REFERENCE: SF-220075

PROJECT: BP12.R002

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP12.R002	1	27

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY CLEVELAND

PROJECT DESCRIPTION BRIDGE NO. 75 ON POLKVILLE ROAD (NC 226) OVER HINTON CREEK

CONTENTS

CAUTION NOTICE

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4/5/2024

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
BP12.R002	2

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 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX		50 MX 25 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	—	6 MX	—	NP	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			
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

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY 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
GENERALLY 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

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

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

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

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
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
γ - UNIT WEIGHT
γ_d - 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

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] D-50
- [ ] _____

ADVANCING TOOLS:
- [X] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [X] -N Q2

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

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. 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:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, 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 DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND 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 DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (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 (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BM2 N: 624839.1 E: 1209733
23+02, 32' LT. -L-
ELEVATION: 887.23 FEET

NOTES:

FIAD: FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
BP12.R002	2A

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)

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

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 INTERLOCKING OF ROCK PIECES

SURFACE CONDITIONS

VERY GOOD	GOOD	FAIR	POOR	VERY POOR
Very rough, fresh unweathered surfaces	Rough, slightly weathered, iron stained surfaces	Smooth, moderately weathered and altered surfaces	Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	Slickensided, highly weathered surfaces with soft clay coatings or fillings

DECREASING SURFACE QUALITY ⇨

90			N/A	N/A
80				
70				
60				
50				
40				
30				
20				
10				
N/A	N/A			

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

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

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 interlayers 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*

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.**

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

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
70	A			
60				
50	B	C	D	E
40				
30			F	
20				
		G	H	10

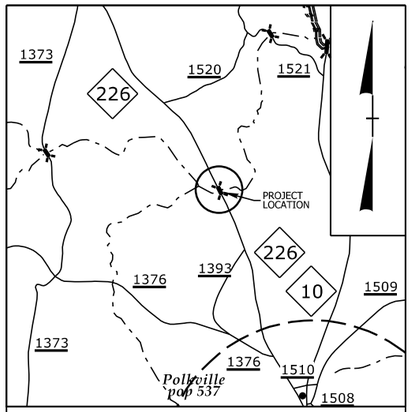
DATE: 8-19-16

09/08/99

PROJECT: BP12.R002

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP (NTS)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

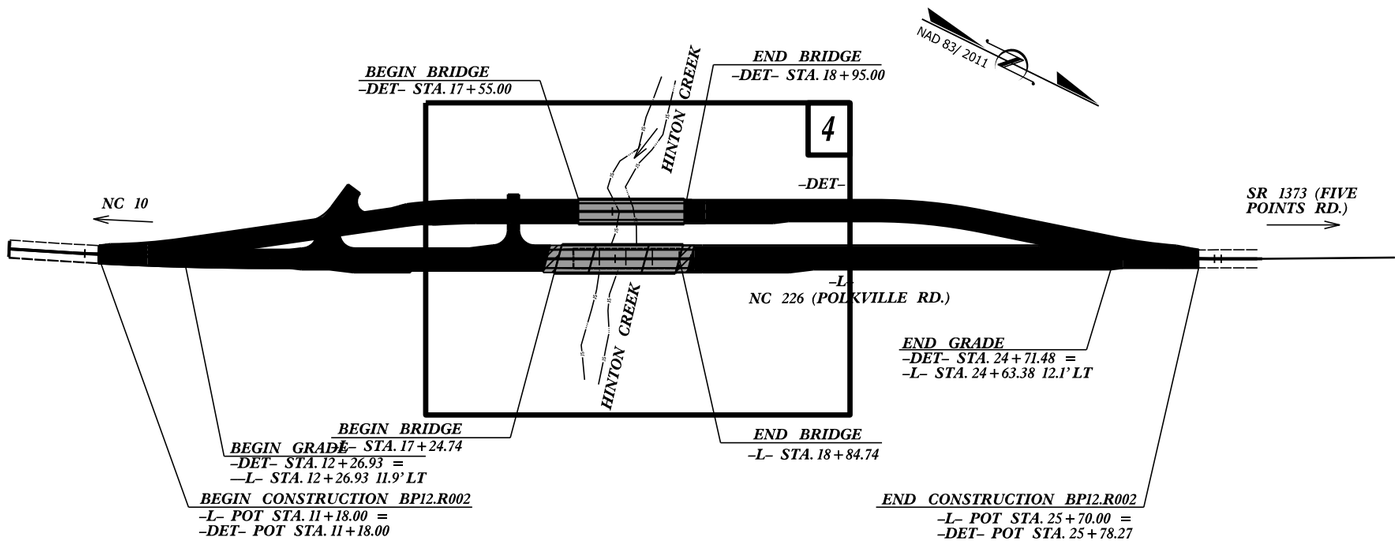
CLEVELAND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP12.R002	3	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
		PE
		UTL & R/W
		CONST

LOCATION: *BRIDGE NO. 220075 OVER HINTON CREEK ON NC 226 (POLKVILLE RD.)*

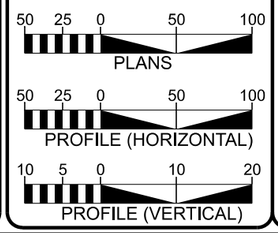
TYPE OF WORK: *GRADING, DRAINAGE, PAVING & STRUCTURE*



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2025 = 3030
ADT 2045 = 4500

T = 7 % *
V = 60 MPH
* TTST =3.5% DUAL =3.5%
FUNC CLASS =
MAJOR COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT BP12.R002 =	0.245 MILES
LENGTH STRUCTURE PROJECT BP12.R002 =	0.030 MILES
TOTAL LENGTH PROJECT BP12.R002 =	0.275 MILES

NCDOT CONTACT: JOSHUA WHITE, PE
DIVISION 12 DIVISION BRIDGE MANAGER

Prepared for the Office of:
DIVISION OF HIGHWAYS - DIV. 12
1710 E. Marion St., Shelby NC, 28151

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: TBD

LETTING DATE: 10/14/25

GREG S. PURVIS, PE
PROJECT ENGINEER

FARRELL NICHOLSON, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO.	SHEET NO.
BP12.R002	4

SITE PLAN

0 40 80
FEET

SKEW = 75 DEGREES
SKEW = 90 DEGREES(DET)

END BENT 1 LINE DET
BENT LINE 1 DET
END BENT 2 LINE DET
HINTON CREEK
NAD 83 NC GRID NAZOIN
SOIL
GREU-TL3
EBI-C_DET
EB2-C_DET
BI-C_DET
F-DETOUR-
AWD
GR
EBI-A
EBI-B
BI-A
BI-B
B2-A
B2-B
EB2-A
EB2-B
BRIDGE NO. 75
-L-
TO HOLLIS RD.
NC 226 (POLKVILLE RD)
TO DOBBS RD.
END BENT 1 LINE
BENT 1 LINE
HINTON CREEK
BENT 2 LINE
END BENT 2 LINE

PROJECT REFERENCE NO.	SHEET NO.
BP12.R002	5

PROFILE PROJECTED ALONG CENTERLINE OF –L–

0 40 80
FEET
VE = 5

–L–

BRIDGE NO. 75

EB1–B
17+22
9' RT
–L–

EB2–B
18+93
10' RT
–L–

B1–A
17+71
9' LT
–L–

B2–A
18+42
10' LT
–L–

SS-54

SS-44

ASPHALT

ROADWAY EMBANKMENT
MEDIUM STIFF, RED, GRAY AND BROWN, SANDY SILT A-4 AND MEDIUM DENSE, SILTY FINE TO COARSE SAND A-2-4, TRACE MICA, TRACE GRAVEL

ROADWAY EMBANKMENT
MEDIUM DENSE, GRAY, RED AND BROWN, SILTY FINE TO COARSE SAND A-2-4 AND SOFT SANDY SILT A-4, TRACE MICA AND TRACE GRAVEL

VERY SOFT, RED AND BROWN, SANDY CLAY A-6 AND VERY SOFT RED, BROWN, SILTY CLAY A-7-5, TRACE MICA

NWS Elev.=861.8'

02/24

RESIDUAL
MEDIUM DENSE TO DENSE, RED, GRAY AND BROWN.

SILTY FINE TO COARSE SAND A-2-4, AND A-2-4, AND STIFF SANDY SILT A-4, TRACE MICA, TRACE ROCK FRAGMENTS

60/0.1

BT
02/24

100/0.4
60/0.0

60/0.0

BT
02/24

CRYSTALLINE ROCK
BIOTITE GNEISS

100/0.9
60/0.0

RS-1

RS-3

CRYSTALLINE ROCK
BIOTITE GNEISS
REC=87%
RQD=81%
GSI=60 - 90

CRYSTALLINE ROCK
BIOTITE GNEISS
REC=66%
RQD=51%
GSI=10 - 80

CT
02/24

CT
02/24

Ⓐ ARTIFICIAL FILL
MEDIUM STIFF, BROWN AND GRAY, SANDY SILT A-4 AND MEDIUM DENSE, GRAY, SILTY FINE TO COARSE SAND A-2-4, TRACE GRAVEL

Ⓑ ALLUVIAL
VERY SOFT TO MEDIUM STIFF, GRAY, RED, TAN AND BROWN, SANDY SILT A-4, AND VERY LOOSE SILTY FINE TO COARSE SAND A-2-4 AND MEDIUM DENSE GRAVELLY FINE TO COARSE SAND A-1-b, TRACE ROCK FRAGMENTS AND TRACE MICA

Ⓒ WEATHERED ROCK
(BIOTITE GNEISS)

NOTE: EXISTING GROUND SURFACE PROFILE OF –L– CENTERLINE TAKEN FROM ELECTRONIC TIN FILE 220075_ls_tnl.tin' DATED 1/16/24. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

890
880
870
860
850
840
830
820

16+00 17+00 18+00 19+00 20+00 21+00

PROJECT REFERENCE NO.	SHEET NO.
BP12.R002	6

PROFILE PROJECTED ALONG CENTERLINE OF –DETOUR–

0 40 80
FEET
VE = 5

-DETOUR-

DETOUR BRIDGE

Ⓐ **ALLUVIAL**
SOFT TO MEDIUM STIFF, RED AND BROWN, SANDY SILT A-4

Ⓑ **RESIDUAL**
MEDIUM DENSE, GRAY, SILTY FINE TO COARSE SAND A-2-4 AND SOFT TO STIFF, TAN, GRAY AND BROWN, SANDY SILT A-4, TRACE MICA

