

REFERENCE: B-5982

PROJECT: 47814

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY HAYWOOD
PROJECT DESCRIPTION REPLACE BRIDGE 430095 ON
US 74 OVER SOUTHERN RAILROAD

SITE DESCRIPTION STA. 20+37.51 -L-

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5982	1	22

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.

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 - 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

H. HANCOCK, EI

TRIGON EXPLORATION

E. ESTEP

T. PRESTON

INVESTIGATED BY H. HANCOCK, EI

^{DS}
DCE

DRAWN BY D. BROWN, PE

CHECKED BY H. HANCOCK, EI

SUBMITTED BY D. BROWN, PE

DATE FEBRUARY 2023



STEWART



DocuSigned by:

Donald W. Brown Jr.

03/14/2023

C06817F5E770411
SIGNATURE

DATE

**DOCUMENT NOT CONSIDERED FINAL
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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 208, 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, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

Table with columns for GENERAL CLASS., GRANULAR MATERIALS (<= 35% PASSING #200), SILT-CLAY MATERIALS (> 35% PASSING #200), ORGANIC MATERIALS, GROUP CLASS., SYMBOL, % PASSING #10, #40, #200, MATERIAL PASSING #40 LL, PI, GROUP INDEX, USUAL TYPES OF MAJOR MATERIALS, GEN. RATING AS SUBGRADE.

PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

Table with columns for PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT^2).

TEXTURE OR GRAIN SIZE

Table with columns for U.S. STD. SIEVE SIZE OPENING (MM), BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE. SD.), FINE SAND (F SD.), SILT (SL.), CLAY (CL.).

SOIL MOISTURE - CORRELATION OF TERMS

Table with columns for SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION.

PLASTICITY

Table with columns for NON PLASTIC, SLIGHTLY PLASTIC, MODERATELY PLASTIC, HIGHLY PLASTIC, PLASTICITY INDEX (PI), DRY STRENGTH.

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

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.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50

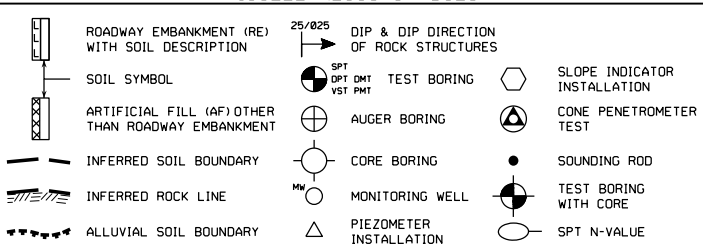
PERCENTAGE OF MATERIAL

Table with columns for ORGANIC MATERIAL, GRANULAR SOILS, SILT - CLAY SOILS, OTHER MATERIAL.

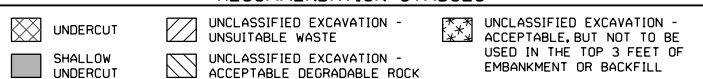
GROUND WATER

Water level symbols: 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.

MISCELLANEOUS SYMBOLS



RECOMMENDATION SYMBOLS



ABBREVIATIONS

Table listing abbreviations: 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, FRAGS. - 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, UG - UNIT WEIGHT, UG - DRY UNIT WEIGHT, SAMPLE ABBREVIATIONS: S - BULK, SS - SPLIT SPOON, ST - SHELBY TUBE, RS - ROCK, RT - RECOMPACTED TRIAXIAL, CBR - CALIFORNIA BEARING RATIO.

EQUIPMENT USED ON SUBJECT PROJECT

Table with columns for DRILL UNITS, ADVANCING TOOLS, HAMMER TYPE, CORE SIZE, HAND TOOLS.

ROCK DESCRIPTION

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 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:

Table with columns for WEATHERED ROCK (WR), CRYSTALLINE ROCK (CR), NON-CRYSTALLINE ROCK (NCR), COASTAL PLAIN SEDIMENTARY ROCK (CP).

WEATHERING

Table with columns for FRESH, VERY SLIGHT (IV SLI), SLIGHT (SLI), MODERATE (MOD.), MODERATELY SEVERE (MOD. SEV.), SEVERE (SEV.), VERY SEVERE (IV SEV.), COMPLETE.

ROCK HARDNESS

Table with columns for VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT.

FRACTURE SPACING

Table with columns for TERM, SPACING, BEDDING, THICKNESS.

INDURATION

Table with columns for FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED.

TERMS AND DEFINITIONS

Table with definitions: 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. SLICKENISE - 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.

BENCH MARK: GPS-I22 (GI22)

ELEVATION: 2583.10 FEET

NOTES: FIAD = FILLED IMMEDIATELY AFTER DRILLING

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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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.

STRUCTURE

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
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DECREASING SURFACE QUALITY →

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.

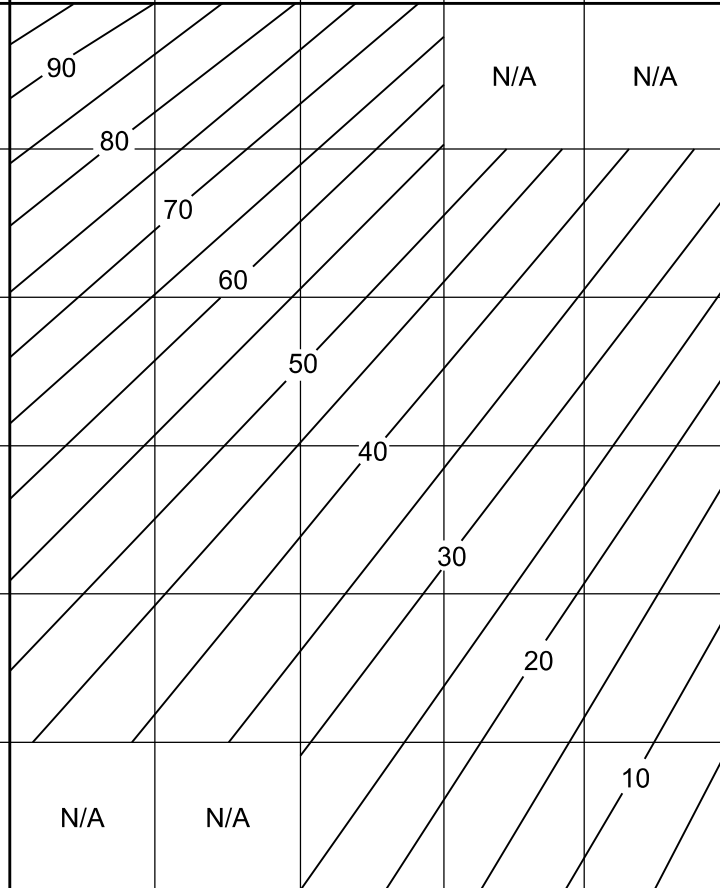
COMPOSITION AND STRUCTURE

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
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DECREASING INTERLOCKING OF ROCK PIECES

INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities	90				N/A	N/A
BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	80	70				
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		60	50			
BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity			40			
DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces				30		
LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes					20	
						10
	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.

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

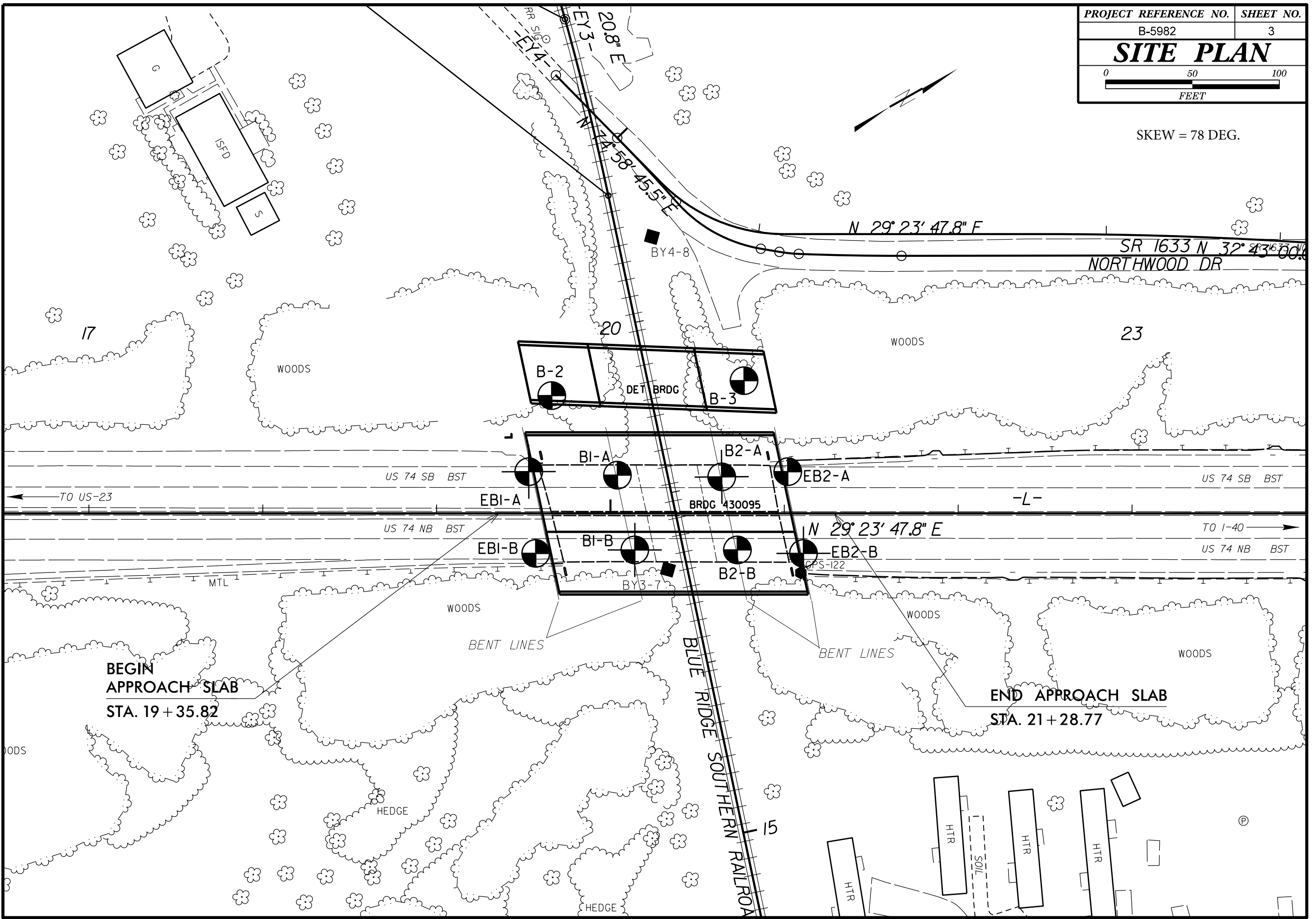
F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure

