

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BD-5109AB	1	9

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY FORSYTH
PROJECT DESCRIPTION BRIDGE 142 ON SR 1639
(TUTTLE RD.) OVER WEST FORK MUDDY CREEK

SITE DESCRIPTION _____

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE(S)
5-6	CROSS SECTIONS
7-8	BORE LOG(S)
9	SITE PHOTOGRAPH(S)

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 BORHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

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

PERSONNEL

J.K. STICKNEY

C.L. SMITH

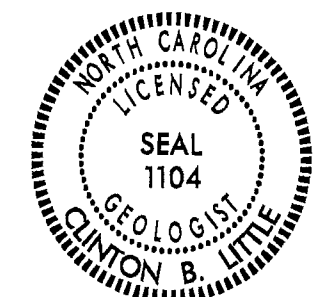
INVESTIGATED BY J.E. BEVERLY

DRAWN BY J.K. McCLURE

CHECKED BY C.B. LITTLE

SUBMITTED BY C.B. LITTLE

DATE SEPTEMBER 2014



DocuSigned by:
Clinton B. Little 9/23/2014

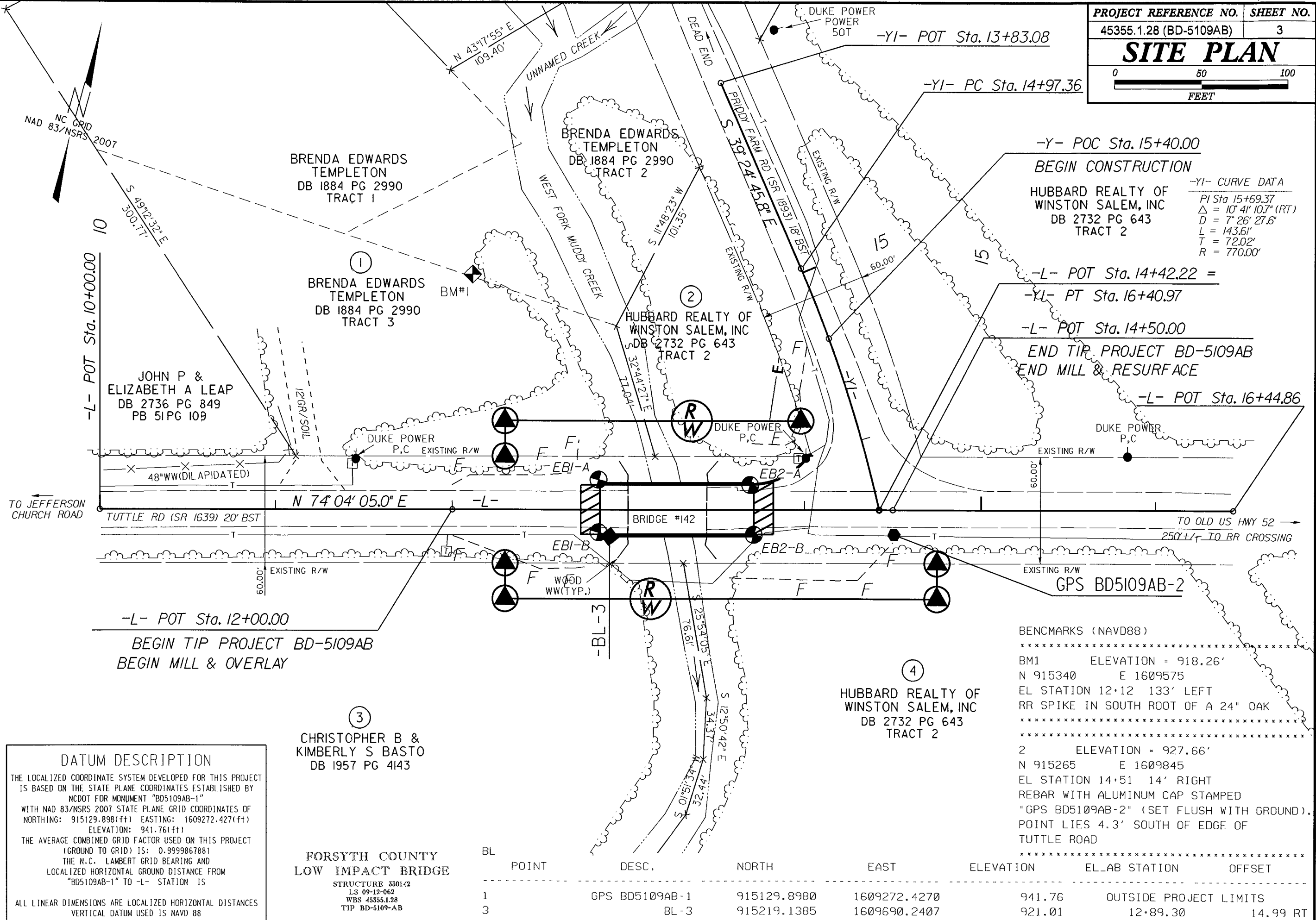
9306432408452... DATE

REFERENCE: BD-5109AB

PROJECT: 45355.1.28

**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, VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.										HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:										ALLUVIUM (ALUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARGILLACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE 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 (N OR BPF) OF A 148 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SCRC) - 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.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.									
MINERALOGICAL COMPOSITION										CRISTALLINE ROCK (CR)										NON-CRYSTALLINE ROCK (NCR)										COASTAL PLAIN SEDIMENTARY ROCK (CP)									
COMPRESSION										SLIGHTLY COMPRESSIBLE										MODERATELY COMPRESSIBLE										HIGHLY COMPRESSIBLE									
PERCENTAGE OF MATERIAL										ORGANIC MATERIAL										GRANULAR SOILS										SILT - CLAY SOILS									
GROUND WATER										WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING										STATIC WATER LEVEL AFTER 24 HOURS										PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA									
MISCELLANEOUS SYMBOLS										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION										SOIL SYMBOL										ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT									
RECOMMENDATION SYMBOLS										UNDERCUT EXCAVATION										UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE										UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL									
ABBREVIATIONS										AR - AUGER REFUSAL										BT - BORING TERMINATED										CL - CLAY									
SOIL MOISTURE - CORRELATION OF TERMS										SOIL MOISTURE SCALE (ATTERBERG LIMITS)										FIELD MOISTURE DESCRIPTION										GUIDE FOR FIELD MOISTURE DESCRIPTION									
PLASTICITY										NON PLASTIC										SLIGHTLY PLASTIC										MODERATELY PLASTIC									
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.										DRILL UNITS:										ADVANCING TOOLS:									
EQUIPMENT USED ON SUBJECT PROJECT										DRILL UNITS:										ADVANCING TOOLS:										HAMMER TYPE:									
INDURATION										FRIABLE										MODERATELY INDURATED										INDURATED									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									
ROCK HARDNESS										VERY HARD										HARD										MODERATELY HARD									
TEXTURE OR GRAIN SIZE										U.S. STD. SIEVE SIZE OPENING (MM)										BOULDER (BLDR.)										COBBLE (COB.)									
CONSISTENCY OR DENSENESS										PRIMARY SOIL TYPE										COMPACTNESS OR CONSISTENCY										RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)									



-Y- POC Sta. 15+40.00
BEGIN CONSTRUCTION
 HUBBARD REALTY OF WINSTON SALEM, INC
 DB 2732 PG 643 TRACT 2
 -YI- CURVE DATA
 PI Sta 15+69.37
 $\Delta = 10^{\circ} 41' 10.7''$ (RT)
 $D = 7^{\circ} 26' 27.6''$
 $L = 143.61'$
 $T = 72.02'$
 $R = 770.00'$

-L- POT Sta. 14+42.22 =
 -YL- PT Sta. 16+40.97
 -L- POT Sta. 14+50.00
**END TIP PROJECT BD-5109AB
 END MILL & RESURFACE**
 -L- POT Sta. 16+44.86

BENCHMARKS (NAVD88)

