

REFERENCE: B-5157

PROJECT: 42332

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY Granville
 PROJECT DESCRIPTION Replace Bridge No. 178 over Fox
Creek on SR 1304 (Sunset Road)

 SITE DESCRIPTION _____

CONTENTS

| <u>SHEET NO.</u> | <u>DESCRIPTION</u> |
|------------------|--------------------|
| 1 | TITLE SHEET |
| 2 | LEGEND |
| 3 | SITE PLAN |
| 4 | PROFILE |
| 5-6 | CROSS SECTIONS |
| 7-8 | BORE LOG REPORTS |
| 9 | SITE PHOTOGRAPHS |

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C. | B-5157 | 1 | 9 |

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.

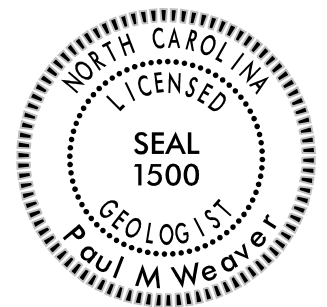
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE 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 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

TRIGON
P. Weaver

INVESTIGATED BY P. Weaver
 DRAWN BY P. Petrucci
 CHECKED BY P. Weaver
 SUBMITTED BY ESP Associates, PA
 DATE June, 2015



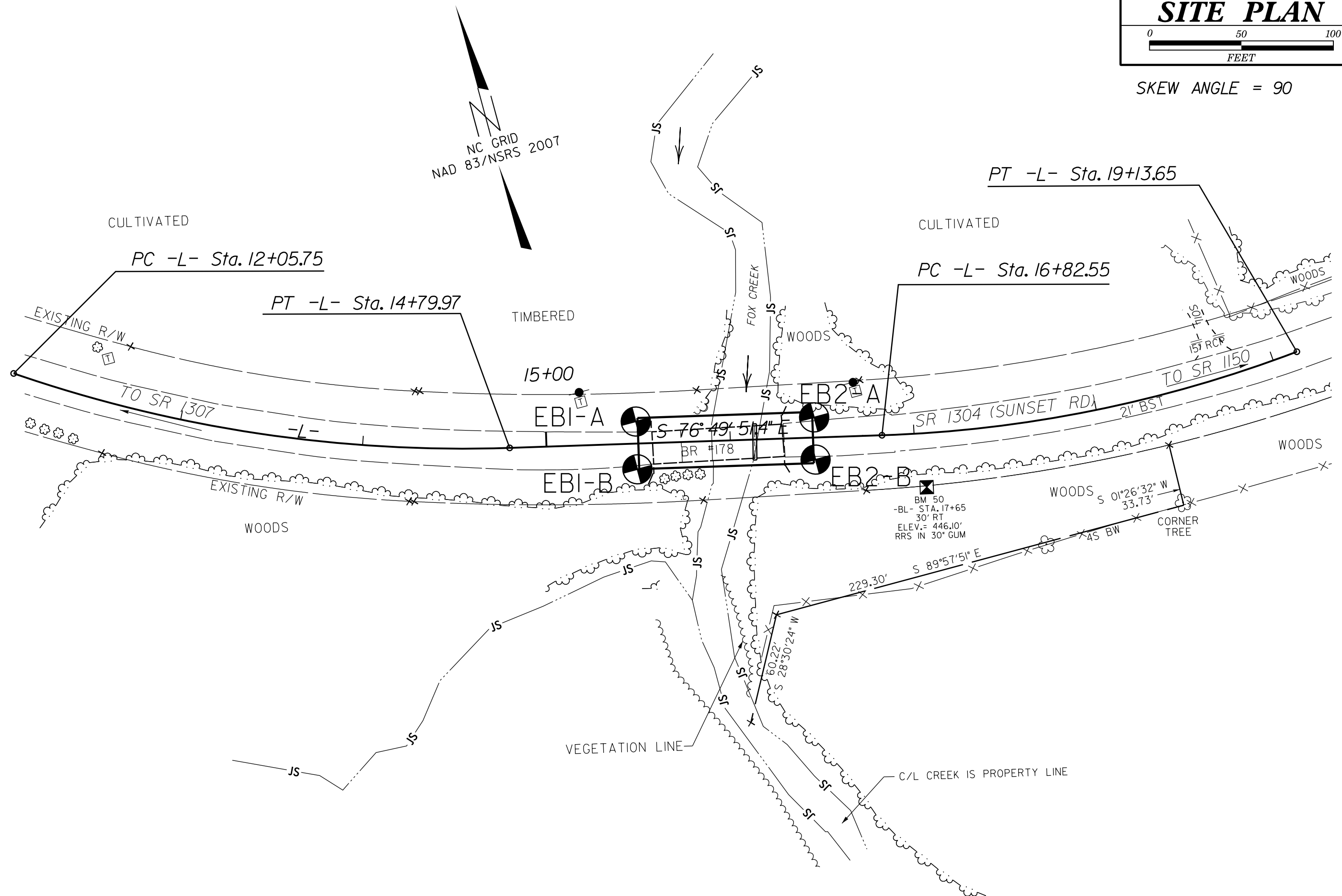
DocuSigned by:
Paul Weaver 7/20/2015
 01847D3738AD49C...
 SIGNATURE DATE

