

REFERENCE: B-5716

PROJECT: 45672

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ROCKINGHAM
PROJECT DESCRIPTION BRIDGE NO. 140 OVER DAN RIVER
ON SR 1138 (LINDSEY BRIDGE ROAD)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5716	1	

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT, AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

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

- NOTES:
- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

TRIGON

GOODNIGHT, D.J.

LANE, R.W.

INVESTIGATED BY FALCON ENG.

DRAWN BY HUNSBERGER, W.S.

CHECKED BY CROCKETT, S. C.

SUBMITTED BY FALCON ENG.

DATE MARCH 2024



DocuSigned by:

W. Scott Hunsberger 4/2/2024

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SIGNATURE

DATE

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

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS									
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:										<u>ALLUVIUM (ALLUV.)</u> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA. <u>ARENACEOUS</u> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <u>ARGILLACEOUS</u> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. <u>ARTESIAN</u> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. <u>CALCAREOUS (CALC.)</u> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <u>COLLUVIUM</u> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <u>CORE RECOVERY (REC.)</u> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <u>FAULT</u> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <u>FISSILE</u> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <u>FLOAT</u> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. <u>FLOOD PLAIN (FP)</u> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <u>FORMATION (FM.)</u> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <u>JOINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <u>LEDGE</u> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <u>LENS</u> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <u>MOTTLED (MOT.)</u> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <u>PERCHED WATER</u> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <u>RESIDUAL (RES.) SOIL</u> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <u>ROCK QUALITY DESIGNATION (RQD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <u>SAPROLITE (SAP.)</u> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. <u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <u>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</u> - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. <u>STRATA CORE RECOVERY (SREC.)</u> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <u>STRATA ROCK QUALITY DESIGNATION (SROQ)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. <u>TOPSOIL (TS.)</u> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CRYSTALLINE ROCK (CR)									
GENERAL CLASS.										THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.										NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.										FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.									
SILT-CLAY MATERIALS (< 35% PASSING #200)										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.										COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.									
GROUP CLASS.										SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE										VERY SLIGHT (V SL.)										SLIGHT (SL.)									
SYMBOL										PERCENTAGE OF MATERIAL										MODERATE (MOD.)										MODERATELY SEVERE (MOD. SEV.)									
%										ORGANIC MATERIAL TRACE OF ORGANIC MATTER LITTLE ORGANIC MATTER MODERATELY ORGANIC HIGHLY ORGANIC										SEVERE (SEV.)										VERY SEVERE (V SEV.)									
MATERIAL PASSING #40										GROUND WATER										COMPLETE										VERY HARD									
LL										WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING										ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>										ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i>									
PI										STATIC WATER LEVEL AFTER 24 HOURS										ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i>										ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.									
GROUP INDEX										PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA										ROCK QUALITY DESIGNATION (RQD)										ROCK QUALITY DESIGNATION (RQD)									
USUAL TYPES OF MAJOR MATERIALS										SPRING OR SEEP										ROCK HARDNESS										VERY HARD									
GEN. RATING AS SUBGRADE										MISCELLANEOUS SYMBOLS										HARD										MODERATELY HARD									
EXCELLENT TO GOOD										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION										MODERATELY HARD										MEDIUM HARD									
FAIR TO POOR										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT										SOFT										VERY SOFT									
FAIR TO POOR										INFERRED SOIL BOUNDARY										MEDIUM HARD										WIDE									
POOR										INFERRED ROCK LINE										MODERATELY CLOSE										CLOSE									
UNSUITABLE										ALLUVIAL SOIL BOUNDARY										VERY CLOSE										VERY CLOSE									
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30										RECOMMENDATION SYMBOLS										BEDDING										BENCH MARK: BM-2 -L- 21+73.58, 151.71' LT									
CONSISTENCY OR DENSENESS										UNDERCUT										TERM										THICKNESS									
PRIMARY SOIL TYPE										UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE										VERY THICKLY BEDDED										4 FEET									
COMPACTNESS OR CONSISTENCY										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										THICKLY BEDDED										1.5 - 4 FEET									
RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										THINLY BEDDED										0.16 - 1.5 FEET									
RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										VERY THINLY BEDDED																			

SOIL MOISTURE - CORRELATION OF TERMS														
SOIL MOISTURE SCALE (ATTERBERG LIMITS)			FIELD MOISTURE DESCRIPTION			GUIDE FOR FIELD MOISTURE DESCRIPTION								
LL RANGE (PI) PL	LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE											
		- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE											
	PLASTIC LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE											
		- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE											
PLASTICITY														
PLASTICITY INDEX (PI)					DRY STRENGTH									
NON PLASTIC					0-5					VERY LOW				
SLIGHTLY PLASTIC					6-15					SLIGHT				
MODERATELY PLASTIC					16-25					MEDIUM				
HIGHLY PLASTIC					26 OR MORE					HIGH				
COLOR														
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.														

EQUIPMENT USED ON SUBJECT PROJECT		
DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:
☐ CME-45C	☒ CLAY BITS	☒ AUTOMATIC ☐ MANUAL
☒ CME-55	☐ 6" CONTINUOUS FLIGHT AUGER	CORE SIZE:
☐ CME-550	☒ 8" HOLLOW AUGERS	☐ -8 ☐ -H
☐ VANE SHEAR TEST	☐ HARD FACED FINGER BITS	☒ -N 02
☐ PORTABLE HOIST	☐ TUNG.-CARBIDE INSERTS	HAND TOOLS:
☐ B-57 MOBILE	☒ CASING ☐ W/ ADVANCER	☐ POST HOLE DIGGER
☐	☐ TRICONE ☐ STEEL TEETH	☐ HAND AUGER
☐	☐ TRICONE ☐ TUNG.-CARB.	☐ SOUNDING ROD
☐	☒ CORE BIT	☐ VANE SHEAR TEST
☐	☐	☐

FRACTURE SPACING		BEDDING	
TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FOOT	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET
		THINLY LAMINATED	< 0.008 FEET
INDURATION			
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.			
FRIABLE		RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY INDURATED		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
INDURATED		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
EXTREMELY INDURATED		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	

DATE: 1-XX-17

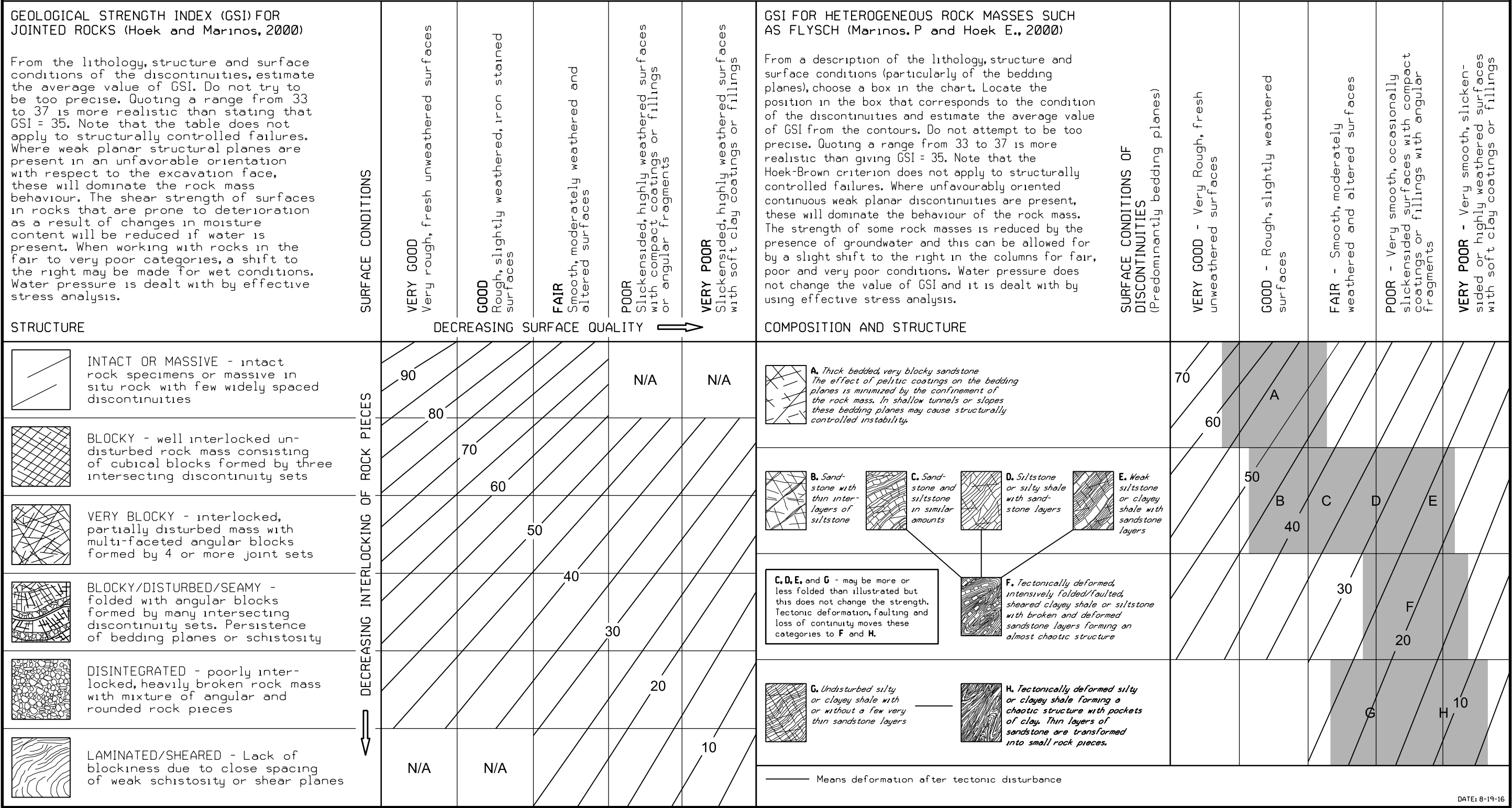
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