 BM1 ELEVATION = 918.26'
 N 915340 E 1609575
 EL STATION 12+12 133' LEFT
 RR SPIKE IN SOUTH ROOT OF A 24" OAK

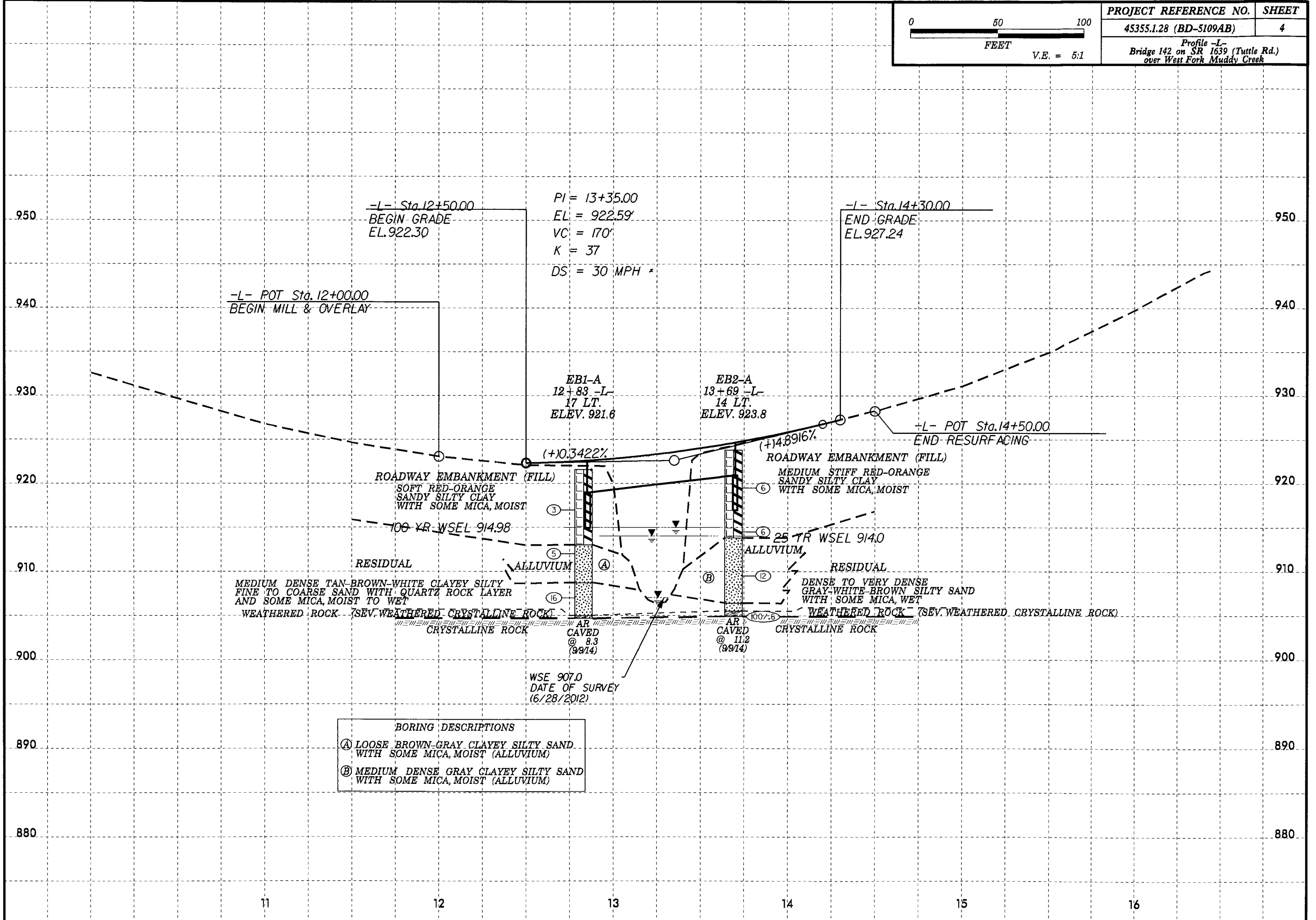
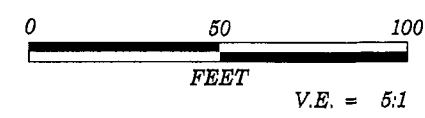
 2 ELEVATION = 927.66'
 N 915265 E 1609845
 EL STATION 14+51 14' RIGHT
 REBAR WITH ALUMINUM CAP STAMPED
 "GPS BD5109AB-2" (SET FLUSH WITH GROUND).
 POINT LIES 4.3' SOUTH OF EDGE OF
 TUTTLE ROAD

DATUM DESCRIPTION
 THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "BD5109AB-1" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 915129.898(±) EASTING: 1609272.427(±) ELEVATION: 941.76(±) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999867881 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BD5109AB-1" TO -L- STATION IS
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

③ CHRISTOPHER B & KIMBERLY S BASTO
 DB 1957 PG 4143

**FORSYTH COUNTY
 LOW IMPACT BRIDGE**
 STRUCTURE 330142
 LS 09-12-062
 WBS 45355.1.28
 TIP BD-5109-AB

BL	POINT	DESC.	NORTH	EAST	ELEVATION	EL LAB STATION	OFFSET
1	GPS BD5109AB-1		915129.8980	1609272.4270	941.76	OUTSIDE PROJECT LIMITS	
3	BL-3		915219.1385	1609690.2407	921.01	12+89.30	14.99 RT
2	GPS BD5109AB-2		915264.5210	1609845.0910	927.66	14+50.65	13.86 RT