EB1–C DET
17+51
74' LT
–L–

SS-69

Ⓐ 3 5 8
Ⓑ 16

MEDIUM STIFF, RED BROWN, SILTY CLAY A-7-5

02/24

WEATHERED ROCK
(BIOTITE GNEISS)

100/0.4
60/0.0

BT
02/24

CRYSTALLINE ROCK
BIOTITE GNEISS

B1–C DET
18+37
46' LT
–L–

NWS
Elev.=861.8'

02/24

60/0.0

BT
02/24

CRYSTALLINE ROCK
BIOTITE GNEISS

EB2–C DET
18+96
63' LT
–L–

ST-1

Ⓐ 2 4
WOH
6

02/24

ALLUVIAL
VERY SOFT TO SOFT, RED BROWN, SANDY SILT A-4

VERY LOOSE TO LOOSE, TAN AND GRAY, GRAVELLY FINE TO COARSE SAND A-1-b

Ⓑ 3 15 8

100/0.4
60/0.0

BT
02/24

WEATHERED ROCK
(BIOTITE GNEISS)

CRYSTALLINE ROCK
BIOTITE GNEISS

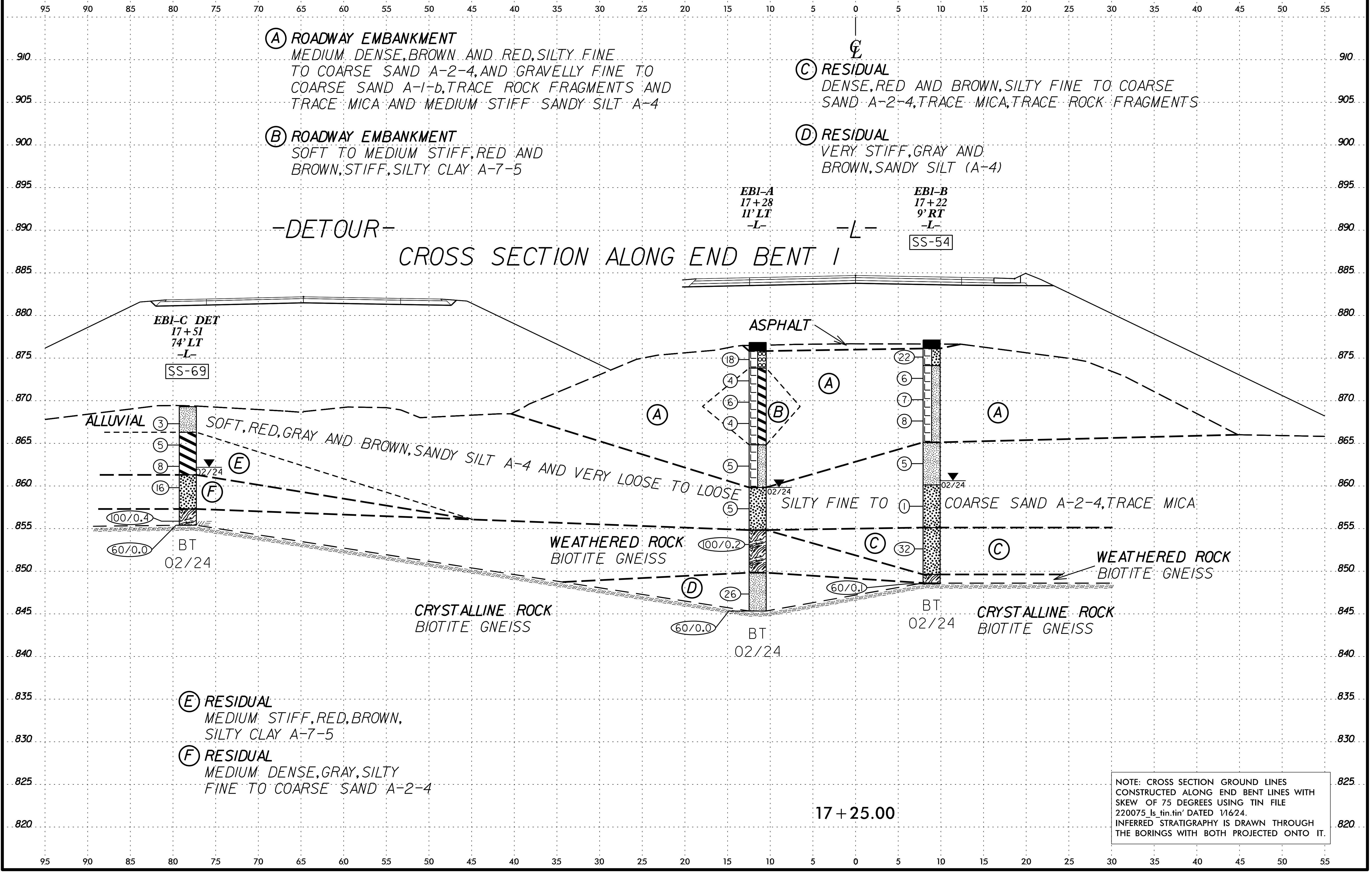
NOTE: EXISTING GROUND SURFACE PROFILE OF –L– CENTERLINE TAKEN FROM ELECTRONIC TIN FILE 220075_ls_tnl.tin' DATED 1/16/24. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

900 890 880 870 860 850 840 830

16+00 17+00 18+00 19+00 20+00 21+00

PROJ. REFERENCE NO.	SHEET NO.
BP12.R002	7

CROSS SECTION ALONG END BENT 1



(A) ROADWAY EMBANKMENT
MEDIUM DENSE, BROWN AND RED, SILTY FINE TO COARSE SAND A-2-4, AND GRAVELLY FINE TO COARSE SAND A-1-b, TRACE ROCK FRAGMENTS AND TRACE MICA AND MEDIUM STIFF SANDY SILT A-4

(B) ROADWAY EMBANKMENT
SOFT TO MEDIUM STIFF, RED AND BROWN, STIFF, SILTY CLAY A-7-5

(C) RESIDUAL
DENSE, RED AND BROWN, SILTY FINE TO COARSE SAND A-2-4, TRACE MICA, TRACE ROCK FRAGMENTS

(D) RESIDUAL
VERY STIFF, GRAY AND BROWN, SANDY SILT (A-4)

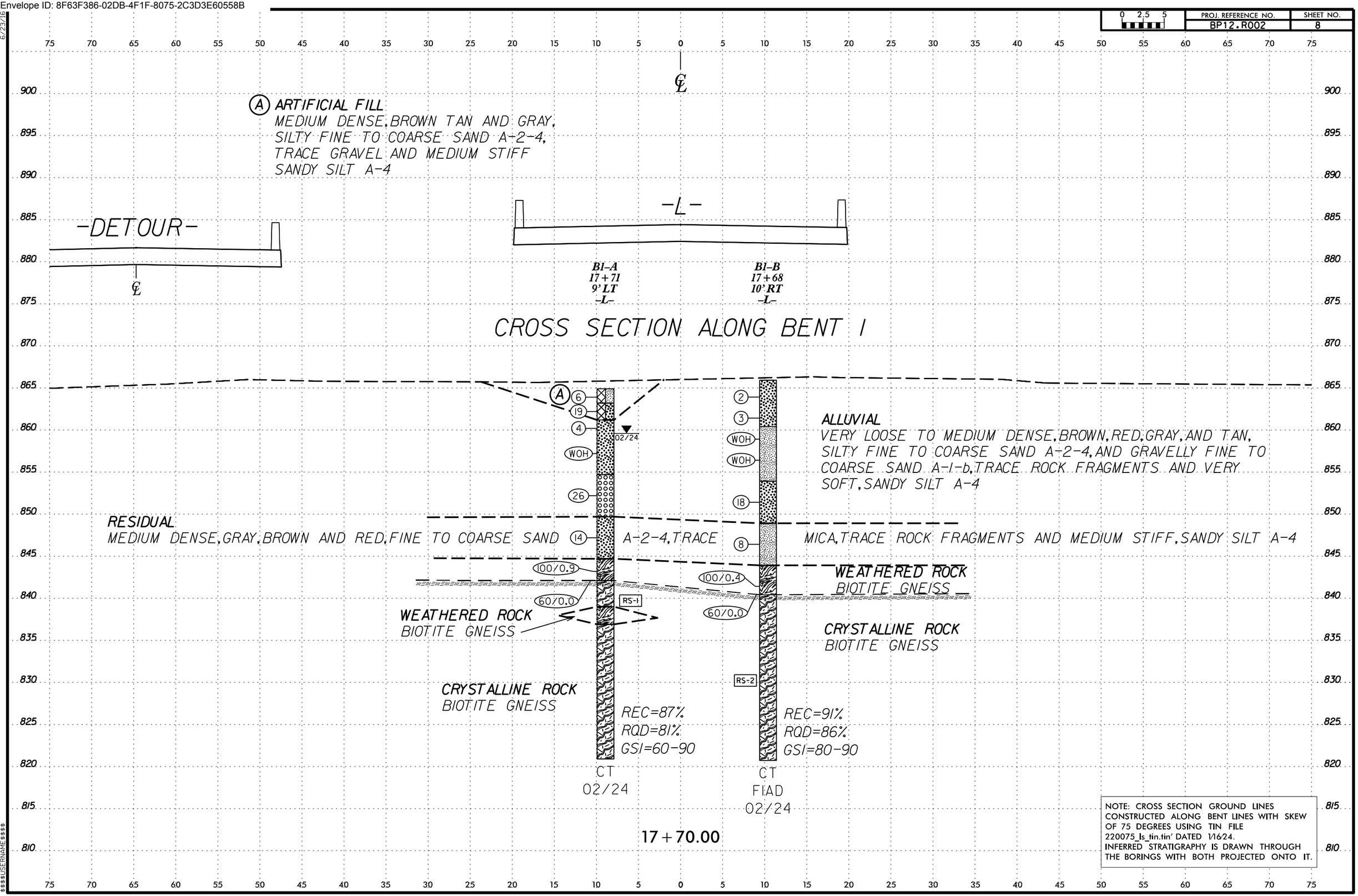
(E) RESIDUAL
MEDIUM STIFF, RED, BROWN, SILTY CLAY A-7-5

(F) RESIDUAL
MEDIUM DENSE, GRAY, SILTY FINE TO COARSE SAND A-2-4

NOTE: CROSS SECTION GROUND LINES CONSTRUCTED ALONG END BENT LINES WITH SKEW OF 75 DEGREES USING TIN FILE 220075_ls_tin.tin' DATED 1/16/24.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

PROJ. REFERENCE NO.	SHEET NO.
BP12.R002	8

CROSS SECTION ALONG BENT 1



NOTE: CROSS SECTION GROUND LINES CONSTRUCTED ALONG BENT LINES WITH SKEW OF 75 DEGREES USING TIN FILE 220075_ls_tin.tin' DATED 1/16/24.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