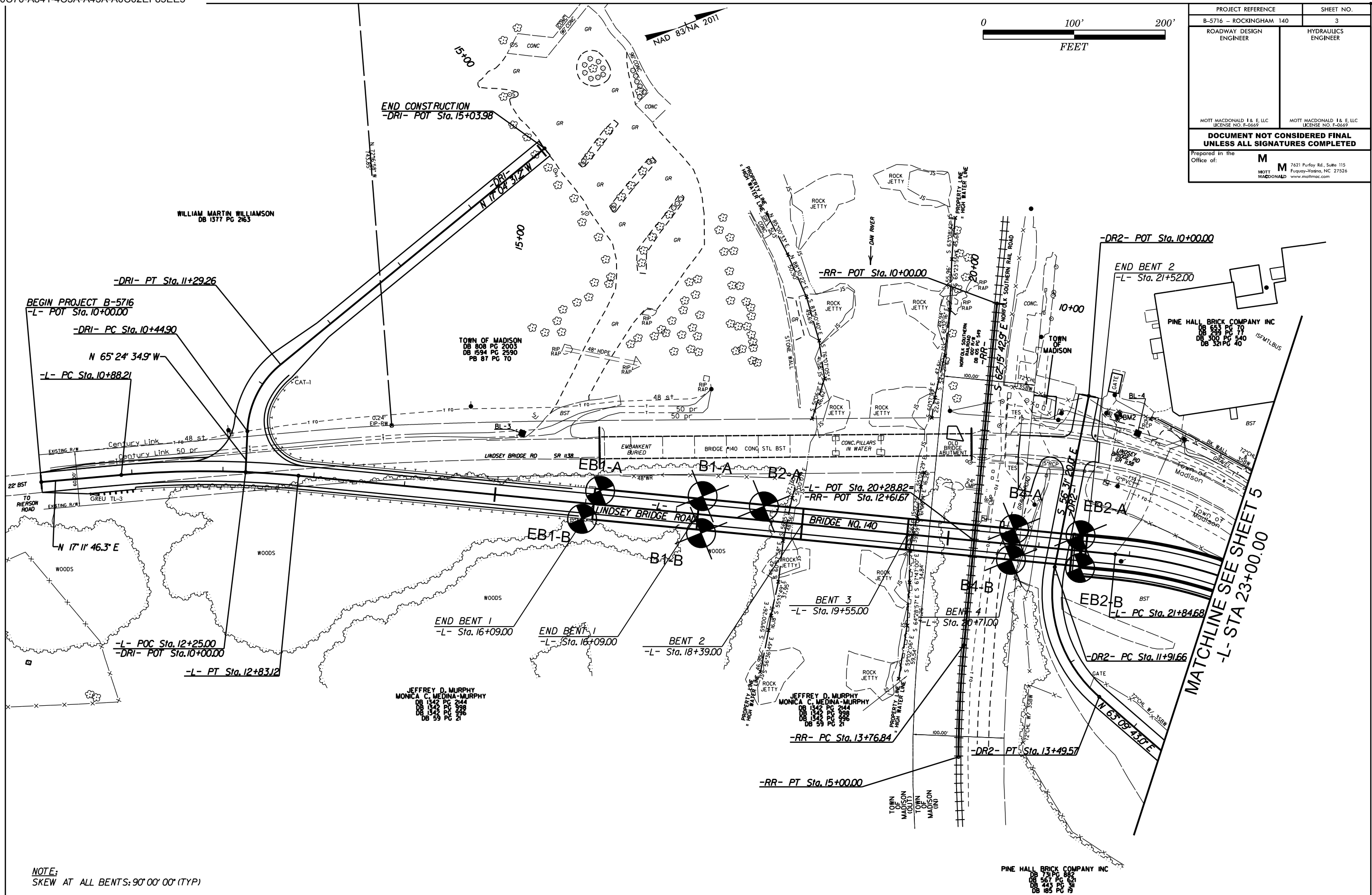
SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)





B ROADWAY EMBANKMENT: TAN AND RED, MOIST, LOOSE, SILTY SAND (A-2-4)
C ARTIFICIAL FILL: BROWN, MOIST, STIFF, SANDY SILT (A-6)
D ARTIFICIAL FILL: BROWN, MOIST, LOOSE, SILTY SAND (A-2-4)
E ALLUVIAL: ORANGE BROWN AND GRAY, MOIST TO SAT., SOFT TO MED. STIFF, SANDY CLAY AND SANDY AND CLAYEY SILT (A-4, A-5, A-6)
F ALLUVIAL: GRAY BROWN AND ORANGE, WET TO SAT., V. LOOSE TO MED. DENSE, SANDY SILT (A-2-4)
G RESIDUAL: TAN RED ORANGE BROWN AND GRAY, DRY TO MOIST, SOFT TO HARD, SANDY SILT AND SANDY AND SILTY CLAY (A-4, A-6, A-7)
H RESIDUAL: GRAY TAN WHITE AND ORANGE, MOIST, MED. TO V. DENSE, SILTY CLAYEY AND GRAVELLY SAND (A-1-a; A-2-4, A-2-6)
I WEATHERED ROCK: TAN GRAY AND BROWN, TRIASSIC SANDSTONE AND MUDSTONE
J NON-CRYSTALLINE ROCK: TAN GRAY AND BROWN, FRESH TO SLI. WEATHERING, V. HARD TO HARD, MOD. CLOSE TO CLOSE FRACTURE SPACING, MOD. INDURATED TO INDURATED, THINLY TO THICKLY BEDDED, TRIASSIC SANDSTONE AND MUDSTONE

BEGIN PROJECT STA. 10+00.00
 BEGIN GRADE STA. 10+50.00 EL = 576.29'
 MILL TO EXIST
 -DR1=
 PROPOSED GROUND LINE
 EXISTING GROUND LINE
 EB1-A 16+15 15' LT
 RS-01 B-A 17+27 20' LT
 RS-03, RS-04 B2-A 17+96 15' LT
 DAN RIVER N.W.S. = 543.3
 EXISTING RR TRACK CL
 FUTURE RR TRACK CL
 CT
 RS-05 B4-A 20+71 17' LT
 RS-08 EB2-A 21+45 17' LT
 REC=96% ROD=40% GSI=40-45
 REC=93% ROD=61% GSI=45-50
 CT FIAD
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ALONG THE CENTERLINE OF PROFILE.

01020

FEET

VE = 0

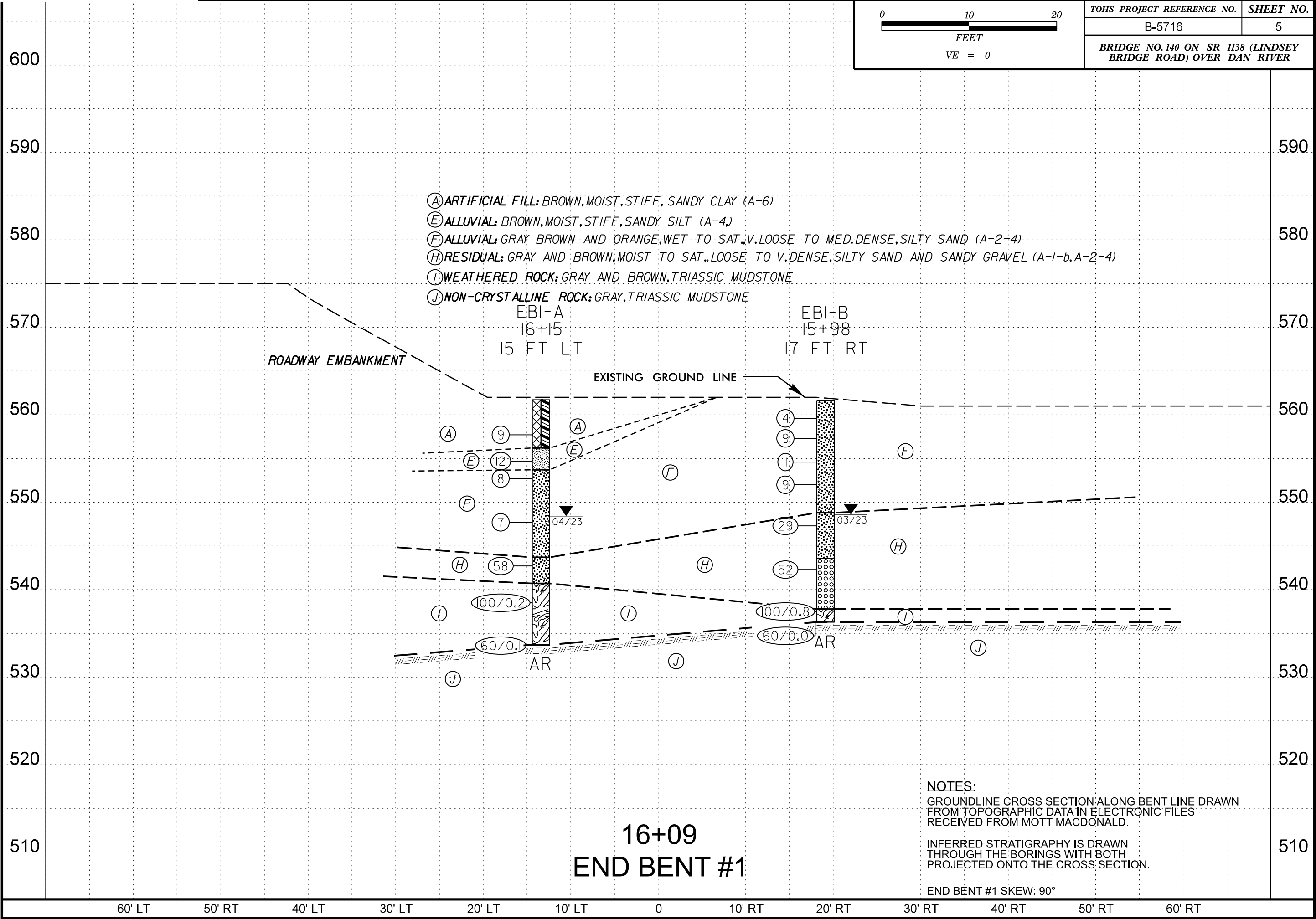
TOHS PROJECT REFERENCE NO.

B-5716

BRIDGE NO. 140 ON SR 1138 (LINDSEY
BRIDGE ROAD) OVER DAN RIVER

SHEET NO.

