

REFERENCE: R-2707C

PROJECT: 34497

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY Cleveland  
PROJECT DESCRIPTION US 74 (Shelby Bypass) from West  
of NC 226 to West of NC 150

SITE DESCRIPTION Bridge Nos. 0466 & 0467 over First  
Broad River on Highway US 74 Bypass Between SR 1005  
and SR 1827

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
2A	SUPPLEMENTAL GSI LEGEND
3	SITE PLAN
4-5	PROFILES
6-7	CROSS SECTIONS
8-34	BORE LOGS, CORE REPORTS, & CORE PHOTOGRAPHS
35	LABORATORY SUMMARY FOR ROCK CORE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2707C	1	36

CAUTION NOTICE

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

PERSONNEL

Stephen Abernathy

Mike Morgan

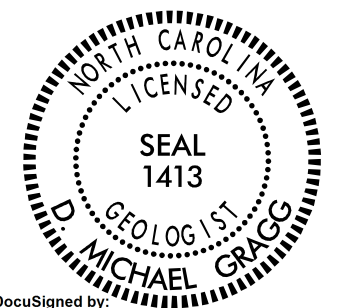
INVESTIGATED BY D. Michael Gragg

DRAWN BY Tamara Stivers

CHECKED BY Kenneth Bussey

SUBMITTED BY HDR|ICA

DATE November, 2016



DocuSigned by:  
D. Michael Gragg

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12/20/2016

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

**SUBSURFACE INVESTIGATION**

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

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

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

**GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)**

From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.

**STRUCTURE**

**SURFACE CONDITIONS**

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

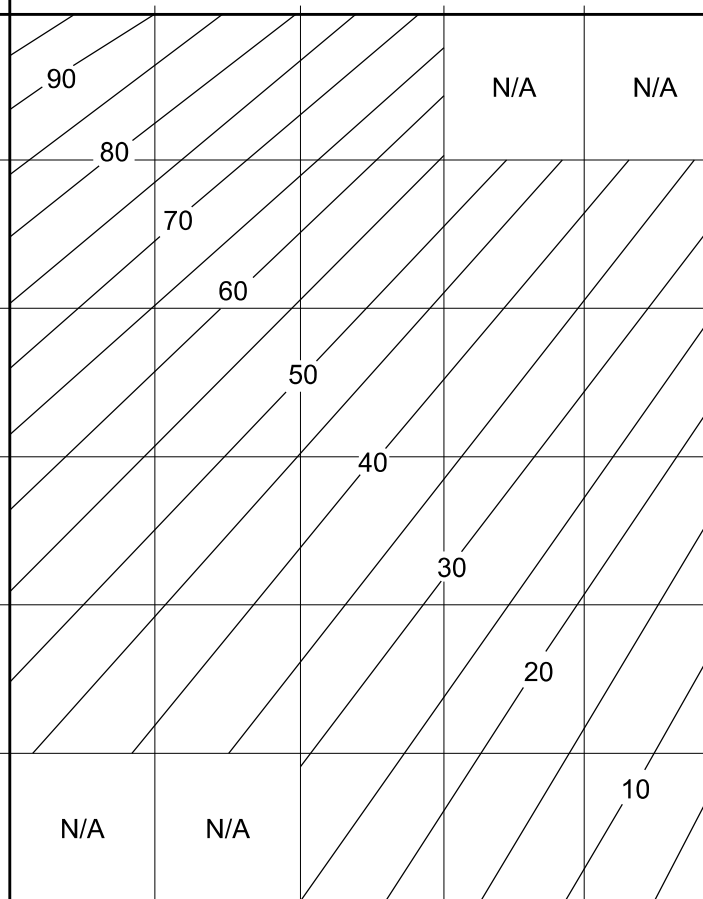
**COMPOSITION AND STRUCTURE**

**SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)**

<b>VERY GOOD</b> - Very Rough, fresh unweathered surfaces	<b>GOOD</b> - Rough, slightly weathered surfaces	<b>FAIR</b> - Smooth, moderately weathered and altered surfaces	<b>POOR</b> - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments	<b>VERY POOR</b> - 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	30	
DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces				20	
LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	N/A	N/A			10



