

REFERENCE: U-2579C

PROJECT: 34839

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579C	1	12

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

**CONTENTS**

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COUNTY FORSYTH  
PROJECT DESCRIPTION WINSTON SALEM NORTHERN BELTWAY

SITE DESCRIPTION BRIDGE NO. 700 ON -Y1- (US 311 - NEW WALKERTOWN ROAD) OVER -L- (FUTURE I-74)

**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) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 CONTRACTOR 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 THE 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.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
  2. 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.

PERSONNEL

C. BUKOVITZ, E.I.

J. BRADSHAW, E.I.

GEOLOGIC EX.

M. BREWER, P.E.

INVESTIGATED BY ECS CAROLINAS, LLP

DRAWN BY M. BREWER, P.E.

CHECKED BY M. WALKO, P.E.

SUBMITTED BY ECS CAROLINAS, LLP

DATE MARCH 2016



DocuSigned by  
D. Matthew Brewer

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3/11/2016

SIGNATURE

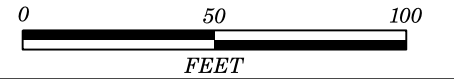
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**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

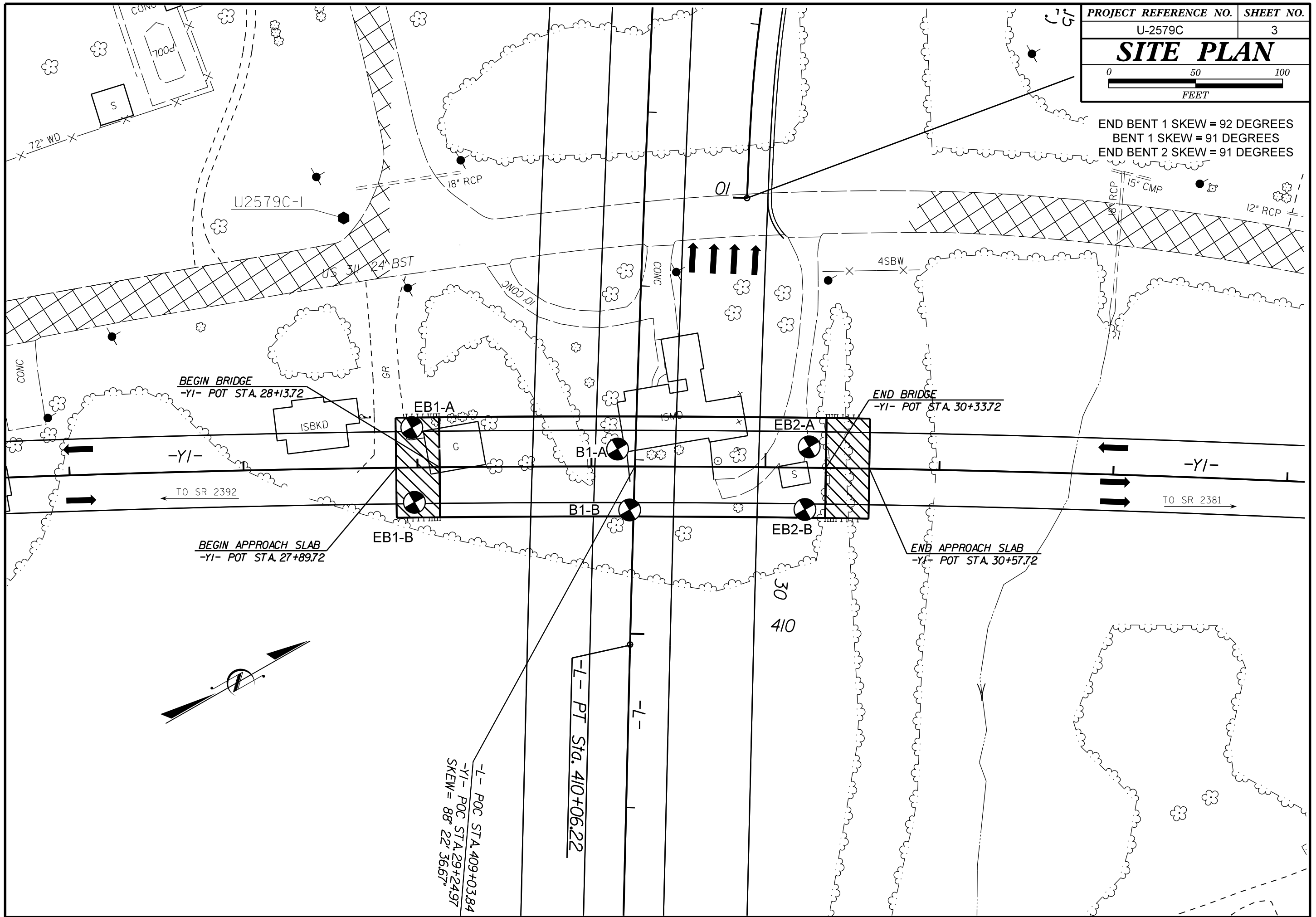
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT  
SUBSURFACE INVESTIGATION  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																													
SOIL IS CONSIDERED 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 THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, 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:  WEATHERED ROCK (WR)  CRYSTALLINE ROCK (CR)  NON-CRYSTALLINE ROCK (NCR)  COASTAL PLAIN SEDIMENTARY ROCK (CP)										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, SUCH 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.																													
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>										<b>ANGULARITY OF GRAINS</b>										<b>WEATHERING</b>																																							
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.										FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.																																							
<b>MINERALOGICAL COMPOSITION</b>										<b>COMPRESSION</b>										<b>PERCENTAGE OF MATERIAL</b>																																							
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50										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																																							
<b>GROUND WATER</b>										<b>MISCELLANEOUS SYMBOLS</b>										<b>ROCK HARDNESS</b>																																							