5



01020

FEET

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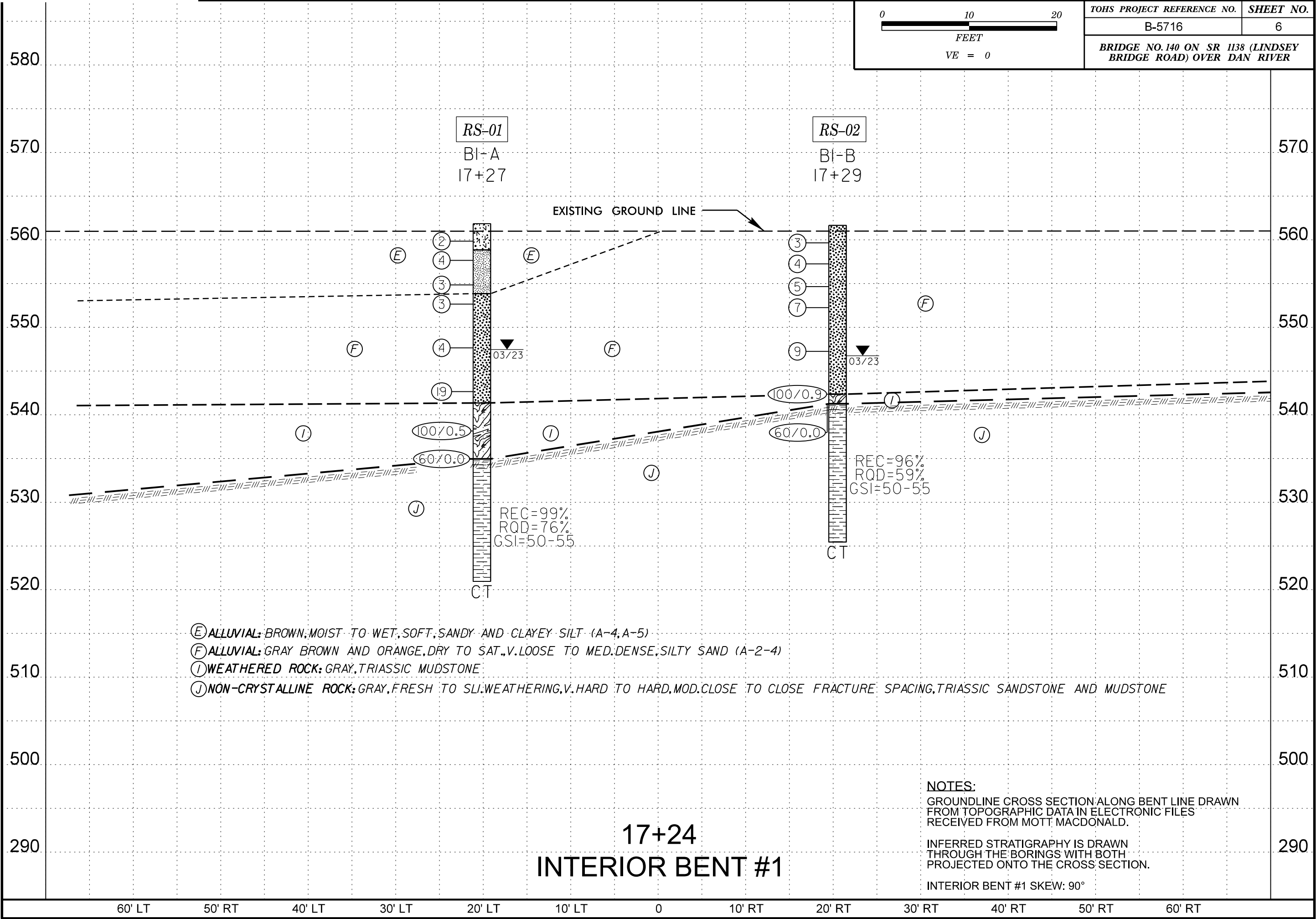
TOHS PROJECT REFERENCE NO.

B-5716

BRIDGE NO. 140 ON SR 1138 (LINDSEY BRIDGE ROAD) OVER DAN RIVER

SHEET NO.

6



01020

FEET

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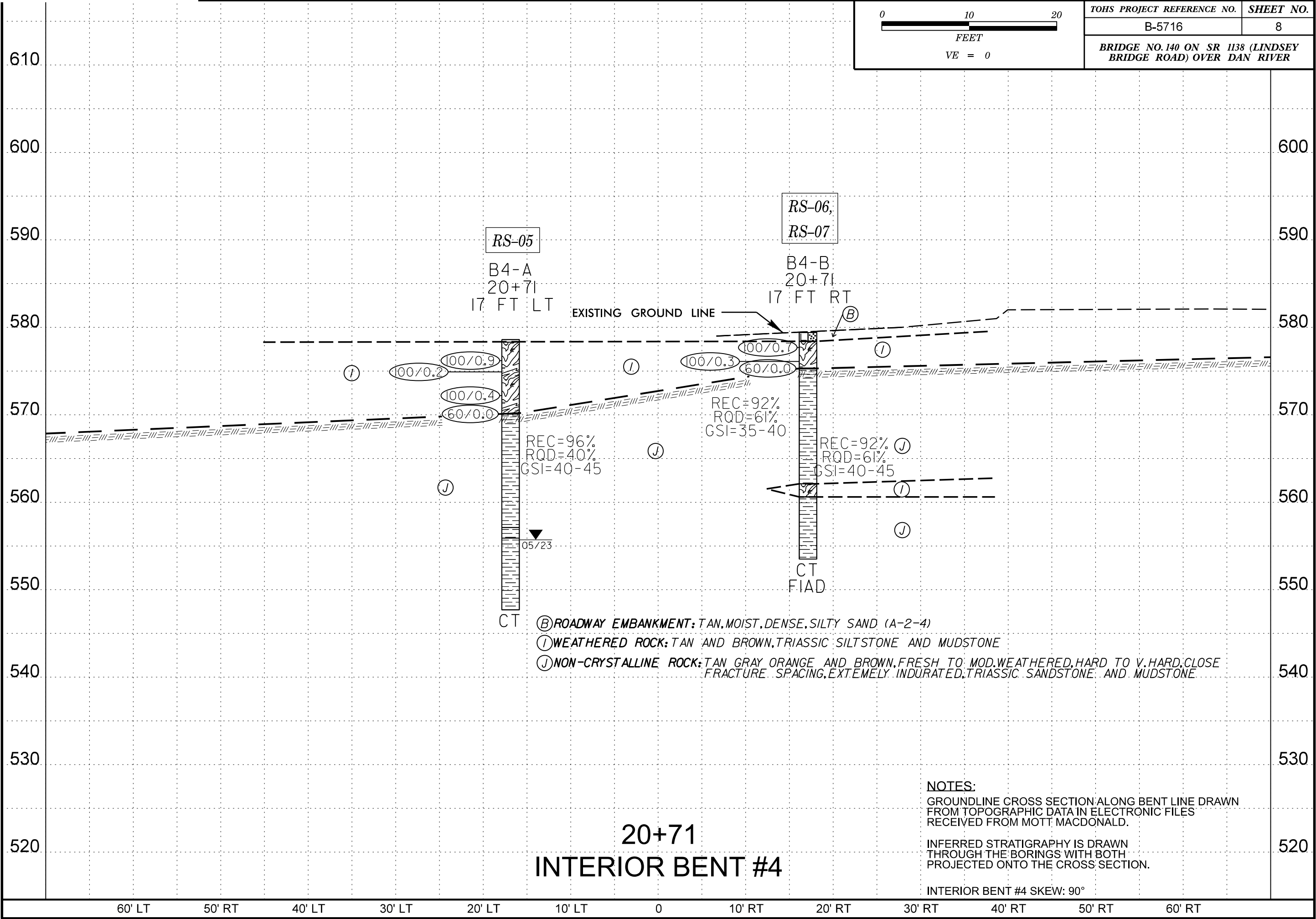
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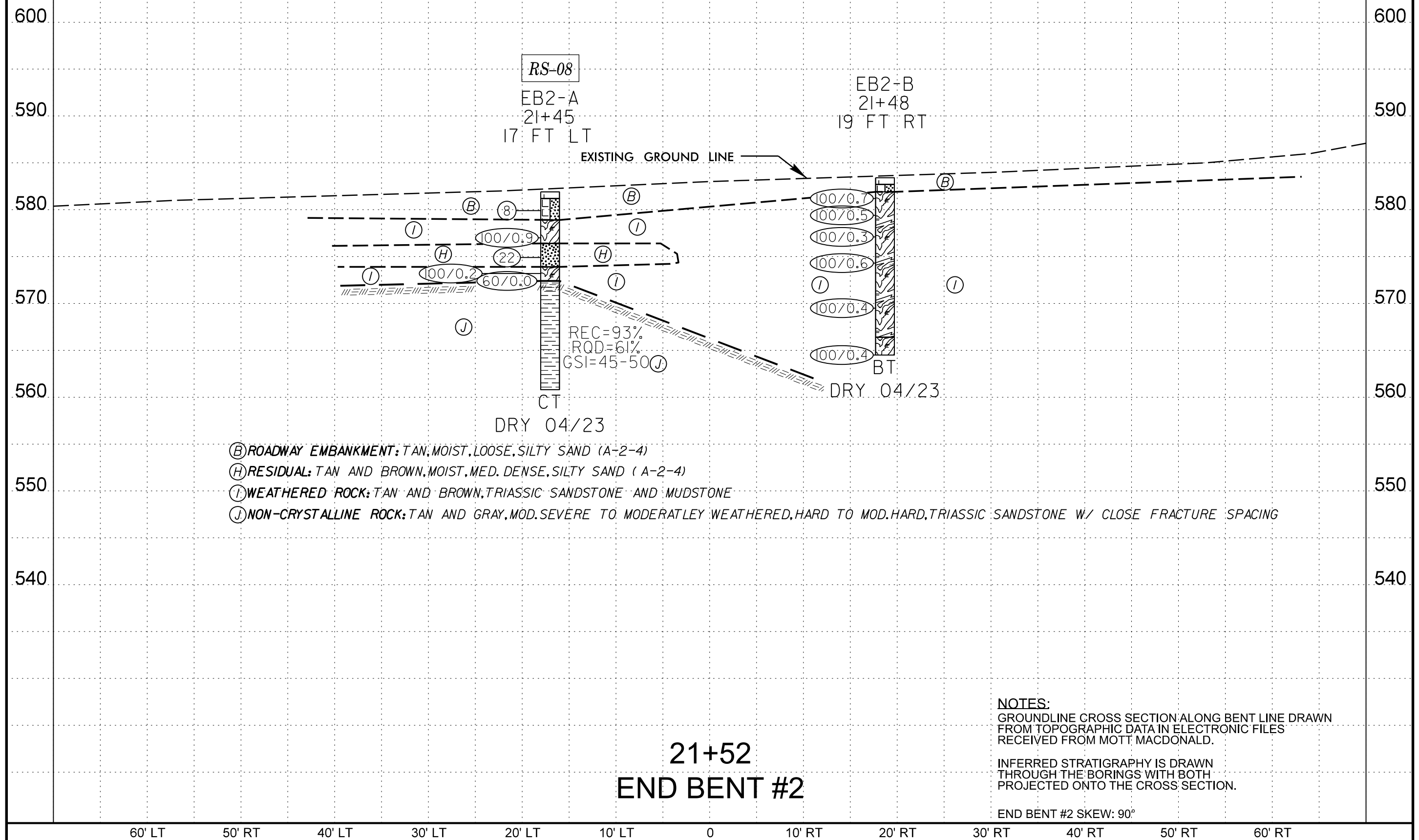
B-5716

BRIDGE NO. 140 ON SR 1138 (LINDSEY BRIDGE ROAD) OVER DAN RIVER

SHEET NO.