**A. Thick bedded, very blocky sandstone**  
The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.

**B. Sandstone with thin inter-layers of siltstone**

**C. Sandstone and siltstone in similar amounts**

**D. Siltstone or silty shale with sandstone layers**

**E. Weak siltstone or clayey shale with sandstone layers**

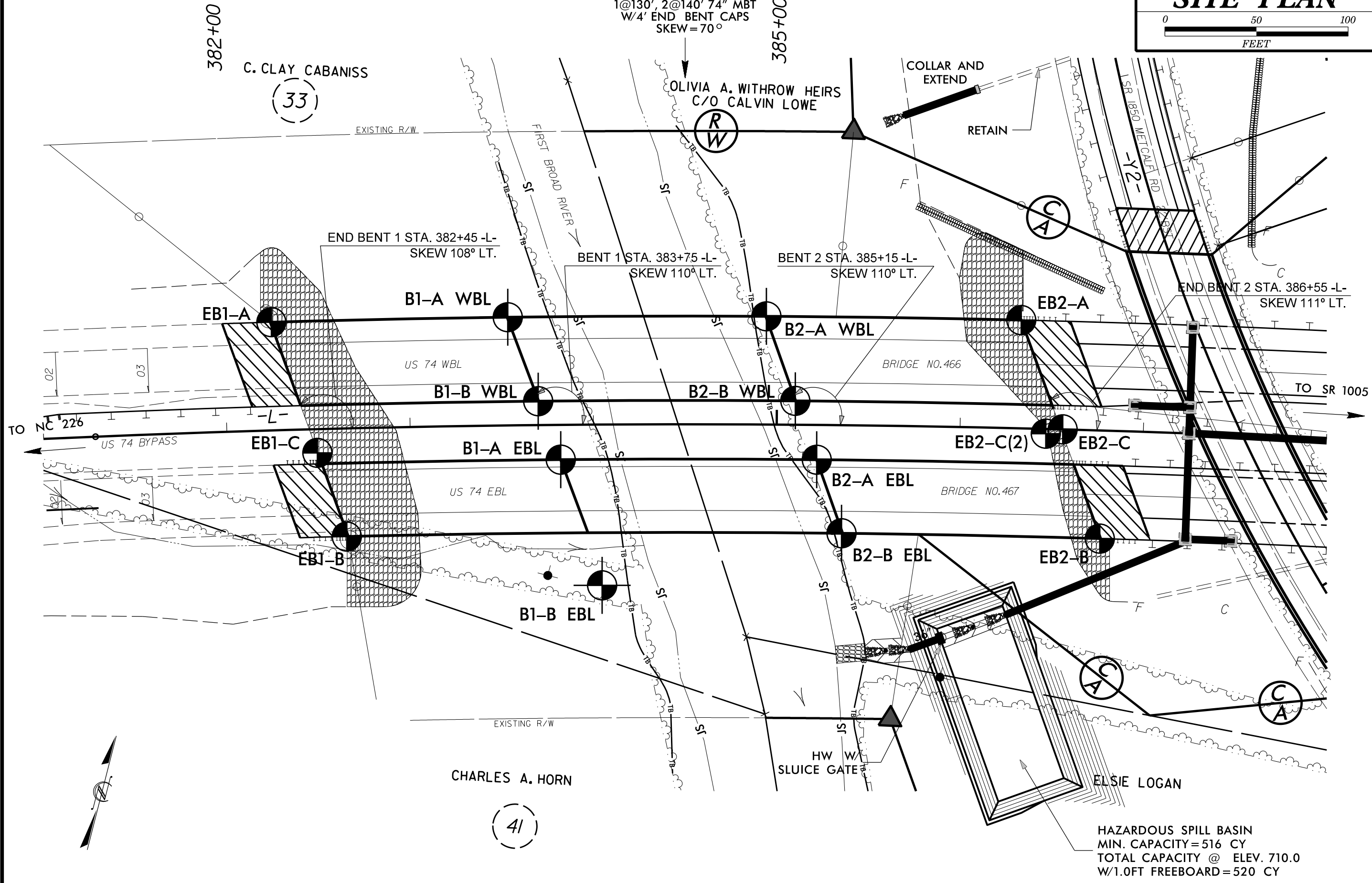
**F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure**

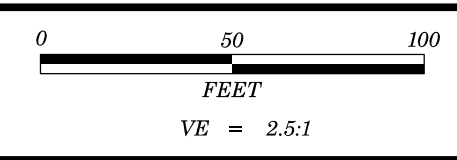
**G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers**