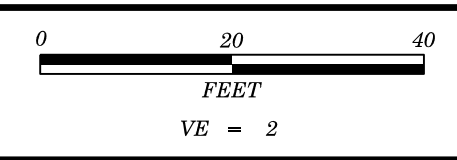
G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers

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.

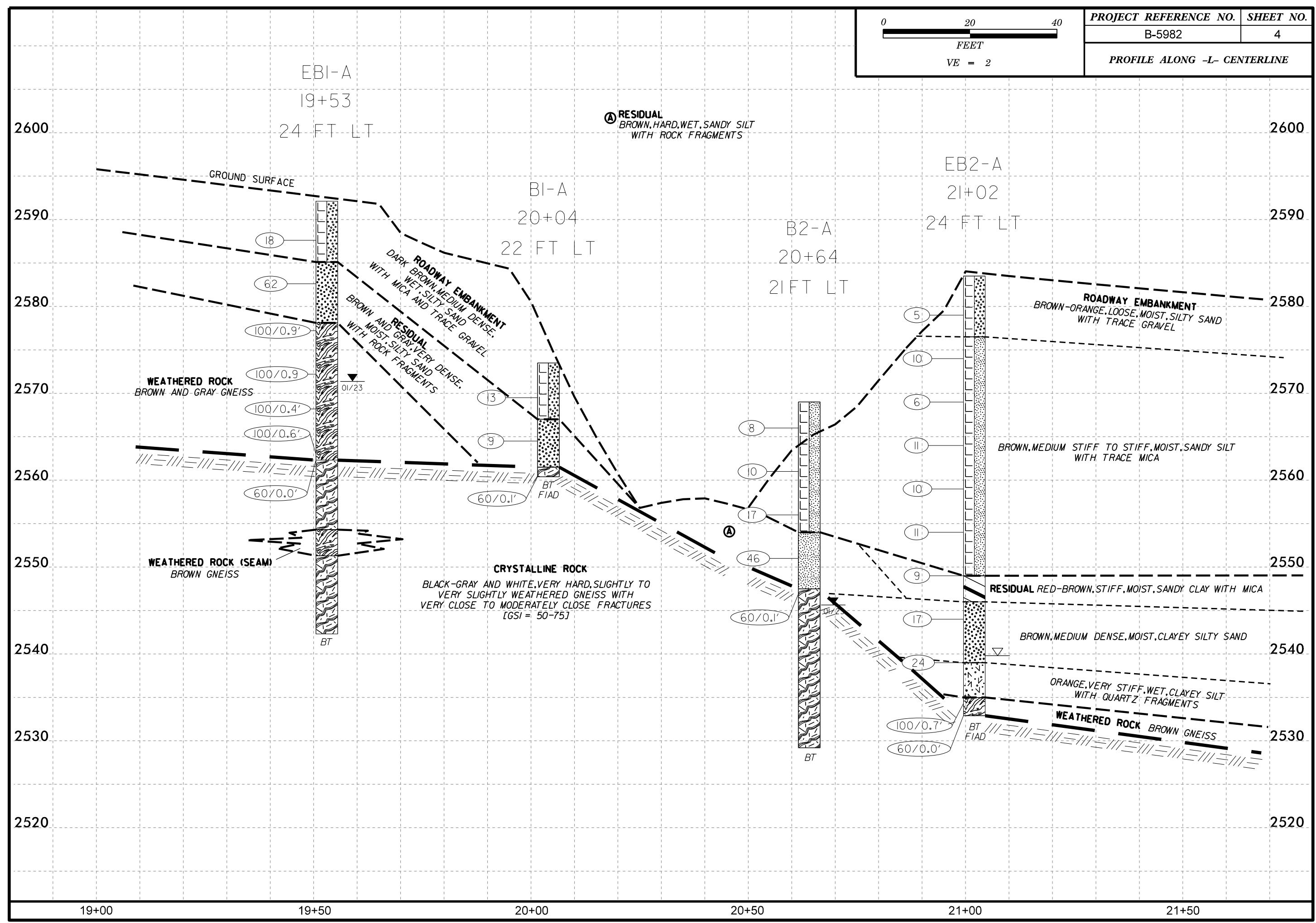
C, D, E, and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to **F** and **H**.

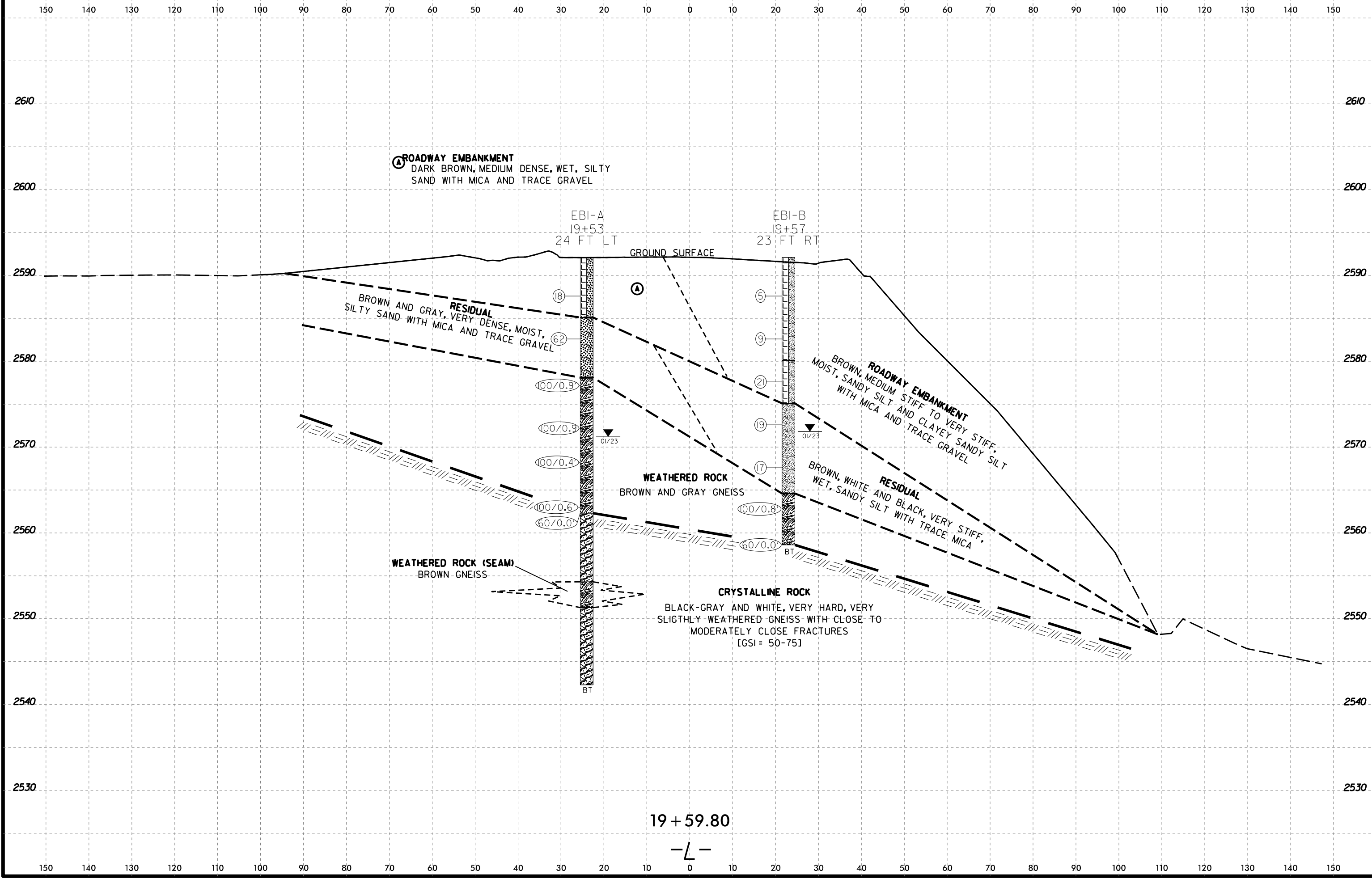
SKEW = 78 DEG.





