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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
RAIL DIVISION
GEOTECHNICAL ENGINEERING UNIT

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APPENDIX A - PROVIDED FOUNDATION LOADS

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. <u>C-4901C</u> F.A. PROJ
COUNTY <u>DAVIDSON</u>
PROJECT DESCRIPTION BRIDGE ON SR 2005 BETWEEN
SR 2123 AND SR 2014
SITE DESCRIPTION <u>TURNER RD</u> (SR 2005) GRADE SEPARATION
OVER NORFOLK SOUTHERN RAILROAD
"BOWERS TO LAKE"



\	STATE	STATE PROJECT REPERENCE NO.	SHEET NO.	TOTAL SHEETS
	N.C.	C-4901C	1	41
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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 BORNING LOOS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENONEERING UNTIL AT 1919 250-0408. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNING LOGS. ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

CENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSUPFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSUPFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BORFHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU IN-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INBERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOSTUPE CONDITIONS INDICATED IN THE SUBSUPFACE 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, PRECEPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC PACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSUBFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PLANPOSES, MEFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT MARRANT OR GUARANTE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOT THE INTERPRETATIONS MADE, OR DEVINON 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 SATISTY HUNGLE AS TO CONDITIONS TO BE ENCOUNTERED ON THIS FORDLECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL CONDITIONS TO BE ENCOUNTERED ON THIS FORM THE ACTUAL CONDITIONS TO BE ENCOUNTERED AT THE SITE DIFFERING FROM THAS CRUICAL CONDITIONS FOR SOME ENCOUNTERED AT THE SITE DIFFERING FROM THOSE NOICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

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	FALCON
DATE	MAY 18, 2012
SEAL 038072	05 [18 2012

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

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CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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 TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS	<u>WELL GRADED</u> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <u>UNIFORM</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586), SOIL	POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO DR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.	AQUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZON OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR.	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAVERS, HIGHLY PLASTIC, A-7-6	SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 ROCK (WR) BLOWS PER FOOT IF TESTED.	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	GROUND SURFACECALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED, ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-7-5 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31	ROCK (NCR) SEDIMENTARY ROCK THAT WOULD TELLU SPIT REFUSAL IF TESTED, RUCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	OF SLOPE.
SYMBOL COOCCOOCCOOCCOOCCOOCCOOCCOOCCOOCCOOCC	MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK PYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
X PASSING SILT-	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
# 40 30 MX GRANULAR CLAY PEAT	ORGANIC MATERIAL GRANULAR SILT - CLAY SOILS SOILS OTHER MATERIAL	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
■ 200 15 MX 25 MX 10 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN 36 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
LIQUID LIMIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	HORIZONTAL.
PERSITE INDEX 6 MX NP 10 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN LITTLE OR HIGHLY	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANI		OF A CRYSTALLINE NATURE. SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAUS. FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
MATERIALS SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITAR	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
SUBGRADE	SPRING OR SEEP	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30		MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	THE STREAM.
CONSISTENCY OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINED	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH (MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK,	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY PENETRATION RESISTENCE (N-VALUE) (TONS/F12)	ROADWAY EMBANKMENT (RE) POPT DATE TEST BORING W/ 0	BURING IF TESTED WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
VERY LODGE	→	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GRANIII AR LOOSE 4 TO 10		EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	ITS LATERAL EXTENT.
MATERIAL DENSE 30 TO 50	ARTIFICIAL FILL (AF) OTHER - CORE BORING REF SPT	REFUSAL IF TESTED, YIELDS SPT N VALUES > 100 BPF	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN
VERY DENSE >50	INFERRED SOIL BOUNDARY MONITORING WELL	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT (V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT	AND	REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED YIELDS SPT N VALUES < 100 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE A PIEZOMETER INSTALLATION	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	SLOPE INDICATOR	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD >30 >4	25/825 DIP & DIP DIRECTION OF	ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AN
TEXTURE OR GRAIN SIZE	ROCK STRUCTURES CONE PENETROMETER TEST	ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SOUNDING ROD	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK,	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEA	TEST TO DETACH HAND SPECIMEN.	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
GRAIN MM 305 75 2.0 0.25 0.05 0.005 SIZE IN. 12 3	CPT - CONE PENETRATION TEST NP - NON PLASTIC 7- DRY UNIT WE	GHT BY MODERATE BLOWS.	SLIP PLANE.
SOIL MOISTURE - CORRELATION OF TERMS	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBRE	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. IATIONS HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	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
SOU MOISTURE SCALE FIELD MOISTURE	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	POINT OF A GEOLOGIST'S PICK.	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUB	SOFT CAN BE GROVED 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	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH
- SATURATED - USUALLY LIQUID: VERY WET, USUALLY	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	PIECES CAN BE BROKEN BY FINGER PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTE FRAGS FRAGMENTS	CHA DE CHATED WITH KNIFE, CHA DE EXCHANTED REHOILT WITH FOINT OF FICK. FIELES I INCH	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 TH
PLASTIC SEMISON TO PEONITORS DEVINE TO	HI HIGHLY V - VERY RATIO	BEARING SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
(PI) ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLL PLASTIC LIMIT	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM SPACING TERM THICKNESS	BENCH MARK:
OM OPTIMUM MOISTURE - MOIST - (M) SOLID: AT OR NEAR OPTIMUM MOISTURE			
SL SHRINKAGE LIMIT	MUSILE 8-	MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET	ELEVATION: FT.
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	RK-51	VERY CLOSE LESS THAN & 16 FFFT THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:
PLASTICITY	S HOLLOW AUGERS	INDURATION (0.008 FEET	FIAD - FILLED-IN AFTER DRILLING
PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH	→ CME-45C	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	†
NONPLASTIC 0-5 VERY LOW	X CME-55 TUNGCARBIDE INSERTS -H	DUDDING LITTLE COURSE COURSE AND STORY OF THE COURSE COURSE	
LOW PLASTICITY 6-15 SLIGHT	CASING W/ ADVANCER HAND TOOLS:	FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST X TRICONE 3 STEEL TEETH POST HOLE DIGG		
COLOR	X CME-850 TRICONE TUNGCARB. HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	X CORE BIT SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	VANE SHEAR TE	T EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SAMPLE BREAKS ACROSS GRAINS.	

PROJECT REFERENCE NO.

C-490IC

SHEET NO.



May 18, 2012

Mr. Len Hill, P.E. AECOM 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607

Re: Structure Subsurface Investigation Report

TIP No.:

C-4901C

WBS No.:

49010.1.STR07T1B

County:

Davidson

Project Description:

Bridge on SR 2005 between SR 2123 and SR 2014

Site Description:

Turner Rd (SR 2005) Grade Separation over Norfolk Southern Railroad

"Bowers to Lake"

Falcon Project No.:

G11019.00

Dear Mr. Hill,

As authorized, Falcon Engineering, Inc. (Falcon) has completed the geotechnical subsurface investigation for the proposed Turner Road grade separation near Lexington in Davidson County, North Carolina. A site vicinity map is shown on Sheet 8. Our investigation was performed in general accordance with our proposal number F2011-051, dated March 25, 2011 and subsequent contract amendment for additional services. This report includes the results of our field and laboratory testing, geotechnical recommendations for foundations, site and boring location plans, profiles and cross sections showing subsurface conditions, boring and core logs, and rock core photographs.

PROJECT DESCRIPTION

The existing at-grade crossing between the Norfolk Southern Railroad "Bowers to Lake" and Turner Road (SR 2005) will be replaced with a new bridge structure in the same vicinity. Recommendations for the realigned approach roadway are provided under a separate cover. We understand modifications of the existing rail corridor will also be completed under a separate scope by others. The new bridge structure will be located east of the existing crossing, and an existing bridge structure over Hamby Creek. The new structure will traverse both features with a total of 6 spans (7 bents). The proposed structure will be approximately 544-foot-long and 37-foot-wide. The End Bents will be supported by two rows of piles; one vertical and one battered. Interior Bents will be supported by 54-inch diameter drilled shaft foundations. Due to the orientation of the rail corridor relative to Hamby Creek, there are two unique bent arrangements for the structure, with different skew angles and foundation orientations. A detailed summary of the bent and foundation arrangements is provided in the table below.

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Engineering | Inspection | Testing | Agency CM 1210 Trinity Road, Suite 110 | Raleigh, North Carolina 27607 | T 919.871.0800 | F 919.871.0803

SHEET 3

Table 1: Summary of Proposed Foundation System

Bent	Station	Total Number of Piles/Shafts	Foundation Type and Size	Pile/Shaft Spacing (Center to Center)	Top of Drilled Shaft Elevation (feet, NAVD)	Bottom of Cap Elevation (feet, NAVD)
End Bent 1	20+71.90	6 vertical 6 battered	HP12x53 Steel Piles	8'-0"	N/A	688.0*
Bent 1	21+35.40	2	54-inch diameter Drilled Shafts	24'-0''	663.0	688.7
Bent 2	22+47.90	2	54-inch diameter Drilled Shafts	24'-0''	649.0	687.8
Bent 3	22+90.40	3	54-inch diameter Drilled Shafts	16'-3"	647.0	687.8
Bent 4	24+15.40	3	54-inch diameter Drilled Shafts	16'-3"	643.0	685.6
Bent 5	25+15.40	3	54-inch diameter Drilled Shafts	16'-3"	646.0	683.3
End Bent 2	25+15.40	8 vertical 8 battered	HP12x53 Steel Piles	6'-10"	N/A	683.0*

^{*} Elevation assumed by Falcon based on drawings provided by AECOM.

Loads for driven pile and drilled shaft foundations at each bent were provided by AECOM. The provided loads are attached to this report in Appendix A.

Fills on the order of 30 feet in height are proposed at both approaches. Slopes at the end bents are proposed at 2 Horizontal (H) to 1 Vertical (V). The end bent 1 slope will be protected by 4" concrete slope protection. The end bent 2 slope will be protected by class II rip-rap with filter fabric.



SITE DESCRIPTION/GEOLOGY

The existing alignment of Turner Road trends generally north/south leading up to either side of the at-grade crossing. Approaching the site from the south, Turner Road turns west, crosses Hamby Creek, turns back to cross the railroad, then resumes its northward trajectory. The proposed alignment will instead follow a relatively straight northward trajectory, to the east of the existing alignment. On the south side of Hamby Creek, a rolling pasture occupies the location of the proposed alignment. A previous roadway embankment, appearing to be up to 15 feet high, is present along the proposed approach and end bent 2 slope. Underground utilities including a water line and natural gas line approximately parallel this embankment. This pasture extends all the way to the banks of Hamby Creek with the exception of a small wooded area in the vicinity of bent 5.

On the north side of Hamby Creek, the area between the creek and railroad is steeply sloped, heavily wooded, and contains isolated depressed areas which appear to hold water for a significant portion of the year. Bents 2 and 3 are located within this area. Bent 1 is located north of the existing railroad tracks. This area is relatively clear adjacent to the existing rail corridor. End bent 1 is located within a wooded area. In addition, an existing overhead power and natural gas easement traverses the proposed approach fills near end bent 1.

Immediately east of the proposed grade separation, an existing rail bridge carries the railroad over Hamby Creek. The structures consists of a concrete arch bridge, with 2 approximately 50-foot arch spans crossing Hamby Creek. We understand a geotechnical investigation has been conducted by others to assess the need for replacing or expanding this structure to accommodate the planned rail corridor improvements.

According to the **Geologic Map of North Carolina** (1985), the proposed site is located within the Charlotte Belt region of the Western Piedmont of North Carolina. Specifically, bedrock at the site is noted to consist of metamorphosed granitic rock **(CZg)**, consisting of megacrystic, well foliated rocks which locally contain hornblende.

FIELD EVALUATION PROCEDURE

Evaluation of the subsurface conditions for the project consisted of drilling fourteen (14) Standard Penetration Test (SPT) borings. Two (2) borings were drilled near each bent location. An additional boring was drilled within the end bent 2 approach slope. Rock coring was performed in the nine (9) interior bent borings in order to verify the presence, quality, and composition of rock and to assist in the design of drilled shaft foundations. Borings were performed using a CME-55 all-terrainvehicle (ATV) mounted drill rig, or a CME-850, rubber-tracked vehicle mounted drill rig equipped with 2 ½-inch inside diameter hollow-stem augers, mud rotary drilling equipment, an automatic hammer, and NQ2 sized, wire-line type diamond-impregnated rock coring equipment. SPT borings and soil/rock core sampling were performed in general accordance with the American Association of State Highway Transportation Officials (AASHTO T-206 and T-225).

Soil and rock core samples were obtained from the borings and visually classified in the field before being placed in moisture-proof containers and transported to our laboratory. Groundwater measurement readings were taken within each borehole with a weighted 100-foot measuring tape from a reference location at the top of each boring. Readings were recorded immediately

SHEET 4

after boring termination, and again after a waiting period of at least 24 hours before being backfilled.

SUBSURFACE AND GROUNDWATER CONDITIONS

Based on the results of our borings, subsurface conditions generally consist of residual soil, underlain by weathered rock (WR) and crystalline rock (CR) materials north of Hamby Creek. South of Hamby Creek, a relatively wide, deep alluvial plain is present above residual soil materials. Some fills were encountered at the site as well, particularly in the vicinity of end bent 2 where a previous roadway embankment is present. Isolated fills were encountered in other locations as well.

Topsoil and rootmat was encountered in the majority of the borings and ranged in thickness from approximately 2 to 8 inches. Artificial Fill and Roadway Embankment soils encountered consisted of very loose to medium dense silty sands (A-2-4) to medium stiff to stiff silts and clays with varying amounts of sands (A-4, A-6, A-7-5) with trace organics, gravel, and debris. Alluvial materials were encountered south of Hamby Creek only, extending beyond end bent 2. Alluvial materials encountered consisted of very loose to loose, sands, gravels, an silty sands (A-1-b, A-2-4, A-3) frequently interlayered with very soft to stiff silts and clays (A-4, A-6, A-7). Weathered rock (WR) and crystalline rock (CR) materials were penetrated beneath residual soils, consisting of metamorphosed granitic rock. Thickness of WR generally increased with distance from Hamby Creek up to approximately 7 feet. WR was not encountered in some borings. CR was cored from interior bent borings to varying depths in accordance with NCDOT drilled shaft criteria. Cored materials consisted of severely weathered to fresh, medium hard to very hard, very closely to moderately closely fractured, metamorphosed granitic rock. This material grades between gneiss and schist, with megacrystic felsic compositional bands up to a few feet thick.

Groundwater measurements were obtained immediately after boring termination. The measured groundwater ranged in elevation from approximately 641 to 648 feet, NAVD. Based on the Bridge Scour Report (BSR) provided to us by AECOM, the normal water surface elevation in Hamby Creek is approximately 640 feet, NAVD.

LABORATORY TESTING

Representative split-spoon and bulk samples were selected from soil test borings to verify visual field classifications and determine soil index properties. A total of twelve (12) samples were analyzed in our laboratory for natural moisture content, grain size analysis, and Atterberg limits. Additionally, six (6) representative rock core samples were subjected to unconfined compressive strength testing. The results of these laboratory tests can be found on Sheet 39 of this report. All testing was performed in accordance with the following American Society for Testing and Materials (ASTM) and AASHTO procedures:

- AASHTO T-88 (as modified by NCDOT) "Particle Size Analysis of Soil"
- AASHTO T-89 (as modified by NCDOT) "Determining the Liquid Limits of Soil"
- AASHTO T-90 "Determining the Plastic Limit and Plasticity of Soils"
- AASHTO T-265 "Laboratory Determination of Moisture Content of Soils"
- ASTM D-2938-86 "Standard Test Method for Unconfined Compressive Strength of Intact Rock"



FOUNDATION RECOMMENDATIONS

The foundation recommendations presented below are based on the service and strength limit state loads, plans, hydraulic report and profiles provided by AECOM.

Pile cap elevations at the end bents were not provided, therefore they were assumed at elevations 688 and 683 feet, NAVD, at end bents 1 and 2, respectively. New fills on the order of 30 feet are proposed at both end bents. We have assumed that approach fills will be placed prior to driving end bent piles. Due to the presence of compressible fine-grained alluvial soil layers and buried organics at the end bent 2 approach, we recommend a waiting period of one month be included in the schedule for the majority of the settlements to be completed. We also recommend a waiting period of one month at the end bent 1 approach. In addition, we assume all end bent piles will be driven after the waiting period is completed at both approaches.

End piles will be driven to weathered rock. A resistance factor of 0.6 was used when estimating the required driving resistance. In addition to a single row of vertical piles, we understand a second row of end bent piles will be battered to provide resistance against lateral forces. The number of vertical and battered piles at each end bent will be same. Therefore, vertical end bent piles are not anticipated to carry lateral forces or moments. End bent piles are not otherwise designed to resist lateral forces. Based on the provided plans, we understand piles will be battered at a 3H:12V slope. We understand the maximum tension and compression loads provided by AECOM accounts for battered piles, and lateral forces will not subject the battered piles to loads exceeding those provided. Please refer to Sheet 6 for pile foundation recommendations and plan notes. Pile pay item quantities are presented on Sheet 7.

Required drilled shaft axial capacity will be achieved by a combination of side friction and end bearing in WR and CR. Drilled shafts will require embedment into competent rock materials to achieve lateral capacity and shaft fixity. Lateral load analyses for the provided loads were performed using LPILE v5.0 using the service limit state and strength limit state loads provided by AECOM for each bent. LPILE v5.0 performs lateral analyses by applying lateral forces and moments at the top of the shaft in two dimensions. Based on our LPILE analysis, the maximum deflection at the top of the shafts under the service limit state loads varied between 0.06 and 0.34 inches. The maximum deflection at the top of the shafts under strength limit state loads varied between 0.11 and 0.80 inches. Please refer to Sheet 6 for drilled pier foundation recommendations and plan notes. Drilled pier pay item quantities are presented on Sheet 7.

All drilled shaft foundations should be inspected in accordance with the NCDOT Drilled Pier Inspection Manual. We understand this will be the responsibility of others. However, Falcon can provide geotechnical design support during construction if requested in order to ensure compliance with the design.

Based on the preliminary general drawing provided to us by AECOM, end bent slopes are proposed at 2H:1V with concrete slope protection and class II rip-rap with filter fabric slope protection at end bents 1 and 2, respectively. Approach embankment fills shall be placed in accordance with NCDOT Standard Specifications for Roads and Structures (NCDOT Specifications).

New fills will be placed over top of the existing gas and water pipes at the end bent approaches. During our field investigation, we observed monuments and temporary markings which indicated SHEET 5

the water line follows an alignment differing from that shown on the project drawings provided to us. Based on the end bent boring data, we anticipate approximately 1 to 2 inches and 4 to 6 inches of settlement at the original ground surface in the vicinity of the gas main locations (shown on the plans) at end bents 1 and 2, respectively. Depending on the depth, exact location, installation and backfill procedures used to install the natural gas and water pipes, anticipated settlement of the surrounding soils may exceed these estimates. We recommend the owner(s) of these utilities be consulted to determine if measures need to be taken prior to construction.

CLOSURE

If any of the project information contained in this report is incorrect or has changed, please inform Falcon so that we may amend the contents of this report as appropriate.

Recommendations and evaluations provided by Falcon are based on the information provided by AECOM. Modifications of our recommendations and evaluations may be required if there are changes to the design or location of the structure or roadway. Recommendations in this report are based on data obtained from soil borings. The nature and extent of variations between borings may not become evident until construction.

Our professional services for this project have been performed in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made. Falcon appreciates the opportunity to have provided you with geotechnical engineering services for this project. If you have any questions regarding this report, please contact our office.

Sincerely,

FALCON ENGINEERING, INC.