**H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.**

→ Means deformation after tectonic disturbance

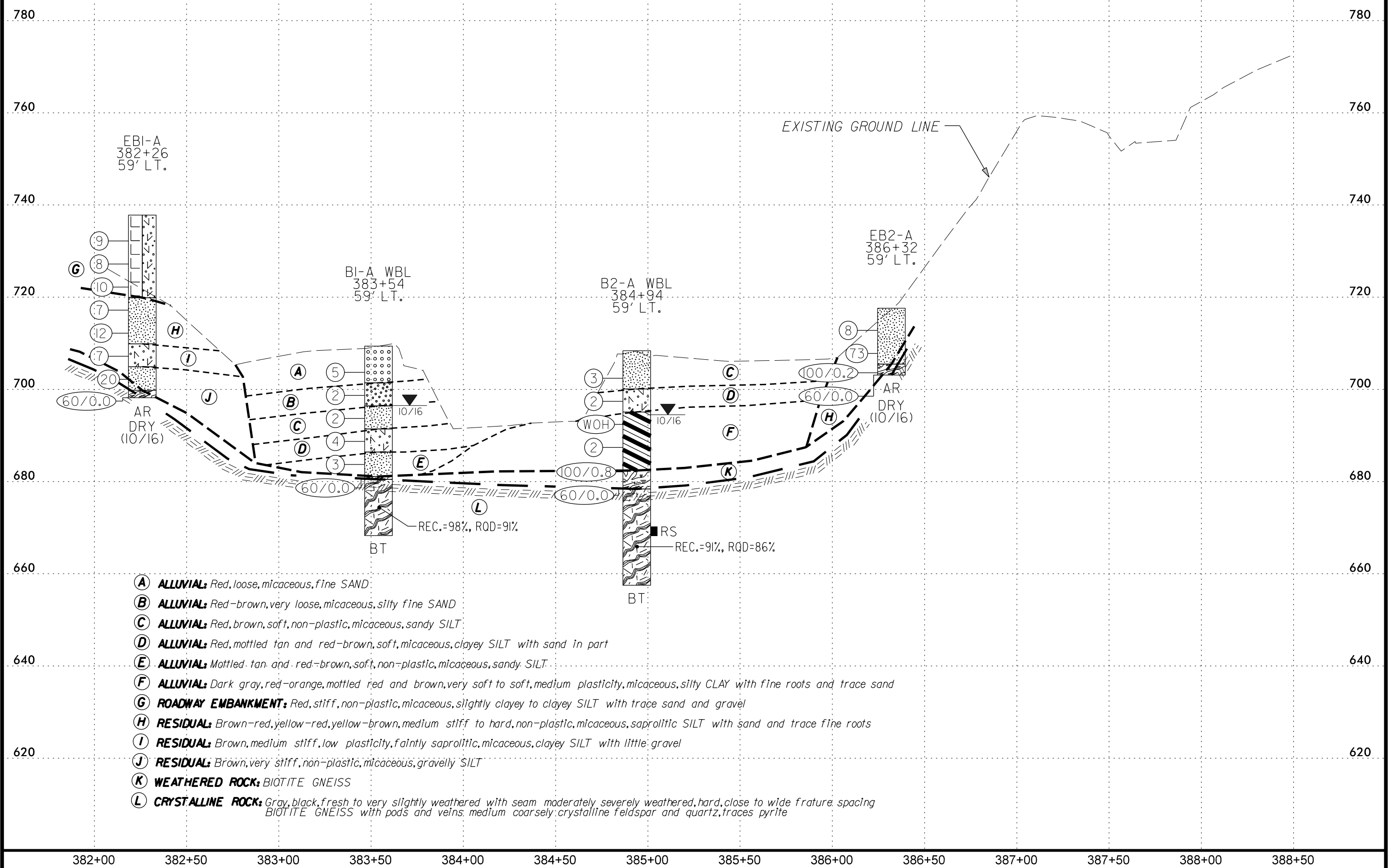
CL STA 384+50 -L-  
GP EL=735.26  
1@130', 2@140' 74" MBT  
W/4' END BENT CAPS  
SKEW=70°



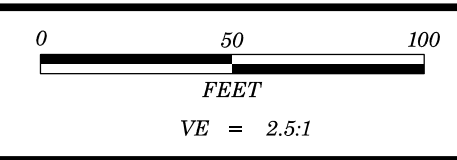


PROJECT REFERENCE NO.	SHEET NO.
R-2707C	4
BRIDGE NO. 466 PROFILE 59' LT. OF -L-	

GROUNDLINE PROFILE CREATED FROM r2707c\_ls\_tin.tin FILE RECEIVED FROM NCDOT DATED 11-16-2016  
 INFERRED STRATIGRAPHY IS DRAWN AT THE PROFILE OFFSET WITH THE BORINGS PROJECTED ONTO THE PROFILE  
 TIN FILE PROVIDED DOES NOT DISPLAY THE CURRENT EMBANKMENT AT END BENT 1