8

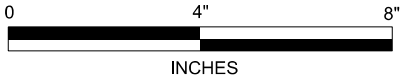
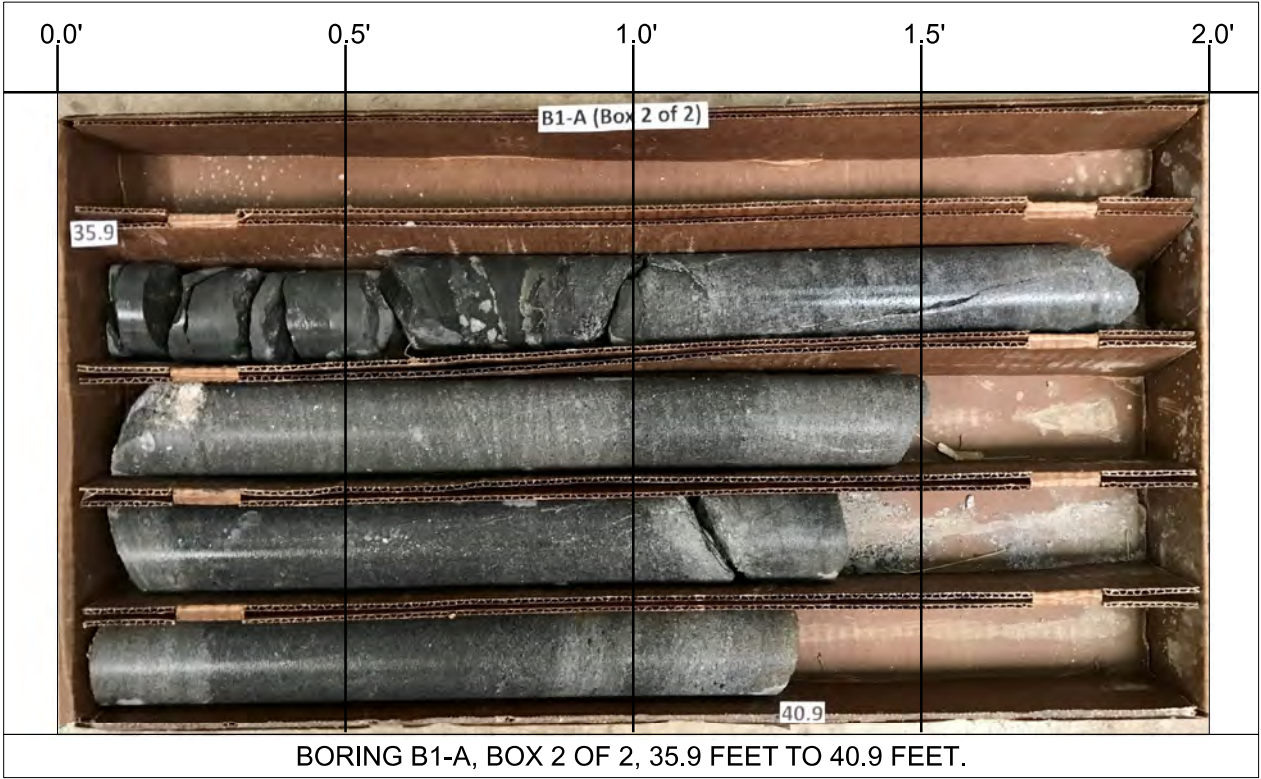




WBS 45672.1.1		TIP B-5716		COUNTY ROCKINGHAM		GEOLOGIST Lane, R.W.							
SITE DESCRIPTION BRIDGE NO. 140 OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD)							GROUND WTR (ft)						
BORING NO. EB1-A		STATION 16+15		OFFSET 15 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 561.7 ft		TOTAL DEPTH 28.1 ft		NORTHING 956,509		EASTING 1,707,780							
						0 HR. 1.9							
						24 HR. 13.3							
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 83% 05/09/2022				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic							
DRILLER Toothman, R.		START DATE 03/30/23		COMP. DATE 03/31/23		SURFACE WATER DEPTH N/A							
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT		SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			
565													
560	558.7	3.0	5	4	5							561.7	0.3' TOPSOIL
													ARTIFICIAL FILL
													BROWN, STIFF, SANDY CLAY (A-6)
555	555.7	6.0	4	5	7							556.2	UNABLE TO PERFORM 1.0' SPT DUE TO BRICKS AND DEBRIS IN TOP 2.5'
													ALLUVIAL
	553.7	8.0	4	3	5							553.7	BROWN, STIFF, SANDY SILT (A-4)
													BROWN, LOOSE, SILTY SAND (A-2-4)
550													GRAVEL LAYER 17.0' TO 18.0'
	548.7	13.0	2	3	4								
545													
	543.7	18.0	29	20	38							543.7	TRIASSIC RESIDUAL
													GRAY, V. DENSE, SILTY SAND (A-2-4)
540												540.7	TRACE ROCK FRAGS.
	538.7	23.0											WEATHERED ROCK
													GRAY, TRIASSIC MUDSTONE
535	533.7	28.0										533.7	NON-CRYSTALLINE ROCK
												533.6	GRAY, TRIASSIC MUDSTONE
													Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 533.6 ft IN NCR: MUDSTONE

NC DOT BORE SINGLE B5716.GPJ NC_DOT.GDT 4/2/24

NCDOT CORE SINGLE B5716.GPJ NC DOT.GDT 4/2/24



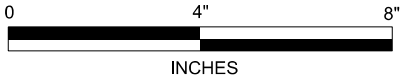
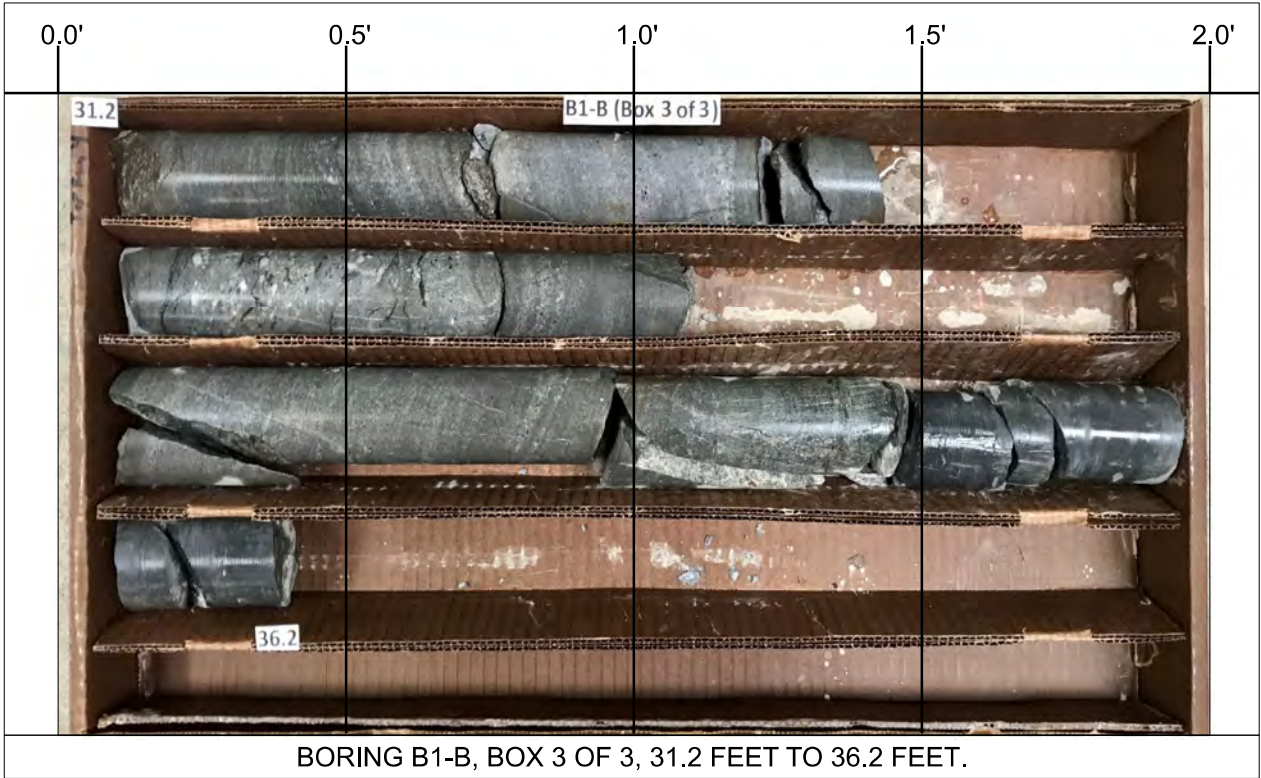
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513
PHONE: 919.871.0800

ROCK CORE PHOTOGRAPHS

BRIDGE NO. 140 OVER DAN RIVER ON
SR 1138 (LINDSEY BRIDGE ROAD)
ROCKINGHAM COUNTY, NORTH CAROLINA
TIP: B-5716 | WBS: 45672.1.1
FALCON PROJECT NO. G20014.00