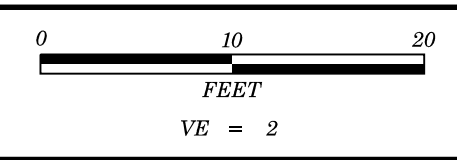
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

| 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: | | | | | | | | | | 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 DISLOADED 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. | | | | | | | | | |
| SOIL LEGEND AND AASHTO CLASSIFICATION | | | | | | | | | | ANGULARITY OF GRAINS | | | | | | | | | | WEATHERED ROCK (WR) | | | | | | | | | | CRYSTALLINE ROCK (CR) | | | | | | | | | |
| 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. | | | | | | | | | | NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. | | | | | | | | | | FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. | | | | | | | | | |
| MINERALOGICAL COMPOSITION | | | | | | | | | | COMPRESSION | | | | | | | | | | NON-CRYSTALLINE ROCK (NCR) | | | | | | | | | | COASTAL PLAIN SEDIMENTARY ROCK (CP) | | | | | | | | | |
| 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 | | | | | | | | | | 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. | | | | | | | | | |
| PERCENTAGE OF MATERIAL | | | | | | | | | | GROUND WATER | | | | | | | | | | WEATHERING | | | | | | | | | | | | | | | | | | | |
| ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL | | | | | | | | | | WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING | | | | | | | | | | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. | | | | | | | | | | | | | | | | | | | |
| TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC > 10% | | | | | | | | | | STATIC WATER LEVEL AFTER 24 HOURS | | | | | | | | | | VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA | | | | | | | | | | SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | SPRING OR SEEP | | | | | | | | | | 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. | | | | | | | | | | | | | | | | | | | |
| MISCELLANEOUS SYMBOLS | | | | | | | | | | | | | | | | | | | | 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 | | | | | | | | | | | | | | | | | | | |
| ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION | | | | | | | | | | DIP & DIP DIRECTION OF ROCK STRUCTURES | | | | | | | | | | 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, WOULD YIELD SPT N VALUES > 100 BPF | | | | | | | | | | | | | | | | | | | |
| SOIL SYMBOL | | | | | | | | | | TEST BORING | | | | | | | | | | VERY SEVERE (IV SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF | | | | | | | | | | | | | | | | | | | |
| ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT | | | | | | | | | | AUGER BORING | | | | | | | | | | 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. | | | | | | | | | | | | | | | | | | | |
| INFERRED SOIL BOUNDARY | | | | | | | | | | CORE BORING | | | | | | | | | | ROCK HARDNESS | | | | | | | | | | | | | | | | | | | |
| INFERRED ROCK LINE | | | | | | | | | | MONITORING WELL | | | | | | | | | | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. | | | | | | | | | | | | | | | | | | | |
| ALLUVIAL SOIL BOUNDARY | | | | | | | | | | PIEZOMETER INSTALLATION | | | | | | | | | | 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 GROUDED 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 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. | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | 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. | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | FRACTURE SPACING | | | | | | | | | | BEDDING | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | TERM SPACING | | | | | | | | | | TERM THICKNESS | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | VERY WIDE MORE THAN 10 FEET | | | | | | | | | | VERY THICKLY BEDDED 4 FEET | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | WIDE 3 TO 10 FEET | | | | | | | | | | THICKLY BEDDED 1.5 - 4 FEET | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | MODERATELY CLOSE 1 TO 3 FEET | | | | | | | | | | THINLY BEDDED 0.16 - 1.5 FEET | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | CLOSE 0.16 TO 1 FOOT | | | | | | | | | | VERY THINLY BEDDED 0.03 - 0.16 FEET | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | VERY CLOSE LESS THAN 0.16 FEET | | | | | | | | | | THICKLY LAMINATED 0.008 - 0.03 FEET | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | THINLY LAMINATED < 0.008 FEET | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLASTICITY | | | | | | | | | | EQUIPMENT USED ON SUBJECT PROJECT | | | | | | | | | | INDURATION | | | | | | | | | | | | | | | | | | | |
| NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC | | | | | | | | | | DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST | | | | | | | | | | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. | | | | | | | | | | | | | | | | | | | |
| PLASTICITY INDEX (PI) DRY STRENGTH | | | | | | | | | | ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE 2 7/8" STEEL TEETH TRICONE TUNG-CARB. CORE BIT | | | | | | | | | | FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. | | | | | | | | | | | | | | | | | | | |
| COLOR | | | | | | | | | | | | | | | | | | | | MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. | | | | | | | | | | | | | | | | | | | |
| DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE. | | | | | | | | | | | | | | | | | | | | 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. | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | NOTES: FIAD = Filled Immediately After Drilling | | | | | | | | | |