PROJECT REFERENCE NO.	SHEET NO.
B-5982	4
PROFILE ALONG -L- CENTERLINE	





A ROADWAY EMBANKMENT
DARK BROWN, MEDIUM DENSE, WET, SILTY SAND WITH MICA AND TRACE GRAVEL

EBI-A
19+53
24 FT LT

EBI-B
19+57
23 FT RT

GROUND SURFACE

RESIDUAL
BROWN AND GRAY, VERY DENSE, MOIST, SILTY SAND WITH MICA AND TRACE GRAVEL

ROADWAY EMBANKMENT
BROWN, MEDIUM STIFF TO VERY STIFF, MOIST, SANDY SILT AND CLAYEY SANDY SILT WITH MICA AND TRACE GRAVEL

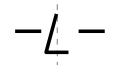
WEATHERED ROCK
BROWN AND GRAY GNEISS

RESIDUAL
BROWN, WHITE AND BLACK, VERY STIFF, WET, SANDY SILT WITH TRACE MICA

WEATHERED ROCK (SEAM)
BROWN GNEISS

CRYSTALLINE ROCK
BLACK-GRAY AND WHITE, VERY HARD, VERY SLIGHTLY WEATHERED GNEISS WITH CLOSE-TO-MODERATELY CLOSE FRACTURES
[GSI = 50-75]

19+59.80

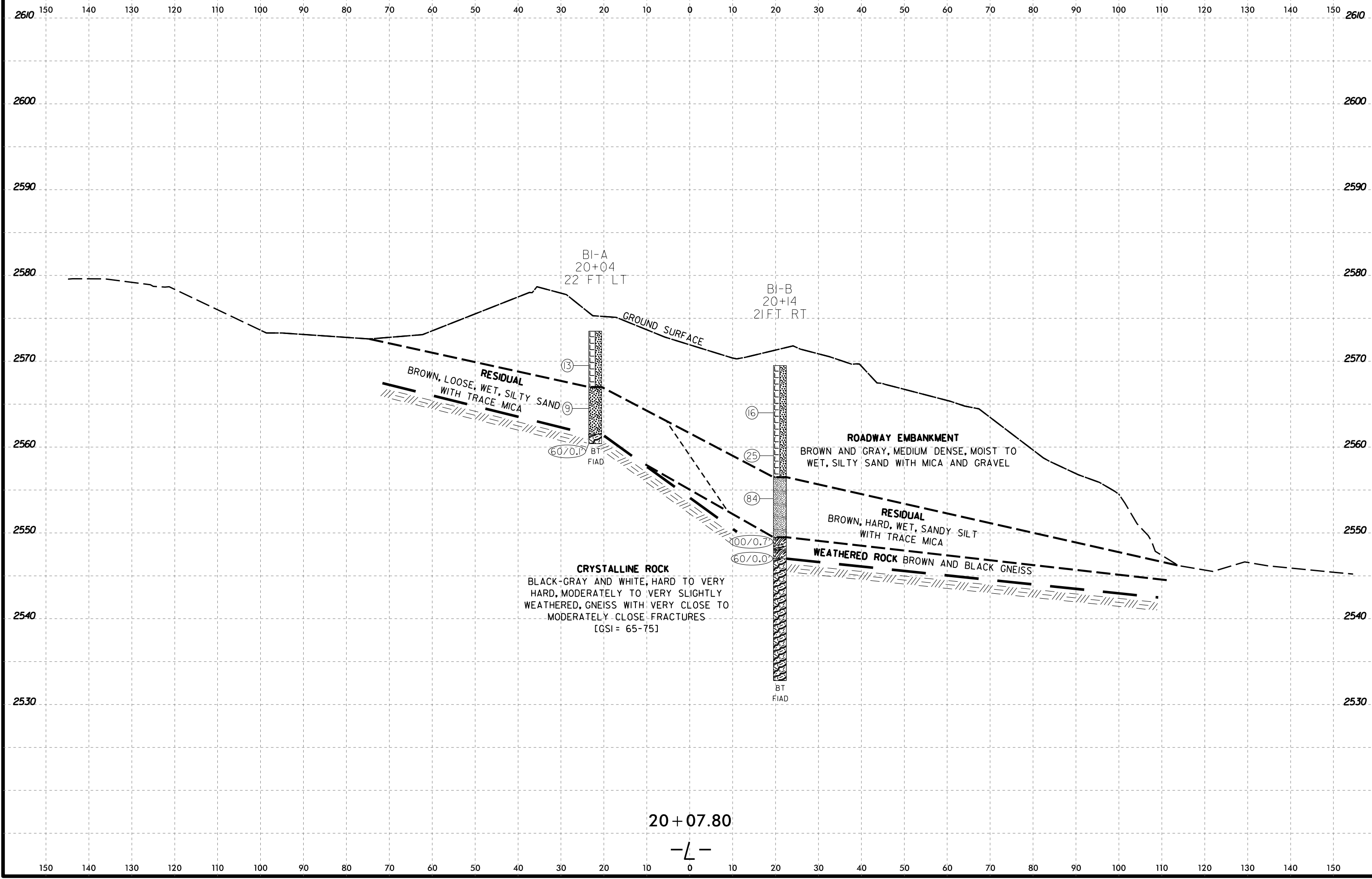


VE = 2



PROJ. REFERENCE NO. B-5982

SHEET NO. 6



BI-A
20+04
22 FT. LT

BI-B
20+14
21 FT. RT

GROUND SURFACE

RESIDUAL
BROWN, LOOSE, WET, SILTY SAND
WITH TRACE MICA

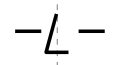
ROADWAY EMBANKMENT
BROWN AND GRAY, MEDIUM DENSE, MOIST TO
WET, SILTY SAND WITH MICA AND GRAVEL

RESIDUAL
BROWN, HARD, WET, SANDY SILT
WITH TRACE MICA

CRYSTALLINE ROCK
BLACK-GRAY AND WHITE, HARD TO VERY
HARD, MODERATELY TO VERY SLIGHTLY
WEATHERED, GNEISS WITH VERY CLOSE TO
MODERATELY CLOSE FRACTURES
[GSI = 65-75]