B-5716	COUNTY ROCKINGHAM	GEOLOGIST Lane, R.W.
OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD)		GROUND WTR (ft)
ATION 17+29	OFFSET 21 ft RT	ALIGNMENT -L-
AL DEPTH 36.2 ft	NORTHING 956,594	EASTING 1,707,865
E-55 83% 05/09/2022	DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
ART DATE 03/29/23	COMP. DATE 03/29/23	SURFACE WATER DEPTH N/A
BLOWS PER FOOT 0 25 50 75 100		SAMP. NO. / LOG MOI G
		SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)
		561.5 0.2' TOPSOIL 0.0'
		ALLUVIAL BROWN, V. LOOSE TO LOOSE, SILTY SAND (A-2-4) GRAVEL LAYER 18.4' TO 19.3'
		D W M M
		W
		542.2 19.3' WEATHERED ROCK GRAY, TRIASSIC MUDSTONE NON-CRYSTALLINE ROCK GRAY, FRESH TO MOD. WEATHERING, V. HARD TO SOFT, MOD. CLOSE TO V. CLOSE FRACTURE SPACING, EXTREMELY TO MOD. INDURATED, THINLY BEDDED, TRIASSIC SANDSTONE WITH MUDSTONE LAYERS GSI = 50-55 20.4'
		541.1
		RS-02
		525.3 36.2' Boring Terminated at Elevation 525.3 ft IN NCR: MUDSTONE

[illegible]



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ROCK CORE PHOTOGRAPHS

BRIDGE NO. 140 OVER DAN RIVER ON
SR 1138 (LINDSEY BRIDGE ROAD)
ROCKINGHAM COUNTY, NORTH CAROLINA
TIP: B-5716 | WBS: 45672.1.1
FALCON PROJECT NO. G20014.00

GEOTECHNICAL BORING REPORT

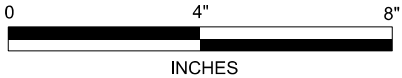
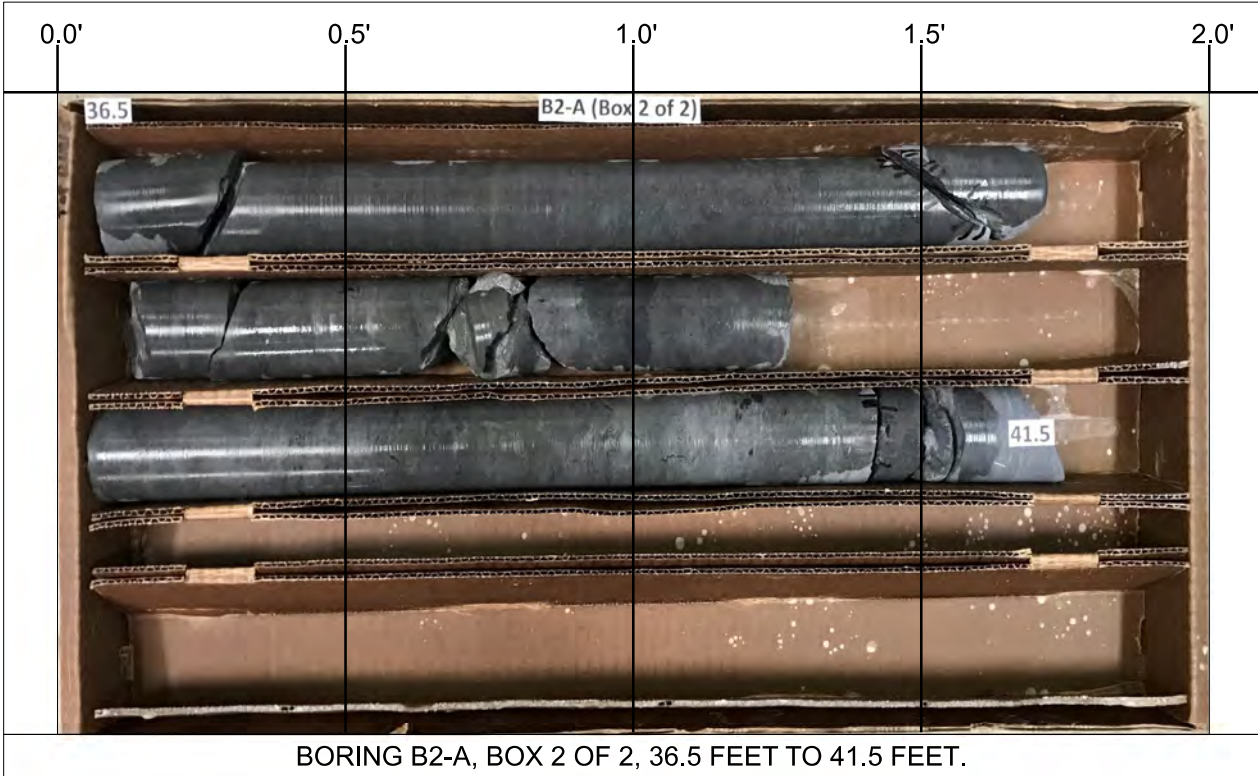
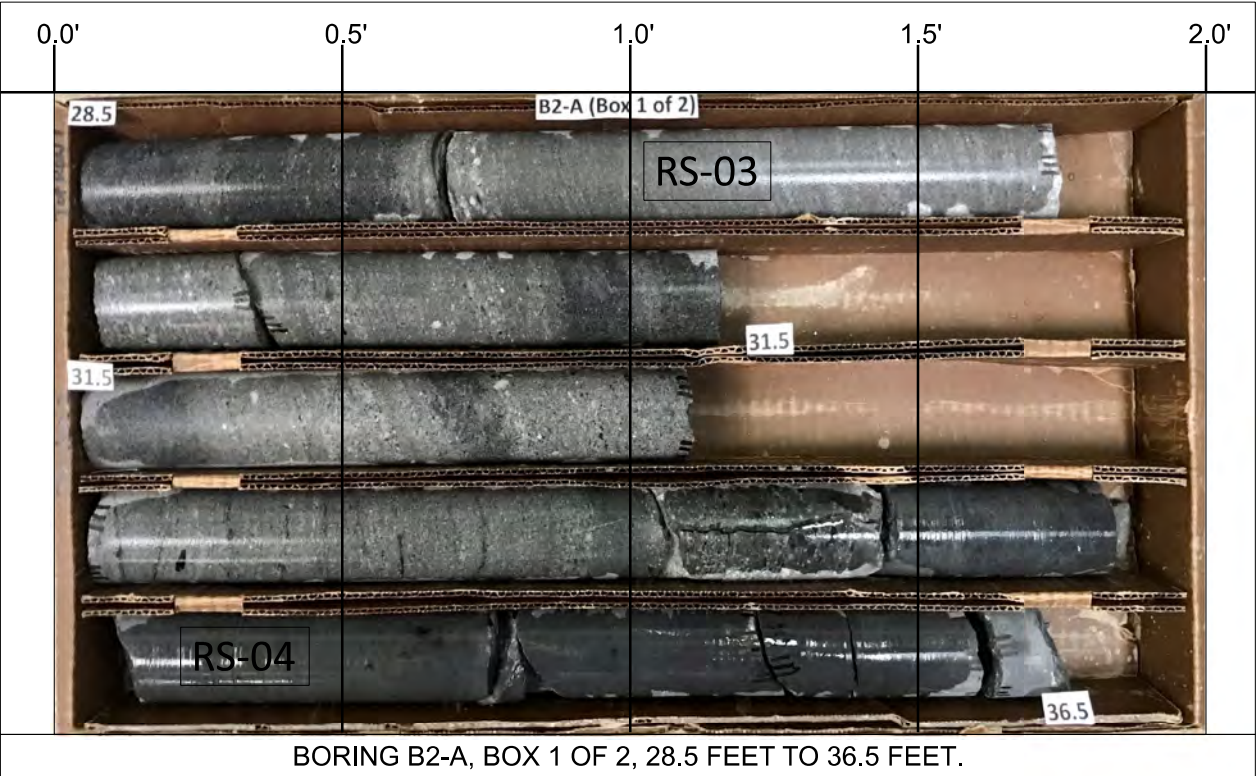
BORE LOG

WBS 45672.1.1			TIP B-5716			COUNTY ROCKINGHAM			GEOLOGIST Lane, R.W.					
SITE DESCRIPTION BRIDGE NO. 140 OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD)									GROUND WTR (ft)					
BORING NO. B2-A			STATION 17+95			OFFSET 15 ft LT			ALIGNMENT -L-					
COLLAR ELEV. 559.6 ft			TOTAL DEPTH 41.5 ft			NORTHING 956,669			EASTING 1,707,864					
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 83% 05/09/2022						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic					
DRILLER Toothman, R.			START DATE 04/06/23			COMP. DATE 04/06/23			SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)
560														
	558.6	1.0	1	1	0	1						M	559.6	0.0
	556.0	3.6	1	2	1	3						W	ALLUVIAL BROWN, V. LOOSE, SILTY SAND (A-2-4)	
555	553.6	6.0	1	2	1	3						Sat.		
	551.0	8.6	2	2	1	3						M		
550														
	546.0	13.6	2	1	2	3						Sat.		
545														
	541.0	18.6								100/0.2			541.0	18.6
540			100/0.2										WEATHERED ROCK GRAY, TRIASSIC MUDSTONE	
	536.1	23.5								100/0.2				
535			100/0.2											
	531.1	28.5											531.1	28.5
530			60/0.0							60/0.0			NON-CRYSTALLINE ROCK FRESH, HARD, GRAY, TRIASSIC SANDSTONE WITH MOD. CLOSE TO WIDE FRACTURE SPACING GSI = 50-55	
											RS-03		525.5	34.1
525													FRESH TO SLI. WEATHERED, MED. HARD TO MOD. HARD, GRAY, MOD. INDURATED, THINLY BEDDED, TRIASSIC SANDSTONE WITH MUDSTONE LAYERS, WITH CLOSE TO MOD. CLOSE FRACTURE SPACING GSI = 45-50	
											RS-04		518.1	41.5
520													Boring Terminated at Elevation 518.1 ft IN NCR: MUDSTONE	