Jeremy R. Hamm, El

Mahalingam Bahiradhan (Bahi), PE Geotechnical Designer Senior Geotechnical Project Manager



FOUNDATION RECOMMENDATIONS

WBS # 49010.1.STR07T1B DESCRIPTION Turner Road (SR 2005) Grade Seperation over
T.I.P. NO. C-4901C Norfolk Southern Railroad "Bowers to Lake"

COUNTY Davidson

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	INITIALS	DATE	
DESIGN	MB	05/18/12	
CHECK	CN	05/18/12	
APPROVAL			

STATION

20+71 to 26+16-L-

	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	MISCELLANEOUS DETAILS
END BENT 1	-L- 20+71.90	Cap on HP12x53 Steel Piles	106 tons/pile	Bottom of Cap El. = 688 ± ft Length of Pile = 45 ft Number of Vertical Piles = 6 Number of Battered Piles = 6 Pile Spacing = 8 feet 0 inches
BENT 1	-L- 21+35.40	54-inch Diameter Drilled Piers	556 tons/pier	Bottom of Cap E1. = 688.7 ft Point of Fixity E1. = 636.0 ft. Tip E1. No Higher Than = 627.0 ft. Number of Drilled Piers = 2 Pier Spacing = 24 feet 0 inches
BENT 2	-L- 22+47.90	54-inch Diameter Drilled Piers	528 tons/pier	Bottom of Cap El. = 687.8 ft Point of Fixity El.(Lt. Pier) = 630.0 ft. Tip El. No Higher Than (Lt. Pier) = 621.0 ft. Point of Fixity El.(Rt. Pier) = 637.0 ft. Tip El. No Higher Than (Rt. Pier) = 628.0 ft. Number of Drilled Piers = 2 Pier Spacing = 24 feet 0 inches
BENT 3	-L- 22+90.40	54-inch Diameter Drilled Piers	411 tons/pier	Bottom of Cap El. = 687.8 ft Point of Fixity El.(Lt. & Ct. Piers) = 629.0 ft. Tip El. No Higher Than (Lt. & Ct. Piers) = 620.0 ft. Point of Fixity El.(Rt. Pier) = 637.0 ft. Tip El. No Higher Than (Rt. Pier) = 628.0 ft. Number of Drilled Piers = 3 Pier Spacing = 16 feet 3 inches
BENT 4	-L- 24+15.40	54-inch Diameter Drilled Piers	492 tons/pier	Bottom of Cap El. = 685.6 ft Point of Fixity El. = 624.0 ft. Tip El. No Higher Than = 615.0 ft. Number of Drilled Piers = 3 Pier Spacing = 16 feet 3 inches
BENT 5	-L- 25+15.40	54-inch Diameter Drilled Piers	441 tons/pier	Bottom of Cap El. = 683.3 ft Point of Fixity El. = 618.0 ft. Tip El. No Higher Than = 609.0 ft. Number of Drilled Piers = 3 Pier Spacing = 16 feet 3 inches
END BENT 2	-L- 26+15.40	Cap on HP12x53 Steel Piles	115 tons/pile	Bottom of Cap El. = 683 ± ft Length of Pile = 60 ft Number of Vertical Piles = 8 Number of Battered Piles = 8 Pile Spacing = 6 feet 10 inches

SHEET 6

TIP# C-4901C

County Davidson

FOUNDATION RECOMMENDATION NOTES ON PLANS

- 1. Piles at End Bent 1 are designed for a factored resistance of 106 Tons per pile.
- 2. Drive piles at End Bent 1 to a required driving resistance of 177 Tons per pile.
- 3. Piles at End Bent 2 are designed for a factored resistance of 115 Tons per pile.
- 4, Drive piles at End Bent 2 to a required driving resistance of 192 Tons per pile.
- Testing piles with PDA during driving, restriking and redriving may be required. Engineer will determine the need for PDA testing. For PDA testing, see Section 450 of the Standard Specifications.
- 6. For Piles, See Section 450 of the Standard Specification.
- 7. Drilled piers at Bent No. 1 are designed for a factored resistance of 556 Tons per pier. Check field conditions for the required tip resistance of 50 TSF.
- 8. Install drilled piers at Bent No. 1 that extend to an elevation no higher than 627.0 ft, satisfy the required tip resistance and have a penetration of at least 10 feet into rock as defined by article 411-1 of the Standard Specifications.
- 9. Permanent steel casing may be required for drilled piers at Bent No. 1. If required, do not extend permanent casings below elevation 636 feet without prior approval from the engineer.
- 10 Drilled piers at Bent No. 2 are designed for a factored resistance of 528 Tons per pier. Check field conditions for the required tip resistance of 50 TSF.
- 11 Install left drilled pier at Bent No. 2 that extends to an elevation no higher than 621.0 ft, satisfies the required tip resistance, and has a penetration of at least 12 feet into rock as defined by article 411-1 of the Standard Specifications.
- 12. Install right drilled pier at Bent No. 2 that extends to an elevation no higher than 628.0 ft, satisfies the required tip resistance, and has a penetration of at least 11 feet into rock as defined by article 411-1 of the Standard Specifications.
- 13. Permanent steel casings may be required for drilled piers at Bent No. 2. If required, do not extend permanent casings below elevation 639 feet without prior approval from the engineer.
- 14. Drilled piers at Bent No. 3 are designed for a factored resistance of 411 Tons per pier. Check field conditions for the required tip resistance of 50 TSF.
- 15. Install left and center drilled piers at Bent No. 3 that extend to an elevation no higher than 620.0 ft, satisfy the required tip resistance, and have a penetration of at least 13 feet into rock as defined by article 411-1 of the Standard Specifications.
- 16. Install right drilled pier at Bent No. 3 that extends to an elevation no higher than 628.0 ft, satisfies the required tip resistance, and has a penetration of at least 11 feet into rock as defined by article 411-1 of the Standard Specifications.
- 17. Permanent steel casings may be required for drilled piers at Bent No. 3. If required, do not extend permanent casings below elevation 639 feet without prior approval from the engineer.
- 18. Drilled piers at Bent No. 4 are designed for a factored resistance of 492 Tons per pier. Check field conditions for the required tip resistance of 50 TSF.
- 19. Install drilled piers at Bent No. 4 that extend to an elevation no higher than 615.0 ft, satisfy the required tip resistance and have a penetration of at least 11 feet into rock as defined by article 411-1 of the Standard Specifications.
- 20. Permanent steel casings may be required for drilled piers at Bent No. 4. If required, do not extend permanent casings below elevation 626 feet without prior approval from the engineer.
- 21. Drilled piers at Bent No. 5 are designed for a factored resistance of 441 Tons per pier. Check field conditions for the required tip resistance of 50 TSF.
- 22. Install drilled piers at Bent No. 5 that extend to an elevation no higher than 609.0 ft, satisfy the required tip resistance and have a have a penetration of at least 12 feet into rock as defined by article 411-1 of the Standard Specifications.
 23. Permanent steel casings may be required for drilled piers at Bent No. 5. If required, do not extend permanent casings below elevation 620 feet without
- prior approval from the engineer
- 24. SID inspections may be required for drilled piers. The Engineer will determine the need for SID inspections. For SID inspection, see Section 411 of the Standard Specifications.
- 25. CSL tubes are required and CSL testing may be required for drilled piers. The Engineer will determine the need for CSL testing. For Crosshole Sonic Logging, see Section 411 of the Standard Specifications.
- 26. For drilled piers, see Section 411 of the Standard Specifications.
- 27. Scour critical elevation for Bent No. 2 is 648 feet, NAVD. Scour critical elevations are used to monitor possible scour problems during the life of the structure.
- 28. Scour critical elevation for Bent No. 3 is 645 feet, NAVD. Scour critical elevations are used to monitor possible scour problems during the life of the structure.
- 29. Scour critical elevation for Bent No. 4 is 640 feet, NAVD. Scour critical elevations are used to monitor possible scour problems during the life of the structure.

FOUNDATION RECOMMENDATION COMMENTS

- 1. A waiting period of one month will be required for both end bent approach fills.
- 2. End bent piles shall be driven after the waiting period is completed.
- 3. End slopes of 2:1(H:V) are OK with slope protection.
- 4. Maximum lateral deflections at the top of the interior bent columns under strength limit state loads ranged between 1.1 and 2.9 inches.
- 5. Maximum lateral deflections at the top of the interior bent columns under service limit state loads ranged between 0.6 and 2.6 inches.
- 6. Design scour elevation at Bent 1 was not provided and Bent 5 is protected from scour.
- 7. Design scour elevation at Bent 2 is 649 feet.
- 8. Design scour elevation at Bent 3 is 647 feet.
- 9. Design scour elevation at Bent 4 is 641 feet.

DRILLED PIER PAY ITEM QUANTITIES

WBS ELEMENT_	49010.1.STR07T1B		DATE_	3/27/2012	
TIP NO.	C-4901C		DESIGNED BY_	МВ	
COUNTY	Davidson		CHECKED BY	CN	
STATION_	20+71 to 26+16-L-				
DESCRIPTION _	Turner Road (SR 2005) Grade Seperat	ion over			
]	Norfolk Southern Railroad "Bowers to	Lake"			
NUMBER (OF BENTS WITH DRILLED PIERS	5			
NUMBE	ER OF DRILLED PIERS PER BENT	2 or 3	•		
NUMBER OF EN	ND BENTS WITH DRILLED PIERS				
NUMBER OF	DRILLED PIERS PER END BENT		•		

	DRILLED PIER PAY ITEMS					
	PERMANENT					
	STEEL CASING	54" DIA.			CROSSHOLE	
	FOR 54" DIA.	DRILLED PIERS	SPT	SID	SONIC	
BENT # OR	DRILLED PIER	NOT IN SOIL	TESTING	INSPECTION*	LOGGING	
END BENT #	(yes/no/maybe)	(per linear ft/m)	(per each)	(per each)	(per each)	
Bent 1	Maybe	22				
Bent 2	Maybe	24				
Bent 3	Maybe	42				
Bent 4	Maybe	36				
Bent 5	Maybe	39				
TOTALS		163	0	1	5	

^{*} If SID inspections are required with a Note on Plans, show "SID Inspection" pay item per bent or end bent. If SID inspections may be required with a Note on Plans, show "SID Inspection" pay item as a total per structure only (do not show per bent or end bent).

Notes:

Blanks or "no" represent quantity of zero.

If permanent steel casing is required or may be required, Structure Design should calculate the pay item quantity, "Permanent Steel Casing for ____ Dia. Drilled Pier", as the difference between the top of drilled pier elevation or the top of permanent steel casing elevation (whichever is lower) and the elevation the permanent steel casing can not extend below as shown with a Note on Plans.

Structure Design should determine the pay item quantity, "___ Dia. Drilled Piers in Soil", based upon the total drilled pier length per bent or end bent minus the "___ Dia. Drilled Piers not in Soil" per bent or end bent shown in the table above.

Show "Crosshole Sonic Logging" pay item as a total only equal to the anticipated number of drilled piers to be CSL tested. Crosshole Sonic Logging (CSL) tests are required for most bridges with drilled piers. CSL tests and tubes may be omitted by not including the CSL provision in the Contract if, based on the subsurface conditions, there is a low risk of drilled pier construction problems.

SHEET 7

PILE PAY ITEMS

(For 2012 Lettings and Later - Revised 4/18/11)

WBS ELEMENT	49010.1.STR07T1B	DATE	3/27/2012
TIP NO.	C-4901C	DESIGNED BY	MB
COUNTY	Davidson	CHECKED BY	CN
STATION	20+71 to 26+16-L-		
DESCRIPTION	Turner Road (SR 2005) Grade Seperation over Norfolk Southern Railroad "Bowers to Lake"		**************************************
NUME NUMBER OF E	OF BENTS WITH PILES EER OF PILES PER BENT END BENTS WITH PILES EF PILES PER END BENT	Only required for "Predrilling for Piles" & "Pile Excavation" Pay	

	P	ILE PAY ITEM	I QUANTIT	TES		
Steel Pile	Pipe Pile	Predrilling	Pile	Exca (per li	vation near ft)	PDA
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	yes/no/may be	(per unear it)	(per eacn)	2011	Son	(per each)
No						
No						
			^			
	Pile Points (yes/no) No	Steel Pile Pipe Pile Points Plates (yes/no) (yes/no/maybe) No No	Steel Pile Pile Points Plates (yes/no) No	Steel Pile Pipe Pile Points (yes/no) No	Steel Pile Pipe Pile Predrilling Pile (per li per linear ft) No	Steel Pile Pipe Pile Points (yes/no) No

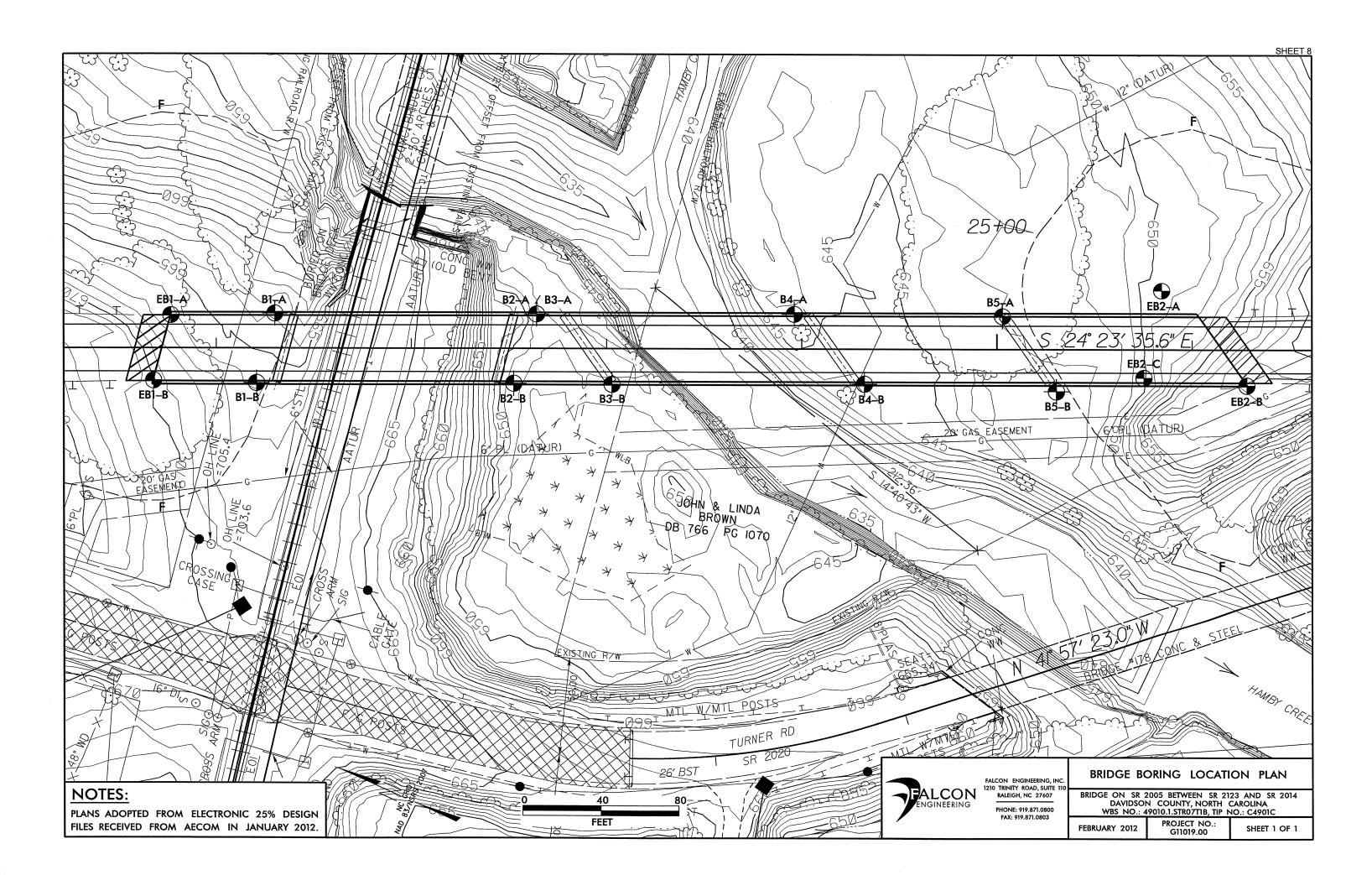
Notes:

Blanks or "no" represent quantity of zero.

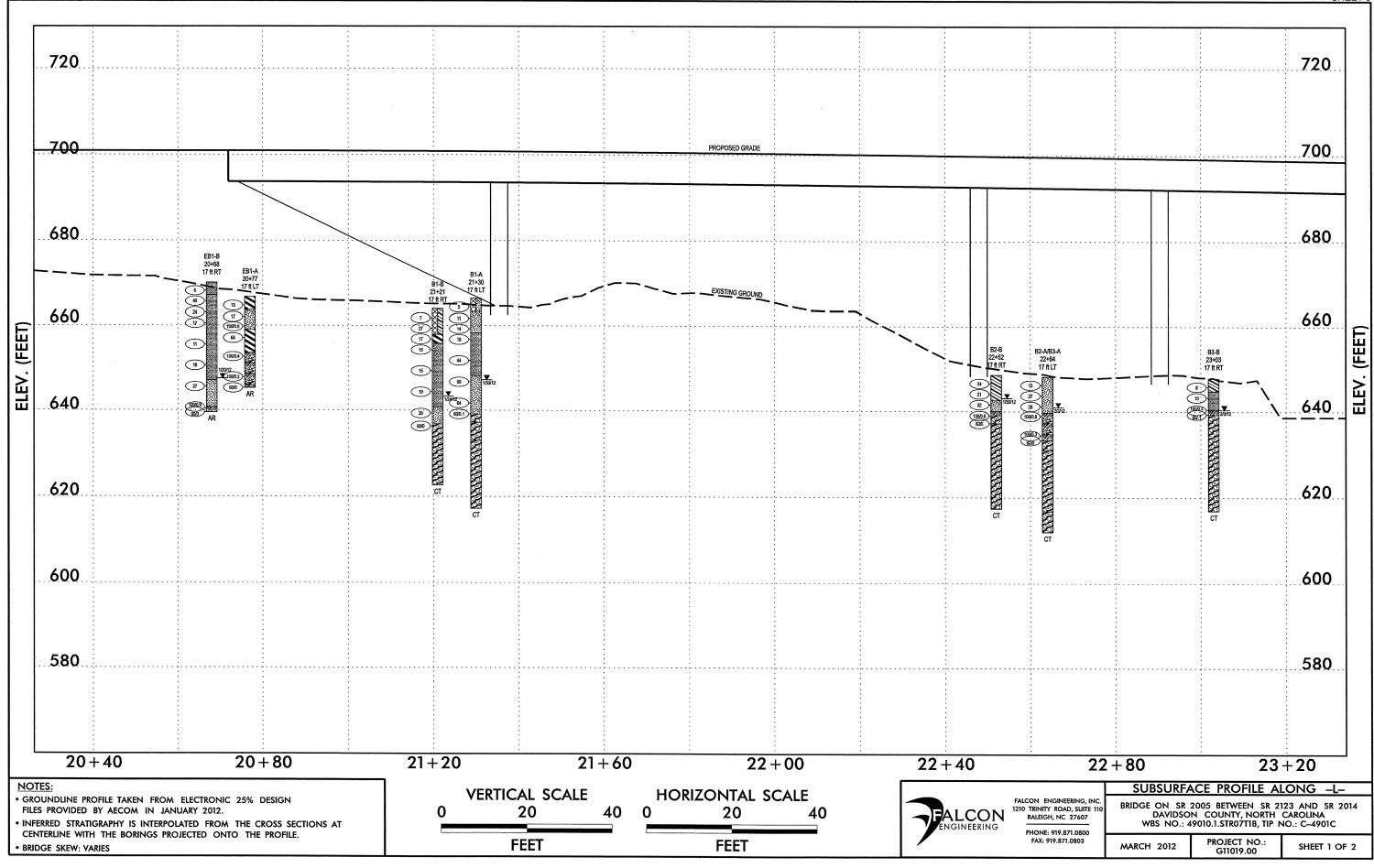
If steel pile points are required, calculate quantity of "Steel Pile Points" as equal to the number of steel piles.

