

REFERENCE: B-4461

PROJECT: 33712

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CHATHAM
PROJECT DESCRIPTION BRIDGE NO. 10 ON SR 1916
(CORINTH RD) OVER SHADDOX CREEK

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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) 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

W. S. HUNSBERGER

TRIGON EXP

INVESTIGATED BY WSH

DRAWN BY WSH

CHECKED BY J.R. HAMM

SUBMITTED BY FALCON

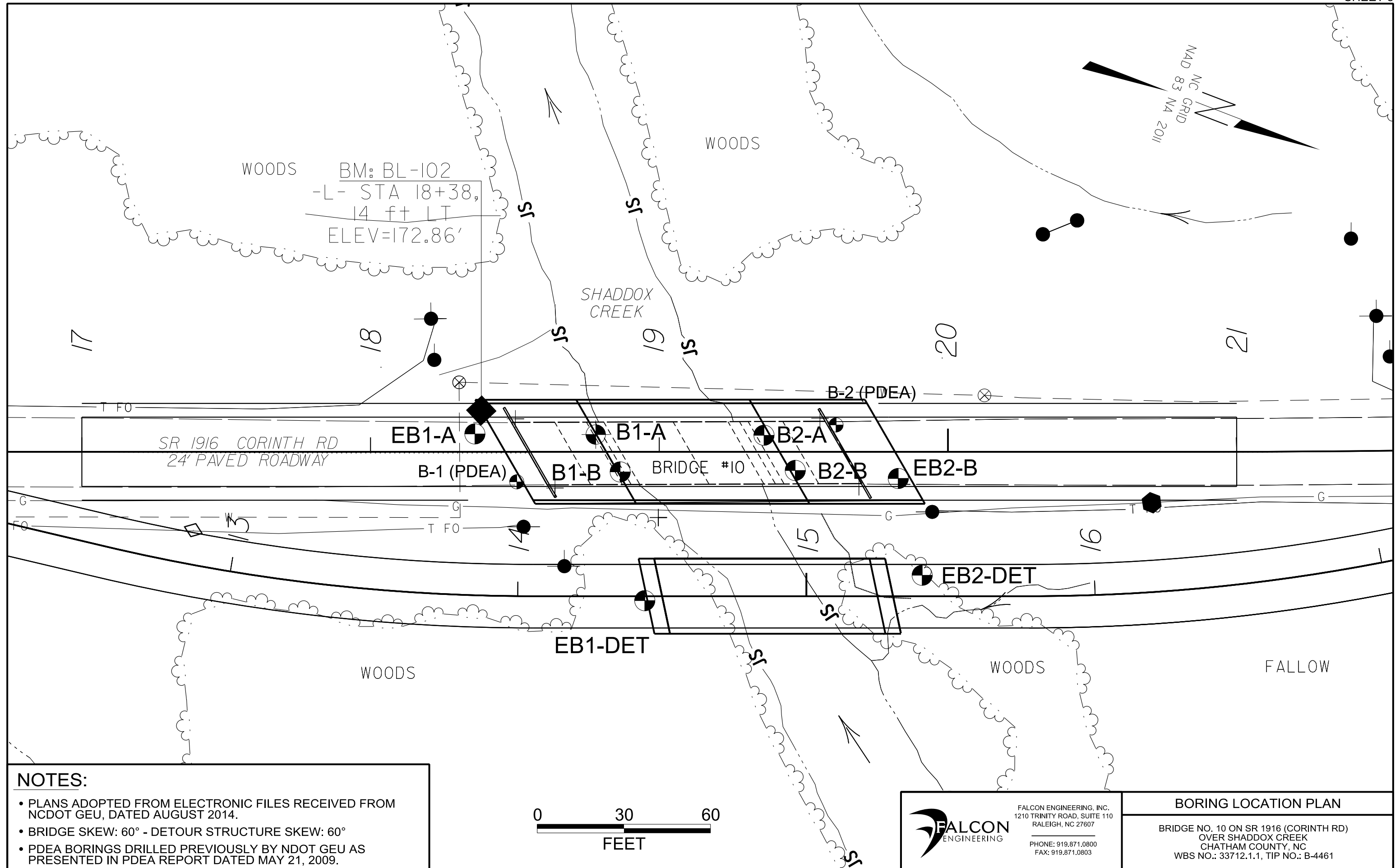
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Jeremy R. Hamm 12/19/2014
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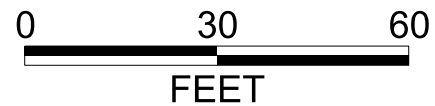
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

| 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 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 (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 | | | | | | | | | | NON-CRYSTALLINE ROCK (NCR) | | | | | | | | | | COASTAL PLAIN SEDIMENTARY ROCK (CP) | | | | | | | | | | WEATHERING | | | | | | | | | |
| MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE. | | | | | | | | | | 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. | | | | | | | | | | FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. | | | | | | | | | |
| COMPRESSION | | | | | | | | | | PERCENTAGE OF MATERIAL | | | | | | | | | | VERY SLIGHT (IV SLI.) | | | | | | | | | | SLIGHT (SLI.) | | | | | | | | | |
| SLIGHTLY COMPRESSIBLE LL < 31 | | | | | | | | | | ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL | | | | | | | | | | 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. | | | | | | | | | | 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. | | | | | | | | | |
| MODERATELY COMPRESSIBLE LL = 31 - 50 | | | | | | | | | | TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC > 10% | | | | | | | | | | 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. | | | | | | | | | | 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. | | | | | | | | | |
| HIGHLY COMPRESSIBLE LL > 50 | | | | | | | | | | GROUND WATER | | | | | | | | | | MODERATE (MOD.) | | | | | | | | | | MODERATELY SEVERE (MOD. SEV.) | | | | | | | | | |
| | | | | | | | | | | WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING | | | | | | | | | | 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 | | | | | | | | | | 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 | | | | | | | | | |
| | | | | | | | | | | STATIC WATER LEVEL AFTER 24 HOURS | | | | | | | | | | VERY SEVERE (SEV.) | | | | | | | | | | SEVERE (SEV.) | | | | | | | | | |
| | | | | | | | | | | PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA | | | | | | | | | | 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 | | | | | | | | | | 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. | | | | | | | | | |
| | | | | | | | | | | SPRING OR SEEP | | | | | | | | | | COMPLETE | | | | | | | | | | ROCK HARDNESS | | | | | | | | | |
| MISCELLANEOUS SYMBOLS | | | | | | | | | | RECOMMENDATION SYMBOLS | | | | | | | | | | VERY HARD | | | | | | | | | | HARD | | | | | | | | | |
| ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION | | | | | | | | | | UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE | | | | | | | | | | CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. | | | | | | | | | | CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. | | | | | | | | | |
| SOIL SYMBOL | | | | | | | | | | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK | | | | | | | | | | MODERATELY HARD | | | | | | | | | | MODERATELY HARD | | | | | | | | | |
| ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT | | | | | | | | | | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK | | | | | | | | | | 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. | | | | | | | | | | 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. | | | | | | | | | |
| INFERRED SOIL BOUNDARY | | | | | | | | | | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK | | | | | | | | | | MEDIUM HARD | | | | | | | | | | SOFT | | | | | | | | | |
| INFERRED ROCK LINE | | | | | | | | | | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK | | | | | | | | | | 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. | | | | | | | | | | FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. | | | | | | | | | |
| ALLUVIAL SOIL BOUNDARY | | | | | | | | | | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK | | | | | | | | | | VERY SOFT | | | | | | | | | | VERY SOFT | | | | | | | | | |
| | | | | | | | | | | UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK | | | | | | | | | | 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. | | | | | | | | | | 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. | | | | | | | | | |
| TEXTURE OR GRAIN SIZE | | | | | | | | | | ABBREVIATIONS | | | | | | | | | | FRACTURE SPACING | | | | | | | | | | BEDDING | | | | | | | | | |
| U.S. STD. SIEVE SIZE OPENING (MM) | | | | | | | | | | AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST | | | | | | | | | | TERM SPACING | | | | | | | | | | TERM THICKNESS | | | | | | | | | |
| BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.) | | | | | | | | | | BT - BORING TERMINATED MICA - MICACEOUS WEA. - WEATHERED | | | | | | | | | | VERY WIDE MORE THAN 10 FEET | | | | | | | | | | VERY THICKLY BEDDED 4 FEET | | | | | | | | | |
| GRAIN SIZE | | | | | | | | | | CL. - CLAY NP - NON PLASTIC CSE. - COARSE PMT - PRESSUREMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAG. - FRAGMENTS HI. - HIGHLY | | | | | | | | | | WIDE 3 TO 10 FEET | | | | | | | | | | THICKLY BEDDED 1.5 - 4 FEET | | | | | | | | | |
| SOIL MOISTURE - CORRELATION OF TERMS | | | | | | | | | | EQUIPMENT USED ON SUBJECT PROJECT | | | | | | | | | | MODERATELY CLOSE 1 TO 3 FEET | | | | | | | | | | THINLY BEDDED 0.16 - 1.5 FEET | | | | | | | | | |
| SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION | | | | | | | | | | DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: CORE SIZE: HAND TOOLS: | | | | | | | | | | CLOSE 0.16 TO 1 FOOT | | | | | | | | | | VERY THINLY BEDDED 0.03 - 0.16 FEET | | | | | | | | | |
| LL - LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE | | | | | | | | | | CME-45C CLAY BITS AUTOMATIC | | | | | | | | | | VERY CLOSE LESS THAN 0.16 FEET | | | | | | | | | | THICKLY LAMINATED 0.008 - 0.03 FEET | | | | | | | | | |
| PL - PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE | | | | | | | | | | CME-55 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OM - OPTIMUM MOISTURE SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE | | | | | | | | | | CME-550 HARD FACED FINGER BITS TUNG-CARBIDE INSERTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SL - SL - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE | | | | | | | | | | VANE SHEAR TEST CASING w/ ADVANCER TRICONE 2-15/16" STEEL TEETH TRICONE TUNG-CARB. CORE BIT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLASTICITY | | | | | | | | | | INDURATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC | | | | | | | | | | FRIBLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLASTICITY INDEX (PI) DRY STRENGTH | | | | | | | | | | MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| COLOR | | | | | | | | | | INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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. | | | | | | | | | | EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



NOTES:

- PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU, DATED AUGUST 2014.
- BRIDGE SKEW: 60° - DETOUR STRUCTURE SKEW: 60°
- PDEA BORINGS DRILLED PREVIOUSLY BY NDOT GEU AS PRESENTED IN PDEA REPORT DATED MAY 21, 2009.

