

STATE	STATE PROJECT REFERENCE NO.	DIST NO.	TOTAL SHEETS
N.C.	45355.1.16 (BD-5109P)	1	9

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

STRUCTURE
SUBSURFACE INVESTIGATION

CONTENTS

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PROJ. REFERENCE NO. 45355.1.16 (BD-5109P) F.A. PROJ. BRZ-1625(5)
COUNTY FORSYTH
PROJECT DESCRIPTION REPLACE EXISTING BRIDGE NO. 145
SR 1625 - BOWENS RD.

SITE DESCRIPTION _____

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 1991 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 THIS 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.

PROJECT: 45355.1.16 ID: BD-5109P

PERSONNEL
KLEINFELDER

INVESTIGATED BY C. B. LITTLE
CHECKED BY C. B. LITTLE
SUBMITTED BY C. B. LITTLE
DATE AUGUST 2012



8-16-12

DRAWN BY: C. E. BURRIS

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 PLAN, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.

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 THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAVELY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HARD PLASTIC, A-7-6</i>					WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: <u>ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</u>					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. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 60 BLOWS PER FOOT IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR) 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 SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.					ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOTL) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRODUCED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN 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 60 BLOWS PER FOOT. STRATA CORE RECOVERY (SCREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. BENCH MARK: BL-2 STA. -L- (3+28.31) 16.20RT N 895544.6770 E 1596236.4380 ELEVATION: 842.03 FT.				
SOIL LEGEND AND AASHTO CLASSIFICATION					MINERALOGICAL COMPOSITION					WEATHERING									
GENERAL CLASS. GRANULAR MATERIALS (< 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS					MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KADLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.					FRESH ROCK GENERALLY FRESH, JOINTS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SLI) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SLI) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK 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. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.									
CONSISTENCY OR DENSITY					MISCELLANEOUS SYMBOLS					ROCK HARDNESS									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNDEFINED COMPRESSIVE STRENGTH (TONS/F ²)					ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES					SPT TEST BORING TEST BORING W/ CORE SPT N-VALUE CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST 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. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROUDED OR GOUGED 0.85 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.				
TEXTURE OR GRAIN SIZE					ABBREVIATIONS					FRACTURE SPACING									
U.S. STD. SIZE OPENING (MM) BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CS, SD.) FINE SAND (FS, SD.) SILT (SL.) CLAY (CL.)					AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS H. - HIGHLY MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP, - SAPROLITIC SD. - SAND, SANDY SL - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL W. - MOISTURE CONTENT V - VERY					TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET									
SOIL MOISTURE - CORRELATION OF TERMS					EQUIPMENT USED ON SUBJECT PROJECT					BEDDING									
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION					DRILL UNITS: MOBILE B- BK-51 CME-4BC CME-55B PORTABLE HOIST CME-55 ADVANCING TOOLS: CLAY BITS CONTINUOUS FLIGHT AUGER HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING W/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG-CARB. CORE BIT					TERM THICKNESS VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET									
PLASTICITY										INDURATION									
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH					FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE 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.									
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.																			

FORSYTH COUNTY LOW IMPACT BRIDGE

STRUCTURE 330145
LS 09-11-087
WBS 45355.116
TIP BD-5109-P

PROJECT REFERENCE NO. 45355.116 (BD-5109P)	SHEET 3
<h2 style="margin: 0;">SITE PLAN</h2>	
<p style="text-align: center; margin: 0;">0 50 100 FEET</p>	
SKEW = 105° 00' 00"	