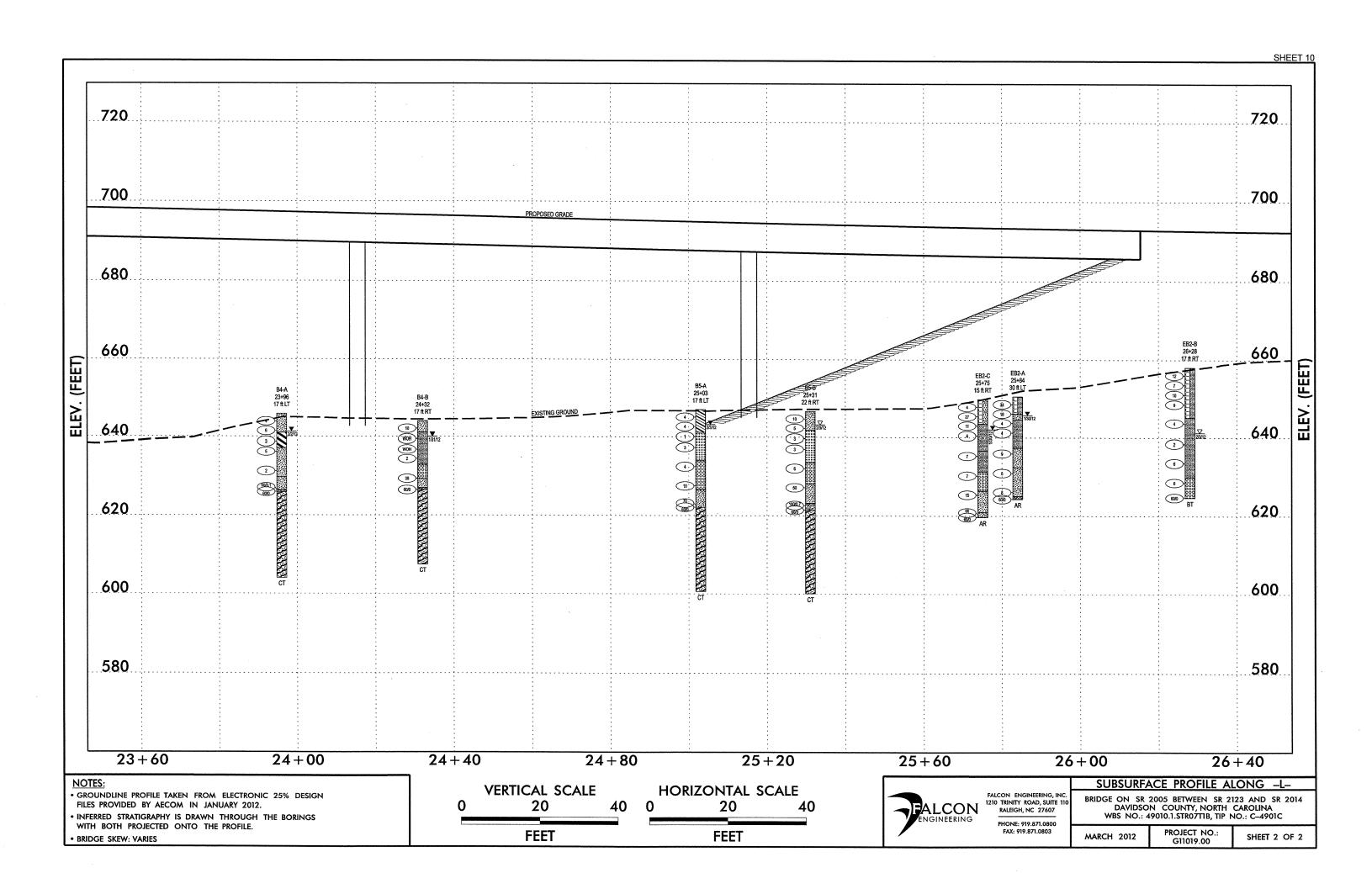
If pipe pile plates are or may be required, calculate the quantity of "Pipe Pile Plates" as equal to the number of pipe piles.

If PDA testing may be required, show quantities of "PDA Testing" on the substructure plans as totals only. If PDA testing is required, show quantities of "PDA Testing" on the substructure plans for each bent or end bent.