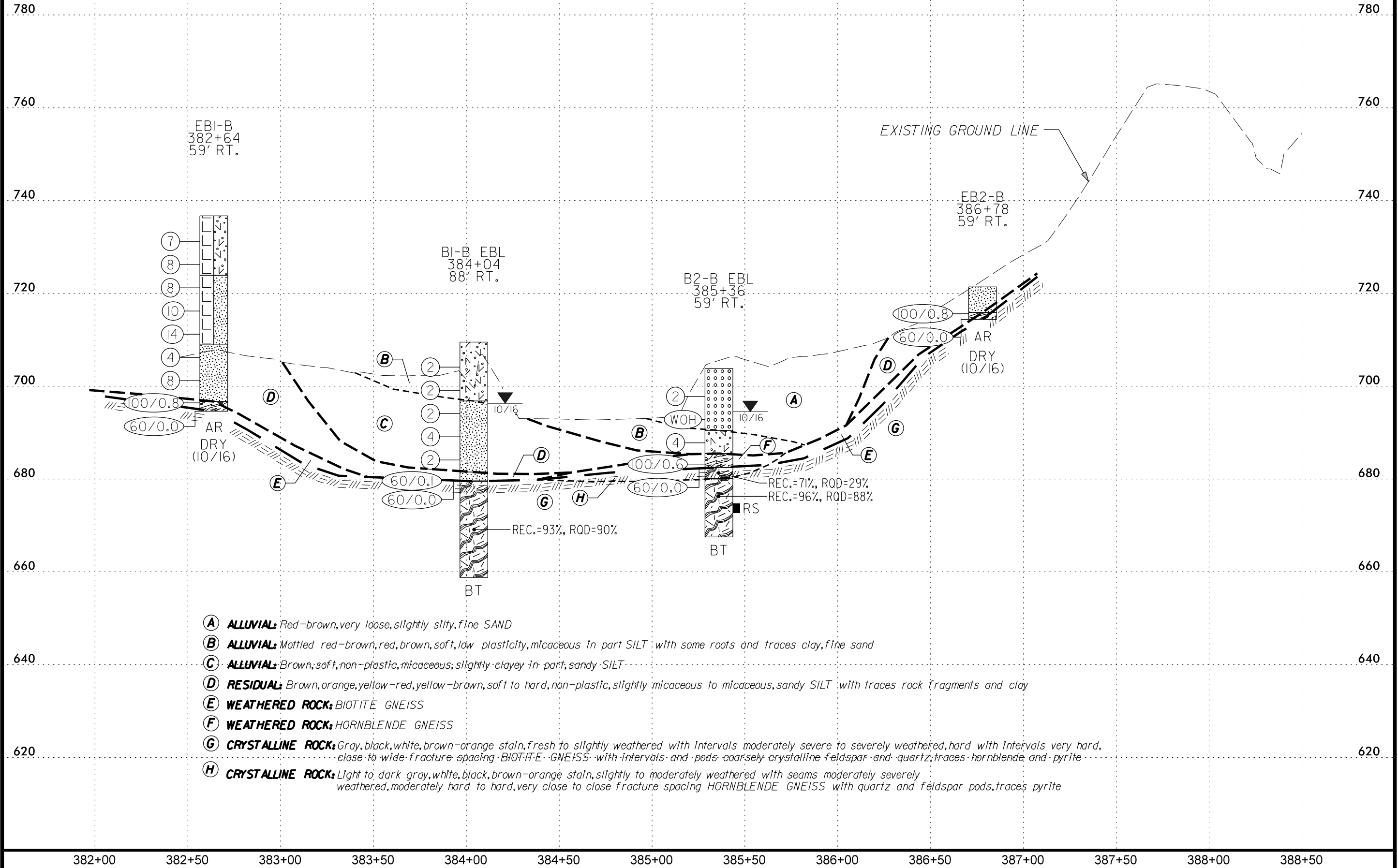


- (A) **ALLUVIAL:** Red, loose, micaceous, fine SAND
- (B) **ALLUVIAL:** Red-brown, very loose, micaceous, silty fine SAND
- (C) **ALLUVIAL:** Red, brown, soft, non-plastic, micaceous, sandy SILT
- (D) **ALLUVIAL:** Red, mottled tan and red-brown, soft, micaceous, clayey SILT with sand in part
- (E) **ALLUVIAL:** Mottled tan and red-brown, soft, non-plastic, micaceous, sandy SILT
- (F) **ALLUVIAL:** Dark gray, red-orange, mottled red and brown, very soft to soft, medium plasticity, micaceous, silty CLAY with fine roots and trace sand
- (G) **ROADWAY EMBANKMENT:** Red, stiff, non-plastic, micaceous, slightly clayey to clayey SILT with trace sand and gravel