FAIR TO POOR POOR UNSUITABLE										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY										DIP & DIP DIRECTION OF ROCK STRUCTURES SPT DMT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. 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. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED 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. 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.										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. 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. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED 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. 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.																			
<b>CONSISTENCY OR DENSENESS</b>										<b>RECOMMENDATION SYMBOLS</b>										<b>ABBREVIATIONS</b>																																							
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )										UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - COARSE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED UNIT WEIGHT DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO										UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL										AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - COARSE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED UNIT WEIGHT DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO																			
<b>TEXTURE OR GRAIN SIZE</b>										<b>SOIL MOISTURE - CORRELATION OF TERMS</b>										<b>EQUIPMENT USED ON SUBJECT PROJECT</b>																																							
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 0.075 0.053										SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST DIEDRICH D-50 DIEDRICH D-120										FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																													
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)										LL - LIQUID LIMIT PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT										ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE * STEEL TEETH TRICONE * TUNG-CARB. CORE BIT 2 1/4" H.S.A.										TERM SPACING THICKNESS VERY WIDE MORE THAN 10 FEET 4 FEET WIDE 3 TO 10 FEET 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FOOT 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET										BENCH MARK: U-2579C-1(GPS): N-876,419.2850, E-1651,591.6020  ELEVATION: 976.94 FEET																			
<b>PLASTICITY</b>										<b>INDURATION</b>										<b>NOTES:</b>																																							
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC										FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.										BORING COORDINATES WERE OBTAINED USING A TRIMBLE GEO7X HANDHELD H-STAR UNIT W/ SUB-FOOT ACCURACY.  FIAD = FILLED IN AFTER DRILLING																																							
<b>COLOR</b>																																																											
DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																																																											