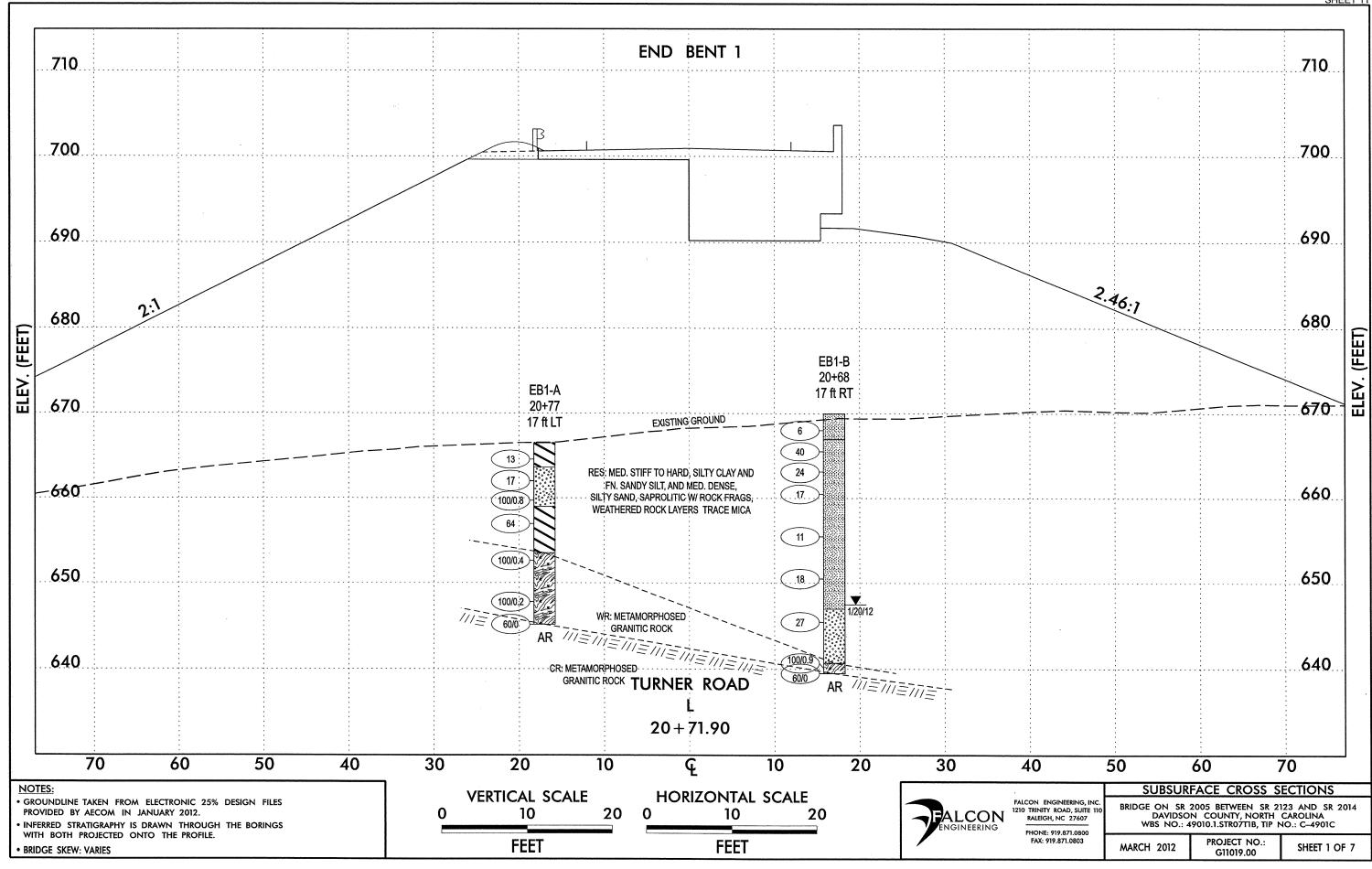




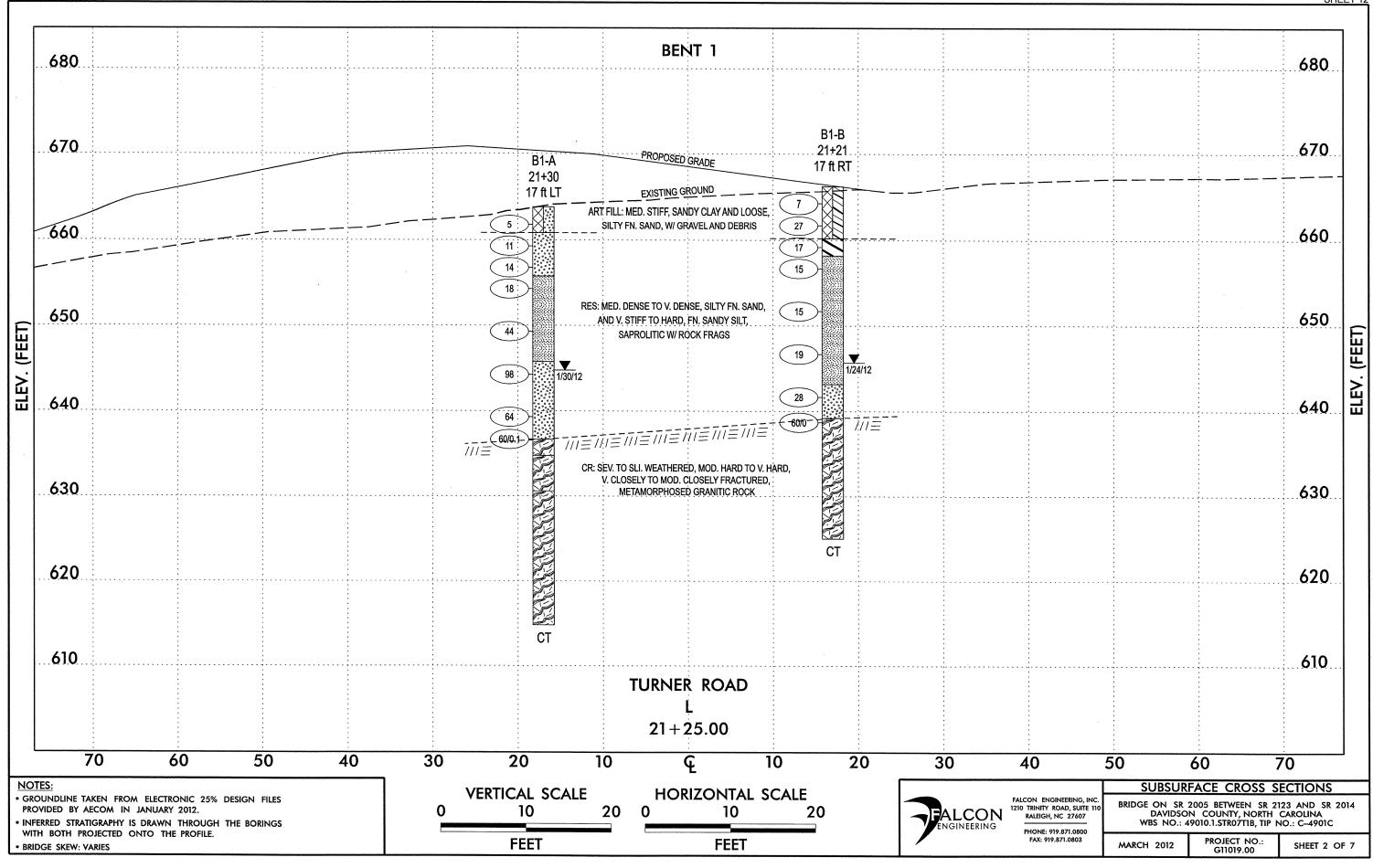


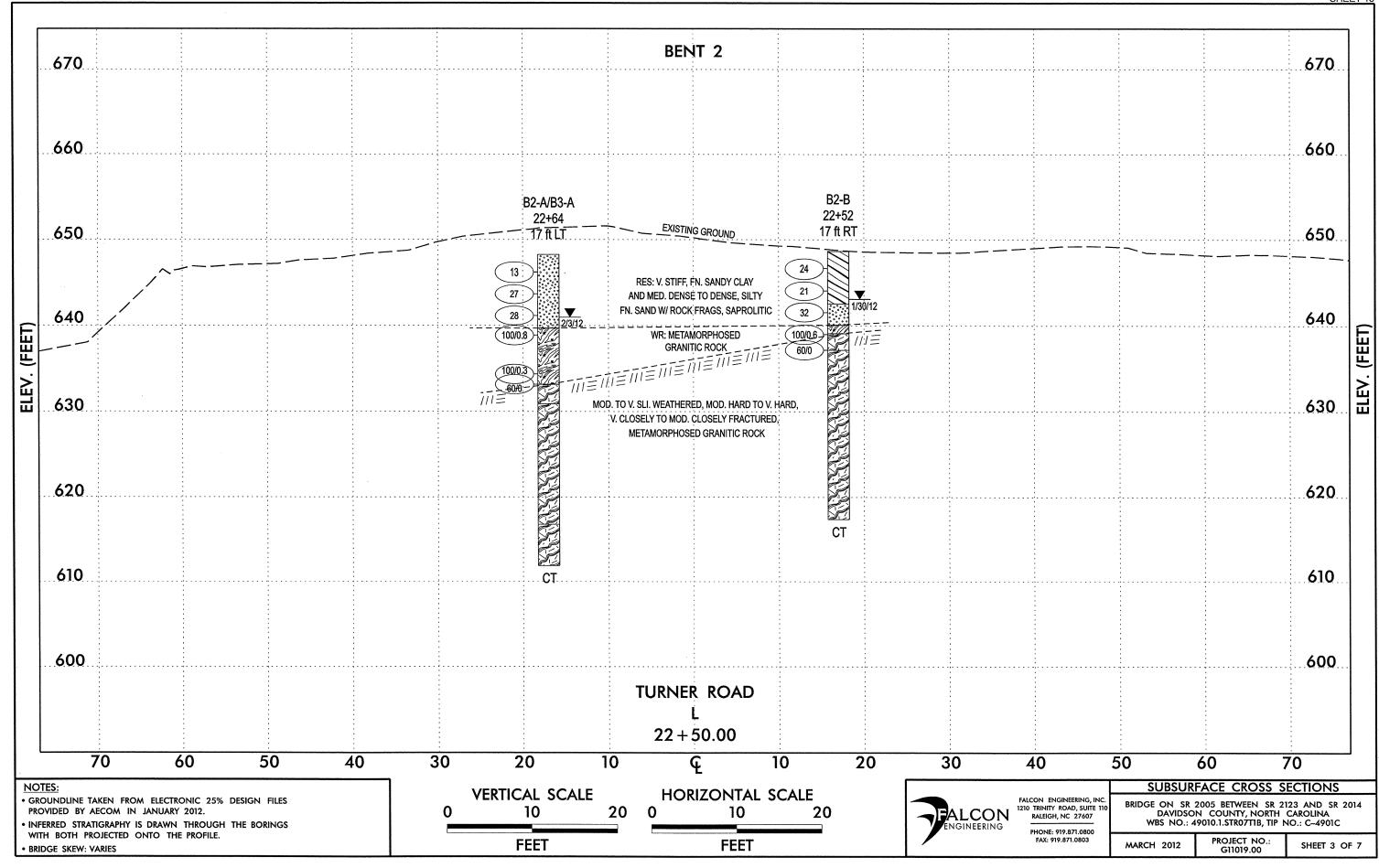


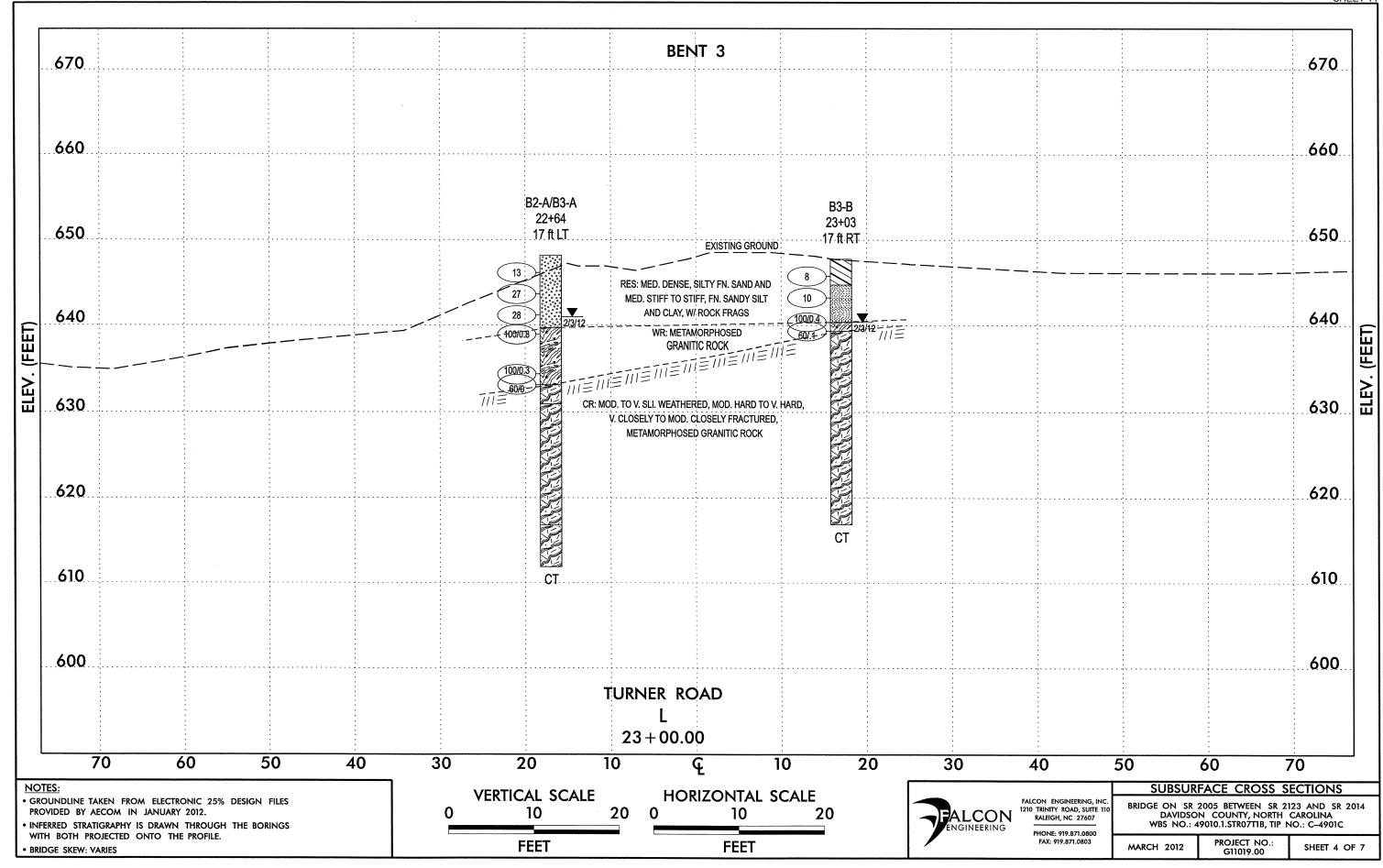


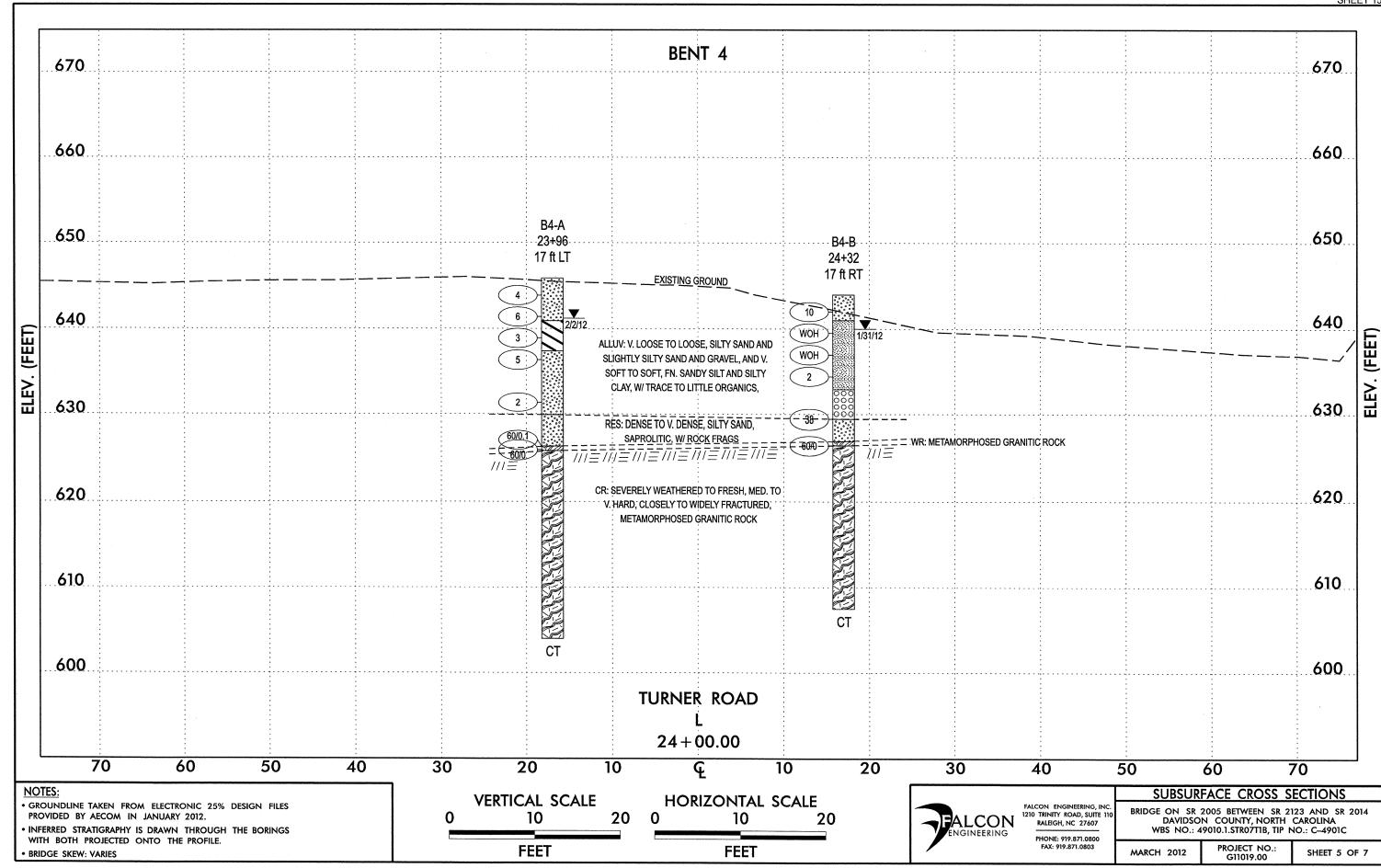


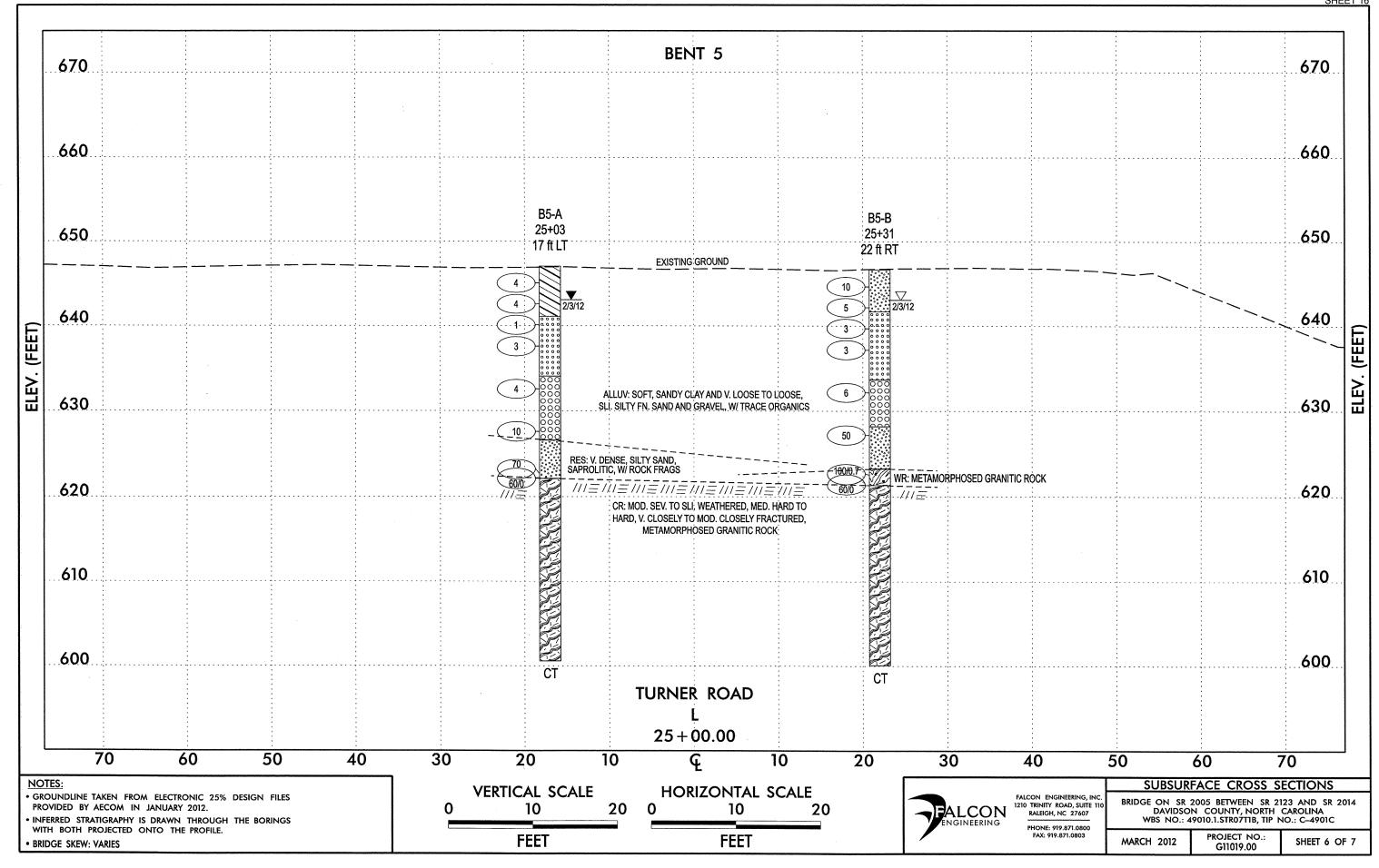




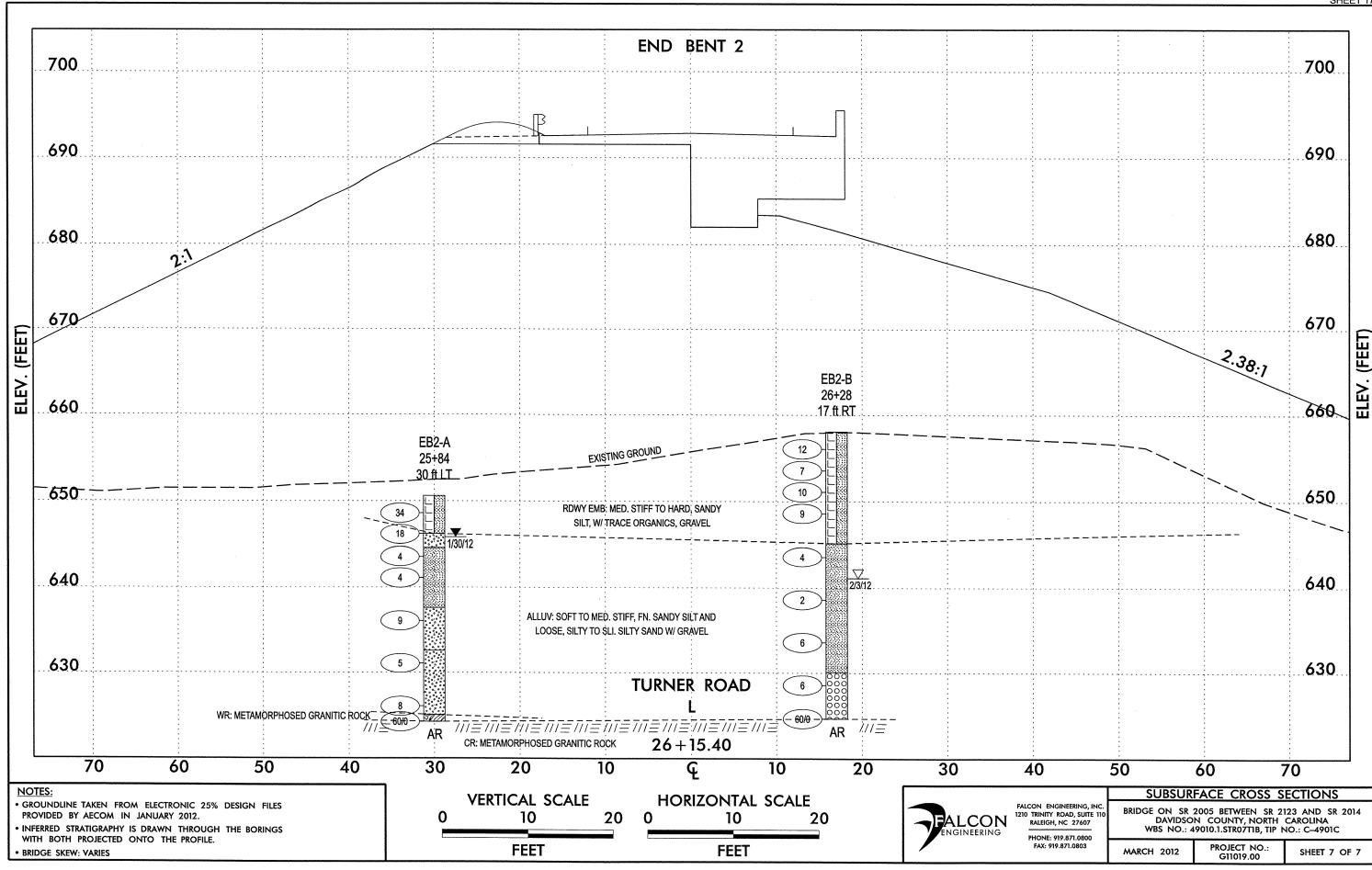




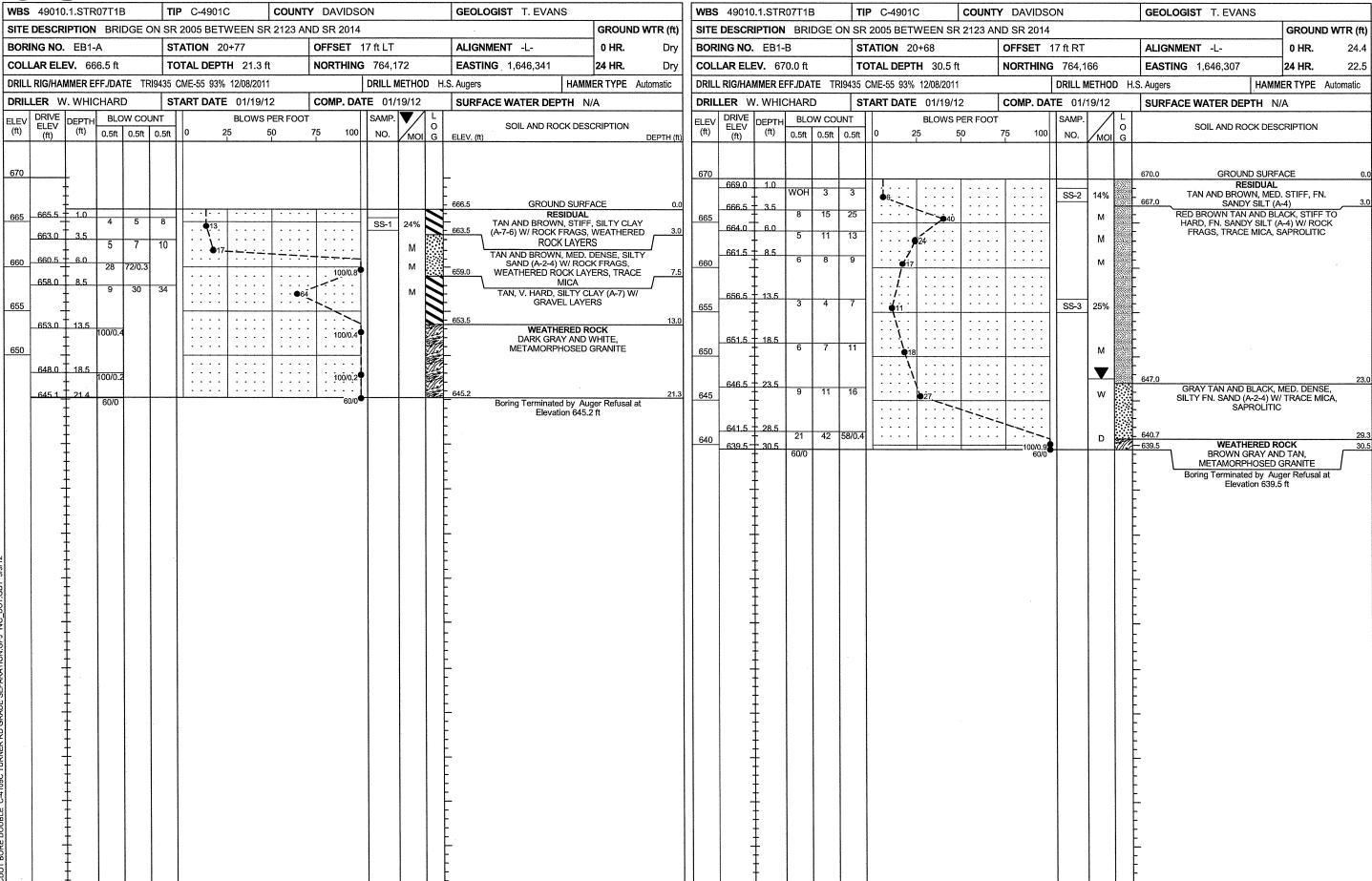








NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

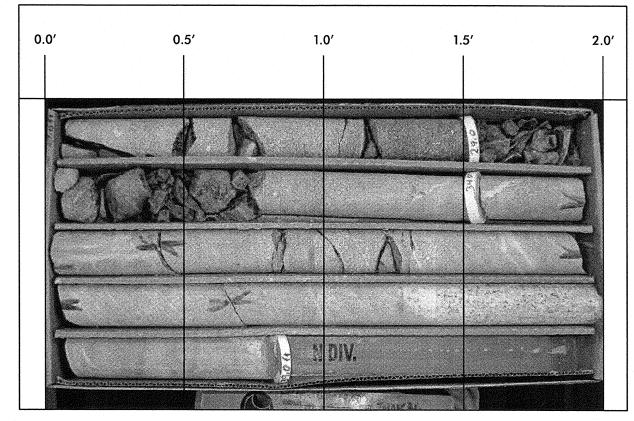




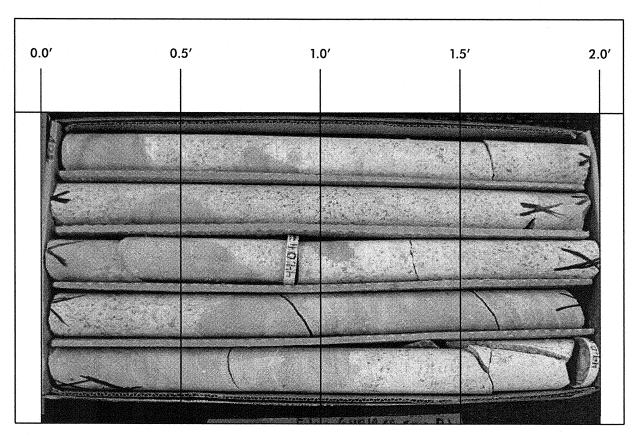
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35	+		60/0.1						60/0.1			2	CRYSTALLINE R 634.8 BLUE-GRAY AND BRO	
	<u> </u>												WEATHERED, HARD, FRACTURED, METAMO	CLOSELY
	<u> </u>									!			GRANITE	
30	\pm	•											DK. GRAY, SEV. WEATHER	RED, HARD, V.
	1												CLOSE TO CLOSELY FF	
25	Ŧ			ļ				• • • •	.	RS-1	1		. CRYSTALLINE R BLUE-GRAY, SLI. WEATHE	
	Ŧ			ŀ									 V. HARD, CLOSE TO MO 	D. CLOSELY
	Ŧ												FRACTURED, METAMO GRANITE, W/ MEGAO	CRYSTIC
20	_	-			1					i I			COMPOSITIONAL E	BANDS
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15				 	+					Н—	 	PAT .	614.8 - Boring Terminated at Elev	ation 614.8 ft

NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

\sim				L D									
ļ	49010.				L	C-490					AVIDSON	GEOLOGIST T. EVAN	
SITE	DESCRI	PTION	BRI	DGE ON	SR 20	05 BE	TWEEN	SR 21	23 AI	ND S	R 2014		GROUND WTR (ft)
BORI	NG NO.	B1-A			STAT	ION	21+30			OF	FSET 17 ft LT	ALIGNMENT -L-	0 HR. 19.0
COLL	AR ELE	V . 66	3.8 ft		TOTA	AL DEF	PTH 49	.0 ft		NO	RTHING 764,124	EASTING 1,646,364	24 HR. 19.0
DRILL	RIG/HAM	IMER E	FF./DA	TE TRI94	35 CMI	E-55 93	% 12/08/	2011			DRILL METHOD H.S	. Augers	HAMMER TYPE Automatic
DRIL	LER W.	. WHIC	CHAR)	STAF	RT DAT	ΓE 01/2	4/12		CO	MP. DATE 01/26/12	SURFACE WATER DEP	TH N/A
COR	SIZE	NQ2			TOTA	L RUN	22.01	t					
ELEV	RUN	DEPTH	RUN	DRILL	REC.	JN RQD	SAMP.	STR REC.	ATA RQD	L		EACDIDTION AND DELLARIA	
(ft)	(ft)	(ft)	(ft)	RATE (Min/ft)	(ft)	(fi)	NO.	(#)	(ft) %	O G	ELEV. (ft)	ESCRIPTION AND REMARKS	S DEPTH (ft)
636.8												Begin Coring @ 27.0 ft	
635	636.8 634.8	27.0 29.0	2.0	2:14/1.0 0:58/1.0	(1.5) 75%	(0.3) 15%		(1.5)	(0.3) 16%		_636.7 _634.8 BIUE-GRAY AND	CRYSTALLINE ROCK	D HARD CLOSELY 29.0
	+	-	5.0	1:00/1.0	(2.0)	(0.8)		79% (1.2) 29%	(0.0)		3232 31711 7110	BROWN, MOD. WEATHEREI URED, METAMORPHOSED (-, · · · · · · · · · · · · · · · · · · ·
	+	•		1:35/1.0 3:12/1.0	40%	16%		29%	0%		DK. GRAY. SEV	CRYSTALLINE ROCK WEATHERED, HARD, V. CLO	OSE TO CLOSELY
630	629.8	34.0		2:15/1.0 4:11/1.0				(15.7)	(15.2)			URED, METAMORPHOSED (
	†		5.0	3:01/1.0 1:39/1.0	(5.0) 100%	(4.8) 96%		99%	96%		BLUE-GRAY, SLI. W	CRYSTALLINE ROCK EATHERED, HARD TO V. HA	ARD, CLOSE TO MOD.
	1			1:47/1.0 1:52/1.0			RS-1	}				CTURED, METAMORPHOSE CRYSTIC COMPOSITIONAL	
625	624.8	39.0	5.0	1:52/1.0 2:08/1.0 2:19/1.0	(4.9)	(4.9)		1			_		
	+	-		2:54/1.0 3:04/1.0	98%	98%		İ		1	-		
620	619.8	44.0	ŀ	3:13/1.0 2:43/1.0				ŀ			-		
	+		5.0	2:59/1.0 2:36/1.0		(4.7)		ŀ					
	. ‡	-		2:32/1.0	100%	94%		ŀ			- -		
615	614.8	49.0		2:14/1.0 1:59/1.0						S.	614.8		49.0
	‡	-	ŀ								- Bor	ing Terminated at Elevation 61	14.8 ft
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BORING B1-A, BOX 1 OF 2, 27.0 FEET TO 39.0 FEET



BORING B1-A, BOX 2 OF 2, 39.0 FEET TO 49.0 FEET





PHONE: 919.871.0800 FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014 DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07TIB, TIP NO.: C-4901C