- (H) **RESIDUAL:** Brown-red, yellow-red, yellow-brown, medium stiff to hard, non-plastic, micaceous, saprolitic SILT with sand and trace fine roots
- (I) **RESIDUAL:** Brown, medium stiff, low plasticity, faintly saprolitic, micaceous, clayey SILT with little gravel
- (J) **RESIDUAL:** Brown, very stiff, non-plastic, micaceous, gravelly SILT
- (K) **WEATHERED ROCK:** BIOTITE GNEISS
- (L) **CRYSTALLINE ROCK:** Gray, black, fresh to very slightly weathered with seam moderately severely weathered, hard, close to wide fracture spacing BIOTITE GNEISS with pods and veins, medium coarsely crystalline feldspar and quartz, traces pyrite



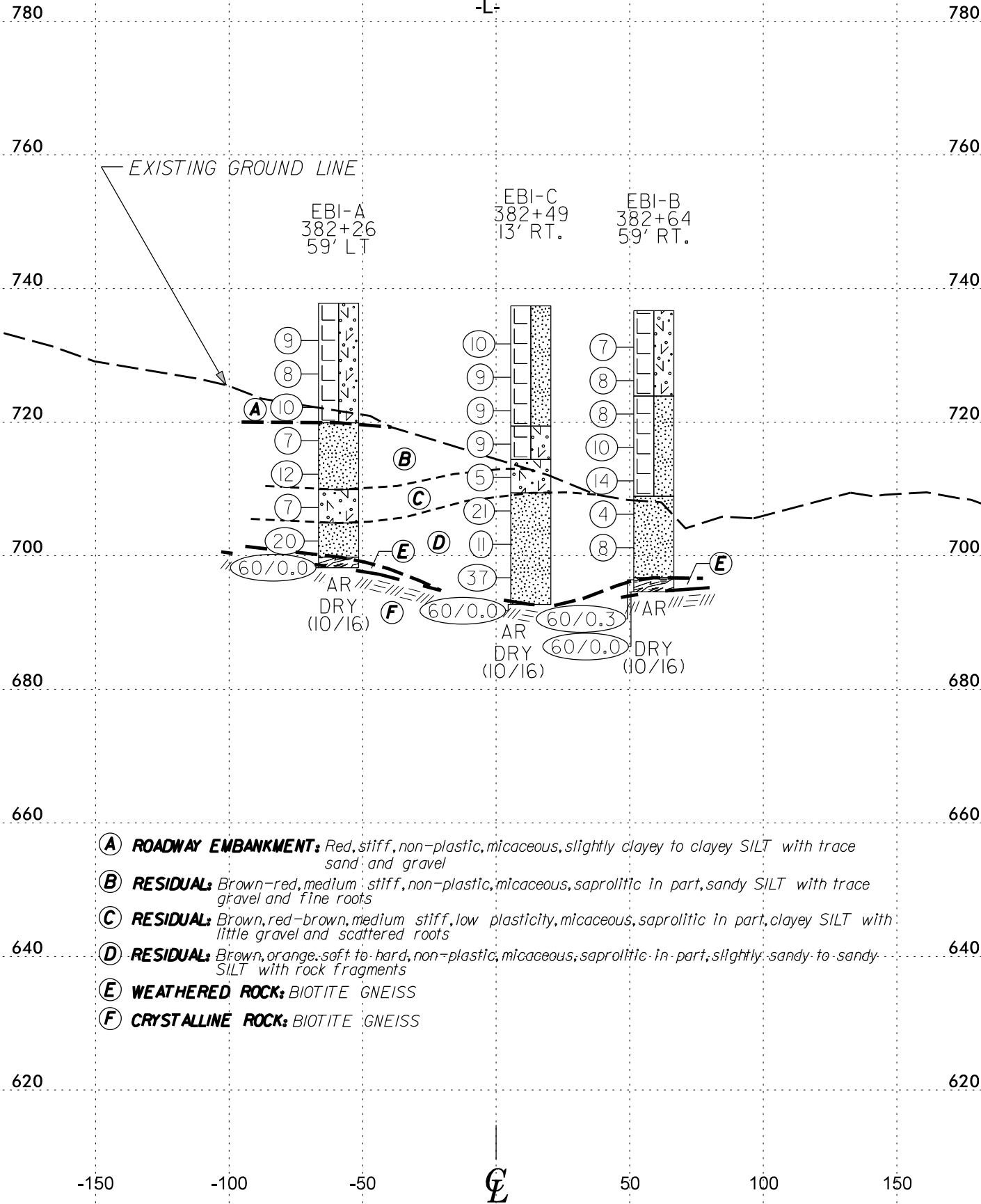
PROJECT REFERENCE NO.	SHEET NO.
R-2707C	5
BRIDGE NO. 467 PROFILE 59' RT. OF -L-	