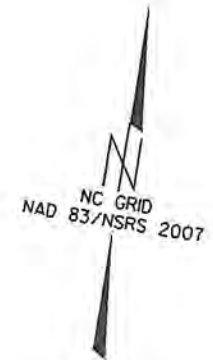
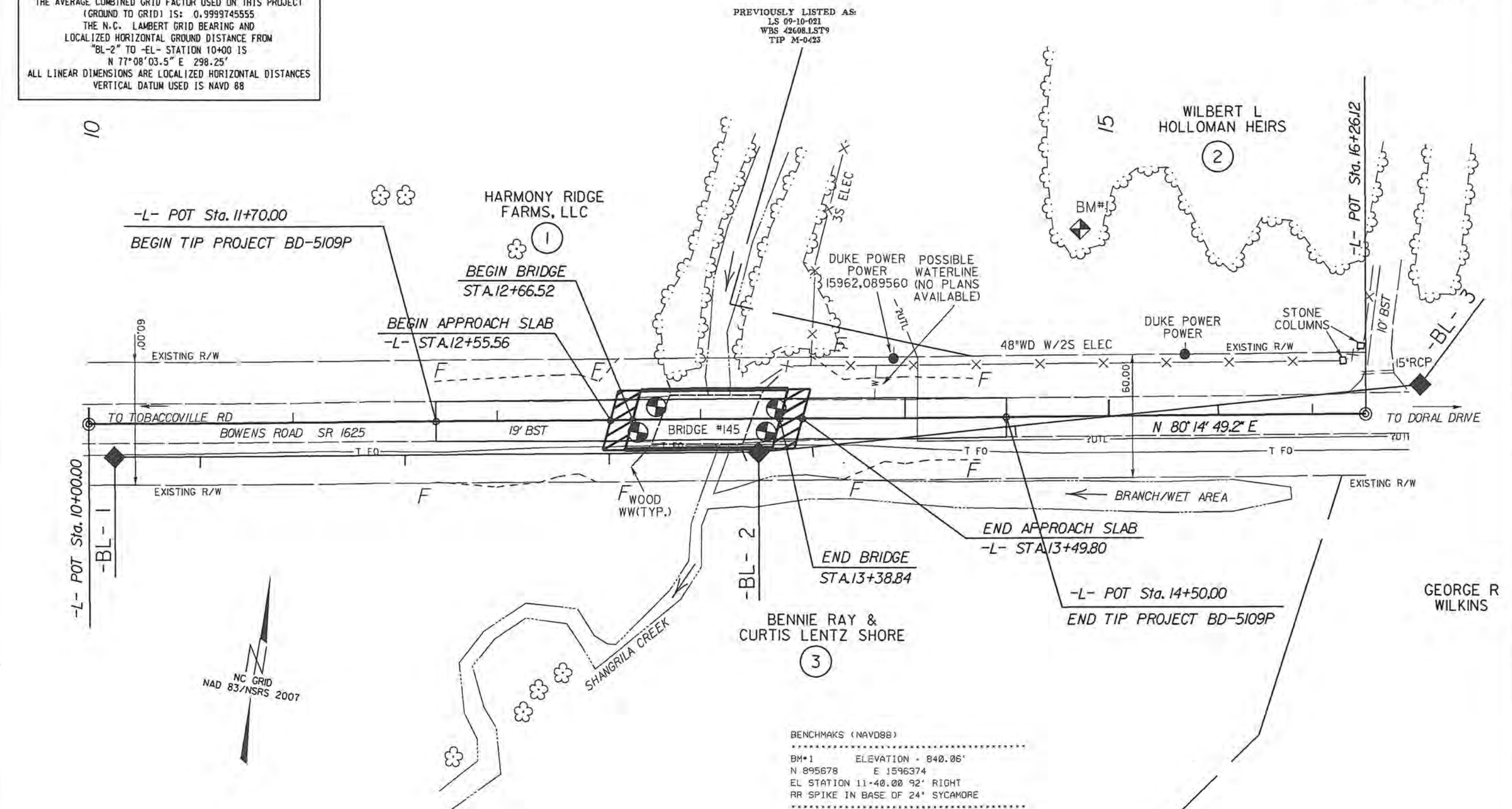
DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "BL-2" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 895544.677(ft) EASTING: 1596236.438(ft) ELEVATION: 842.03(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999745555

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BL-2" TO -EL- STATION 10+00 IS
N 77° 08' 03.5" E 298.25'

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88



BENCHMARKS (NAVD88)

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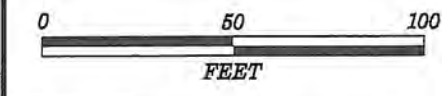
BM*1 ELEVATION = 840.06'
N 895678 E 1596374
EL STATION 11+40.00 92' RIGHT
RR SPIKE IN BASE OF 24' SYCAMORE

.....