WEATHERED ROCK BROWN AND BLACK GNEISS

20 + 07.80

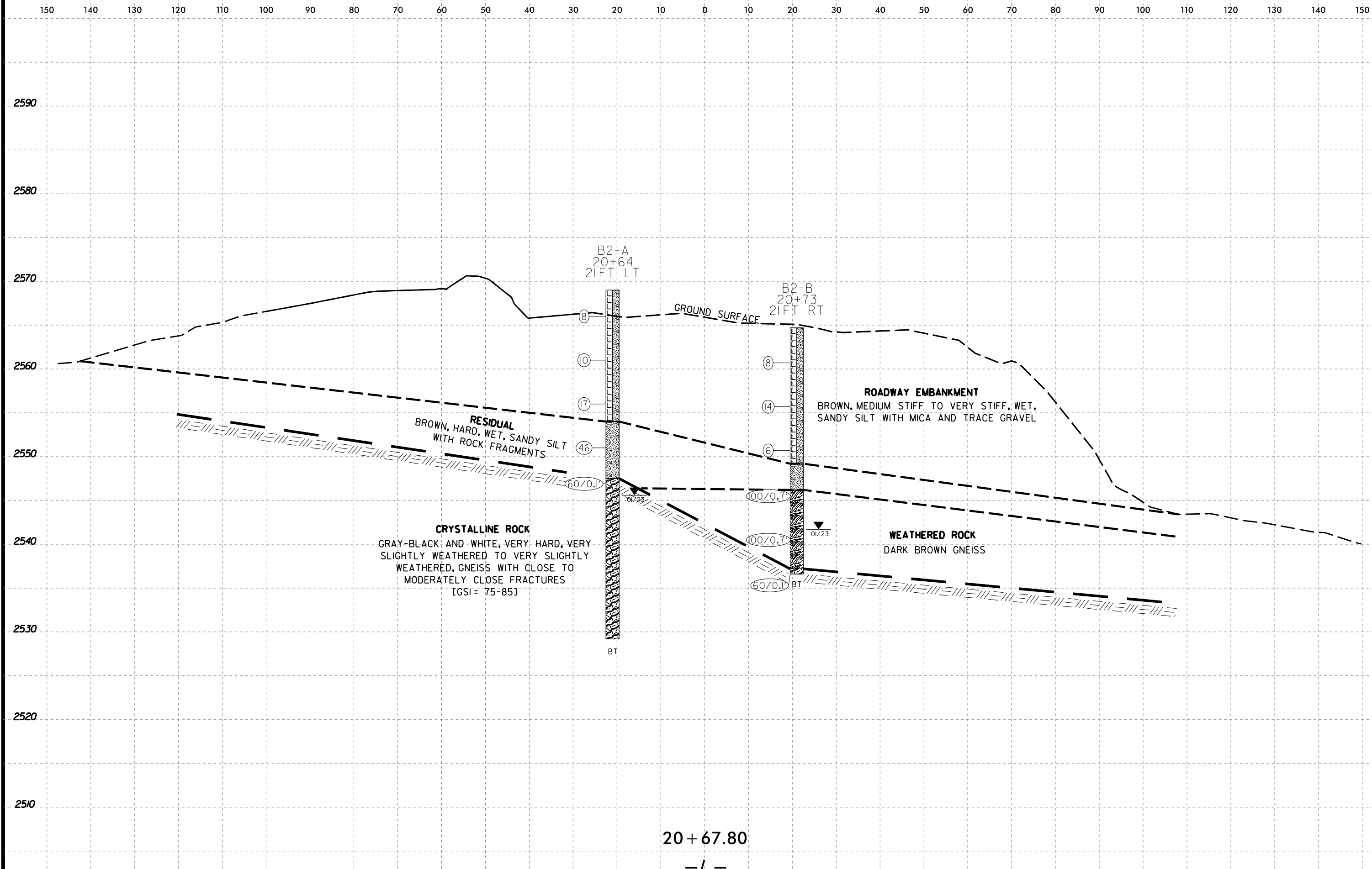


VE = 2



PROJ. REFERENCE NO. B-5982

SHEET NO. 7



B2+A
20+64
21FT LT

B2-B
20+73
21FT RT

GROUND SURFACE

ROADWAY EMBANKMENT
BROWN, MEDIUM STIFF TO VERY STIFF, WET,
SANDY SILT WITH MICA AND TRACE GRAVEL

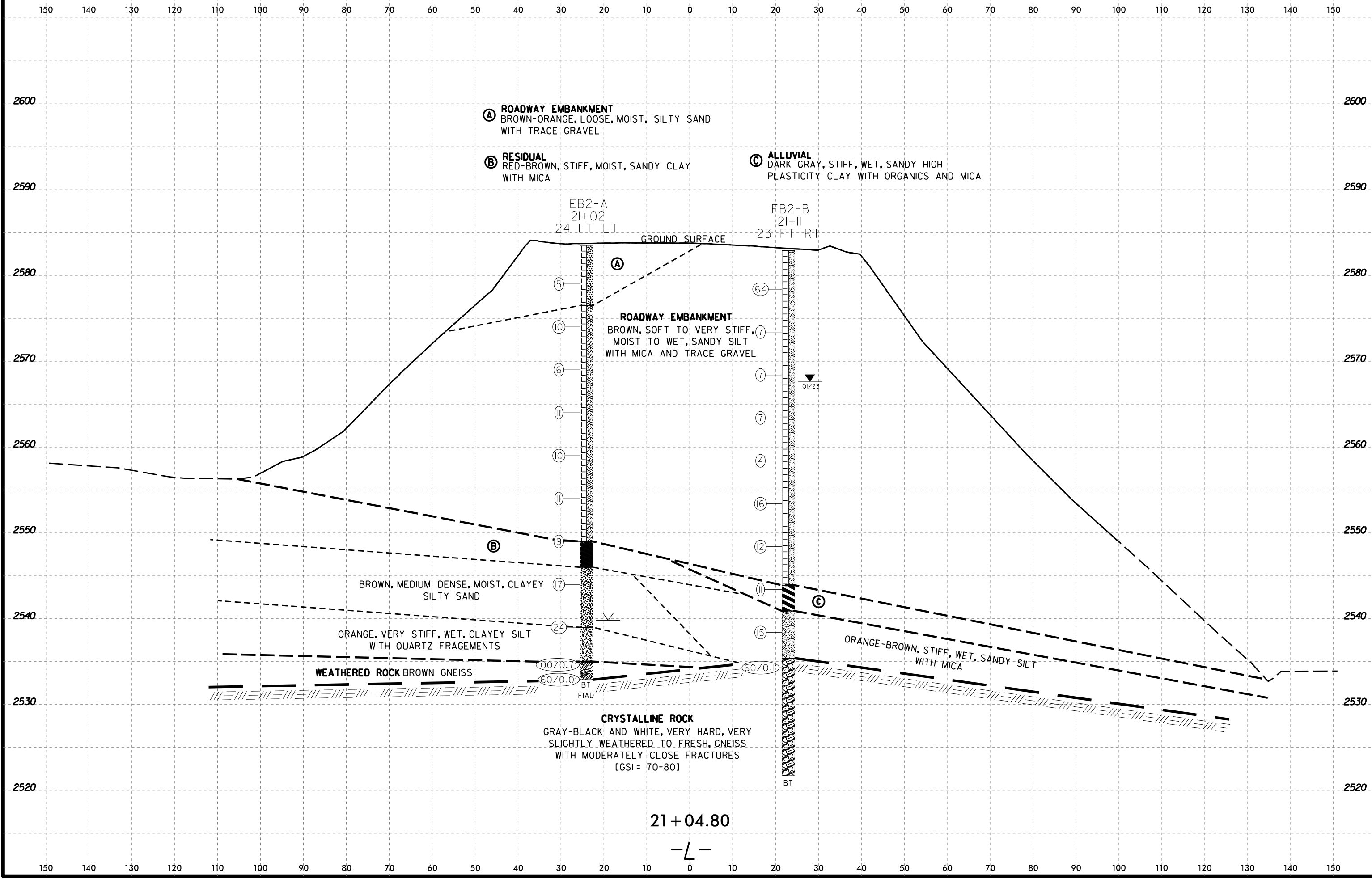
RESIDUAL
BROWN, HARD, WET, SANDY SILT
WITH ROCK FRAGMENTS

CRYSTALLINE ROCK
GRAY-BLACK AND WHITE, VERY HARD, VERY
SLIGHTLY WEATHERED TO VERY SLIGHTLY
WEATHERED, GNEISS WITH CLOSE TO
MODERATELY CLOSE FRACTURES
[GSI = 75-85]

WEATHERED ROCK
DARK BROWN GNEISS

20 + 67.80

-L-



(A) ROADWAY EMBANKMENT
BROWN-ORANGE, LOOSE, MOIST, SILTY SAND WITH TRACE GRAVEL

(B) RESIDUAL
RED-BROWN, STIFF, MOIST, SANDY CLAY WITH MICA

(C) ALLUVIAL
DARK GRAY, STIFF, WET, SANDY HIGH PLASTICITY CLAY WITH ORGANICS AND MICA

EB2-A
21+02
24 FT. LT.

EB2-B
21+11
23 FT. RT.

GROUND SURFACE

ROADWAY EMBANKMENT
BROWN, SOFT TO VERY STIFF, MOIST TO WET, SANDY SILT WITH MICA AND TRACE GRAVEL

BROWN, MEDIUM DENSE, MOIST, CLAYEY SILTY SAND

ORANGE, VERY STIFF, WET, CLAYEY SILT WITH QUARTZ FRAGEMENTS

WEATHERED ROCK BROWN GNEISS

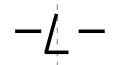
100/0.7
60/0.0
BT
FIAD

CRYSTALLINE ROCK
GRAY-BLACK AND WHITE, VERY HARD, VERY SLIGHTLY WEATHERED TO FRESH, GNEISS WITH MODERATELY CLOSE FRACTURES [GSI = 70-80]

01/23

ORANGE-BROWN, STIFF, WET, SANDY SILT WITH MICA

21 + 04.80



GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI									
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 19+53		OFFSET 24 ft LT		ALIGNMENT L									
COLLAR ELEV. 2,592.1 ft		TOTAL DEPTH 49.8 ft		NORTHING 671,848		EASTING 833,421									
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic									
DRILLER Estep, J. E.		START DATE 01/17/23		COMP. DATE 01/18/23		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2595															
2590	2,588.6	3.5	10	9	9								W	GROUND SURFACE ROADWAY EMBANKMENT DARK BROWN, SILTY SAND WITH MICA AND TRACE GRAVEL	0.0
2585	2,583.6	8.5	17	27	35								M	RESIDUAL BROWN AND GRAY, SILTY SAND WITH ROCK FRAGMENTS	7.0
2580	2,578.6	13.5	20	40	60/0.4'									WEATHERED ROCK BROWN AND GRAY GNEISS	14.0
2575	2,573.6	18.5	26	46	60/0.4'									WEATHERED ROCK BROWN AND GRAY GNEISS	100/0.9
2570	2,568.6	23.5	100/0.4											WEATHERED ROCK BROWN AND GRAY GNEISS	100/0.9
2565	2,563.6	28.5	71	30/0.1										WEATHERED ROCK BROWN GNEISS	100/0.6
2560	2,562.3	29.8	60/0.0'											CRYSTALLINE ROCK BLACK-GRAY AND WHITE, HARD TO VERY HARD, SLIGHTLY WEATHERED GNEISS WITH CLOSE FRACTURES [GSI = 50-60]	60/0.0'
2555														WEATHERED ROCK BROWN GNEISS	29.8
2550														CRYSTALLINE ROCK BLACK-GRAY AND WHITE, VERY HARD, VERY SLIGHTLY WEATHERED GNEISS WITH CLOSE TO MODERATELY CLOSE FRACTURES [GSI = 65-75]	37.8
2545													RS-1	CRYSTALLINE ROCK BLACK-GRAY AND WHITE, VERY HARD, VERY SLIGHTLY WEATHERED GNEISS WITH CLOSE TO MODERATELY CLOSE FRACTURES [GSI = 65-75]	40.8
														CRYSTALLINE ROCK BLACK-GRAY AND WHITE, VERY HARD, VERY SLIGHTLY WEATHERED GNEISS WITH CLOSE TO MODERATELY CLOSE FRACTURES [GSI = 65-75]	2,542.3
														Boring Terminated at Elevation 2,542.3 ft in Crystalline Rock	49.8