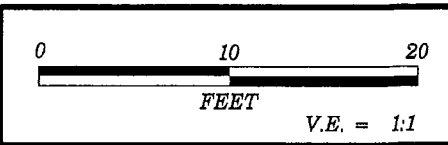


BORING DESCRIPTIONS

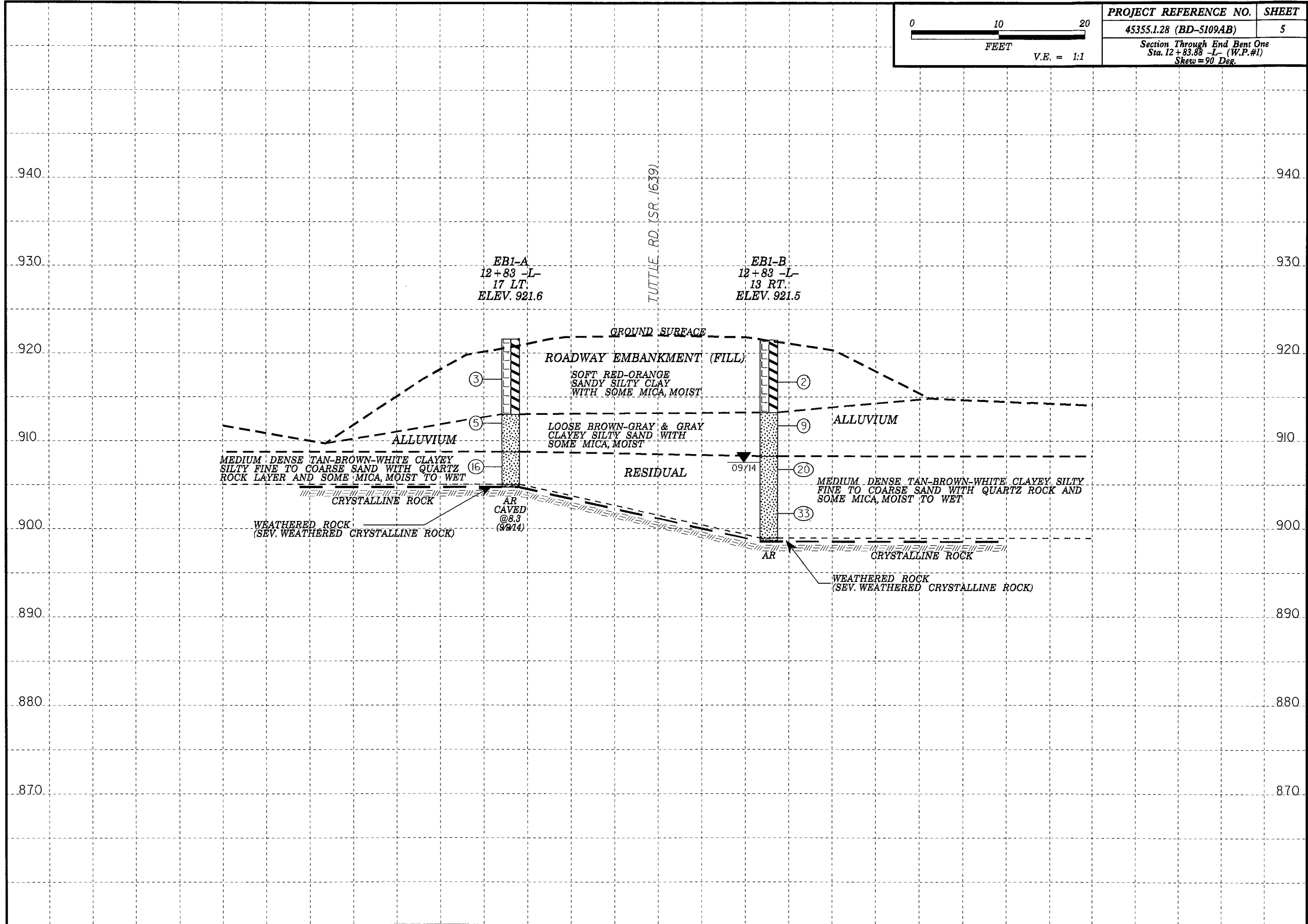
Ⓐ LOOSE BROWN-GRAY CLAYEY SILTY SAND WITH SOME MICA, MOIST (ALLUVIUM)