BM*2 ELEVATION = 857.54'
N 895491 E 1595926
EL STATION 16+13 16' LEFT
REBAR WITH ALUMINUM CAP STAMPED
"BL-1" (SET FLUSH WITH GROUND).
POINT LIES 6.7' SOUTH OF EDGE OF
BOWENS ROAD

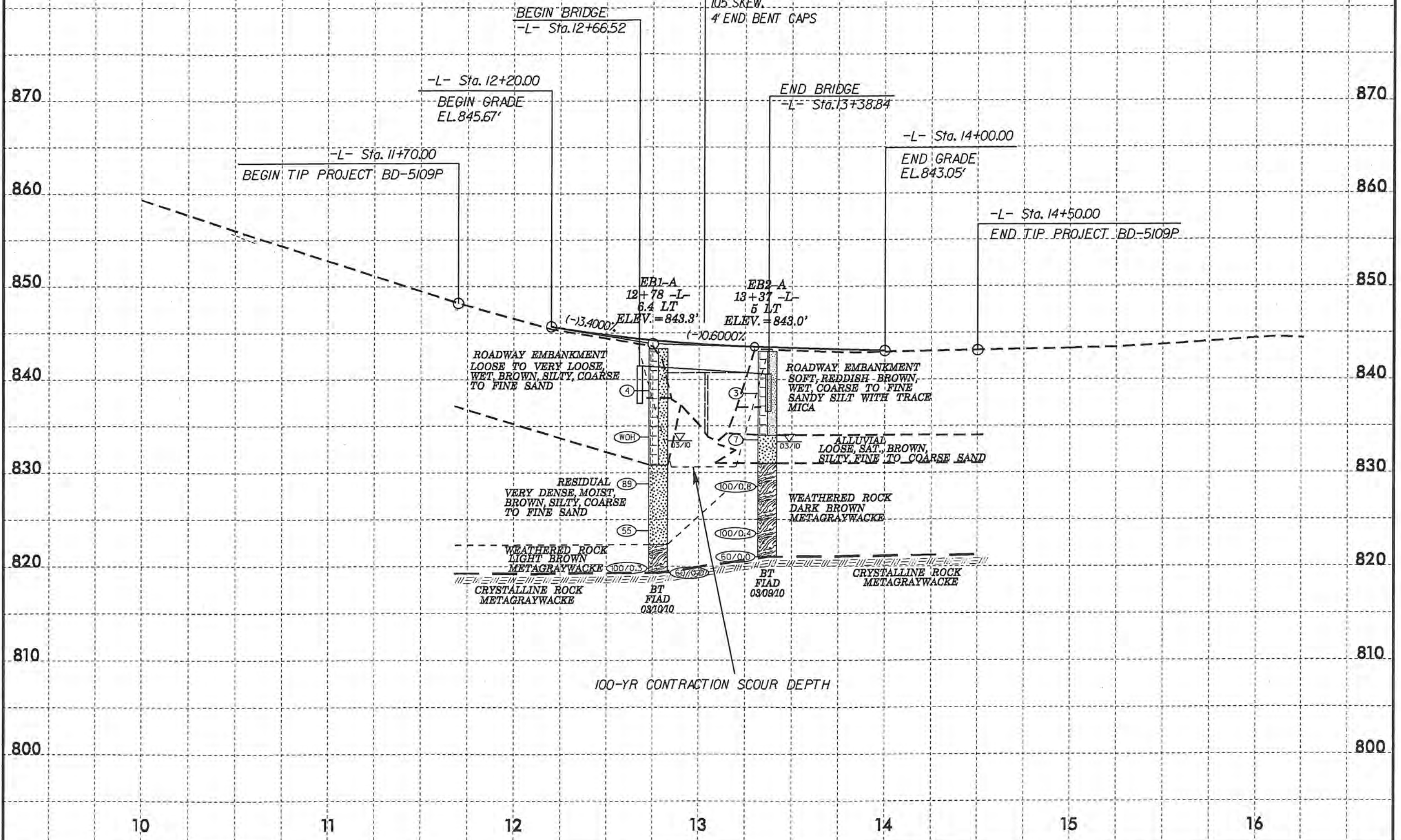
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BL POINT	DESC.	NORTH	EAST	ELEVATION	EL STATION	OFFSET
3	BL-3	895629.7330	1596551.5830	844.10	OUTSIDE PROJECT LIMITS	
2	BL-2	895544.6770	1596236.4380	842.03	12+97.81	16.20 LT
1	BL-1	895491.1400	1595925.5030	857.54	16+13.32	16.29 LT



