

REFERENCE: I-2513AC

PROJECT: 34165

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4 - 5	CROSS SECTIONS
6 - 10	BORE LOGS
11	SITE PHOTOGRAPHS

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY BUNCOMBE
PROJECT DESCRIPTION I-26 CONNECTOR (I-40 TO
US 19 – US 23 – US 70 NORTH TO ASHEVILLE)
SITE DESCRIPTION BRIDGES NO. 900 AND NO. 901
ON I-26 /I-240 OVER STATE STREET BETWEEN
SR 3556 (AMBOY ROAD) AND US 23 BUSINESS
(HAYWOOD ROAD)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AC	1	11

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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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

MARPLES, Z. J.

TURNAGE, J. R.

OXENDINE, J.

WHITEHEAD, T.

DUGGINS, W. T.

INVESTIGATED BY MARPLES, Z. J.

DRAWN BY ALMULLA, H.

CHECKED BY RIGGS, Jr., A. F.

SUBMITTED BY RIGGS, Jr., A. F.

DATE MAY 2024

Prepared in the Office of:



2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
NC REGISTERED ENGINEERING FIRM: E-0869
NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:

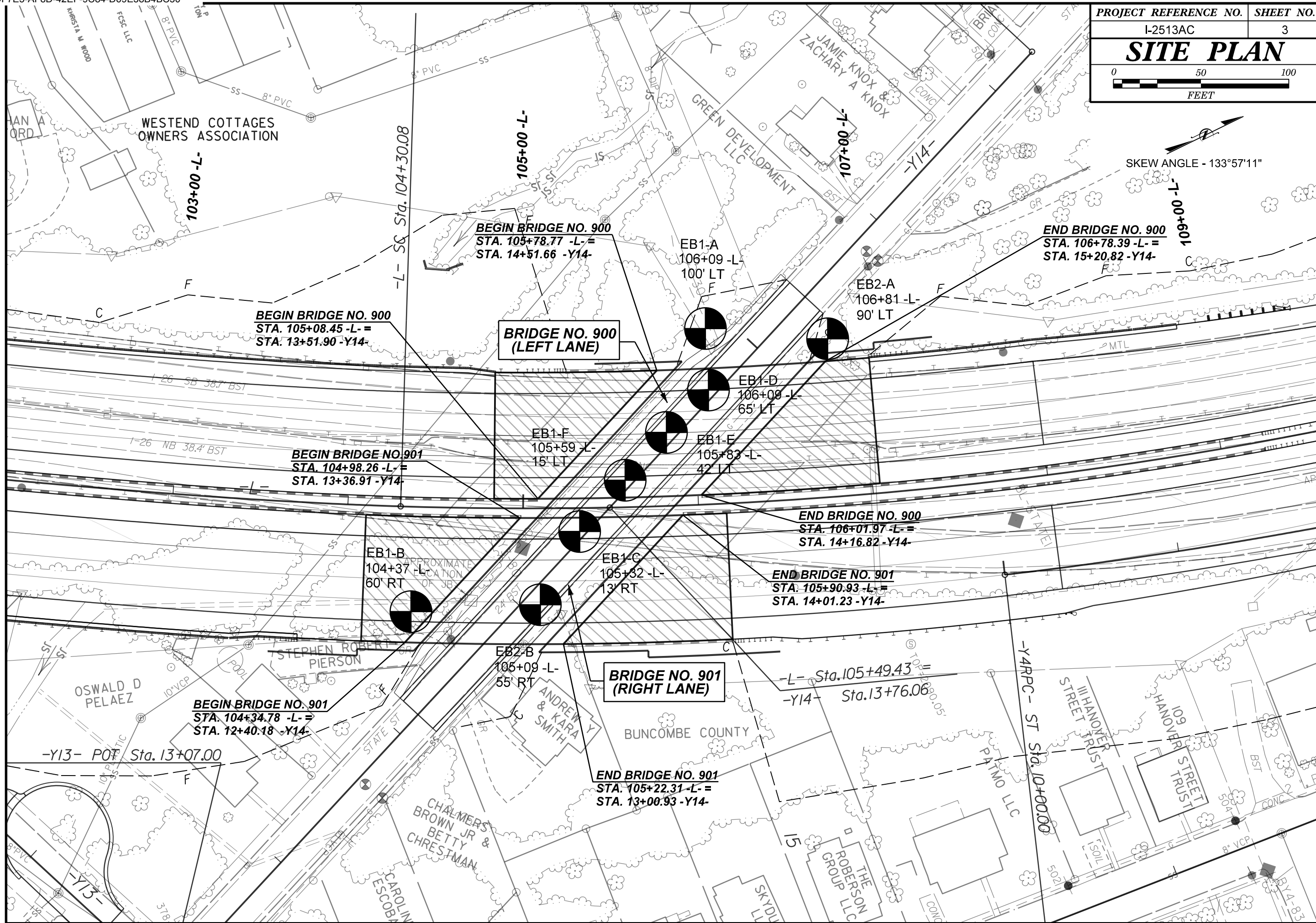
Abner Riggs Jr. 2/26/2025

C2F6ACA84D274B1...
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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

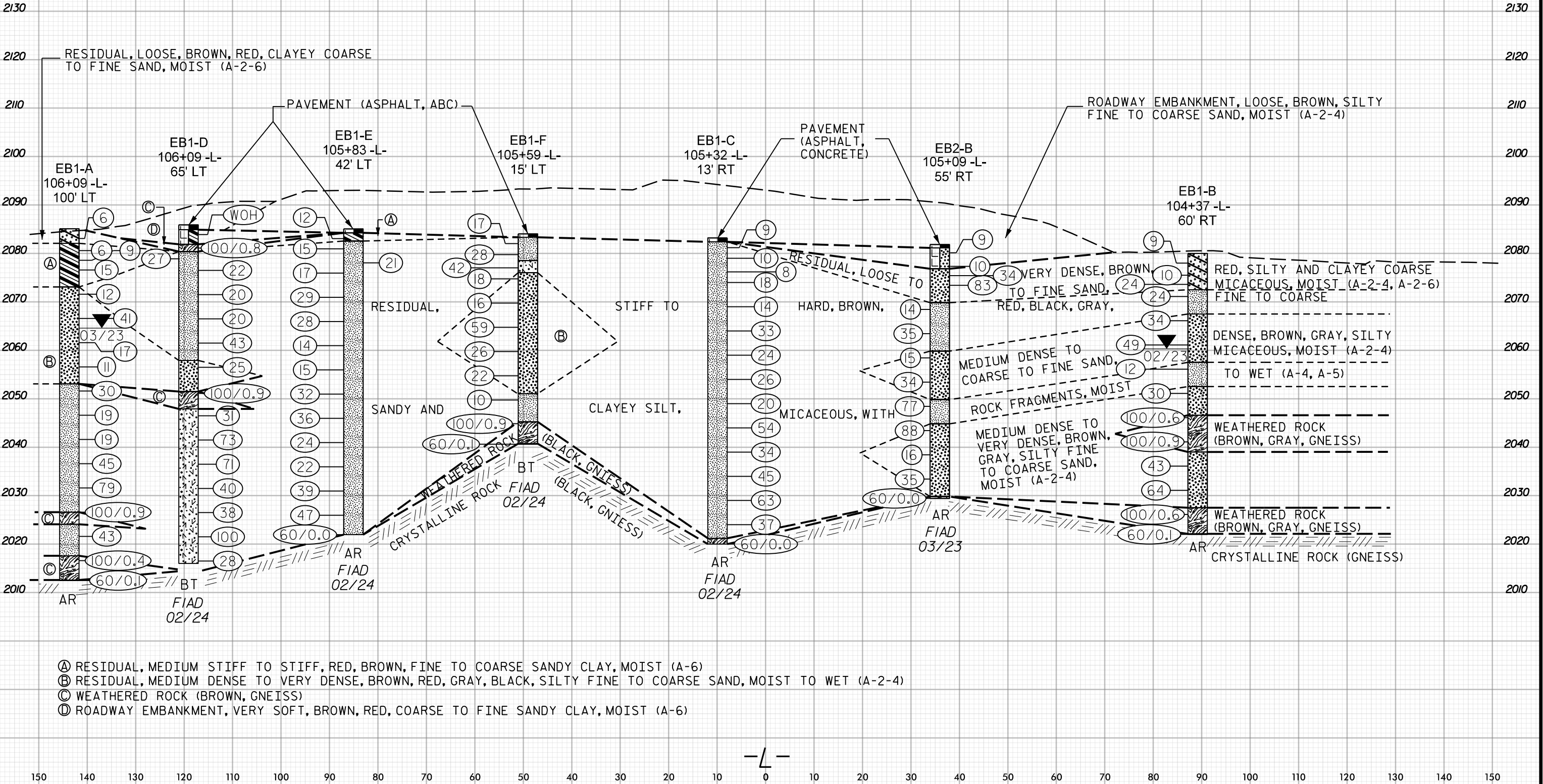
SOIL DESCRIPTION												GRADATION												ROCK DESCRIPTION												TERMS AND DEFINITIONS													
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>												WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.												HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:												ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.													
SOIL LEGEND AND AASHTO CLASSIFICATION												ANGULARITY OF GRAINS												WEATHERED ROCK (WR)												CRYSTALLINE ROCK (CR)													
GENERAL CLASS.		GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)						ORGANIC MATERIALS				CRYSTALLINE ROCK (CR)		NON-CRYSTALLINE ROCK (NCR)		COASTAL PLAIN SEDIMENTARY ROCK (CP)																											
GROUP CLASS.	A-1	A-1-b	A-3	A-2-4	A-2	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7																																			
SYMBOL																																																	
% PASSING #10 #40 #200	50 MX 30 MX 15 MX		50 MX 25 MX 10 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN				GRANULAR SOILS		SILT-CLAY SOILS		MUCK, PEAT																													
MATERIAL PASSING #40 LL PI	-		-	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN					SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS																															
GROUP INDEX	0		0	0	4 MX	8 MX	12 MX	16 MX	NO MX							FAIR TO POOR		POOR		UNSUITABLE																													
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		CLAYEY SOILS																																									
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD						FAIR TO POOR						FAIR TO POOR		POOR		UNSUITABLE																																
PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30																																																	
CONSISTENCY OR DENSENESS												MISCELLANEOUS SYMBOLS												ROCK HARDNESS												BEDDING													
PRIMARY SOIL TYPE		COMPACTNESS OR CONSISTENCY		RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)				RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES		SLOPE INDICATOR INSTALLATION		SEVERE (SEV.)		VERY SEVERE (V SEV.)		COMPLETE		VERY HARD		HARD		MODERATELY HARD		MEDIUM HARD		SOFT		VERY SOFT															
GENERAL GRANULAR MATERIAL (NON-COHESIVE)		VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE		< 4 4 TO 10 10 TO 30 30 TO 50 > 50				N/A				SOIL SYMBOL		TEST BORING		CONE PENETROMETER TEST																																	
GENERAL SILT-CLAY MATERIAL (COHESIVE)		VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD		< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30				< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4				INFERRED SOIL BOUNDARY		CORE BORING		SOUNDING ROD		TEST BORING WITH CORE																															
												INFERRED ROCK LINE		MONITORING WELL																																			
												ALLUVIAL SOIL BOUNDARY		PIEZOMETER INSTALLATION		SPT N-VALUE																																	
TEXTURE OR GRAIN SIZE												RECOMMENDATION SYMBOLS												FRACTURE SPACING												INDURATION													
U.S. STD. SIEVE SIZE OPENING (MM)		4 4.75		10 2.00		40 0.42		60 0.25		200 0.075		270 0.053		X UNDERCUT		UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE		UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL		SHALLOW UNDERCUT		UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		AR - AUGER REFUSAL		MED. - MEDIUM		VST - VANE SHEAR TEST		TERM		SPACING		TERM		THICKNESS													
BOULDER (BLDR.)		COBBLE (COB.)		GRAVEL (GR.)		COARSE SAND (CSE, SD.)		FINE SAND (F SD.)		SILT (SL.)		CLAY (CL.)												CL - CLAY		WEA. - WEATHERED		γ - UNIT WEIGHT		γ _d - DRY UNIT WEIGHT		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO							
GRAIN SIZE		305 12		75 3		2.0		0.25		0.05		0.005												BT - BORING TERMINATED		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	
SOIL MOISTURE - CORRELATION OF TERMS												ABBREVIATIONS												FRACTIONAL SPACING												BEDDING													
SOIL MOISTURE SCALE (ATTERBERG LIMITS)		FIELD MOISTURE DESCRIPTION		GUIDE FOR FIELD MOISTURE DESCRIPTION								AR - AUGER REFUSAL		MED. - MEDIUM		VST - VANE SHEAR TEST		TERM		SPACING		TERM		THICKNESS		BENCH MARK: BY3-79; STA. 8+71.89 -Y3- N: 683368.9022, E: 934385.0560		ELEVATION: 2097.48 FEET		NOTES:		FIAD - FILLED IMMEDIATELY AFTER DRILLING																	
LL		LIQUID LIMIT		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
PL		PLASTIC LIMIT		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CSE - COARSE		DMT - DILATOMETER TEST		DPT - DYNAMIC PENETRATION TEST		e - VOID RATIO		F - FINE		FOSS. - FOSSILIFEROUS		FRAC. - FRACTURED, FRACTURES		FRAGS. - FRAGMENTS		HL - HIGHLY		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO									
OM		OPTIMUM MOISTURE		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CSE - COARSE		DMT - DILATOMETER TEST		DPT - DYNAMIC PENETRATION TEST		e - VOID RATIO		F - FINE		FOSS. - FOSSILIFEROUS		FRAC. - FRACTURED, FRACTURES		FRAGS. - FRAGMENTS		HL - HIGHLY		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO									
SL		SHRINKAGE LIMIT		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CSE - COARSE		DMT - DILATOMETER TEST		DPT - DYNAMIC PENETRATION TEST		e - VOID RATIO		F - FINE		FOSS. - FOSSILIFEROUS		FRAC. - FRACTURED, FRACTURES		FRAGS. - FRAGMENTS		HL - HIGHLY		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO									
PLASTICITY												EQUIPMENT USED ON SUBJECT PROJECT												FRACTIONAL SPACING												BEDDING													
PLASTICITY INDEX (PI)		DRY STRENGTH		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
NON PLASTIC		VERY LOW		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
SLIGHTLY PLASTIC		SLIGHT		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
MODERATELY PLASTIC		MEDIUM		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
HIGHLY PLASTIC		HIGH		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
COLOR												EQUIPMENT USED ON SUBJECT PROJECT												FRACTIONAL SPACING												BEDDING													
COLOR		DRY STRENGTH		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
NON PLASTIC		VERY LOW		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
SLIGHTLY PLASTIC		SLIGHT		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
MODERATELY PLASTIC		MEDIUM		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
HIGHLY PLASTIC		HIGH		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
COLOR												EQUIPMENT USED ON SUBJECT PROJECT												FRACTIONAL SPACING												BEDDING													
COLOR		DRY STRENGTH		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
NON PLASTIC		VERY LOW		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
SLIGHTLY PLASTIC		SLIGHT		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
MODERATELY PLASTIC		MEDIUM		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
HIGHLY PLASTIC		HIGH		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
COLOR												EQUIPMENT USED ON SUBJECT PROJECT												FRACTIONAL SPACING												BEDDING													
COLOR		DRY STRENGTH		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
NON PLASTIC		VERY LOW		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		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		S - BULK		SS - SPLIT SPOON		ST - SHELBY TUBE		RS - ROCK		RT - RECOMPACTED TRIAXIAL		CBR - CALIFORNIA BEARING RATIO			
SLIGHTLY PLASTIC		SLIGHT		USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE								CL - CLAY		MOD. - MODERATELY		NP - NON PLASTIC		ORG																															

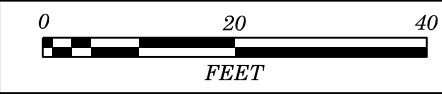


NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE: i2513_ls_tnl.tin (DATED: 01/19/2023)

SKEW ANGLE - 133°57'11"

CROSS SECTION ALONG END BENT 1 AT STA. 105+03.34 -L-



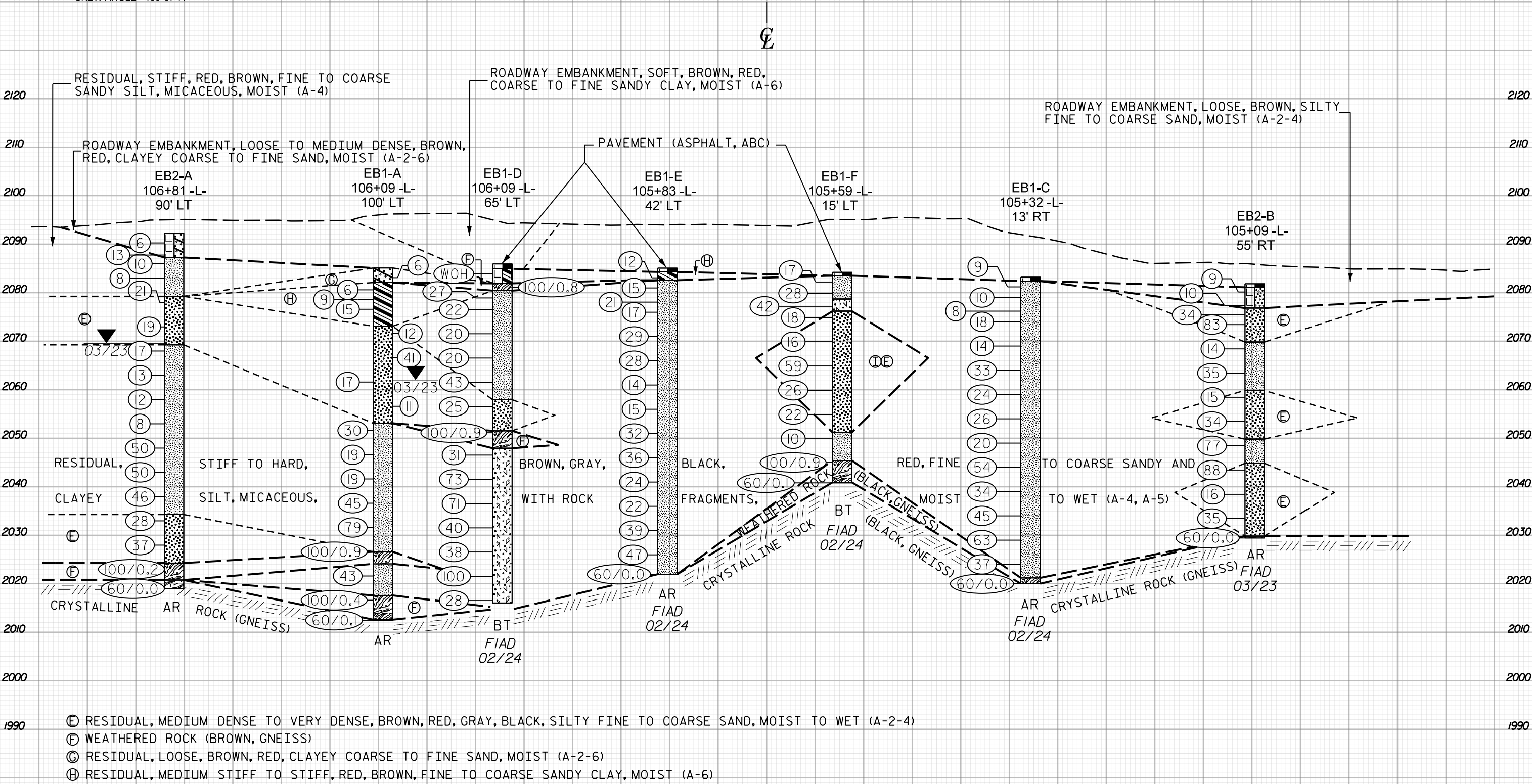


PROJ. REFERENCE NO.	SHEET NO.
I-2513AC	5

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE: i2513_ls_tnl.tin (DATED: 01/19/2023)

SKEW ANGLE - 133°57'11"