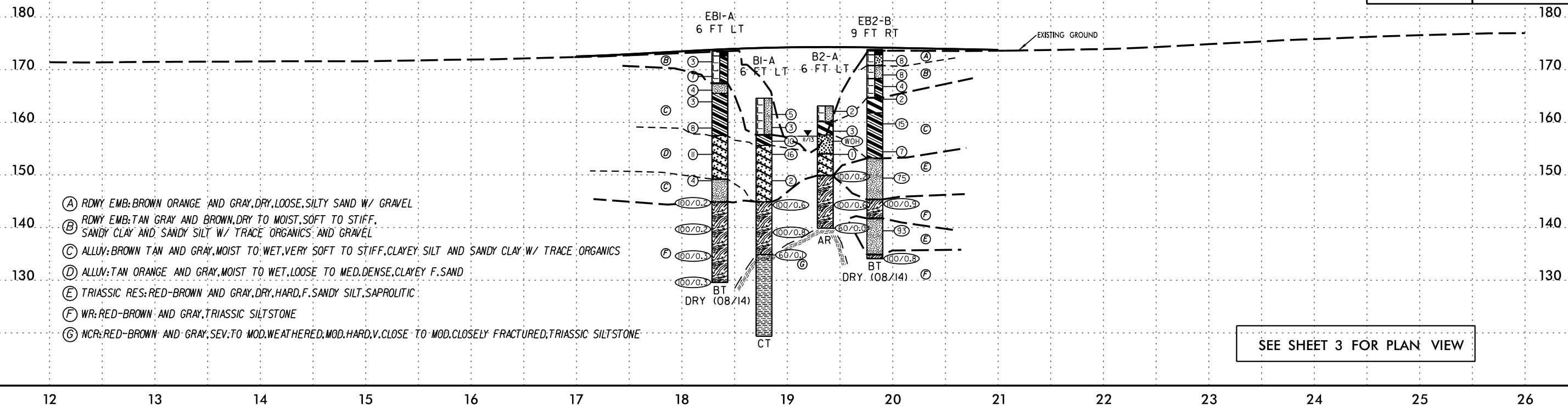


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 FALCON ENGINEERING, INC.
 1210 TRINITY ROAD, SUITE 110
 RALEIGH, NC 27607
 PHONE: 919.871.0800
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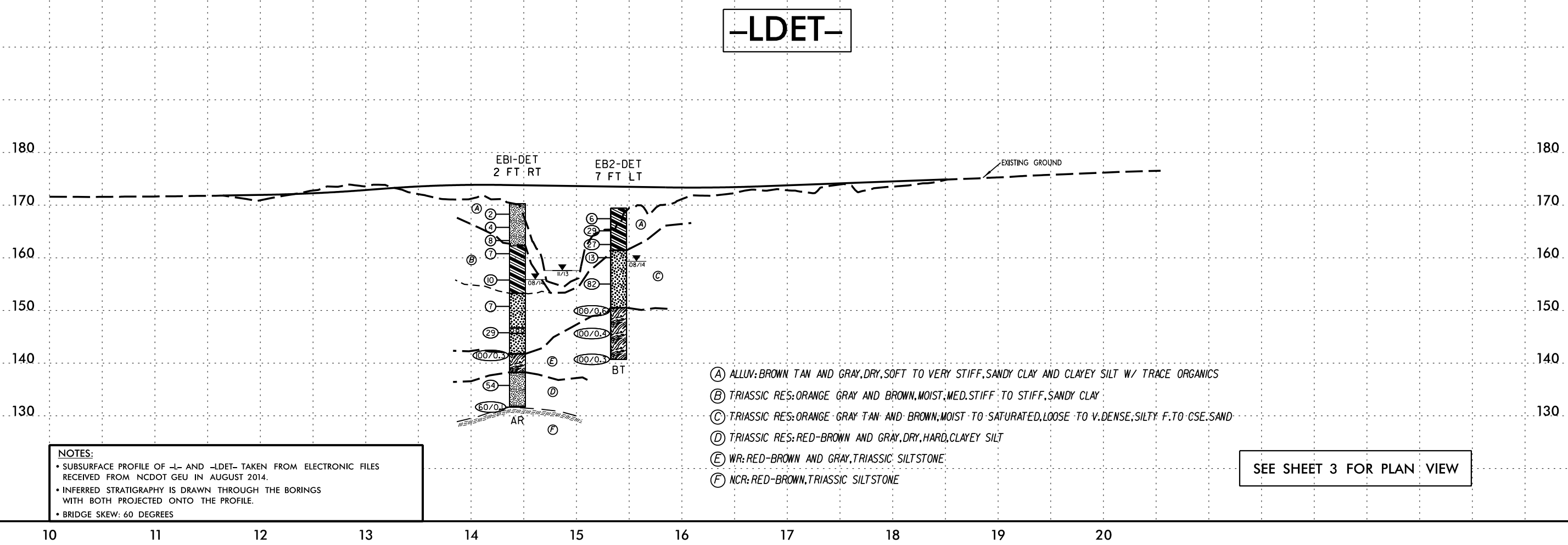
BORING LOCATION PLAN
 BRIDGE NO. 10 ON SR 1916 (CORINTH RD)
 OVER SHADDOX CREEK
 CHATHAM COUNTY, NC
 WBS NO.: 33712.1.1, TIP NO.: B-4461

5/28/99

| | |
|--|---------------------|
| PROJECT REFERENCE NO. B-4461 | SHEET NO. 4 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |



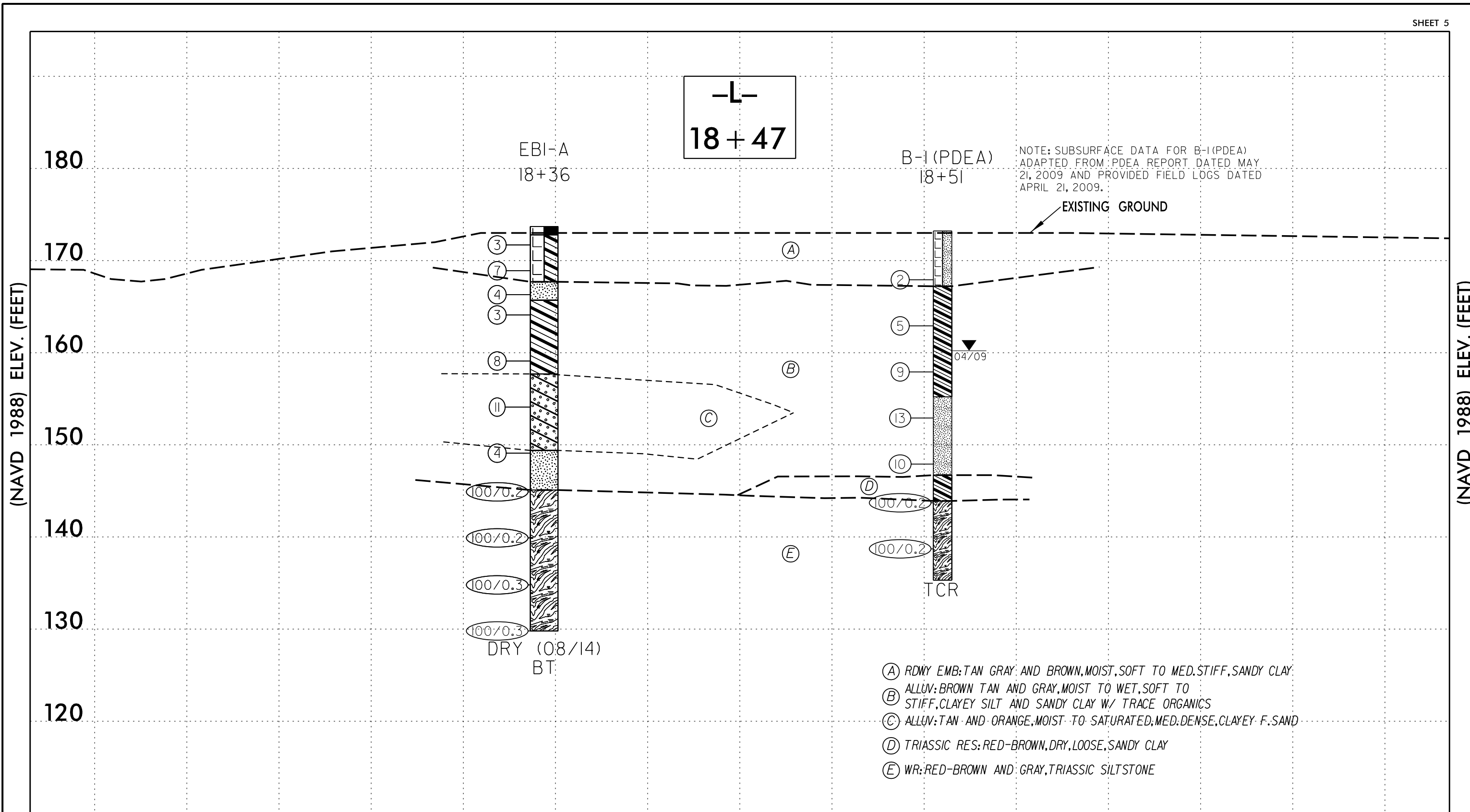
SEE SHEET 3 FOR PLAN VIEW



NOTES:

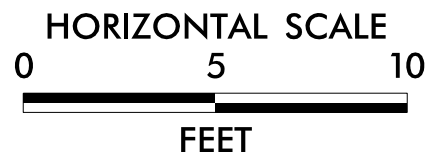
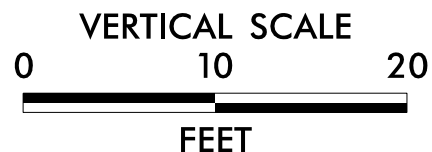
- SUBSURFACE PROFILE OF -L- AND -LDET- TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU IN AUGUST 2014.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- BRIDGE SKEW: 60 DEGREES

SEE SHEET 3 FOR PLAN VIEW



NOTES:

- GROUNDLINE CROSS SECTION ALONG BENT TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU IN AUGUST 2014.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.
- BRIDGE SKEW: 60 DEGREES