CROSS SECTION ALONG BENT 2

-DETOUR-

-L-

℄

B1–C DET
18+37
46' LT
-L-

B2–A
18+42
10' LT
-L-

B2–B
18+37
12' RT
-L-

Ⓐ **ROADWAY EMBANKMENT**
VERY LOOSE, BROWN AND RED, SILTY FINE TO COARSE SAND A-2-4, TRACE MICA

Ⓑ **ALLUVIAL**
VERY LOOSE TO MEDIUM DENSE, BROWN AND GRAY, SILTY FINE TO COARSE SAND A-2-4 AND VERY SOFT TO SOFT SANDY SILT A-4, TRACE ORGANIC MATTER

Ⓒ **RESIDUAL**
MEDIUM DENSE TO DENSE, GRAY, RED AND BROWN, SILTY FINE TO COARSE SAND A-2-4, TRACE ROCK FRAGMENTS AND MEDIUM STIFF TO STIFF SANDY SILT A-4

02/24
60/0.0
B.T
02/24

WEATHERED ROCK
(BIOTITE GNEISS)

CRYSTALLINE ROCK
BIOTITE GNEISS

2
WOH
WOH
WOH
18
100/0.4
60/0.0
02/24
RS-3
REC=66%
RQD=51%
GSI=10-80
C.T
02/24

CRYSTALLINE ROCK
BIOTITE GNEISS

1
3
1
7
16
37
60/0.0
RS-4
REC=76%
RQD=48%
GSI=40-90
C.T
FIAD
02/24

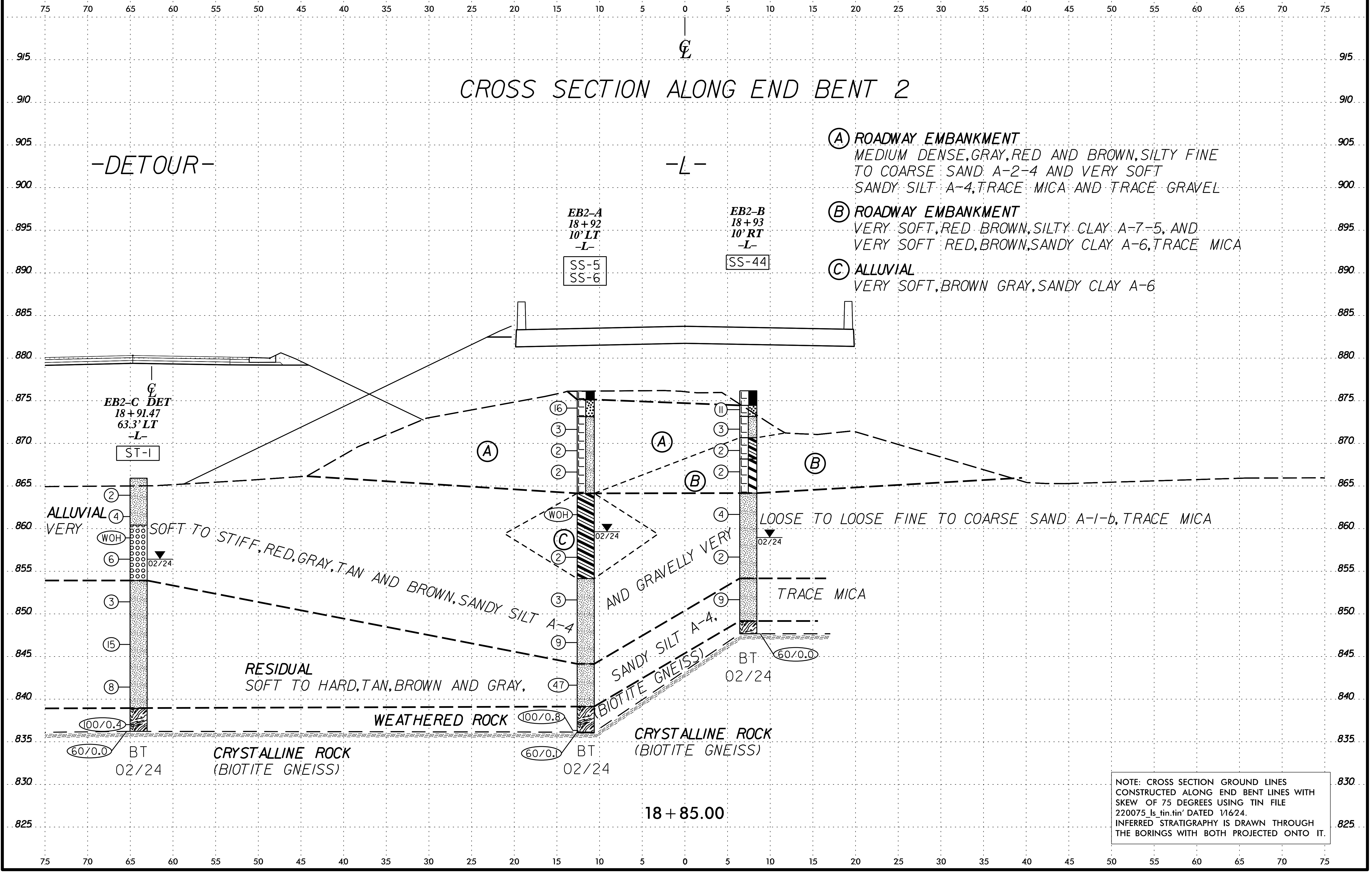
CRYSTALLINE ROCK
BIOTITE GNEISS

18+40.00

NOTE: CROSS SECTION GROUND LINES CONSTRUCTED ALONG BENT LINES WITH SKEW OF 75 DEGREES USING TIN FILE 220075_ls_tin.tin' DATED 1/16/24. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

CROSS SECTION ALONG END BENT 2



Ⓐ **ROADWAY EMBANKMENT**
MEDIUM DENSE, GRAY, RED AND BROWN, SILTY FINE TO COARSE SAND A-2-4 AND VERY SOFT SANDY SILT A-4, TRACE MICA AND TRACE GRAVEL

Ⓑ **ROADWAY EMBANKMENT**
VERY SOFT, RED BROWN, SILTY CLAY A-7-5, AND VERY SOFT RED, BROWN, SANDY CLAY A-6, TRACE MICA

Ⓒ **ALLUVIAL**
VERY SOFT, BROWN GRAY, SANDY CLAY A-6

NOTE: CROSS SECTION GROUND LINES CONSTRUCTED ALONG END BENT LINES WITH SKEW OF 75 DEGREES USING TIN FILE 220075_ls_tin.tin' DATED 1/16/24.
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

GEOTECHNICAL BORING REPORT
BORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 17+28	**OFFSET** 11 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 876.8 ft	**TOTAL DEPTH** 31.5 ft	**NORTHING** 624,332	**EASTING** 1,210,006	**24 HR.** 17.0
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/06/24	**COMP. DATE** 02/06/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
880											
	875.8	1.0								876.8 ROADWAY SURFACE	0.0
875			15	12	6	18		W		875.8 ASPHALT - 12 "	1.0
	873.3	3.5	2	2	2	4		W		**ROADWAY EMBANKMENT** MEDIUM DENSE, BROWN, GRAVELLY FINE TO COARSE SAND A-1-b	3.0
870	870.8	6.0	2	2	4	6		W		SOFT TO MEDIUM STIFF, RED BROWN, SILTY CLAY A-7-5	
	868.3	8.5	1	2	2	4		W			
865										864.8	12.0
	863.3	13.5	3	3	2	5		W		MEDIUM STIFF, RED BROWN, SANDY SILT A-4	
860										859.8	17.0
	858.3	18.5	2	2	3	5		W		**ALLUVIAL** LOOSE, GRAY, SILTY FINE TO COARSE SAND A-2-4	
855										854.8	22.0
	853.3	23.5	100/0.2			100/0.2				**WEATHERED ROCK** (BIOTITE GNEISS)	
850										849.8	27.0
	848.3	28.5	16	17	9	26		M		**RESIDUAL** VERY STIFF, GRAY AND BROWN, SANDY SILT A-4	
	845.3	31.5	60/0.0			60/0.0				845.3	31.5
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 845.3 ft ON CRYSTALLINE ROCK (BIOTITE GNEISS)	

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 17+22	**OFFSET** 9 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 877.1 ft	**TOTAL DEPTH** 28.6 ft	**NORTHING** 624,335	**EASTING** 1,210,026	**24 HR.** 16.5
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/09/24	**COMP. DATE** 02/09/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
880										
	876.1	1.0								877.1 ROADWAY SURFACE 0.0
875			12	12	10	22		M		876.1 ASPHALT - 12 " 1.0
	873.6	3.5	3	3	3	6		M		**ROADWAY EMBANKMENT** 874.1 MEDIUM DENSE, BROWN, SILTY FINE TO COARSE SAND A-2-4, TRACE GRAVEL 3.0
870	871.1	6.0	2	4	3	7		M		MEDIUM STIFF, RED BROWN, SANDY SILT A-4, TRACE MICA, TRACE GRAVEL
	868.6	8.5	3	5	3	8		M		
865										865.1 12.0
	863.6	13.5	2	2	3	5		W		**ALLUVIAL** MEDIUM STIFF, RED BROWN, SANDY SILT A-4, TRACE MICA
860										860.1 17.0
	858.6	18.5	WOH	WOH	1	1	SS-54	Sat.		VERY LOOSE, GRAY, SILTY FINE TO COARSE SAND A-2-4
855										855.1 22.0
	853.6	23.5	13	14	18	32		M		**RESIDUAL** DENSE, RED BROWN, SILTY FINE TO COARSE SAND A-2-4, TRACE MICA, TRACE ROCK FRAGMENTS
850										849.6 27.5
	848.6	28.5	60/0.1			60/0.1				848.6 **WEATHERED ROCK** (BIOTITE GNEISS) 28.5
										848.5 28.6 **CRYSTALLINE ROCK** (BIOTITE GNEISS)
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 848.5 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 17+71	**OFFSET** 9 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 864.9 ft	**TOTAL DEPTH** 44.0 ft	**NORTHING** 624,372	**EASTING** 1,209,988	**24 HR.** 5.3
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/07/24	**COMP. DATE** 02/07/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
865											
	864.9	0.0	1	4	2	6 19		M		864.9 GROUND SURFACE	0.0
	863.2	1.7						M		**ARTIFICIAL FILL** MEDIUM STIFF, BROWN GRAY, SANDY SILT A-4, TRACE GRAVEL	
			3	10	9					863.2	1.7
	861.2	3.7								MEDIUM DENSE, TAN BROWN, SILTY FINE TO COARSE SAND A-2-4, TRACE GRAVEL	
860			1	2	2	4				861.2	3.7
	858.2	6.7						Sat.		**ALLUVIAL** VERY LOOSE TO LOOSE, BROWN, SILTY FINE TO COARSE SAND A-2-4	
			WOH	WOH	WOH	0				854.7	10.2
855										MEDIUM DENSE, GRAY TAN, GRAVELLY FINE TO COARSE SAND A-1-b	
	853.2	11.7								849.7	15.2
			10	14	12	26		Sat.		**RESIDUAL** MEDIUM DENSE, GRAY, SILTY FINE TO COARSE SAND A-2-4	
850										844.7	20.2
	848.2	16.7								**WEATHERED ROCK** (BIOTITE GNEISS)	
			7	8	6	14		M		842.1	22.8
845										**CRYSTALLINE ROCK** BLUE GRAY, VERY HARD TO MEDIUM HARD, FRESH TO MODERATELY SEVERE WEATHERING, VERY CLOSE TO WIDE FRACTURE SPACING, BIOTITE GNEISS	
	843.2	21.7								838.6	26.3
	842.1	22.8	23	77/0.4		100/0.9				836.9	28.0
			60/0.0			60/0.0				REC = 100% RQD = 89%	
840							RS-1			**WEATHERED ROCK** (BIOTITE GNEISS)	
										BLUE GRAY, VERY HARD TO HARD, FRESH TO VERY SLIGHT WEATHERING, VERY CLOSE TO WIDE FRACTURE SPACING, BIOTITE GNEISS	
835										REC = 94% RQD = 88%	
830										820.9	44.0
825										Boring Terminated at Elevation 820.9 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)	