# SITE PLAN



END BENT 1 SKEW = 92 DEGREES  
 BENT 1 SKEW = 91 DEGREES  
 END BENT 2 SKEW = 91 DEGREES





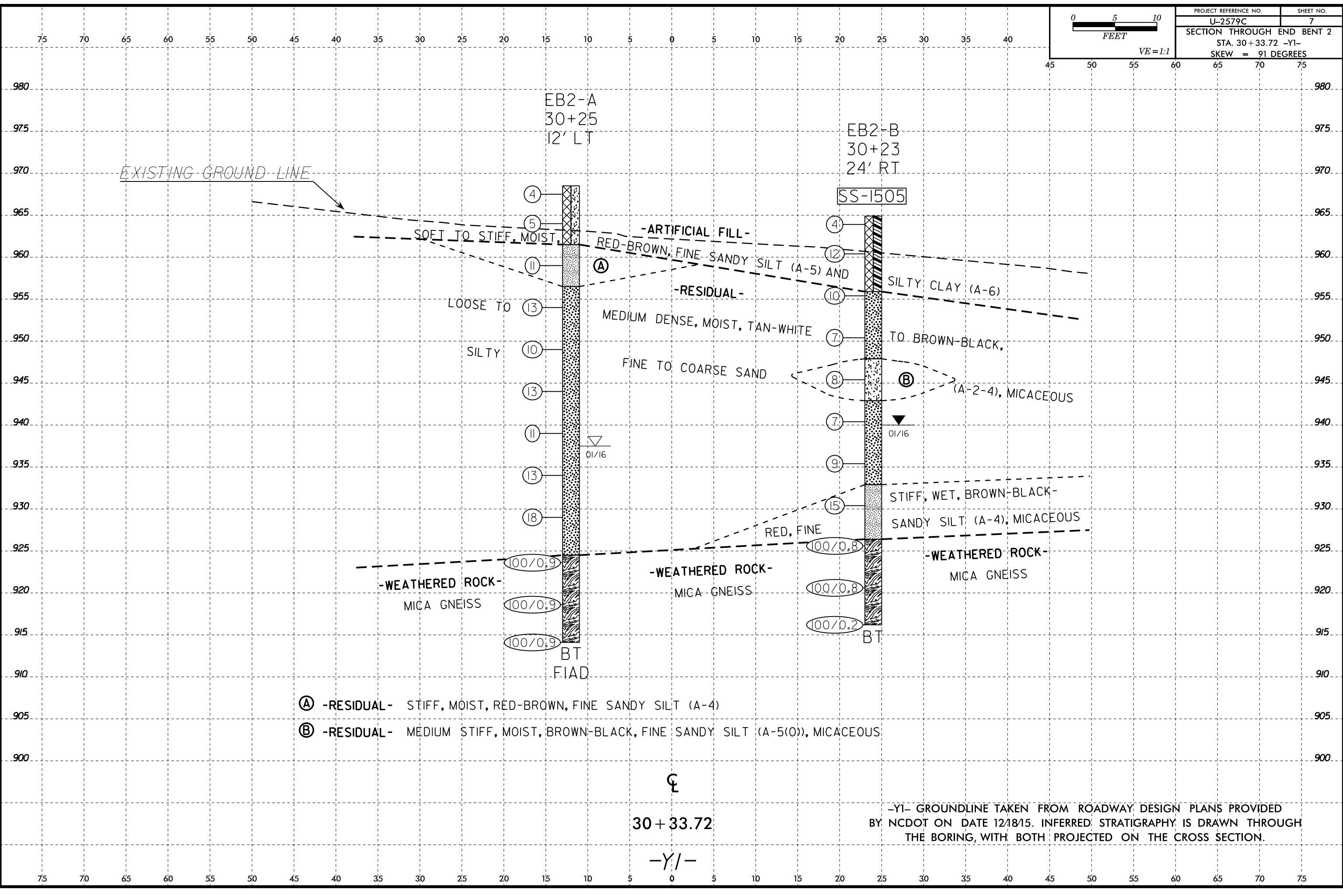




8/23/99

08-MAR-2016 17:16 I:\2\GEO\TECH\02-PRG\JFC\1511000\11999\11500\11500 - U-2579C BRDG (26410) - Bridge No. 700 - DTR\CADD\_GEO\TECH\Site&Sub\U-2579C\_Geo\_xsi-1j1.dgn