CROSS SECTION ALONG END BENT 2 AT STA. 105+96.43 -L-



NCDOT BORE SINGLE I2513AC GEO BRDG STATE STREET - UPDATED 03-11-24.GPJ NC DOT.GDT 5/23/24

NCDOT BORE SINGLE I2513AC GEO BRDG STATE STREET - UPDATED 03-11-24.GPJ NC DOT.GDT 5/23/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.6					TIP I-2513AC					COUNTY BUNCOMBE					GEOLOGIST Marples, Z. J.						
SITE DESCRIPTION BRIDGES NO. 900 AND NO. 901 ON I-26/ I-240 OVER STATE STREET BETWEEN SR 3556 AND US 23 BUS.															GROUND WTR (ft)						
BORING NO. EB1-B					STATION 104+37					OFFSET 60 ft RT					ALIGNMENT -L-					0 HR. N/A	
COLLAR ELEV. 2,080.0 ft					TOTAL DEPTH 58.0 ft					NORTHING 682,703					EASTING 934,597					24 HR. 19.7	
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 93% 01/28/2022										DRILL METHOD Mud Rotary					HAMMER TYPE Automatic						
DRILLER Turnage, J.					START DATE 02/28/23					COMP. DATE 02/28/23					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)					
2085																					
2080																					
2075	2,079.0	1.0		2	4	5							M		2,080.0	GROUND SURFACE 0.0					
	2,076.5	3.5		4	4	6							M								
	2,074.6	5.4		11	11	13							M								
2070	2,072.1	7.9		8	11	13							M		2,072.5	7.5					
	2,067.1	12.9		11	14	20							M		2,067.5	12.5					
2065																					
	2,062.1	17.9		12	14	35							M								
2060	2,057.1	22.9		2	5	7							M		2,057.5	22.5					
	2,052.1	27.9		43	20	10							M		2,052.5	27.5					
2050																					
	2,047.1	32.9		17	70	30/0.1									2,046.6	33.4					
2045	2,042.1	37.9		20	80/0.4																
	2,037.1	42.9		16	16	27							M		2,039.0	41.0					
2035																					
	2,032.1	47.9		49	36	28							M								
2030	2,027.1	52.9		90	10/0.1										2,027.5	52.5					
2025	2,022.1	57.9													2,022.1	57.9					
															2,022.0	58.0					
															CRYSTALLINE ROCK (GNEISS) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,022.0 ft IN CRYSTALLINE ROCK (GNEISS)						

NC DOT BORE SINGLE I-2513AC_GEO_BRDG_STATE STREET - UPDATED 03-11-24.GPJ NC_DOT.GDT 5/23/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.6				TIP I-2513AC				COUNTY BUNCOMBE				GEOLOGIST Marples, Z. J.					
SITE DESCRIPTION BRIDGES NO. 900 AND NO. 901 ON I-26/ I-240 OVER STATE STREET BETWEEN SR 3556 AND US 23 BUS.												GROUND WTR (ft)					
BORING NO. EB2-B				STATION 105+10				OFFSET 55 ft RT				ALIGNMENT -L-				0 HR. N/A	
COLLAR ELEV. 2,081.8 ft				TOTAL DEPTH 52.4 ft				NORTHING 682,771				EASTING 934,626				24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 93% 01/28/2022								DRILL METHOD Mud Rotary				HAMMER TYPE Automatic					
DRILLER Turnage, J.				START DATE 03/07/23				COMP. DATE 03/07/23				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)		
2085																	
2080	2,081.1	0.7		3	4	5								2,081.8	GROUND SURFACE	0.0	
														2,081.1	PAVEMENT (0.5' ASPHALT, 0.2' CONCRETE)	0.7	
	2,078.3	3.5		6	4	6							M		ROADWAY EMBANKMENT		
	2,076.4	5.4		13	15	19							M		LOOSE, BROWN, SILTY FINE TO COARSE SAND, MOIST (A-2-4)	5.0	
2075	2,074.4	7.4		14	31	52							M		RESIDUAL		
													M		DENSE TO VERY DENSE, BROWN, SILTY COARSE TO FINE SAND, MOIST, MICACEOUS (A-2-4)		
2070	2,069.4	12.4		6	9	5							M		STIFF TO HARD, BROWN, RED FINE TO COARSE SANDY SILT, MICACEOUS, MOIST (A-4)	12.0	
2065	2,064.4	17.4		7	11	24							M				
2060	2,059.4	22.4		5	5	10							M		MEDIUM DENSE TO DENSE, BROWN, SILTY FINE TO COARSE SAND, MICACEOUS, MOIST (A-2-4)	22.0	
2055	2,054.4	27.4		10	14	20							M				
2050	2,049.4	32.4		16	33	44							M		HARD, BROWN, GRAY, FINE TO COARSE SANDY SILT, MICACEOUS, MOIST (A-4)	32.0	
2045	2,044.4	37.4		16	56	32							M		MEDIUM DENSE TO VERY DENSE, BROWN, SILTY FINE TO COARSE SAND, MOIST (A-2-4)	37.0	
2040	2,039.4	42.4		5	7	9							M				
2035	2,034.4	47.4		6	13	22							M				
2030	2,029.4	52.4		60/0.0									M		CRYSTALLINE ROCK (GNEISS)	52.0	
														2,029.4	Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,029.4 ft IN CRYSTALLINE ROCK (GNEISS)	52.4	

NC DOT BORE SINGLE I-2513AC_GEO_BRDG_STATE STREET - UPDATED 03-11-24.GPJ NC_DOT.GDT 5/23/24

[illegible]

NCDOT BORE SINGLE I2513AC GEO BRDG STATE STREET - UPDATED 03-11-24.GPJ NC DOT.GDT 5/23/24

NCDOT BORE SINGLE I2513AC GEO BRDG STATE STREET - UPDATED 03-11-24.GPJ NC DOT.GDT 5/23/24

NCDOT BORE SINGLE I2513AC GEO BRDG STATE STREET - UPDATED 03-11-24.GPJ NC DOT.GDT 5/23/24

NCDOT BORE SINGLE I2513AC_GEO_BRDG_STATE STREET - UPDATED 03-11-24.GPJ NC_DOT.GDT 5/23/24

SITE PHOTOGRAPHS

BRIDGES NO. 900 AND NO. 901 ON I-26 / I-240 OVER STATE STREET
BETWEEN SR 3556 (AMBOY ROAD) AND US 23 BUSINESS (HAYWOOD ROAD)



END BENT 1 LOOKING EAST



END BENT 2 LOOKING WEST



ON STATE STREET ALONG -Y14-
ALIGNMENT LOOKING SOUTH



ON STATE STREET ALONG -Y14-
ALIGNMENT LOOKING NORTH

REFERENCE: I-2513AC

PROJECT: 34165

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4 - 5	CROSS SECTIONS
6 - 10	BORE LOGS
11	SITE PHOTOGRAPHS

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY BUNCOMBE
PROJECT DESCRIPTION I-26 CONNECTOR (I-40 TO
US 19 – US 23 – US 70 NORTH TO ASHEVILLE)
SITE DESCRIPTION BRIDGES NO. 900 AND NO. 901
ON I-26 /I-240 OVER STATE STREET BETWEEN
SR 3556 (AMBOY ROAD) AND US 23 BUSINESS
(HAYWOOD ROAD)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AC	1	11

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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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

MARPLES, Z. J.

TURNAGE, J. R.

OXENDINE, J.

WHITEHEAD, T.

DUGGINS, W. T.

INVESTIGATED BY MARPLES, Z. J.

DRAWN BY ALMULLA, H.

CHECKED BY RIGGS, Jr., A. F.

SUBMITTED BY RIGGS, Jr., A. F.

DATE MAY 2024

Prepared in the Office of:



2401 BRENTWOOD ROAD, SUITE 107
RALEIGH, NORTH CAROLINA 27604
NC REGISTERED ENGINEERING FIRM: E-0869
NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:

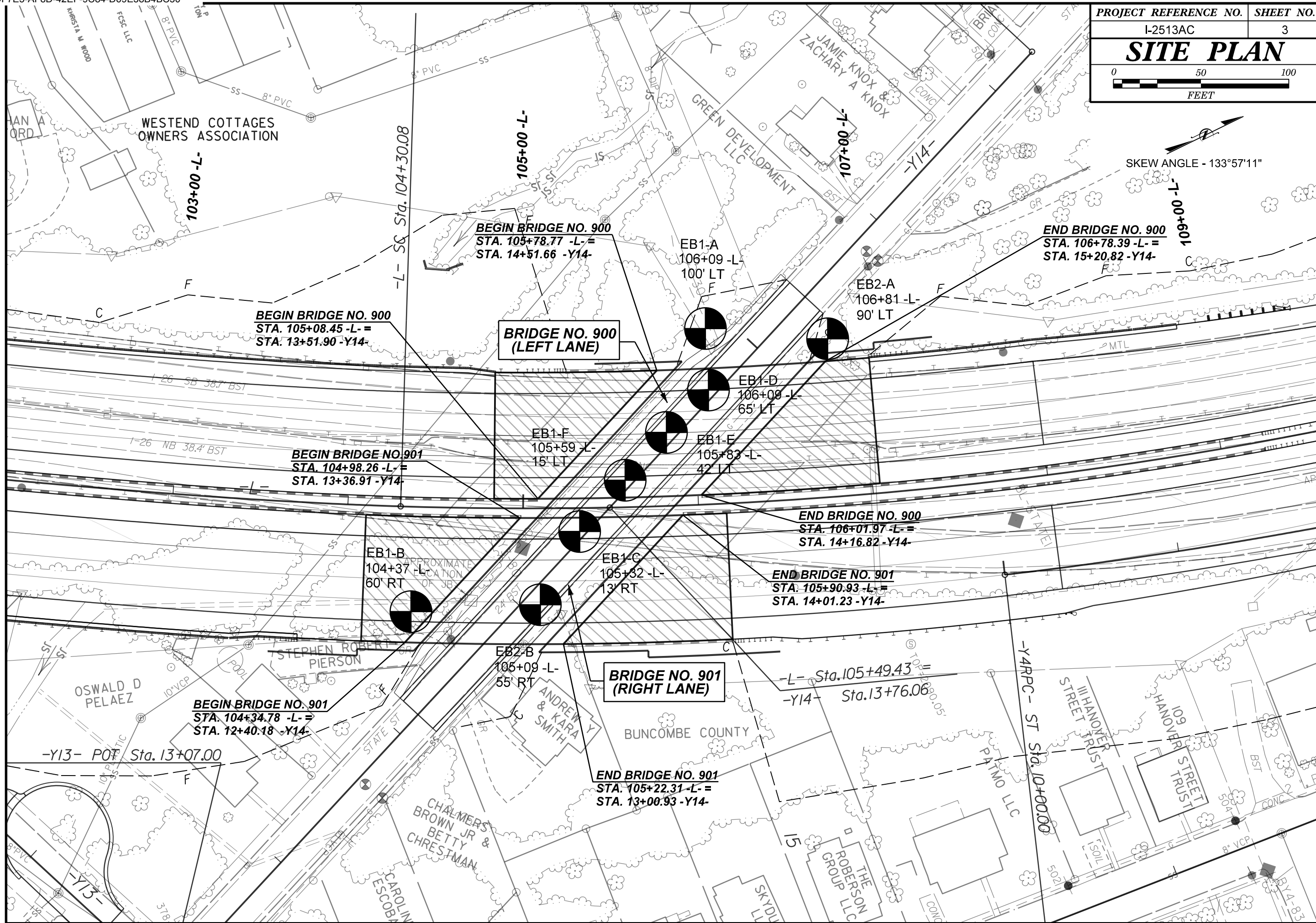
Abner Riggs Jr. 2/26/2025

C2F6ACA84D274B1...
SIGNATURE DATE

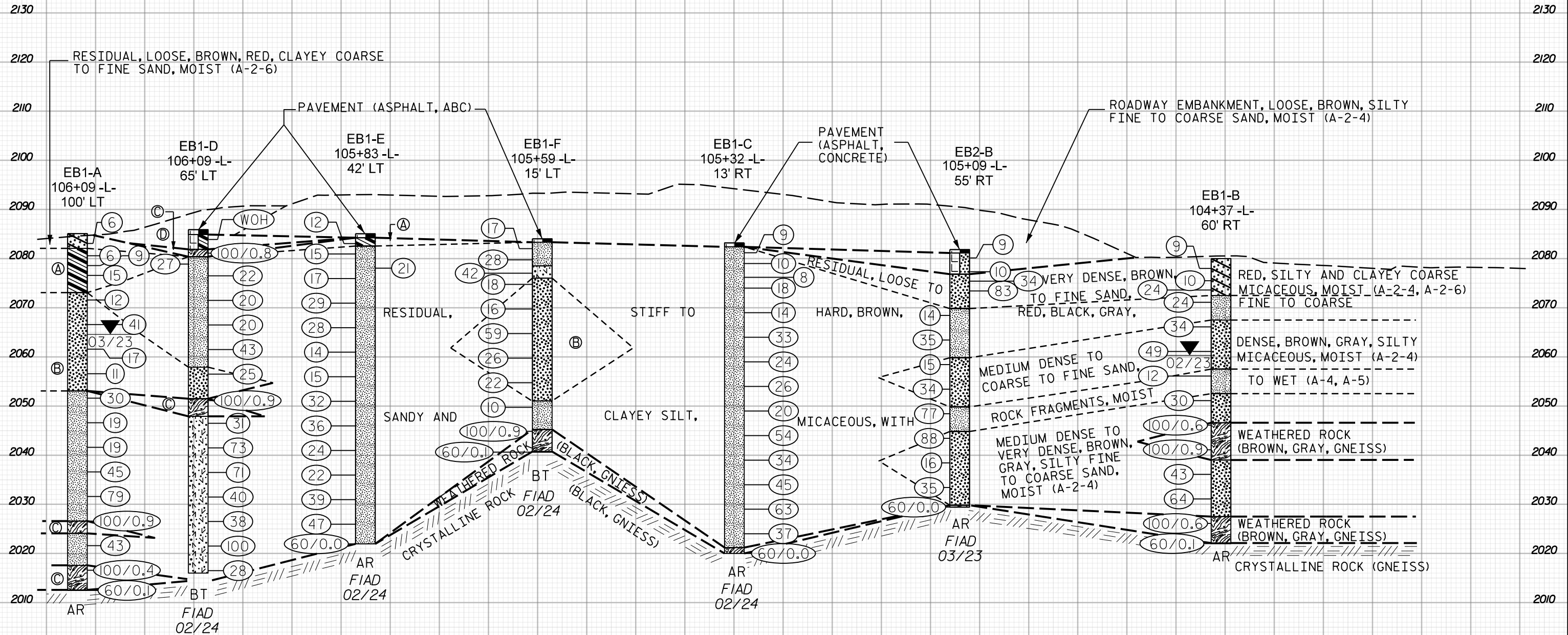
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

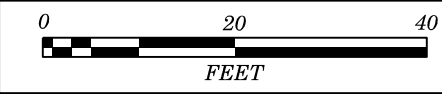
DATE: 8-15-14



CROSS SECTION ALONG END BENT 1 AT STA. 105+03.34 -L-

 $\mathcal{G}$ 

- 7-

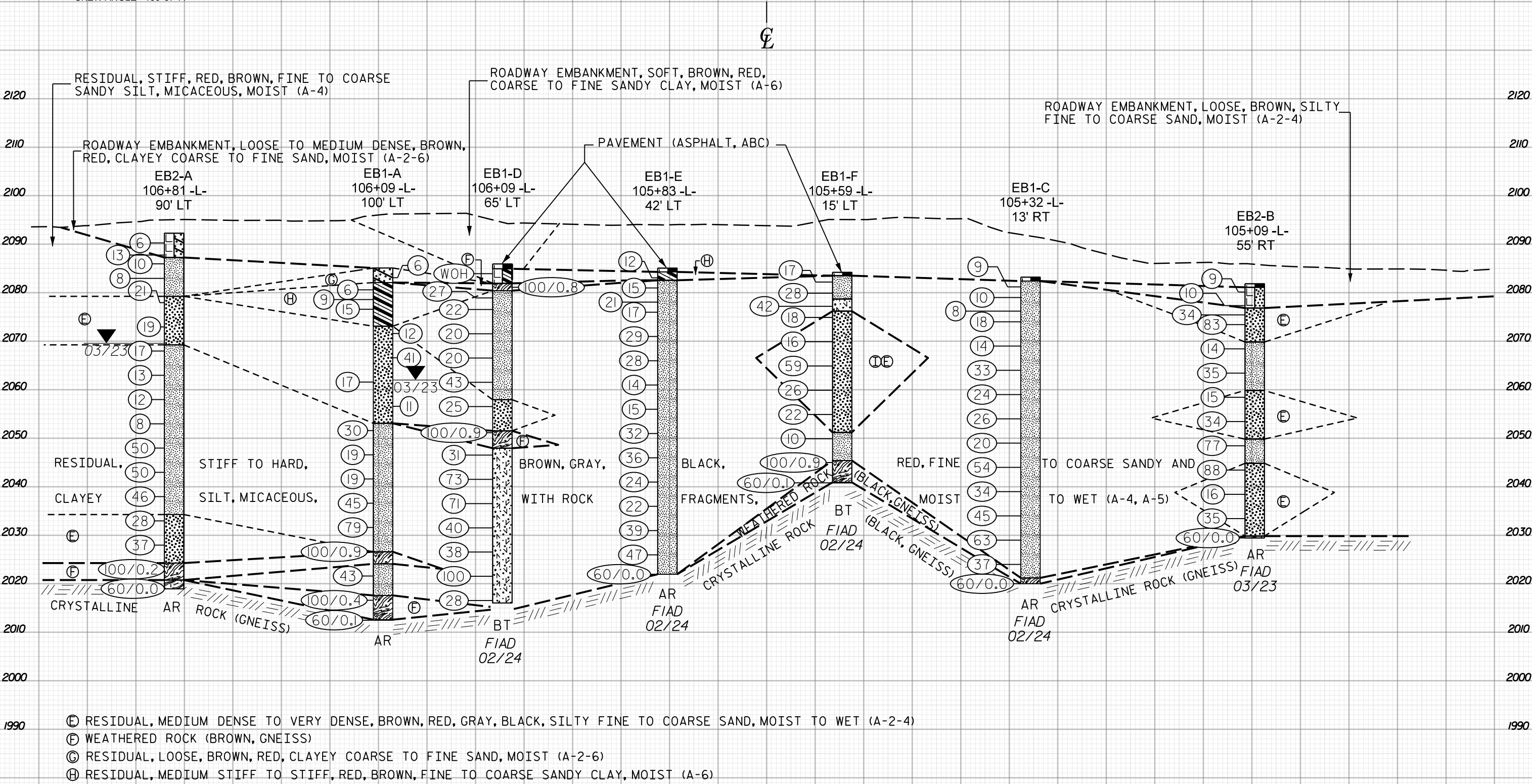


PROJ. REFERENCE NO.	SHEET NO.
I-2513AC	5

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE: i2513_ls_tnl.tin (DATED: 01/19/2023)

SKEW ANGLE - 133°57'11"

CROSS SECTION ALONG END BENT 2 AT STA. 105+96.43 -L-



NCDOT BORE SINGLE I2513AC GEO BRDG STATE STREET - UPDATED 03-11-24.GPJ NC DOT.GDT 5/23/24

NCDOT BORE SINGLE I2513AC GEO BRDG STATE STREET - UPDATED 03-11-24.GPJ NC DOT.GDT 5/23/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.6					TIP I-2513AC					COUNTY BUNCOMBE					GEOLOGIST Marples, Z. J.						
SITE DESCRIPTION BRIDGES NO. 900 AND NO. 901 ON I-26/ I-240 OVER STATE STREET BETWEEN SR 3556 AND US 23 BUS.															GROUND WTR (ft)						
BORING NO. EB1-B					STATION 104+37					OFFSET 60 ft RT					ALIGNMENT -L-					0 HR. N/A	
COLLAR ELEV. 2,080.0 ft					TOTAL DEPTH 58.0 ft					NORTHING 682,703					EASTING 934,597					24 HR. 19.7	
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 93% 01/28/2022										DRILL METHOD Mud Rotary					HAMMER TYPE Automatic						
DRILLER Turnage, J.					START DATE 02/28/23					COMP. DATE 02/28/23					SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION							
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)						
2085																					
2080																					
2075	2,079.0	1.0		2	4	5															
	2,076.5	3.5		4	4	6															
	2,074.6	5.4		11	11	13															
2070	2,072.1	7.9		8	11	13															
	2,067.1	12.9		11	14	20															
2065																					
2060	2,062.1	17.9		12	14	35															
2055	2,057.1	22.9		2	5	7															
	2,052.1	27.9		43	20	10															
2050																					
2045	2,047.1	32.9		17	70	30/0.1															
2040	2,042.1	37.9		20	80/0.4																
2035	2,037.1	42.9		16	16	27															
	2,032.1	47.9		49	36	28															
2030																					
	2,027.1	52.9		90	10/0.1																
2025																					
	2,022.1	57.9		60/0.1																	
</																					