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI	
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							GROUND WTR (ft)
BORING NO. EB1-A		STATION 19+53		OFFSET 24 ft LT		ALIGNMENT L	
COLLAR ELEV. 2,592.1 ft		TOTAL DEPTH 49.8 ft		NORTHING 671,848		EASTING 833,421	
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic	
DRILLER Estep, J. E.		START DATE 01/17/23		COMP. DATE 01/18/23		SURFACE WATER DEPTH N/A	
CORE SIZE NQ				TOTAL RUN 20.0 ft			
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RQD (ft) %	SAMP. NO.
2562.3	2,562.3	29.8	5.0	3:00/1.0 3:40/1.0 3:43/1.0 4:26/1.0 4:43/1.0	(5.0) 100%	(3.0) 59%	
2555	2,557.3	34.8	5.0	3:05/1.0 3:35/1.0 8:25/1.0 1:55/1.0 1:25/1.0	(1.4) 28%	(0.0) 0%	
2550	2,552.3	39.8	5.0	2:14/1.0 6:09/1.0 8:40/1.0 8:03/1.0 6:01/1.0	(4.3) 86%	(3.0) 60%	
2545	2,547.3	44.8	5.0	6:21/1.0 5:10/1.0 5:20/1.0 8:25/1.0 8:55/1.0	(5.0) 100%	(4.3) 86%	RS-1
	2,542.3	49.8					
Begin Coring @ 29.8 ft							
CRYSTALLINE ROCK							
BLACK-GRAY AND WHITE, HARD TO VERY HARD, SLIGHTLY WEATHERED GNEISS WITH CLOSE FRACTURES [GSI = 50-60]							
WEATHERED ROCK							
BROWN GNEISS							
CRYSTALLINE ROCK							
BLACK-GRAY AND WHITE, VERY HARD, VERY SLIGHTLY WEATHERED GNEISS WITH CLOSE TO MODERATELY CLOSE FRACTURES [GSI = 65-75]							
Boring Terminated at Elevation 2,542.3 ft in Crystalline Rock							

NCDOT BORE DOUBLE_B5982_GEO_BRDG0095_BH.GPJ_NC_DOT.GDT 02/08/23

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI									
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 19+57		OFFSET 23 ft RT		ALIGNMENT L									
COLLAR ELEV. 2,592.1 ft		TOTAL DEPTH 33.5 ft		NORTHING 671,828		EASTING 833,464									
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Estep, J. E.		START DATE 01/30/23		COMP. DATE 01/30/23		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2595															
														2,592.1	0.0
2590	2,588.6	3.5	2	2	3								M	ROADWAY EMBANKMENT BROWN SANDY SILT WITH MICA AND TRACE GRAVEL	
2585	2,583.6	8.5	3	4	5								M		
2580	2,578.6	13.5	9	13	8								M	BROWN AND GRAY, CLAYEY SANDY SILT WITH TRACE MICA AND TRACE GRAVEL	12.0
2575	2,573.6	18.5	6	8	11								W	RESIDUAL BROWN, WHITE, AND BLACK SANDY SILT WITH TRACE MICA	17.0
2570	2,568.6	23.5	6	8	9								W		
2565	2,563.6	28.5	30	70/0.3'										WEATHERED ROCK BROWN AND GRAY GNEISS	27.5
2560	2,558.6	33.5	60/0.0'											Boring Terminated with Standard Penetration Test Refusal at Elevation 2,558.6 ft on Crystalline Rock	33.5

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI									
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							GROUND WTR (ft)								
BORING NO. B1-A		STATION 20+04		OFFSET 22 ft LT		ALIGNMENT L									
COLLAR ELEV. 2,573.5 ft		TOTAL DEPTH 13.1 ft		NORTHING 671,892		EASTING 833,448									
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022				DRILL METHOD Wash Boring		HAMMER TYPE Automatic									
DRILLER Estep, J. E.		START DATE 01/16/23		COMP. DATE 01/16/23		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2575															
														2,573.5	0.0
2570	2,570.5	3.0	7	6	7								M	ROADWAY EMBANKMENT BROWN, SILTY SAND WITH TRACE MICA	
2565	2,565.5	8.0	4	4	5								W	RESIDUAL BROWN, SILTY SAND WITH TRACE MICA	6.5
	2,560.5	13.0	60/0.1'											CRYSTALLINE ROCK GNEISS	12.0
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,560.4 ft in Crystalline Rock	13.1

NCDOT BORE DOUBLE B5982_GEO_BRDG0095_BH.GPJ NC_DOT.GDT 02/08/23

GEOTECHNICAL BORING REPORT

BORE LOG

GEOTECHNICAL BORING REPORT

CORE LOG

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI										
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							GROUND WTR (ft)									
BORING NO. B1-B		STATION 20+14		OFFSET 21 ft RT		ALIGNMENT L										
COLLAR ELEV. 2,569.5 ft		TOTAL DEPTH 36.7 ft		NORTHING 671,879		EASTING 833,491										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic										
DRILLER Estep, J. E.		START DATE 01/31/23		COMP. DATE 01/31/23		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2570														2,569.5	0.0	GROUND SURFACE
																ROADWAY EMBANKMENT DARK BROWN AND GRAY SILTY SAND WITH GRAVEL AND TRACE MICA
2565	2,565.0	4.5	7	8	8											
2560	2,560.0	9.5	9	14	11											
2555	2,555.0	14.5	14	14	70											RESIDUAL BROWN SANDY SILT WITH TRACE MICA
2550	2,550.0	19.5	30	19	81/0.2'											WEATHERED ROCK BROWN AND BLACK GNEISS
2545	2,547.0	22.5	60/0'													CRYSTALLINE ROCK BLACK-GRAY, AND WHITE, HARD TO VERY HARD, MODERATELY TO VERY SLIGHTLY WEATHERED GNEISS WITH VERY CLOSE TO MODERATELY CLOSE FRACTURES [GSI = 65-75]
2540																
2535																
																Boring Terminated at Elevation 2,532.8 ft in Crystalline Rock

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI	
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							GROUND WTR (ft)
BORING NO. B1-B		STATION 20+14		OFFSET 21 ft RT		ALIGNMENT L	
COLLAR ELEV. 2,569.5 ft		TOTAL DEPTH 36.7 ft		NORTHING 671,879		EASTING 833,491	
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic	
DRILLER Estep, J. E.		START DATE 01/31/23		COMP. DATE 01/31/23		SURFACE WATER DEPTH N/A	
CORE SIZE N/A		TOTAL RUN 14.2 ft		DESCRIPTION AND REMARKS			
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (%)	RQD (%)	SAMP. NO.
2547	2,547.0	22.5	4.2	1:11/0.2 5:10/1.0 2:55/1.0 4:17/1.0 6:02/1.0	(3.7) 88%	(2.1) 50%	
2545	2,542.8	26.7					
2540			5.0	5:20/1.0 4:27/1.0 6:50/1.0 6:49/1.0 9:40/1.0	(5.0) 100%	(2.9) 58%	
2535	2,537.8	31.7					RS-3
			5.0	6:14/1.0 6:47/1.0 7:38/1.0 7:12/1.0 6:43/1.0	(4.8) 96%	(3.8) 76%	
	2,532.8	36.7					
Boring Terminated at Elevation 2,532.8 ft in Crystalline Rock							

NCDOT BORE DOUBLE B5982_GEO_BRDG0095_BH.GPJ_NC_DOT.GDT 02/08/23

GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI	
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							
BORING NO. B2-A		STATION 20+64		OFFSET 21 ft LT		ALIGNMENT L	
COLLAR ELEV. 2,569.0 ft		TOTAL DEPTH 39.8 ft		NORTHING 671,944		EASTING 833,478	
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic	
DRILLER Estep, J. E.		START DATE 01/18/23		COMP. DATE 01/19/23		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2570														2,569.0	GROUND SURFACE	0.0	
2565	2,567.0	2.0	3	3	5							W			ROADWAY EMBANKMENT BROWN, SANDY SILT WITH MICA AND TRACE GRAVEL		
2560	2,562.0	7.0	4	4	6							W					
2555	2,557.0	12.0	5	9	8							W					
2550	2,552.0	17.0	7	17	29							W			RESIDUAL BROWN, SANDY SILT WITH ROCK FRAGMENTS AT ~18 FEET	15.0	
2545	2,547.0	22.0	60/0.1'									W			CRYSTALLINE ROCK GRAY-BLACK AND WHITE, VERY HARD, SLIGHTLY TO VERY SLIGHTLY WEATHERED GNEISS WITH CLOSE TO MODERATELY CLOSE FRACTURES [GSI = 75-85]	21.5	
2540																	
2535												RS-2					
2530														2,529.2			39.8
															Boring Terminated at Elevation 2,529.2 ft in Crystalline Rock		

NCDOT BORE DOUBLE_B5982_GEO_BRDG0095_BH.GPJ_NC_DOT.GDT_02/08/23

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI	
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							
BORING NO. B2-A		STATION 20+64		OFFSET 21 ft LT		ALIGNMENT L	
COLLAR ELEV. 2,569.0 ft		TOTAL DEPTH 39.8 ft		NORTHING 671,944		EASTING 833,478	
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic	
DRILLER Estep, J. E.		START DATE 01/18/23		COMP. DATE 01/19/23		SURFACE WATER DEPTH N/A	