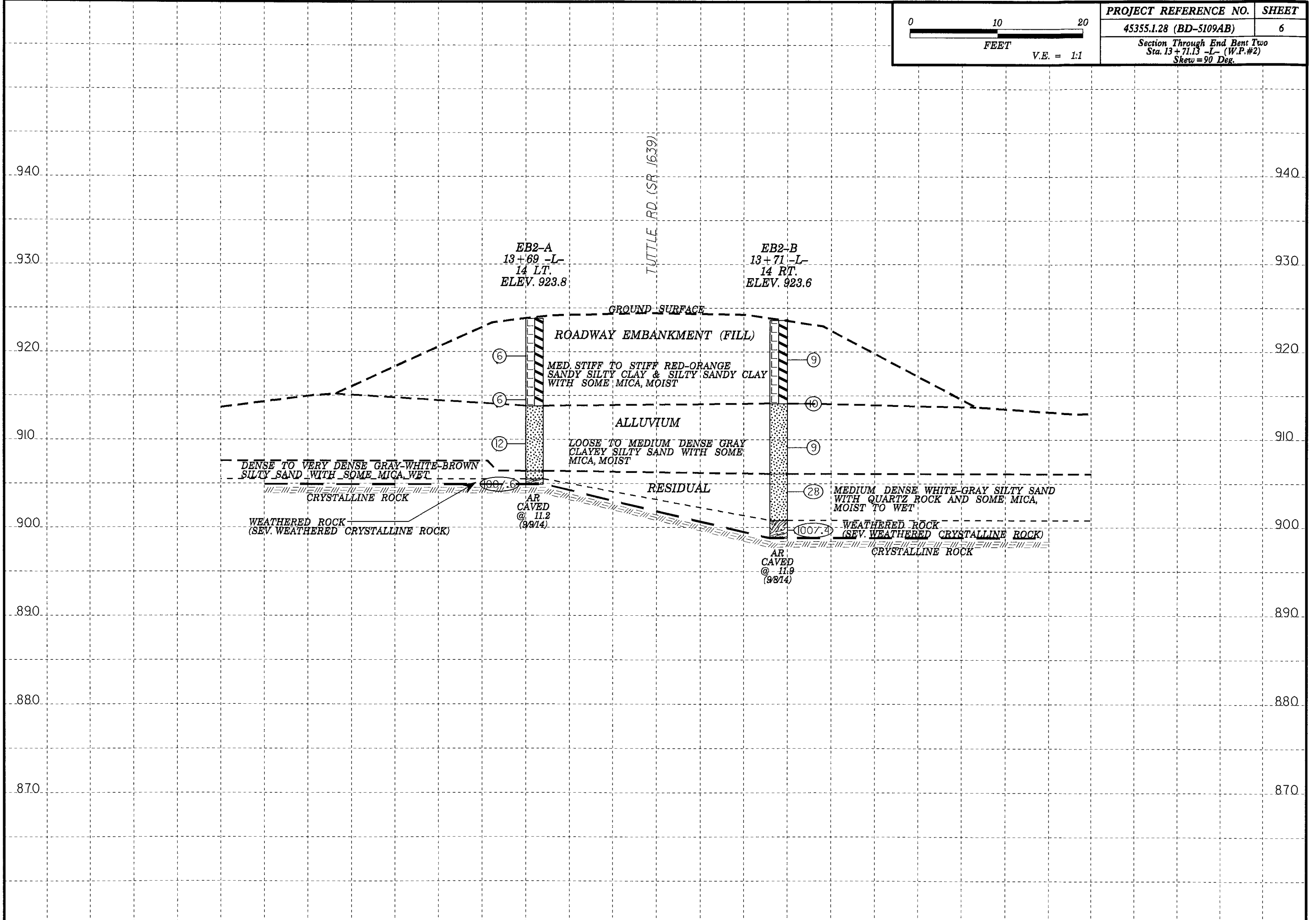
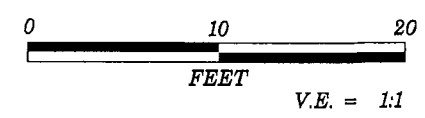
Ⓑ MEDIUM DENSE GRAY CLAYEY SILTY SAND WITH SOME MICA, MOIST (ALLUVIUM)