FEBRUARY 2012

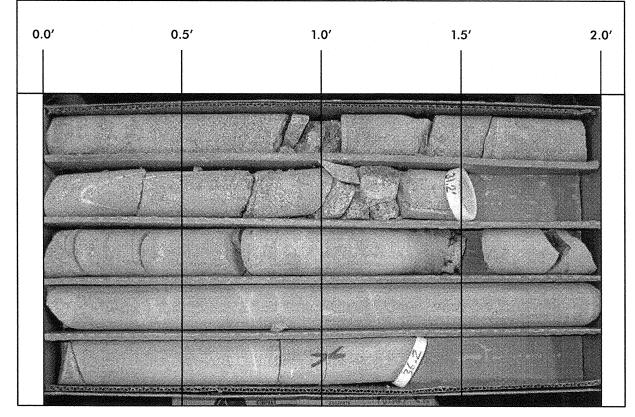
PROJECT NO.: G11019.00



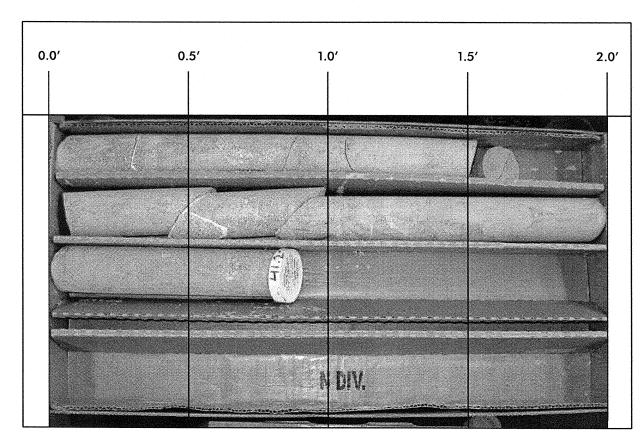
### DESCRIPTION BRIDGE ON SECON SECON BETWEEN SECON S	
BORING NO. B1-B	ND WTR (fi
DRILL RIGHAMMER EFF.DATE	12.8
DRILLER R. TOOTHMAN START DATE 01/23/12 COMP. DATE 01/23/12 SURFACE WATER DEPTH N/A	20.9
ELEV DEPTH (ft)	Automatic
ELEV (II) C(II) 0.561 0.561 0.561 0.561 0 0.56	
665 665 2 1.0 4 3 4 3 4 662.7 3.5 7 15 12 660 660 2 6.0 6 7 10 652.7 8.5 5 7 8 652.7 13.5 5 6 9 615 D 652.7 13.5 5 6 9 615 D 652.7 13.5 5 6 9 615 D 652.7 13.5 5 6 9 615 D 652.7 13.5 5 6 9 615 D 652.7 13.5 5 6 9 615 D 652.7 13.5 5 6 9 615 D 652.7 13.5 5 6 9 615 D 652.7 13.5 5 6 9 615 D 663.2 RED-BROWN AND WHITE, MED. To SILTY FN. SAND (A2-4) SAPROLITIC 630 631 632 633.7 27.5 6070	l DEPTH (
665 665 2 1.0 4 3 4 7 15 12 277 660 660 660 7 10 717 8 657.7 8.5 5 7 8 7 15 5 6 9 15 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
662 7 3.5 7 15 12 660 660 7 10 667 7 8.5 5 7 8 15 15	CLAY
655. 665 665 665 665 665 665 665 665 665	ULA
655 652 7 13.5 5 6 9 15	ILTY 8
650 652 7 13.5 5 6 9 15 D D 643.2 GRAY BROWN AND WHITE, MED. II SILTY FN. SAND (A-2-4) SAPROL 640 638 7 27.5 60/0 635	TIFF,
645 646 647.7 18.5 4 7 12 648 649 649 638.7 27.5 60/0 639.2 CRYSTALLINE ROCK BLUE-GRAY AND WHITE, MED. I. WEATHERED, MOD. ALOSELY FRACTURED MOD. CLOSELY FRACTURED METAMORPHOSED GRANITE	,
645 642.7 23.5 9 14 14 635 636 637 638.7 27.5 60/0 636 638.7 27.5 60/0 637 639.2 CRYSTALLINE ROCK BLUE-GRAY AND WHITE, MED. IS WEATHERED, MOD. HARD, V. CLO MOD. CLOSELY FRACTURED METAMORPHOSED GRANITE	
640 638.7 - 27.5 60/0 636 CRYSTALLINE ROCK BLUE-GRAY AND WHITE, MED. CRYSTALLINE ROCK BLUE-GRAY AND WHITE, MED. CRYSTALLINE ROCK MOD. CLOSELY FRACTURED MOD. CLOSELY FRACTURED METAMORPHOSED GRANITE	
640 638.7 - 27.5 60/0 636 637 638.7 - 27.5 60/0	
635 BLUE-GRAY AND WHITE, MEI WEATHERED, MOD. HARD, V. CLO MOD. CLOSELY FRACTURED METAMORPHOSED GRANITE 630 625.0	TIC 27
630 METAMORPHOSED GRANITE	
625	
625 Boring Terminated at Elevation 628	
Boring Terminated at Elevation 628	41
	.0 ft

NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

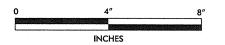
			701		VI.	HAC	NE	· ()	<u> </u>				
	49010				L	C-490					PAVIDSON	GEOLOGIST T. EVANS	
SITE	DESCRI	PTION	BRI	DGE ON	SR 20	05 BE	TWEEN	SR 21	23 AN	ND S	R 2014	W-WARL	GROUND WTR (ft)
BORI	NG NO.	B1-B			STAT	ION	21+21			OF	FSET 17 ft RT	ALIGNMENT -L-	0 HR. 12.8
COLL	AR ELE	V . 66	6.2 ft		TOTA	L DEI	PTH 41.	2 ft		NO	RTHING 764,117	EASTING 1,646,328	24 HR . 20.5
DRILL	RIGIHAN	AMER E	FF./DA	TE TRI94	35 CMI	E-55 93	% 12/08/2	011			DRILL METHOD H.S	Augers HAMME	R TYPE Automatic
DRIL	LER R.	TOOT	1AMH	1	STAF	RT DA	FE 01/2	3/12		CO	MP. DATE 01/23/12	SURFACE WATER DEPTH N/A	A
COR	E SIZE	NQ2			TOTA	L RUI	1 13.7 f	t					
ELEV	RUN ELEV	DEPTH	RUN	DRILL	REC.	JN RQD	SAMP.	STR REC.	ATA RQD	Ľ		CODUDITION AND DELABOR	
(ft)	(ft)	(ft)	(ft)	RATE (Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	O G	ELEV. (ft)	ESCRIPTION AND REMARKS	DEPTH (ft)
638.7												Begin Coring @ 27.5 ft	
	638.7	27.5	3.7	3:28/1.0 10:22/1.0	(3.4) 92%	(1.6) 43%				1	- BUE-GRAY AND W	CRYSTALLINE ROCK HITE, MED. WEATHERED, MOD. HAP	RD V CLOSE
635	635.0	31.2		3:30/1.0 2:08/0.8			-					Y FRACTURED, METAMORPHOSED	
	-	-	5.0	4:58/1.0 3:26/1.0 4:07/1.0	(5.0) 100%	(3.9) 78%						(continued)	
		-		4:07/1.0 3:41/1.0									
630	630.0	36.2	5.0	3:41/1.0 4:33/1.0	(4.3)	(3.9)					<u>. </u>		
	1	-	0.0	4:38/1.0 4:16/1.0	86%	78%					-		
625	625.0	- 41.2		4:55/1.0						مستواهبو			
023	023.0	- 41.2		4:54/1.0						شنطعة	625.0 _ Bori	ng Terminated at Elevation 625.0 ft	41.2
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BORING B1-B, BOX 1 OF 2, 27.1 FEET TO 36.2 FEET



BORING B1-B BOX 2OF 2, 36.2 FEET TO 41.2 FEET





PHONE: 919.871.0800 FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014 DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07T1B, TIP NO.: C-4901C

FEBRUARY 2012

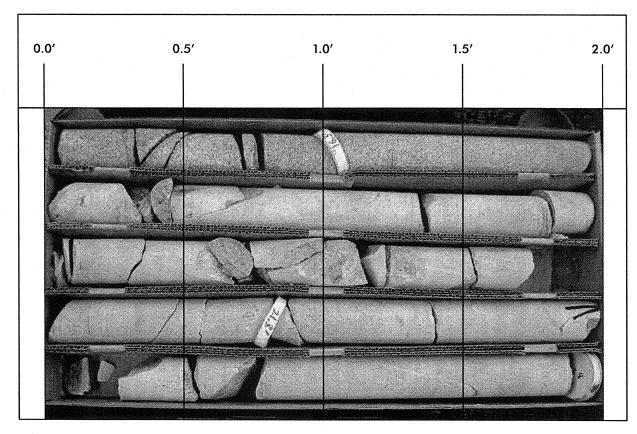
PROJECT NO.: G11019.00



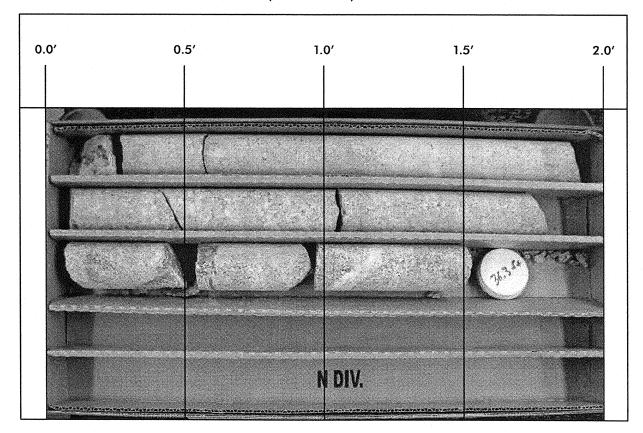
WBS	49010	.1.STR	07T1	3	TI	IP C-4901C	COUNT	r DAVIDS	NC			GEOLOGIST T. EVANS		
SITE	DESCR	IPTION	BRI	DGE	ON SR	R 2005 BETWEEN SF	2123 AN	ID SR 2014					GROUND W	TR (ft
BORI	NG NO.	B2-A	/B3-A		S	TATION 22+64		OFFSET 1	17 ft LT			ALIGNMENT -L-	0 HR.	6.5
COLL	AR ELE	EV . 64	8.2 ft		TO	OTAL DEPTH 36.3 f		NORTHING	764,0	101		EASTING 1,646,419	24 HR.	7.2
DRILL	RIGIHAN	AMER E	FFJDA	TE TI	RI0472	CME-850 67% 12/08/201	1		DRILL N	NETHO	D H	S. Augers HAM	MER TYPE Auto	matic
DRIL	LER R	. TOO1	HMAI	V	S ⁻	TART DATE 01/27/1	2	COMP. DA	ΓE 01/	30/12		SURFACE WATER DEPTH	N/A	
ELEV	DRIVE ELEV	DEPTH	BLC	M CO	UNT	- l '	PER FOOT		SAMP.	lacksquare	LO	SOIL AND ROCK DE	SCRIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50 	75 100	NO.	MOI		ELEV. (ft)		EPTH (
650		-			ŀ							: :		
	647.2 ⁻	1.0				 			-		100	648.2 GROUND SUR		0
645	_		4	5	8	13.	: : : :			D		TAN AND BROWN, MED FN. SAND (A-2-4) W/ F	DENSE, SILTY	
	644.7-	- 3.5 -	11	12	15	27			Ì	М		-	NOON TIVIOO	
	642.2	6.0	10	12	16					M'		- -		
640	639.7-	- 85	30	70/0.3						W	7247	639.7		8
	-	-	30	7070.3			::::	100/0.8)	\ v		- WEATHERED I - BROWN GRAY A	ND TAN,	
635	0047	40.5					: : : :			ľ		- METAMORPHOSED GRA - FRAGS	NITE, W/ ROCK	
	634.7— 633.2		100/0.3					- 100/0.3				 633.2		1:
	-	-	60/0	1			: : : :	60/0	'		2	CRYSTALLINE 630.9 BLUE-GRAY, MOD. WEA		1
30	_	Ė										HARD TO HARD, V. CLOS	SE TO CLOSELY	Γ'
	-	-					: : : :		ľ	ŀ		GRANITE		1
325	-	-					: : : :		ŀ			- CRYSTALLINE - GRAY AND WHITE, V. SL	I. WEATHERED,	
	-	-			ŀ			· · · ·		ĺ		 V. HARD, CLOSELY F METAMORPHOSED 		
	-				İ							. .		
620	_	-										-		
	-	ļ.			Ĭ				1	ľ		- - - 616.8		
615	-	-										CRYSTALLINE		3
	-	F										 BLLUE-GRAY, V. SLI.\ HARD, CLOSE TO MC 	D. CLOSELY	
				<u> </u>	ļ		<u> </u>	<u> </u>	4	<u> </u>		FRACTURED, METAN GRANITE		36
	_	_										Boring Terminated at Ele	evation 611.9 ft	
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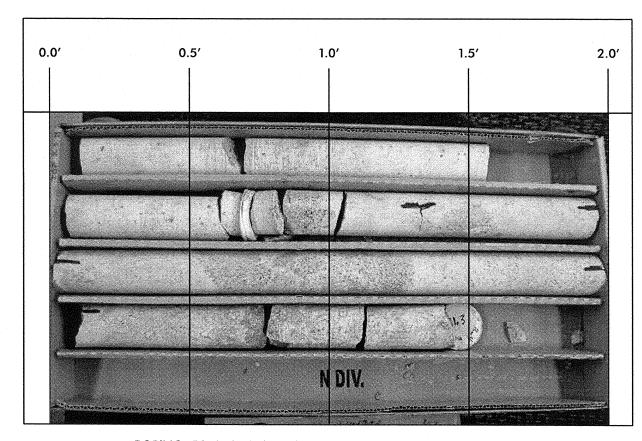
WBS	49010	.1.STR	07T1E	3	TIP	C-490	1C	C	TNUC	Y D	PAVIDSON	GEOLOGIST T. EVANS	<u></u>	
 				DGE ON	L		***************************************	r						UND WTR (ft)
BORI	NG NO.	B2-A	/B3-A		STAT	ΓΙΟΝ	22+64			OF	FSET 17 ft LT	ALIGNMENT -L-	O HE	1
COLL	AR ELE	EV. 64	8.2 ft		TOTA	AL DEI	PTH 36	.3 ft		NO	RTHING 764,001	EASTING 1,646,419	24 HF	₹. 7.2
DRILL	RIGIHAI	MMER E	FF./DA	TE TRI04	72 CM	E-850 6	37% 12/0	3/2011			DRILL METHOD H.S	. Augers	HAMMER TYP	E Automatic
DRIL	LER R	. тоот	AMH	٧	STAI	RT DA	TE 01/2	27/12		co	MP. DATE 01/30/12	SURFACE WATER DEP	ΓΗ N/A	
COR	E SIZE	NQ2	-		TOTA	AL RUI	N 21.3	ft						
ELEV	RUN ELEV	DEPTH		DRILL RATE	REC.	JN RQD	SAMP.	STR REC.	RQD	0	Г	ESCRIPTION AND REMARKS	·	
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(#)	(ft)	NO.	(ft)	(ft) %	Ğ	ELEV. (ft)		N	DEPTH (ft)
633.2	633.2	15.0	1.3	3:48(0.3	(1.0)	(0.0)		(2.0)	(1.0)		633.2	Begin Coring @ 15.0 ft CRYSTALLINE ROCK		15.0
630	631.9 -	- 16.3 -	5.0	3:46/0.3 8:18/1.0 4:43/1.0	77%	0%		87%		1	630.9 BLUE-GRAY, MOD. \	VEATHERED, MOD HARD TO RACTURED, METAMORPHOS		DSE TO
000	-	-		4:43/1.0 5:54/1.0 9:21/1.0	(4.9) 98%	(2.0) 40%		(12.2) 87%	(9.3) 66%			CRYSTALLINE ROCK		
	626.9	21.3	5.0	9:36/1.0 17:28/1.0 14:54/1.0	(4.3)	(4.0)		ŀ				ITE, V. SLI. WEATHERED, V. 'URED, METAMORPHOSED G		LY
625	_	-	0.0	15:54/1.0 8:26/1.0	86%	80%					-			
	621.9	26.3		19:10/1.0 26:22/1.0							<u> </u>			
620	_	_	5.0	25:48/1.0 16:34/1.0	(4.9) 98%	(4.3) 86%								
	.]	Ė		12:22/1.0 9:46/1.0		50,76								
	616.9	31.3	5.0	11:34/1.0 8:24/1.0	(4.7)	(3.5)		(4.6)	(3.5)		616.8	CRYSTALLINE ROCK		31.4
615	_	_		4:52/1.0 3:08/1.0	94%	70%		94%	71%		BLLUE-GRAY, V. SL	. WEATHERED, HARD, CLOS URED, METAMORPHOSED G	E TO MOD. CL	.OSELY
	611.9	36.3		2:16/1.0 8:04/1.0							611.9			36.3
	-	_									L Bor	ing Terminated at Elevation 61	1.9 ft	
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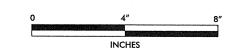
BORING B2-A / B3-A, BOX 1 OF 3, 15.0 FEET TO 23.8 FEET



BORING B2-A / B3-A, BOX 3 OF 3, 31.3 FEET TO 36.3 FEET



BORING B2-A / B3-A , BOX 2 OF 3, 23.8 FEET TO 31.3 FEET





PHONE: 919.871.0800 FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014 DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07TIB, TIP NO.: C-4901C

FEBRUARY 2012

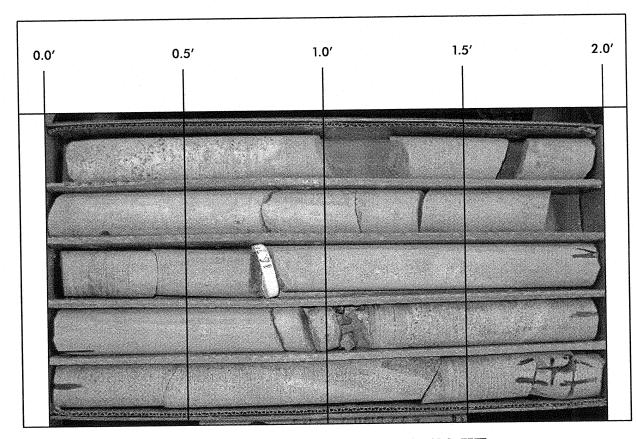
PROJECT NO.: G11019.00



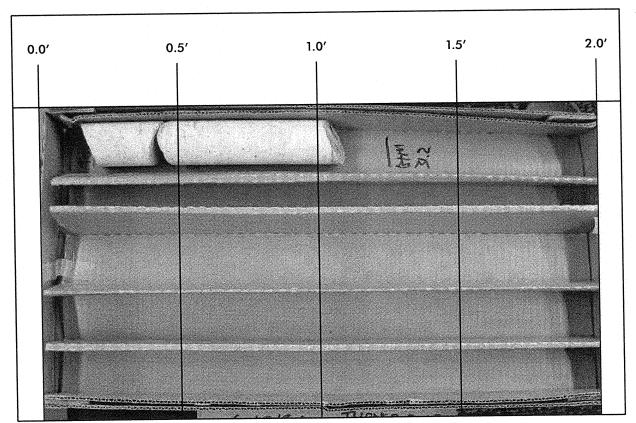
WBS	49010.1.S	R07T1	В	TI	P C-4901C	COUNT	Y DAVIDS	NC			GEOLOGIST T. EVANS		
SITE	DESCRIPTIO	N BR	IDGE		2005 BETWEEN	SR 2123 A	ND SR 2014					GROUND WI	rR (ft
BOR	ING NO. B2	-B		ST	TATION 22+52		OFFSET				ALIGNMENT -L-	0 HR.	N/A
	LAR ELEV.				DTAL DEPTH 31.2		NORTHING	·			EASTING 1,646,382	24 HR.	5.5
					CME-850 67% 12/08/		T	L		D H.	T	MER TYPE Autor	natic
DRIL	LER R. TO				TART DATE 01/25		COMP. DA			, , , , , , , , , , , , , , , , , , , 	SURFACE WATER DEPTH	N/A	
ELEV (ft)	DRIVE ELEV (ft) (ft)	''}	0.5ft		0 25	50 50	75 100	SAMP. NO.	МОІ	L O G	SOIL AND ROCK DES		PTH (
650											_ - 648.6 GROUND SUR	FACE	o
645	647.6 1.0 645.1 3.5	6	9	15					М		TAN GRAY AND BROWN SANDY CLAY (A-6) S	I, V. STIFF, FN.	
	642.6 + 6.0		16	16	21				W		642.6 BLUE-GRAY BROWN AN		6
640	640.1 7 8.5	36	50	50/0.1			100/0.6		D		640.1 SILTY FN. SAND (A-2-4) W 639.1 SAPROLIT WEATHERED I 637.2 BLUE-GRAY AND	IC / ROCK /	8 9 11
635		60/0					60/0	RS-2			METAMORPHOSED CRYSTALLINE BLUE-GRAY AND	GRANITE ROCK BROWN,	.,
630	<u> </u>										METAMORPHOSED CRYSTALLINE BLUE-GRAY AND TAN, WEATHERED, MOD HAI	ROCK MOD. TO SLI.	
625	+++++++++++++++++++++++++++++++++++++++										MOD. CLOSELY FR. METAMORPHOSED GRAI AMOUNTS OF Q	ACTURED, NITE, W/ LARGE	
											-		
620	+ +										 : 617.4		3.