NCDOT BORE DOUBLE BP12.R002_GEO_BRIDGE0075.GPJ NC_DOT.GDT 4/4/24

GEOTECHNICAL BORING REPORT
CORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 17+71	**OFFSET** 9 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 864.9 ft	**TOTAL DEPTH** 44.0 ft	**NORTHING** 624,372	**EASTING** 1,209,988	**24 HR.** 5.3
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/07/24	**COMP. DATE** 02/07/24	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 21.2 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
842.1											Begin Coring @ 22.8 ft	
	842.1	22.8	1.2	1:15/1.2	(1.2)	(1.2)		(3.5)	(3.1)		842.1 **CRYSTALLINE ROCK**	22.8
840	840.9	24.0	5.0	1:00/1.0	100%	100%		100%	89%		BLUE GRAY, VERY HARD TO MEDIUM HARD, FRESH TO MODERATELY SEVERE WEATHERING, VERY CLOSE TO WIDE FRACTURE SPACING, BIOTITE GNEISS	
				1:00/1.0	(2.3)	(1.9)					838.6	26.3
				0:30/1.0	46%	38%					836.9	28.0
				1:00/1.0							GSI = 60 - 90	
	835.9	29.0		3:45/1.0				(15.0)	(14.1)		**WEATHERED ROCK**	
835			5.0	1:00/1.0	(5.0)	(5.0)		94%	88%		BLUE GRAY, VERY HARD TO HARD, FRESH TO VERY SLIGHT WEATHERING, VERY CLOSE TO WIDE FRACTURE SPACING, BIOTITE GNEISS	
				1:15/1.0	100%	100%					GSI = 80 - 90	
				1:15/1.0								
				1:15/1.0								
	830.9	34.0		1:15/1.0								
830			5.0	1:15/1.0	(5.0)	(4.3)						
				1:00/1.0	100%	86%						
				1:00/1.0								
	825.9	39.0		1:15/1.0								
825			5.0	1:00/1.0	(5.0)	(4.8)						
				1:15/1.0	100%	96%						
				1:30/1.0								
				1:30/1.0								
	820.9	44.0		1:45/1.0							820.9	44.0
											Boring Terminated at Elevation 820.9 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)	

NCDOT CORE DOUBLE BP12.R002_GEO_BRIDGE0075.GPJ NC_DOT.GDT 4/4/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 17+68	**OFFSET** 10 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 865.9 ft	**TOTAL DEPTH** 45.2 ft	**NORTHING** 624,378	**EASTING** 1,210,007	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/13/24	**COMP. DATE** 02/13/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										865.9	GROUND SURFACE 0.0
865	864.9	1.0	1	1	1	2		M		**ALLUVIAL** VERY LOOSE, BROWN RED, SILTY FINE TO COARSE SAND A-2-4	
	862.4	3.5	1	1	2	3		W		860.4	5.5
860	859.9	6.0	WOH	WOH	WOH	0		Sat.		VERY SOFT, GRAY BROWN, SANDY SILT A-4	
	857.4	8.5	WOH	WOH	WOH	0		Sat.			
855											
	852.4	13.5	9	9	9	18		Sat.		MEDIUM DENSE, GRAY BROWN, SILTY FINE TO COARSE SAND A-2-4, TRACE ROCK FRAGMENTS	
850										848.9	17.0
	847.4	18.5	8	4	4	8		M		**RESIDUAL** MEDIUM STIFF, BROWN RED, SANDY SILT A-4, TRACE MICA, TRACE ROCK FRAGMENTS	
845										843.9	22.0
	842.4	23.5	100/0.4			100/0.4				**WEATHERED ROCK** (BIOTITE GNEISS)	
840	840.4	25.5	60/0.0			60/0.0				840.4	25.5
							RS-2			**CRYSTALLINE ROCK** BLUE GRAY, VERY HARD TO HARD, FRESH TO VERY SLIGHT WEATHERING, CLOSE TO WIDE FRACTURE SPACING, BIOTITE GNEISS REC = 91% RQD = 86%	
835											
830											
825										820.7	45.2
										Boring Terminated at Elevation 820.7 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)	

NCDOT BORE DOUBLE BP12.R002_GEO_BRIDGE0075.GPJ NC_DOT.GDT 4/4/24

GEOTECHNICAL BORING REPORT
CORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 17+68	**OFFSET** 10 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 865.9 ft	**TOTAL DEPTH** 45.2 ft	**NORTHING** 624,378	**EASTING** 1,210,007	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/13/24	**COMP. DATE** 02/13/24	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 19.7 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
840.4											Begin Coring @ 25.5 ft	
	840.4	25.5	4.7	0:30/0.7 1:00/1.0 2:00/1.0 1:00/1.0 1:00/1.0	(4.0) 85%	(3.5) 74%		(18.0) 91%	(17.0) 86%		840.4 **CRYSTALLINE ROCK** BLUE GRAY, VERY HARD TO HARD, FRESH TO VERY SLIGHT WEATHERING, WIDE TO CLOSE FRACTURE SPACING, BIOTITE GNEISS GSI = 80 - 90	25.5
	835.7	30.2	5.0	1:00/1.0 1:00/1.0 1:00/1.0 0:30/1.0 1:00/1.0	(4.0) 80%	(3.5) 70%	RS-2					
830	830.7	35.2	5.0	1:00/1.0 1:00/1.0 1:00/1.0 1:00/1.0 1:00/1.0	(5.0) 100%	(5.0) 100%						
825	825.7	40.2	5.0	1:00/1.0 1:00/1.0 1:00/1.0 1:00/1.0 1:00/1.0	(5.0) 100%	(5.0) 100%						
	820.7	45.2									820.7 Boring Terminated at Elevation 820.7 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)	45.2

NCDOT CORE DOUBLE BP12.R002_GEO_BRIDGE0075.GPJ NC_DOT.GDT 4/4/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 18+42	**OFFSET** 10 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 863.7 ft	**TOTAL DEPTH** 42.9 ft	**NORTHING** 624,435	**EASTING** 1,209,956	**24 HR.** 5.6
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/08/24	**COMP. DATE** 02/08/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
865											
										863.7 GROUND SURFACE	0.0
	862.7	1.0	1	1	1	2		M		**ALLUVIAL** VERY LOOSE, BROWN, SILTY FINE TO COARSE SAND A-2-4	
860	860.2	3.5	WOH	WOH	WOH	0					
	857.7	6.0	WOH	WOH	WOH	0		W			
855	855.2	8.5	WOH	WOH	WOH	0		W			
	853.2	10.5	8	9	9	18		W		853.2 MEDIUM DENSE, GRAY BROWN, GRAVELLY FINE TO COARSE SAND A-1-b	10.5 / 12.5
850										**RESIDUAL**	
	848.2	15.5								848.7 VERY STIFF, RED BROWN, SANDY SILT A-4	15.0
	847.5	16.2	100/0.4			100/0.4				847.5 **WEATHERED ROCK** (BIOTITE GNEISS)	16.2
845			60/0.0			60/0.0	RS-3			**CRYSTALLINE ROCK** GRAY BROWN, HARD TO SOFT, FRESH TO MODERATELY SEVERE WEATHERING, VERY CLOSE TO CLOSE FRACTURE SPACING, BIOTITE GNEISS REC = 73% RQD = 51%	
840											
835										835.8 GRAY BROWN, MEDIUM HARD TO SOFT, MODERATELY SEVERE TO SEVERE WEATHERING, VERY CLOSE FRACTURE SPACING, BIOTITE GNEISS	27.9
830										830.8 REC = 22% RQD = 0% GRAY WHITE BROWN, VERY HARD TO MODERATELY HARD, FRESH TO SLIGHT WEATHERING, VERY CLOSE TO WIDE FRACTURE SPACING, BIOTITE GNEISS	32.9
825										820.8 REC = 81% RQD = 75% Boring Terminated at Elevation 820.8 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)	42.9