PROJECT REFERENCE NO.		SHEET NO.	
U-2579C		7	
SECTION THROUGH END BENT 2			
STA. 30+33.72 -Y1-			
SKEW = 91 DEGREES			



- Ⓐ -RESIDUAL- STIFF, MOIST, RED-BROWN, FINE SANDY SILT (A-4)
- Ⓑ -RESIDUAL- MEDIUM STIFF, MOIST, BROWN-BLACK, FINE SANDY SILT (A-5(0)), MICACEOUS

30 + 33.72

-Y1-

-Y1- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT ON DATE 12/18/15. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST J. Bradshaw									
SITE DESCRIPTION Bridge No. 700 on -Y1- (US-311 - New Walkerton Road) over -L- (Future I-74)							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 27+97		OFFSET 23 ft LT		ALIGNMENT -Y1-									
COLLAR ELEV. 969.6 ft		TOTAL DEPTH 58.6 ft		NORTHING 876,393		EASTING 1,651,716									
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER J. Messick		START DATE 01/14/16		COMP. DATE 01/14/16		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					
970	969.6	0.0	3	3	4							M		969.6 GROUND SURFACE 0.0	
														967.6 <b>RESIDUAL</b> Brown, Silty CLAY (A-7-5), Medium Stiff Red-Brown, Fine Sandy SILT (A-5), Very Stiff, Micaceous 2.0	
965	966.1	3.5	6	8	11							M		962.6 Tan, Silty Fine SAND (A-2-5(0)), Medium Dense, Micaceous 7.0	
960	961.1	8.5	5	6	6							SS-1015 21%		957.6 Tan-White, Silty Fine to Coarse SAND (A-2-4), Loose to Very Dense, Micaceous 12.0	
955	956.1	13.5	5	5	4							M			
950	951.1	18.5	5	6	7							M			
945	946.1	23.5	6	8	16							M			
940	941.1	28.5	6	9	13							M			
935	936.1	33.5	5	7	10							M			
930	931.1	38.5	6	7	11							M			
925	926.1	43.5	8	19	40							M			
920	921.1	48.5	84	16/0.1										921.1 WEATHERED ROCK Tan-White, (MICA GNEISS). 48.5	
915	916.1	53.5	14	58	42/0.2										
	911.1	58.5	60/0.1											911.1 CRYSTALLINE ROCK (MICA GNEISS). 58.5	
														Boring Terminated with Standard Penetration Test Refusal at Elevation 911.0 ft IN CRYSTALLINE ROCK (MICA GNEISS)	

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST J. Bradshaw									
SITE DESCRIPTION Bridge No. 700 on -Y1- (US-311 - New Walkerton Road) over -L- (Future I-74)							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 27+98		OFFSET 20 ft RT		ALIGNMENT -Y1-									
COLLAR ELEV. 967.5 ft		TOTAL DEPTH 54.3 ft		NORTHING 876,373		EASTING 1,651,753									
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER J. Messick		START DATE 01/14/16		COMP. DATE 01/14/16		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					
970														967.5 GROUND SURFACE 0.0	
														967.5 <b>RESIDUAL</b> Red-Brown, Fine Sandy SILT (A-5), Medium Stiff to Stiff, Micaceous	
965	967.5	0.0	3	2	4							M			
960	963.5	4.0	4	6	8							M			
955	958.5	9.0	3	4	5							M			
950	953.5	14.0	4	4	5							SS-1004 15%		955.5 Tan-Gray, Silty Fine to Coarse SAND (A-2-4(0)), Loose to Very Dense, Micaceous 12.0	
945	948.5	19.0	3	5	7							M			
940	943.5	24.0	6	7	8							M			
935	938.5	29.0	15	18	14							M			
930	933.5	34.0	23	24	28							M			
925	928.5	39.0	13	28	32							M			
920	923.5	44.0	100/0.3											923.5 WEATHERED ROCK Gray-White, (MICA GNEISS). 44.0	
915	918.5	49.0	25	55	45/0.2										
	913.5	54.0	100/0.3											913.2 Boring Terminated at Elevation 913.2 ft IN WEATHERED ROCK (MICA GNEISS) 54.3	