NC DOT BORE SINGLE I2513AC_GEO_BRDG_STATE STREET - UPDATED 03-11-24.GPJ NC_DOT.GDT 5/23/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.6				TIP I-2513AC				COUNTY BUNCOMBE				GEOLOGIST Marples, Z. J.					
SITE DESCRIPTION BRIDGES NO. 900 AND NO. 901 ON I-26/ I-240 OVER STATE STREET BETWEEN SR 3556 AND US 23 BUS.												GROUND WTR (ft)					
BORING NO. EB2-B				STATION 105+10				OFFSET 55 ft RT				ALIGNMENT -L-				0 HR. N/A	
COLLAR ELEV. 2,081.8 ft				TOTAL DEPTH 52.4 ft				NORTHING 682,771				EASTING 934,626				24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 93% 01/28/2022								DRILL METHOD Mud Rotary				HAMMER TYPE Automatic					
DRILLER Turnage, J.				START DATE 03/07/23				COMP. DATE 03/07/23				SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
2085																	
2080	2,081.1	0.7	3	4	5	9							M	2,081.8	GROUND SURFACE	0.0	
2075	2,078.3	3.5	6	4	6	10							M	2,081.1	PAVEMENT (0.5' ASPHALT, 0.2' CONCRETE)	0.7	
	2,076.4	5.4	13	15	19	34							M	2,076.8	ROADWAY EMBANKMENT LOOSE, BROWN, SILTY FINE TO COARSE SAND, MOIST (A-2-4)	5.0	
2070	2,074.4	7.4	14	31	52				83				M		RESIDUAL DENSE TO VERY DENSE, BROWN, SILTY COARSE TO FINE SAND, MOIST, MICACEOUS (A-2-4)		
	2,069.4	12.4	6	9	5	14							M	2,069.8	STIFF TO HARD, BROWN, RED FINE TO COARSE SANDY SILT, MICACEOUS, MOIST (A-4)	12.0	
2065	2,064.4	17.4	7	11	24				35				M				
2060	2,059.4	22.4	5	5	10	15							M	2,059.8	MEDIUM DENSE TO DENSE, BROWN, SILTY FINE TO COARSE SAND, MICACEOUS, MOIST (A-2-4)	22.0	
2055	2,054.4	27.4	10	14	20				34				M				
2050	2,049.4	32.4	16	33	44				77				M	2,049.8	HARD, BROWN, GRAY, FINE TO COARSE SANDY SILT, MICACEOUS, MOIST (A-4)	32.0	
2045	2,044.4	37.4	16	56	32				88				M	2,044.8	MEDIUM DENSE TO VERY DENSE, BROWN, SILTY FINE TO COARSE SAND, MOIST (A-2-4)	37.0	
2040	2,039.4	42.4	5	7	9	16							M				
2035	2,034.4	47.4	6	13	22				35				M				
2030	2,029.4	52.4	60/0.0										M	2,029.8 2,029.4	CRYSTALLINE ROCK (GNEISS) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,029.4 ft IN CRYSTALLINE ROCK (GNEISS)	52.0 52.4	

NC DOT BORE SINGLE I2513AC_GEO_BRDG_STATE STREET - UPDATED 03-11-24.GPJ NC_DOT.GDT 5/23/24

[illegible]

NCDOT BORE SINGLE I2513AC GEO BRDG STATE STREET - UPDATED 03-11-24.GPJ NC DOT.GDT 5/23/24

NCDOT BORE SINGLE I2513AC GEO BRDG STATE STREET - UPDATED 03-11-24.GPJ NC DOT.GDT 5/23/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.6			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST Marples, Z. J.						
SITE DESCRIPTION BRIDGES NO. 900 AND NO. 901 ON I-26/ I-240 OVER STATE STREET BETWEEN SR 3556 AND US 23 BUS.									GROUND WTR (ft)						
BORING NO. EB1-E			STATION 105+83			OFFSET 42 ft LT			ALIGNMENT -L-			0 HR. N/A			
COLLAR ELEV. 2,085.1 ft			TOTAL DEPTH 63.1 ft			NORTHING 682,879			EASTING 934,569			24 HR. FIAD			
DRILL RIG/HAMMER EFF./DATE TER1006 Geoprobe 7822DT 90% 01/20/2023						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic						
DRILLER WHITEHEAD, T.			START DATE 02/20/24			COMP. DATE 02/20/24			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)
2090															
2085															
2080	2,084.1	1.0	4	5	7	12						M		2,085.1	0.0
	2,082.0	3.1	4	7	8	15						M		2,084.3	0.8
	2,079.1	6.0	5	10	11	21						M		2,082.6	2.5
2075	2,077.0	8.1	3	8	9	17						M		PAVEMENT (0.3' ASPHALT, 0.5' ABC)	
	2,072.0	13.1	6	14	15	29						M		RESIDUAL STIFF, BROWN, RED, FINE TO COARSE SANDY CLAY, MOIST (A-6) STIFF TO HARD, BROWN, RED, BLACK, FINE TO COARSE SANDY SILT, MOIST (A-4)	
2070												M			
2065	2,067.0	18.1	11	13	15	28						M			
	2,062.0	23.1	7	7	7	14						M			
2060	2,057.0	28.1	6	7	8	15						M			
	2,052.0	33.1	11	15	17	32						M			
2050	2,047.0	38.1	9	18	18	36						M			
	2,042.0	43.1	8	11	13	24						M			
2040	2,037.0	48.1	7	10	12	22						M			
	2,032.0	53.1	8	18	21	39						M			
2030	2,027.0	58.1	11	23	24	47						M			
	2,022.0	63.1	60/0.0			60/0.0						M		2,022.0	63.1
Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,022.0 ft ON CRYSTALLINE ROCK (GNEISS)															

NC DOT BORE SINGLE I2513AC_GEO_BRDG_STATE STREET - UPDATED 03-11-24.GPJ NC_DOT.GDT 5/23/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.6			TIP I-2513AC			COUNTY BUNCOMBE			GEOLOGIST Marples, Z. J.					
SITE DESCRIPTION BRIDGES NO. 900 AND NO. 901 ON I-26/ I-240 OVER STATE STREET BETWEEN SR 3556 AND US 23 BUS.									GROUND WTR (ft)					
BORING NO. EB1-F			STATION 105+59			OFFSET 15 ft LT			ALIGNMENT -L-					
COLLAR ELEV. 2,084.2 ft			TOTAL DEPTH 43.4 ft			NORTHING 682,846			EASTING 934,584					
0 HR.			N/A			24 HR.			FIAD					
DRILL RIG/HAMMER EFF./DATE TER1006 Geoprobe 7822DT 90% 01/20/2023						DRILL METHOD Mud Rotary			HAMMER TYPE Automatic					
DRILLER WHITEHEAD, T.			START DATE 02/21/24			COMP. DATE 02/21/24			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		MOI		ELEV. (ft) DEPTH (ft)
2085														
	2,083.2	1.0												2,084.2 GROUND SURFACE 0.0
			6	6	11									2,083.5 PAVEMENT (0.3' ASPHALT, 0.4' ABC) 0.7
2080	2,080.9	3.3												
			9	14	14									
	2,078.2	6.0												2,078.7 VERY STIFF, BROWN, RED, FINE TO COARSE SANDY SILT, WET (A-4) 5.5
			9	20	22									
2075	2,075.9	8.3												2,076.2 HARD, BROWN, RED, CLAYEY SILT, MOIST (A-5) 8.0
			5	8	10									
														2,076.2 MEDIUM DENSE TO VERY DENSE, BROWN, GRAY, SILTY FINE TO COARSE SAND, MOIST (A-2-4)
2070	2,070.9	13.3												
			4	6	10									
	2,065.9	18.3												
2065			11	23	36									
2060	2,060.9	23.3												
			9	15	11									
2055	2,055.9	28.3												
			5	9	13									
2050	2,050.9	33.3												
			3	4	6									2,051.2 STIFF, BROWN, BLACK, FINE TO COARSE SANDY SILT, MOIST (A-4) 33.0
2045	2,045.9	38.3												
			12	88/0.4										2,045.4 WEATHERED ROCK (BLACK, GNEISS) 38.8
	2,040.9	43.3												2,040.9 CRYSTALLINE ROCK (BLACK, GNEISS) 43.3
			60/0.1											2,040.8 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,040.8 ft IN CRYSTALLINE ROCK (GNEISS) 43.4

NC DOT BORE SINGLE I2513AC_GEO_BRDG_STATE STREET - UPDATED 03-11-24.GPJ NC_DOT.GDT 5/23/24

PROJECT REFERENCE NO.	SHEET NO.
I-2513AC	11

SITE PHOTOGRAPHS

BRIDGES NO. 900 AND NO. 901 ON I-26 / I-240 OVER STATE STREET
BETWEEN SR 3556 (AMBOY ROAD) AND US 23 BUSINESS (HAYWOOD ROAD)



END BENT 1 LOOKING EAST



END BENT 2 LOOKING WEST



ON STATE STREET ALONG -Y14-
ALIGNMENT LOOKING SOUTH



ON STATE STREET ALONG -Y14-
ALIGNMENT LOOKING NORTH

REFERENCE: I-2513AC

PROJECT: 34165

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-7	CROSS SECTIONS
8-17	BORE LOGS, CORE LOGS, AND CORE PHOTOS

APPENDICES

<u>APPENDIX</u>	<u>TITLE</u>	<u>SHEETS</u>
A	LABORATORY RESULTS	18-19

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY BUNCOMBE
PROJECT DESCRIPTION I-26I-40I-240 INTERCHANGE TO
SR 3548 (HAYWOOD RD)

SITE DESCRIPTION BRIDGE NO. 206 ON -L- (I-26I-240)
OVER HOMINY CREEK AND SR 3620 (HOMINY
CREEK RD) BETWEEN I-40 WB AND NC 191

STATE	TOWN OF HOLLY SPRINGS PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AC	1	20

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

CG2

GOODNIGHT, D.J.

INVESTIGATED BY FALCON ENG.

DRAWN BY CROCKETT, S.C.

CHECKED BY HUNSBERGER, W.S.

SUBMITTED BY FALCON ENG.

DATE SEPTEMBER 2024



DocuSigned by:
Stephen Crockett 9/24/2024
C5CA5FED48E0435...
SIGNATURE DATE

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

DATE: 8-15-14

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

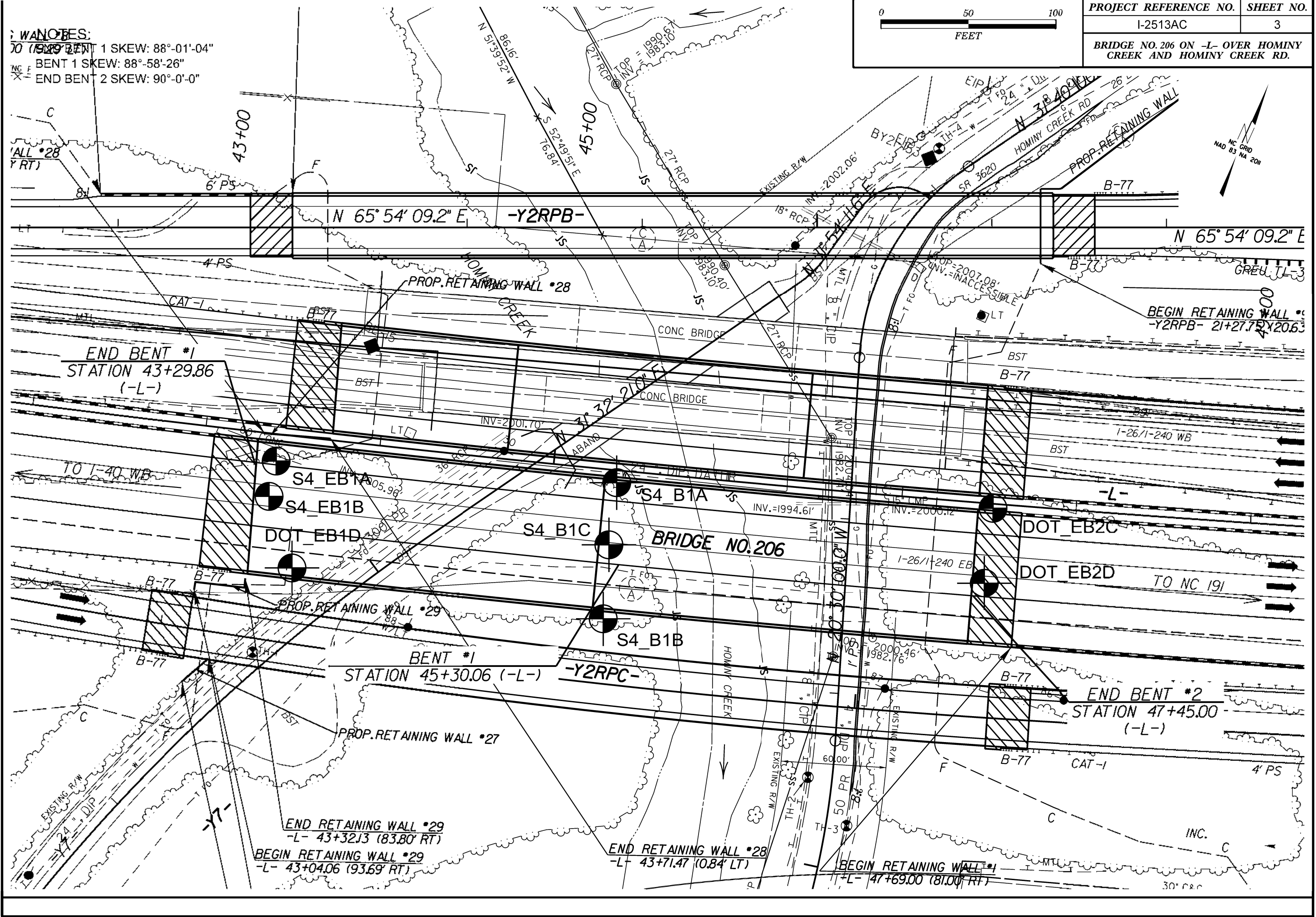
SUBSURFACE INVESTIGATION

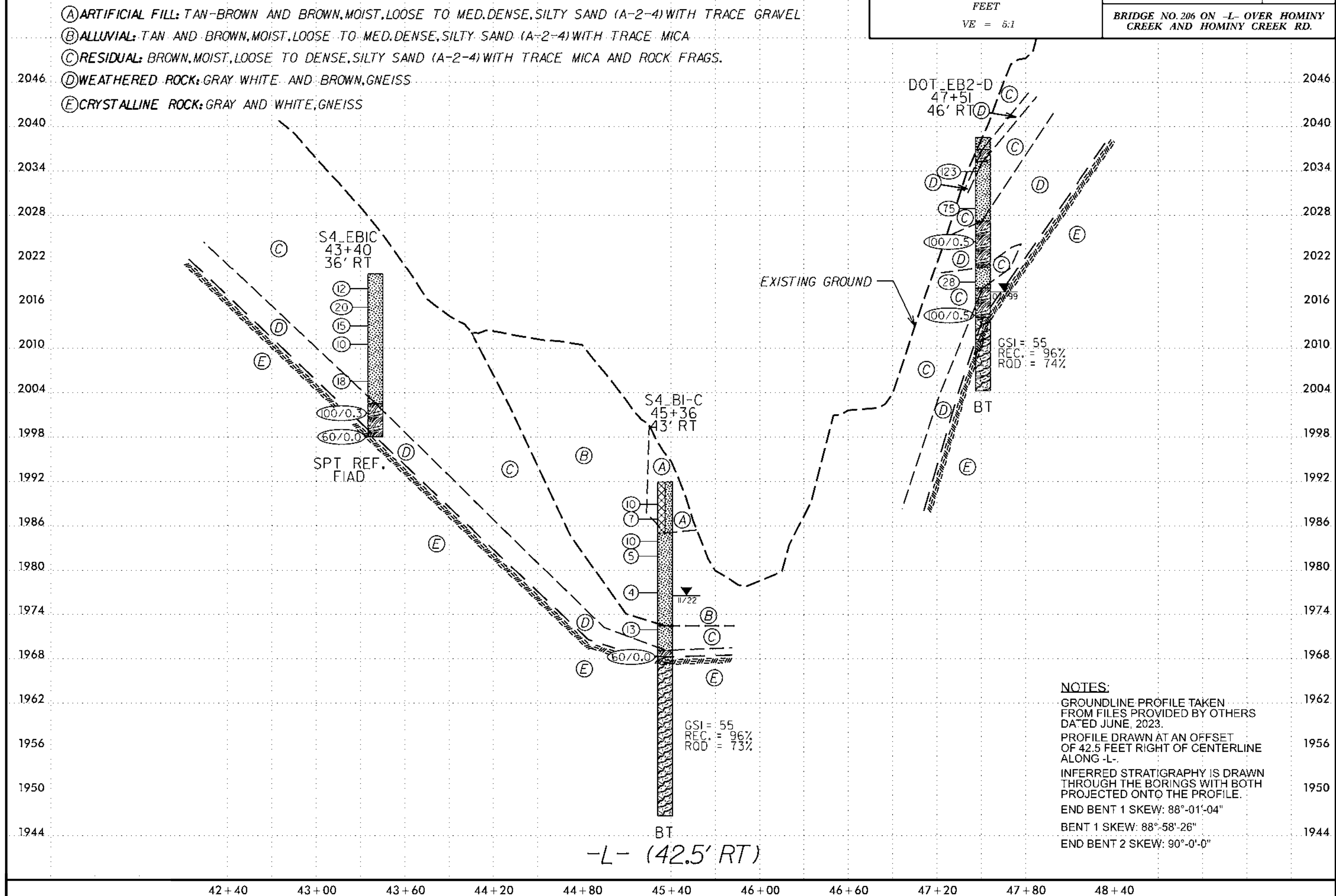
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

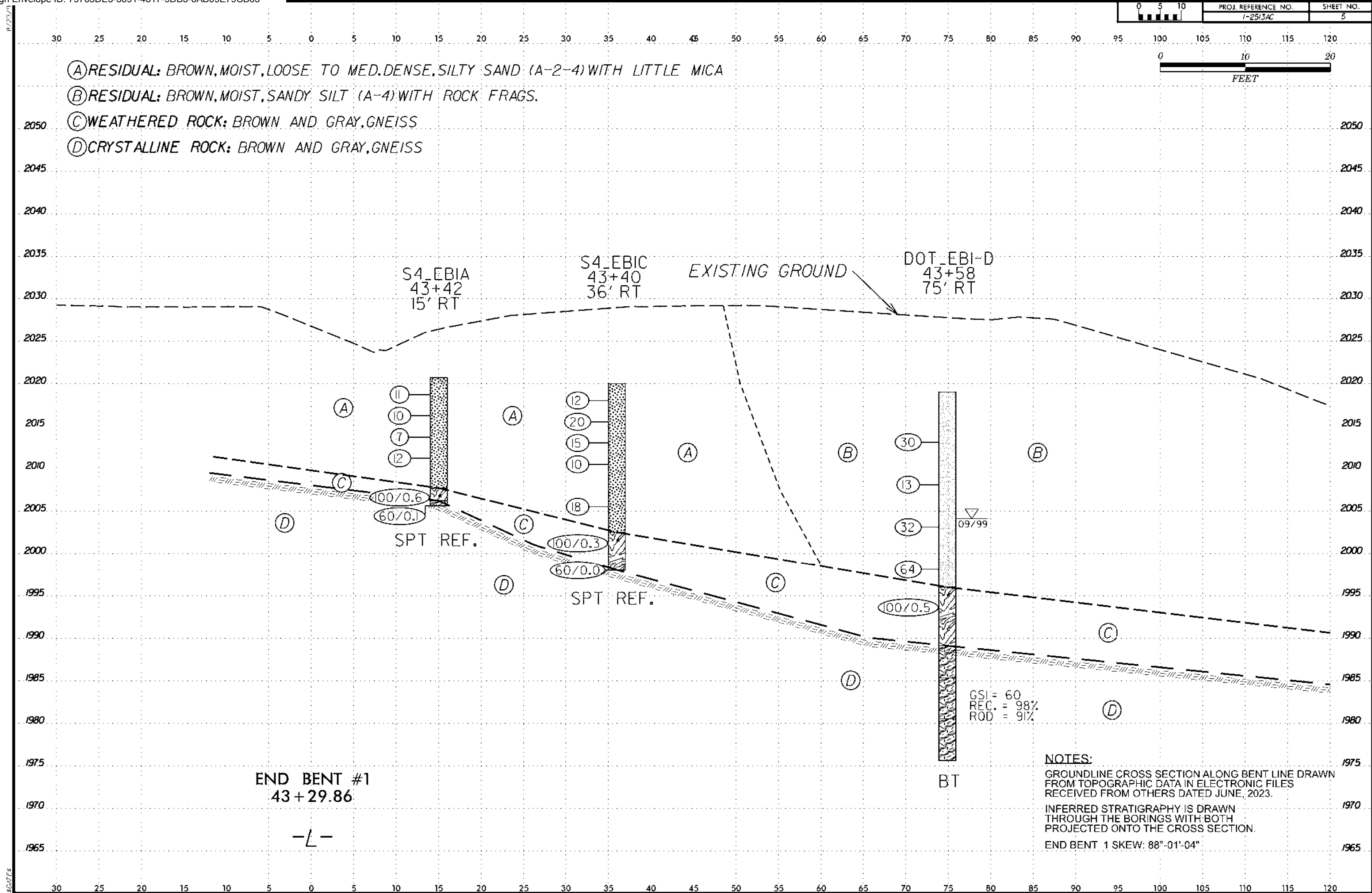
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