PI = 12+75.00
 EL = 843.80'
 VC = 110'
 K = 39

CL STA 13+02.68
 CL EL. 843.73
 SINGLE SPAN 1 @ 70'
 2" CORED SLAB
 105' SKEW
 4" END BENT CAPS



BEGIN BRIDGE
 -L- Sta. 12+66.52

-L- Sta. 12+20.00
 BEGIN GRADE
 EL. 845.67'

-L- Sta. 11+70.00
 BEGIN TIP PROJECT BD-5109P

END BRIDGE
 -L- Sta. 13+38.84

-L- Sta. 14+00.00
 END GRADE
 EL. 843.05'

-L- Sta. 14+50.00
 END TIP PROJECT BD-5109P

EB1-A
 12+78 -L-
 6.4 LT
 ELEV. = 843.3'

EB2-A
 13+37 -L-
 5 LT
 ELEV. = 843.0'

ROADWAY EMBANKMENT
 LOOSE TO VERY LOOSE,
 WET, BROWN, SILTY, COARSE
 TO FINE SAND

ROADWAY EMBANKMENT
 SOFT, REDDISH-BROWN,
 WET, COARSE TO FINE
 SANDY SILT WITH TRACE
 MICA

ALLUVIAL
 LOOSE, SAT., BROWN,
 SILTY, FINE TO COARSE SAND