CORE SIZE						TOTAL RUN					LOG	DESCRIPTION AND REMARKS	
ELEV (ft)	DEPTH (ft)	DRILL RATE (Min/ft)	RUN REC. (%)	RQD (%)	SAMP. NO.	REC. (%)	RQD (%)	STRATA (%)	RQD (%)				
Begin Coring @ 22.1 ft													
2546.9	2,546.9	22.1	2.7	5:14/0.7	(2.7)	(2.7)							GRAY-BLACK AND WHITE, VERY HARD, SLIGHTLY TO VERY SLIGHTLY WEATHERED GNEISS WITH CLOSE TO MODERATELY CLOSE FRACTURES [GSI = 75-85]
2545	2,544.2	24.8	5.0	5:30/1.0 6:04/1.0	100%	100%							
2540	2,539.2	29.8	5.0	6:17/1.0 4:40/1.0 3:55/1.0	(5.0)	(2.7)							
2535	2,534.2	34.8	5.0	4:30/1.0 6:02/1.0									
2530	2,529.2	39.8	5.0	4:39/1.0 4:53/1.0 5:48/1.0 5:45/1.0 6:21/1.0	(5.0)	(5.0)							
				5:23/1.0 5:35/1.0 5:25/1.0 5:39/1.0 5:45/1.0	100%	100%							
Boring Terminated at Elevation 2,529.2 ft in Crystalline Rock													

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI										
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							GROUND WTR (ft)									
BORING NO. B2-B		STATION 20+73		OFFSET 21 ft RT		ALIGNMENT L										
COLLAR ELEV. 2,564.7 ft		TOTAL DEPTH 28.1 ft		NORTHING 671,931		EASTING 833,519										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Estep, J. E.		START DATE 01/20/23		COMP. DATE 01/20/23		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2565														2,564.7	GROUND SURFACE	0.0
	2,561.7	3.0	3	4	4								W		ROADWAY EMBANKMENT BROWN, SANDY SILT WITH MICA	
2560													W			
	2,556.7	8.0	5	6	8								W			
2555													W			
	2,551.7	13.0	3	3	3											
2550																
	2,546.7	18.0	30	64	36/0.2'									2,549.2	RESIDUAL DARK BROWN, SANDY SILT	15.5
2545														2,546.2	WEATHERED ROCK DARK BROWN, GNEISS	18.5
	2,541.7	23.0	36	60	40/0.2'											
2540																
	2,536.7	28.0	60/0.1'											2,537.2	CRYSTALLINE ROCK GNEISS	27.5
														2,536.6	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,536.6 ft in Crystalline Rock	

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI										
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 21+02		OFFSET 24 ft LT		ALIGNMENT L										
COLLAR ELEV. 2,583.5 ft		TOTAL DEPTH 50.6 ft		NORTHING 671,978		EASTING 833,495										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Estep, J. E.		START DATE 01/16/23		COMP. DATE 01/16/23		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2585														2,583.5	GROUND SURFACE	0.0
	2,580.0	3.5	3	3	2								M		ROADWAY EMBANKMENT BROWN-ORANGE, SILTY SAND WITH TRACE GRAVEL	
2580																
	2,575.0	8.5	5	5	5								M		BROWN, SANDY SILT WITH TRACE GRAVEL AND TRACE MICA	7.0
2575																
	2,570.0	13.5	3	3	3								M			
2570																
	2,565.0	18.5	3	5	6								M			
2565																
	2,560.0	23.5	3	5	5								M			
2560																
	2,555.0	28.5	3	4	7								M			
2555																
	2,550.0	33.5	3	3	6								M			
2550																
	2,545.0	38.5	5	7	10								M		RESIDUAL RED-BROWN, SANDY CLAY WITH MICA	34.5
2545														2,549.0		
	2,540.0	43.5	7	7	17								M		BROWN, CLAYEY SILTY SAND	37.5
2540																
	2,539.0	44.5											W		ORANGE, CLAYEY SILT WITH QUARTZ FRAGMENTS	44.5
2535																
	2,535.0	48.5	21	79/0.2'												
	2,532.9	50.6	60/0.0'											2,539.0	WEATHERED ROCK BROWN GNEISS	48.5
														2,532.9	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,532.9 ft on Crystalline Rock	

NCDOT BORE DOUBLE_B5982_GEO_BRDG0095_BH.GPJ_NC_DOT.GDT 02/13/23

GEOTECHNICAL BORING REPORT

BORE LOG

GEOTECHNICAL BORING REPORT

CORE LOG

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI										
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 21+11		OFFSET 23 ft RT		ALIGNMENT L										
COLLAR ELEV. 2,582.9 ft		TOTAL DEPTH 61.2 ft		NORTHING 671,963		EASTING 833,539										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic												
DRILLER Estep, J. E.		START DATE 01/20/23		COMP. DATE 01/30/23		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2585															2,582.9	GROUND SURFACE
2580	2,579.4	3.5	2	54	10											ROADWAY EMBANKMENT BROWN SANDY SILT WITH MICA
2575	2,574.4	8.5	3	3	4											
2570	2,569.4	13.5	2	4	3											
2565	2,564.4	18.5	2	3	4											
2560	2,559.4	23.5	2	2	2											
2555	2,554.4	28.5	5	7	9											
2550	2,549.4	33.5	4	5	7											
2545	2,544.4	38.5	4	4	7											
2540	2,539.4	43.5	4	6	9											
2535	2,534.4	48.5	60/0.1													
2530																
2525																

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST H. HANCOCK, EI					
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US 74 OVER SOUTHERN RAILROAD (STA. 20+37.51 -L-)							GROUND WTR (ft)				
BORING NO. EB2-B		STATION 21+11		OFFSET 23 ft RT		ALIGNMENT L					
COLLAR ELEV. 2,582.9 ft		TOTAL DEPTH 61.2 ft		NORTHING 671,963		EASTING 833,539					
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022		DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic							
DRILLER Estep, J. E.		START DATE 01/20/23		COMP. DATE 01/30/23		SURFACE WATER DEPTH N/A					
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	TOTAL RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		
2534.3	2,534.3	48.6	2.6	3:00/0.6 9:50/1.0 11:00/1.0	(2.6) 100%	(2.6) 100%					Begin Coring @ 48.6 ft
2530	2,531.7	51.2	5.0	8:31/1.0 6:53/1.0 6:55/1.0 9:26/1.0 11:35/1.0	(4.6) 92%	(4.5) 90%					GRAY-BLACK, AND WHITE, VERY HARD, VERY SLIGHTLY WEATHERED TO FRESH GNEISS WITH MODERATELY CLOSE FRACTURES [GSI = 70-80]
2525	2,526.7	56.2	5.0	15:45/1.0 9:15/1.0 8:10/1.0 8:15/1.0 7:31/1.0	(5.0) 100%	(5.0) 100%	RS-4				
	2,521.7	61.2									Boring Terminated at Elevation 2,521.7 ft in Crystalline Rock Caved at 15.5 ft at 24 hr. Water depth not true GW (likely drill mud).

NCDOT BORE DOUBLE B5982 GEO_BRDG0095_BH.GPJ NC_DOT_GDT_02/08/23

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US-74 OVER SOUTHER RAILROAD							GROUND WTR (ft)									
BORING NO. B-2		STATION 17+70		OFFSET 12 ft RT		ALIGNMENT -L DET-										
COLLAR ELEV. 2,587.0 ft		TOTAL DEPTH 23.6 ft		NORTHING 671,881		EASTING 833,389										
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 96% 04/08/2019			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Coffey, Jr., C.		START DATE 05/02/22		COMP. DATE 05/02/55		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	ELEV. (ft)	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2590															2,587.0	0.0
2585	2,584.1	2.9	2	7	8											
2580	2,579.1	7.9	2	4	5											
2575	2,574.1	12.9	1	4	6											
2570	2,569.1	17.9	1	20	16											
2565	2,565.4	21.6	100/0.4												2,565.8	21.2
	2,564.1	22.9														
	2,563.4	23.6	16	84/0.2											2,563.4	23.6
			60/0.0													

WBS 47814.1.1		TIP B-5982		COUNTY HAYWOOD		GEOLOGIST Johnson, C. D.										
SITE DESCRIPTION REPLACE BRIDGE 430095 ON US-74 OVER SOUTHER RAILROAD							GROUND WTR (ft)									
BORING NO. B-3		STATION 18+81		OFFSET CL		ALIGNMENT -L DET-										
COLLAR ELEV. 2,561.8 ft		TOTAL DEPTH 20.9 ft		NORTHING 671,982		EASTING 833,436										
DRILL RIG/HAMMER EFF./DATE AFO6744 CME - 45C 96% 04/08/2019			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Coffey, Jr., C.		START DATE 04/28/22		COMP. DATE 04/28/22		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	ELEV. (ft)	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2565															2,561.8	0.0
2560	2,558.2	3.6	6	8	9											
2555	2,553.2	8.6	36	43	57/0.3											
2550	2,548.2	13.6	6	6	3											
2545	2,543.2	18.6	WOH	43	57/0.1											
	2,540.9	20.9	60/0.0													
															2,551.6	10.2
															2,542.1	19.7
															2,540.9	20.9

NCDOT BORE DOUBLE B5982_GEO_BRD0095_BH.GPJ NC_DOT_GDT 02/09/23

ROCK TEST RESULTS



Rock Core Compressive Strength (ASTM D7012)

Proj Number: F22038.00 Proj Name: B-5982 BRDG 430095 (Haywood) Report Date: 01/25/2023