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

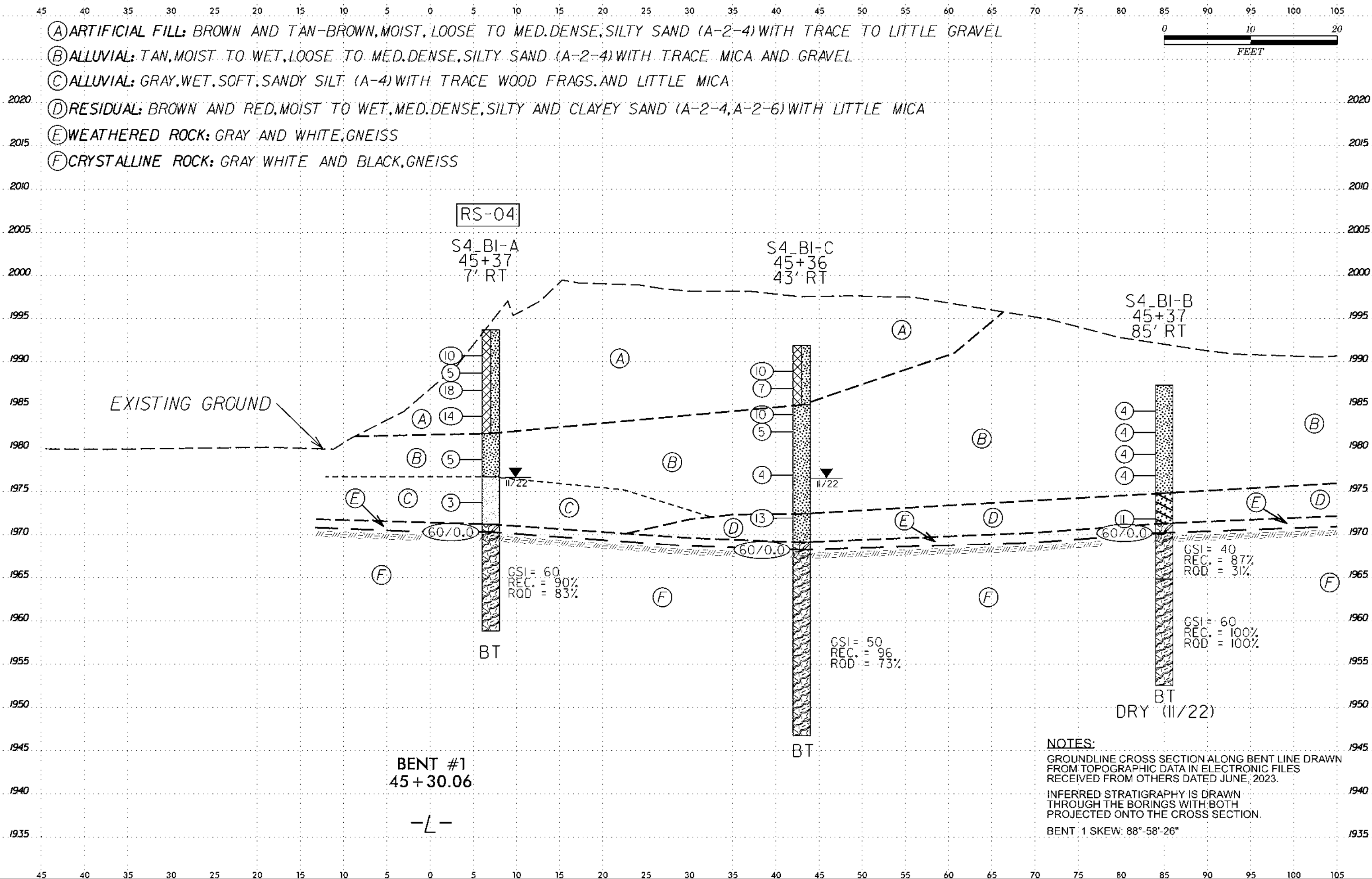
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.	SURFACE CONDITIONS VERY GOOD Very rough, fresh unweathered surfaces GOOD Rough, slightly weathered, iron stained surfaces FAIR Smooth, moderately weathered and altered surfaces POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings	STRUCTURE INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	DECREASING SURFACE QUALITY ➡ DECREASING INTERLOCKING OF ROCK PIECES ⬇	GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000) From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.	SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes) VERY GOOD - Very Rough, fresh unweathered surfaces GOOD - Rough, slightly weathered surfaces FAIR - Smooth, moderately weathered and altered surfaces POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings	COMPOSITION AND STRUCTURE A. Thick bedded, very blocky sandstone. The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability. B. Sandstone with thin inter-layers of siltstone C. Sandstone and siltstone in similar amounts D. Siltstone or silty shale with sandstone layers E. Weak siltstone or clayey shale with sandstone layers F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces. — Means deformation after tectonic disturbance
---	--	---	---	---	---	---







B/23/3



B/23/9

0510

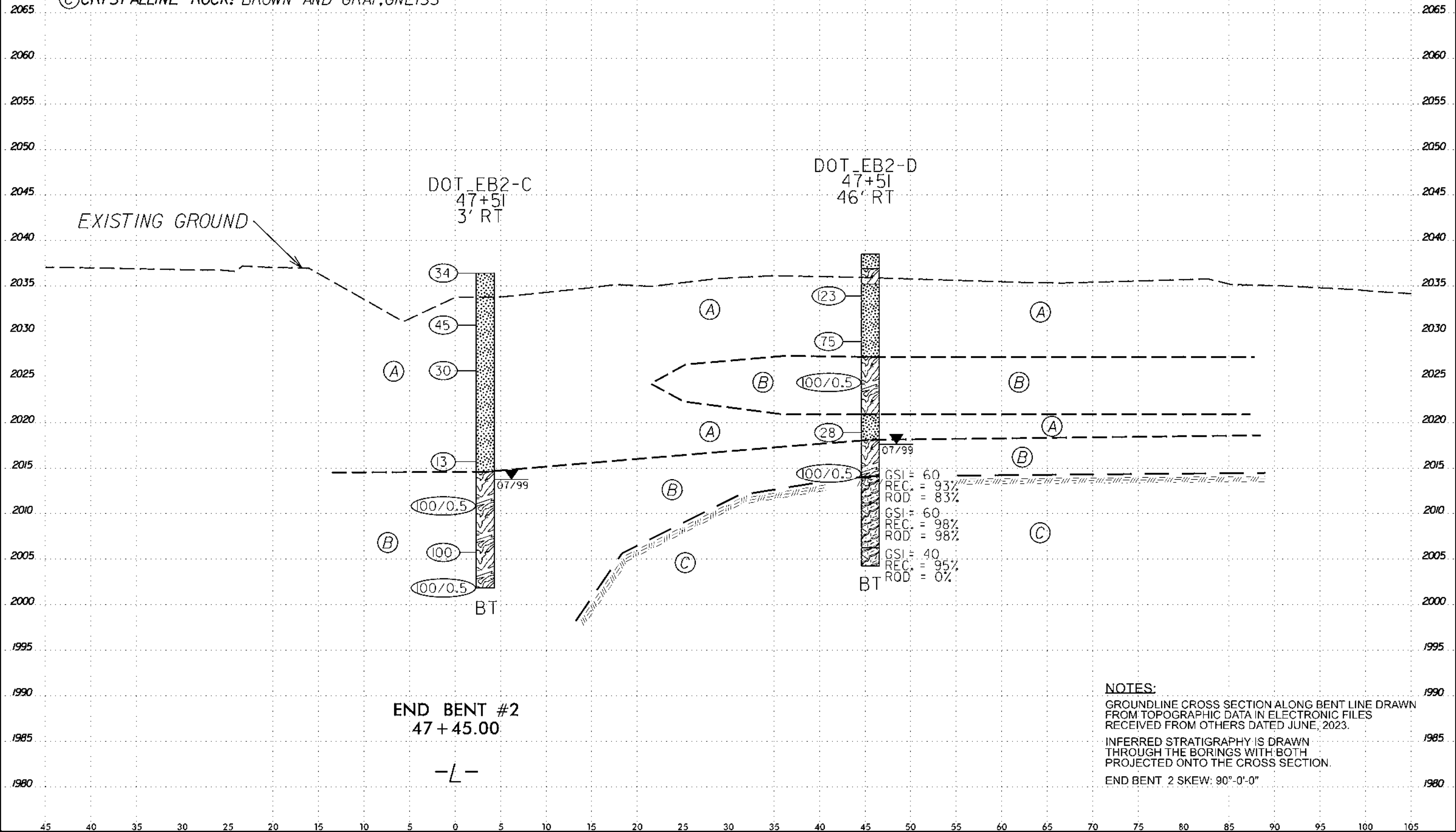
PROJ. REFERENCE NO.
I-25/3AC

SHEET NO.
7

01020

FEET

- (A) RESIDUAL: BROWN, MOIST, MED. DENSE TO V. DENSE, SILTY SAND (A-2-4) WITH ROCK FRAGS.
- (B) WEATHERED ROCK: BROWN AND GRAY, GNEISS
- (C) CRYSTALLINE ROCK: BROWN AND GRAY, GNEISS

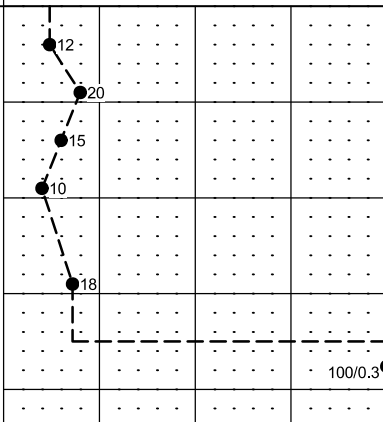
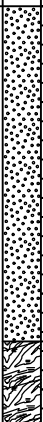


GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.2			TIP 1-2513AC			COUNTY BUNCOMBE			GEOLOGIST Goodnight, D.J.						
SITE DESCRIPTION Bridge No. 206 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191										GROUND WTR (ft)					
BORING NO. S4_EB1A			STATION 43+42			OFFSET 15 ft RT			ALIGNMENT -L-		0 HR. Dry				
COLLAR ELEV. 2,020.7 ft			TOTAL DEPTH 15.1 ft			NORTHING 679,017			EASTING 930,178		24 HR. N/A				
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 87% 05/10/2022						DRILL METHOD H.S. Augers				HAMMER TYPE Automatic					
DRILLER Odom, C.			START DATE 02/27/23			COMP. DATE 02/27/23			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)
2025															
2020															
	2,019.7	1.0	3	4	7									2,020.7	0.0
	2,017.2	3.5	5	5	5										
2015	2,014.7	6.0	2	3	4										
	2,012.2	8.5	4	5	7										
2010															
	2,007.2	13.5	36	64/0.1										2,007.7	13.0
	2,005.7	15.0												2,006.2	14.5
			60/0.1											2,005.6	15.1

NC DOT BORE SINGLE I-4213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.2			TIP 1-2513AC			COUNTY BUNCOMBE			GEOLOGIST Goodnight, D.J.										
SITE DESCRIPTION Bridge No. 206 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191											GROUND WTR (ft)								
BORING NO. S4_EB1C			STATION 43+40			OFFSET 36 ft RT			ALIGNMENT -L-			0 HR.	Dry						
COLLAR ELEV. 2,020.0 ft			TOTAL DEPTH 22.0 ft			NORTHING 678,997			EASTING 930,182			24 HR.	N/A						
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 87% 05/10/2022						DRILL METHOD H.S. Augers				HAMMER TYPE Automatic									
DRILLER Odom, C.			START DATE 02/27/23			COMP. DATE 02/27/23			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)				
2020														2,020.0	0.0				
2015	2,019.0	1.0	5	5	7							M		RESIDUAL BROWN, LOOSE TO MEDIUM DENSE, SILTY SAND (A-2-4) WITH LITTLE MICA					
	2,016.5	3.5	7	10	10							M							
2010	2,014.0	6.0	5	7	8							M							
	2,011.5	8.5	5	5	5							M							
2005	2,006.5	13.5	6	8	10							M							
	2,001.5	18.5	100/0.3																WEATHERED ROCK GRAY AND BROWN, BIOTITE GNEISS
2000	1,998.0	22.0	60/0.0										1,998.0						22.0
														Boring Terminated at Elevation 1,998.0 ft on CR: GNEISS					

NC DOT BORE SINGLE I-4213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.2			TIP 1-2513AC			COUNTY BUNCOMBE			GEOLOGIST SHELTON, T. P.				
SITE DESCRIPTION Bridge No. 206 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191									GROUND WTR (ft)				
BORING NO. DOT_EB1-D			STATION 43+58			OFFSET 75 ft RT			ALIGNMENT -L-			0 HR. 14.9	
COLLAR ELEV. 2,019.0 ft			TOTAL DEPTH 43.5 ft			NORTHING 678,965			EASTING 930,211			24 HR. N/A	
DRILL RIG/HAMMER EFF./DATE CME 550						DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic				
DRILLER GOSNESS, W. A.			START DATE 09/02/99			COMP. DATE 09/02/99			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		MOI	ELEV. (ft) DEPTH (ft)
2020													
2015	2,014.1	4.9											2,019.0 GROUND SURFACE 0.0
2010	2,009.1	9.9	7	11	19							M	SAPROLITE STIFF TO HARD, BROWN, SANDY SILT (A-4), OCCASIONAL ROCK FRAGMENTS
2005	2,004.1	14.9	7	5	8								
2000	1,999.1	19.9	7	5	27							M	
1995	1,994.1	24.9	52	34	30								1,996.0 23.0
1990			100/0.5										WEATHERED ROCK (MUSCOVITE/BIOTITE GNEISS)
1985													1,989.1 29.9
1980													CRSTALLINE ROCK (MUSCOVITE/BIOTITE GNEISS)
													1,985.3 33.7
													(MUSCOVITE/BIOTITE GNEISS)
													1,980.4 38.6
													(MUSCOVITE/BIOTITE GNEISS)
													1,975.5 43.5
													Boring Terminated at Elevation 1,975.5 ft IN MUSCOVITE/BIOTITE GNEISS
													PLEASE NOTE: This specific boring was completed in 1999. Core Photos are available from the Geotech Unit Asheville Field Office (AFO) if necessary. Photos are of an insufficient nature for professional evaluation. Please contact the AFO if necessary at dcelllott@ncdot.gov.

NC DOT BORE SINGLE I-213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

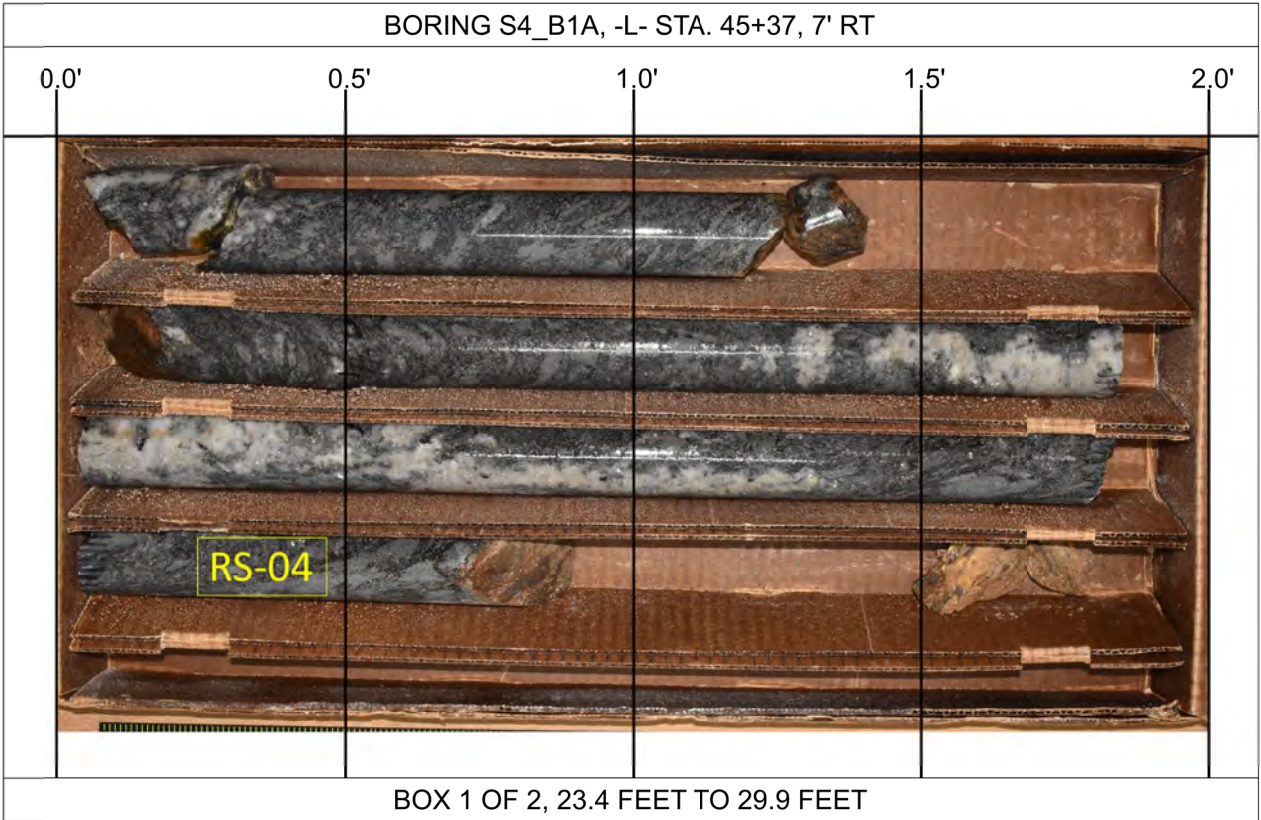
GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34165.1.2				TIP 1-2513AC				COUNTY BUNCOMBE				GEOLOGIST SHELTON, T. P.			
SITE DESCRIPTION Bridge No. 206 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191												GROUND WTR (ft)			
BORING NO. DOT_EB1-D				STATION 43+58				OFFSET 75 ft RT				ALIGNMENT -L-		0 HR.	14.9
COLLAR ELEV. 2,019.0 ft				TOTAL DEPTH 43.5 ft				NORTHING 678,965				EASTING 930,211		24 HR.	N/A
DRILL RIG/HAMMER EFF./DATE CME 550								DRILL METHOD SPT Core Boring				HAMMER TYPE Automatic			
DRILLER GOSNESS, W. A.				START DATE 09/02/99				COMP. DATE 09/02/99				SURFACE WATER DEPTH N/A			
CORE SIZE NXWL				TOTAL RUN 13.6 ft											
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %		SAMP. NO.	STRATA REC. (ft) %		LOG	DESCRIPTION AND REMARKS				
												ELEV. (ft)	DEPTH (ft)		
1989.15	1,989.1	29.9	3.8		(3.7) 97%	(3.6) 95%		(3.7) 97%	(3.6) 95%		1,989.1	Begin Coring @ 29.9 ft			29.9
1985	1,985.3	33.7	4.9		(4.7) 96%	(4.4) 90%		(4.7) 96%	(4.4) 90%		1,985.3	CRYSTALLINE ROCK MEDIUM DARK GRAY, VERY SLIGHTLY WEATHERED MUSCOVITE/BIOTITE GNEISS. FINE GRAINED WITH GARNET-RICH ZONES AND OCCASIONAL QUARTZ LAYERS. FOLIATION NEAR VERTICAL.			33.7
1980	1,980.4	38.6	4.9		(4.9) 100%	(4.4) 90%		(4.9) 100%	(4.4) 90%		1,980.4	GSI = 60 GRAY TO MEDIUM DARK GRAY, VERY SLIGHTLY WEATHERED TO FRESH MUSCOVITE/BIOTITE GNEISS WITH QUARTZ SEAMS, GRADING TO OCCASIONAL ZONES OF GRANULITE. FINE TO MEDIUM GRAIN WITH GARNETS AND TRACE PYRITE.			38.6
	1,975.5	43.5									1,975.5	GSI = 60 MEDIUM DARK GRAY AND BROWN-GRAY, VERY SLIGHTLY WEATHERED MUSCOVITE/BIOTITE GNEISS WITH BRECCIA ASPECT. QUARTZ/FIELD SEAMS. MEDIUM FOLDED FINE TO MEDIUM GROUND; PYRITE AND GARNETS MEDIUM TO ABUNDANT.			43.5
Boring Terminated at Elevation 1,975.5 ft IN MUSCOVITE/BIOTITE GNEISS															
PLEASE NOTE: This specific boring was completed in 1999. Core Photos are available from the Geotech Unit Asheville Field Office (AFO) if necessary. Photos are of an insufficient nature for professional evaluation. Please contact the AFO if necessary at dcelllott@ncdot.gov.															