RESIDUAL
 VERY DENSE, MOIST,
 BROWN, SILTY, COARSE
 TO FINE SAND

WEATHERED ROCK
 DARK BROWN
 METAGRAYWACKE

WEATHERED ROCK
 LIGHT BROWN
 METAGRAYWACKE

CRYSTALLINE ROCK
 METAGRAYWACKE

BT
 FIAD
 03/09/10

BT
 FIAD
 03/09/10

CRYSTALLINE ROCK
 METAGRAYWACKE

100-YR CONTRACTION SCOUR DEPTH

870
860
850
840
830
820
810
800

870
860
850
840
830
820
810
800

10

11

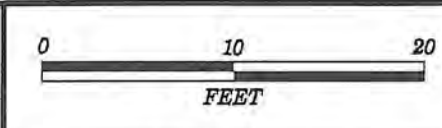
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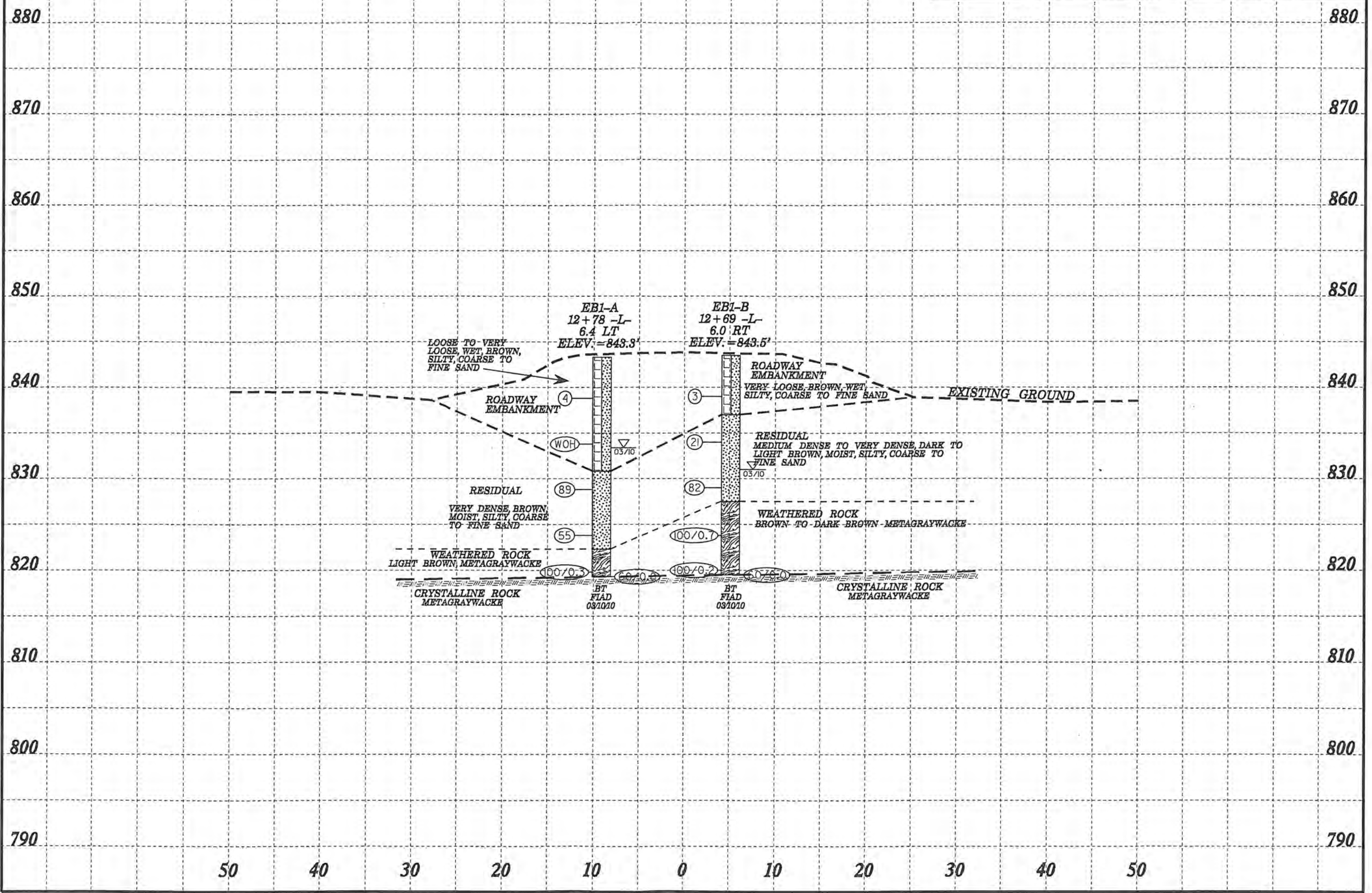
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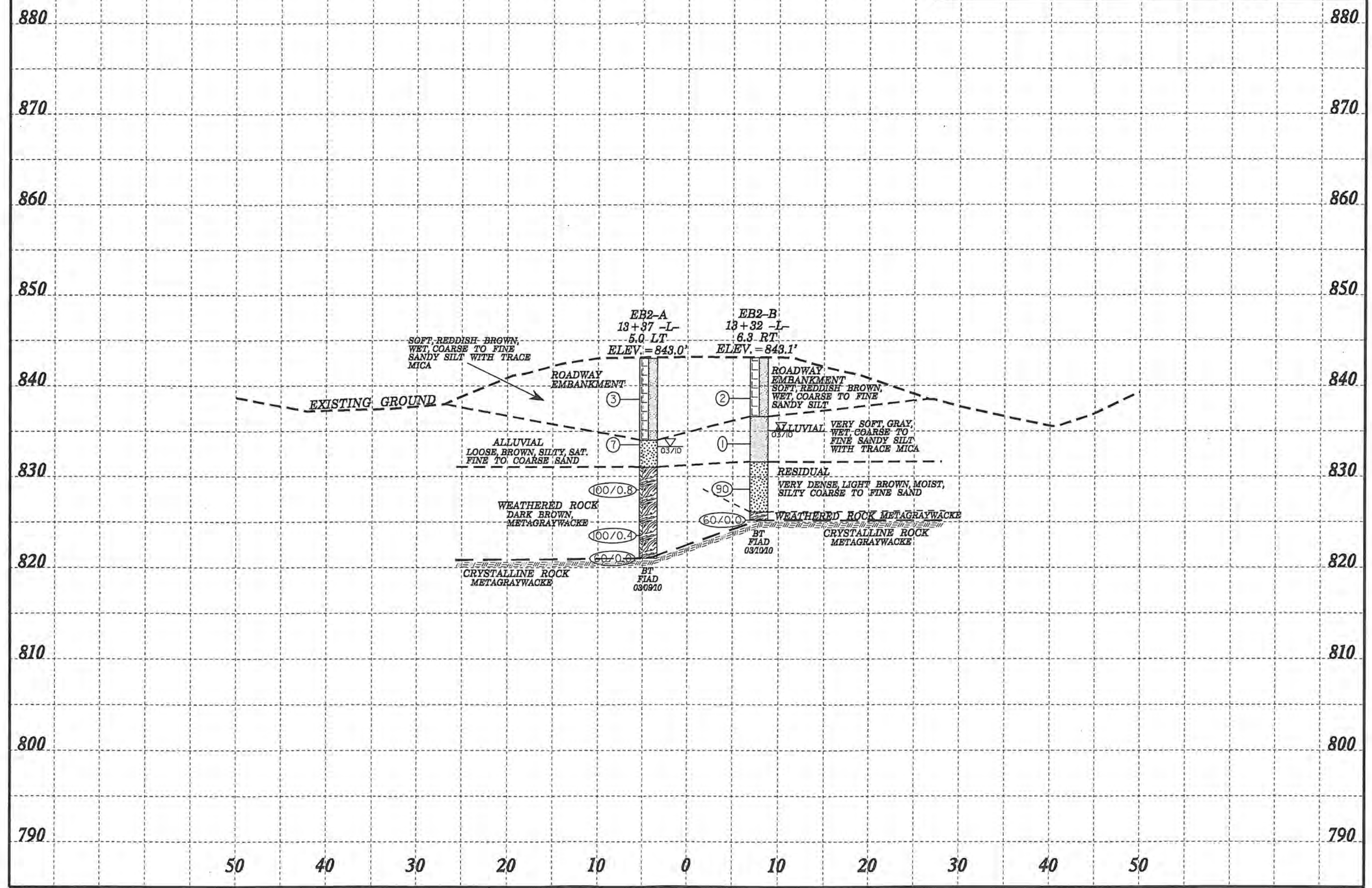
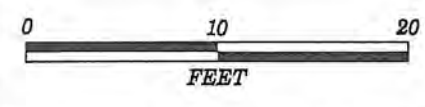
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16