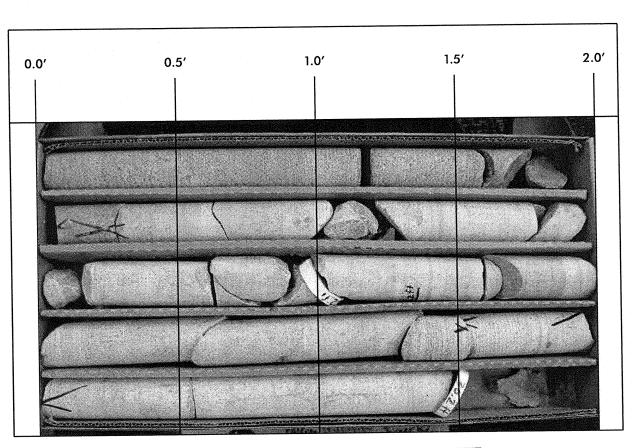
WBS	49010	.1.STR	07T1E	3	TIP	C-490)1C	C	OUNT	Y D	AVIDSON	GEOLOGIST T. EVAN	S		
SITE	DESCR	IPTION	BRI	DGE ON	SR 20	05 BE	TWEEN	SR 2	123 AI	ND S	R 2014		GI	ROUND WI	FR (ft)
BOR	NG NO.	B2-B			STAT	ION	22+52			OF	FSET 17 ft RT	ALIGNMENT -L-	0	HR.	N/A
COLI	AR ELI	EV . 64	8.6 ft		TOTA	AL DE	PTH 31.	.2 ft		NO	RTHING 763,997	EASTING 1,646,382	24	HR.	5.5
DRILL	RIGIHA	MMER E	FF./DA	TE TRI04	72 CM	E-850 (67% 12/08	/2011			DRILL METHOD H.S	6. Augers	HAMMER	TYPE Autor	matic
DRIL	LER R	. TOOT	HMAI	1	STAI	RT DA	TE 01/2	5/12		co	MP. DATE 01/27/12	SURFACE WATER DEP	TH N/A		
COR	E SIZE	NQ2					N 19.8 f								
ELEV	RUN ELEV	DEPTH		DRILL RATE	REC.	RQD	SAMP.	REC.	ATA RQD	P	D	DESCRIPTION AND REMARKS	3		
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	G	FLEV. (ft)			DE	EPTH (ft)
637.2	637.2	11.4	40	0.554.0	(4.5)	(0.0)		(18.8) 95%	(40.0)	2	007.0	Begin Coring @ 11.4 ft			
635	037.2	- '''-	4.8	2:55/1.0 8:02/1.0	(4.2) 88%	(3.6) 75%	RS-2	(18.8) 95%	(16.2) 82%		637.2 BLUE-GRAY AND TAI	CRYSTALLINE ROCK N, MOD. TO SLI. WEATHERE			11.4
	632.4	16.2		8:02/1.0 8:27/1.0 9:01/1.0 6:42/0.8							_ TO MOD. CLOSELY	Y FRACTURED, METAMORPH LARGE AMOUNTS OF QUAR		NITE, W/	
600			5.0	7:42/1.0 9:54/1.0 10:18/1.0	(5.0) 100%	(4.8) 96%					<u>.</u>				
630	-	<u> </u>		10:18/1.0 11:21/1.0	10070	5070					<u>-</u> -				
İ	627.4	21.2	5.0	19:00/1.0	(4.6)	(3.2)					- -				
625	_	_	0.0	9:47/1.0 9:35/1.0 39:00/1.0	92%	64%					- 				
	622.4	26.2		8:58/1.0 10:24/1.0							<u>.</u>				
600			5.0	40:00/1.0 57:44/1.0	(5.0)	(4.6) 92%					- -				
620	-	<u> </u>		3:00/1.0 7:24/1.0	10078	JE /6					_ -				
	617.4	31.2		14:00/1.0				ļ		2	- 617.4 - Bor	ing Terminated at Elevation 6	17 4 ft		31.2
İ	-	‡	ŀ								- -	mg rommatod at Elevation o			İ
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NCDOT CORE SINGLE C-4109C TURNER RD GRADE SEPARATION.GFO NC.DOT.GDT 38712		Ŧ									_				
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z		†	1	1		1		1	1	1	_				



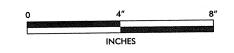
BORING B2-B, BOX 1 OF 3, 11.4 FEET TO 21.2 FEET



BORING B2-B, BOX 3 OF 3, 30.2 FEET TO 31.2 FEET



BORING B2-B, BOX 2 OF 3, 21.2 FEET TO 30.2 FEET.





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ROCK CORE PHOTOGRAPHS

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014 DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07TIB, TIP NO.: C-4901C

FEBRUARY 2012 PROJE

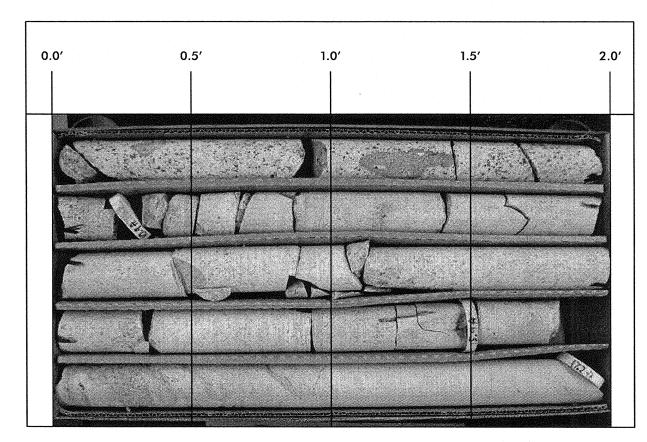
PROJECT NO.: G11019.00



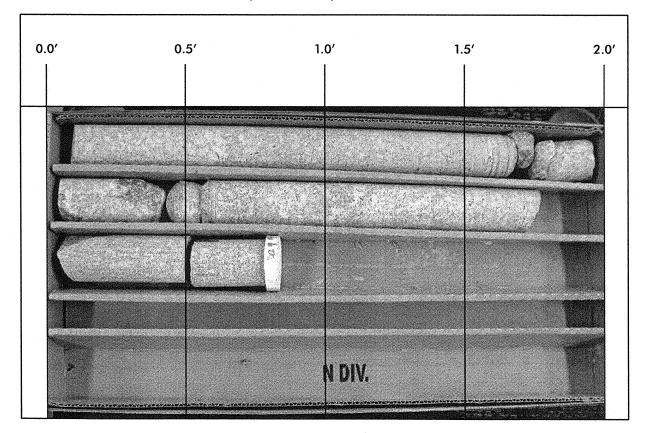
NBS	49010	1.1.STR	107T1E	3	TI	P C-4901C	COUNT	r DAVIDS	NC			GEOLOGIST T. EVANS	3		
SITE	DESCR	IPTION	BRI	DGE	ON SR	2005 BETWEEN S	R 2123 AN	ID SR 2014					GF	ROUND W	/TR (f
30RI	ING NO.	B3-B			S	TATION 23+03		OFFSET	17 ft RT			ALIGNMENT -L-	0	HR.	7.
COLI	LAR ELI	EV . 64	7.8 ft		т	DTAL DEPTH 30.9	ť	NORTHING	763,9	151		EASTING 1,646,402	24	HR.	7.
RILL	RIGIHA	MMER E	FFJDA	TE T	RI0472	CME-850 67% 12/08/20	11		DRILL N	ЛЕТНО	D H	S. Augers	HAMMER	TYPE Aut	omatic
DRIL	LER R	. TOO1	1AMH	N	S	TART DATE 01/31/	2	COMP. DA	TE 01/	31/12		SURFACE WATER DEP	ΓΗ N/A	······································	
LEV	DRIVE ELEV	DEPTH	BLC	W CO	UNT	BLOWS	PER FOOT		SAMP.	V /	LO	SOIL AND ROO	K DESCRIP	TION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	MOI		ELEV. (ft)			EPTH
650	646.8	1.0					Т	· T					SURFACE		
345		+	3	4	4	.∳8 · · · · · ·	<u> </u>			M		GRAY AND BROW		TIFF, FN.	
	644.3	3.5	4	5	5	10-				w		BROWN BLACK A	ND TAN, ST		
	641.8	60	4	5	100/0.4					M		SANDY SILT (A-4) W/ ROCK	FRAGS	
540	639.3	8.5			100/0.		1	100/0.4		101	100		RED ROCK		
		Ŧ	60/0.1					607.1		-			ANITE		
35		Ŧ										CRYSTAL BLUE-GRAY AND	LINE ROCK		-
	1 -	Ŧ										WEATHERED, MC CLOSE TO MOD. CL	D. HARD T	O HARD,	
		Ŧ										METAMORPH			
30	-	‡							RS-3	}		-			
		‡	1				: : : :	: : : :				- -			
25		‡					: : : :					- -			
	† -	‡								ļ		- -			
		‡					: : : :				1	- -			
20	-	‡								ĺ		. 			
		‡					: : : :					616.9			;
		‡	<u> </u>		 				'	†	-	Boring Terminated	at Elevation	n 616.9 ft	•
															



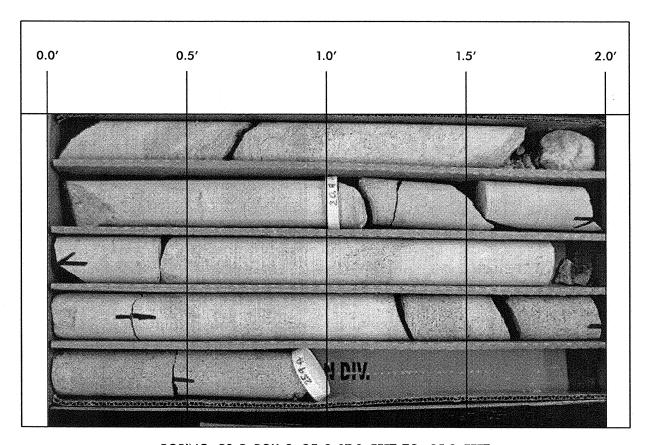
												T			
	49010				L	C-490					PAVIDSON	GEOLOGIST T. EVAN	S		
-				DGE ON			TWEEN	SR 21	123 AI			т		-	D WTR (ft)
	NG NO.				<u> </u>		23+03			├	FSET 17 ft RT	ALIGNMENT -L-		0 HR.	7.4
	AR ELE				<u> </u>		PTH 30.			NO	RTHING 763,951	EASTING 1,646,402		24 HR.	7.4
 					72 CM	E-850 (57% 12/08	2011		1	DRILL METHOD H.S	S. Augers	HAMM	ER TYPE	Automatic
DRIL	LER R	. TOO1	IAMH	1	STAI	RT DA	TE 01/3	1/12		co	MP. DATE 01/31/12	SURFACE WATER DEP	TH N	'A	
COR	E SIZE	NQ2		T	i		N 22.4 f		A T A	<u> </u>					
ELEV	RUN ELEV	DEPTH		DRILL RATE	REC.	JN RQD	SAMP. NO.	STR REC.	RQD	9		DESCRIPTION AND REMARK	S		
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	140.	(ft) %	(ft)	G	ELEV. (ft)				DEPTH (ft)
639.3	639.3 -	8.5	2.4	3:25/1.0	(2.0)	(1.5)			ļ		639.3	Begin Coring @ 8.5 ft CRYSTALLINE ROCK			8.5
İ	636.9	10.9		3:42/1.0 1:36/0.4	83%	63%					BLUE-GRAY AND 1	TAN, MOD. TO SLI. WEATHE MOD. CLOSELY FRACTURED			то
635	<u>-</u>	<u> </u>	5.0	3:47/1.0 3:49/1.0	(5.0) 100%	(4.0) 80%						GRANITE	, IVIL I A	WORT HOC	
ľ	-	<u> </u>	Ì	3:47/1.0 3:49/1.0 5:50/1.0 9:43/1.0							-				
	631.9	15.9	5.0	8:05/1.0 4:12/1.0	(4.9)	(4.3)					_				
630	_	Ł		4:48/1.0 3:38/1.0	98%	86%	RS-3				<u> </u>				
	626.9	20.9		3:38/1.0 3:24/1.0 6:31/1.0							<u></u>				
625		-	5.0	6:14/1.0 7:10/1.0	(5.0) 100%	(4.7) 94%									
		F		7:48/1.0 11:15/1.0	100,0	34,0					- -				
	621.9	25.9	5.0	6:35/1.0	(4.5)	(3.7)									
620	-	F	0.0	6:03/1.0 4:00/1.0 3:38/1.0	90%	74%					_				
	616.9	30.9		7:11/1.0 5:12/1.0							616.9				30.9
	-	- 00.5		0.121.0								ring Terminated at Elevation 6	16.9 ft		
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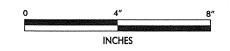
BORING B3-B, BOX 1 OF 3, 8.5 FEET TO 17.2 FEET



BORING B3-B, BOX 3 OF 3, 25.9 FEET TO 30.9 FEET



BORING B3-B, BOX 2 OF 3, 17.2 FEET TO 25.9 FEET





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

PHONE: 919.871.0800 FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014 DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07T1B, TIP NO.: C-4901C

FEBRUARY 2012

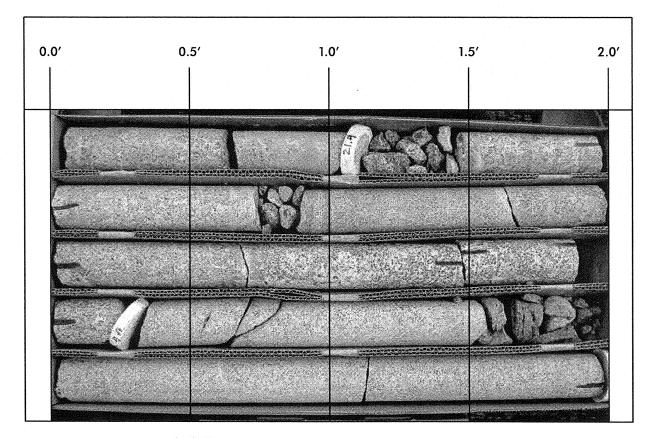
PROJECT NO.: G11019.00



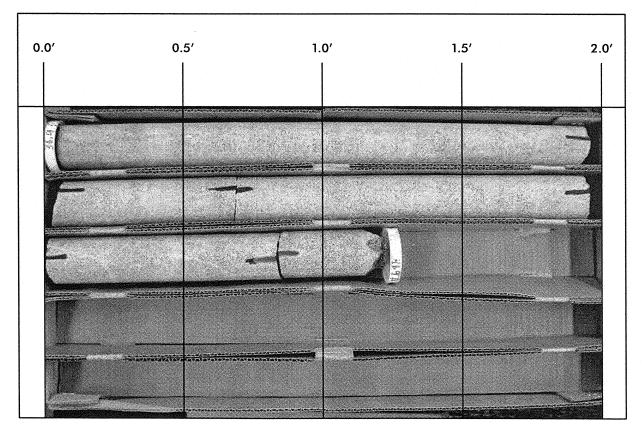
BS	49010).1.STR	.07T1E	3	TI	1	C-4901C		COUNT	T DP	WIDS(אוכ			GEOLOGIST T. EVANS		
ITE	DESCR	IPTION	BRI	DGE	ON SF	₹2	005 BETV	VEEN SF	2123 A	ND SR	2014					GROUN	D WTR (fi
ORI	NG NO.	. B4-A			S	TA	TION 23	+96		OFF	SET 1	17 ft LT			ALIGNMENT -L-	0 HR.	4.0
OLL	AR ELI	EV . 64	5.9 ft		T	OT	AL DEPT	H 41.9 f	t	NOR	THING	763,8	81		EASTING 1,646,474	24 HR.	4.
RILL	RIGIHA	MMER E	FFJDA	TE T	RI9435	CN	ME-55 93%	12/08/2011				DRILL N	IETHO	D H	.S. Augers HA	MMER TYPE	Automatic
RIL	LER R	. TOOT	HMAI	V	S	TΑ	RT DATE	02/01/1	2	COM	P. DA	ΓE 02/	01/12		SURFACE WATER DEPTH	N/A	
.EV	DRIVE ELEV	DEPTH	BLC	W CC	UNT	Π		BLOWS	PER FOO	т		SAMP.	$\mathbf{V}/$	L	SOIL AND ROCK D	ECODIDITION	
ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft		0 2	5 :	50	75	100	NO.	MOI		ELEV. (ft)	ESCRIPTION	DEPTH
50					i												
45	644.9	1.0							1					Se	645.9 GROUND SU		
	642.4	+	3	1 4	3		4						M W		BROWN AND TAN, LOC (A-2-4) W/ SILT AND	SE, SILTY SA	S
40	639.9	6.0	WOH	1	2		7 6,						Sat.		640.9 DK GRAY AND TAN, SC (A-7) W/ TRACE		
35	637.4	8.5	2	3	2		5						Sat.		- 637.4 - DK GRAY, LOOSE TO FN. SAND (.TY
	632.4	13.5	1	1	1		2						Sat.		-		
30	627.4	18.5														E, SILTY SAN	1 ID
25	626.0	19.9	25 60/0	40	60/0.1						60/0.1 60/0.		W	8	- 626.4 (A-2-4) W/ ROCK FRAG - 625.9 WEATHERED - BLUE-GRAY, METAL GRANIT	ROCK MORPHOSED	ر ک
20		† †										- DO 4			CRYSTALLINI BLUE-GRAY, SEV WEATHERED, MED. 1	ROCK 7. TO MOD.	
	_	T +										RS-4			CLOSE TO WIDELY METAMORPHOSE	FRACTURED	
15	-	‡ ‡													· -		
10	-	‡						: : : :	: : :						-		
805		 															
	-	‡	<u> </u>	ļ	ļ	Н									604.0 Boring Terminated at E	loyation 604 (4
	-	+++++++++++++++++++++++++++++++++++++++															



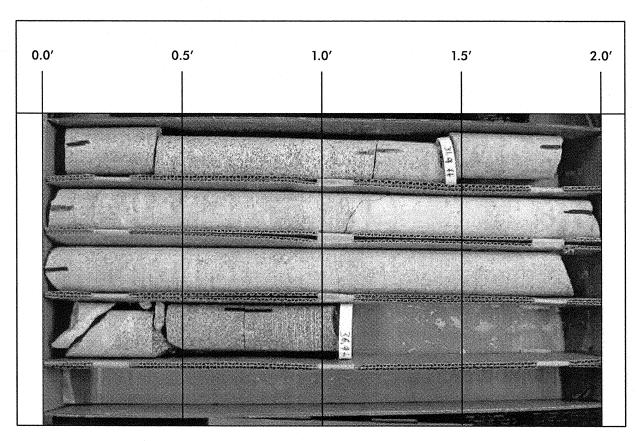
				AL D			·····						
	49010.				L	C-490	***				AVIDSON	GEOLOGIST T. EVANS	
SITE	DESCRI	MOIT	BRI	DGE ON	SR 20	05 BE	TWEEN	SR 21	23 AI	ND S	R 2014		GROUND WTR (ft)
BORI	NG NO.	B4-A			STAT	ION	23+96			OF	FSET 17 ft LT	ALIGNMENT -L-	0 HR. 4.6
COLL	AR ELE	<i>l</i> . 64	5.9 ft		TOT	AL DEI	PTH 41	.9 ft		NO	RTHING 763,881	EASTING 1,646,474	24 HR. 4.7
DRILL	RIGHAM	MER EI	F./DA	TE TRI94	35 CM	E-55 93	% 12/08/2	2011			DRILL METHOD H.S	Augers HAMI	MERTYPE Automatic
DRIL	LER R.	тоот	HMAN	١	STAF	RT DA	ΓE 02/0	1/12		CO	MP. DATE 02/01/12	SURFACE WATER DEPTH N	I/A
CORE	SIZE	1Q2					N 21.9 f						
ELEV	RUN ELEV	EPTH	RUN	DRILL RATE	REC.	JN RQD	SAMP.	STR REC.	RQD	P P	D	ESCRIPTION AND REMARKS	
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	(ft) %	Ğ	ELEV. (ft)		DEPTH (ft)
625.9 625	625.9	20.0	4.0	0.50(4.0	(4.0)	(4.0)					005.0	Begin Coring @ 20.0 ft	
020	624.0	21.9	1.9 5.0	3:58/1.0 1:23/0.9	(1.0) 53%	(1.0) 53%				2		CRYSTALLINE ROCK TO MOD. WEATHERED, MED. TO	
	‡		5.0	2:53/1.0 5:41/1.0	(4.8) 96%	(4.5) 90%					CLOSE TO WIDE	LY FRACTURED, METAMORPHOSE	ED GRANITE
620	619.0	26.9		4:35/1.0 3:31/1.0			RS-4				- 		
	019.0	20.9	5.0	2:22/1.0 2:49/1.0	(4.8)	(4.5)		1			- -		
245	‡			2:18/1.0 3:21/1.0	96%	90%					- -		
615	614.0	31.9		3:10/1.0 3:03/1.0							-		
	†		5.0	2:48/1.0 2:56/1.0	(5.0) 100%	(4.8) 96%					<u>.</u>		
610	<u> </u>			3:15/1.0 3:09/1.0							<u>-</u> 		
	609.0 T	36.9	5.0	3:10/1.0 3:11/1.0	(5.0)	(5.0)					<u>.</u>		
	±			3:03/1.0 3:03/1.0	100%	100%					- -		
605	604.0	41.9		3:09/1.0 3:18/1.0							- 		41.9
	+									Γ		ng Terminated at Elevation 604.0 ft	
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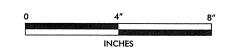
BORING B4-A, BOX 1 OF 3, 20.0 FEET TO 30.4 FEET