GEOTECHNICAL BORING REPORT

CORE LOG

WBS 45672.1.1		TIP B-5716		COUNTY ROCKINGHAM		GEOLOGIST Lane, R.W.					
SITE DESCRIPTION BRIDGE NO. 140 OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD)								GROUND WTR (ft)			
BORING NO. B2-A		STATION 17+95		OFFSET 15 ft LT		ALIGNMENT -L-		0 HR.	12.0		
COLLAR ELEV. 559.6 ft		TOTAL DEPTH 41.5 ft		NORTHING 956,669		EASTING 1,707,864		24 HR.	11.9		
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 83% 05/09/2022				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic					
DRILLER Toothman, R.		START DATE 04/06/23		COMP. DATE 04/06/23		SURFACE WATER DEPTH N/A					
CORE SIZE NQ2		TOTAL RUN 13.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %			
531.12											
530	531.1	28.5	3.0	3:38/1.0 3:54/1.0 3:30/1.0	(3.0) 100%	(3.0) 100%		(5.6) 100%	(5.6) 100%		Begin Coring @ 28.5 ft NON-CRYSTALLINE ROCK 531.1 FRESH, HARD, GRAY, TRIASSIC SANDSTONE WITH MOD. CLOSE TO WIDE FRACTURE SPACING GSI = 50-55 28.5
	528.1	31.5		4:28/1.0 3:31/1.0 6:35/1.0 8:44/1.0 10:58/1.0	(4.8) 96%	(4.6) 92%					525.5 34.1
525			5.0					(6.9) 93%	(6.1) 82%		FRESH TO SLI. WEATHERED, MED. HARD TO MOD. HARD, GRAY, MOD. INDURATED, THINLY BEDDED, TRIASSIC SANDSTONE WITH MUDSTONE LAYERS, WITH CLOSE TO MOD. CLOSE FRACTURE SPACING GSI = 45-50
	523.1	36.5		10:13/1.0 9:22/1.0 11:06/1.0 11:56/1.0 6:13/1.0	(4.7) 94%	(4.1) 82%					
520			5.0								
	518.1	41.5									518.1 41.5
Boring Terminated at Elevation 518.1 ft IN NCR: MUDSTONE											



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ROCK CORE PHOTOGRAPHS

BRIDGE NO. 140 OVER DAN RIVER ON
SR 1138 (LINDSEY BRIDGE ROAD)
ROCKINGHAM COUNTY, NORTH CAROLINA
TIP: B-5716 | WBS: 45672.1.1
FALCON PROJECT NO. G20014.00

GEOTECHNICAL BORING REPORT

BORE LOG

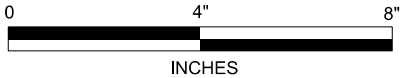
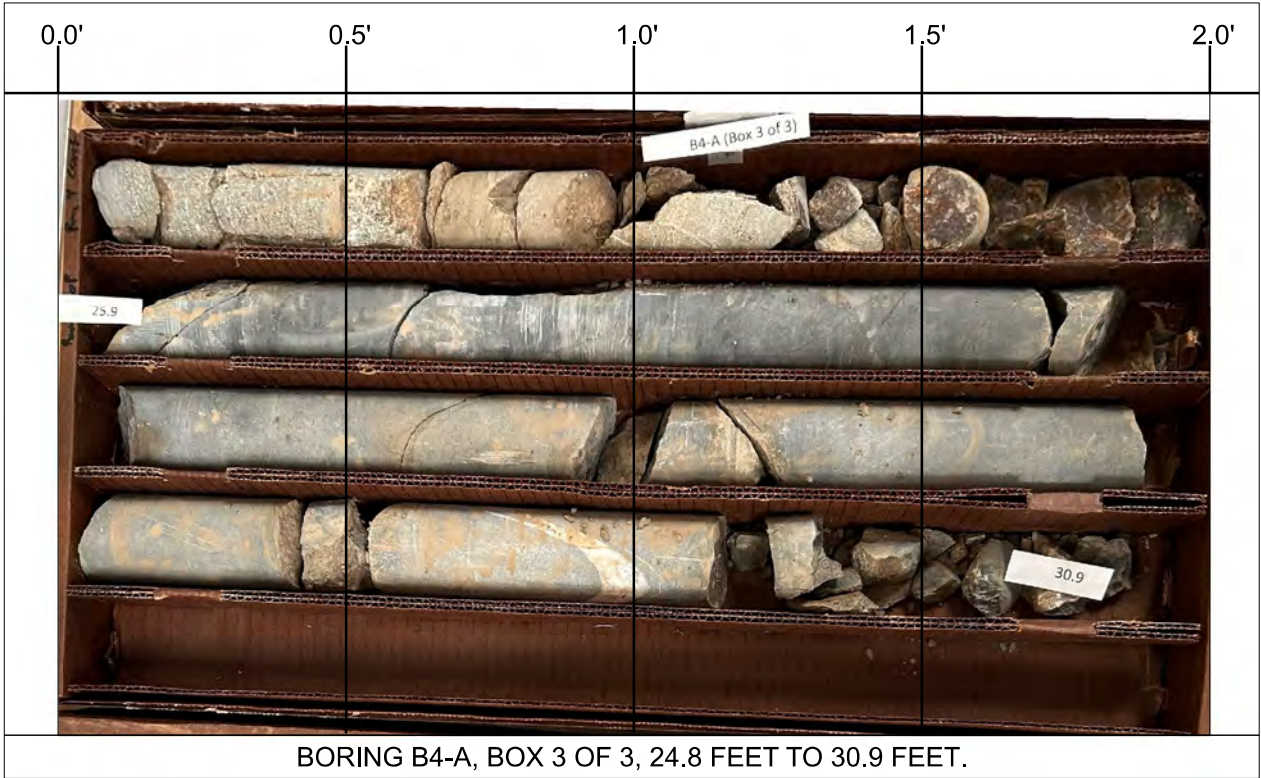
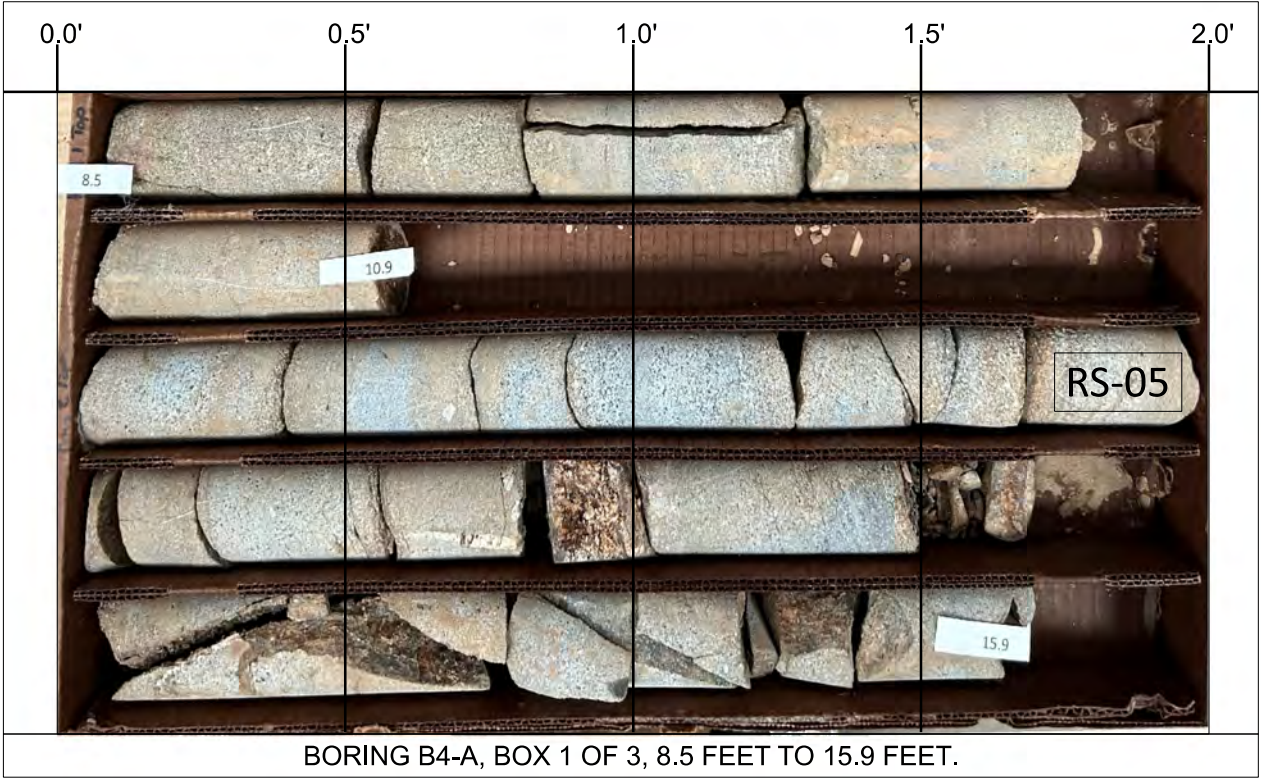
WBS 45672.1.1			TIP B-5716			COUNTY ROCKINGHAM			GEOLOGIST Lane, R.W.			
SITE DESCRIPTION BRIDGE NO. 140 OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD)									GROUND WTR (ft)			
BORING NO. B4-A			STATION 20+71			OFFSET 17 ft LT			ALIGNMENT -L-			
COLLAR ELEV. 578.6 ft			TOTAL DEPTH 30.9 ft			NORTHING 956,914			EASTING 1,707,991			
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022						DRILL METHOD Wash Boring			HAMMER TYPE Automatic			
DRILLER Estep, J. E.			START DATE 05/16/23			COMP. DATE 05/16/23			SURFACE WATER DEPTH N/A			
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION
			0.5ft	0.5ft	0.5ft	0	25	50	75	100		ELEV. (ft) DEPTH (ft)
580												
	577.6	1.0	21	54	46/0.4							578.6 0.0
575	575.1	3.5	100/0.2									0.1' BITUMINOUS CONCRETE 0.2' AGGREGATE BASE COURSE
	572.6	6.0	100/0.4									WEATHERED ROCK TAN AND BROWN, TRIASSIC MUDSTONE
570	570.1	8.5	60/0.0									570.1 8.5
												NON-CRYSTALLINE ROCK GRAY, MOD. SEV. TO FRESH WEATHERING, SOFT TO V. HARD, EXTREMELY INDURATED, TRIASSIC SANDSTONE GSI = 40-45
565												
560												
555												557.1 21.5
												555.9 22.7
												GRAY, FRESH TO MOD. WEATHERING, HARD TO V. HARD, CLOSE FRACTURE SPACING, EXTREMELY INDURATED, TRIASSIC SANDSTONE WITH CONGLOMERATE
550												547.7 30.9
												GRAY, FRESH TO MOD. WEATHERING, HARD TO V. HARD, CLOSE FRACTURE SPACING, EXTREMELY INDURATED, THINLY BEDDED, TRIASSIC MUDSTONE GSI = 45-50
												Boring Terminated at Elevation 547.7 ft IN NCR: MUDSTONE