PROJECT REFERENCE NO.	SHEET
45355.1.16 (BD-5109P)	5
SECTION THROUGH EB-1	
STA. -L- 12+66.52	
SKEW = 105°00'00"	







WBS 45355.1.16			TIP BD5109P			COUNTY FORSYTH			GEOLOGIST T. Wells						
SITE DESCRIPTION Bridge 145 on SR 1625 over Shangrila Creek								GROUND WTR (ft)							
BORING NO. EB1-A		STATION 12+78		OFFSET 6 ft LT		ALIGNMENT -L-		0 HR. 9.9							
COLLAR ELEV. 843.3 ft		TOTAL DEPTH 24.0 ft		NORTHING 895,558		EASTING 1,596,183		24 HR. FIAD							
DRILL RIG/HAMMER EFF./DATE CME-55				DRILL METHOD H.S. Augers				HAMMER TYPE Automatic							
DRILLER R. Toothman			START DATE 03/10/10			COMP. DATE 03/10/10			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
845														GROUND SURFACE	0.0
														ROADWAY EMBANKMENT	
	839.8	3.5		2	1	3							W	Loose to Very Loose, Brown, Silty, Coarse to Fine SAND	
835	834.8	8.5		WOH	WOH	WOH							W		
830	829.8	13.5		19	47	42							M	RESIDUAL	12.5
														Very Dense, Brown, Silty, Coarse to Fine SAND	
825	824.8	18.5		20	21	34							M		
820	819.8	23.5												WEATHERED ROCK	21.0
	819.3	24.0												Light Brown, Metagraywacke	24.0
														Boring Terminated with Standard Penetration Test Refusal at Elevation 819.3 ft on Crystalline Rock: Metagraywacke	

NCDOT BORE SINGLE BD5109P_GEO_BH_BRD0145_FORSYTH.GPJ NC_DOT.GDT 8/13/12



WBS 45355.1.16			TIP BD5109P			COUNTY FORSYTH			GEOLOGIST T. Wells						
SITE DESCRIPTION Bridge 145 on SR 1625 over Shangrila Creek								GROUND WTR (ft)							
BORING NO. EB1-B		STATION 12+69		OFFSET 6 ft RT		ALIGNMENT -L-		0 HR. 12.5							
COLLAR ELEV. 843.5 ft		TOTAL DEPTH 24.0 ft		NORTHING 895,545		EASTING 1,596,176		24 HR. FIAD							
DRILL RIG/HAMMER EFF./DATE CME-55				DRILL METHOD H.S. Augers				HAMMER TYPE Automatic							
DRILLER R. Toothman			START DATE 03/10/10			COMP. DATE 03/10/10			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
845														GROUND SURFACE	0.0
														ROADWAY EMBANKMENT	
	840.0	3.5		1	1	2							W	Very Loose, Brown, Silty, Coarse to Fine SAND	
835	835.0	8.5		16	12	9							M	RESIDUAL	6.5
														Medium Dense to Very Dense, Dark to Light Brown, Silty, Coarse to Fine SAND	
830	830.0	13.5		16	32	50							M		
825	825.0	18.5		29	61	39/0.2								WEATHERED ROCK	16.0
														Brown to Dark Brown, Metagraywacke	
820	820.0	23.5												WEATHERED ROCK	24.0
	819.5	24.0												Light Brown, Metagraywacke	24.0
														Boring Terminated with Standard Penetration Test Refusal at Elevation 819.5 ft on Crystalline Rock: Metagraywacke	