GROUNDLINE PROFILE CREATED FROM r2707c\_ls\_tin.tin FILE RECEIVED FROM NCDOT DATED 11-16-2016  
 INFERRED STRATIGRAPHY IS DRAWN AT THE PROFILE OFFSET WITH THE BORINGS PROJECTED ONTO THE PROFILE  
 TIN FILE PROVIDED DOES NOT DISPLAY THE CURRENT EMBANKMENT AT END BENT 1



- (A) **ALLUVIAL:** Red-brown, very loose, slightly silty, fine SAND
- (B) **ALLUVIAL:** Mottled red-brown, red, brown, soft, low plasticity, micaceous in part SILT with some roots and traces clay, fine sand
- (C) **ALLUVIAL:** Brown, soft, non-plastic, micaceous, slightly clayey in part, sandy SILT
- (D) **RESIDUAL:** Brown, orange, yellow-red, yellow-brown, soft to hard, non-plastic, slightly micaceous to micaceous, sandy SILT with traces rock fragments and clay
- (E) **WEATHERED ROCK:** BIOTITE GNEISS
- (F) **WEATHERED ROCK:** HORNBLLENDE GNEISS
- (G) **CRYSTALLINE ROCK:** Gray, black, white, brown-orange stain, fresh to slightly weathered with intervals moderately severe to severely weathered, hard with intervals very hard, close to wide fracture spacing BIOTITE GNEISS with intervals and pods coarsely crystalline feldspar and quartz, traces hornblende and pyrite
- (H) **CRYSTALLINE ROCK:** Light to dark gray, white, black, brown-orange stain, slightly to moderately weathered with seams moderately severely weathered, moderately hard to hard, very close to close fracture spacing HORNBLLENDE GNEISS with quartz and feldspar pods, traces pyrite

CROSS SECTION CREATED FROM r2707c\_ls\_tin.tin FILE DATED 11-16-2016  
 TIN FILE PROVIDED DOES NOT DISPLAY THE CURRENT EMBANKMENT  
 108° SKEW  
 -L-