WSE 907.0
DATE OF SURVEY
(6/28/2012)



PROJECT REFERENCE NO.	SHEET
45355.1.28 (BD-5109AB)	5
Section Through End Bent One Sta. 12+83.88 -L- (W.P.#1) Skew = 90 Deg.	



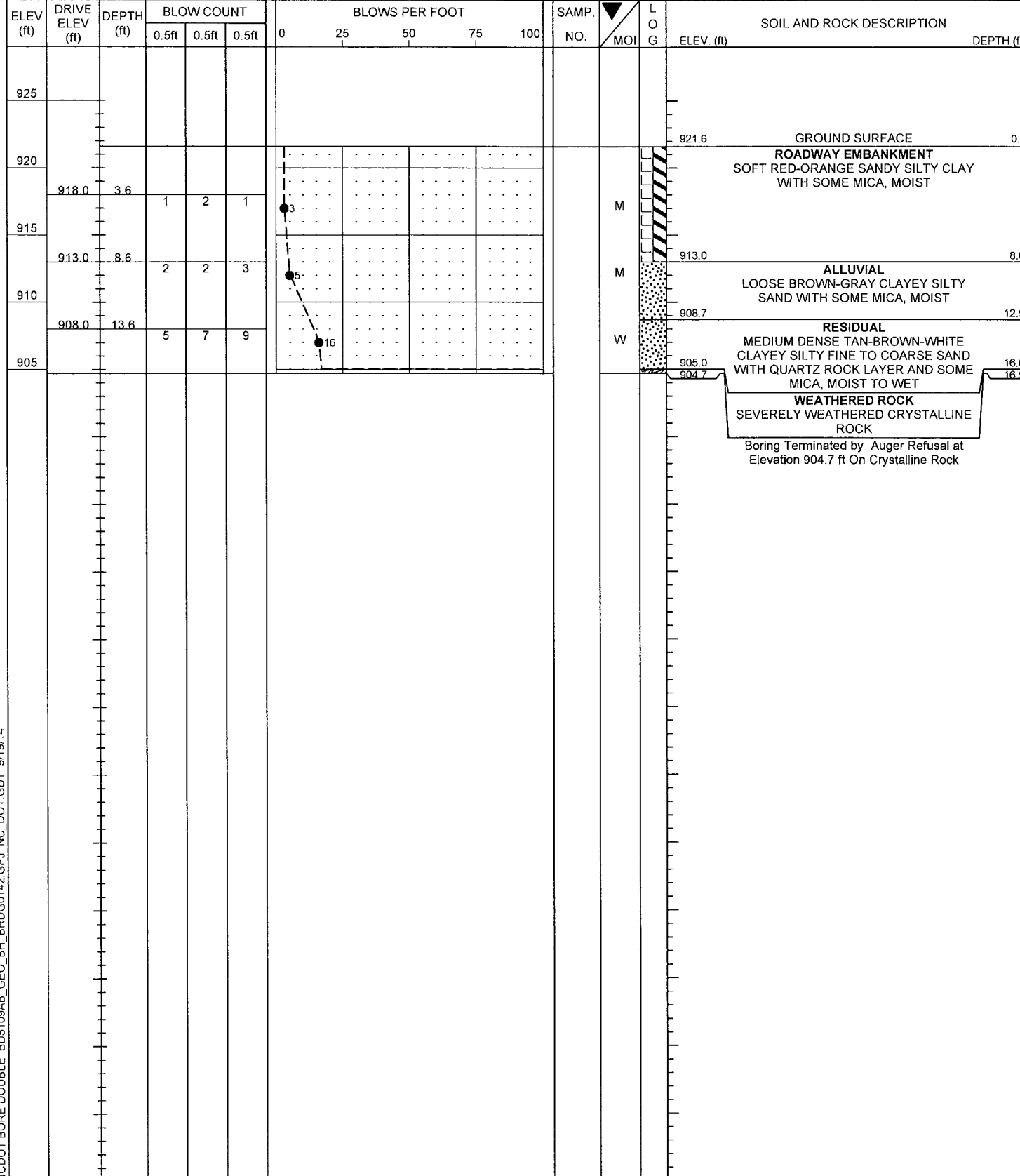




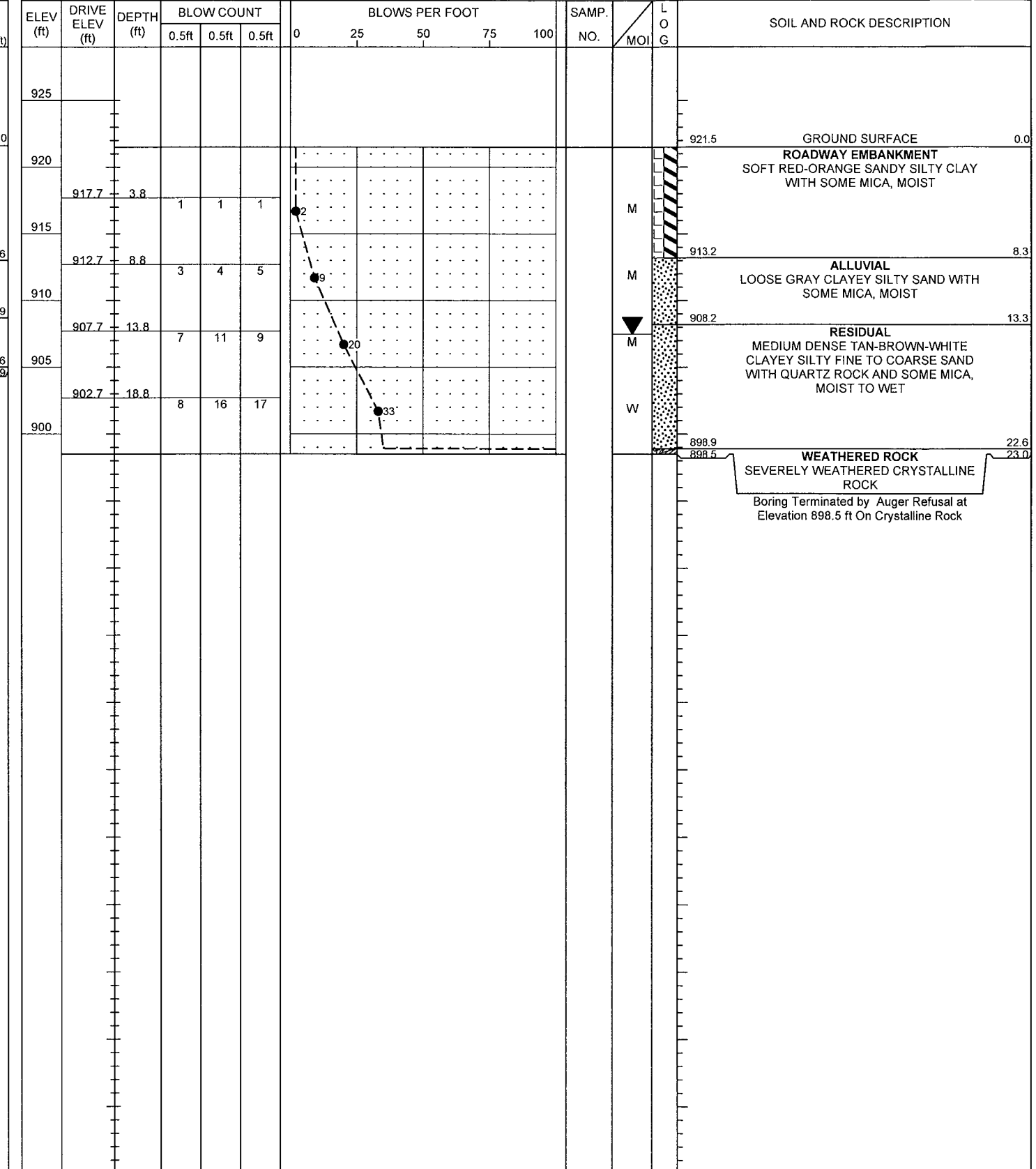
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 45355.1.29		TIP BD-5109AB		COUNTY FORSYTH		GEOLOGIST Stickney, J. K.	
SITE DESCRIPTION BRIDGE 142 on SR 1639 (Tuttle Rd) over WEST MUDDY FORK CREEK							GROUND WTR (ft)
BORING NO. EB1-A		STATION 12+83		OFFSET 17 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 921.6 ft		TOTAL DEPTH 16.9 ft		NORTHING 915,248		EASTING 1,609,675	
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic			
DRILLER Smith, C.L.		START DATE 09/08/14		COMP. DATE 09/08/14		SURFACE WATER DEPTH N/A	