GEOTECHNICAL BORING REPORT
CORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 18+42	**OFFSET** 10 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 863.7 ft	**TOTAL DEPTH** 42.9 ft	**NORTHING** 624,435	**EASTING** 1,209,956	**24 HR.** 5.6
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/08/24	**COMP. DATE** 02/08/24	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 26.7 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
847.5											Begin Coring @ 16.2 ft	
	847.5	16.2	1.7	1:00/0.7 1:30/1.0	(0.9) 53%	(0.9) 53%		(8.5) 73%	(6.0) 51%		847.5 **CRYSTALLINE ROCK** GRAY BROWN, HARD TO SOFT, FRESH TO MODERATELY SEVERE WEATHERING, VERY CLOSE TO CLOSE FRACTURE SPACING, BIOTITE GNEISS GSI = 50 - 60	16.2
845	845.8	17.9	5.0	1:00/1.0 0:45/1.0 0:45/1.0 0:45/1.0 1:00/1.0	(2.8) 56%	(2.0) 40%	RS-3					
840	840.8	22.9	5.0	1:00/1.0 0:45/1.0 0:45/1.0 1:00/1.0 1:00/1.0	(4.8) 96%	(3.1) 62%						
835	835.8	27.9	5.0	1:00/1.0 1:15/1.0 1:15/1.0 1:00/1.0 0:30/1.0	(1.1) 22%	(0.0) 0%		(1.1) 22%	(0.0) 0%		835.8 GRAY BROWN, MEDIUM HARD TO SOFT, MODERATELY SEVERE TO SEVERE WEATHERING, VERY CLOSE FRACTURE SPACING, BIOTITE GNEISS GSI = 10 - 20	27.9 / 32.9
830	830.8	32.9	5.0	0:45/1.0 1:15/1.0 1:00/1.0 1:15/1.0 1:00/1.0	(3.1) 62%	(2.5) 50%		(8.1) 81%	(7.5) 75%		830.8 GRAY WHITE BROWN, VERY HARD TO MODERATELY HARD, FRESH TO SLIGHT WEATHERING, VERY CLOSE TO WIDE FRACTURE SPACING, BIOTITE GNEISS GSI = 70 - 80	32.9
825	825.8	37.9	5.0	1:30/1.0 2:30/1.0 1:45/1.0 3:00/1.0 2:30/1.0	(5.0) 100%	(5.0) 100%						
	820.8	42.9									820.8 Boring Terminated at Elevation 820.8 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)	42.9

GEOTECHNICAL BORING REPORT
BORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 18+37	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 865.8 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 624,440	**EASTING** 1,209,978	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/14/24	**COMP. DATE** 02/14/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
870										
865										865.8 GROUND SURFACE 0.0
	863.1	2.7	1	1	0	1		W		**ROADWAY EMBANKMENT** VERY LOOSE, BROWN RED, SILTY FINE TO COARSE SAND A-2-4, TRACE MICA
860	860.6	5.2	1	1	2	3		Sat.		861.1 4.7
	858.1	7.7	1	0	1	1		Sat.		**ALLUVIAL** VERY LOOSE TO LOOSE, BROWN GRAY, SILTY FINE TO COARSE SAND A-2-4, WOOD FRAGMENTS & TRACE ORGANIC MATTER IN LAST SAMPLE
855	855.6	10.2	2	4	3	7		Sat.		
	852.6	13.2	4	8	8	16		W		853.1 12.7 **RESIDUAL** MEDIUM DENSE TO DENSE, GRAY BROWN, SILTY FINE TO COARSE SAND A-2-4, TRACE ROCK FRAGMENTS
850	847.6	18.2	12	17	20	37		M		
845	845.8	20.0	60/0.0			60/0.0				845.8 20.0 **CRYSTALLINE ROCK** BLUE GRAY, VERY HARD TO HARD, FRESH TO SLIGHT WEATHERING, MODERATELY CLOSE TO CLOSE FRACTURE SPACING, BIOTITE GNEISS
840							RS-4			GSI = 80 - 90
835										839.1 26.7 REC = 97% RQD = 88% BLUE GRAY, VERY HARD TO HARD, FRESH TO MODERATE WEATHERING, MODERATELY CLOSE TO VERY CLOSE FRACTURE SPACING, BIOTITE GNEISS
830										REC = 69% RQD = 33%
825										820.8 45.0 Boring Terminated at Elevation 820.8 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)

NCDOT BORE DOUBLE BP12.R002_GEO_BRIDGE0075.GPJ NC_DOT.GDT 4/4/24

GEOTECHNICAL BORING REPORT
CORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 18+37	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 865.8 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 624,440	**EASTING** 1,209,978	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/14/24	**COMP. DATE** 02/14/24	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 25.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN ROD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA ROD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
845.8											Begin Coring @ 20.0 ft
845	845.8	20.0	5.0	1:00/1.0 1:15/1.0 1:30/1.0 1:15/1.0 1:15/1.0	(4.8) 96%	(4.2) 84%		(6.5) 97%	(5.9) 88%		845.8 20.0 **CRYSTALLINE ROCK** BLUE GRAY, VERY HARD TO HARD, FRESH TO SLIGHT WEATHERING, MODERATELY CLOSE TO CLOSE FRACTURE SPACING, BIOTITE GNEISS
840	840.8	25.0	5.0	1:00/1.0 1:00/1.0 1:00/1.0 1:00/1.0 1:00/1.0	(4.5) 90%	(3.2) 64%	RS-4	(12.6) 69%	(6.1) 33%		GSI = 80 - 90 839.1 26.7 BLUE GRAY, VERY HARD TO HARD, FRESH TO MODERATE WEATHERING, MODERATELY CLOSE TO VERY CLOSE FRACTURE SPACING, BIOTITE GNEISS
835	835.8	30.0	5.0	0:45/1.0 2:00/1.0 1:00/1.0 1:30/1.0 1:15/1.0	(3.2) 64%	(0.9) 18%					GSI = 40 - 50
830	830.8	35.0	5.0	0:45/1.0 0:30/1.0 1:15/1.0 1:30/1.0 2:00/1.0	(2.3) 46%	(1.1) 22%					
825	825.8	40.0	5.0	1:15/1.0 1:00/1.0 1:00/1.0 1:15/1.0 1:45/1.0	(4.3) 86%	(2.6) 52%					
	820.8	45.0									820.8 45.0 Boring Terminated at Elevation 820.8 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)

NCDOT CORE DOUBLE BP12.R002_GEO_BRIDGE0075.GPJ NC_DOT.GDT 4/4/24

GEOTECHNICAL BORING REPORT
BORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 18+92	**OFFSET** 10 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 876.1 ft	**TOTAL DEPTH** 40.1 ft	**NORTHING** 624,480	**EASTING** 1,209,934	**24 HR.** 16.5
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/06/24	**COMP. DATE** 02/06/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) — DEPTH (ft)
880										
875	875.1	1.0	10	9	7	16		M		876.1 — ROADWAY SURFACE — 0.0 875.1 — ASPHALT - 12 " — 1.0
	872.6	3.5	2	1	2	3		W		**ROADWAY EMBANKMENT** 873.1 — MEDIUM DENSE, BROWN, SILTY FINE TO COARSE SAND A-2-4, TRACE GRAVEL — 3.0
870	870.1	6.0	1	1	1	2		W		SOFT TO VERY SOFT, BROWN, SANDY SILT A-4, TRACE MICA, TRACE GRAVEL
	867.6	8.5	1	1	1	2		W		
865	862.6	13.5	WOH	WOH	WOH	0	SS-5	W		864.1 — 12.0 **ALLUVIAL** VERY SOFT, GRAY, SANDY CLAY A-6
860	857.6	18.5	1	1	1	2	SS-6	W		
855	852.6	23.5	2	1	2	3		W		854.1 — 22.0 SOFT TO STIFF, GRAY, SANDY SILT A-4, TRACE MICA
850	847.6	28.5	4	4	5	9		W		
845	842.6	33.5	5	9	38	47		M		844.1 — 32.0 **RESIDUAL** HARD, BROWN GRAY, SANDY SILT A-4, TRACE MICA
840	837.6	38.5	26	38	62/0.3	100/0.8				839.1 — 37.0 **WEATHERED ROCK** (BIOTITE GNEISS)
	836.2	39.9	60/0.1			60/0.1				836.1 — 40.0 836.0 — 40.1 **CRYSTALLINE ROCK** (BIOTITE GNEISS) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 836.0 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Kebea, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 18+93	**OFFSET** 10 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 876.2 ft	**TOTAL DEPTH** 28.5 ft	**NORTHING** 624,490	**EASTING** 1,209,951	**24 HR.** 17.2
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Millwood, J.	**START DATE** 02/09/24	**COMP. DATE** 02/09/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
880										
875	875.0	1.2	11	7	4	11		M		876.2 — ROADWAY SURFACE — 0.0 874.5 — ASPHALT - 14 " AND STONE - 6 " — 1.7
	872.7	3.5	1	2	1	3		M		873.2 — **ROADWAY EMBANKMENT** MEDIUM DENSE, GRAY, SILTY FINE TO COARSE SAND A-2-4, TRACE GRAVEL — 3.0
870	870.2	6.0	1	1	1	2		M		870.7 — SOFT, RED BROWN, SANDY SILT A-4, TRACE MICA — 5.5
	867.7	8.5	2	1	1	2	SS-44	M		868.2 — VERY SOFT, RED BROWN, SANDY CLAY A-6, TRACE MICA — 8.0
865	862.7	13.5	1	2	2	4		W		VERY SOFT, RED BROWN, SILTY CLAY A-7-5, TRACE MICA 864.2 — 12.0 **ALLUVIAL** SOFT TO VERY SOFT, BROWN GRAY, SANDY SILT A-4, TRACE MICA
860	857.7	18.5	WOH	WOH	2	2		Sat.		
855	852.7	23.5	6	5	4	9		W		854.2 — 22.0 **RESIDUAL** STIFF, BROWN, SANDY SILT A-4, TRACE MICA
850	847.7	28.5	60/0.0			60/0.0				849.2 — 27.0 847.7 — **WEATHERED ROCK** (BIOTITE GNEISS) — 28.5 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 847.7 ft ON CRYSTALLINE ROCK (BIOTITE GNEISS)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Gordan, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. EB1-C DET	**STATION** 17+51	**OFFSET** 74 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 869.3 ft	**TOTAL DEPTH** 13.9 ft	**NORTHING** 624,325	**EASTING** 1,209,939	**24 HR.** 7.1
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Miller, T.	**START DATE** 02/26/24	**COMP. DATE** 02/26/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
870										869.3 GROUND SURFACE	0.0
	868.3	1.0	2	1	2	3		M		**ALLUVIAL** SOFT, RED BROWN, SANDY SILT A-4	
	865.8	3.5								866.3	3.0
865			2	2	3	5	SS-69	M		MEDIUM STIFF, RED BROWN, SILTY CLAY A-7-5	
	863.3	6.0	5	4	4	8					
	860.8	8.5						M		861.3	8.0
860			4	8	8	16				**RESIDUAL** MEDIUM DENSE, GRAY, SILTY FINE TO COARSE SAND A-2-4	
										857.3	12.0
	855.8	13.5								**WEATHERED ROCK** (BIOTITE GNEISS)	
	855.4	13.9	100/0.4			100/0.4				855.4	13.9
			60/0.0			60/0.0				Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 855.4 ft ON CRYSTALLINE ROCK (BIOTITE GNEISS)	
										TOPSOIL - 3"	