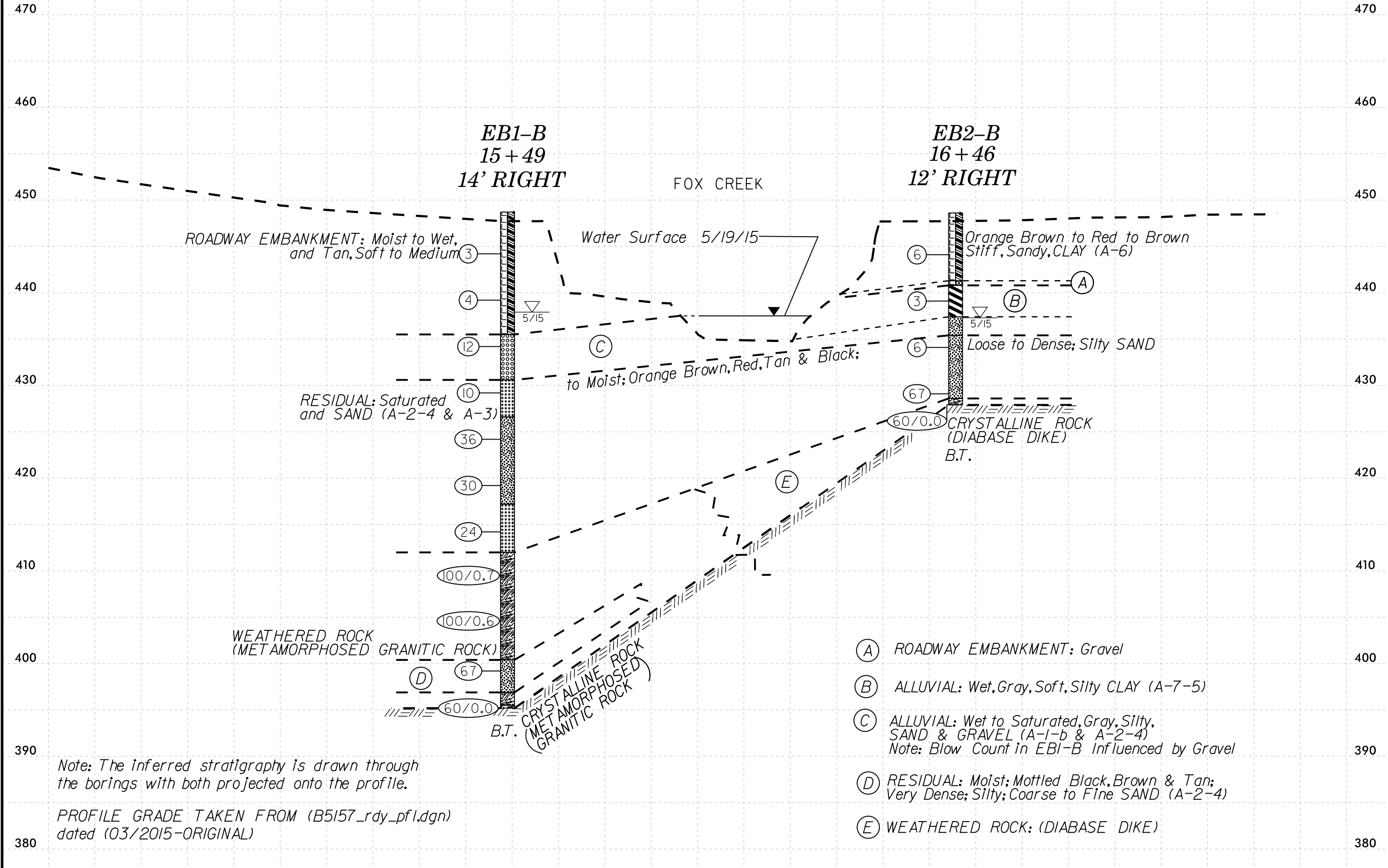
SKEW ANGLE = 90

NC GRID
NAD 83/NSRS 2007





| | |
|---|------------------|
| PROJECT REFERENCE NO. | SHEET NO. |
| B-5157 | 4 |
| PROFILE ALONG BORINGS RIGHT OF -L- PROJECTED ALONG -L- | |



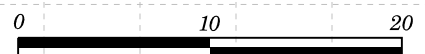
Note: The inferred stratigraphy is drawn through the borings with both projected onto the profile.