WBS 45355.1.29		TIP BD-5109AB		COUNTY FORSYTH		GEOLOGIST Stickney, J. K.	
SITE DESCRIPTION BRIDGE 142 on SR 1639 (Tuttle Rd) over WEST MUDDY FORK CREEK							GROUND WTR (ft)
BORING NO. EB1-B		STATION 12+83		OFFSET 13 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 921.5 ft		TOTAL DEPTH 23.0 ft		NORTHING 915,220		EASTING 1,609,684	
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic			
DRILLER Smith, C.L.		START DATE 09/09/14		COMP. DATE 09/09/14		SURFACE WATER DEPTH N/A	





NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

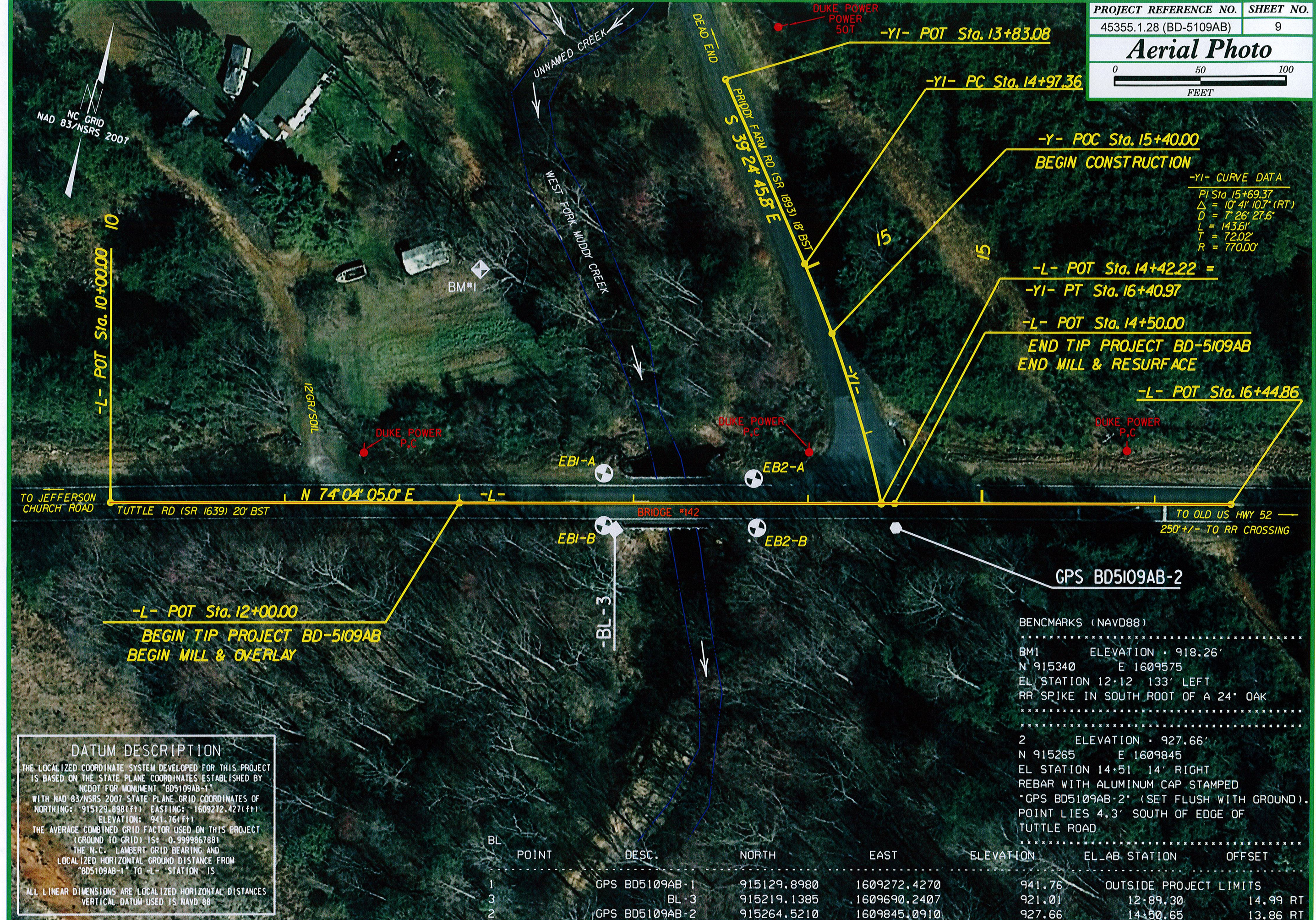
WBS 45355.1.29	TIP BD-5109AB	COUNTY FORSYTH	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE 142 on SR 1639 (Tuttle Rd) over WEST MUDDY FORK CREEK			GROUND WTR (ft)
BORING NO. EB2-A	STATION 13+69	OFFSET 14 ft LT	ALIGNMENT -L-
COLLAR ELEV. 923.8 ft	TOTAL DEPTH 18.9 ft	NORTHING 915,269	EASTING 1,609,759
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014			DRILL METHOD H.S. Augers
DRILLER Smith, C.L.			HAMMER TYPE Automatic
START DATE 09/08/14	COMP. DATE 09/08/14	SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
925														923.8 GROUND SURFACE	0.0
920	920.5	3.3	2	3	3								M	ROADWAY EMBANKMENT MEDIUM STIFF RED-ORANGE SANDY SILTY CLAY WITH SOME MICA, MOIST	
915	915.5	8.3	3	3	3								M		
910	910.5	13.3	3	6	6								W	ALLUVIAL MED. DENSE GRAY CLAYEY SILTY SAND WITH SOME MICA, MOIST	10.0
905	905.5	18.3	21	79/1										RESIDUAL DENSE TO VERY DENSE GRAY-WHITE-BROWN SILTY SAND WITH SOME MICA, WET WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	17.4 18.3 18.9
														Boring Terminated by Auger Refusal at Elevation 904.9 ft On Crystalline Rock	