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Gordan, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. B1-C DET	**STATION** 18+37	**OFFSET** 46 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 865.9 ft	**TOTAL DEPTH** 22.7 ft	**NORTHING** 624,414	**EASTING** 1,209,926	**24 HR.** 5.9
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Miller, T.	**START DATE** 02/26/24	**COMP. DATE** 02/26/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
870										
										865.9 GROUND SURFACE 0.0
865										**ALLUVIAL** MUD ROTARY PROBE
										854.9 11.0
860										**RESIDUAL**
855										
850										
845										
	843.2	22.7	60/0.0			60/0.0				843.2 22.7
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 843.2 ft ON CRYSTALLINE ROCK (BIOTITE GNEISS)
										TOPSOIL - 3" and Alluvial/Residual contact is inferred

GEOTECHNICAL BORING REPORT
BORE LOG

WBS BP12.R002	**TIP** N/A	**COUNTY** CLEVELAND	**GEOLOGIST** Gordan, B.	
SITE DESCRIPTION BRIDGE NO. 75 ON NC 226 OVER HINTON CREEK				**GROUND WTR (ft)**
BORING NO. EB2-C DET	**STATION** 18+96	**OFFSET** 63 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 866.9 ft	**TOTAL DEPTH** 29.7 ft	**NORTHING** 624,461	**EASTING** 1,209,884	**24 HR.** 9.5
DRILL RIG/HAMMER EFF./DATE SME0382 DIEDRICH D-50 89% 03/04/2022		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER Miller, T.	**START DATE** 02/26/24	**COMP. DATE** 02/26/24	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
870										866.9 GROUND SURFACE	0.0
	865.9	1.0								**ALLUVIAL** VERY SOFT TO SOFT, RED BROWN, SANDY SILT A-4	
865			1	1	1	2		M			
	863.4	3.5	3	2	2	4		M		861.4	5.5
	860.9	6.0	WOH	WOH	WOH	0		W		VERY LOOSE TO LOOSE, TAN GRAY, GRAVELLY FINE TO COARSE SAND A-1-b	
860											
	858.4	8.5	3	3	3	6					
855										854.9	12.0
	853.4	13.5	3	1	2	3		M		**RESIDUAL** SOFT TO STIFF, TAN GRAY BROWN, SANDY SILT A-4, TRACE MICA	
850											
	848.4	18.5	7	8	7	15		M			
845											
	843.4	23.5	3	4	4	8		M			
840										839.9	27.0
	838.4	28.5	100/0.4			100/0.4				**WEATHERED ROCK** (BIOTITE GNEISS)	
	837.2	29.7	60/0.0			60/0.0				837.2	29.7
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 837.2 ft ON CRYSTALLINE ROCK (BIOTITE GNEISS)	
										TOPSOIL - 3"	

NCDOT BORE DOUBLE BP12.R002_GEO_BRIDGE0075.GPJ NC_DOT.GDT 4/4/24

SUMMARY OF LABORATOTY TEST DATA

Soil Classification and Gradation

S&ME, Inc. Charlotte, 8848 Red Oak Blvd., Suite A, Charlotte, NC 28217

S&ME Project No.:	6235-17-005	Project Name:	Bridge No. 75 on Polkville Rd. (NC 226) over Hinton Creek
State Project No.:	BP12.R002	County:	Cleveland
Federal ID No.:		TIP No.:	
Client Name:	NCDOT	Client Address:	Raleigh, NC

Boring No.	Sample No.	Sample Depth (feet)	AASHTO Classification		Total % Passing Sieve #					% By Weight				LL	PL	PI	Moisture %
					10	40	60	200	270	Coarse Sand	Fine Sand	Silt	Clay				
EB1-B	SS-54	18.5-20.0	A-2-4	(0)	100	99	86	32.0	26.2	14	60	8	18	N.P.	N.P.	N.P.	31.3
EB1-C	SS-69	3.5-5.0	A-7-5	(16)	100	92	85	65.4	63.6	15	20	7	55	60	37	23	37.7
EB2-A	SS-5	13.5-15.0	A-6	(8)	100	99	98	74.4	68.6	2	29	29	40	36	25	11	35.6
EB2-A	SS-6	18.5-20.0	A-6	(9)	100	99	96	72.4	67.0	4	22	26	41	36	22	14	38.1
EB2-B	SS-44	6.0-7.5	A-6	(2)	100	88	76	43.8	39.3	24	37	10	29	37	24	13	31.0
EB2-C	ST-1	6.0-8.0	A-1-b	(0)	100	47	30	13.0	11.5	70	18	5	7	N.P.	N.P.	N.P.	22.9

References / Comments / ND=Not Detemined.

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Karen Warner _____ 118-06-0305 Joey Daily Project Manager

CONSOLIDATION TEST DATA

4/2/2024

Client: NCDOT
Project: Replace Bridge No.75 on Polkville Rd. over Hilton Creek
Project Number: 6235-17-005
Location: NI
Depth: 6-8' **Sample Number:** EB2-C ST-1
Material Description: A-1-b
Liquid Limit: NP **Plasticity Index:** NP
AASHTO: A-1-b
Figure No.: EB2-C ST-1
Testing Remarks: AASHTO T-216
Method B Inundated
NP: Non-Plastic
NI: No Information Provided
Specific Gravity Assumed
Tested by: Karen Warner **Checked by:** Lilma Schimmel

Test Specimen Data

NATURAL MOISTURE		VOID RATIO		AFTER TEST	
Wet w+t =	704.11 g.	Spec. Gr. =	2.70	Wet w+t =	245.85 g.
Dry w+t =	596.27 g.	Est. Ht. Solids =	0.549 in.	Dry w+t =	216.41 g.
Tare Wt. =	124.40 g.	Init. V.R. =	0.819	Tare Wt. =	98.13 g.
Moisture =	22.9 %	Init. Sat. =	75.3 %	Moisture =	24.9 %
UNIT WEIGHT		TEST START		Dry Wt. =	118.28* g.
Height =	0.998 in.	Height =	0.998 in.		
Diameter =	2.491 in.	Diameter =	2.491 in.		
Weight =	149.28 g.				
Dry Dens. =	95.2 pcf				

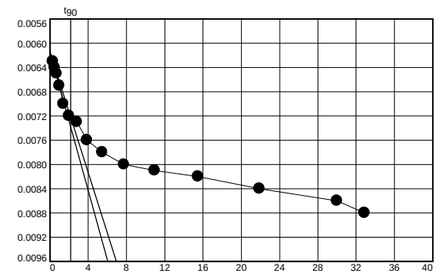
End-Of-Load Summary

Pressure (ksf)	Final Dial (in.)	Deformation (in.)	C_v (ft.^{2}/day)	C_α	Void Ratio	% Strain
start	0.00000	0.00000			0.819	
0.25	0.00880	0.00880	0.449		0.803	0.9 Comprs.
0.50	0.01620	0.01620	1.383		0.790	1.6 Comprs.
1.00	0.02700	0.02700	1.211		0.770	2.7 Comprs.
2.00	0.04330	0.04330	1.368		0.740	4.3 Comprs.
4.00	0.06310	0.06310	1.230		0.704	6.3 Comprs.
1.00	0.05930	0.05930	0.941		0.711	5.9 Comprs.
4.00	0.06560	0.06560	0.083		0.700	6.6 Comprs.
8.00	0.08660	0.08660	0.975		0.661	8.7 Comprs.
16.00	0.11520	0.11520	0.994		0.609	11.5 Comprs.

Compression index (C_C), ksf = 0.16 **Preconsolidation pressure (P_p), ksf =** 1.5 **Void ratio at P_p (e_m) =** 0.752
Recompression index (C_r) = 0.07

Pressure: 0.25 ksf — **TEST READINGS** — **Load No. 1**

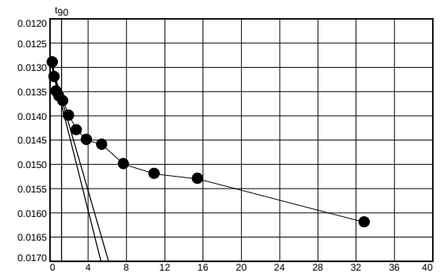
No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	+0 00:00:00	0.00000	11	+0 00:60:00	0.00800
2	+0 00:00:06	0.00630	12	+0 02:00:00	0.00810
3	+0 00:00:15	0.00640	13	+0 04:00:00	0.00820
4	+0 00:00:30	0.00650	14	+0 08:00:00	0.00840
5	+0 00:00:60	0.00670	15	+0 15:00:00	0.00860
6	+0 00:02:00	0.00700	16	+0 18:00:51	0.00880
7	+0 00:04:00	0.00720			
8	+0 00:08:00	0.00730			
9	+0 00:15:00	0.00760			
10	+0 00:30:00	0.00780			



Void Ratio = 0.803 **Compression =** 0.9%
D_0 = 0.0061 **D_{90} =** 0.0072 **D_{100} =** 0.0073 **C_v at 4.67 min. =** 0.449 ft.^{2}/day

Pressure: 0.50 ksf — **TEST READINGS** — **Load No. 2**

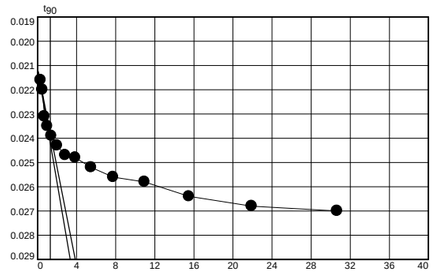
No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.00880	11	+0 00:60:00	0.01500
2	+0 00:00:06	0.01290	12	+0 02:00:00	0.01520
3	+0 00:00:15	0.01320	13	+0 04:00:00	0.01530
4	+0 00:00:30	0.01350	14	+0 18:02:51	0.01620
5	+0 00:00:60	0.01360			
6	+0 00:02:00	0.01370			
7	+0 00:04:00	0.01400			
8	+0 00:08:00	0.01430			
9	+0 00:15:00	0.01450			
10	+0 00:30:00	0.01460			



Void Ratio = 0.790 **Compression =** 1.6%
D_0 = 0.0128 **D_{90} =** 0.0137 **D_{100} =** 0.0137 **C_v at 1.49 min. =** 1.383 ft.^{2}/day