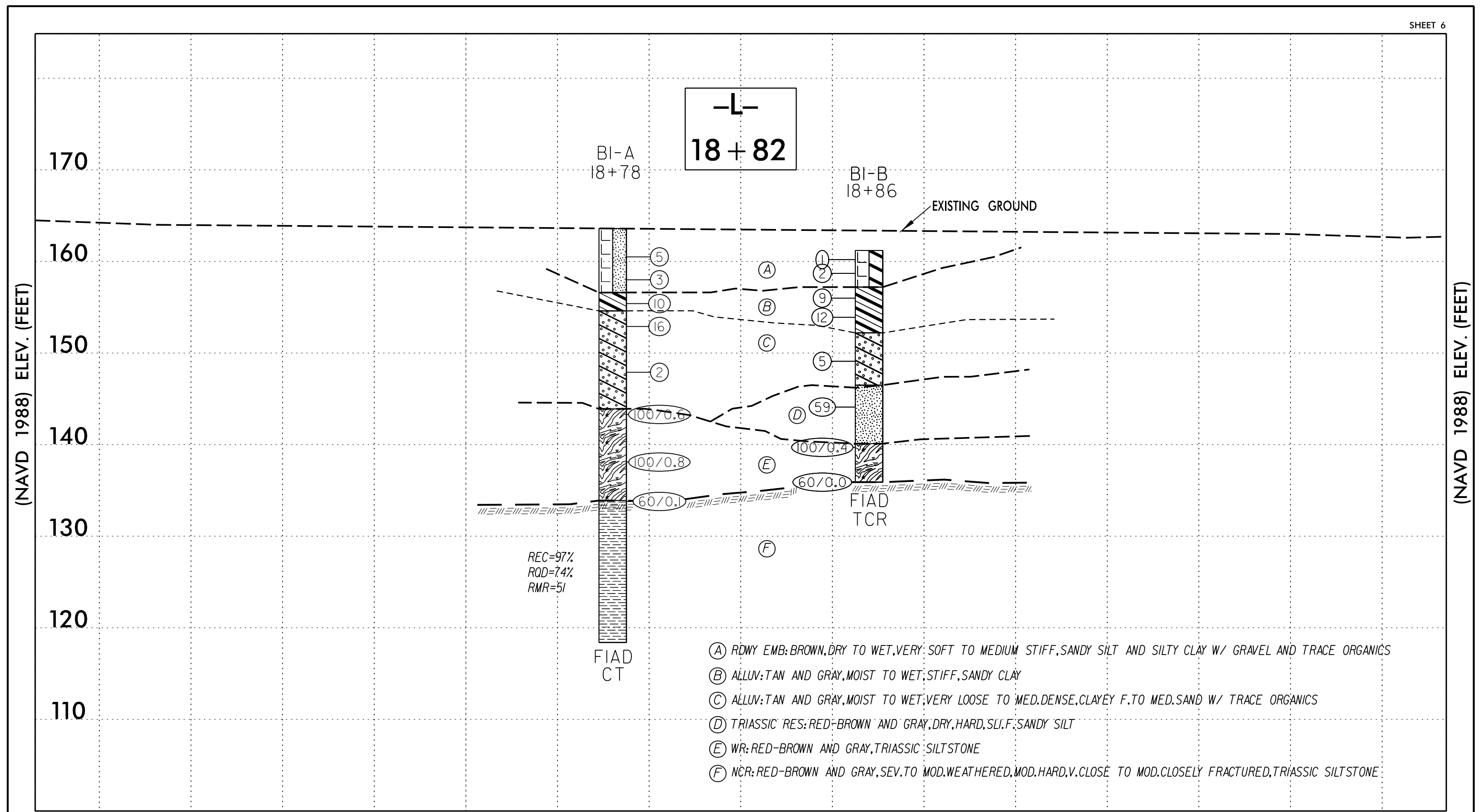


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-L- SUBSURFACE CROSS SECTION (END BENT 1)

BRIDGE NO. 10 ON SR 1916
(CORINTH RD) OVER SHADDOX CREEK
CHATHAM COUNTY, NORTH CAROLINA
WBS.: 33712.1.1, TIP.: B-4461

- (A) RDWY EMB: TAN GRAY AND BROWN, MOIST, SOFT TO MED. STIFF, SANDY CLAY
- (B) ALLUV: BROWN TAN AND GRAY, MOIST TO WET, SOFT TO STIFF, CLAYEY SILT AND SANDY CLAY W/ TRACE ORGANICS
- (C) ALLUV: TAN AND ORANGE, MOIST TO SATURATED, MED. DENSE, CLAYEY F. SAND
- (D) TRIASSIC RES: RED-BROWN, DRY, LOOSE, SANDY CLAY
- (E) WR: RED-BROWN AND GRAY, TRIASSIC SILTSTONE



- (A) RDWY EMB: BROWN, DRY TO WET, VERY SOFT TO MEDIUM STIFF, SANDY SILT AND SILTY CLAY W/ GRAVEL AND TRACE ORGANICS
- (B) ALLUV: TAN AND GRAY, MOIST TO WET, STIFF, SANDY CLAY
- (C) ALLUV: TAN AND GRAY, MOIST TO WET, VERY LOOSE TO MED. DENSE, CLAYEY F. TO MED. SAND W/ TRACE ORGANICS
- (D) TRIASSIC RES: RED-BROWN AND GRAY, DRY, HARD, SLI. F. SANDY SILT
- (E) WR: RED-BROWN AND GRAY, TRIASSIC SILTSTONE
- (F) NCR: RED-BROWN AND GRAY, SEV. TO MOD. WEATHERED, MOD. HARD, V. CLOSE TO MOD. CLOSELY FRACTURED, TRIASSIC SILTSTONE

NOTES:

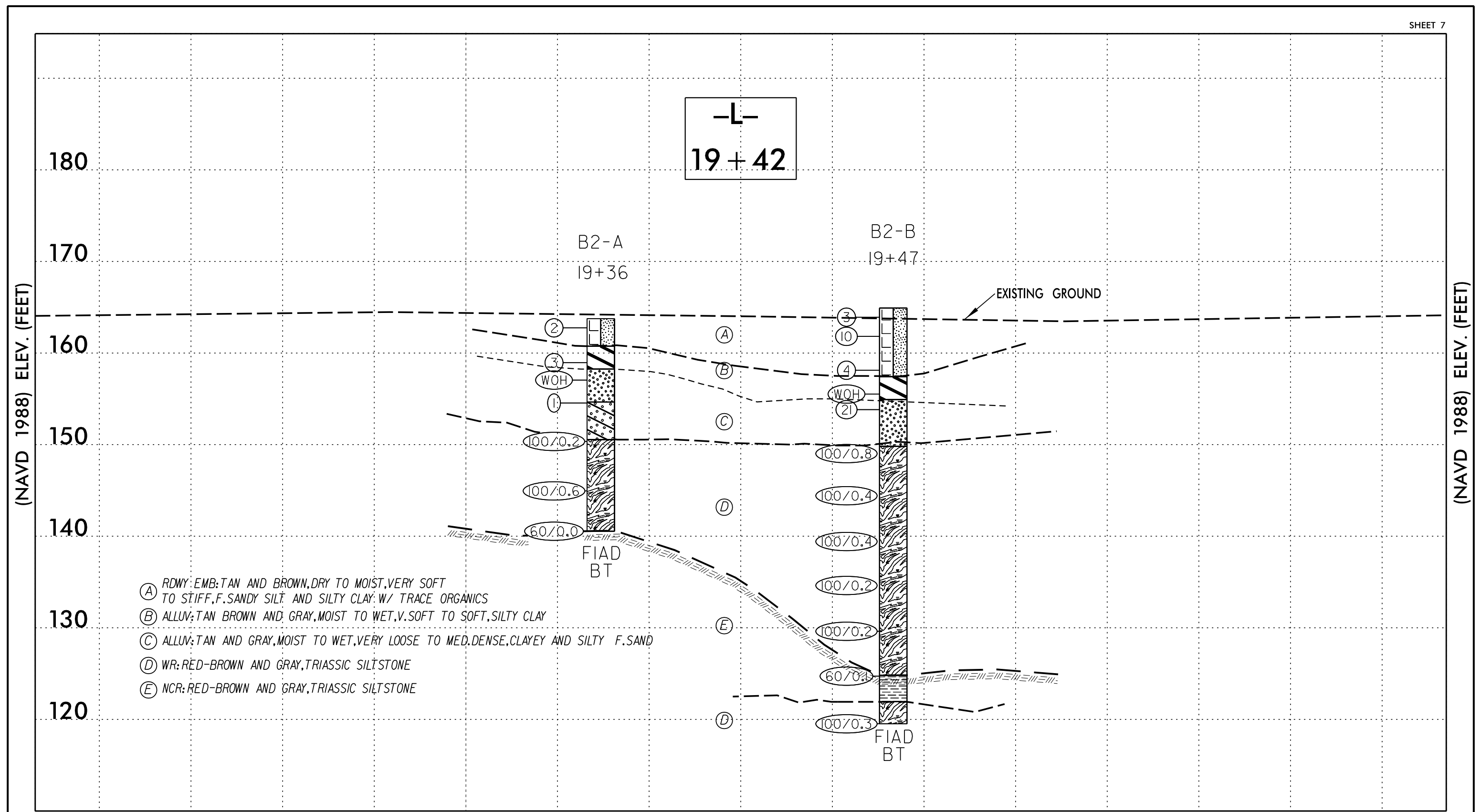
- GROUNDLINE CROSS SECTION ALONG BENT TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU IN AUGUST 2014.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.
- BRIDGE SKEW: 60 DEGREES



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-L- SUBSURFACE CROSS SECTION (INTERIOR BENT 1)

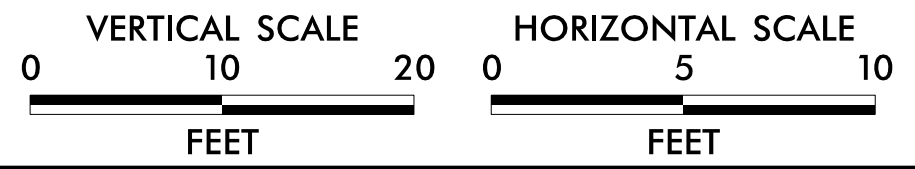
BRIDGE NO. 10 ON SR 1916
(CORINTH RD) OVER SHADDOX CREEK
CHATHAM COUNTY, NORTH CAROLINA
WBS.: 33712.1.1, TIP.: B-4461



- (A) RDWY: EMB: TAN AND BROWN, DRY TO MOIST, VERY SOFT TO STIFF, F. SANDY SILT AND SILTY CLAY W/ TRACE ORGANICS
- (B) ALLUV: TAN BROWN AND GRAY, MOIST TO WET, V. SOFT TO SOFT, SILTY CLAY
- (C) ALLUV: TAN AND GRAY, MOIST TO WET, VERY LOOSE TO MED. DENSE, CLAYEY AND SILTY F. SAND
- (D) WR: RED-BROWN AND GRAY, TRIASSIC SILTSTONE
- (E) NCR: RED-BROWN AND GRAY, TRIASSIC SILTSTONE

NOTES:

- GROUNDLINE CROSS SECTION ALONG BENT TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU IN AUGUST 2014.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.
- BRIDGE SKEW: 60 DEGREES



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-L- SUBSURFACE CROSS SECTION (INTERIOR BENT 2)