PROFILE GRADE TAKEN FROM (B5157_rdy_pf1.dgn) dated (03/2015-ORIGINAL)

- (A) ROADWAY EMBANKMENT: Gravel
- (B) ALLUVIAL: Wet, Gray, Soft, Silty CLAY (A-7-5)
- (C) ALLUVIAL: Wet to Saturated, Gray, Silty, SAND & GRAVEL (A-1-b & A-2-4)
Note: Blow Count in EB1-B Influenced by Gravel
- (D) RESIDUAL: Moist; Mottled Black, Brown & Tan; Very Dense; Silty; Coarse to Fine SAND (A-2-4)
- (E) WEATHERED ROCK: (DIABASE DIKE)

CROSS SECTION ALONG END BENT I

8/23/99



SCALE: 1" = 10'

VE = 0

SKEW ANGLE = 90

EBI-A
15+49
12' LEFT

EBI-B
15+49
14' RIGHT

Ground Surface

ROADWAY EMBANKMENT: Wet,
Orange Brown to
and Tan, Soft to Medium
CLAY (A-6)

Gray &
Reddish Brown
Stiff, Coarse to

Fine Sandy,
CLAY (A-6)

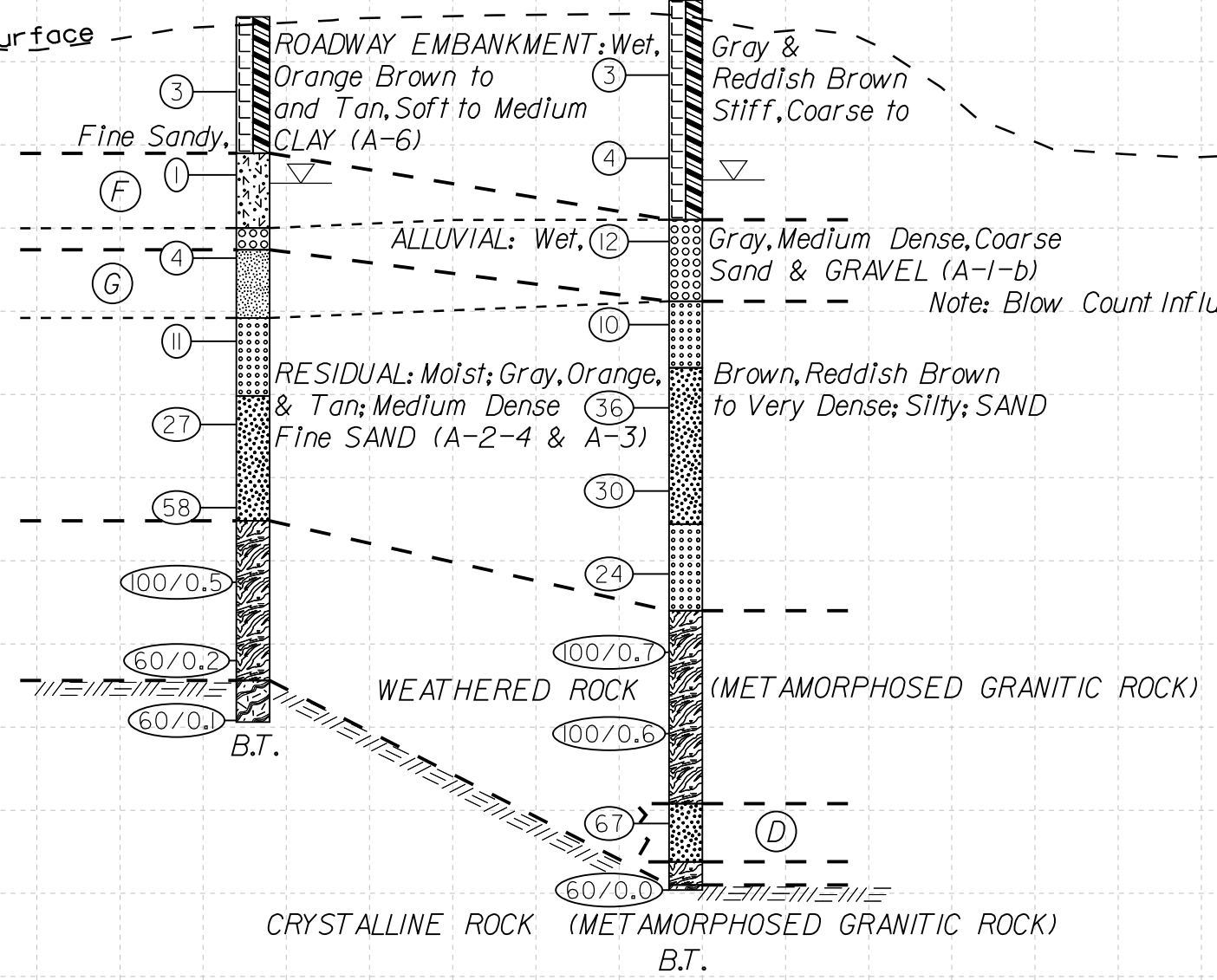
ALLUVIAL: Wet,
Gray, Medium Dense, Coarse
Sand & GRAVEL (A-1-b)