Pressure: 1.00 ksf **TEST READINGS** **Load No. 3**

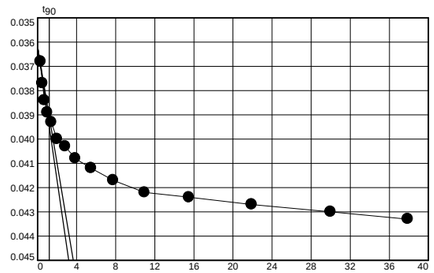
No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.01620	11	+0 00:60:00	0.02560
2	+0 00:00:06	0.02160	12	+0 02:00:00	0.02580
3	+0 00:00:15	0.02200	13	+0 04:00:00	0.02640
4	+0 00:00:30	0.02310	14	+0 08:00:0	0.02680
5	+0 00:00:60	0.02350	15	+0 15:39:50	0.02700
6	+0 00:02:00	0.02390			
7	+0 00:04:00	0.02430			
8	+0 00:08:00	0.02470			
9	+0 00:15:00	0.02480			
10	+0 00:30:00	0.02520			



Void Ratio = 0.770 **Compression =** 2.7%
D_0 = 0.0212 **D_{90} =** 0.0238 **D_{100} =** 0.0241 **C_v at 1.67 min. =** 1.211 ft.^{2}/day

Pressure: 2.00 ksf **TEST READINGS** **Load No. 4**

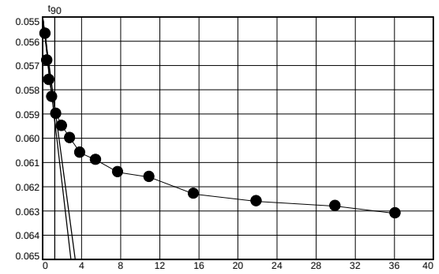
No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.02700	11	+0 00:60:00	0.04170
2	+0 00:00:06	0.03680	12	+0 02:00:00	0.04220
3	+0 00:00:15	0.03770	13	+0 04:00:00	0.04240
4	+0 00:00:30	0.03840	14	+0 08:00:00	0.04270
5	+0 00:00:60	0.03890	15	+0 15:00:00	0.04300
6	+0 00:02:00	0.03930	16	+0 23:56:34	0.04330
7	+0 00:04:00	0.04000			
8	+0 00:08:00	0.04030			
9	+0 00:15:00	0.04080			
10	+0 00:30:00	0.04120			



Void Ratio = 0.740 **Compression =** 4.3%
D_0 = 0.0362 **D_{90} =** 0.0391 **D_{100} =** 0.0394 **C_v at 1.44 min. =** 1.368 ft.^{2}/day

Pressure: 4.00 ksf **TEST READINGS** **Load No. 5**

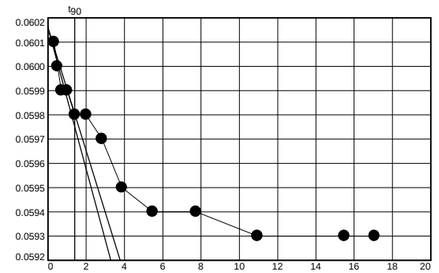
No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.04330	11	+0 00:60:00	0.06140
2	+0 00:00:06	0.05570	12	+0 02:00:00	0.06160
3	+0 00:00:15	0.05680	13	+0 04:00:00	0.06230
4	+0 00:00:30	0.05760	14	+0 08:00:00	0.06260
5	+0 00:00:60	0.05830	15	+0 15:00:00	0.06280
6	+0 00:02:00	0.05900	16	+0 21:45:11	0.06310
7	+0 00:04:00	0.05950			
8	+0 00:08:00	0.06000			
9	+0 00:15:00	0.06060			
10	+0 00:30:00	0.06090			



Void Ratio = 0.704 **Compression =** 6.3%
D_0 = 0.0550 **D_{90} =** 0.0587 **D_{100} =** 0.0591 **C_v at 1.54 min. =** 1.230 ft.^{2}/day

Pressure: 1.00 ksf **TEST READINGS** **Load No. 6**

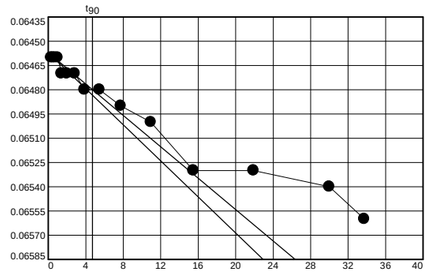
No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.06310	11	+0 00:60:00	0.05940
2	+0 00:00:06	0.06010	12	+0 02:00:00	0.05930
3	+0 00:00:15	0.06000	13	+0 04:00:00	0.05930
4	+0 00:00:30	0.05990	14	+0 04:51:11	0.05930
5	+0 00:00:60	0.05990			
6	+0 00:02:00	0.05980			
7	+0 00:04:00	0.05980			
8	+0 00:08:00	0.05970			
9	+0 00:15:00	0.05950			
10	+0 00:30:00	0.05940			



Void Ratio = 0.711 **Compression =** 5.9%
D_0 = 0.0602 **D_{90} =** 0.0598 **D_{100} =** 0.0598 **C_v at 1.98 min. =** 0.941 ft.^{2}/day

Pressure: 4.00 ksf — **TEST READINGS** — **Load No. 7**

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.05930	11	+0 00:60:00	0.06490
2	+0 00:00:06	0.06460	12	+0 02:00:00	0.06500
3	+0 00:00:15	0.06460	13	+0 04:00:00	0.06530
4	+0 00:00:30	0.06460	14	+0 08:00:00	0.06530
5	+0 00:00:60	0.06460	15	+0 15:00:00	0.06540
6	+0 00:02:00	0.06470	16	+0 18:58:02	0.06560
7	+0 00:04:00	0.06470			
8	+0 00:08:00	0.06470			
9	+0 00:15:00	0.06480			
10	+0 00:30:00	0.06480			



Void Ratio = 0.700 **Compression =** 6.6%
D_0 = 0.0646 **D_{90} =** 0.0648 **D_{100} =** 0.0648 **C_V at 22.30 min. =** 0.083 ft.^{2}/day

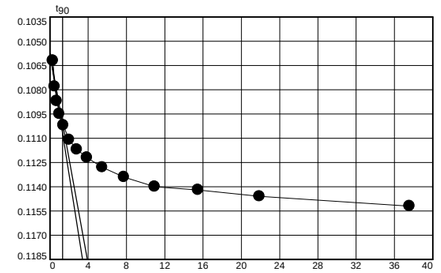
Pressure: 8.00 ksf — **TEST READINGS** — **Load No. 8**

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.06560	11	+0 00:60:00	0.08450
2	+0 00:00:06	0.07840	12	+0 02:00:00	0.08500
3	+0 00:00:15	0.07960	13	+0 04:00:00	0.08570
4	+0 00:00:30	0.08060	14	+0 08:00:00	0.08590
5	+0 00:00:60	0.08120	15	+0 15:00:00	0.08620
6	+0 00:02:00	0.08190	16	+0 23:51:29	0.08660
7	+0 00:04:00	0.08260			
8	+0 00:08:00	0.08320			
9	+0 00:15:00	0.08350			
10	+0 00:30:00	0.08410			

Void Ratio = 0.661 **Compression =** 8.7%
D_0 = 0.0780 **D_{90} =** 0.0818 **D_{100} =** 0.0822 **C_V at 1.85 min. =** 0.975 ft.^{2}/day

Pressure: 16.00 ksf — **TEST READINGS** — **Load No. 9**

No.	Clock Time	Dial Reading	No.	Clock Time	Dial Reading
1	0	0.08660	11	+0 00:60:00	0.11340
2	+0 00:00:06	0.10620	12	+0 02:00:00	0.11400
3	+0 00:00:15	0.10780	13	+0 04:00:00	0.11420
4	+0 00:00:30	0.10870	14	+0 08:00:00	0.11460
5	+0 00:00:60	0.10950	15	+0 23:32:47	0.11520
6	+0 00:02:00	0.11020			
7	+0 00:04:00	0.11110			
8	+0 00:08:00	0.11170			
9	+0 00:15:00	0.11220			
10	+0 00:30:00	0.11280			



Void Ratio = 0.609 **Compression =** 11.5%
D_0 = 0.1058 **D_{90} =** 0.1100 **D_{100} =** 0.1105 **C_V at 1.72 min. =** 0.994 ft.^{2}/day

Form No. TR-43-D7012C-02
Revision No. : 0
Revision Date: 08/22/18

UNCONFINED COMPRESSION
(ASTM D7012 Method C)

S&ME, Inc. - Knoxville 1413 Topside Road, Louisville, TN 37777

Project Name: Bridge No. 75 on Polkville Rd over Hinton Creek
Project Number: 6235-17-005

Report Date: March 15, 2024
Reviewed By: Victoria Igoe

Boring No.	Sample No.	Depth (ft)	Dimensions, in.		Shape (See Key)	Area (in^2)	Unit Weight (lbs/ft^3)	Loading Rate (psi/sec)	Maximum Load (lbs)	Strength (psi)	Moisture (%)
			Length	Diameter							
B1-A	RS-1	24.6 - 25.0	4.48	1.96	A	3.02	172.1	67	26,250	8,692	0.0
B1-B	RS-2	30.5 - 30.9	4.42	1.97	A	3.05	174.3	68	16,700	5,475	0.1
B2-A	RS-3	18.2 - 18.6	4.18	1.97	A	3.05	171.4	80	35,998	11,803	0.0
B2-B	RS-4	25.0 - 25.4	4.61	1.97	A	3.05	173.6	92	53,742	17,620	0.0

NOTES: Effective (as received) unit weight as determined by RTH 109-93.
Loading rates were selected to target reaching failure between 2 and 15 minutes.
Test results for specimens not meeting the requirements of ASTM D4543-19 may differ from a test specimen that meets the requirements of ASTM D4543.

SHAPE KEY

ASTM D4543-19 Standard Practice for Preparing Rock Core as Cylindrical Test Specimens and Verifying Conformance to Dimensional and Shape Tolerance Section 1.2 - "Rock is a complex engineering material that can vary greatly as a function of lithology, stress history, weathering, moisture content and chemistry, and other natural geologic processes. As such, it is not always possible to obtain or prepare rock core specimens that satisfy the desirable tolerances given in this practice. Most commonly, this situation presents itself with weaker, more porous, and poorly cemented rock types and rock types containing significant or weak (or both) structural features. For rock types which are difficult to prepare, all reasonable efforts shall be made to prepare a specimen in accordance with this practice and for the intended test procedure. However, when it has been determined by trial and error that this is not possible, prepare the rock specimen to the closest tolerances practicable and consider this to be the best effort and report it as such and if allowable or necessary for the intended test, capping the ends of the specimen as discussed in this practice is permitted."