BRIDGE NO. 10 ON SR 1916
(CORINTH RD) OVER SHADDOX CREEK
CHATHAM COUNTY, NORTH CAROLINA
WBS.: 33712.1.1, TIP.: B-4461

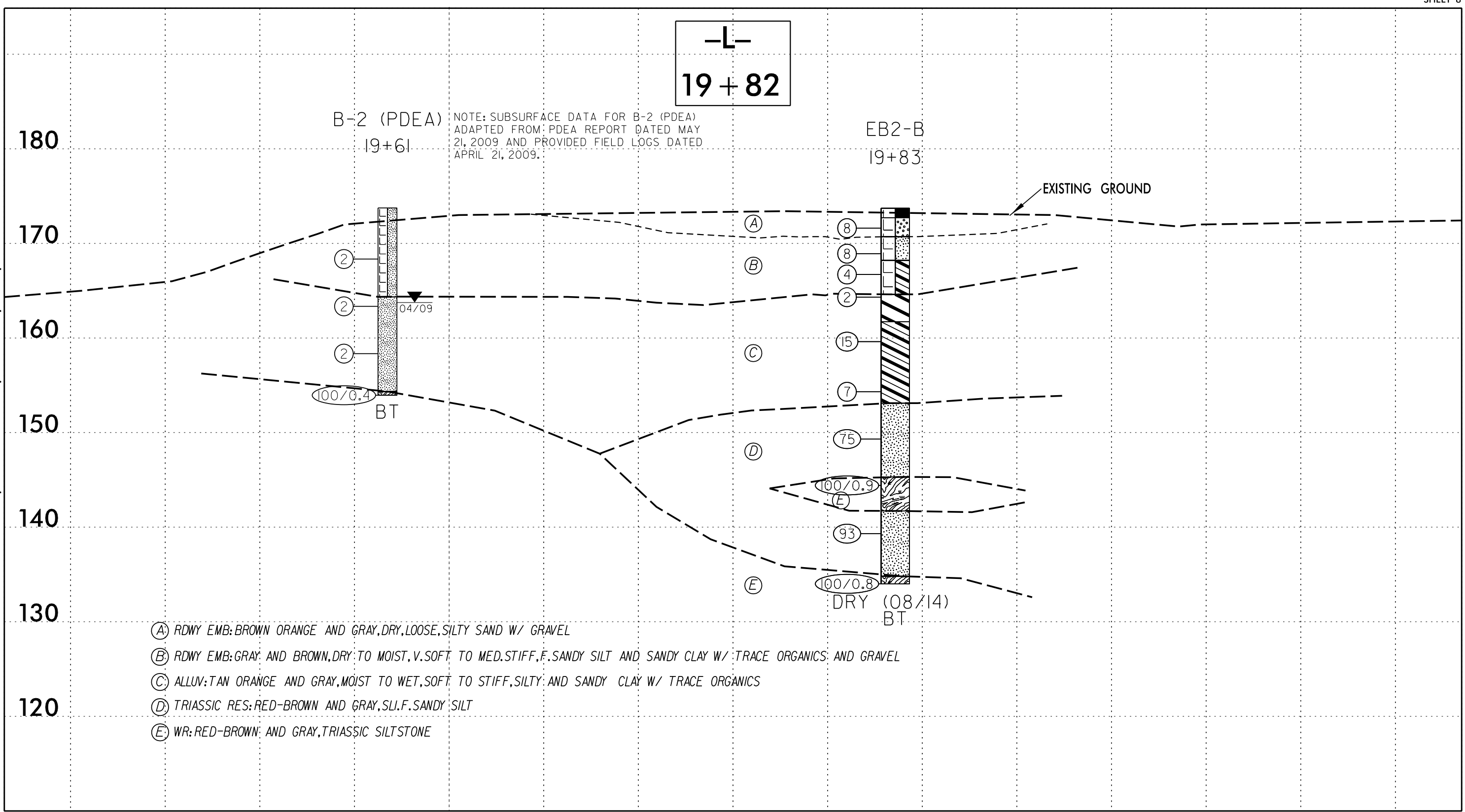
-L-
19 + 82

B-2 (PDEA) 19+61
NOTE: SUBSURFACE DATA FOR B-2 (PDEA) ADAPTED FROM: PDEA REPORT DATED MAY 21, 2009 AND PROVIDED FIELD LOGS DATED APRIL 21, 2009.

EB2-B 19+83

(NAVD 1988) ELEV. (FEET)

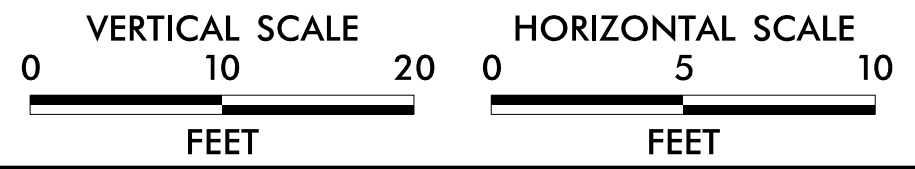
(NAVD 1988) ELEV. (FEET)



- (A) RDWY EMB: BROWN ORANGE AND GRAY, DRY, LOOSE, SILTY SAND W/ GRAVEL
- (B) RDWY EMB: GRAY AND BROWN, DRY TO MOIST, V. SOFT TO MED. STIFF, F. SANDY SILT AND SANDY CLAY W/ TRACE ORGANICS AND GRAVEL
- (C) ALLUV: TAN ORANGE AND GRAY, MOIST TO WET, SOFT TO STIFF, SILTY AND SANDY CLAY W/ TRACE ORGANICS
- (D) TRIASSIC RES: RED-BROWN AND GRAY, SL. F. SANDY SILT
- (E) WR: RED-BROWN AND GRAY, TRIASSIC SILTSTONE

NOTES:

- GROUNDLINE CROSS SECTION ALONG BENT TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU IN AUGUST 2014.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.
- BRIDGE SKEW: 60 DEGREES



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-L- SUBSURFACE CROSS SECTION (END BENT 2)

BRIDGE NO. 10 ON SR 1916
(CORINTH RD) OVER SHADDOX CREEK
CHATHAM COUNTY, NORTH CAROLINA
WBS.: 33712.1.1, TIP.: B-4461

| WBS 33712.1.1 | | TIP B-4461 | | COUNTY CHATHAM | | GEOLOGIST Hunsberger, W. S. | | | | | | | | | | | |
|---|-----------------|--------------------------|------------|-----------------------|-------|-----------------------------|-----------------|----|----|-----|-----------|---------|-------|---------------------------|------------|--|------|
| SITE DESCRIPTION BRIDGE NO. 10 ON SR 1916 (CORINTH RD) OVER SHADDOX CREEK | | | | | | | GROUND WTR (ft) | | | | | | | | | | |
| BORING NO. EB1-A | | STATION 18+36 | | OFFSET 6 ft LT | | ALIGNMENT -L- | | | | | | | | | | | |
| COLLAR ELEV. 173.5 ft | | TOTAL DEPTH 43.9 ft | | NORTHING 671,913 | | EASTING 1,986,969 | | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 92% 02/07/2014 | | DRILL METHOD H.S. Augers | | HAMMER TYPE Automatic | | | | | | | | | | | | | |
| DRILLER GOWER, S. | | START DATE 08/21/14 | | COMP. DATE 08/21/14 | | SURFACE WATER DEPTH N/A | | | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | L O G | SOIL AND ROCK DESCRIPTION | DEPTH (ft) | | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | | |
| 175 | | | | | | | | | | | | | | | | | |
| | 172.5 | 1.0 | 3 | 1 | 2 | | | | | | | | | | 173.5 | EXISTING PAVEMENT | 0.0 |
| | 172.6 | | | | | | | | | | | | | | 172.6 | 0.9' BITUMINOUS CONCRETE | 0.9 |
| 170 | 169.7 | 3.8 | 1 | 3 | 4 | | | | | | | | | | | ROADWAY EMBANKMENT TAN GRAY AND BROWN, SANDY CLAY (A-6) | |
| | 167.1 | 6.4 | 1 | 2 | 2 | | | | | | | | | | 167.5 | ALLUVIAL BROWN AND TAN, CLAYEY SILT (A-4) | 6.0 |
| 165 | 164.9 | 8.6 | 1 | 1 | 2 | | | | | | | | | | 165.5 | BROWN AND GRAY, SANDY CLAY (A-6) W/ TRACE ORGANICS | 8.0 |
| | 159.9 | 13.6 | 22 | 3 | 5 | | | | | | | | | | | | |
| 160 | 159.9 | 13.6 | | | | | | | | | | | | | | | |
| | 154.9 | 18.6 | 3 | 5 | 6 | | | | | | | | | | 157.5 | TAN AND ORANGE, CLAYEY F. SAND (A-2-6) | 16.0 |
| 155 | 154.9 | 18.6 | | | | | | | | | | | | | | | |
| | 149.9 | 23.6 | 5 | 3 | 1 | | | | | | | | | | 149.2 | GRAY, CLAYEY SILT (A-4) W/ TRACE ORGANICS | 24.3 |
| 150 | 149.9 | 23.6 | | | | | | | | | | | | | | | |
| | 144.9 | 28.6 | 100/0.2 | | | | | | | | | | | | 144.9 | WEATHERED ROCK RED-BROWN AND GRAY, TRIASSIC SILTSTONE | 28.6 |
| 145 | 144.9 | 28.6 | | | | | | | | | | | | | | | |
| | 139.9 | 33.6 | 100/0.2 | | | | | | | | | | | | | | |
| 140 | 139.9 | 33.6 | | | | | | | | | | | | | | | |
| | 134.9 | 38.6 | 100/0.3 | | | | | | | | | | | | | | |
| 135 | 134.9 | 38.6 | | | | | | | | | | | | | | | |
| | 129.9 | 43.6 | 100/0.3 | | | | | | | | | | | | 129.6 | Boring Terminated at Elevation 129.6 ft in WR: TRIASSIC SILTSTONE | 43.9 |
| 130 | 129.9 | 43.6 | | | | | | | | | | | | | | | |

NCDOT BORE SINGLE B4461_GEO_BRDG0010_GINT.GPJ NC_DOT.GDT 11/13/14

| | | | |
|---|---------------------|--------------------------|-----------------------------|
| WBS 33712.1.1 | TIP B-4461 | COUNTY CHATHAM | GEOLOGIST Hunsberger, W. S. |
| SITE DESCRIPTION BRIDGE NO. 10 ON SR 1916 (CORINTH RD) OVER SHADDOX CREEK | | | GROUND WTR (ft) |
| BORING NO. B1-A | STATION 18+78 | OFFSET 6 ft LT | ALIGNMENT -L- |
| COLLAR ELEV. 164.6 ft | TOTAL DEPTH 45.2 ft | NORTHING 671,952 | EASTING 1,986,954 |
| DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014 | | DRILL METHOD Wash Boring | HAMMER TYPE Automatic |
| DRILLER WICHARD, W. | START DATE 08/28/14 | COMP. DATE 08/28/14 | 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 | | | | | |
| 165 | | | | | | | | | | | | | | 164.6 | 0.0 |
| 160 | 162.5 | 2.1 | 2 | 3 | 2 | | | | | | | | | | |
| 155 | 160.0 | 4.6 | 2 | 1 | 2 | | | | | | | | | | |
| 150 | 157.4 | 7.2 | 5 | 5 | 5 | | | | | | | | | | |
| 145 | 154.9 | 9.7 | 6 | 7 | 9 | | | | | | | | | | |
| 140 | 149.9 | 14.7 | 4 | 1 | 1 | | | | | | | | | | |
| 135 | 144.9 | 19.7 | 74 | 26/0.1 | | | | | | | | | | | |
| 130 | 139.9 | 24.7 | 56 | 44/0.3 | | | | | | | | | | | |
| 125 | 134.9 | 29.7 | 60/0.1 | | | | | | | | | | | | |
| 120 | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Boring Terminated at Elevation 119.4 ft in NCR: TRIASSIC SILTSTONE | | | | | | | | | | | | | | |
| O HR WATER LEVEL INACCURATE DUE TO DRILLING METHOD | | | | | | | | | | | | | | |