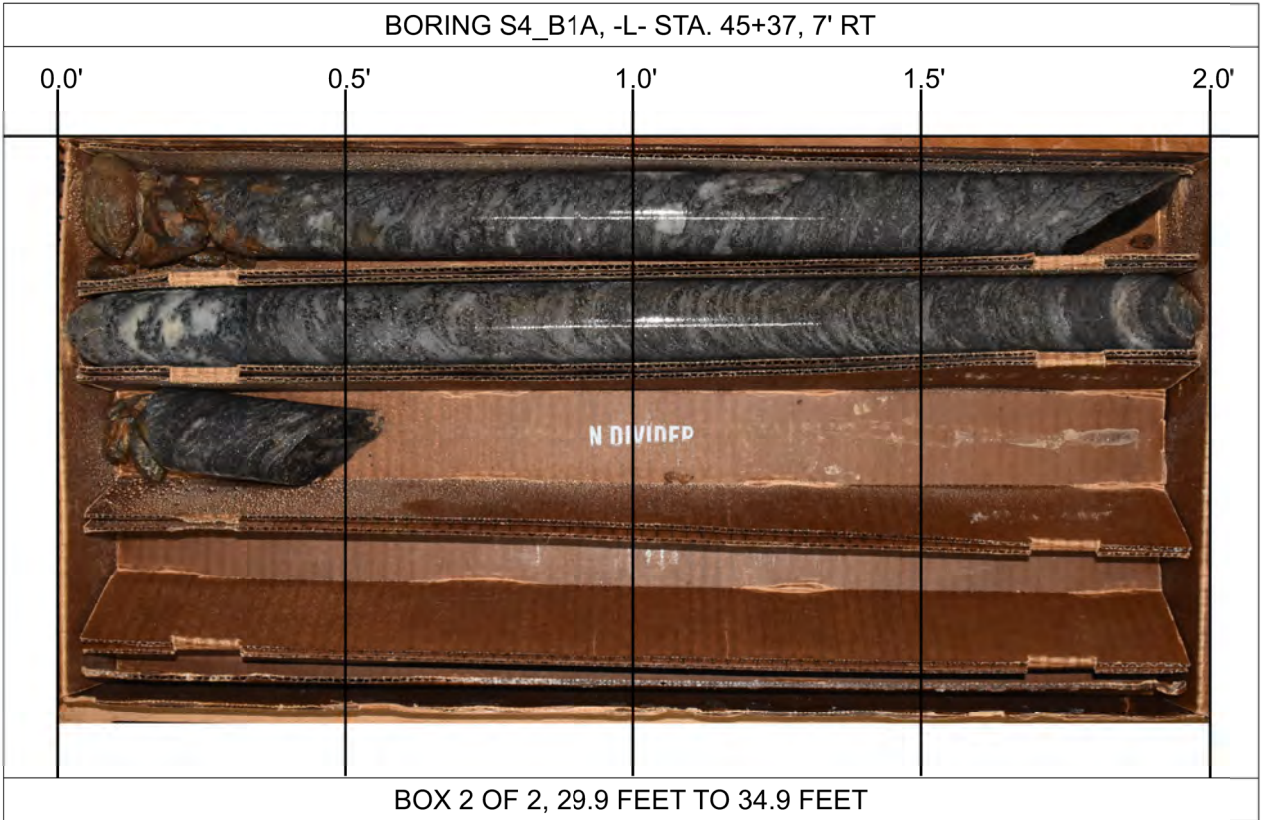
NC DOT CORE SINGLE I-213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

NCDOT BORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

NCDOT CORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24



GSI = 60



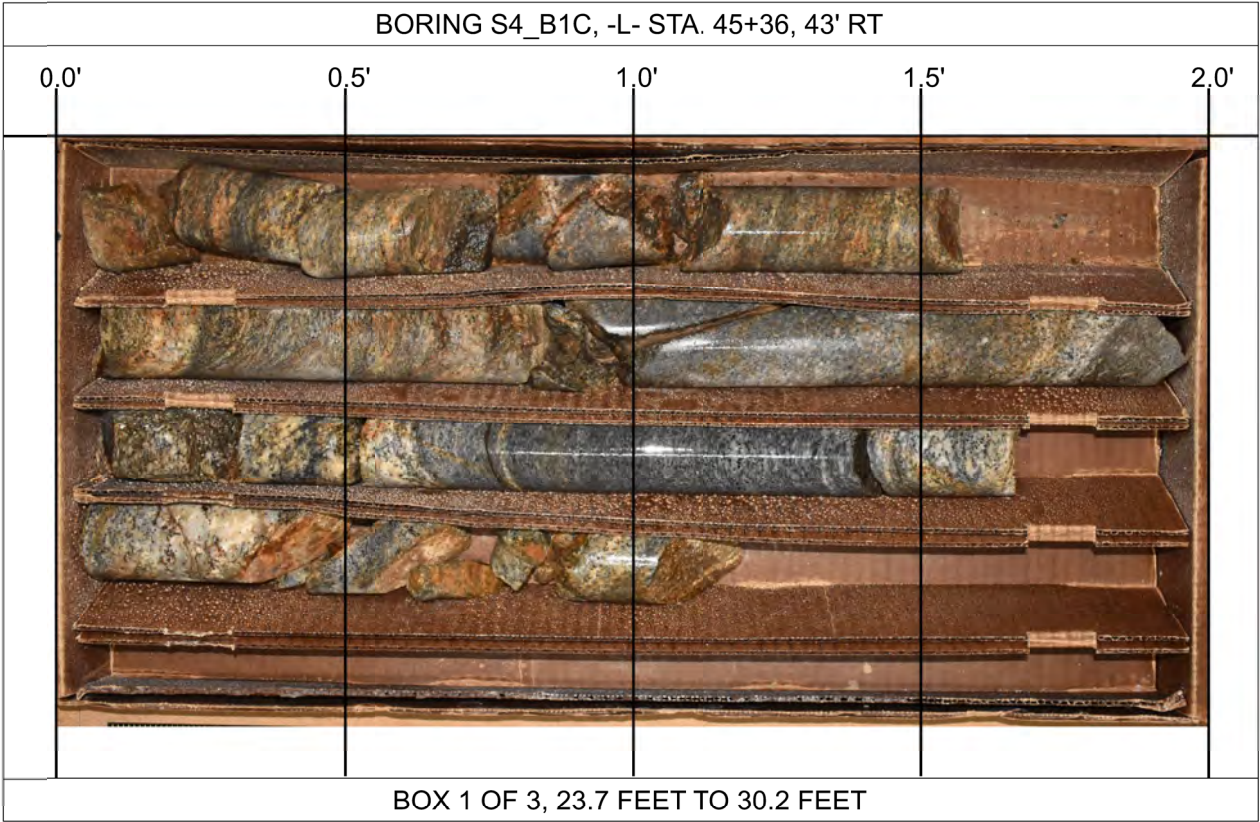
GSI = 60



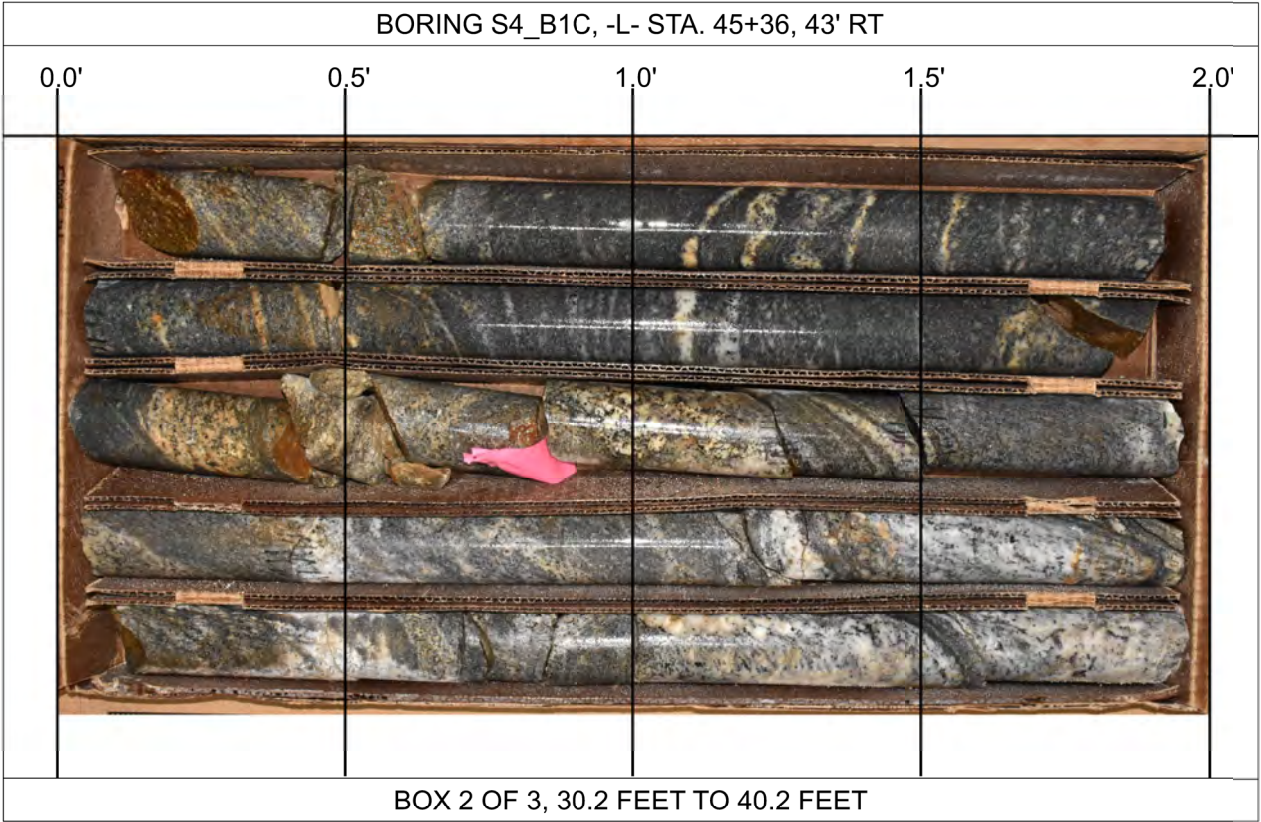
 FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 CARY, NC 27513 PHONE: 919.871.0800 www.falconengineering.com	ROCK CORE PHOTOGRAPHS
	BRIDGE ON -L- OVER HOMINY CREEK AND SR 3620 BETWEEN I-40 WB AND NC 191 BUNCOMBE COUNTY, NC WBS: 34165 TIP: I-2513AC FALCON PROJECT NO. G22009.01

NCDOT BORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

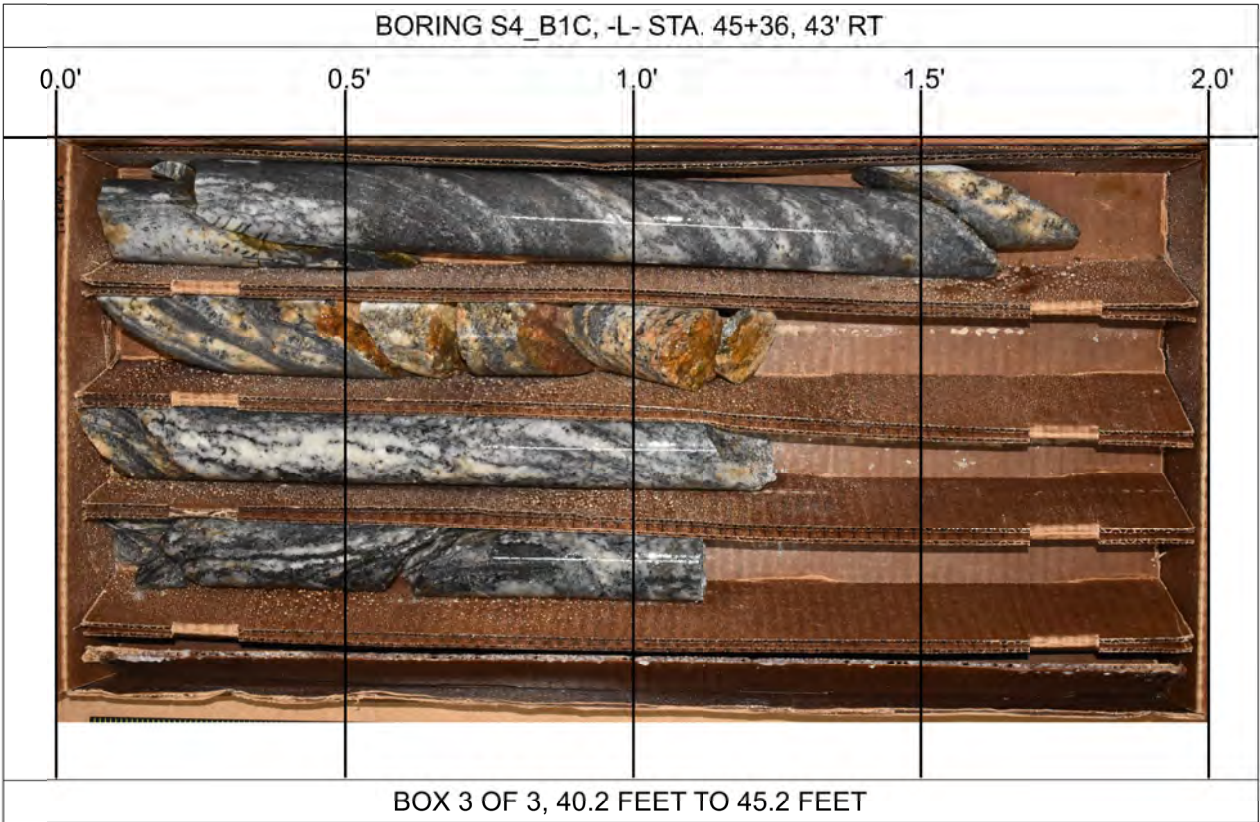
NCDOT CORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24



GSI = 55



GSI = 55



GSI = 55



 FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 CARY, NC 27513 PHONE: 919.871.0800 www.falconengineering.com	ROCK CORE PHOTOGRAPHS
	BRIDGE ON -L- OVER HOMINY CREEK AND SR 3620 BETWEEN I-40 WB AND NC 191 BUNCOMBE COUNTY, NC WBS: 34165 TIP: I-2513AC FALCON PROJECT NO. G22009.01

GEOTECHNICAL BORING REPORT
BORE LOG

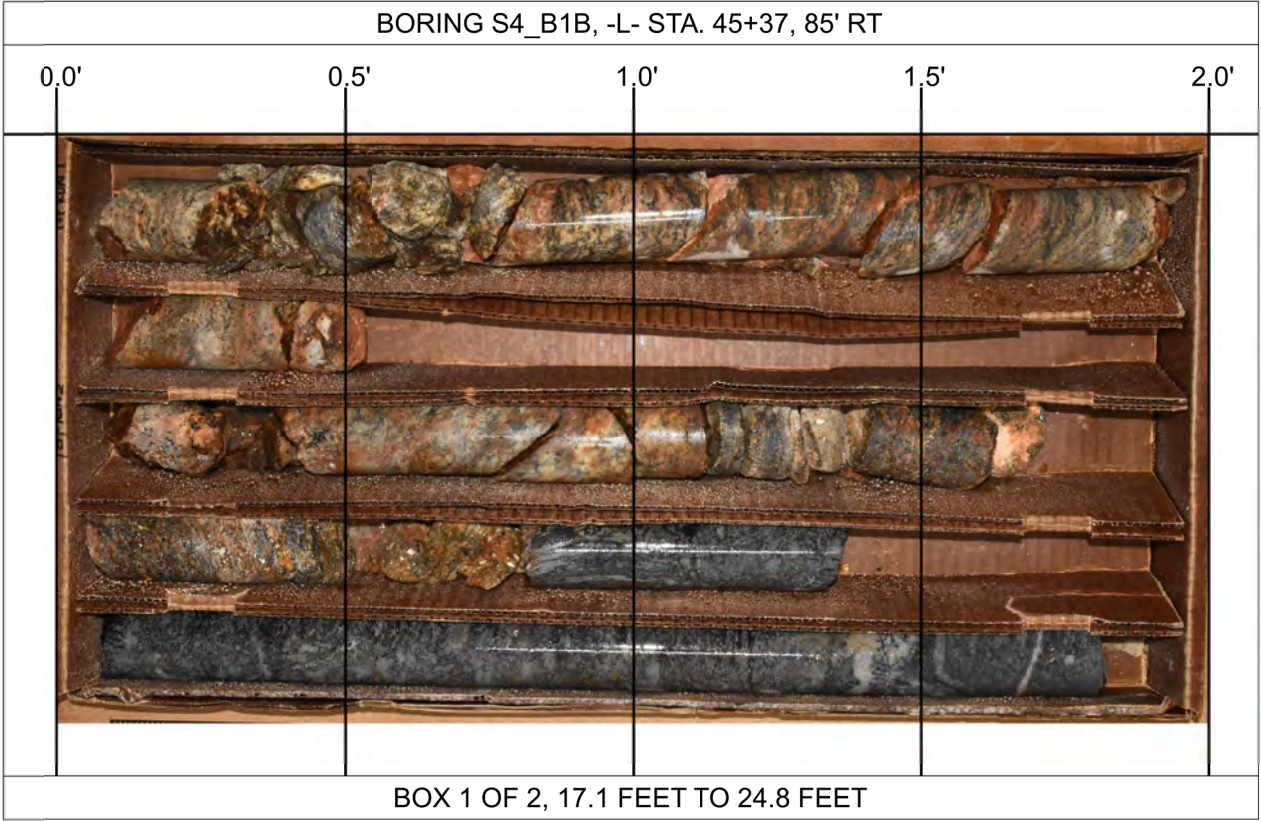
WBS 34165.1.2			TIP 1-2513AC			COUNTY BUNCOMBE			GEOLOGIST Goodnight, D.J.							
SITE DESCRIPTION Bridge No. 206 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191												GROUND WTR (ft)				
BORING NO. S4_B1-B			STATION 45+37			OFFSET 85 ft RT			ALIGNMENT -L-			0 HR.	Dry			
COLLAR ELEV. 1,987.3 ft			TOTAL DEPTH 34.8 ft			NORTHING 679,011			EASTING 930,385			24 HR.	Dry			
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 87% 05/10/2022						DRILL METHOD H.S. Augers				HAMMER TYPE Automatic						
DRILLER Odom, C.			START DATE 10/27/22			COMP. DATE 11/01/22			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)	
1990																
1985	1,985.3	2.0	2	2	2									1,987.3	GROUND SURFACE	0.0
														ALLUVIAL TAN, LOOSE, SILTY SAND (A-2-4) WITH TRACE MICA AND GRAVEL		
1980	1,982.8	4.5	2	2	2						M					
1975	1,980.3	7.0	2	2	2						M					
1970	1,977.8	9.5	2	2	2						M					
1965	1,972.8	14.5	2	3	8						W			1,974.8	RESIDUAL RED-BROWN, MED. DENSE, CLAYEY SAND (A-2-6)	12.5
																1,971.3 1,970.2
1960	1,970.2	17.1	60/0.0											1,964.8	CRYSTALLINE ROCK GRAY TAN AND WHITE, GNEISS	22.5
																GRAY AND BLACK, GNEISS
1955														1,952.5	Boring Terminated at Elevation 1,952.5 ft in CR: GNEISS	34.8