GEOTECHNICAL BORING REPORT

CORE LOG

WBS 45672.1.1				TIP B-5716				COUNTY ROCKINGHAM				GEOLOGIST Lane, R.W.							
SITE DESCRIPTION BRIDGE NO. 140 OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD)												GROUND WTR (ft)							
BORING NO. B4-A				STATION 20+71				OFFSET 17 ft LT				ALIGNMENT -L-				0 HR. 20.5			
COLLAR ELEV. 578.6 ft				TOTAL DEPTH 30.9 ft				NORTHING 956,914				EASTING 1,707,991				24 HR. 22.9			
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022								DRILL METHOD Wash Boring				HAMMER TYPE Automatic							
DRILLER Estep, J. E.				START DATE 05/16/23				COMP. DATE 05/16/23				SURFACE WATER DEPTH N/A							
CORE SIZE NQ2				TOTAL RUN 22.4 ft															
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS								
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %								DEPTH (ft)		
578.6											Begin Coring @ 8.5 ft								
570	570.1	8.5	2.4	2:14/0.4	(2.3)	(1.5)					NON-CRYSTALLINE ROCK								
	567.7	10.9	7:13/1.0	96%	63%	570.1					GRAY, MOD. SEV. TO FRESH WEATHERING, SOFT TO V. HARD, EXTREMELY INDURATED, TRIASSIC SANDSTONE	8.5							
565			5.0	4:11/1.0	(5.0)	(1.3)	RS-05				GSI = 40-45								
			3:45/1.0	100%	26%														
560	562.7	15.9		4:00/1.0															
			3:09/1.0																
555	557.7	20.9	5.0	2:55/1.0	(4.7)	(2.2)					557.1 21.5								
			3:17/1.0	94%	44%	555.9					GRAY, FRESH TO MOD. WEATHERING, HARD TO V. HARD, CLOSE FRACTURE SPACING, EXTREMELY INDURATED, TRIASSIC SANDSTONE WITH CONGLOMERATE	22.7							
550	552.7	25.9	5.0	4:07/1.0	(5.0)	(3.3)					GRAY, FRESH TO MOD. WEATHERING, HARD TO V. HARD, CLOSE FRACTURE SPACING, EXTREMELY INDURATED, THINLY BEDDED, TRIASSIC MUDSTONE								
			4:24/1.0	100%	66%						GSI = 45-50								
	547.7	30.9		4:36/1.0	(5.0)	(3.2)					547.7 30.9								
				4:42/1.0							Boring Terminated at Elevation 547.7 ft IN NCR: MUDSTONE								
				6:05/1.0															
				6:44/1.0															

NCDDOT CORE SINGLE BS/76.GPJ NC.DDOT.GDI 4/2/24



FALCON ENGINEERING, INC.
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ROCK CORE PHOTOGRAPHS

BRIDGE NO. 140 OVER DAN RIVER ON
SR 1138 (LINDSEY BRIDGE ROAD)
ROCKINGHAM COUNTY, NORTH CAROLINA
TIP: B-5716 | WBS: 45672.1.1
FALCON PROJECT NO. G20014.00

GEOTECHNICAL BORING REPORT

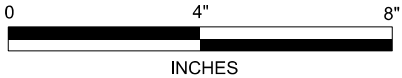
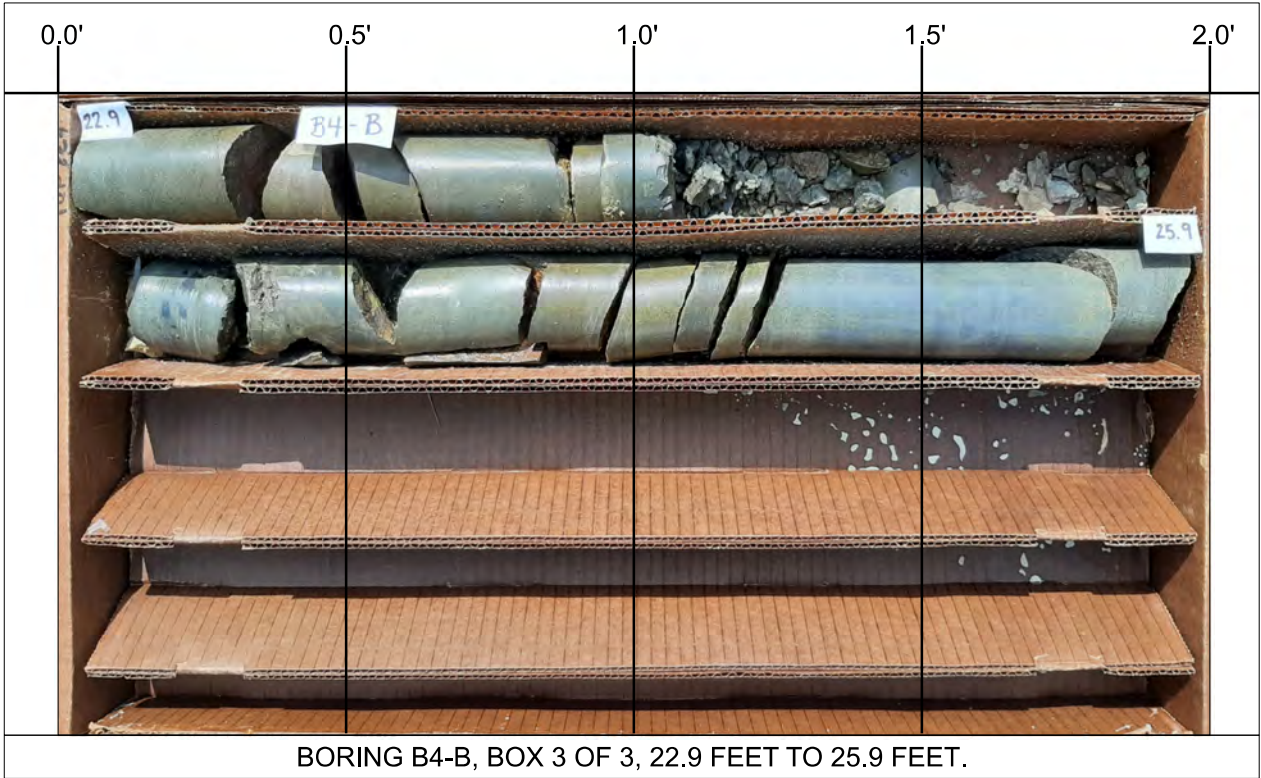
BORE LOG

WBS 45672.1.1			TIP B-5716			COUNTY ROCKINGHAM			GEOLOGIST Lane, R.W.					
SITE DESCRIPTION BRIDGE NO. 140 OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD)									GROUND WTR (ft)					
BORING NO. B4-B			STATION 20+71			OFFSET 17 ft RT			ALIGNMENT -L-					
COLLAR ELEV. 579.4 ft			TOTAL DEPTH 25.9 ft			NORTHING 956,898			EASTING 1,708,021					
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022						DRILL METHOD Wash Boring			HAMMER TYPE Automatic					
DRILLER Estep, J. E.			START DATE 05/17/23			COMP. DATE 05/17/23			SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)
580														
	578.4	1.0	31	69	0.2								579.4	0.4' GRAVEL
	576.4	3.0								100/0.7			578.4	ROADWAY EMBANKMENT
	575.3	4.1	100	0.3						100/0.3				TAN, DENSE, SILTY SAND (A-2-4)
575			60	0.0						60/0.0			575.3	WEATHERED ROCK
														TAN, TRIASSIC SILTSTONE
570											RS-06			NON-CRYSTALLINE ROCK
											RS-07			TAN ORANGE AND GRAY. V. SEVERELY TO MODERATELY WEATHERED, SOFT TO HARD, VERY CLOSE TO MODERATELY CLOSELY FRACTURED, TRIASSIC SILTSTONE
565														GSI = 40-45
													562.1	
560													560.6	WEATHERED ROCK
														GRAY AND WHITE, TRIASSIC SILTSTONE
														NON-CRYSTALLINE ROCK
555														BROWN AND GRAY, SEVERELY TO MODERATELY WEATHERED, SOFT TO HARD, VERY CLOSE TO CLOSELY FRACTURED, MOD. INDURATED, THINLY BEDDED, TRIASSIC SILTSTONE
													553.5	GSI = 40-45
														Boring Terminated at Elevation 553.5 ft IN NCR: SILTSTONE

GEOTECHNICAL BORING REPORT

CORE LOG

WBS 45672.1.1				TIP B-5716				COUNTY ROCKINGHAM				GEOLOGIST Lane, R.W.										
SITE DESCRIPTION BRIDGE NO. 140 OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD)												GROUND WTR (ft)										
BORING NO. B4-B				STATION 20+71				OFFSET 17 ft RT				ALIGNMENT -L-				0 HR. 19.3						
COLLAR ELEV. 579.4 ft				TOTAL DEPTH 25.9 ft				NORTHING 956,898				EASTING 1,708,021				24 HR. FIAD						
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022								DRILL METHOD Wash Boring				HAMMER TYPE Automatic										
DRILLER Estep, J. E.				START DATE 05/17/23				COMP. DATE 05/17/23				SURFACE WATER DEPTH N/A										
CORE SIZE NQ2				TOTAL RUN 21.8 ft																		
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS											
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %													
575.3	575.3	4.1	1.8	2:10/0.8	(1.5)	(1.1)		(12.1)	(8.0)		Begin Coring @ 4.1 ft NON-CRYSTALLINE ROCK TAN ORANGE AND GRAY. V. SEVERELY TO MODERATELY WEATHERED, SOFT TO HARD, VERY CLOSE TO MODERATLEY CLOSELY FRACTURED, TRIASSIC SILTSTONE GSI = 40-45											
	573.5	5.9		3:02/1.0	83%	61%		92%	61%													
			5.0	2:25/1.0	(5.0)	(2.5)					570											
				2:44/1.0	100%	50%																
	568.5	10.9		2:49/1.0			RS-06				565											
			5.0	3:31/1.0	(4.9)	(3.3)	RS-07															
				2:17/1.0	98%	66%					560											
	563.5	15.9		2:12/1.0	(4.2)	(1.1)																
			5.0	3:55/1.0	84%	22%					555											
				2:26/1.0																		
	558.5	20.9		2:17/1.0	(6.7)	(2.1)		(6.7)	(2.1)		WEATHERED ROCK GRAY AND WHITE, TRIASSIC SILTSTONE NON-CRYSTALLINE ROCK BROWN AND GRAY, SEVERELY TO MODERATELY WEATHERED, SOFT TO HARD, VERY CLOSE TO CLOSELY FRACTURED, MOD. INDURATED, THINLY BEDDED, TRIASSIC SILTSTONE GSI = 40-45											
			5.0	2:48/1.0	(5.0)	(1.6)		94%	30%													
	553.5	25.9		4:56/1.0							553.5											
Boring Terminated at Elevation 553.5 ft IN NCR: SILTSTONE																						