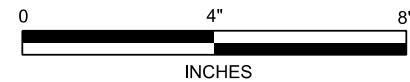
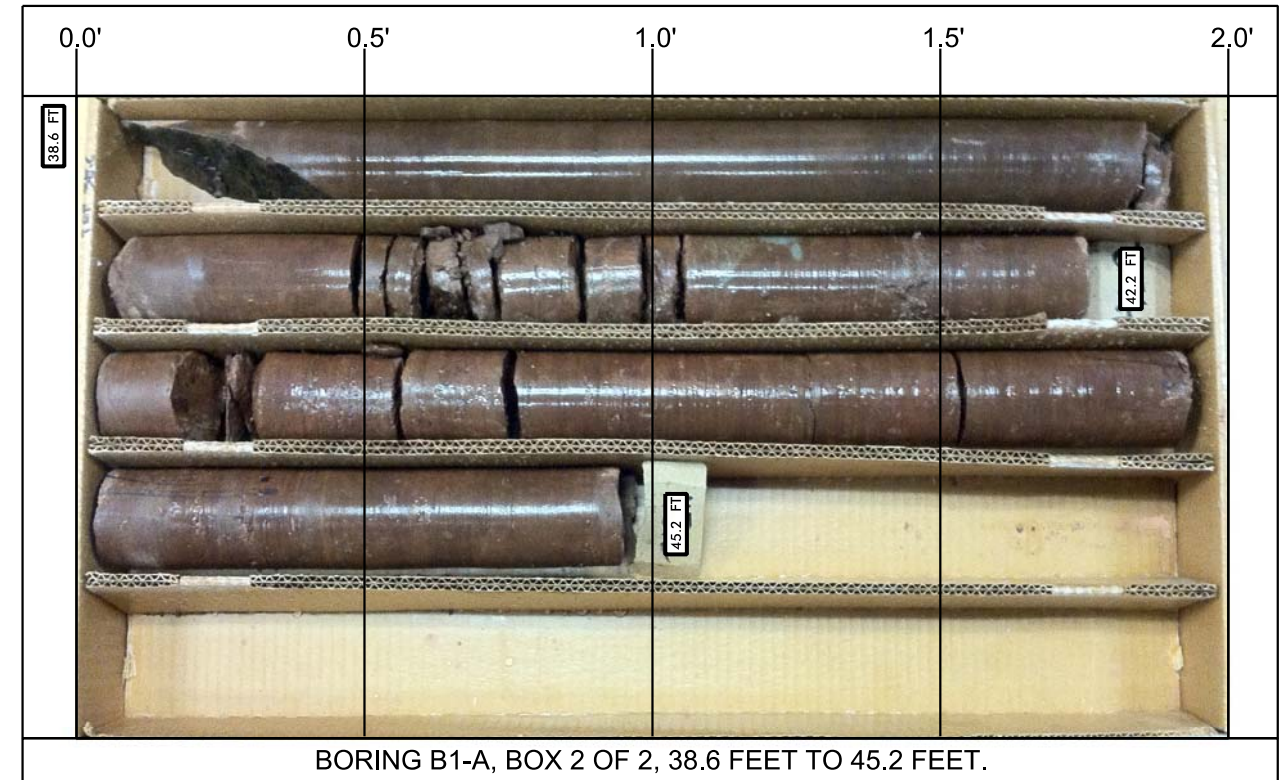
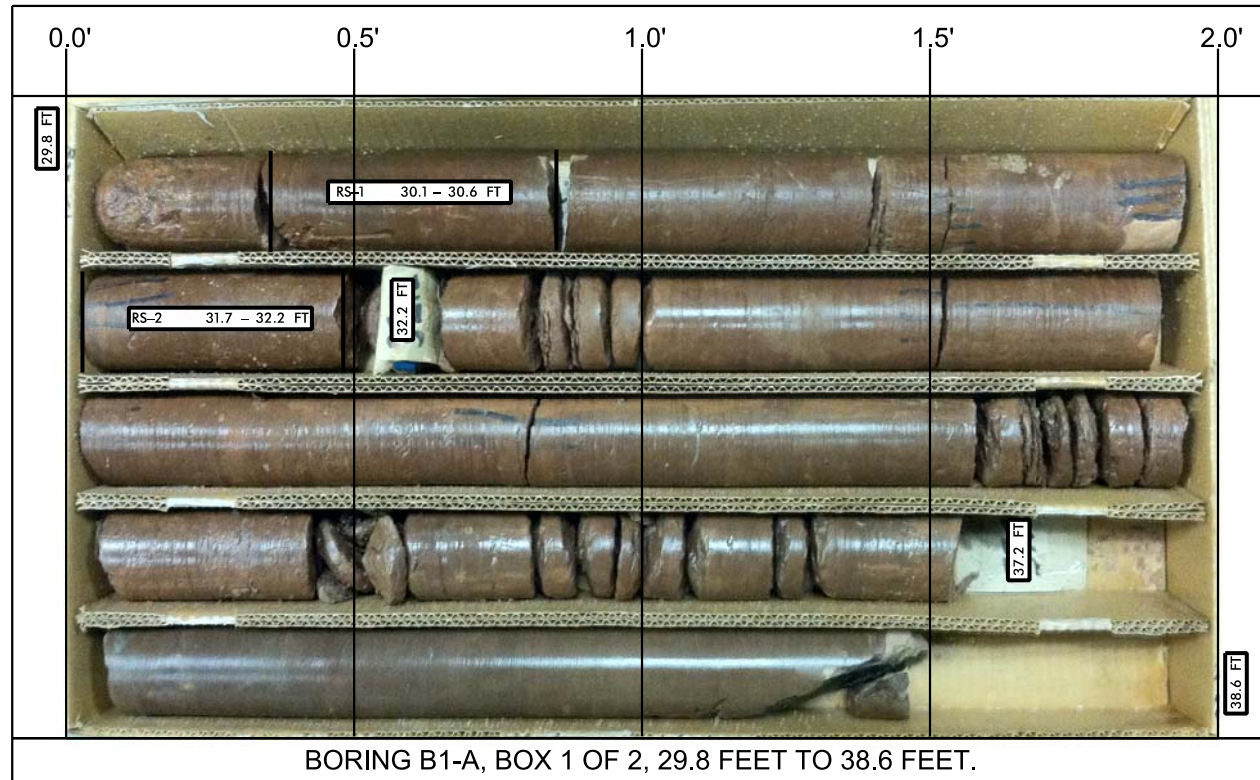
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|---|---------------------|--------------------------|-----------------------------|
| WBS 33712.1.1 | TIP B-4461 | COUNTY CHATHAM | GEOLOGIST Hunsberger, W. S. |
| SITE DESCRIPTION BRIDGE NO. 10 ON SR 1916 (CORINTH RD) OVER SHADDOX CREEK | | | GROUND WTR (ft) |
| BORING NO. B1-A | STATION 18+78 | OFFSET 6 ft LT | ALIGNMENT -L- |
| COLLAR ELEV. 164.6 ft | TOTAL DEPTH 45.2 ft | NORTHING 671,952 | EASTING 1,986,954 |
| DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 73% 02/07/2014 | | DRILL METHOD Wash Boring | HAMMER TYPE Automatic |
| DRILLER WICHARD, W. | START DATE 08/28/14 | COMP. DATE 08/28/14 | SURFACE WATER DEPTH N/A |

| 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 (%) | | | |
| 134.9 | | | | | | | | | | | | |
| | 134.9 | 29.7 | 2.5 | 3:55/0.5 | (2.5) | (2.1) | RS-1 | (15.1) | (11.4) | | Begin Coring @ 29.7 ft | 29.7 |
| | 132.4 | 32.2 | | 5:25/1.0 | 100% | 84% | RS-2 | 97% | 74% | | NON-CRYSTALLINE ROCK | |
| | | | 5.0 | 3:42/1.0 | | | | | | | RED-BROWN, MOD. SEV. TO MOD. WEATHERED, MOD. HARD, V. CLOSE TO MOD. CLOSELY FRACTURED, TRIASSIC SILTSTONE | |
| 130 | | | | 5:17/1.0 | (4.8) | (2.9) | | | | | | |
| | | | | 3:45/1.0 | 96% | 58% | | | | | | |
| | | | | 4:18/1.0 | | | | | | | | |
| | | | | 5:27/1.0 | | | | | | | | |
| | | | | 6:21/1.0 | | | | | | | | |
| 125 | | | | 3:51/1.0 | (4.9) | (4.0) | | | | | | |
| | | | | 4:13/1.0 | 98% | 80% | | | | | | |
| | | | | 4:33/1.0 | | | | | | | | |
| | | | | 5:25/1.0 | | | | | | | | |
| | | | | 5:27/1.0 | | | | | | | | |
| 120 | | | | 5:28/1.0 | (2.9) | (2.4) | | | | | | |
| | | | | 5:52/1.0 | 97% | 80% | | | | | | |
| | | | | 4:13/1.0 | | | | | | | | |

| | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|
| Boring Terminated at Elevation 119.4 ft in NCR: TRIASSIC SILTSTONE | | | | | | | | | | | |
| O HR WATER LEVEL INACCURATE DUE TO DRILLING METHOD | | | | | | | | | | | |