Note: Blow Count Influenced by Gravel

RESIDUAL: Moist; Gray, Orange,
& Tan; Medium Dense
Fine SAND (A-2-4 & A-3)

Brown, Reddish Brown
to Very Dense; Silty; SAND

- (F) ALLUVIAL: Wet, Gray, Very Soft, Clayey SILT (A-5) With Trace Wood Fragments
- (G) RESIDUAL: Moist, Brown & Gray with Black, Soft to Medium Stiff, Fine Sandy SILT (A-4)
- (D) RESIDUAL: Moist; Mottled Black, Brown & Tan; Very Dense; Silty; Coarse to Fine SAND (A-2-4)

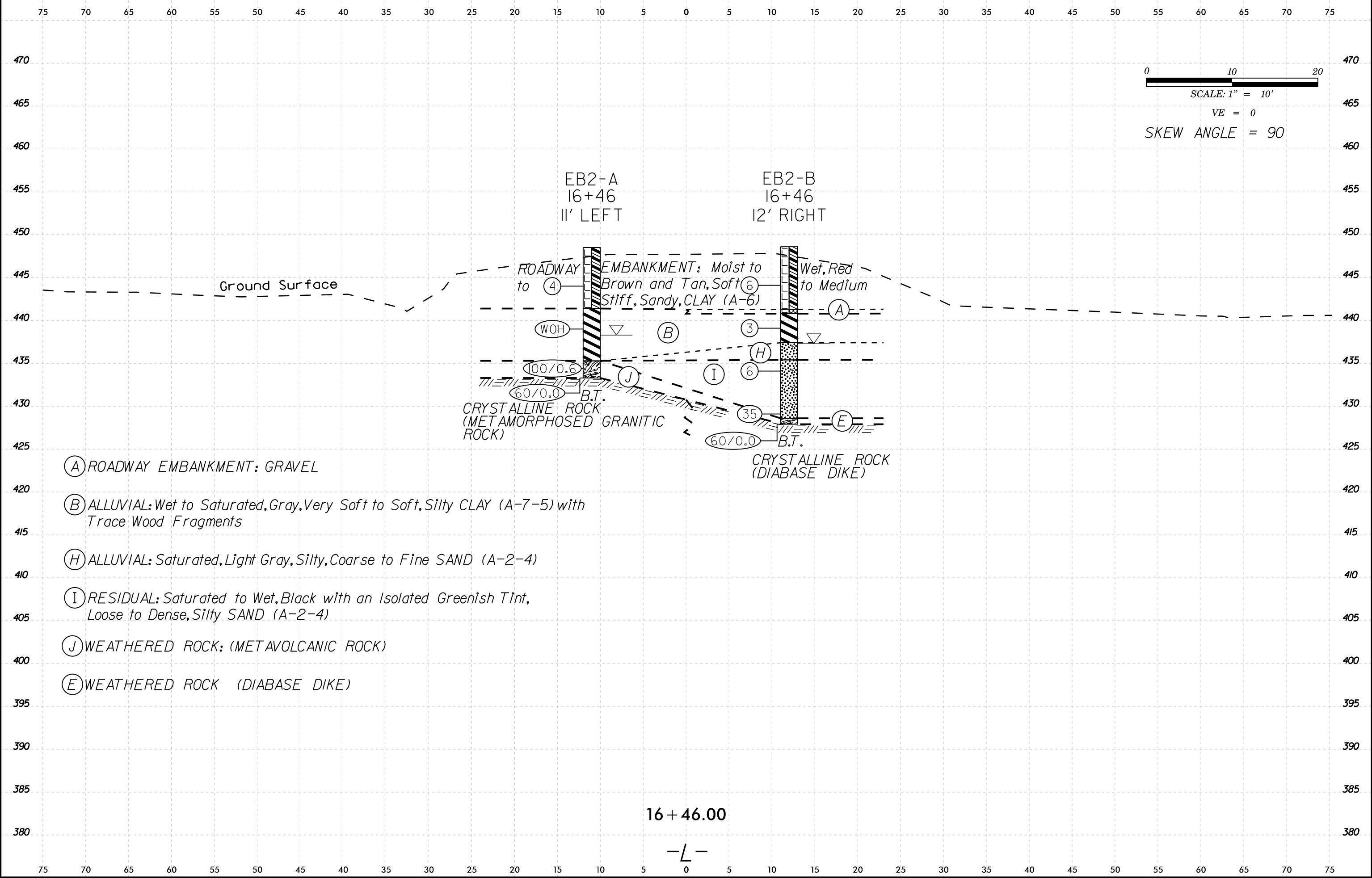


15 + 49.00

-L-

CROSS SECTION ALONG END BENT 2

8/23/99



- (A) ROADWAY EMBANKMENT: GRAVEL
- (B) ALLUVIAL: Wet to Saturated, Gray, Very Soft to Soft, Silty CLAY (A-7-5) with Trace Wood Fragments
- (H) ALLUVIAL: Saturated, Light Gray, Silty, Coarse to Fine SAND (A-2-4)
- (I) RESIDUAL: Saturated to Wet, Black with an Isolated Greenish Tint, Loose to Dense, Silty SAND (A-2-4)
- (J) WEATHERED ROCK: (METAVOLCANIC ROCK)
- (E) WEATHERED ROCK (DIABASE DIKE)

16 + 46.00

-L-

GEOTECHNICAL BORING REPORT

BORE LOG

| WBS 42332.1.1 | | TIP B-5157 | | COUNTY GRANVILLE | | GEOLOGIST Weaver, P.M. | | | | | | | | | | |
|---|-----------------|---------------------|--------------------------|---------------------|-------|-------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|---|--|------|
| SITE DESCRIPTION Replace Bridge No. 178 over Fox Creek on SR 1304 (Sunset Road) | | | | | | | GROUND WTR (ft) | | | | | | | | | |
| BORING NO. EB1-A | | STATION 15+49 | | OFFSET 12 ft LT | | ALIGNMENT -L- | | | | | | | | | | |
