19.6	
														NON-CRYSTALLINE ROCK (Triassic Sandstone) 24.0	
320														Triassic Sandstone 29.0	
315														Boring Terminated at Elevation 317.0 ft in Non-Crystalline Rock (Triassic Sandstone)	

NCDOT BORE DOUBLE R2000AF_GEO_BRD0340_BH.GPJ_NC_DOT.GDT 07/30/08

PROJECT NO. 34365.1.3	ID. R-2000AF	COUNTY Durham	GEOLOGIST Moorefield, T. P.
SITE DESCRIPTION Widening of Bridge No. 340 on -L- (I-40) over Page Rd.			GROUND WTR (ft)
BORING NO. B2	STATION 25+12	OFFSET 94ft LT	ALIGNMENT -L-
COLLAR ELEV. 346.0 ft	TOTAL DEPTH 29.0 ft	NORTHING 775,915	EASTING 2,047,707
DRILL MACHINE D-50	DRILL METHOD NW Casing w/ Core	HAMMER TYPE Manual	
START DATE 07/08/08	COMP. DATE 07/08/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 11.6 ft

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
339											Begin Coring @ 7.0 ft	
	339.0	7.0	2.0	3:40	(2.0)	(1.6)		(4.6)	(3.6)		WEATHERED ROCK 7.0	
	337.0	9.0	5.0	3:35	100%	80%		100%	78%		Red-brown, severely weathered, soft, moderately close fracture spacing, thickly bedded, moderately indurated, Triassic Mudstone.	
335				2:30	(5.0)	(5.0)		(2.6)	(2.4)		NON-CRYSTALLINE ROCK 11.6	
				2:35	100%	100%		100%	92%		Tan-yellow, fine- to coarse-grained, poorly sorted, moderately weathered, medium hard, moderately close fracture spacing, thickly bedded, moderately indurated, Triassic Sandstone.	
	332.0	14.0	5.0	2:40				(1.7)	(0.0)		NON-CRYSTALLINE ROCK 14.2	
				2:45				100%	0%		Triassic Sandstone 15.9	
330				2:19	(4.7)	(2.1)		(1.7)	(0.0)		TRIASSIC RESIDUAL 17.3	
				2:20	94%	42%		100%	0%		Dark gray, hard Silty Clay	
				2:48				(1.1)	(1.6)		NON-CRYSTALLINE ROCK 17.3	
				3:20				79%	94%		Tan-yellow, fine- to coarse-grained, interbedded with 0.3" to 0.5" thick layers of light red, mudstone. Moderately severely weathered, soft to moderately hard, very close to close fracture spacing, thinly bedded, friable to moderately indurated, Triassic Sandstone.	
	327.0	19.0	5.0	4:07				(1.7)	(0.0)		WEATHERED ROCK 19.0	
				5:40	(5.0)	(4.7)		100%	94%		Triassic Sandstone 19.6	
325				2:28				(0.6)	(0.0)		TRIASSIC RESIDUAL 24.0	
				2:54				100%	0%		Dark gray, moist to wet, hard, Silty Clay.	
	322.0	24.0	5.0	2:46				(0.6)	(4.4)		NON-CRYSTALLINE ROCK 24.0	
				3:20				100%	100%		Gray to gray-red, moderately weathered, hard, moderately close fracture spacing, thickly bedded, moderately indurated, Triassic Sandy Siltstone.	
320				2:58	(4.7)	(4.3)		(4.4)	(4.3)		WEATHERED ROCK 29.0	
				2:45	94%	86%		94%	86%		Dark red-gray, severely weathered, soft, very close fracture spacing, very thinly bedded, friable, Triassic Siltstone.	
	317.0	29.0		3:05				(4.7)	94%		NON-CRYSTALLINE ROCK 29.0	
315											Gray, fine- to medium-grain size with zones of silt and clay laminae, slightly weathered, moderately hard, wide fracture spacing, thickly bedded, moderately indurated Triassic Sandstone.	
											Gray, fine- to medium-grain size with zones of silt and clay laminae (24.0' to 24.3' and 25.3' to 26.2'), very slightly weathered, moderately hard, wide fracture spacing, thickly bedded, indurated, Triassic Sandstone.	
											Boring Terminated at Elevation 317.0 ft in Non-Crystalline Rock (Triassic Sandstone)	

NCDOT CORE SINGLE R2000AF_GEO_BRD0340_BH.GPJ_NC_DOT.GDT 07/30/08

EB1

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	99' LT	23+67	3.5-5.0	A-4(2)	26	8	22.2	27.6	28.0	22.2	95	83	53	-	-
SS-2	99' LT	23+67	13.5-15.0	A-6(3)	30	13	31.5	23.2	19.1	26.2	100	80	50	-	-
SS-3	99' LT	23+67	18.5-20.0	A-6(9)	34	12	4.4	23.8	43.5	28.3	100	98	81	-	-
SS-4	99' LT	23+67	33.5-35.0	A-4(2)	28	8	1.8	52.9	25.1	20.2	100	100	55	15	-
SS-5	99' LT	23+67	38.5-40.0	A-6(17)	40	16	2.6	7.3	61.9	28.3	100	99	94	-	-

B1

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-7	92' LT	24+24	1.5-3.0	A-4(0)	30	5	33.5	28.3	24.1	14.1	92	70	41	-	-

B2

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	94' LT	25+12	0.8-2.3	A-6(6)	30	12	13.9	24.2	35.6	26.2	95	88	65	-	-

CORE PHOTOGRAPHS

B2
BOXES 1,2 & 3: 7.0 - 29.0 FEET