NCDOT BORE DOUBLE U2579C\_GEO\_BRDG700.GPJ NC\_DOT\_GDT 3/8/16



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST J. Bradshaw										
SITE DESCRIPTION Bridge No. 700 on -Y1- (US-311 - New Walkerton Road) over -L- (Future I-74)							GROUND WTR (ft)									
BORING NO. B1-A		STATION 29+15		OFFSET 10 ft LT		ALIGNMENT -Y1-										
COLLAR ELEV. 967.9 ft		TOTAL DEPTH 58.6 ft		NORTHING 876,489		EASTING 1,651,785										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Messick		START DATE 01/15/16		COMP. DATE 01/15/16		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						
970																
	967.9	0.0	2	4	6										967.9	GROUND SURFACE
965	964.4	3.5	5	7	9											<b>RESIDUAL</b> Red-Brown, Fine Sandy SILT (A-5), Medium Stiff, Micaceous
960	959.4	8.5	5	6	6										960.9	Tan-White, Silty Fine to Coarse SAND (A-2-4), Medium Dense to Very Dense, Micaceous
955	954.4	13.5	5	4	6											
950	949.4	18.5	4	4	7											
945	944.4	23.5	7	8	9											
940	939.4	28.5	6	7	9											
935	934.4	33.5	6	5	7											
930	929.4	38.5	7	9	10											
925	924.4	43.5	31	29	32											
920	919.4	48.5	46	54/0.3												
915	914.4	53.5	81	19/0.1												
910	909.4	58.5	60/0.1													

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST J. Bradshaw										
SITE DESCRIPTION Bridge No. 700 on -Y1- (US-311 - New Walkerton Road) over -L- (Future I-74)							GROUND WTR (ft)									
BORING NO. B1-B		STATION 29+22		OFFSET 25 ft RT		ALIGNMENT -Y1-										
COLLAR ELEV. 964.9 ft		TOTAL DEPTH 59.5 ft		NORTHING 876,478		EASTING 1,651,819										
DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. Messick		START DATE 01/14/16		COMP. DATE 01/15/16		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						
965	964.9	0.0	2	2	4											
960	960.5	4.4	4	5	6											
955	955.5	9.4	4	4	7											
950	950.5	14.4	3	4	4											
945	945.5	19.4	3	5	5											
940	940.5	24.4	9	8	9											
935	935.5	29.4	6	8	9											
930	930.5	34.4	18	30	65											
925	925.5	39.4	18	25	36											
920	920.5	44.4	15	85/0.4												
915	915.5	49.4	62	38/0.2												
910	910.5	54.4	87	13/0.1												
	905.5	59.4	60/0.1													

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**CRYSTALLINE ROCK (MICA GNEISS).**  
Boring Terminated with Standard Penetration Test Refusal at Elevation 909.3 ft IN CRYSTALLINE ROCK (MICA GNEISS)

**CRYSTALLINE ROCK (MICA GNEISS).**  
Boring Terminated with Standard Penetration Test Refusal at Elevation 905.4 ft IN CRYSTALLINE ROCK (MICA GNEISS)

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST J. Bradshaw									
SITE DESCRIPTION Bridge No. 700 on -Y1- (US-311 - New Walkerton Road) over -L- (Future I-74)							GROUND WTR (ft)								
BORING NO. EB2-A		STATION 30+25		OFFSET 12 ft LT		ALIGNMENT -Y1-									
0 HR. 31.0		TOTAL DEPTH 54.4 ft		NORTHING 876,585		EASTING 1,651,839									
24 HR. FIAD		DRILL RIG/HAMMER EFF./DATE GEO366 Diedrich D50 87% 11/07/2015		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER J. Messick		START DATE 01/15/16		COMP. DATE 01/15/16		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					
970	968.5	0.0												GROUND SURFACE	0.0
	968.5	0.0	2	2	2								M	ARTIFICIAL FILL	
965	965.0	3.5	2	2	3								M	Red-Brown, Fine Sandy SILT (A-5), Soft to Medium Stiff	
960	960.0	8.5	3	4	7								M	RESIDUAL	7.0
													M	Tan-Red-Brown, Fine Sandy SILT (A-4), Stiff	
955	955.0	13.5	5	5	8								M	Tan-White, Silty Fine to Coarse SAND (A-2-4), Medium Dense, Micaceous	12.0
950	950.0	18.5	3	5	5								M		
945	945.0	23.5	5	6	7								M		
940	940.0	28.5	8	5	6								M		
935	935.0	33.5	5	6	7								M		
930	930.0	38.5	5	7	11								M		
925	925.0	43.5	30	32	68/0.4								M		
920	920.0	48.5	40	49	51/0.4								M	WEATHERED ROCK	44.0
														Tan-White, (MICA GNEISS).	
915	915.0	53.5	27	73/0.4										100/0.9	54.4
														Boring Terminated at Elevation 914.1 ft IN WEATHERED ROCK (MICA GNEISS)	