| COLLAR ELEV. 447.7 ft | | TOTAL DEPTH 42.4 ft | | NORTHING 948,513 | | EASTING 2,081,089 | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015 | | | DRILL METHOD H.S. Augers | | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Estep, E. | | START DATE 05/19/15 | | COMP. DATE 05/19/15 | | 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 | | | | | | |
| 450 | | | | | | | | | | | | | | 447.7 | GROUND SURFACE | 0.0 |
| 445 | 444.2 | 3.5 | 1 | 2 | 1 | | | | | | | | W | ROADWAY EMBANKMENT Gray and Orange Brown, Soft, Coarse to Fine Sandy CLAY (A-6) | | |
| 440 | 439.2 | 8.5 | WOH | WOH | 1 | | | | | | | | W | | | |
| 435 | 434.2 | 13.5 | 7 | 2 | 2 | | | | | | | | M | ALLUVIAL Wet, Gray, Very Soft, Clayey SILT (A-5) with Trace Wood Fragments | 8.2 | |
| 430 | 429.2 | 18.5 | 3 | 4 | 7 | | | | | | | | M | RESIDUAL Brown and Gray with Black, Soft to Medium Stiff, Fine Sandy SILT (A-4) | 12.7 | |
| 425 | 424.2 | 23.5 | 5 | 9 | 18 | | | | | | | | M | RESIDUAL Reddish Orange, Medium Dense, Fine SAND (A-3) | 14.0 | |
| 420 | 419.2 | 28.5 | 7 | 16 | 42 | | | | | | | | M | RESIDUAL Reddish Orange to Reddish Brown, Medium Dense to Very Dense, Silty, Coarse to Fine SAND (A-2-4) | 18.1 | |
| 415 | 414.2 | 33.5 | 100/0.5 | | | | | | | | | | M | WEATHERED ROCK (METAMORPHOSED GRANITIC ROCK) | 22.8 | |
| 410 | 409.2 | 38.5 | 60/0.2 | | | | | | | | | | M | WEATHERED ROCK (METAMORPHOSED GRANITIC ROCK) | 30.3 | |
| | 405.4 | 42.3 | 60/0.1 | | | | | | | | | | M | CRYSTALLINE ROCK (METAMORPHOSED GRANITIC ROCK) | 39.9 | |
| | | | | | | | | | | | | | | | Boring Terminated with Standard Penetration Test Refusal at Elevation 405.3 ft In Crystalline Rock: METMORPHOSED GRANITIC ROCK | 42.4 |