BORING B4-A, BOX 3 OF 3, 36.9 FEET TO 41.9 FEET



BORING B4-A, BOX 2 OF 3, 30.4 FEET TO 36.9 FEET





PHONE: 919.871.0800 FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014 DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07T1B, TIP NO.: C-4901C

FEBRUARY 2012

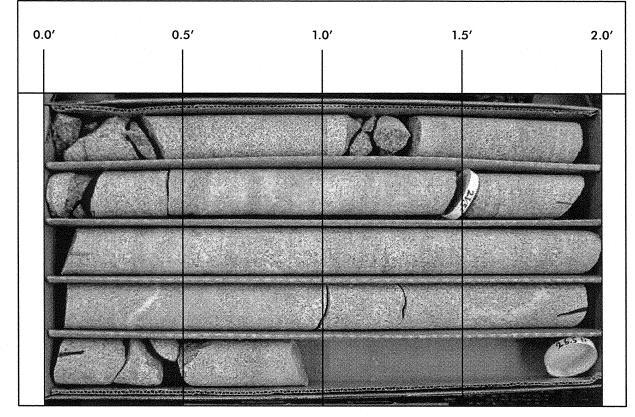
PROJECT NO.: G11019.00



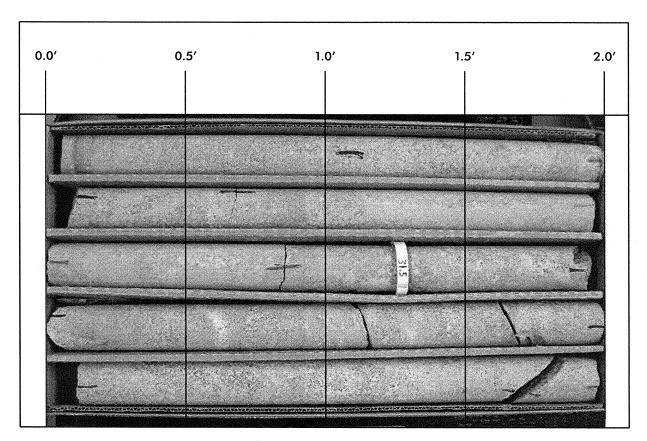
WBS	49010	.1.STR	07T1E	3	TI	P C-4901C	COUNT	Y DAVIDS	NC			GEOLOGIST T. EVAN	S	
SITE	DESCRI	PTION	BRI	DGE	ON SR	R 2005 BETWEEN SF	R 2123 AN	ND SR 2014					GROUN	D WTR (fi
BORI	NG NO.	B4-B			ST	TATION 24+32		OFFSET	17 ft RT			ALIGNMENT -L-	0 HR.	4.0
COLL	AR ELE	V . 64	4.0 ft		TO	OTAL DEPTH 36.3 f	t	NORTHING	763,8	34		EASTING 1,646,456	24 HR.	4.0
DRILL	RIGIHAN	MER E	AGLA	TE TI	RI9435	CME-55 93% 12/08/201	1		DRILL N	ЛЕТНО	D H.	S. Augers	HAMMER TYPE	Automatic
DRIL	LER W	. WHIC	CHARI)	ST	TART DATE 01/30/1	2	COMP. DA	TE 01/	30/12		SURFACE WATER DEP	TH N/A	
ELEV	DRIVE ELEV	DEPTH	BLC	W CO	UNT	4	PER FOOT		SAMP.	$\mathbf{V}/$	LO	SOIL AND RO	CK DESCRIPTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	50	75 100	NO.	MOI		ELEV. (ft)		DEPTH
		-												
645		-											D SURFACE	
	643.0	1.0	2	5	5		T		†	 			LUVIAL	
640	640.5	- - 3.5				10 :				M		641.0 (A-2-4) W/	CLAY LAYERS	
0.10	638.0	- - 6.0	WOH	WOH	WOH	4 0				Sat.		DK. GRAY, V. SOFT W/ LITTLI	, FN. SANDY SILT : E ORGANICS	(A-4)
	-	-	WOH	WOH	WOH	0				Sat.		•		
635	635.5	- 8.5 -	WOH	WOH	2	2,				Sat.		-		
	1	-									000	633.0 GRAY, SLI, SILTY	SAND AND GRAV	1
630	630.5	- - 13.5	2	2	36						0000	. (4	4-1-b)	
	7	_			36	38.				M	000		SIDUAL	1
	626.5	17.5	60/0					.60/0	,			626.5	SE, SILTY FN. SAN \-2-4)	D 1
625			0070									DK. GRAY, METAM	E RED ROCK IORPHOSED GRAN	IITE
]				ŀ							CRYSTA	LLINE ROCK SLI. TO FRESHLY	
620		_			į.							WEATHERED, HAR		OSE
	-	-							RS-5				HOSED GRANITE	٠
												•		
615		-										-		
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610]											· •		
	-											- - 607.5		•
	-						1						d at Elevation 607.7	ft3
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NCDOT GEOTECHNICAL ENGINEERING UNIT

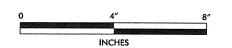
WBS	49010	.1.STR	07T1E	3	TIP	C-490	1C	C	TNUC	Y D	AVIDSO	V		GEOLOGIST T. EVAN	S		
SITE	DESCR	IPTION	BRI	DGE ON	SR 20	05 BE	TWEEN	SR 21	23 AI	ND S	SR 2014					GROUN	ND WTR (ft)
BOR	NG NO.	B4-B			STAT	ION	24+32			OF	FSET 17	ft RT		ALIGNMENT -L-		0 HR.	4.0
COLI	AR ELI	EV . 64	4.0 ft		TOTA	L DE	PTH 36.	.3 ft		NO	RTHING	763,834		EASTING 1,646,456		24 HR.	4.0
DRILL	. RIGIHAI	MMER E	FF./DA	TE TRI94	35 CMI	E-55 93	12/08/2	2011			Į i	ORILL METHOD	H.S	. Augers	HAMM	ER TYPE	Automatic
DRIL	LER V	/. WHI	CHAR)	STAF	RT DA	TE 01/3	0/12		co	MP. DAT	€ 01/30/12		SURFACE WATER DEP	TH N	/A	
COR	E SIZE	NQ2					1 19.0 f										
ELEV	RUN ELEV	DEPTH		DRILL RATE	REC.	RQD	SAMP.	REC.	RQD	P			D	ESCRIPTION AND REMARKS	3		
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft)	(ft)	NO.	(ft) %	(ft) %	G	ELEV. (ft)						DEPTH (ft)
626.5 625	626.5	17.5	4.0	3:31/1.0	(3.3)	(2.3)					626.5			Begin Coring @ 17.5 ft CRYSTALLINE ROCK			17.5
023	-	ļ.		3:31/1.0 2:16/1.0 2:50/1.0	(3.3) 83%	(2.3) 58%					-			TO FRESHLY WEATHERED, LY FRACTURED, METAMORI			ID,
	622.5	21.5	5.0	3:44/1.0 3:38/1.0	(5.0)	(4.5)					<u> </u>						_
620	-	L	ŀ	3:04/1.0 1:52/1.0	100%	90%					L						
	617.5	26.5		1:54/1.0 1:42/1.0			RS-5	1			_						
615		-	5.0	2:06/1.0 2:11/1.0	(5.0) 100%	(5.0) 100%					-						
013		†		2:12/1.0 2:19/1.0		·					-						
	612.5	+ 31.5 -	5.0	2:08/1.0 2:18/1.0	(5.0)	(5.0)					‡						
610	-	‡		1:54/1.0 2:00/1.0	100%	100%											
	607.5	36.5		2:01/1.0 1:52/1.0							607.5						36.5
		‡									ļ.		Bori	ing Terminated at Elevation 60	7.7 ft		
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BORING B4-B, BOX 1 OF 2, 17.5 FEET TO 26.5 FEET



BORING B4-B, BOX 2 OF 2, 26.5 FEET TO 36.5 FEET





> PHONE: 919.871.0800 FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014 DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07TIB, TIP NO.: C-4901C

FEBRUARY 2012

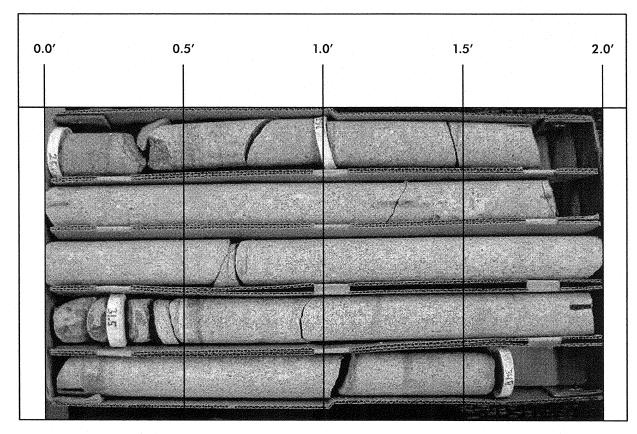
PROJECT NO.: G11019.00



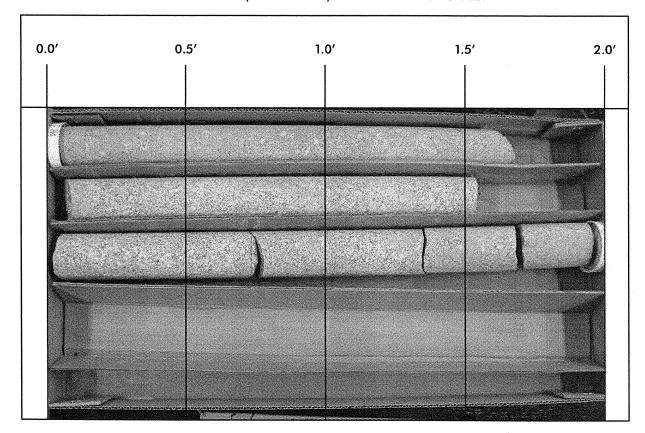
WBS	49010.1.ST	R07T1	В	TI	P C-4901C	COUNT	Y DAVIDS	ON			GEOLOGIST T. EVANS		
SITE	DESCRIPTIO	N BR	IDGE	ON SR	2005 BETWEEN SF	2123 AN	ND SR 2014					GROUNI	D WTR (ft
BOR	ING NO. B5-	A		S	TATION 25+03		OFFSET	17 ft LT			ALIGNMENT -L-	0 HR.	4.5
COL	LAR ELEV. 6	47.1 ft		TO	OTAL DEPTH 46.5 f		NORTHING	763,7	'84		EASTING 1,646,517	24 HR.	4.0
DRILL	RIG/HAMMER	EFF.JD#	TE TI	RI9435	CME-55 93% 12/08/2011			DRILL	METHO	D H	S. Augers HAMM	IER TYPE	Automatic
DRIL	LER R. TOO	ТНМА	.N	S	TART DATE 02/01/1	2	COMP. DA	TE 02/	02/12		SURFACE WATER DEPTH N	/A	
ELEV	DRIVE DEPTH	H BL	ow co	UNT	BLOWS	PER FOOT		SAMP.	V	L	SOIL AND ROCK DES	CRIPTION	
(ft)	(ft) (ft)	0.5ft	0.5ft	0.5ft	0 25	50 1	75 100	NO.	МО		ELEV. (ft)		DEPTH (f
		ŀ											
650			ŀ								: 		
	‡			ŀ					ŀ		- 647.1 GROUND SURF.	ACE	0
645	646.1 1.0	2	2	2			1		1		ALLUVIAL		·····
040	643.6 + 3.5				! • • • • • • • • • • • • • • • • • • •				W		BROWN, SOFT, SANDY (TRACE ORGAN	IICS	141
	641.1 6.0	2	2	2	 • •				W		- - 641.1		6.
640	l Ŧ	1	WOH	1	1		1		Sat.	0000	TAN, V. LOOSE, SLI. SILTY	FN. SAND ((A-3)
	638.6 + 8.5	1	1	2	i	: : : :	: : : :		Sat.	0000	<u>-</u>		
635	ļ Ţ	ŀ	Ì							0000	- -		
	633.6 - 13.5	1	2	2						000	634.1 GRAY, LOOSE, SLI. SILT	Y SAND AN	13.
	Ŧ	'	-	_	4::::	: : : :	: : : :		Sat.	000	GRAVEL (A-1-		_
630	528.6 ± 18.5		ĺ	ŀ				·		000	- -		
	D20.0 T 10.3	4	4	6	10				Sat.	0000	- - - 626.6		20
625	1										- RESIDUAL	CII TV CANI	20.
	623.6 + 23.5	10	32	38		**:			١.,		 BLUE-GRAY, V. DENSE, (A-2-4) W/ ROCK FRAGS, 		
	622.1 7 25.0	60/0					70		M		622.1 CRYSTALLINE R	OCK	25.
620	1 ±		-		l 	 					BLUE-GRAY, SLI. WEATH HARD TO HARD, CLOS		
	<u> </u>	İ			:::: ::::	: : : :					CLOSELY FRACTI		
615	<u> </u>			l							<u>-</u>		
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040	<u> </u>		1]							<u>-</u> -		
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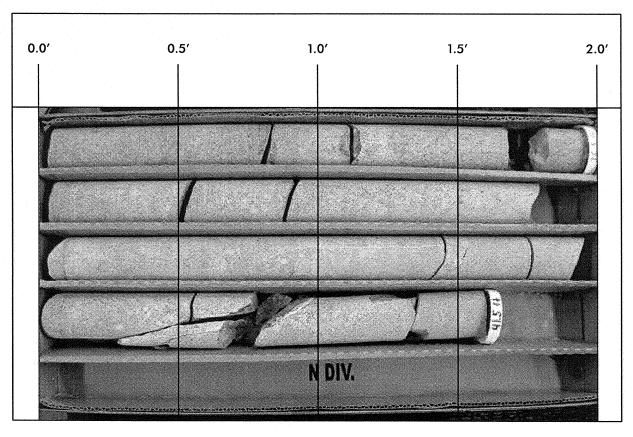
	/ W						J KE					
	49010.1.5				<u> </u>	C-490					DAVIDSON GEOLOGIST T. EVANS	
	DESCRIPT		BRII	DGE ON				SR 2	123 AI	_		
BOR	ING NO. B	85-A			STA	TION	25+03				FFSET 17 ft LT ALIGNMENT -L- 0 HR.	4.5
<u></u>	LAR ELEV.				<u> </u>		PTH 46			NC	ORTHING 763,784 EASTING 1,646,517 24 HR.	4.0
DRILL	RIGIHAMME	REF	F./DA	TE TRI94	35 CM	E-55 9	3% 12/08/2	2011			DRILL METHOD H.S. Augers HAMMER TYPE Autom	natic
DRIL	LER R.TO	ITOC	HMAN	1	STA	RT DA	TE 02/0	1/12		CC	OMP. DATE 02/02/12 SURFACE WATER DEPTH N/A	
COR	E SIZE NO	22		······································	1		N 21.5 f					
ELEV (ft)		PTH ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	JN RQD (ft) %	SAMP. NO.	STR REC. (ft)	ATA RQD (ft) %	L O G	DESCRIPTION AND REMARKS	PTH (ft)
622.1											Begin Coring @ 25.0 ft	
620	828:6 - 2 6	5.0 6.5	1.5 5.0	4:50/1.0 2:55/0.5 2:38/1.0	(0.9) 60% (4.9)	(0.3) 20% (4.7)					622.1 CRYSTALLINE ROCK BLUE-GRAY, SLI. WEATHERED, MOD. HARD TO HARD, CLOSE TO MOD. CLOSELY FRACTURED, METAMORPHOSED GRANITE	25.0
	Ŧ			2:38/1.0 2:40/1.0 2:29/1.0	98%	94%		ŀ				
615	615.6 3	1.5	E 0	2:10/1.0 2:16/1.0	(5.0)	(4.4)	RS-6	ŀ				
	Ŧ	1	5.0	2:37/1.0 2:24/1.0	(5.0) 100%	(4.4) 88%		ŀ				
	610.6 + 36	6.5		2:42/1.0 3:41/1.0 3:43/1.0				ŀ				
610	†		5.0	3:22/1.0 3:02/1.0	(5.0) 100%	(4.0) 80%						
-				3:20/1.0 2:43/1.0					ŀ		*	
605	605.6 + 4	1.5	5.0	2:42/1.0 3:14/1.0	(5.0)	(4.8)					<u></u>	
	‡	1		2:46/1.0 2:52/1.0	100%	96%						
	600.6 4	6.5		3:02/1.0 3:13/1.0							7- 600.6	46.5
	‡	l									Boring Terminated at Elevation 600.6 ft	
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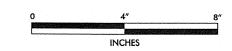
BORING B5-A, BOX 1 OF 3, 25.0 FEET TO 34.8 FEET



BORING B5-A, BOX 3 OF 3, 41.5 FEET TO 46.5 FEET



BORING B5-A, BOX 2 OF 3, 34.8 FEET TO 41.5 FEET





PHONE: 919.871.0800 FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014 DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07T1B, TIP NO.: C-4901C