Sample No.: RS-1 Location: Boring EB1-A Depth (ft): 46.3

Test Specimen Weight (lb): 1.21 Calc. Unit Weight (lb/CF): 172.7

Core Diameter, D (in)			Core Length, L (in)			
#1	#2	Average	#1	#2	#3	Average
1.982	1.982	1.982	3.920	3.920	3.930	3.923

Compressive Strength			
L/D Ratio	Cross-Sectional Area (in ²)	Applied Load (lbf)	Compressive Strength (psi)
1.979	3.09	5,807	1,880

Test Method: C

Comments:

PHOTOGRAPHS



Tested by: J. Evans



Rock Core Compressive Strength (ASTM D7012)

Proj Number: F22038.00 Proj Name: B-5982 BRDG 430095 (Haywood) Report Date: 02/07/2023

Sample No.: RS-3 Location: Boring B1-B Depth (ft): 32.0

Test Specimen Weight (lb): 1.21 Calc. Unit Weight (lb/CF): 174.1

Core Diameter, D (in)			Core Length, L (in)			
#1	#2	Average	#1	#2	#3	Average
1.971	1.972	1.972	3.934	3.927	3.938	3.933

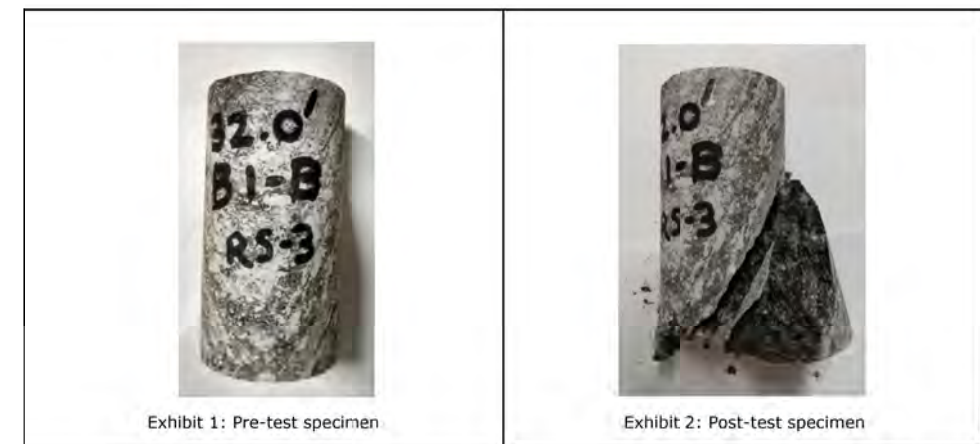
Compressive Strength			
L/D Ratio	Cross-Sectional Area (in ²)	Applied Load (lbf)	Compressive Strength (psi)
1.995	3.05	8,815	2,890

Test Method: C

Comments:

Specimen broke along seam

PHOTOGRAPHS



Tested by: J. Evans

ROCK TEST RESULTS



Rock Core Compressive Strength (ASTM D7012)

Proj Number: F22038.00 Proj Name: B-5982 BRDG 430095 (Haywood) Report Date: 01/25/2023

Sample No.: RS-2 Location: Boring B2-A Depth (ft): 34.3

Test Specimen Weight (lb): 1.21 Calc. Unit Weight (lb/CF): 172.1

Core Diameter, D (in)		
#1	#2	Average
1.982	1.984	1.983

Core Length, L (in)			
#1	#2	#3	Average
3.930	3.930	3.940	3.933

Compressive Strength			
L/D Ratio	Cross-Sectional Area (in ²)	Applied Load (lbf)	Compressive Strength (psi)
1.984	3.09	20,278	6,560

Test Method: C

Comments:

PHOTOGRAPHS



Tested by: J. Evans



Rock Core Compressive Strength (ASTM D7012)

Proj Number: F22038.00 Proj Name: B-5982 BRDG 430095 (Haywood) Report Date: 02/07/2023

Sample No.: RS-4 Location: Boring EB2-B Depth (ft): 57.3

Test Specimen Weight (lb): 1.19 Calc. Unit Weight (lb/CF): 171.2

Core Diameter, D (in)		
#1	#2	Average
1.956	1.957	1.957

Core Length, L (in)			
#1	#2	#3	Average
3.994	3.994	4.000	3.996

Compressive Strength			
L/D Ratio	Cross-Sectional Area (in ²)	Applied Load (lbf)	Compressive Strength (psi)
2.042	3.01	24,567	8,160

Test Method: C

Comments:

PHOTOGRAPHS



Tested by: J. Evans

CORE PHOTOGRAPHS



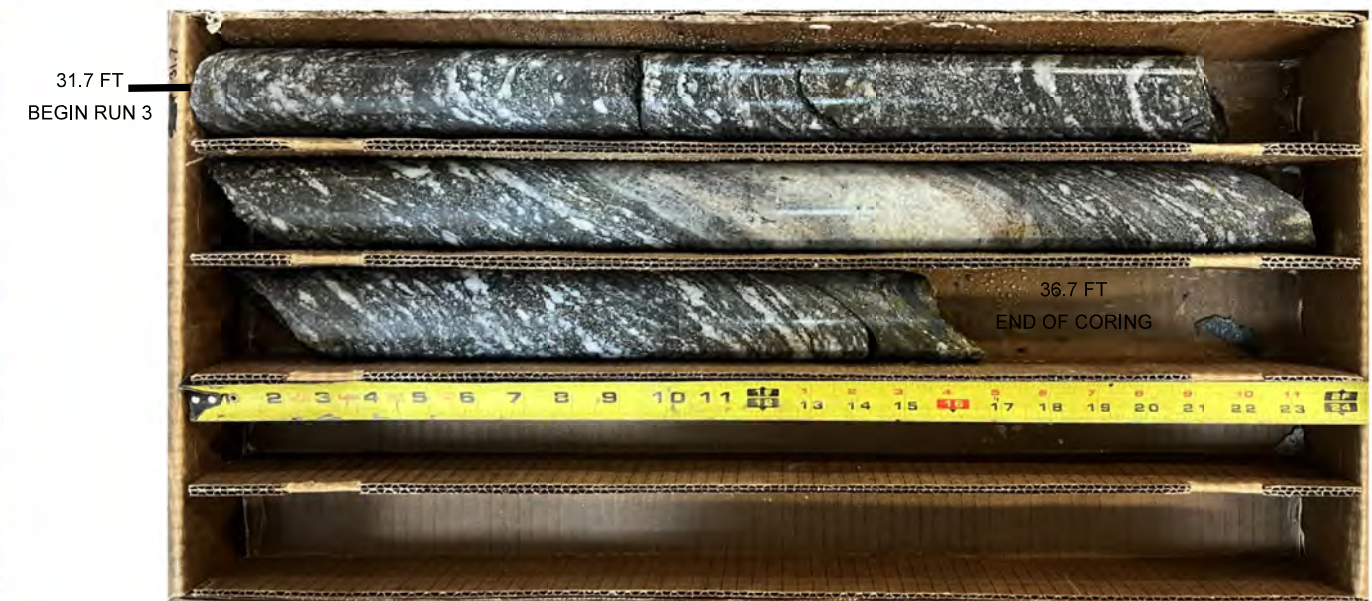
BORING EBI-A - RUNS 1, 2, AND 3



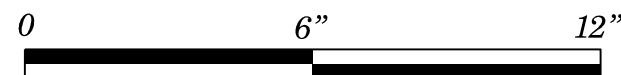
BORING EBI-A - RUNS 3 AND 4



BORING BI-B - RUNS 1 AND 2



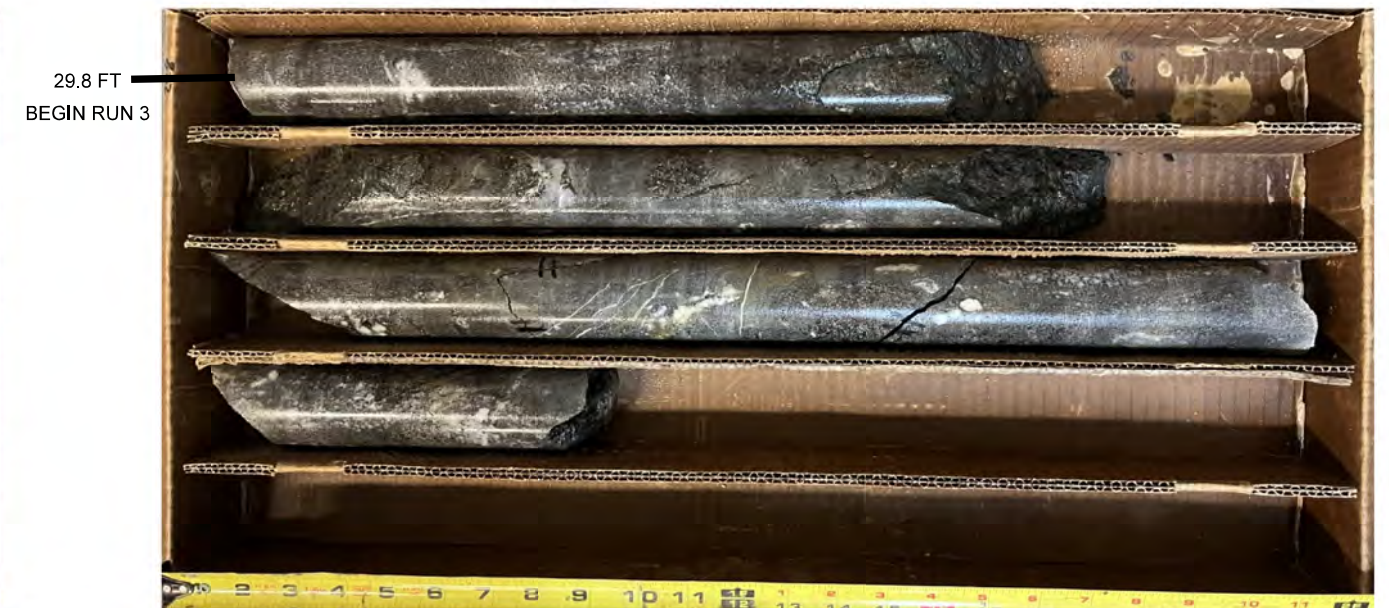
BORING BI-B - RUN 3



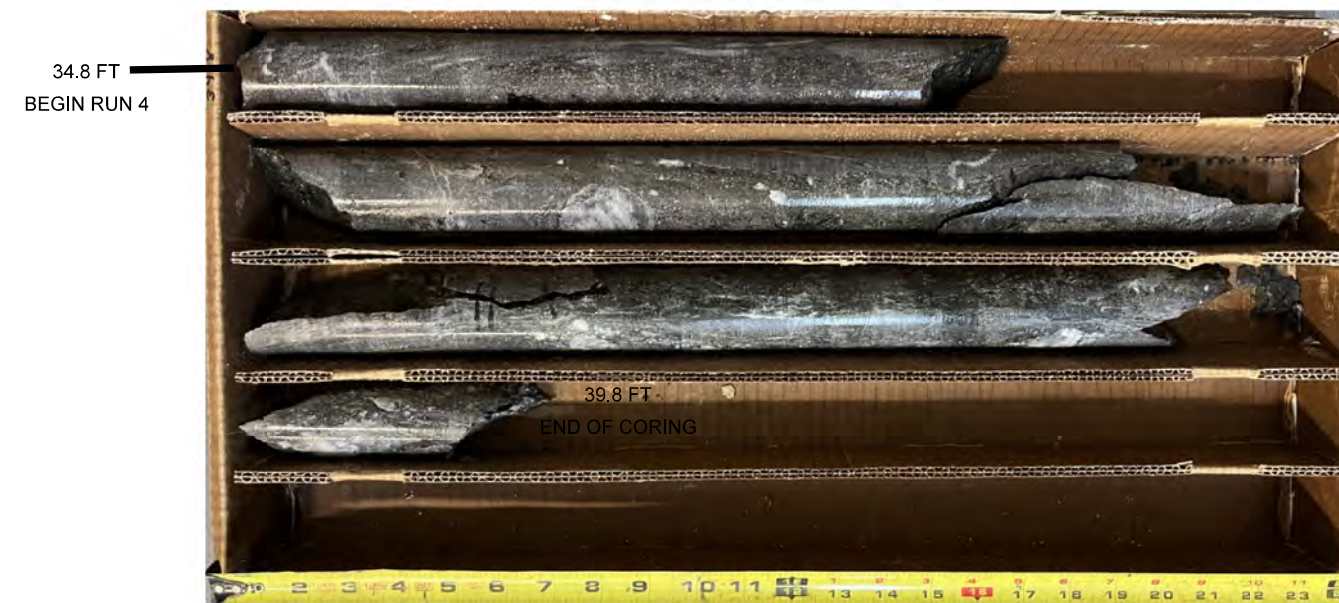
CORE PHOTOGRAPHS



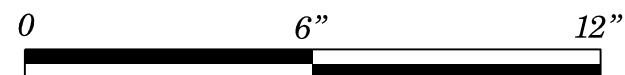
BORING B2-A - RUNS 1 AND 2



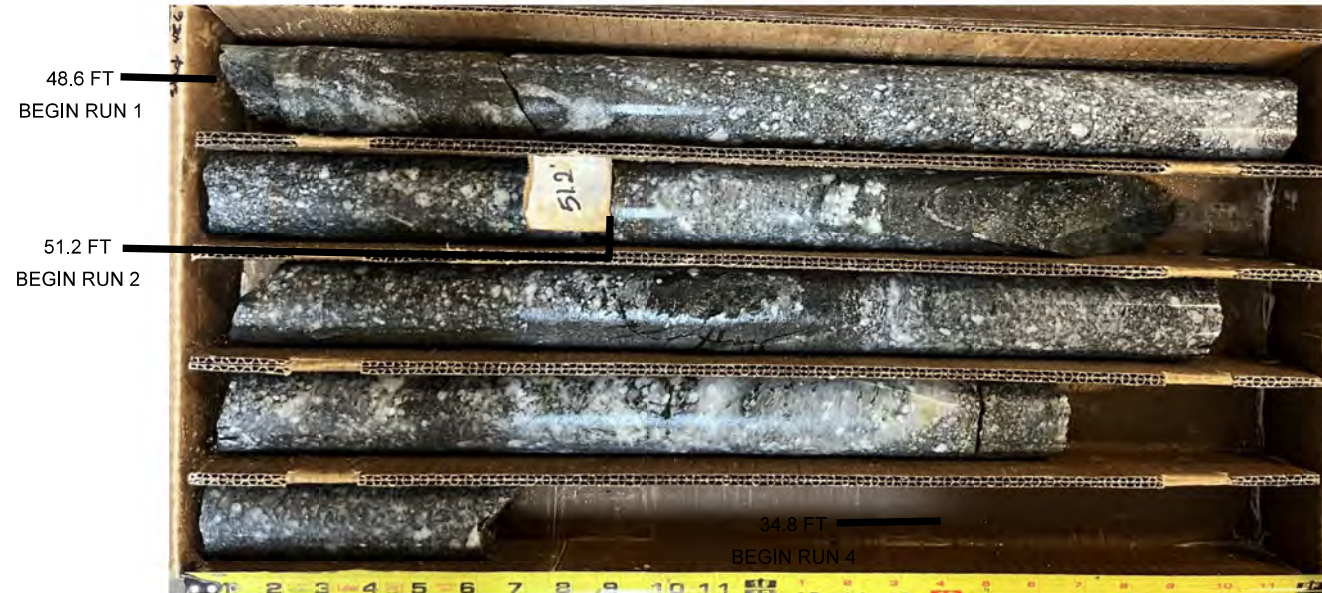
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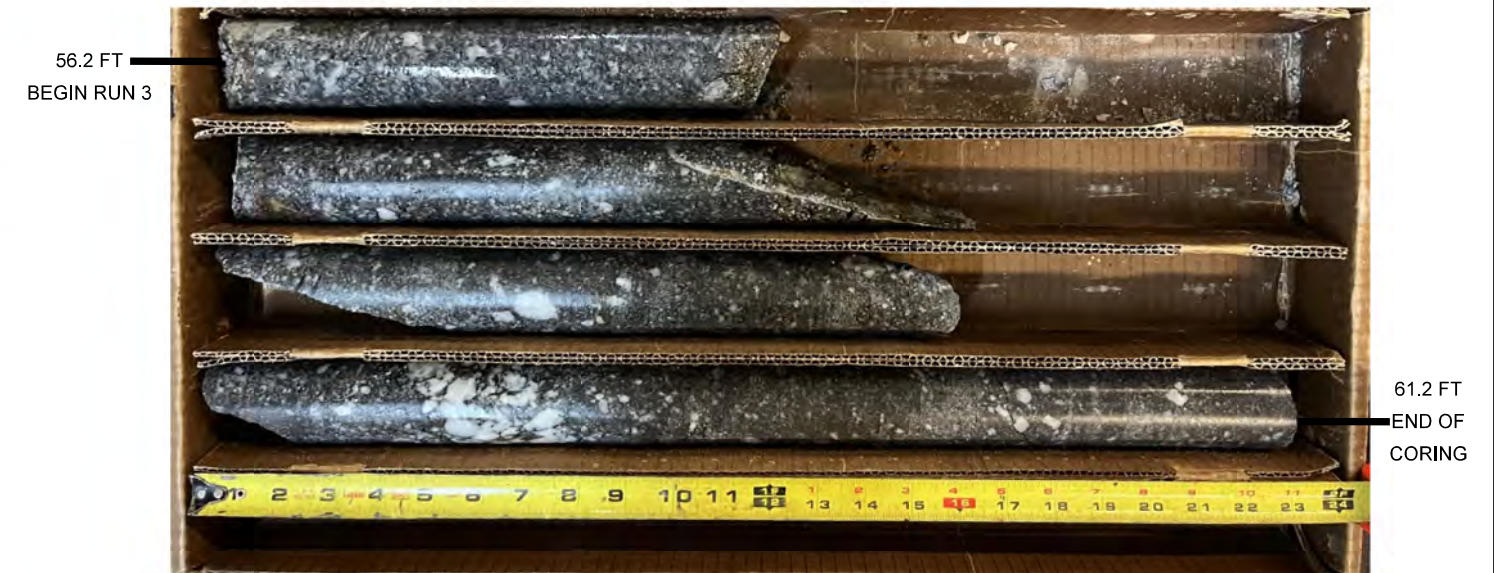
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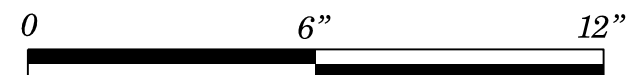
CORE PHOTOGRAPHS



BORING EB2-B - RUNS 1 AND 2



BORING EB2-B - RUN 3



SITE PHOTOGRAPH