| WBS 42332.1.1 | | TIP B-5157 | | COUNTY GRANVILLE | | GEOLOGIST Weaver, P.M. | | | | | | | | | | |
|---|-----------------|---------------------|--------------------------|---------------------|-------|-------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|---|----------------|-----|
| SITE DESCRIPTION Replace Bridge No. 178 over Fox Creek on SR 1304 (Sunset Road) | | | | | | | GROUND WTR (ft) | | | | | | | | | |
| BORING NO. EB1-B | | STATION 15+49 | | OFFSET 14 ft RT | | ALIGNMENT -L- | | | | | | | | | | |
| COLLAR ELEV. 448.7 ft | | TOTAL DEPTH 53.5 ft | | NORTHING 948,488 | | EASTING 2,081,083 | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015 | | | DRILL METHOD H.S. Augers | | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Estep, E. | | START DATE 05/19/15 | | COMP. DATE 05/19/15 | | 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 | | | | | | |
| 450 | | | | | | | | | | | | | | 448.7 | GROUND SURFACE | 0.0 |
| 445 | 445.2 | 3.5 | 1 | 1 | 2 | | | | | | | | W | ROADWAY EMBANKMENT Orange Brown to Reddish Brown and Tan, Soft to Medium Stiff, Coarse to Fine Sandy, CLAY (A-6) | | |
| 440 | 440.2 | 8.5 | 2 | 1 | 3 | | | | | | | | W | | | |
| 435 | 435.2 | 13.5 | 5 | 6 | 6 | | | | | | | | W | ALLUVIAL Gray, Medium Dense, Coarse SAND and GRAVEL (A-1-b) | 13.2 | |
| 430 | 430.2 | 18.5 | 2 | 4 | 6 | | | | | | | | W | RESIDUAL Mottled Orange, Brown, and Tan; Fine SAND (A-3) | 18.1 | |
| 425 | 425.2 | 23.5 | 8 | 15 | 21 | | | | | | | | M | RESIDUAL Mottled Orange, Brown, and Tan; Dense to Medium Dense; Silty, Coarse to Fine SAND (A-2-4) | 22.1 | |
| 420 | 420.2 | 28.5 | 8 | 10 | 20 | | | | | | | | M | RESIDUAL Mottled Black, Brown, and Reddish Brown; Medium Dense; Fine SAND (A-3) | 31.5 | |
| 415 | 415.2 | 33.5 | 7 | 8 | 16 | | | | | | | | M | WEATHERED ROCK (METAMORPHOSED GRANITIC ROCK) | 36.7 | |
| 410 | 410.2 | 38.5 | 59 | 41/0.2 | | | | | | | | | M | WEATHERED ROCK (METAMORPHOSED GRANITIC ROCK) Note: Alternating Thin Very Hard and Softer Zones Between 44.1' and 48.3' | 39.9 | |
| 405 | 405.2 | 43.5 | 55 | 45/0.1 | | | | | | | | | M | WEATHERED ROCK (METAMORPHOSED GRANITIC ROCK) | 51.8 | |
| 400 | 400.2 | 48.5 | 14 | 25 | 42 | | | | | | | | M | RESIDUAL Mottled Black, Brown, and Tan; Very Dense; Silty; Coarse to Fine SAND (A-2-4) | 53.2 | |
| | 395.2 | 53.5 | 60/0.0 | | | | | | | | | | | CRYSTALLINE ROCK (METAMORPHOSED GRANITIC ROCK) Boring Terminated with Standard Penetration Test Refusal at Elevation 395.2 ft In Crystalline Rock: METMORPHOSED GRANITIC ROCK | 53.5 | |