NCDOT BORE SINGLE B4461_GEO_BRD0010_GINT.GPJ NC_DOT.GDT 11/13/14

NCDOT CORE SINGLE B4461_GEO_BRD0010_GINT.GPJ NC_DOT.GDT 12/10/14



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RALEIGH, NC 27607

PHONE: 919.871.0800
FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

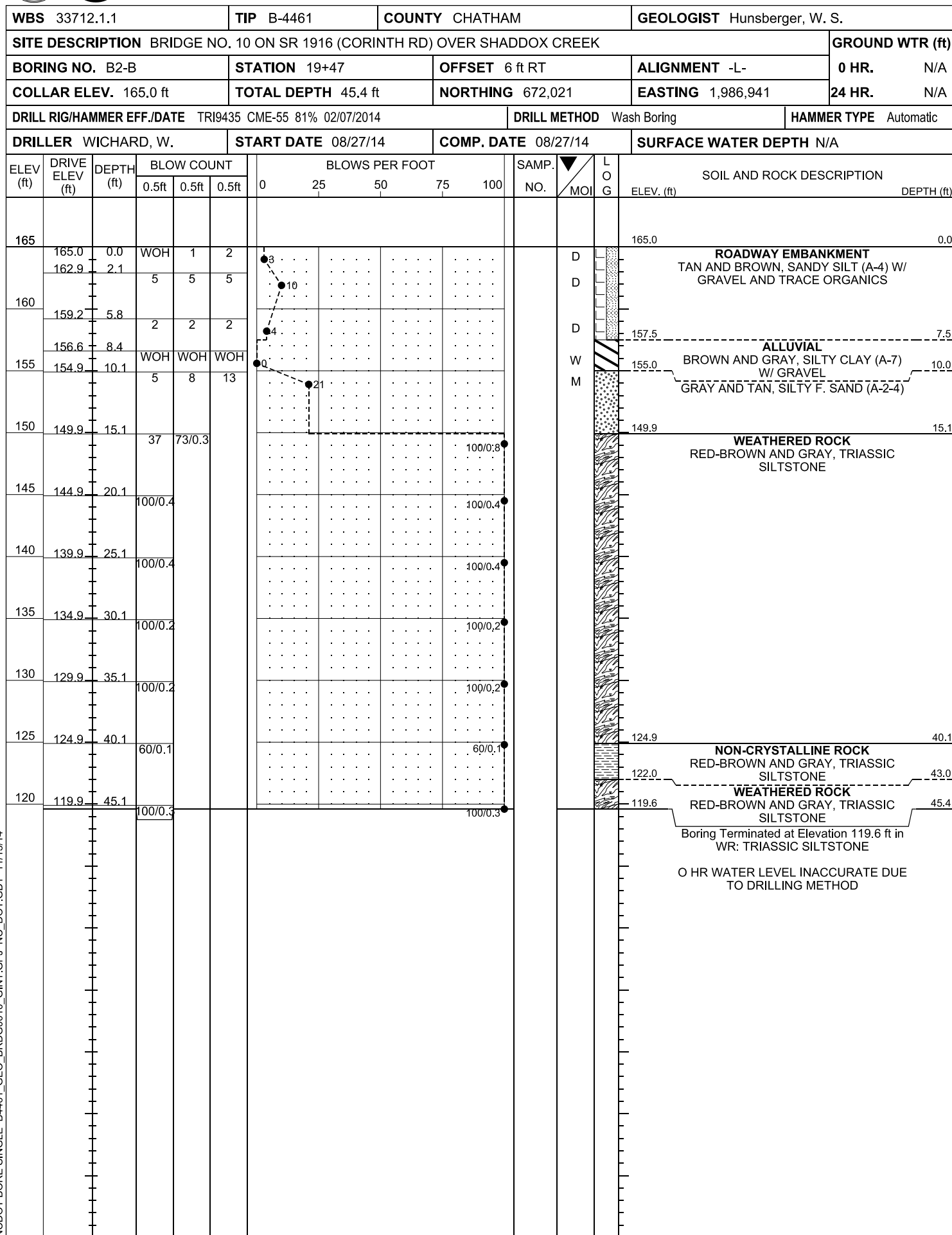
BRIDGE NO. 10 ON SR 1916
(CORINTH RD) OVER SHADDOX CREEK
CHATHAM COUNTY, NC
WBS NO.: 33712.1.1, TIP NO.: B-4461

| WBS 33712.1.1 | | TIP B-4461 | | COUNTY CHATHAM | | GEOLOGIST Hunsberger, W. S. | | | | | | | | | |
|---|-----------------|--------------------------|------------|-----------------------|-------|-----------------------------|-----------------|----|----|-----|-----------|---------|---------------------------|---|------|
| SITE DESCRIPTION BRIDGE NO. 10 ON SR 1916 (CORINTH RD) OVER SHADDOX CREEK | | | | | | | GROUND WTR (ft) | | | | | | | | |
| BORING NO. B1-B | | STATION 18+86 | | OFFSET 7 ft RT | | ALIGNMENT -L- | | | | | | | | | |
| COLLAR ELEV. 161.2 ft | | TOTAL DEPTH 25.3 ft | | NORTHING 671,965 | | EASTING 1,986,963 | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 81% 02/07/2014 | | DRILL METHOD Wash Boring | | HAMMER TYPE Automatic | | | | | | | | | | | |
| DRILLER WICHARD, W. | | START DATE 08/26/14 | | COMP. DATE 08/26/14 | | SURFACE WATER DEPTH N/A | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | SOIL AND ROCK DESCRIPTION | DEPTH (ft) | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | |
| 165 | | | | | | | | | | | | | | | |
| 160 | 161.2 | 0.0 | 1 | WOH | 1 | | | | | | | | | ROADWAY EMBANKMENT LT. BROWN, SILTY CLAY (A-7) W/ TRACE ORGANICS | 0.0 |
| | 159.7 | 1.5 | WOH | WOH | 2 | | | | | | | | | | |
| | 157.0 | 4.2 | 4 | 4 | 5 | | | | | | | | | ALLUVIAL GRAY AND TAN, SANDY CLAY (A-6) | 4.0 |
| 155 | 154.9 | 6.3 | 3 | 5 | 7 | | | | | | | | | | |
| | 150.1 | 11.1 | 3 | 2 | 3 | | | | | | | | | GRAY AND TAN, CLAYEY F. TO MED. SAND (A-2-6) | 9.0 |
| 145 | 145.1 | 16.1 | 29 | 33 | 26 | | | | | | | | | TRIASSIC RESIDUAL RED-BROWN AND GRAY, SLI. F. SANDY SILT (A-4) | 14.7 |
| 140 | 140.1 | 21.1 | 100/0.4 | | | | | | | | | | | WEATHERED ROCK RED-BROWN AND GRAY, TRIASSIC SILTSTONE | 21.1 |
| | 135.9 | 25.3 | 60/0.0 | | | | | | | | | | | Boring Terminated by Tricone Refusal at Elevation 135.9 ft on NCR: TRIASSIC SILTSTONE | 25.3 |
| | | | | | | | | | | | | | | O HR WATER LEVEL INACCURATE DUE TO DRILLING METHOD | |

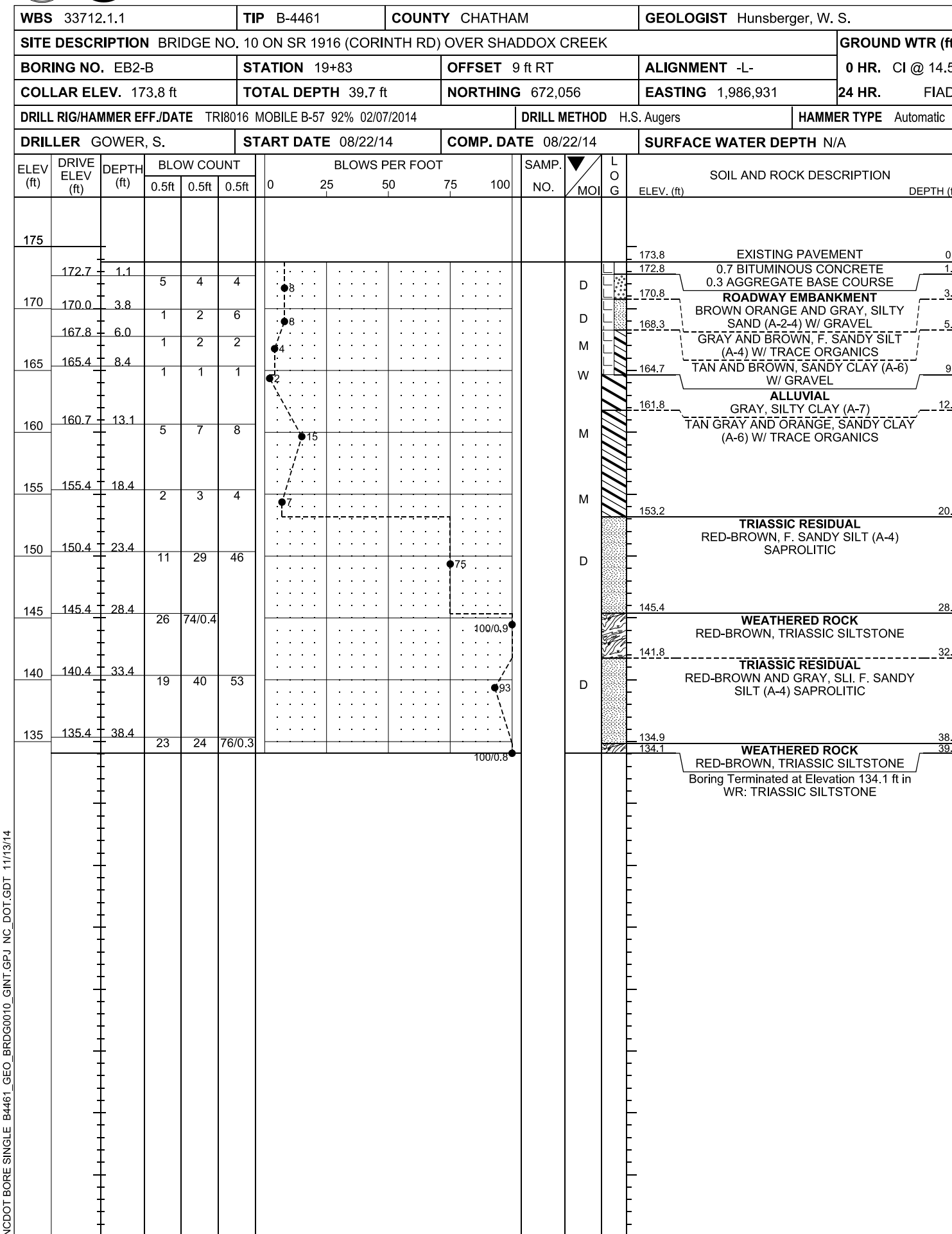
NCDOT BORE SINGLE B4461_GEO_BRDG0010_GINT.GPJ NC_DOT.GDT 11/13/14