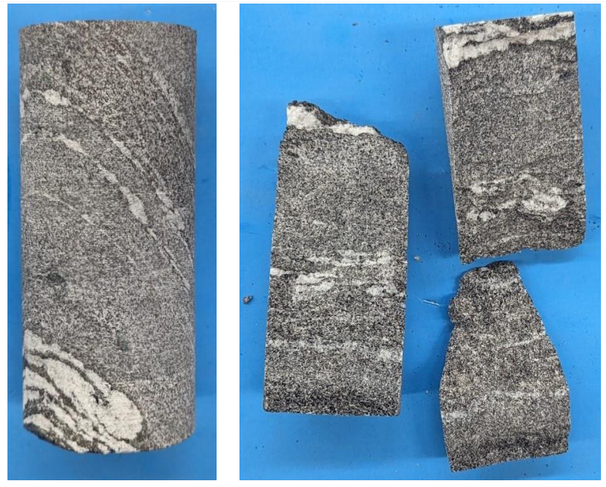
A Test specimen measurements met the desired shape tolerances of ASTM D4543-19 (side straightness, end flatness & parallelism, and end perpendicularity to axis)

B Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism, and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness. Specimen prepared to closest tolerances practicable.

C Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness & parallelism. Specimen did not meet the desired tolerances for side straightness and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

D Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness. Specimen did not meet the desired tolerances for side straightness, parallelism and end perpendicularity to axis. Specimen prepared to closest tolerances practicable.

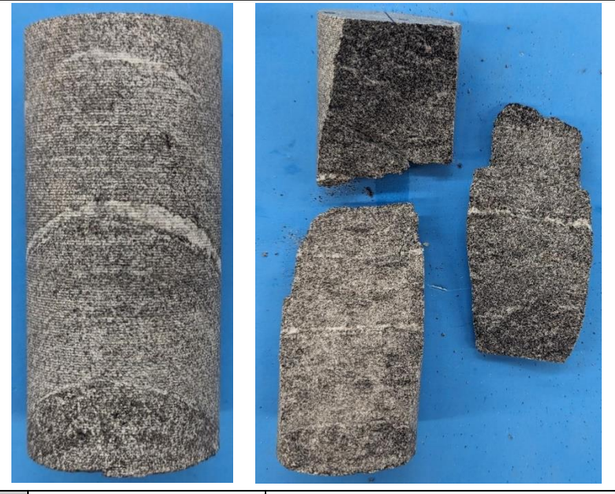
E Test specimen measurements met the desired shape tolerances of ASTM D4543-19 for end flatness and end perpendicularity to axis. Specimen did not meet the desired tolerance for side straightness and parallelism. Specimen prepared to closest tolerances practicable.



Date: 03/14/2024

Photographer: Ryan Skinner

1	**Location / Orientation**	B1-A, RS-1 (24.6' – 25.0')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)



Date: 03/14/2024

Photographer: Ryan Skinner

3	**Location / Orientation**	B2-A, RS-3 (18.2' – 18.6')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)

Date: 03/14/2024

Photographer: Ryan Skinner

1	**Location / Orientation**	B1-B, RS-2 (30.5' – 30.9')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)

Date: 03/14/2024

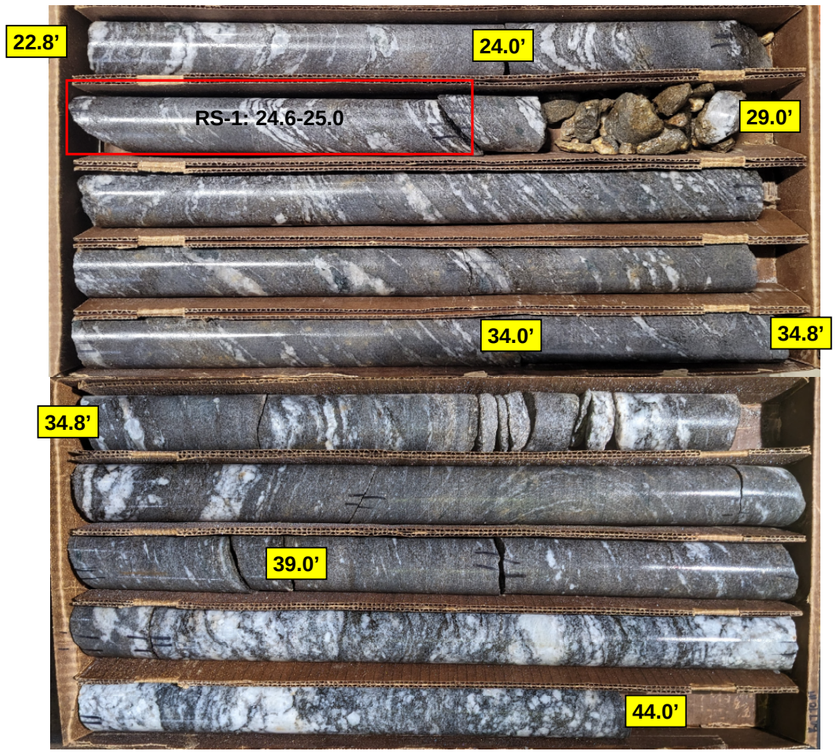
Photographer: Ryan Skinner

4	**Location / Orientation**	B2-B, RS-4 (25.0' – 25.4')
	Remarks	Unconfined Compressive Strength of Rock Core Specimen Before/After (ASTM D7012 Method C)

CORE PHOTOGRAPHS

B1-A

BOXES 1 & 2: 22.8 – 44.0 FEET

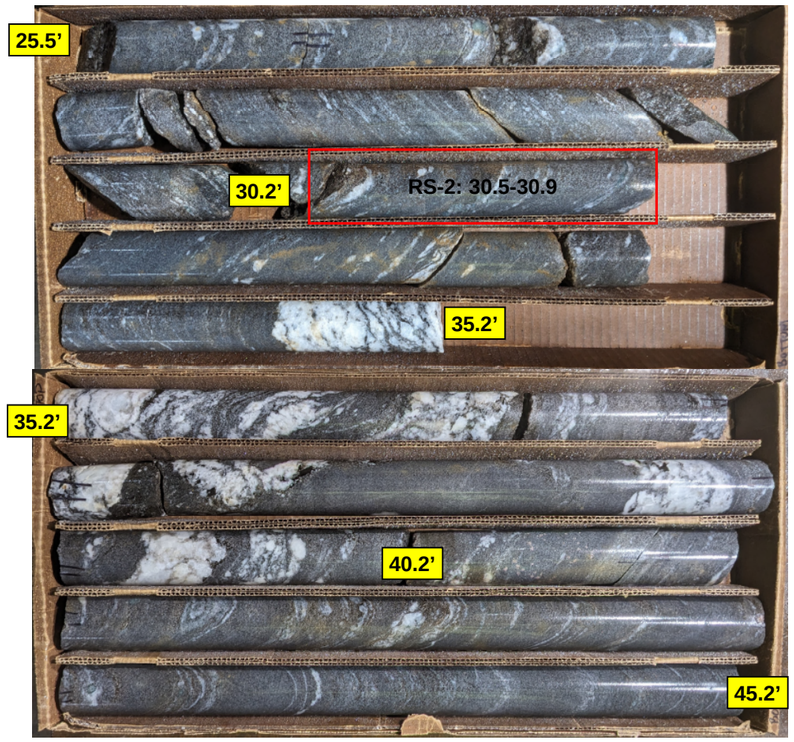


0 1 2

FEET

B1-B

BOXES 1 & 2: 25.5 – 45.2 FEET



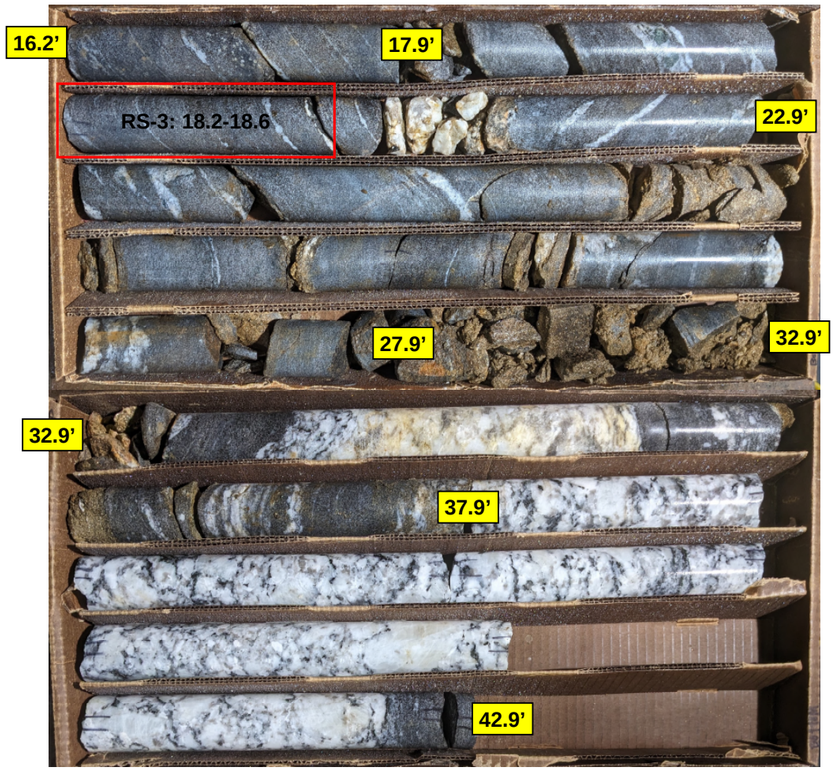
0 1 2

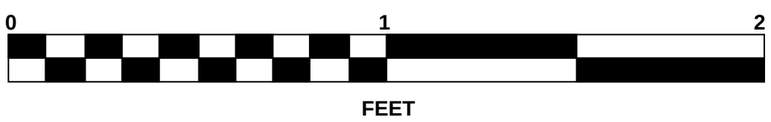
FEET

CORE PHOTOGRAPHS

B2-A

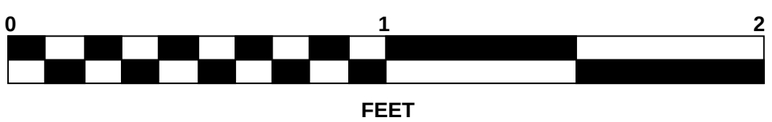
BOXES 1 & 2: 16.2 – 42.9 FEET





B2-B

BOXES 1 & 2: 20.0 – 45.0 FEET



SITE PHOTOGRAPHS

Bridge No. 75 on –L– (SR 226) over Hinton Creek

Looking South