NC DOT BORE SINGLE I-4213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

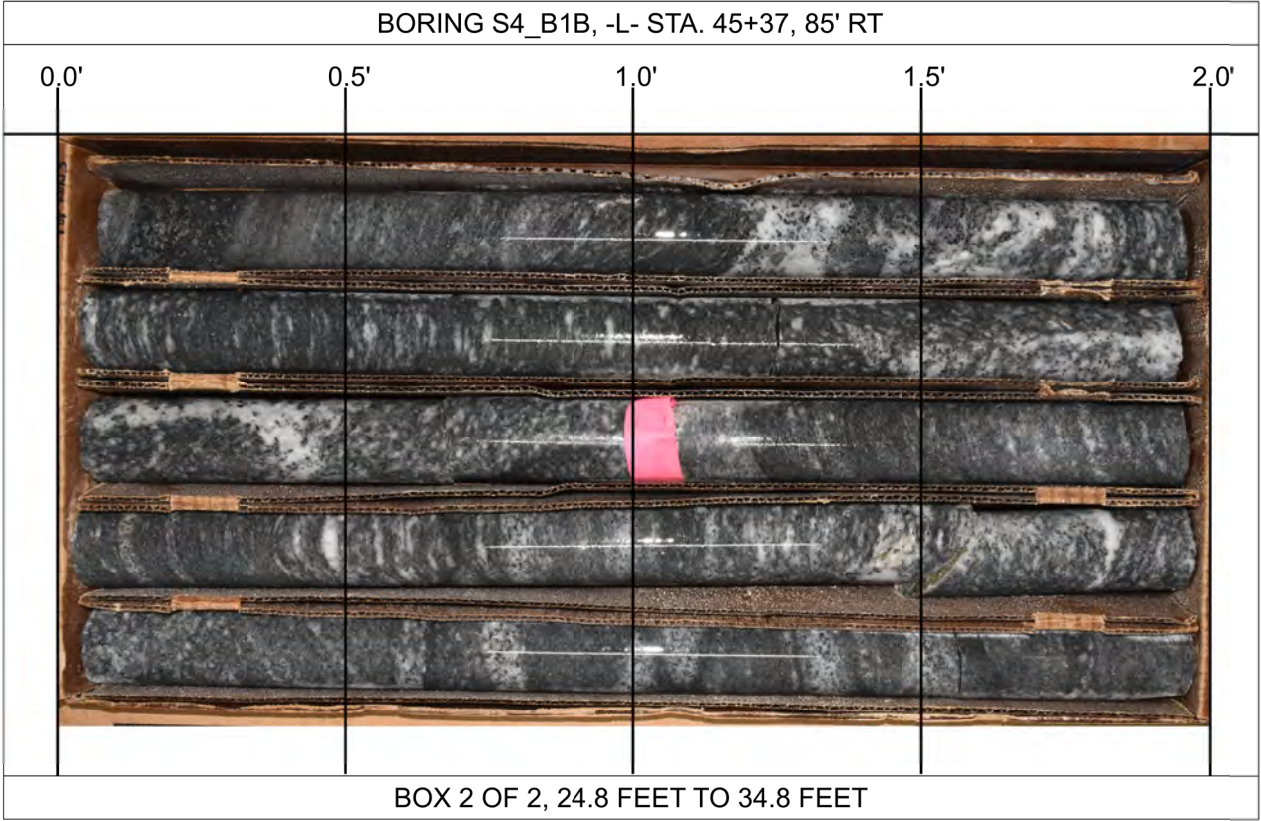
GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34165.1.2				TIP 1-2513AC		COUNTY BUNCOMBE		GEOLOGIST Goodnight, D.J.				
SITE DESCRIPTION Bridge No. 206 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191										GROUND WTR (ft)		
BORING NO. S4_B1-B				STATION 45+37			OFFSET 85 ft RT		ALIGNMENT -L-		0 HR. Dry	
COLLAR ELEV. 1,987.3 ft				TOTAL DEPTH 34.8 ft			NORTHING 679,011		EASTING 930,385		24 HR. Dry	
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 87% 05/10/2022						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic			
DRILLER Odom, C.				START DATE 10/27/22			COMP. DATE 11/01/22		SURFACE WATER DEPTH N/A			
CORE SIZE NQ				TOTAL RUN 17.7 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %ROD (ft) %		SAMP. NO.	STRATA REC. (ft) %ROD (ft) %		L O G	DESCRIPTION AND REMARKS ELEV. (ft)DEPTH (ft)	
1970.2	1,970.2	17.1	2.7	4:47/1.0 3:01/1.0 1:49/0.7	(2.2) 81%	(0.8) 30%		(4.7) 87%	(1.7) 31%		Begin Coring @ 17.1 ft	
	1,967.5	19.8	5.0	2:00/1.0 1:34/1.0 2:24/1.0 2:53/1.0 3:42/1.0	(4.8) 96%	(3.2) 64%					1,970.2 CRYSTALLINE ROCK TAN AND GRAY, MODERATE WEATHERING, MODERATELY HARD TO HARD, GNEISS, WITH V. CLOSE TO CLOSE FRACTURE SPACING17.1	
1965											1,964.8 GSI = 4022.5	
	1,962.5	24.8						(12.3) 100%	(12.3) 100%			GRAY AND BLACK, VERY SLIGHT WEATHERING TO FRESH, HARD TO V. HARD, GNEISS, WITH WIDE FRACTURE SPACING
1960			5.0	3:40/1.0 5:14/1.0 5:45/1.0 6:08/1.0 5:00/1.0	(5.0) 100%	(5.0) 100%						GSI = 60
1955	1,957.5	29.8	5.0	3:52/1.0 4:32/1.0 5:38/1.0 7:11/1.0 12:15/1.0	(5.0) 100%	(5.0) 100%						
	1,952.5	34.8									1,952.5 Boring Terminated at Elevation 1,952.5 ft in CR: GNEISS34.8	

NC DOT CORE SINGLE I-4213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24



GSI = 55



GSI = 60



 FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 CARY, NC 27513 PHONE: 919.871.0800 www.falconengineering.com	ROCK CORE PHOTOGRAPHS
	BRIDGE ON -L- OVER HOMINY CREEK AND SR 3620 BETWEEN I-40 WB AND NC 191 BUNCOMBE COUNTY, NC WBS: 34165 TIP: I-2513AC FALCON PROJECT NO. G22009.01

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.2		TIP 1-2513AC		COUNTY BUNCOMBE		GEOLOGIST SHELTON, T. P.								
SITE DESCRIPTION Bridge No. 206 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191						GROUND WTR (ft)								
BORING NO. DOT_EB2-C		STATION 47+51		OFFSET 3 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 2,036.4 ft		TOTAL DEPTH 34.6 ft		NORTHING 679,159		EASTING 930,562								
DRILL RIG/HAMMER EFF./DATE CME 550				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic								
DRILLER GOSNESS, W. A.		START DATE 07/06/99		COMP. DATE 07/06/99		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT			SAMP. NO.	MOI	L O G	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)
2040														
2035													2,036.4	0.0
2030	2,031.7	4.7	16	25	20								GROUND SURFACE	
2025	2,026.7	9.7	4	12	18								SAPROLITE	
2020			6	9	25								MEDIUM DENSE TO DENSE, BROWN, SILTY SAND (A-2-4) WITH SOME WEATHERED ROCK FRAGMENTS	
2015	2,016.7	19.7	2	4	9									
2010	2,011.8	24.6	43	100/0.5									2,014.6	21.8
2005	2,006.7	29.7	90	68	32								WEATHERED ROCK	
	2,002.3	34.1	100/0.5										(SOFT TO HARD WITH OCCASIONAL SEAMS OF VERY DENSE SAPROLITE)	
													2,001.8	34.6
													Boring Terminated at Elevation 2,001.8 ft IN SOFT WEATHERED ROCK	

NCDOT BORE DOUBLE I-1213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

NCDOT BORE SINGLE I-1213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

NCDOT CORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

REFERENCE: I-25I3AC

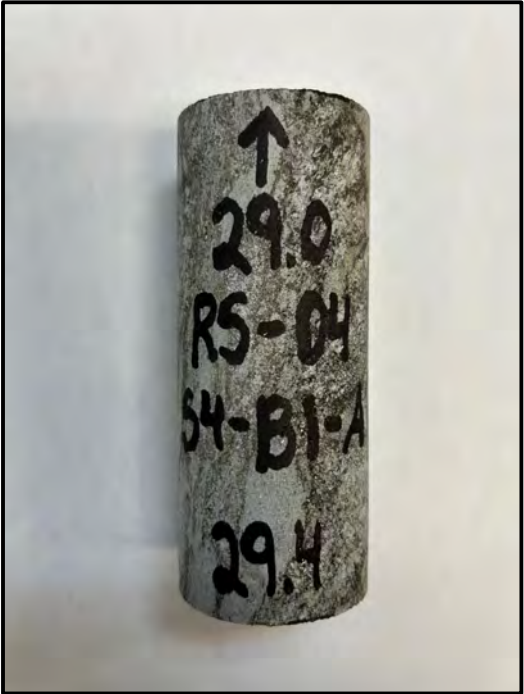
PROJECT: 34I65

PROJECT REFERENCE NO.	SHEET NO.
I-25I3AC	18

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
APPENDIX A
LABORATORY RESULTS

Project No.:	G22009.01	Tested By:	C. Sullivan	Test Date:	2023-19-12
Project Name:	I-2513AA-AC				
Boring ID:	S4-B1-A	Sample ID:	RS-04	Sample Depth:	29.0-29.4 ft
Sample Description:	Dark Gray Granitic Rock				

Initial Specimen Measurements	
Diameter:	1.870 in
Area:	2.746 in²
Length:	4.51 in
Weight:	598.3 g
Unit Weight:	184.0 pcf



LOAD TEST DATA			
Deflection Reading (in)	Load Reading (lb)	Strain (%)	Stress (psi)
0.000	0	0.000	0
0.005	250	0.111	90
0.010	1290	0.222	470
0.015	5180	0.333	1890
0.020	21000	0.443	7650
0.024	25420	0.532	9260

Strain Rate: %/min

Failure Mode:

Remarks:

Note: Uniaxial compressive strength was determined in general accordance with ASTM D7012-14 Method C. Deflection, Strain, and Young's modulus (E) data is provided for reference only and is not intended to be in accordance with ASTM D7012-14 Method D as deflection and strain is not measured in accordance with that procedure. Young's Modulus is calculated using this data to determine the secant modulus at each data interval per Figure 2 (C) in ASTM D 7012-14.

010 ROCK COMPRESSION RESULTS G22009.01.GPJ FALCON_FORMAT.GDT 12/19/23

REFERENCE: I-25I3AC

PROJECT: 34165

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2, 2A	LEGEND
3	SITE PLAN
4	PROFILE
5-8	CROSS SECTIONS
9-21	BORE LOGS, CORE LOGS, AND CORE PHOTOS

APPENDICES

<u>APPENDIX</u>	<u>TITLE</u>	<u>SHEETS</u>
A	LABORATORY RESULTS	22-23

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY BUNCOMBE
PROJECT DESCRIPTION I-26I-40I-240 INTERCHANGE TO
SR 3548 (HAYWOOD RD)

SITE DESCRIPTION BRIDGE NO. 208 ON -L- (I-26I-240)
OVER HOMINY CREEK AND SR 3620 (HOMINY
CREEK RD) BETWEEN I-40 WB AND NC 191

STATE	TOWN OF HOLLY SPRINGS PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AC	1	24

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

CG2

GOODNIGHT, D.J.

NCDOT

INVESTIGATED BY FALCON ENG.

DRAWN BY CROCKETT, S.C.

CHECKED BY HUNSBERGER, W.S.

SUBMITTED BY FALCON ENG.

DATE SEPTEMBER 2024



DocuSigned by:
Stephen Crockett 9/24/2024
C5CA5FED48E0435...
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 (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 (ALLOY) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOOED 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 (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 INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (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.																																																	
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION										WEATHERING																																																											
GENERAL CLASS. GROUP CLASS. SYMBOL % PASSING MATERIAL PASSING #10 #200										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.										FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) 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 (SL.) 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 DIVES "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, WOULD YIELD SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIXES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.										COMPLETE																																																	
PERCENTAGE OF MATERIAL										GROUND WATER																																																																					
ORGANIC MATERIAL TRACE OF ORGANIC MATTER LITTLE ORGANIC MATTER MODERATELY ORGANIC HIGHLY ORGANIC										WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP																																																																					
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS										ROCK HARDNESS																																																											
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUES) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT 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 DMT TEST POINT AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR (INSTALLATION) CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE										VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD 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, GONGES 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 GROOVED OR COUCED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR COUCED 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 FINGER NAIL.										VERY HARD																																							
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS										ABBREVIATIONS																																																											
U.S. STD. SIEVE SIZE OPENING (MM) BOULDER (BLOR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)										UNDERCUT EXCAVATION UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK										AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAG. - FRAGMENTS HI. - 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 VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT %g - DRY UNIT WEIGHT										SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO																																																	
SOIL MOISTURE - CORRELATION OF TERMS										EQUIPMENT USED ON SUBJECT PROJECT																																																																					
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE: CORE SIZE: HAND TOOLS:										FRACTURE SPACING BEDDING										INDURATION																																																	
LL - LIQUID LIMIT PL - PLASTIC LIMIT DM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT										CME-45C CME-55 CME-550X VANE SHEAR TEST PORTABLE MOIST DIEDRICH D-50										CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING W/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG-CARB. CORE BIT										AUTOMATIC MANUAL N O										POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST										TERM SPACING 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										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.										BENCH MARK: BL-15, -L- STA. 43+89, 56' LT N: 679099 E: 930201 ELEVATION: 2029.48 FEET									
PLASTICITY																														NOTES:																																																	
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC																														FIAD - FILLED IMMEDIATELY AFTER DRILLING																																																	
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.																																																																															

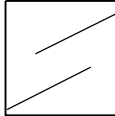
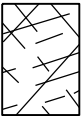
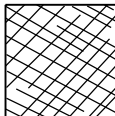
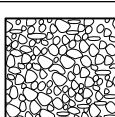
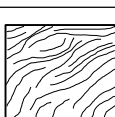
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

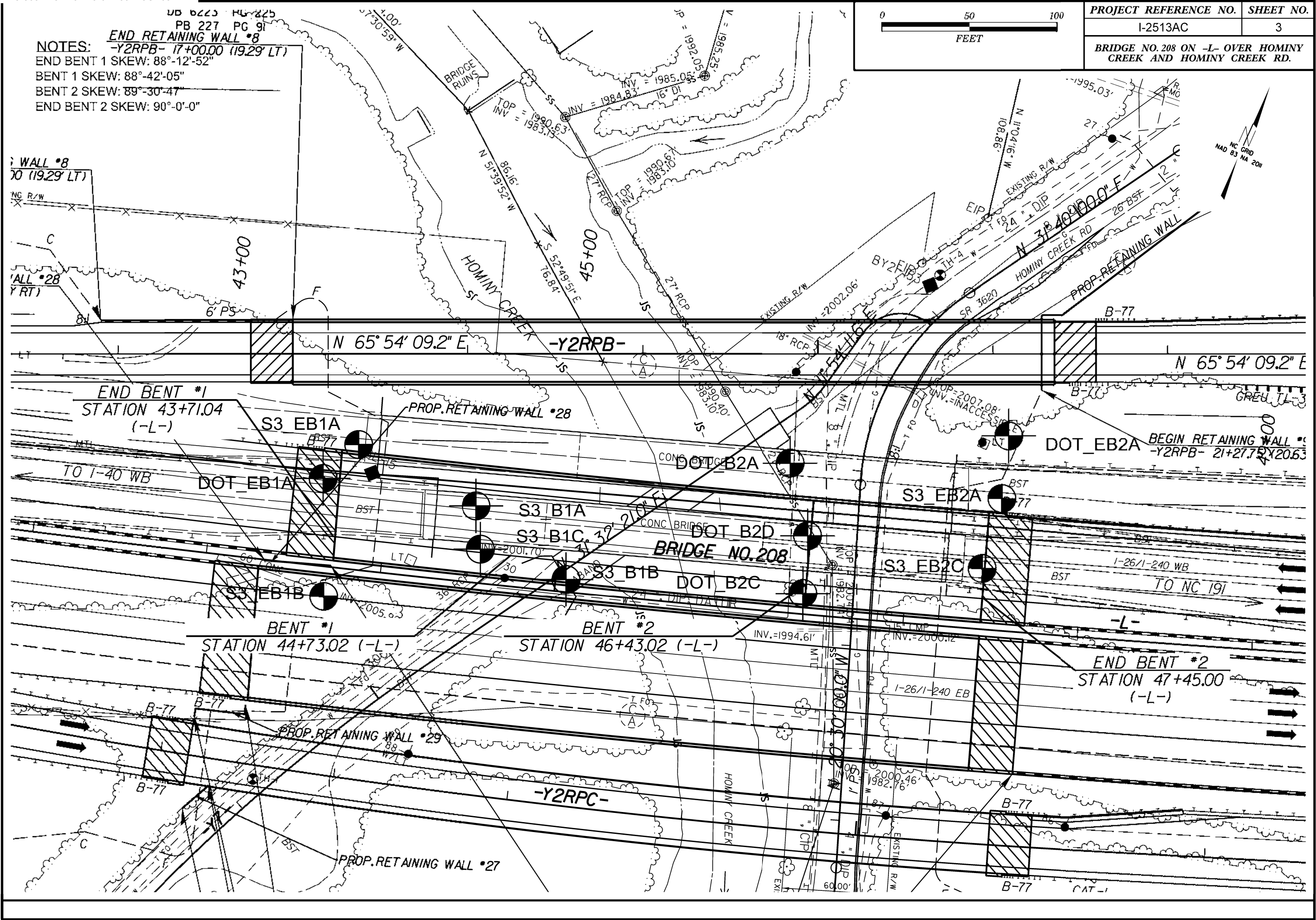
SUBSURFACE INVESTIGATION

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)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)		SURFACE CONDITIONS					GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)		SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)				
From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.		VERY GOOD Very rough, fresh unweathered surfaces	GOOD Rough, slightly weathered, iron stained surfaces	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings	From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.		VERY GOOD - Very Rough, fresh unweathered surfaces	GOOD - Rough, slightly weathered surfaces	FAIR - Smooth, moderately weathered and altered surfaces	POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments	VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings
STRUCTURE		DECREASING SURFACE QUALITY ➡					COMPOSITION AND STRUCTURE						
	INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90			N/A	N/A		A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.	70				
	BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	80							60				
	VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		70					B. Sandstone with thin inter-layers of siltstone		50			
	BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity		60					C. Sandstone and siltstone in similar amounts					
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces			50				D. Siltstone or silty shale with sandstone layers			40		
	LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes			40				E. Weak siltstone or clayey shale with sandstone layers				30	
				30			C, D, E, and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H.					20	
				20				F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure					10
				10				G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers					
		N/A	N/A					H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.					
		— Means deformation after tectonic disturbance											



050100

FEET

VE = 5:1

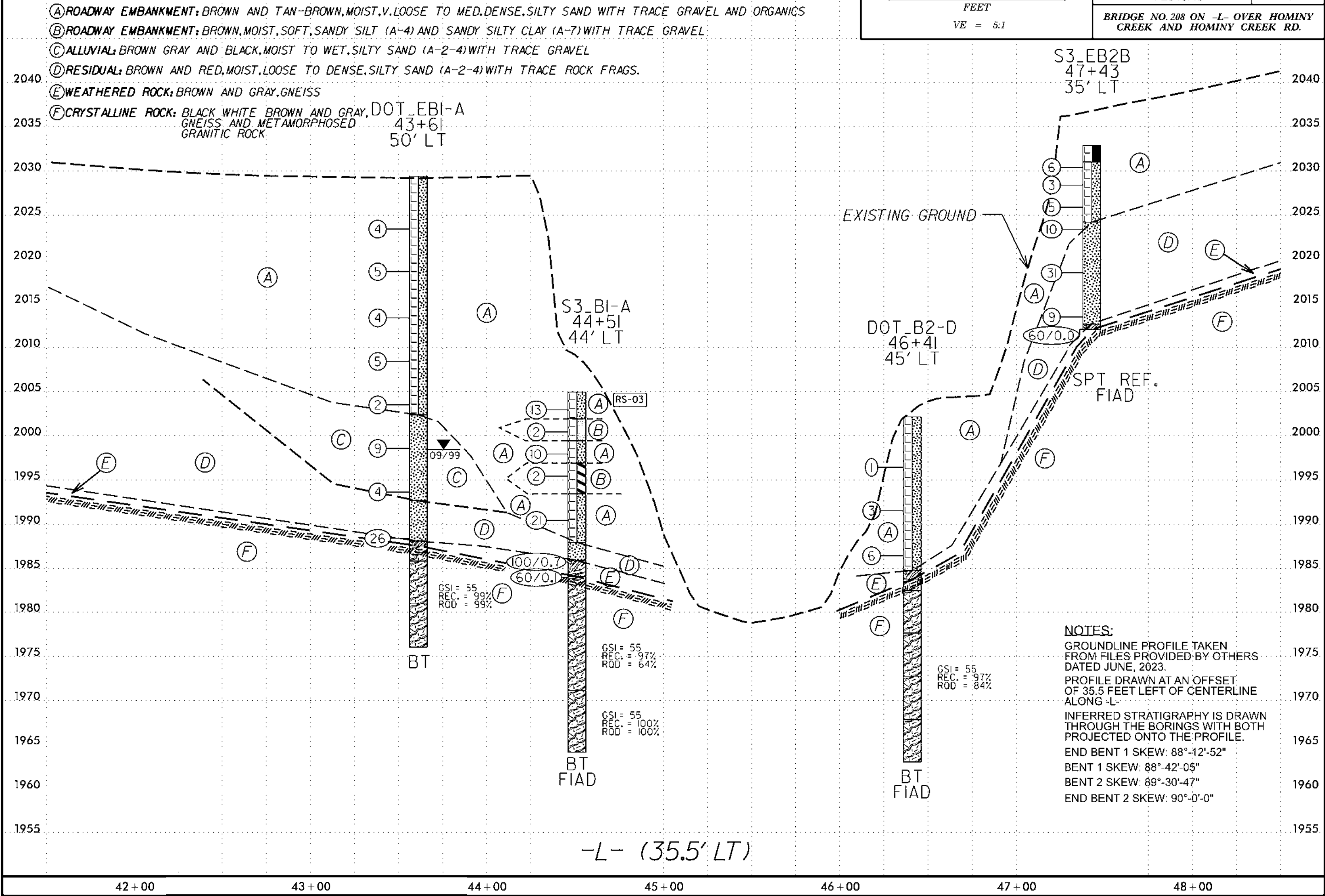
PROJECT REFERENCE NO.