FEBRUARY 2012

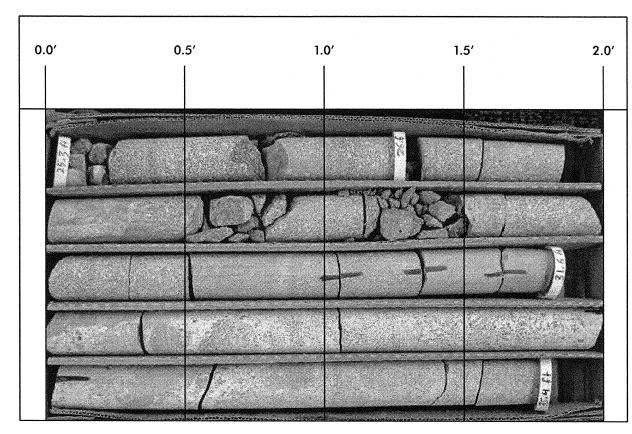
PROJECT NO.: G11019.00

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

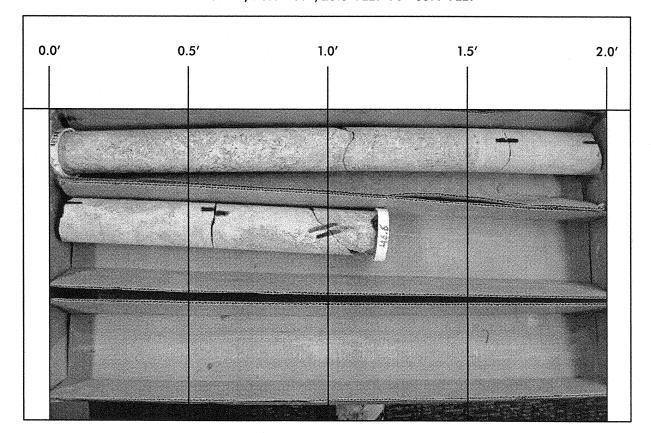
WBS	49010	.1.STR	07T1	В	TI	P C-4901C		COUNT	Y DAVIDS	ON			GEOLOGIST T. EVANS		
SITE	DESCRI	IPTION	BRI	DGE	ON SR	2005 BETV	VEEN SF	2123 A	ND SR 201	ļ				GROUND WT	R (f
3ORI	NG NO.	B5-B			S	FATION 25	+31		OFFSET	22 ft RT			ALIGNMENT -L-	0 HR.	3.
COL	AR ELE	V . 64	6.7 ft		TO	OTAL DEPTI	1 46.6 f	t	NORTHIN	G 763,7	743		EASTING 1,646,493	24 HR.	FIA
DRILL	RIGIHAN	MMER E	FF/DA	TE TI	RI9435	CME-55 93%	12/08/2011		<u> </u>	DRILL I	метно	D H.	S. Augers HAM	MERTYPE Autom	natio
DRIL	LER R.	. TOOT	НМА	N	S	TART DATE	02/02/1	2	COMP. DA	TE 02/	03/12		SURFACE WATER DEPTH	1/A	
LEV	DRIVE ELEV	DEPTH	BLC	ow co	UNT		BLOWS F	PER FOOT	r	SAMP.	V /	L	SOIL AND ROCK DES	COUDTION	
(ft)	(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 25	5 (50	75 100	NO.	MO		ELEV. (ft)		PTH
				ŀ											
650		-		ľ									<u>-</u>		
	-	ļ.											<u>-</u>		
	645.7 -	- 1.0			ļ			Τ			 		_ 646.7 GROUND SURI - ALLUVIAL		
645	-	Ė	5	5	5	10			.		M		 BROWN, LOOSE, SILTY S TRACE ORGANICS, CSE. 	SAND (A-2-4) W/	
	643.2	3.5	8	3	2	5			.		W		- 641.7	O TO D TO	
640	640.7 -	6.0	2	1	2	1					Sat.	0000	TAN, V. LOOSE, FN.	SAND (A-3)	
	638.2	8.5		ļ.,	<u> </u>				.			0000	<u>.</u> -		
	-	<u> </u>	1	1	2	₩3					Sat.	0000	<u>-</u> -		
635	_	<u> </u>						 		1		0000	633.7		
	633.2	13.5	4	3	3	6					Sat.	0000	- GRAY, LOOSE, SLI. SIL' - GRAVEL (A-'		
630	_	L										0000		·- <i>-</i>	
	628.2	18.5			<u> </u>							000	628.2		
	-	Ī	7	6	44			50			Sat.		GRAY, V. DENSE, SILTY: GRAVEL AND ROC	SAND (A-2-4) W/ K FRAGS	
625	_	-			1					-			<u>-</u>		
	623.2	T	60	40/0.2					100/0.7	•		170	623.2 WEATHERED I		
620	621.4	25.3	60/0	1					60/0	•			BLUE-GRAY, METAM GRANITE		
		Ŧ									Ì		CRYSTALLINE BLUE-GRAY AND WHITE		
	_	Ŧ											SLI. WEATHERED, MED. I V. CLOSE TO MOD.	HARD TO HARD,	
615	_	Ŧ						 					 FRACTURED, METAM 	IORPHOSED	
	_	Ŧ	-	ŀ					: : : : :		l		- GRANITE, W/ MEG/ - COMPOSITIONAL	BANDS	
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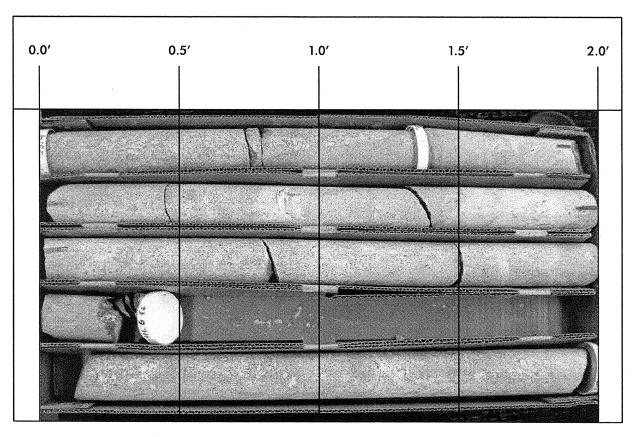
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WBS	49010	.1.STR	07T1E	3	TIP	C-490	1C	С	OUNT	Y C	AVIDS	NC	T	GEOLOG	SIST	T. EV	ANS		
SITE	DESCR	IPTION	BRII	DGE ON	SR 20	05 BE	TWEEN	SR 2	123 AI	ND S	R 2014							GROUI	ND WTR (ft)
BORI	NG NO.	B5-B			STAT	ION	25+31			OF	FSET	22 ft RT		ALIGNMI	ENT	-L-		0 HR.	3.6
COLL	AR ELE	V . 64	6.7 ft		TOTA	AL DEF	PTH 46.	6 ft		NO	RTHING	763,743		EASTING	1,6	546,493	3	24 HR.	FIAD
DRILL	RIGIHAI	MMER EI	FF./DAT	TE TRI94	35 CME	E-55 93	% 12/08/2	011				DRILL METHOD						MER TYPE	Automatic
DRIL	LER R	. TOOT	HMAN	ı	STAF	RT DA	ΓE 02/0	2/12		СО	MP. DA	TE 02/03/12		SURFAC	E WA	TER D	L		
	SIZE				r		1 21.3 f												
ELEV	RUN		RUN	DRILL	RU	JN	SAMP.	STF	RATA	L									
(ft)	ELEV (ft)	(ft)	(ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	NO.	REC:	RQD (ft)	O G	ELEV. (ft)	DE	SCRIPTIO	n and	REMA	RKS		DEPTH (fi
621.4	1.3			(76			/6	/8	-	LLLV.	15)		Begin Co	rina (a) 2E 2	£4		DEFINI
620	621.4 - 620.1	- <u>25.3</u> - 26.6	1.3	2:11/1.0	(1.1)	(0.9)				1	621.4	5115 65 111		CRYST	ALLIN	E ROC	<		25.:
	-	-	5.0	0:57/0.3 3:02/1.0	(4.3)	(2.1)					-	BLUE-GRAY ANI TO HAF		TE, MOD. : CLOSE TO					HARD
	-	-		3:02/1.0 2:55/1.0 3:21/1.0 3:09/1.0 3:51/1.0	86%	42%					-	METAMORPH	IOSED		W/M BAND		YSTIC COI	MPOSITIO	NAL
615	615.1	31.6	5.0	3:51/1.0 4:12/1.0	(5.0)	(4.9)					_					•			
	-		5.0	3:41/1.0	100%	98%													
242	040.4			3:09/1.0 3:32/1.0															
610	610.1	36.6	5.0	3:25/1.0 3:19/1.0	(5.0)	(5.0)													
	-	-		3:36/1.0 4:21/1.0	100%	100%				1									
605	605.1	41.6		3:20/1.0 3:11/1.0						1	F								
	-		5.0	3:55/1.0	(5.0) 100%	(5.0)				-	-								
	-	-		3:40/1.0 2:36/1.0 4:00/1.0	1.00/0	10070													
	600.1	46.6		3:00/1.0					ļ	1	600.1	·····	Daria	- T	4 - L - A		- 600 4 5		46.
	-										_		Вопп	g Termina	ied ai	⊨ievalio	n 600.1 10		
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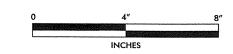
BORING , BOX OF , 25.3 FEET TO 35.4 FEET



BORING B5-B, BOX 3 OF 3, 43.4 FEET TO 46.6 FEET



BORING B5-B, BOX 2 OF 3, 35.4 FEET TO 43.4 FEET





PHONE: 919.871.0800 FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014 DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07T1B, TIP NO.: C-4901C

FEBRUARY 2012

PROJECT NO.: G11019.00

NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 49010.1.STR07T1B		TY DAVIDSON	GEOLOGIST T. EVANS	WBS 49010.1.STR07T1B	TIP C-4901C COUNTY DAVIDSO	
SITE DESCRIPTION BRIDGE ON			GROUND WTR (ft)		I SR 2005 BETWEEN SR 2123 AND SR 2014	·
BORING NO. EB2-A	STATION 25+84	OFFSET 30 ft LT	ALIGNMENT -L- 0 HR. 5.0	BORING NO. EB2-B	STATION 26+28 OFFSET 1	17 ft RT
COLLAR ELEV. 650.6 ft	TOTAL DEPTH 26.3 ft	NORTHING 763,715	EASTING 1,646,563 24 HR. 4.9	COLLAR ELEV. 658.1 ft	TOTAL DEPTH 33.4 ft NORTHING	
DRILL RIG/HAMMER EFF./DATE TRI9	435 CME-55 93% 12/08/2011	DRILL METHOD H.S	. Augers HAMMER TYPE Automatic	DRILL RIG/HAMMER EFF./DATE TRI9	435 CME-55 93% 12/08/2011	DRILL METHOD H.S. Augers HAMMER TYPE Automati
DRILLER W. WHICHARD	START DATE 01/27/12	COMP. DATE 01/27/12	SURFACE WATER DEPTH N/A	DRILLER R. TOOTHMAN		TE 02/03/12 SURFACE WATER DEPTH N/A
ELEV (ft) DEPTH (ft) DEPTH (ft) D.5ft O.5ft		75 100 100	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)	ELEV CHI DEPTH BLOW COUNTY (ft) (ft) 0.5ft 0.5ft 0		SAMP. C SOIL AND ROCK DESCRIPTION MOI G
655				660		
			650.6 GROUND SURFACE 0,0	657.1 1.0 5 6	6	658.1 GROUND SURFACE ROADWAY EMBANKMENT BROWN AND TAN, MED. STIFF TO STIFF,
650 649.6 1.0 9 11	23		ROADWAY EMBANKMENT	655 654.6 7 3.5	4	SANDY SILT(A-4) W/ TRACE ORGANICS,
647.1		· · · · · 33-4 6" C	GRAY BROWN AND TAN, HARD, FN. SANDY SILT (A-4) W/ GRAVEL	652.1 + 6.0		SS-7 17% GRAVEL
645 644 6 6 0 19 8	10	.	646.1 4.5 644.6 ALLUVIAL 6.0	650 649.6 8.5 6 5	5	
1 2 2	2	· · · · · · Sat.	DK GRAY, MED. DENSE, SILTY FN. SAND (A-2-4) W/ TRACE ORGANICS	049.8	5	M M E
642.1 8.5 1 2	2 4	.	DK GRAY, SOFT, FN. SANDY SILT (A-4)	645		645.1
+				644.6 1 13.5	2 4	ALLUVIAL
637.1 13.5 2 4	5 :\:\:\:\:\:\:\:\:\:\:\:\:\:\:\:\:\:\:	· · · · ·	637.6 13.0 DK GRAY AND BROWN, LOOSE, SILTY			STIFF, FN. SANDY SILT (A-4) W/ TRACE
635	9		FN. SAND (A-2-4)	640 639.6 - 18.5		L SIGNWOO
632.1 18.5			632.6 18.0	+ WOH WOH	72	SS-9 21%
630 WOH 2	3		GRAY, LOOSE, SLI. SILTY SAND (A-2-4) W/ GRAVEL	635	$ \dot{i} $	-
\exists	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			2	SS-10 27%
	4					F
625 624.3 26.3		60/0	625.1 25.5 624.3 WEATHERED ROCK 26.3	630 629.6 28.5 3 3	3 4	630.1 GRAY, LOOSE, SILTY SAND (A-2-4) W/
		60/0 [NO SAMPLE RECOVERY Boring Terminated by Auger Refusal at		9 6	GRAVEL GRAVEL
		[-	Elevation 624.3 ft	625 624.7 33.4	60/0	624.7
		[024.7 = 33.4 60/0	60/0	Boring Terminated by Auger Refusal at Elevation 624.7 ft
						Lievation 024.7 it
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	49010).1.STR	0/11	3	TII	P C-4901C	COUNT	Y DAVIDS	NC			GEOLOGIST T. EVANS		
				DGE (2005 BETWEEN S	R 2123 A						GROUND W	TR (ft)
BORI	NG NO.	EB2-	<u>C</u>		ST	FATION 25+75		OFFSET	15 ft RT			ALIGNMENT -L-	0 HR.	8.7
COLL	AR ELE	EV. 64	9.9 ft		TC	OTAL DEPTH 30.2	ft	NORTHING	763,7	05		EASTING 1,646,518	24 HR.	8.0
DRILL	RIG/HAI	MMER E	FF./DA	TE TF	RI9435 (CME-55 93% 12/08/20	11	٠,	DRILL N	METHO	D H.	S. Augers HA	MMER TYPE Auto	matic
DRIL	LER W	/. WHI	CHAR	<u> </u>	ST	TART DATE 01/27	/12	COMP. DA	TE 01/2	27/12		SURFACE WATER DEPTH	N/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLC 0.5ft	0.5ft	UNT 0.5ft	0 25	50 50	75 100	SAMP. NO.	MOI	L O G	SOIL AND ROCK D		EPTH (f
650	648.9	1.0	2	3	1	4				М		649.9 GROUND SU ROADWAY EMB GRAY BROWN AND THE	ANKMENT N, V. LOOSE TO	0.
645	643.9	6.0	2	6	21	27				М		. MED. DENSE, SILTY S - GRAVE - - 643.4	L	6.
640	641.4	8.5	1	2	2	4			SS-11	22%		DK GRAY, STIFF TO S SILT (A-4) W/ TRACE OF	OFT, FN. SANDY	
35	636.4	13.5	3	3	4				SS-12	23%		. 636.9 . GRAY, MED. STIFF, FN.	SANDY SILT (A-4)	13.
30	631.4	18.5	3	3	4				:	Sat.	000	- 631.4 - GRAY, LOOSE, SLI. S	II TY SAND AND	18
	626.4	23.5				. \				J. Jan.	00000	- GRAVEL (A-1-b) W/ TF - - 626.4	ACE ORGANICS	23
25	- - -	<u> </u>	6	7	8	15				Sat.		GRAY, MED. DENSE, SI W/ GRAV	LTY SAND (A-2-4) /EL	
520	621.4 619.7 -	28.5	14	25	41			6-		w		620.9 _619.7 RESIDU	Λ1	29 30
			60/0									DK GRAY AND WHITE, SAND (A-2-4) W/ R SAPROLI Boring Terminated by Elevation 6	OCK FRAGS, TIC Auger Refusal at	

FALCON

1210 TRINITY ROAD, SUITE 110, RALEIGH, NORTH CAROLINA 27607

AASHTO SOIL CLASSIFICATION AND GRADATION SHEET

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014

WBS NO.: 49010.1.STR07T1B, TIP NO.: C-4901C

DAVIDSON COUNTY, NORTH CAROLINA

FALCON ENGINEERING, INC. PROJECT NO: G11019.00

BOR	ING	SAMPLE	то	TAL SAM	PLE	Atterl	berg Limit	t Test	Natural Moisture
AASI	HTO Classific	ation	PEI	RCENT PASS	ING		Results		Content
STATION	OFFSET (FEET)	DEPTH (FEET)	#10	#40	#200	LL	PL	PI	%
EB1	-A	SS-1							,
	A-7-6		99	85	63	49	24	25	24.5
20+68	17 ft LT	1.0 - 2.5					-		
EB1	-В	SS-2						ł	
	A-4		97	80	53	22	16	6	13.8
20+77	17 ft RT	1.0 - 2.5							
EB1	-B	SS-3							
	A-4		99	88	58	41	NP	NP	24.6
20+77	17 ft RT	13.5 - 15.0						*	
EB2	2-A	SS-4							
	A-4		91	68	36	20	NP	NP	8.3
25+84	30 ft LT	1.0 - 2.0							
EB2	2-A	SS- 5							
	A-4		100	96	44	19	NP	NP	21.5
25+84	30 ft LT	8.5 - 10.0							
EB2	2-A	SS- 6							
	A-2-4		100	97	33	20	NP	NP	22.5
25+84	30 ft LT	13.5 - 15.0							
EB2	2-B	SS-7	:						
	A-4		95	78	40	25	NP	NP	16.9
26+28	17 ft RT	3.5 - 5.0							
EB2		SS-8							
	A-4		100	100	92	32	23	9	30.1
26+28	17 ft RT	13.5 - 15.0							
EB2	2-B	SS-9							
	A-4		100	98	48	20	NP	NP	20.5
26+28	17 ft RT	18.5 - 20.0							
EB2		SS-10						,	
	A-4		100	99	87	28	21	7	27.2
26+28	17 ft RT	23.5 - 25.0		<u> </u>					
EB:		SS-11	455				l		
00.75	A-4	1 65 46 5	100	99	50	16	NP	NP	21.9
25+75	15 ft RT	8.5 - 10.0							
EB:		SS-12	400	400					00.0
05.75	A-4	1 40 5 45 5	100	100	41	20	NP	NP	23.2
25+75	15 ft RT	13.5 - 15.0	l	1	l	l	ŀ	l	

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

SHEET 39

PROJECT ID NO.: C-4901C

F.A. NO.:

COUNTY: DAVIDSON

BRIDGE SR 2005 BETWEEN SR 2123 AND SR 2014

Sample #	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)	Splitting Tensile Strength (PSI)
RS-1	B1-A	37.0 - 37.8	Metamorhphosed Granitic Rock	(CZg)		4.20	1.98	177.8	9,928	1,226,730	
RS-2	B2-B	11.6 - 12.2	Metamorhphosed Granitic Rock	(CZg)		4.29	1.97	167.0	14,189	2,647,752	-
RS-3	B3-B	17.5 - 18.1	Metamorhphosed Granitic Rock	(CZg)		3.97	1.99	168.8	4,883	1,140,524	
RS-4	B4-A	25.4 - 26.4	Metamorhphosed Granitic Rock	(CZg)		4.39	1.98	179.7	9,899	1,207,381	-
RS-5	B4-B	24.8 - 25.5	Metamorhphosed Granitic Rock	(CZg)		4.38	1.98	178.6	25,845	3,899,053	-
RS-6	B5-A	29.5 - 30.2	Metamorhphosed Granitic Rock	(CZg)		4.21	1.98	175.0	19,697	3,151,530	-

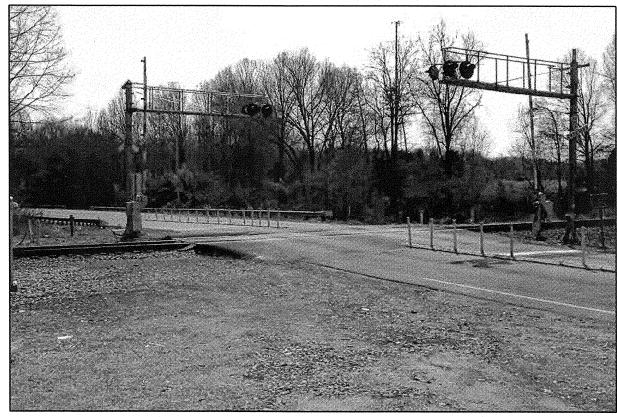


PHOTO 1: EXISTING AT-GRADE CROSSING, LOOKING SOUTHWEST FROM BETWEEN END BENT 1 AND BENT 1



PHOTO 2: LOOKING DOWNSTATION ACROSS HAMBY CREEK FROM NEAR BENT 3.



PHONE: 919.871.0800 FAX: 919.871.0803

SITE PHOTOGRAPHS

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014 DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07T1B, TIP NO.: C-4901C

FEBRUARY 2012

PROJECT NO.: G11019.00

SHEET 1 OF 2



PHOTO 3: LOOKING NORTHEAST (LEFT) FROM NEAR BENT 4. EXISTING CONCRETE ARCH RAILROAD BRIDGE VISIBLE IN BACKGROUND



LOOKING WEST (RIGHT) FROM NEAR BENT 4. EXISTING PREVIOUS ROADWAY EMBANKMENT VISIBLE TO LEFT. EXISTING BRIDGE OVER HAMBY CREEK VISIBLE TO RIGHT IN BACKGROUND.



PHONE: 919.871.0800 FAX: 919.871.0803

SITE PHOTOGRAPHS

BRIDGE ON SR 2005 BETWEEN SR 2123 AND SR 2014 DAVIDSON COUNTY, NORTH CAROLINA WBS NO.: 49010.1.STR07T1B, TIP NO.: C-4901C

FEBRUARY 2012

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