| WBS 33712.1.1 | | TIP B-4461 | | COUNTY CHATHAM | | GEOLOGIST Hunsberger, W. S. | | | | | | | | | |
|---|-----------------|-------------------------|------------|-----------------------|-------|-----------------------------|-----------------|----|----|-----|-----------|---------|---------------------------|---|------|
| SITE DESCRIPTION BRIDGE NO. 10 ON SR 1916 (CORINTH RD) OVER SHADDOX CREEK | | | | | | | GROUND WTR (ft) | | | | | | | | |
| BORING NO. B2-A | | STATION 19+36 | | OFFSET 6 ft LT | | ALIGNMENT -L- | | | | | | | | | |
| COLLAR ELEV. 163.1 ft | | TOTAL DEPTH 23.2 ft | | NORTHING 672,007 | | EASTING 1,986,934 | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 81% 02/07/2014 | | DRILL METHOD Mud Rotary | | HAMMER TYPE Automatic | | | | | | | | | | | |
| DRILLER WICHARD, W. | | START DATE 08/26/14 | | COMP. DATE 08/26/14 | | SURFACE WATER DEPTH N/A | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | SOIL AND ROCK DESCRIPTION | DEPTH (ft) | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | |
| 165 | | | | | | | | | | | | | | | |
| | 163.1 | 0.0 | WOH | 1 | 1 | | | | | | | | | ROADWAY EMBANKMENT TAN, F. SANDY SILT (A-4) | 0.0 |
| 160 | 159.3 | 3.8 | 2 | 1 | 2 | | | | | | | | | ALLUVIAL TAN, SILTY CLAY (A-7) | 3.0 |
| | 157.4 | 5.7 | WOH | WOH | WOH | | | | | | | | | TAN, SILTY SAND (A-2-4) | 5.5 |
| 155 | 154.9 | 8.2 | WOH | WOH | 1 | | | | | | | | | GRAY, CLAYEY F. SAND (A-2-6) | 9.1 |
| | 149.9 | 13.2 | 100/0.2 | | | | | | | | | | | WEATHERED ROCK RED-BROWN AND GRAY, TRIASSIC SILTSTONE | 13.2 |
| 145 | 144.9 | 18.2 | 71 | 29/0.1 | | | | | | | | | | | |
| 140 | 139.9 | 23.2 | 60/0.0 | | | | | | | | | | | Boring Terminated with Standard Penetration Test Refusal at Elevation 139.9 ft on NCR: TRIASSIC SILTSTONE | 23.2 |
| | | | | | | | | | | | | | | O HR WATER LEVEL INACCURATE DUE TO DRILLING METHOD | |

NCDOT BORE SINGLE B4461_GEO_BRDG0010_GINT.GPJ NC_DOT.GDT 11/13/14

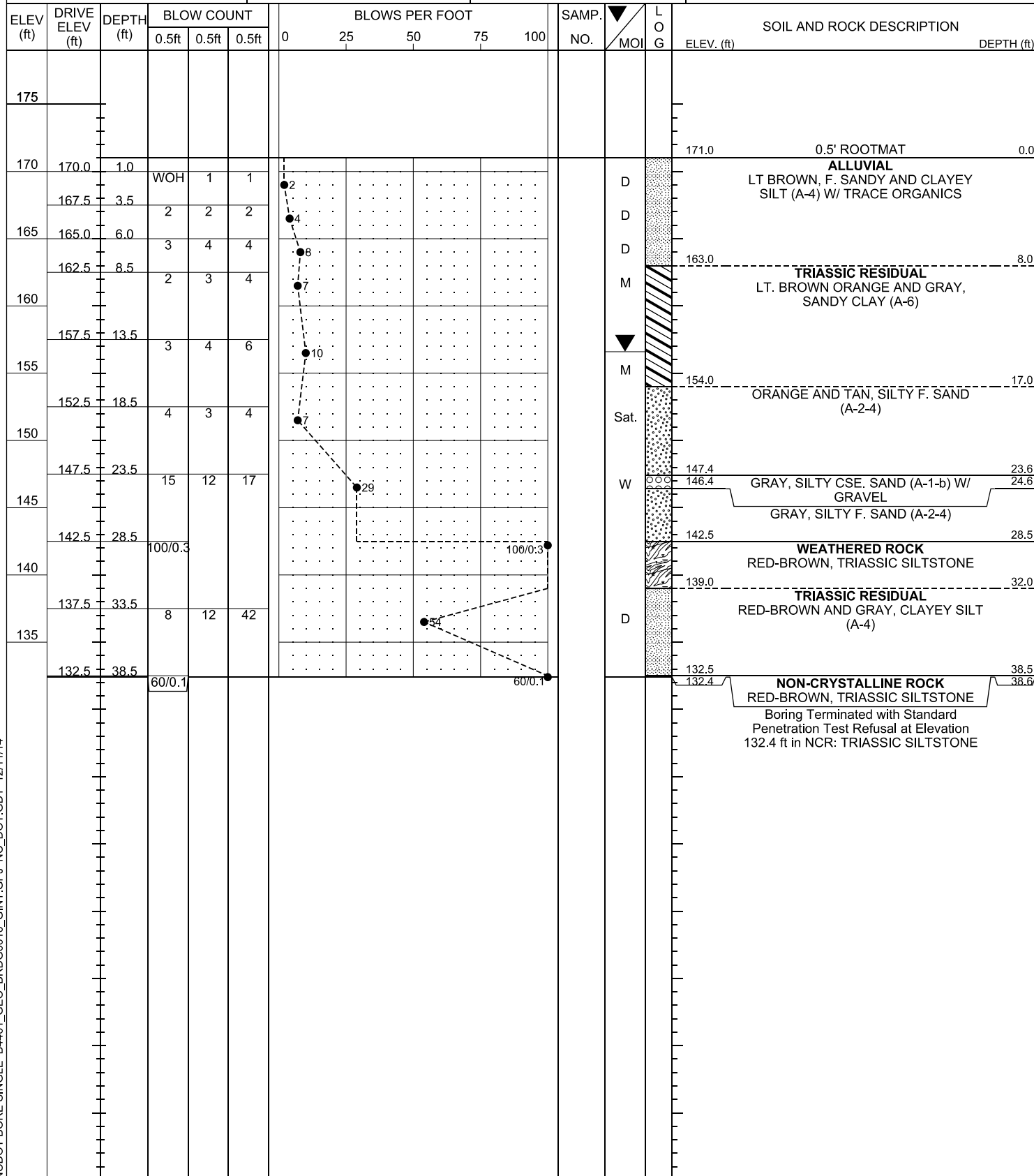


NCDOT BORE SINGLE B4461_GEO_BRD0010_GINT.GPJ NC_DOT.GDT 11/13/14



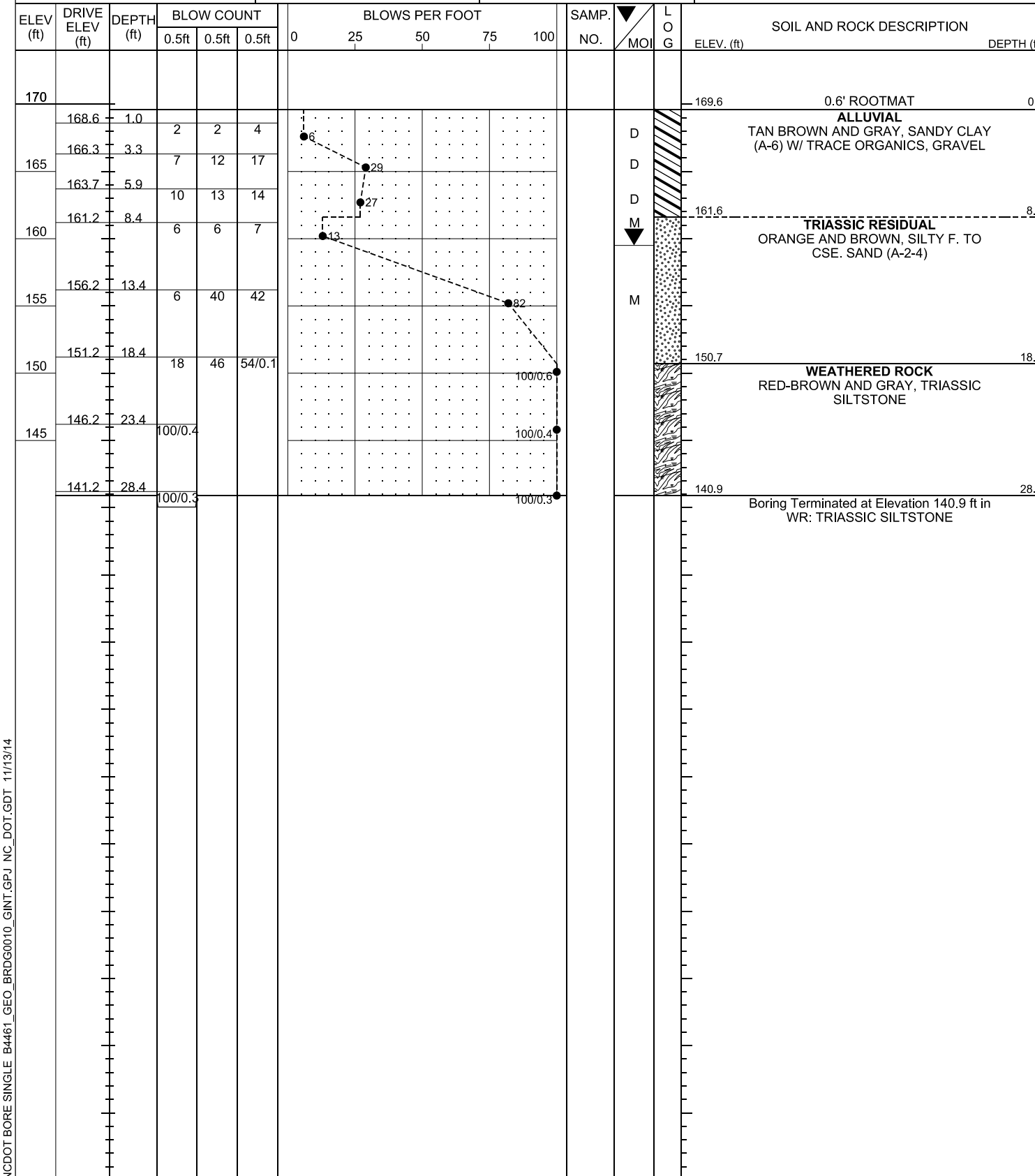
NCDOT BORE SINGLE B4461_GEO_BRD0010_GINT.GPJ NC_DOT.GDT 11/13/14

| | | | |
|---|---------------------|--------------------------|-----------------------------|
| WBS 33712.1.1 | TIP B-4461 | COUNTY CHATHAM | GEOLOGIST Hunsberger, W. S. |
| SITE DESCRIPTION BRIDGE NO. 10 ON SR 1916 (CORINTH RD) OVER SHADDOX CREEK | | | GROUND WTR (ft) |
| BORING NO. EB1 DET | STATION 14+44 | OFFSET 2 ft RT | ALIGNMENT -LDET- |
| COLLAR ELEV. 171.0 ft | TOTAL DEPTH 38.6 ft | NORTHING 671,989 | EASTING 1,987,002 |
| DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 92% 02/07/2014 | | DRILL METHOD H.S. Augers | HAMMER TYPE Automatic |
| DRILLER WICHARD, W. | START DATE 08/25/14 | COMP. DATE 08/26/14 | SURFACE WATER DEPTH N/A |