I-2513AC

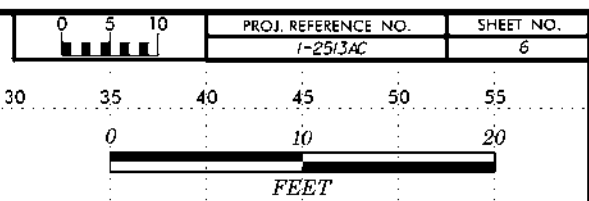
SHEET NO.

4

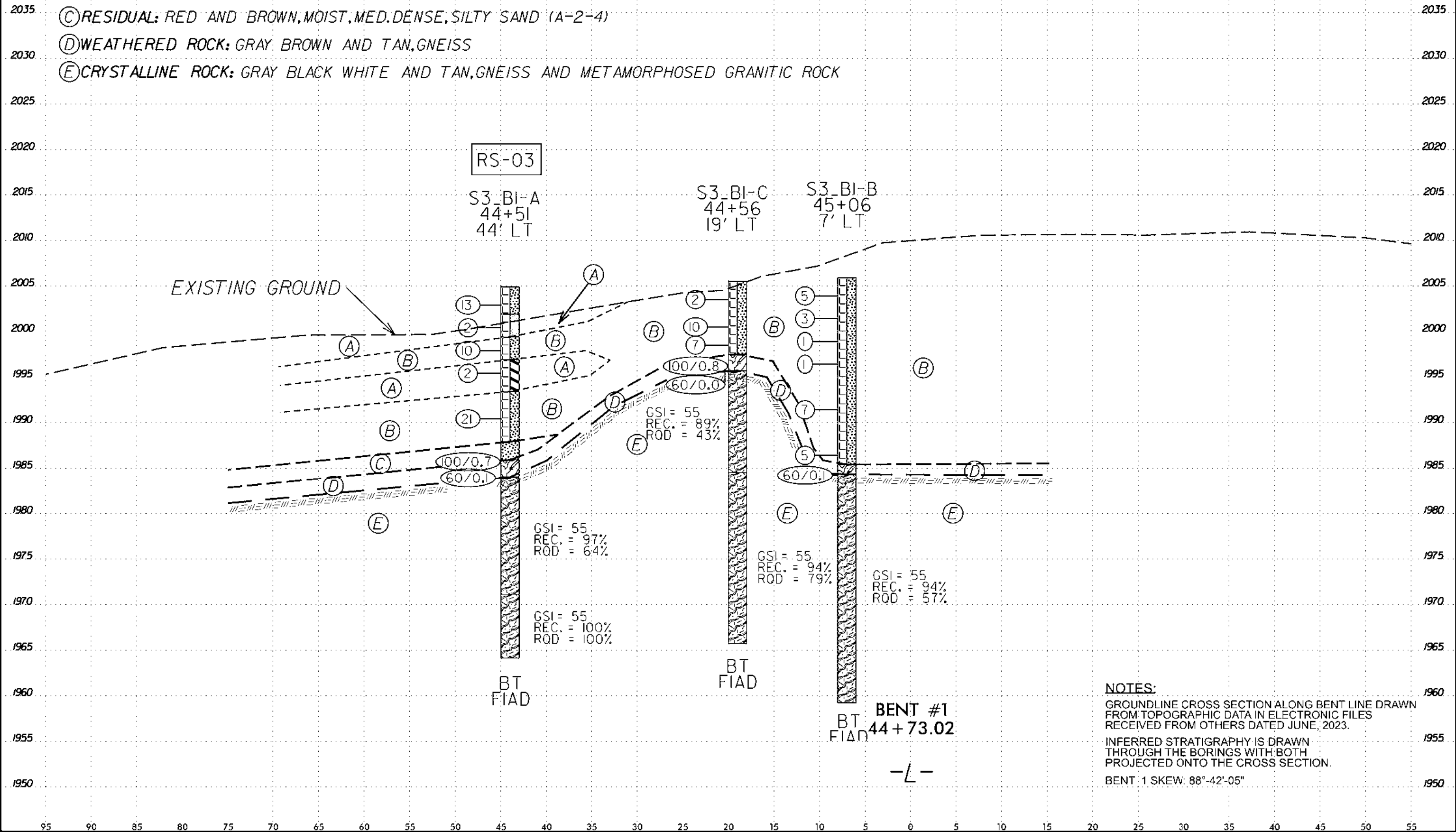
BRIDGE NO. 208 ON -L- OVER HOMINY CREEK AND HOMINY CREEK RD.





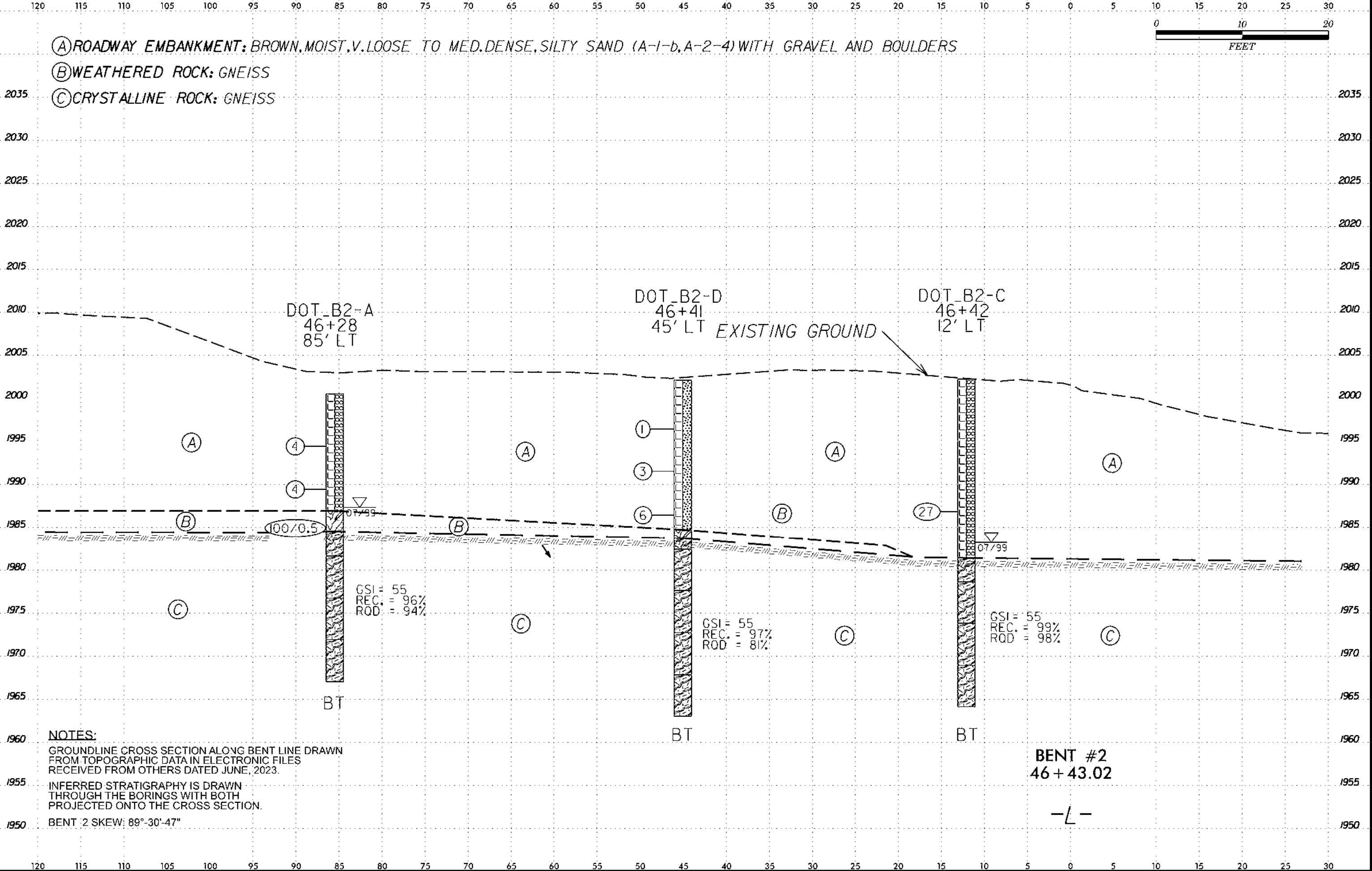
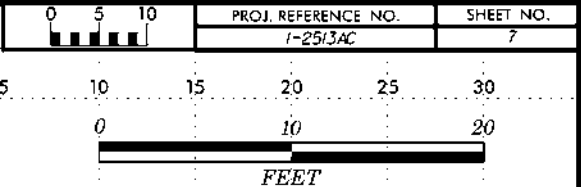


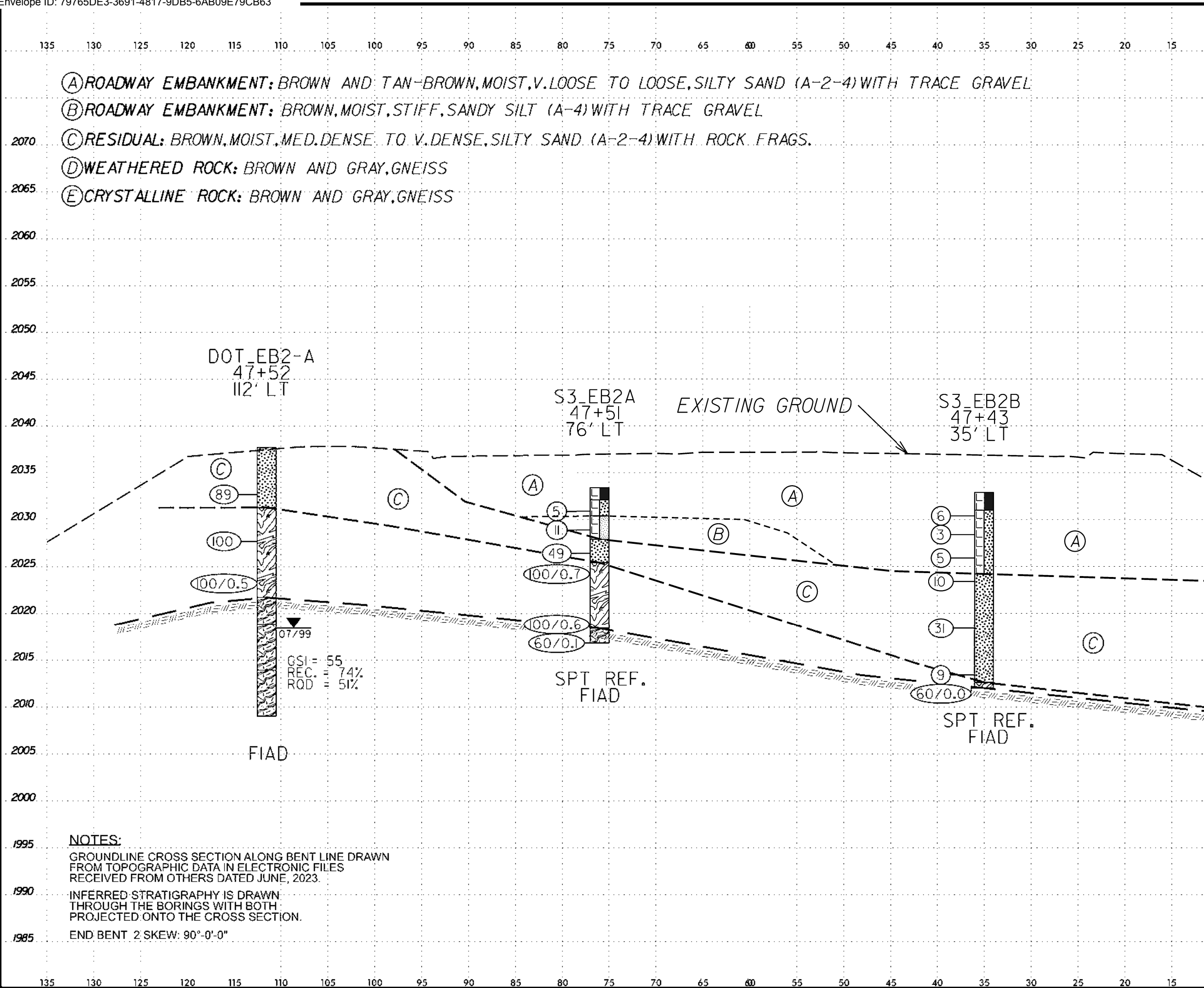
- (A) ROADWAY EMBANKMENT: BROWN, MOIST, SOFT, SANDY SILT (A-4) AND SILTY SANDY CLAY (A-7) WITH LITTLE GRAVEL
- (B) ROADWAY EMBANKMENT: BROWN, MOIST, V. LOOSE TO MED. DENSE, SILTY SAND (A-2-4) WITH TRACE TO LITTLE GRAVEL
- (C) RESIDUAL: RED AND BROWN, MOIST, MED. DENSE, SILTY SAND (A-2-4)
- (D) WEATHERED ROCK: GRAY BROWN AND TAN, GNEISS
- (E) CRYSTALLINE ROCK: GRAY BLACK WHITE AND TAN, GNEISS AND METAMORPHOSED GRANITIC ROCK



NOTES:
GROUNDLINE CROSS SECTION ALONG BENT LINE DRAWN FROM TOPOGRAPHIC DATA IN ELECTRONIC FILES RECEIVED FROM OTHERS DATED JUNE, 2023.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.
BENT 1 SKEW: 88°-42'-05"

B/23/9





— / —

NCDOT BORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

NCDOT BORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

NCDOT BORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

NCDOT CORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

NCDOT BORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

NCDOT CORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24



GSI = 55



GSI = 55



 FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 CARY, NC 27513 PHONE: 919.871.0800 www.falconengineering.com	ROCK CORE PHOTOGRAPHS
	BRIDGE ON -L- OVER HOMINY CREEK AND SR 3620 BETWEEN I-40 WB AND NC 191 BUNCOMBE COUNTY, NC WBS: 34165 TIP: I-2513AC FALCON PROJECT NO. G22009.01

NCDOT BORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

NCDOT CORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24



GSI = 55



GSI = 55



GSI = 55



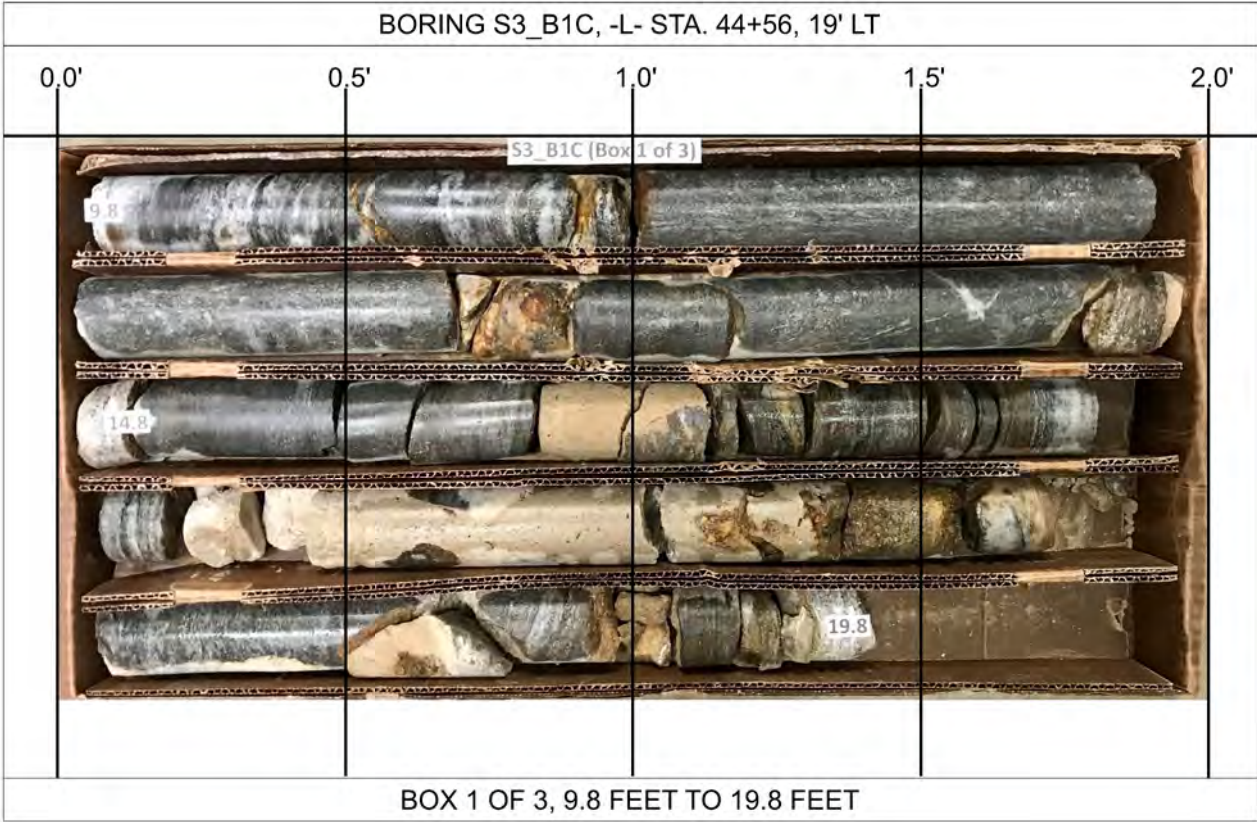
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513
PHONE: 919.871.0800
www.falconengineering.com