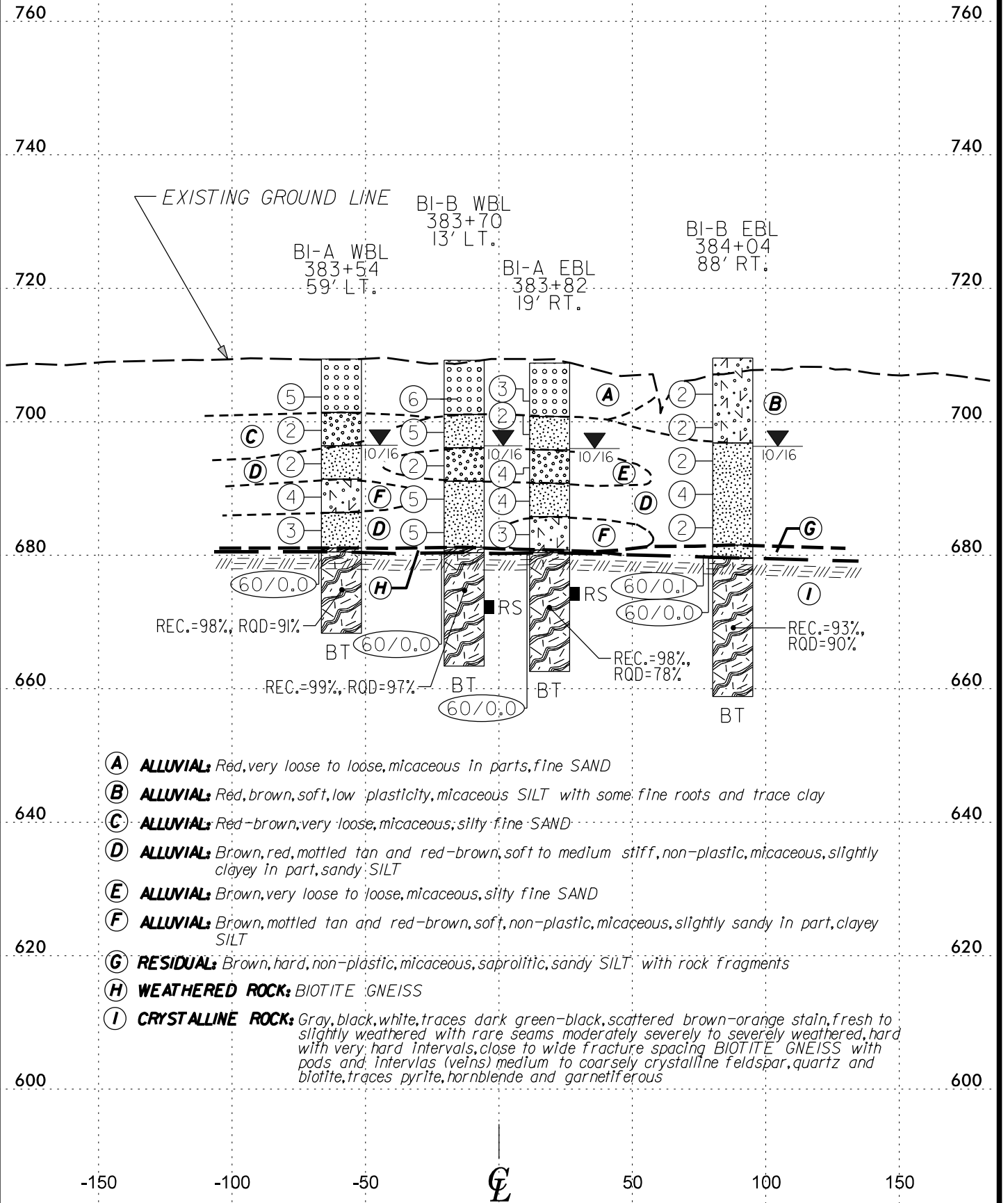
- (A) **ROADWAY EMBANKMENT:** Red, stiff, non-plastic, micaceous, slightly clayey to clayey SILT with trace sand and gravel
- (B) **RESIDUAL:** Brown-red, medium stiff, non-plastic, micaceous, saprolitic in part, sandy SILT with trace gravel and fine roots
- (C) **RESIDUAL:** Brown, red-brown, medium stiff, low plasticity, micaceous, saprolitic in part, clayey SILT with little gravel and scattered roots
- (D) **RESIDUAL:** Brown, orange, soft to hard, non-plastic, micaceous, saprolitic in part, slightly sandy to sandy SILT with rock fragments
- (E) **WEATHERED ROCK:** BIOTITE GNEISS
- (F) **CRYSTALLINE ROCK:** BIOTITE GNEISS

HORIZ. SCALE 0 50 100 (FEET)

VE = 2.5:1

**END BENT 1 - CROSS SECTION  
 STA. 382+45**

CROSS SECTION CREATED FROM r2707c\_ls\_tin.tin FILE DATED 11-16-2016  
 110° SKEW  
 -L-