WBS 34839.1.1		TIP U-2579C		COUNTY FORSYTH		GEOLOGIST C. Bukovitz									
SITE DESCRIPTION Bridge No. 700 on -Y1- (US-311 - New Walkerton Road) over -L- (Future I-74)							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 30+23		OFFSET 24 ft RT		ALIGNMENT -Y1-									
0 HR. 12.3		TOTAL DEPTH 48.7 ft		NORTHING 876,565		EASTING 1,651,869									
24 HR. 24.9		DRILL RIG/HAMMER EFF./DATE GEO102 Diedrich D120 86% 11/07/2015		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER B. Thomas		START DATE 01/15/16		COMP. DATE 01/15/16		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					
965	964.9	0.0	2	2	2								M	GROUND SURFACE	0.0
960	961.4	3.5	5	5	7								M	ARTIFICIAL FILL	
													M	Red, Silty CLAY (A-6), Soft to Stiff, Micaceous	
955	956.4	8.5	5	5	5								M	RESIDUAL	9.0
													M	Red-Gray-Brown, Silty Fine SAND (A-2-4), Loose, Micaceous	
950	951.4	13.5	3	4	3								M		
945	946.4	18.5	3	3	5								M		
940	941.4	23.5	3	4	3								M		
935	936.4	28.5	3	4	5								M		
930	931.4	33.5	4	6	9								M		
925	926.4	38.5	46	50/0.3									M		
920	921.4	43.5	84	16/0.3									M		
	916.4	48.5	100/0.2										M		
													W	Brown-Black, Fine Sandy SILT (A-5(0)), Medium Stiff, Micaceous	17.0
													W	Brown-Black-Gray, Silty Fine SAND (A-2-4) with trace clay, Loose, Micaceous	22.0
													W	Brown-Black-Red, Fine Sandy SILT (A-4) with little clay, Stiff, Micaceous	32.0
													W	WEATHERED ROCK	38.5
													W	Gray-Brown-White, (MICA GNEISS).	
													W	Boring Terminated at Elevation 916.2 ft IN WEATHERED ROCK (MICA GNEISS)	48.7

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### SOIL TEST RESULTS

SAMPLE NO.	BORING	OFFSET	STATION -Y1-	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1015	EB1-A	23' LT	27+97	8.5-10.0'	A-2-5(0)	52	NP	14.9	66.3	9.1	9.6	96.0	89.0	29.0	-	-
SS-1004	EB1-B	20' RT	27+98	14.0-15.5'	A-2-4(0)	NP	NP	20.8	66.3	9.5	3.4	100.0	93.0	20.0	-	-
SS-1505	EB2-B	24' RT	30+23	18.5-20.0'	A-5(0)	44	NP	12.2	58.4	20.2	9.1	100.0	96.0	40.0	21.5	-

SS = Split-Barrel Sample (ASTM D-1586)

NP=Non-Plastic

Lab Technician: Amanda R. Roth

NCDOT Certification No.: 112-09-1003

Signature:  \_\_\_\_\_

**SITE PHOTOS**



*Site Photo No. 1: End Bent 1 -YI- (US 311) Looking Upstation (North)*



*Site Photo No. 3: Bent 1 -YI- (US 311) Looking Upstation (North)*



*Site Photo No. 2: -L- (Future I-74) Looking Upstation (East)*