NCDOT BORE DOUBLE B5157_GEO_BRDG178_GINTLOGS.GPJ_NC_DOT_GDT 7/16/15

GEOTECHNICAL BORING REPORT

BORE LOG

| WBS 42332.1.1 | | TIP B-5157 | | COUNTY GRANVILLE | | GEOLOGIST Weaver, P.M. | | | | | | | | | | | |
|---|-----------------|--------------------------|------------|-----------------------|-------|-------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|--|---------|----------------|-----|
| SITE DESCRIPTION Replace Bridge No. 178 over Fox Creek on SR 1304 (Sunset Road) | | | | | | | GROUND WTR (ft) | | | | | | | | | | |
| BORING NO. EB2-A | | STATION 16+46 | | OFFSET 11 ft LT | | ALIGNMENT -L- | | | | | | | | | | | |
| COLLAR ELEV. 448.5 ft | | TOTAL DEPTH 15.2 ft | | NORTHING 948,488 | | EASTING 2,081,183 | | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015 | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | | | | |
| DRILLER Estep, E. | | START DATE 05/19/15 | | COMP. DATE 05/19/15 | | 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 | | | | | | | |
| 450 | | | | | | | | | | | | | | | 448.5 | GROUND SURFACE | 0.0 |
| 445 | 445.0 | 3.5 | 3 | 2 | 2 | | | | | | | | W | ROADWAY EMBANKMENT Red to Reddish Brown and Tan, Soft to Medium Stiff, Coarse to Fine Sandy CLAY (A-6) with Some Gravel in Upper 3' | | | |
| 440 | 440.0 | 8.5 | WOH | WOH | WOH | | | | | | | | Sat. | ALLUVIAL Gray, Very Soft, Fine Sandy, Silty CLAY (A-7-5) with Trace Wood Fragments | 7.1 | | |
| 435 | 435.0 | 13.5 | | | | | | | | | | | | WEATHERED ROCK (METAVOLCANIC ROCK) | 13.2 | | |
| | 433.3 | 15.2 | 83 | 17/0.1 | | | | | | | | | | Boring Terminated with Standard Penetration Test Refusal at Elevation 433.3 ft on Crystalline Rock: METAVOLCANIC ROCK | 15.2 | | |
| | | | 60/0.0 | | | | | | | | | | | | 100/0.6 | | |
| | | | | | | | | | | | | | | | 60/0.0 | | |

| WBS 42332.1.1 | | TIP B-5157 | | COUNTY GRANVILLE | | GEOLOGIST Weaver, P.M. | | | | | | | | | | | |
|---|-----------------|--------------------------|------------|-----------------------|-------|-------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|--|--------|----------------|-----|
| SITE DESCRIPTION Replace Bridge No. 178 over Fox Creek on SR 1304 (Sunset Road) | | | | | | | GROUND WTR (ft) | | | | | | | | | | |
| BORING NO. EB2-B | | STATION 16+46 | | OFFSET 12 ft RT | | ALIGNMENT -L- | | | | | | | | | | | |
| COLLAR ELEV. 448.6 ft | | TOTAL DEPTH 20.7 ft | | NORTHING 948,468 | | EASTING 2,081,178 | | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015 | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | | | | |
| DRILLER Estep, E. | | START DATE 05/19/15 | | COMP. DATE 05/19/15 | | 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 | | | | | | | |
| 450 | | | | | | | | | | | | | | | 448.6 | GROUND SURFACE | 0.0 |
| 445 | 445.1 | 3.5 | 2 | 3 | 3 | | | | | | | | M | ROADWAY EMBANKMENT Red to Brown and Tan, Medium Stiff, Coarse to Fine Sandy CLAY (A-6) | | | |
| 440 | 440.1 | 8.5 | | | | | | | | | | | W | GRAVEL | 7.3 | | |
| | | | | | | | | | | | | | | ALLUVIAL Gray, Soft, Silty CLAY (A-7-5) | 11.2 | | |
| 435 | 435.1 | 13.5 | 9 | 3 | 3 | | | | | | | | Sat. | Light Gray, Silty, Coarse to Fine SAND (A-2-4) | 13.2 | | |
| | | | | | | | | | | | | | | RESIDUAL Black with an Isolated Greenish Tint, Loose to Dense, Silty SAND (A-2-4) | | | |
| 430 | 430.1 | 18.5 | 5 | 6 | 29 | | | | | | | | W | WEATHERED ROCK (DIABASE DIKE) | 20.0 | | |
| | 427.9 | 20.7 | 60/0.0 | | | | | | | | | | | Boring Terminated with Standard Penetration Test Refusal at Elevation 427.9 ft on Crystalline Rock: DIABASE DIKE | 20.7 | | |
| | | | | | | | | | | | | | | | 60/0.0 | | |

NCDOT BORE DOUBLE B5157_GEO_BRDG178_GINTLOGS.GPJ NC_DOT.GDT 7/16/15

SITE PHOTOGRAPHS

State Project No. 42332.1.1 – TIP No. B-5157 – Replace Bridge No. 178 over Fox Creek on SR 1304 (Sunset Road) – Granville County, NC



View of Existing Bridge No. 178 Looking Upstation



View of Existing Bridge No. 178 Looking Downstation



View of Existing Bridge No. 178 Looking Upstream



View of Existing Bridge No. 178 Looking Downstream