NCDOT BORE SINGLE B4461_GEO_BRDG0010_GINT.GPJ NC_DOT.GDT 12/11/14

| | | | |
|---|---------------------|--------------------------|-----------------------------|
| WBS 33712.1.1 | TIP B-4461 | COUNTY CHATHAM | GEOLOGIST Hunsberger, W. S. |
| SITE DESCRIPTION BRIDGE NO. 10 ON SR 1916 (CORINTH RD) OVER SHADDOX CREEK | | | GROUND WTR (ft) |
| BORING NO. EB2 DET | STATION 15+40 | OFFSET 7 ft LT | ALIGNMENT -LDET- |
| COLLAR ELEV. 169.6 ft | TOTAL DEPTH 28.7 ft | NORTHING 672,075 | EASTING 1,986,959 |
| DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 92% 02/07/2014 | | DRILL METHOD H.S. Augers | HAMMER TYPE Automatic |
| DRILLER WICHARD, W. | START DATE 08/25/14 | COMP. DATE 08/25/14 | SURFACE WATER DEPTH N/A |



NCDOT BORE SINGLE B4461_GEO_BRDG0010_GINT.GPJ NC_DOT.GDT 11/13/14

| | | | |
|---|---------------------|---------------------|---------------------------|
| WBS 33712.1.1 | TIP B-4461 | COUNTY CHATHAM | GEOLOGIST Stickney, J. K. |
| SITE DESCRIPTION BRIDGE NO. 10 ON SR 1916 (CORINTH RD) OVER SHADDOX CREEK | | | GROUND WTR (ft) |
| BORING NO. B-1 (PDEA) | STATION 18+51 | OFFSET 10 ft RT | ALIGNMENT -L- |
| COLLAR ELEV. 173.2 ft | TOTAL DEPTH 37.9 ft | NORTHING 671,933 | EASTING 1,986,979 |
| DRILL RIG/HAMMER EFF./DATE N/A | | DRILL METHOD N/A | HAMMER TYPE Automatic |
| DRILLER N/A | START DATE 04/21/09 | COMP. DATE 04/21/09 | SURFACE WATER DEPTH 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 | 100 | | | | | | |
| 175 | | | | | | | | | | | | | | | 173.2 | 0.0 |
| 170 | 168.9 | 4.3 | 2 | 1 | 1 | | | | | | | | | | 167.2 | 6.0 |
| 165 | 163.9 | 9.3 | 1 | 2 | 3 | | | | | | | | | | | |
| 160 | 158.9 | 14.3 | 2 | 4 | 5 | | | | | | | | | | | |
| 155 | 153.9 | 19.3 | 3 | 6 | 7 | | | | | | | | | | 155.2 | 18.0 |
| 150 | 148.9 | 24.3 | 5 | 5 | 5 | | | | | | | | | | 146.7 | 26.5 |
| 145 | 143.9 | 29.3 | 100/0.2 | | | | | | | | | | | | 143.9 | 29.3 |
| 140 | 138.9 | 34.3 | 100/0.2 | | | | | | | | | | | | 135.3 | 37.9 |

Boring Terminated by Tricone Refusal at Elevation 135.3 ft on NCR: TRIASSIC SILTSTONE

NOTE: SUBSURFACE DATA FOR B-1 (PDEA) ADAPTED FROM PDEA REPORT DATED MAY 21, 2009 AND PROVIDED FIELD LOGS DATED APRIL 21, 2009.

NCDOT BORE SINGLE B4461_GEO_BRDG0010_GINT.GPJ NC_DOT.GDT 12/8/14

| | | | |
|---|---------------------|---------------------|---------------------------|
| WBS 33712.1.1 | TIP B-4461 | COUNTY CHATHAM | GEOLOGIST Stickney, J. K. |
| SITE DESCRIPTION BRIDGE NO. 10 ON SR 1916 (CORINTH RD) OVER SHADDOX CREEK | | | GROUND WTR (ft) |
| BORING NO. B-2 (PDEA) | STATION 19+61 | OFFSET 9 ft LT | ALIGNMENT -L- |
| COLLAR ELEV. 173.8 ft | TOTAL DEPTH 19.8 ft | NORTHING 672,029 | EASTING 1,986,921 |
| DRILL RIG/HAMMER EFF./DATE N/A | | DRILL METHOD N/A | HAMMER TYPE Automatic |
| DRILLER N/A | START DATE 04/21/09 | COMP. DATE 04/21/09 | SURFACE WATER DEPTH 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 | 100 | | | | | | |
| 175 | | | | | | | | | | | | | | | 173.8 | 0.0 |
| 170 | 169.4 | 4.4 | 1 | 1 | 1 | | | | | | | | | | | |
| 165 | 164.4 | 9.4 | 1 | 1 | 1 | | | | | | | | | | | |
| 160 | 159.4 | 14.4 | WOH | 1 | 2 | | | | | | | | | | | |
| 155 | 154.4 | 19.4 | 100/0.4 | | | | | | | | | | | | 154.4 | 19.4 |

WEATHERED ROCK
RED-BROWN, TRIASSIC SILTSTONE
Boring Terminated by Tricone Refusal at Elevation 154.0 ft on NCR: TRIASSIC SILTSTONE

NOTE: SUBSURFACE DATA FOR B-2 (PDEA) ADAPTED FROM PDEA REPORT DATED MAY 21, 2009 AND PROVIDED FIELD LOGS DATED APRIL 21, 2009.

NCDOT BORE SINGLE B4461_GEO_BRDG0010_GINT.GPJ NC_DOT.GDT 12/8/14

AASHTO SOIL CLASSIFICATION AND GRADATION SHEET
BRIDGE NO. 10 ON SR 1916 (CORINTH ROAD) OVER SHADDOX CREEK
TIP NO.: B-4461

CHATHAM COUNTY, NORTH CAROLINA
 FALCON ENGINEERING, INC. PROJECT NO: G14035.00

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES
BRIDGE NO. 10 ON SR 1916 (CORINTH ROAD) OVER SHADDOX CREEK
TIP NO.: B-4461

CHATHAM COUNTY, NORTH CAROLINA
 FALCON ENGINEERING, INC. PROJECT NO: G14035.00

| BORING | | | SAMPLE | TOTAL SAMPLE | | | Atterberg Limit Test Results | | | COARSE SAND (%) | FINE SAND (%) | SILT (%) | CLAY (%) |
|-----------------------|---------------|--------------|-----------------|--------------|------|----|------------------------------|----|----|-----------------|---------------|----------|----------|
| AASHTO Classification | | | PERCENT PASSING | | | LL | PL | PI | | | | | |
| STATION | OFFSET (FEET) | DEPTH (FEET) | #10 | #40 | #200 | | | | | | | | |
| B-1 (PDEA) | | | SS-1 | 100 | 99 | 88 | 30 | 22 | 8 | 2.2 | 18.9 | 50.5 | 28.4 |
| A-4 | | | | | | | | | | | | | |
| 18+51 -L- | 10' RT | 4.8-5.8 | | | | | | | | | | | |
| B-1 (PDEA) | | | SS-2 | 100 | 100 | 91 | 33 | 21 | 12 | 0.4 | 16.4 | 45.0 | 38.1 |
| A-6 | | | | | | | | | | | | | |
| 18+51 -L- | 10' RT | 9.8-10.8 | | | | | | | | | | | |
| B-1 (PDEA) | | | SS-3 | 100 | 100 | 95 | 37 | 22 | 15 | 1.4 | 9.0 | 47.4 | 42.1 |
| A-6 | | | | | | | | | | | | | |
| 18+51 -L- | 10' RT | 14.8-15.8 | | | | | | | | | | | |
| B-1 (PDEA) | | | SS-4 | 100 | 99 | 81 | 27 | 20 | 7 | 3.2 | 23.9 | 44.8 | 28.1 |
| A-4 | | | | | | | | | | | | | |
| 18+51 -L- | 10' RT | 19.8-20.8 | | | | | | | | | | | |
| B-1 (PDEA) | | | SS-5 | 100 | 82 | 40 | 17 | 15 | 2 | 39.3 | 25.5 | 23.2 | 12.0 |
| A-4 | | | | | | | | | | | | | |
| 18+51 -L- | 10' RT | 24.8-25.8 | | | | | | | | | | | |
| B-2 (PDEA) | | | SS-6 | 99 | 98 | 78 | 24 | 19 | 5 | 1.6 | 32.7 | 39.6 | 26.1 |
| A-4 | | | | | | | | | | | | | |
| 19+61 -L- | 9' LT | 4.8-5.9 | | | | | | | | | | | |
| B-2 (PDEA) | | | SS-7 | 100 | 100 | 91 | 26 | 21 | 5 | 0.4 | 19.5 | 52.1 | 28.1 |
| A-4 | | | | | | | | | | | | | |
| 19+61 -L- | 9' LT | 9.9-10.9 | | | | | | | | | | | |

| Sample No. | Boring | Depth (ft) | Rock Type | Geologic Map Unit | Run RQD | Length (ft) | Diameter (ft) | Unit Weight (PCF) | Unconfined Compressive Strength (PSI) | Young's Modulus (PSI) | Rock Mass Rating (RMR) |
|------------|--------|------------|--------------------|-------------------|---------|-------------|---------------|-------------------|---------------------------------------|-----------------------|------------------------|
| RS-1 | B1-A | 30.1-30.5 | TRIASSIC SILTSTONE | TRcp | 84% | 0.35 | 0.16 | 165.9 | 10,020 | 1,316,005 | 51 |
| RS-2 | B1-A | 31.7-32.0 | TRIASSIC SILTSTONE | TRcp | 84% | 0.34 | 0.16 | 164.1 | 8,205 | 884,465 | 51 |



PHOTOGRAPH TAKEN ON SR 1916 (CORINTH RD)
LOOKING UPSTATION ALONG ALIGNMENT -L-



PHOTOGRAPH TAKEN FROM END BENT 2
LOOKING DOWNSTATION ALONG -L-



PHOTOGRAPH TAKEN FROM EAST OF END BENT 2
LOOKING LEFT AND SHOWING EXISTING INTERIOR BENTS



PHOTOGRAPH TAKEN FROM NEAR END BENT 2 OF THE
DETOUR STRUCTURE LOOKING DOWNSTATION ALONG -LDET-



FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
RALEIGH, NC 27607
PHONE: 919.871.0800
FAX: 919.871.0803

SITE PHOTOGRAPHS

BRIDGE NO. 10 ON SR 1916
(CORINTH RD) OVER SHADDOX CREEK
CHATHAM COUNTY, NC
WBS NO.: 33712.1.1, TIP NO.: B-4461