ROCK CORE PHOTOGRAPHS

BRIDGE ON -L- OVER HOMINY CREEK AND SR 3620
BETWEEN I-40 WB AND NC 191
BUNCOMBE COUNTY, NC
WBS: 34165 | TIP: I-2513AC
FALCON PROJECT NO. G22009.01

NCDOT BORE SINGLE I-1213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

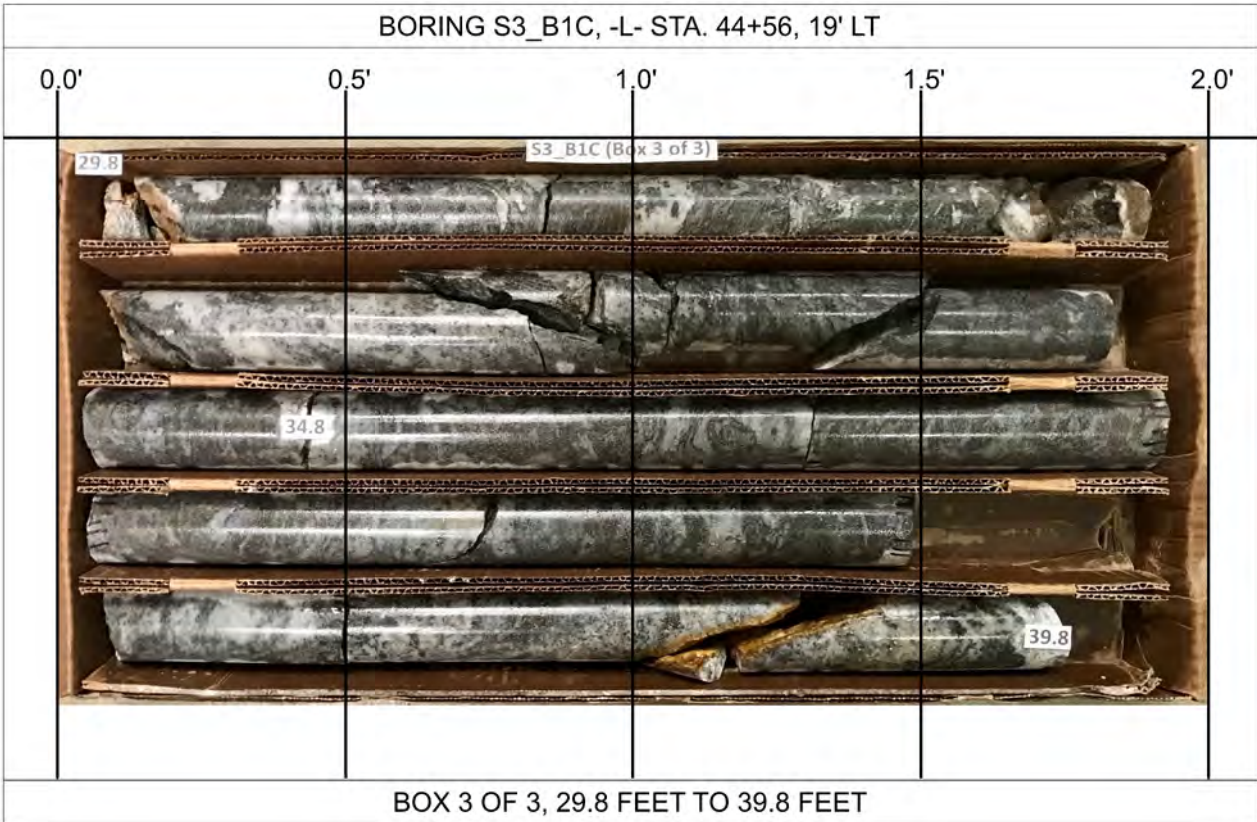
NCDOT CORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24



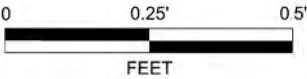
GSI = 55



GSI = 55



GSI = 55



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

ROCK CORE PHOTOGRAPHS

BRIDGE ON -L- OVER HOMINY CREEK AND SR 3620
BETWEEN I-40 WB AND NC 191
BUNCOMBE COUNTY, NC
WBS: 34165 | TIP: I-2513AC
FALCON PROJECT NO. G22009.01

NCDOT BORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

NCDOT CORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.2				TIP 1-2513AC				COUNTY BUNCOMBE				GEOLOGIST SHELTON, T. P.					
SITE DESCRIPTION Bridge No. 208 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191												GROUND WTR (ft)					
BORING NO. DOT_B2-D				STATION 46+41				OFFSET 45 ft LT				ALIGNMENT -L-				0 HR. N/A	
COLLAR ELEV. 2,002.1 ft				TOTAL DEPTH 39.2 ft				NORTHING 679,168				EASTING 930,442				24 HR. N/A	
DRILL RIG/HAMMER EFF./DATE CME 550								DRILL METHOD SPT Core Boring				HAMMER TYPE Automatic					
DRILLER GOSNESS, W. A.				START DATE 07/08/99				COMP. DATE 07/08/99				SURFACE WATER DEPTH N/A					
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
2005																	
														2,002.1 GROUND SURFACE 0.0			
2000														ROADWAY EMBANKMENT VERY LOOSE TO LOOSE, BROWN, SILTY SAND (A-2-4) WITH GRAVEL AND BOULDER FROM 7.0 TO 7.7'			
	1,997.4	4.7				1	0	1									
1995																	
	1,992.5	9.6				1	1	2									
1990																	
	1,987.4	14.7				8	4	2									
1985														1,984.7 17.4			
														1,983.7 18.4			
														1,982.4 19.7			
1980														CRYSTALLINE ROCK (MUSCOVITE/BIOTITE GNEISS)			
														CRYSTALLINE ROCK (MUSCOVITE/BIOTITE GNEISS)			
														1,977.5 24.6			
1975														CRYSTALLINE ROCK (MUSCOVITE/BIOTITE GNEISS)			
														1,972.6 29.5			
1970														CRYSTALLINE ROCK (MUSCOVITE/BIOTITE GNEISS)			
														1,967.7 34.4			
1965														CRYSTALLINE ROCK (MUSCOVITE/BIOTITE GNEISS)			
														1,962.9 39.2			
														Boring Terminated at Elevation 1,962.9 ft IN MUSCOVITE/BIOTITE GNEISS			
														PLEASE NOTE: This specific boring was completed in 1999. Core Photos are available from the Geotech Unit Asheville Field Office (AFO) if necessary. Photos are of an insufficient nature for professional evaluation. Please contact the AFO if necessary at dcelliott@ncdot.gov.			

NC DOT BORE SINGLE I-4213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34165.1.2				TIP 1-2513AC				COUNTY BUNCOMBE				GEOLOGIST SHELTON, T. P.			
SITE DESCRIPTION Bridge No. 208 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191												GROUND WTR (ft)			
BORING NO. DOT_B2-D				STATION 46+41				OFFSET 45 ft LT				ALIGNMENT -L-		0 HR. N/A	
COLLAR ELEV. 2,002.1 ft				TOTAL DEPTH 39.2 ft				NORTHING 679,168				EASTING 930,442		24 HR. N/A	
DRILL RIG/HAMMER EFF./DATE CME 550								DRILL METHOD SPT Core Boring				HAMMER TYPE Automatic			
DRILLER GOSNESS, W. A.				START DATE 07/08/99				COMP. DATE 07/08/99				SURFACE WATER DEPTH N/A			
CORE SIZE NXWL				TOTAL RUN 20.8 ft											
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS			DEPTH (ft)	
					REC. (ft) %	ROD (ft) %		REC. (ft) %	ROD (ft) %						
1983.73	1,983.7	18.4	1.3		(1.1) 85%	(1.1) 85%		(1.1) 85%	(1.1) 85%		1,983.7	Begin Coring @ 18.4 ft		18.4	
1980	1,982.4	18.7	4.9		(4.9) 100%	(3.7) 76%		(4.9) 100%	(3.7) 76%		1,982.4	CRYSTALLINE ROCK MEDIUM DARK GRAY, VERY SLIGHTLY WEATHERED MUSCOVITE/BIOTITE GNEISS. SLIGHTLY FOLDED, FINE TO MEDIUM GRAIN WITH OCCASIONAL FELDSPAR PORPHYROBLASTS. ABUNDANT IRON STAINS, TRACE PYRITE.		19.7	
	1,977.5	24.6	4.9		(4.8) 98%	(4.6) 94%		(4.8) 98%	(4.6) 94%		1,977.5	GSI = 55 CRYSTALLINE ROCK GRAY TO MEDIUM DARK GRAY, VERY SLIGHTLY WEATHERED MUSCOVITE/BIOTITE GNEISS. FINE TO MEDIUM GRAINED, GRADING TO GRANULITE IN PLACES.		24.6	
1975	1,972.6	29.5	4.9		(4.7) 96%	(2.9) 59%		(4.7) 96%	(2.9) 59%		1,972.6	GSI = 55 CRYSTALLINE ROCK MEDIUM DARK GRAY, SLIGHTLY WEATHERED MUSCOVITE/BIOTITE GNEISS WITH GRANULITE IN PLACES.		29.5	
	1,967.7	34.4	4.8		(4.7) 98%	(4.6) 96%		(4.7) 98%	(4.6) 96%		1,967.7	GSI = 55 CRYSTALLINE ROCK MEDIUM DARK GRAY, SLIGHTLY WEATHERED MUSCOVITE/BIOTITE GNEISS WITH GRANULITE IN PLACES.		34.4	
1965	1,962.9	39.2									1,962.9	GSI = 55 CRYSTALLINE ROCK MEDIUM DARK GRAY, SLIGHTLY WEATHERED MUSCOVITE/BIOTITE GNEISS WITH GRANULITE. FINE TO MEDIUM GRAIN. SLIGHTLY FOLDED WITH PYRITE AND MANGANESE. ALONG FOLDS (ASSOCIATED WITH AMPHIBOLES AND BIOTITE LAYERS)		39.2	
Boring Terminated at Elevation 1,962.9 ft IN MUSCOVITE/BIOTITE GNEISS															
PLEASE NOTE: This specific boring was completed in 1999. Core Photos are available from the Geotech Unit Asheville Field Office (AFO) if necessary. Photos are of an insufficient nature for professional evaluation. Please contact the AFO if necessary at dcelllott@ncdot.gov.															

NC DOT CORE SINGLE I-4213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

NCDOT BORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

NCDOT CORE SINGLE I-1213AC GEO COMBINED.GPJ NC DOT.GDT 9/20/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.2			TIP 1-2513AC			COUNTY BUNCOMBE			GEOLOGIST SHELTON, T. P.							
SITE DESCRIPTION Bridge No. 208 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191									GROUND WTR (ft)							
BORING NO. DOT_EB2-A			STATION 47+52			OFFSET 112 ft LT			ALIGNMENT -L-			0 HR. 8.5				
COLLAR ELEV. 2,037.7 ft			TOTAL DEPTH 28.7 ft			NORTHING 679,267			EASTING 930,524			24 HR. 19.3				
DRILL RIG/HAMMER EFF./DATE CME 550						DRILL METHOD SPT Core Boring			HAMMER TYPE Automatic							
DRILLER GOSNESS, W. A.			START DATE 06/30/99			COMP. DATE 06/30/99			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)	
2040																
														2,037.7	GROUND SURFACE 0.0	
2035														SAPROLITE VERY DENSE, BROWN, SILTY SAND (A-2-4) WITH TRACE WEATHERED ROCK FRAGMENTS		
	2,033.7	4.0				29	50	39								
														2,031.3	6.4	
2030														WEATHERED ROCK (MUSCOVITE/BIOTITE GNEISS)		
	2,028.7	9.0				12	13	87								
2025																
	2,023.7	14.0				100	0.5									
														2,021.7	16.0	
2020														CRYSTALLINE ROCK (MUSCOVITE/BIOTITE GNEISS)		
														2,018.8	18.9	
														CRYSTALLINE ROCK (MUSCOVITE/BIOTITE GNEISS)		
2015																
														2,013.9	23.8	
														CRYSTALLINE ROCK (BIOTITE/MUSCOVITE GNEISS)		
2010																
														2,009.0	28.7	
														Boring Terminated at Elevation 2,009.0 ft IN BIOTITE/MUSCOVITE GNEISS		
														PLEASE NOTE: This specific boring was completed in 1999. Core Photos are available from the Geotech Unit Asheville Field Office (AFO) if necessary. Photos are of an insufficient nature for professional evaluation. Please contact the AFO if necessary at dcelllott@ncdot.gov.		

NCDOT BORE SINGLE I-213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

GEOTECHNICAL BORING REPORT
CORE LOG

WBS 34165.1.2				TIP 1-2513AC				COUNTY BUNCOMBE				GEOLOGIST SHELTON, T. P.			
SITE DESCRIPTION Bridge No. 208 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191												GROUND WTR (ft)			
BORING NO. DOT_EB2-A				STATION 47+52				OFFSET 112 ft LT				ALIGNMENT -L-		0 HR. 8.5	
COLLAR ELEV. 2,037.7 ft				TOTAL DEPTH 28.7 ft				NORTHING 679,267				EASTING 930,524		24 HR. 19.3	
DRILL RIG/HAMMER EFF./DATE CME 550								DRILL METHOD SPT Core Boring				HAMMER TYPE Automatic			
DRILLER GOSNESS, W. A.				START DATE 06/30/99				COMP. DATE 06/30/99				SURFACE WATER DEPTH N/A			
CORE SIZE NXWL				TOTAL RUN 12.7 ft											
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %ROD (ft) %		SAMP. NO.	STRATA REC. (ft) %ROD (ft) %		LOG	DESCRIPTION AND REMARKS				
											ELEV. (ft)	DEPTH (ft)			
2021.72															
2020	2,021.7	16.0	2.9		(1.5) 52%	(0.5) 17%		(1.5) 52%	(0.5) 17%		2,021.7	Begin Coring @ 16.0 ft CRYSTALLINE ROCK		16.0	
	2,018.8	18.9			(3.1) 63%	(1.8) 37%		(3.1) 63%	(1.8) 37%		2,018.8	BROWN-GRAY, MODERATELY SEVERE WEATHERED MUSCOVITE/BIOTITE GNEISS.		18.9	
2015			4.9		(3.1) 63%	(1.8) 37%		(3.1) 63%	(1.8) 37%		2,013.9	GSI = 55 CRYSTALLINE ROCK BROWN-GRAY, MODERATELY SEVERE WEATHERED MUSCOVITE/BIOTITE GNEISS TO 22.6'. FROM 22.6'. SLIGHTLY WEATHERED, GRAY MUSCOVITE/BIOTITE GNEISS.		23.8	
	2,013.9	23.8	4.9		(4.8) 98%	(4.2) 86%		(4.8) 98%	(4.2) 86%		2,009.0	GSI = 55 CRYSTALLINE ROCK GRAY, VERY SLIGHTLY WEATHERED TO FRESH BIOTITE/MUSCOVITE GNEISS. WEATHERED ZONE AT 27.1 TO 27.3'. BRECCIATED APPEARANCE AT 27.9 TO 28.7' WITH OCCASIONAL SCHISTOSE ZONES. TRACE PYRITE.		28.7	
2010	2,009.0	28.7													

NCDOT CORE SINGLE I-213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.2			TIP 1-2513AC			COUNTY BUNCOMBE			GEOLOGIST Goodnight, D.J.							
SITE DESCRIPTION Bridge No. 208 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191									GROUND WTR (ft)							
BORING NO. S3_EB2A			STATION 47+51			OFFSET 76 ft LT			ALIGNMENT -L-			0 HR. Dry				
COLLAR ELEV. 2,033.4 ft			TOTAL DEPTH 16.6 ft			NORTHING 679,233			EASTING 930,535			24 HR. FIAD				
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 87% 05/10/2022						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER Brewer, M.			START DATE 02/07/23			COMP. DATE 02/07/23			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)	
2035																
2030	2,031.9	1.5	4	2	3									2,033.4	GROUND SURFACE	0.0
	2,029.9	3.5	2	3	8								M	2,032.1	ROADWAY EMBANKMENT	1.3
	2,027.4	6.0	15	19	30								M	2,030.4	ASPHALT (0.1 FT) AND CONCRETE (1.2 FT)	3.0
2025	2,024.9	8.5	41	59/0.2									M	2,027.9	BROWN, LOOSE, SILTY SAND (A-2-4) WITH LITTLE GRAVEL	5.5
														2,027.9	BROWN, STIFF, SANDY SILT (A-4) WITH LITTLE GRAVEL	8.0
2020	2,019.9	13.5	6	60	40/0.1									2,025.4	RESIDUAL	
	2,016.9	16.5	60/0.1												BROWN, DENSE, SILTY SAND (A-2-4) WITH TRACE ROCK FRAGMENTS	
															WEATHERED ROCK	
															BROWN, GNEISS	
														2,018.4	CRYSTALLINE ROCK	15.0
														2,016.8	BROWN AND GRAY, GNEISS	16.6
															Boring Terminated at Elevation 2,016.8 ft in CR: GNEISS	

NC DOT BORE SINGLE I-4213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 34165.1.2			TIP 1-2513AC			COUNTY BUNCOMBE			GEOLOGIST Goodnight, D.J.					
SITE DESCRIPTION Bridge No. 208 on -L- over Hominy Creek and SR 3620 Between I-40 WB and NC 191									GROUND WTR (ft)					
BORING NO. S3_EB2B			STATION 47+43			OFFSET 35 ft LT			ALIGNMENT -L-			0 HR. Dry		
COLLAR ELEV. 2,032.9 ft			TOTAL DEPTH 20.9 ft			NORTHING 679,192			EASTING 930,541			24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 87% 05/10/2022						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic					
DRILLER Brewer, M.			START DATE 02/07/23			COMP. DATE 02/07/23			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)
2035														
2030	2,031.4	1.5	1	2	4								2,032.9 GROUND SURFACE 0.0	
	2,029.4	3.5	2	1	2								ROADWAY EMBANKMENT 1.9	
	2,026.9	6.0	2	2	3								ASPHALT (0.05 FT) AND CONCRETE (1.5 FT) 1.9	
2025	2,024.4	8.5	7	3	7								BROWN TO TAN-BROWN, LOOSE, SILTY SAND (A-2-4) WITH LITTLE GRAVEL 5.5	
	2,019.4	13.5	10	14	17								2,024.2 8.7	
2020	2,014.4	18.5	8	4	5								RESIDUAL 100/0.7	
	2,012.0	20.9	60/0.0										BROWN, LOOSE TO DENSE, SILTY SAND (A-2-4) WITH TRACE ROCK FRAGMENTS	
2015													2,012.6 20.3	
													2,012.0 20.9	
													WEATHERED ROCK 100/0.6	
													BROWN AND GRAY, GNEISS	
													Boring Terminated at Elevation 2,012.0 ft on CR: GNEISS	

NC DOT BORE SINGLE I-4213AC_GEO_COMBINED.GPJ NC_DOT.GDT 9/20/24

REFERENCE: I-25I3AC

PROJECT: 34I65

PROJECT REFERENCE NO.	SHEET NO.
I-25I3AC	22

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
APPENDIX A
LABORATORY RESULTS

Project No.:	G22009.01	Tested By:	C. Sullivan	Test Date:	2023-19-12
Project Name:	I-2513AA-AC				
Boring ID:	S3-B1-A	Sample ID:	RS-03	Sample Depth:	34.9-35.3 ft
Sample Description:	Gray Granitic Rock				

Initial Specimen Measurements	
Diameter:	1.860 in L/D: 2.44
Area:	2.717 in²
Length:	4.53 in
Weight:	549.7 g
Unit Weight:	170.1 pcf

LOAD TEST DATA

Deflection Reading (in)	Load Reading (lb)	Strain (%)	Stress (psi)
0.000	0	0.000	0
0.005	900	0.110	330
0.010	5500	0.221	2020
0.015	13700	0.331	5040
0.020	21400	0.442	7880
0.025	29300	0.552	10780
0.030	38400	0.662	14130
0.035	47250	0.773	17390
0.038	51700	0.839	19030

Strain Rate: %/min

Failure Mode:

Remarks:

Note: Uniaxial compressive strength was determined in general accordance with ASTM D7012-14 Method C. Deflection, Strain, and Young's modulus (E) data is provided for reference only and is not intended to be in accordance with ASTM D7012-14 Method D as deflection and strain is not measured in accordance with that procedure. Young's Modulus is calculated using this data to determine the secant modulus at each data interval per Figure 2 (C) in ASTM D 7012-14.