WBS 45355.1.29	TIP BD-5109AB	COUNTY FORSYTH	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE 142 on SR 1639 (Tuttle Rd) over WEST MUDDY FORK CREEK			GROUND WTR (ft)
BORING NO. EB2-B	STATION 13+71	OFFSET 14 ft RT	ALIGNMENT -L-
COLLAR ELEV. 923.6 ft	TOTAL DEPTH 24.8 ft	NORTHING 915,243	EASTING 1,609,769
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014			DRILL METHOD H.S. Augers
DRILLER Smith, C.L.			HAMMER TYPE Automatic
START DATE 09/05/14	COMP. DATE 09/05/14	SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
925														923.6 GROUND SURFACE	0.0
920	920.1	3.5	2	3	6								M	ROADWAY EMBANKMENT STIFF RED-ORANGE SILTY SANDY CLAY WITH SOME MICA, MOIST	
915	915.1	8.5	4	4	6								M		
910	910.1	13.5	3	5	4								M	ALLUVIAL LOOSE GRAY CLAYEY SILTY SAND WITH SOME MICA, MOIST	9.5
905	905.1	18.5	9	17	11								M	RESIDUAL MEDIUM DENSE WHITE-GRAY SILTY SAND WITH QUARTZ ROCK AND SOME MICA, MOIST TO WET	17.5
900	900.1	23.5	100/4										M	WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK	22.8 24.8
														Boring Terminated by Auger Refusal at Elevation 898.8 ft On Crystalline Rock	

Aerial Photo



-YI- CURVE DATA
 PI Sta. 15+69.37
 $\Delta = 10^{\circ} 41' 10.7''$ (RT)
 D = 7' 26" 27.6"
 L = 143.61'
 T = 72.02'
 R = 770.00'

-L- POT Sta. 14+42.22 =
-YI- PT Sta. 16+40.97
-L- POT Sta. 14+50.00
END TIP PROJECT BD-5109AB
END MILL & RESURFACE
-L- POT Sta. 16+44.86

-L- POT Sta. 12+00.00
BEGIN TIP PROJECT BD-5109AB
BEGIN MILL & OVERLAY

DATUM DESCRIPTION
 THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "BD5109AB-1" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 915129.898(ft) EASTING: 1609272.427(ft) ELEVATION: 941.76(ft)
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999867881
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BD5109AB-1" TO -L- STATION IS
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

BENCHMARKS (NAVD88)

 BM1 ELEVATION: 918.26'
 N 915340 E 1609575
 EL STATION 12+12 133' LEFT
 RR SPIKE IN SOUTH ROOT OF A 24" OAK

 2 ELEVATION: 927.66'
 N 915265 E 1609845
 EL STATION 14+51 14' RIGHT
 REBAR WITH ALUMINUM CAP STAMPED
 "GPS BD5109AB-2" (SET FLUSH WITH GROUND)
 POINT LIES 4.3' SOUTH OF EDGE OF TUTTLE ROAD

BL	POINT	DESC.	NORTH	EAST	ELEVATION	EL_AB STATION	OFFSET
1		GPS BD5109AB-1	915129.8980	1609272.4270	941.76	OUTSIDE PROJECT LIMITS	
3		BL-3	915219.1385	1609690.2407	921.01	12+89.30	14.99 RT
2		GPS BD5109AB-2	915264.5210	1609845.0910	927.66	14+50.65	13.86 RT