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ROCK CORE PHOTOGRAPHS

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ROCKINGHAM COUNTY, NORTH CAROLINA
TIP: B-5716 | WBS: 45672.1.1
FALCON PROJECT NO. G20014.00

GEOTECHNICAL BORING REPORT

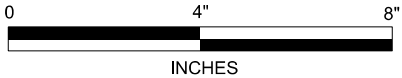
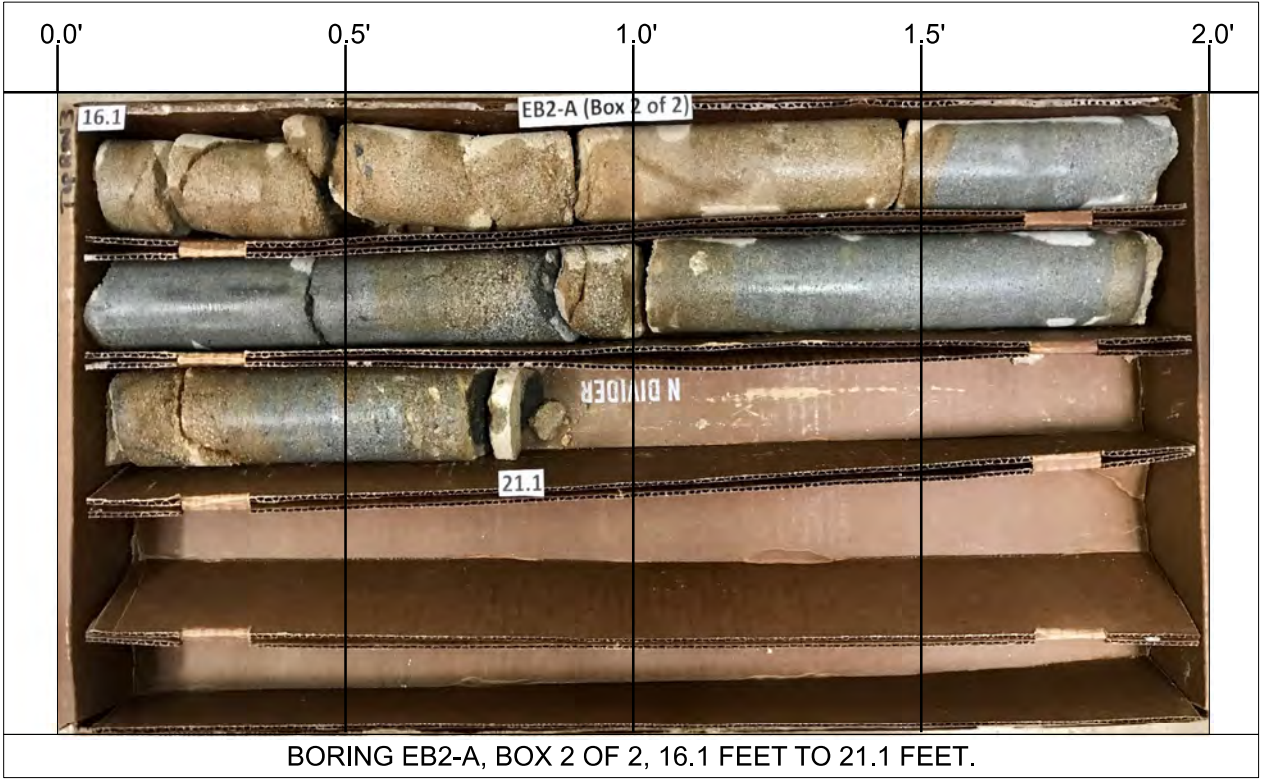
BORE LOG

[illegible]

GEOTECHNICAL BORING REPORT

CORE LOG

WBS 45672.1.1				TIP B-5716				COUNTY ROCKINGHAM				GEOLOGIST GOODNIGHT, D. J.							
SITE DESCRIPTION BRIDGE NO. 140 OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD)												GROUND WTR (ft)							
BORING NO. EB2-A				STATION 21+45				OFFSET 17 ft LT				ALIGNMENT -L-							
COLLAR ELEV. 581.9 ft				TOTAL DEPTH 21.1 ft				NORTHING 956,979				EASTING 1,708,025							
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 83% 05/09/2022								DRILL METHOD H.S. Augers				HAMMER TYPE Automatic							
DRILLER Toothman, R.				START DATE 04/11/23				COMP. DATE 04/11/23				SURFACE WATER DEPTH N/A							
CORE SIZE NQ2				TOTAL RUN 11.6 ft															
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS								
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %										
572.44	572.4	9.5	1.6	2:28/0.6	(1.4)	(1.0)		(10.8)	(7.1)		Begin Coring @ 9.5 ft NON-CRYSTALLINE ROCK MOD. SEVERE TO MODERATE WEATHERING, HARD TO MOD. HARD, TAN AND GRAY, MOD. INDURATED, THINLY BEDDED, TRIASSIC SANDSTONE WITH CLOSE FRACTURE SPACING GSI = 45-50				9.5				
570	570.8	11.1	5:21/1.0	88%	63%		93%	61%											
			5.0	4:18/1.0	(4.7)	(2.9)	RS-08												
				3:42/1.0	94%	58%													
				3:43/1.0															
565	565.8	16.1		3:30/1.0															
			5.0	3:41/1.0															
				2:52/1.0	(4.7)	(3.2)													
				3:18/1.0	94%	64%													
				3:27/1.0															
	560.8	21.1		3:29/1.0															
				3:20/1.0															
Boring Terminated at Elevation 560.8 ft IN NCR: SANDSTONE												21.1							



 FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 CARY, NC 27513 PHONE: 919.871.0800	ROCK CORE PHOTOGRAPHS
	BRIDGE NO. 140 OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD) ROCKINGHAM COUNTY, NORTH CAROLINA TIP: B-5716 WBS: 45672.1.1 FALCON PROJECT NO. G20014.00

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 45672.1.1			TIP B-5716			COUNTY ROCKINGHAM			GEOLOGIST GOODNIGHT, D. J.					
SITE DESCRIPTION BRIDGE NO. 140 OVER DAN RIVER ON SR 1138 (LINDSEY BRIDGE ROAD)										GROUND WTR (ft)				
BORING NO. EB2-B			STATION 21+48			OFFSET 19 ft RT			ALIGNMENT -L-		0 HR. Dry			
COLLAR ELEV. 583.4 ft			TOTAL DEPTH 18.9 ft			NORTHING 956,965			EASTING 1,708,058		24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 83% 05/09/2022						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER Toothman, R.			START DATE 04/10/23			COMP. DATE 04/10/23			SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)
585														
	582.4	1.0											583.4	0.0
			4	80	20/0.2								582.7	0.7
580	579.9	3.5								100/0.7			581.9	1.5
													0.3' BITUMINOUS CONCRETE	
	577.4	6.0								100/0.5			0.4' AGGREGATE BASE COURSE	
													ROADWAY EMBANKMENT	
										100/0.5			TAN, LOOSE, SILTY SAND (A-2-4) W/ TRACE GRAVEL	
										100/0.3			WEATHERED ROCK	
575	574.9	8.5											TAN, TRIASSIC SANDSTONE	
			30	70/0.1						100/0.6				
570	569.9	13.5												
										100/0.4				
	</													

NCDOT BORE SINGLE B5716.GPJ NC_DOT.GDT 4/2/24

SUMMARY OF ROCK CORE TEST RESULTS

BRIDGE NO.140 ON SR 1138 (LINDSEY BRIDGE ROAD) OVER DAN RIVER

ROCKINGHAM COUNTY, NORTH CAROLINA

FALCON ENGINEERING, INC. PROJECT NO: G20014.00

Sample No.	Boring	Alignment	Station	Offset	Northing	Easting	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (ft)	Diameter (ft)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Geologic Strength Index (GSI)	Failure
RS-1	B1-A	-L-	17+27	20 ft LT	956,611	1,707,828	35.0-35.9	SANDSTONE	TRds	76%	0.37	0.16	165.5	17,800	50	
RS-2	B1-B	-L-	17+29	21 ft RT	956,594	1,707,865	26.3-26.7	SANDSTONE	TRds	59%	0.37	0.16	169.1	18,110	50	
RS-3	B2-A	-L-	17+96	15 ft LT	956,669	1,707,864	29.3-29.7	SANDSTONE	TRds	94%	0.37	0.16	166.5	18,790	55	
RS-4	B2-A	-L-	17+96	15 ft LT	956,669	1,707,864	35.0-35.4	MUDSTONE	TRds	82%	0.37	0.16	169.1	6,920	45	
RS-5	B4-A	-L-	20+71	17 ft LT	956,914	1,707,991	12.8-13.2	SANDSTONE	TRds	40%	0.35	0.17	160.5	6,290	40	
RS-6	B4-B	-L-	20+71	17 ft RT	956,898	1,708,201	8.6-9.0	SANDSTONE	TRds	60%	0.37	0.16	155.7	4,230	35	
RS-7	B4-B	-L-	20+71	17 ft RT	956,898	1,708,201	11.2-11.6	SANDSTONE	TRds	38%	0.37	0.16	163.4	12,280	40	
RS-8	EB2-A	-L'	21+45	17 ft LT	956,979	1,708,025	12.0-12.4	SANDSTONE	TRds	61%	0.38	0.16	161.2	10,850	45	

Note: Time to failure on all compression tests was between 2 and 15 minutes per ASTM-D7012.