NCDOT BORE SINGLE BD5109P_GEO_BH_BRD0145_FORSYTH.GPJ NC_DOT.GDT 8/13/12

WBS 45355.1.16		TIP BD5109P		COUNTY FORSYTH		GEOLOGIST T. Wells										
SITE DESCRIPTION Bridge 145 on SR 1625 over Shangrila Creek							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 13+37		OFFSET 5 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 843.0 ft		TOTAL DEPTH 22.0 ft		NORTHING 895,567		EASTING 1,596,241										
DRILL RIG/HAMMER EFF./DATE CME-55		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER R. Toothman		START DATE 03/09/10		COMP. DATE 03/09/10		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						
845																843.0
																843.0
																840
	839.5	3.5														840
																835
	834.5	8.5														835
																830
	829.5	13.5														830
																825
	824.5	18.5														825
																820
	821.0	22.0														820
																821.0
																821.0

WBS 45355.1.16		TIP BD5109P		COUNTY FORSYTH		GEOLOGIST T. Wells										
SITE DESCRIPTION Bridge 145 on SR 1625 over Shangrila Creek							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 13+32		OFFSET 6 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 843.1 ft		TOTAL DEPTH 17.9 ft		NORTHING 895,555		EASTING 1,596,238										
DRILL RIG/HAMMER EFF./DATE CME-55		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER R. Toothman		START DATE 03/10/10		COMP. DATE 03/10/10		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						
845																843.1
																843.1
																840
	839.6	3.5														840
																835
	834.6	8.5														835
																830
	829.6	13.5														830
																825
	825.2	17.9														825
																820
																825.2

NCDOT BORE SINGLE BD5109P_GEO_BH_BRD0145_FORSYTH.GPJ_NC_DOT.GDT 8/13/12

NCDOT BORE SINGLE BD5109P_GEO_BH_BRD0145_FORSYTH.GPJ_NC_DOT.GDT 8/13/12

FORSYTH COUNTY
LOW IMPACT BRIDGE

STRUCTURE 330145
LS 09-11-087
WBS 45355.116
TIP BD-5109-P

PROJECT REFERENCE NO. SHEET

45355.116 (BD-5109P) 9

SITE PHOTO



SKEW = 105°00'00"

DATUM DESCRIPTION
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "BL-2" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 895544.677(11) EASTING: 1596236.438(11) ELEVATION: 842.03(11)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999745555
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BL-2" TO "EL" STATION 10+00 IS N 77°08'03.5" E 298.25'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

PREVIOUSLY LISTED AS:
LS 09-10-021
WBS 42608.1579
TIP M-0423



-L- POT Sta. 10+00.00

-L- POT Sta. 11+70.00
BEGIN TIP PROJECT BD-5109P

-L- POT Sta. 14+50.00
END TIP PROJECT BD-5109P



BENCHMARKS (NAVD88)

BM#1 ELEVATION = 840.06'
N 895679 E 1596374
EL STATION 11+40.00 92' RIGHT
RR SPIKE IN BASE OF 24" SYCAMORE

BM#2 ELEVATION = 857.54'
N 895491 E 1595926
EL STATION 16+13.16' LEFT
REBAR WITH ALUMINUM CAP STAMPED
"BL-1" (SET FLUSH WITH GROUND).
POINT LIES 6.7' SOUTH OF EDGE OF
BOWENS ROAD

BL	POINT	DESC.	NORTH	EAST	ELEVATION	EL STATION	OFFSET
3	BL-3		895629.7330	1596551.5830	844.10		OUTSIDE PROJECT LIMITS
2	BL-2		895544.6770	1596236.4380	842.03	12+97.81	16.20 LT
1	BL-1		895491.1400	1595925.5030	857.54	16+13.32	16.29 LT