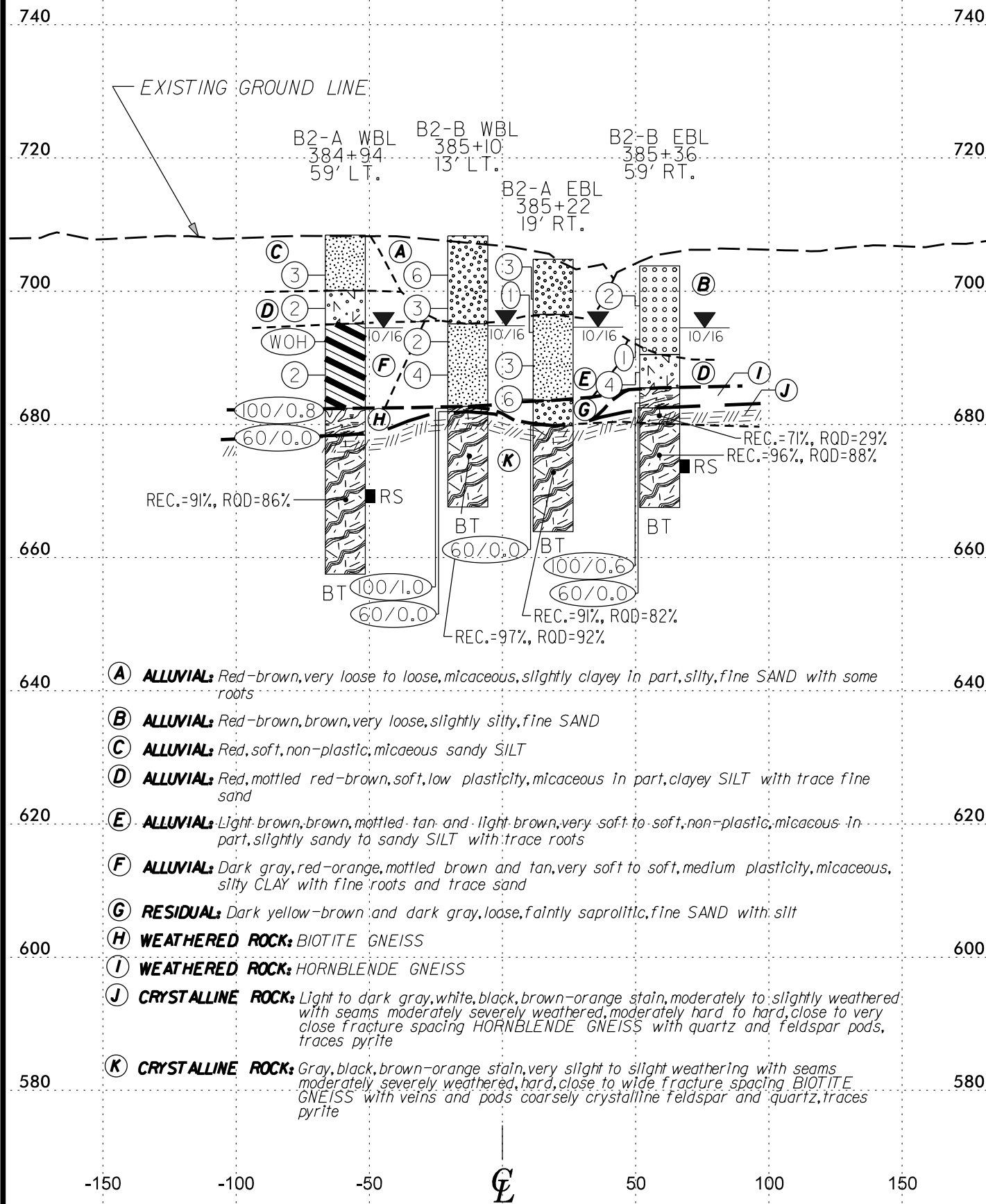
- (A) **ALLUVIAL:** Red, very loose to loose, micaceous in parts, fine SAND
- (B) **ALLUVIAL:** Red, brown, soft, low plasticity, micaceous SILT with some fine roots and trace clay
- (C) **ALLUVIAL:** Red-brown, very loose, micaceous, silty fine SAND
- (D) **ALLUVIAL:** Brown, red, mottled tan and red-brown, soft to medium stiff, non-plastic, micaceous, slightly clayey in part, sandy SILT
- (E) **ALLUVIAL:** Brown, very loose to loose, micaceous, silty fine SAND
- (F) **ALLUVIAL:** Brown, mottled tan and red-brown, soft, non-plastic, micaceous, slightly sandy in part, clayey SILT
- (G) **RESIDUAL:** Brown, hard, non-plastic, micaceous, saprolitic, sandy SILT with rock fragments
- (H) **WEATHERED ROCK:** BIOTITE GNEISS
- (I) **CRYSTALLINE ROCK:** Gray, black, white, traces dark green-black, scattered brown-orange stain, fresh to slightly weathered with rare seams moderately severely to severely weathered, hard with very hard intervals, close to wide fracture spacing BIOTITE GNEISS with pods and intervals (veins) medium to coarsely crystalline feldspar, quartz and biotite, traces pyrite, hornblende and garnetiferous

HORIZ. SCALE 0 50 100 (FEET)

VE = 2.5:1

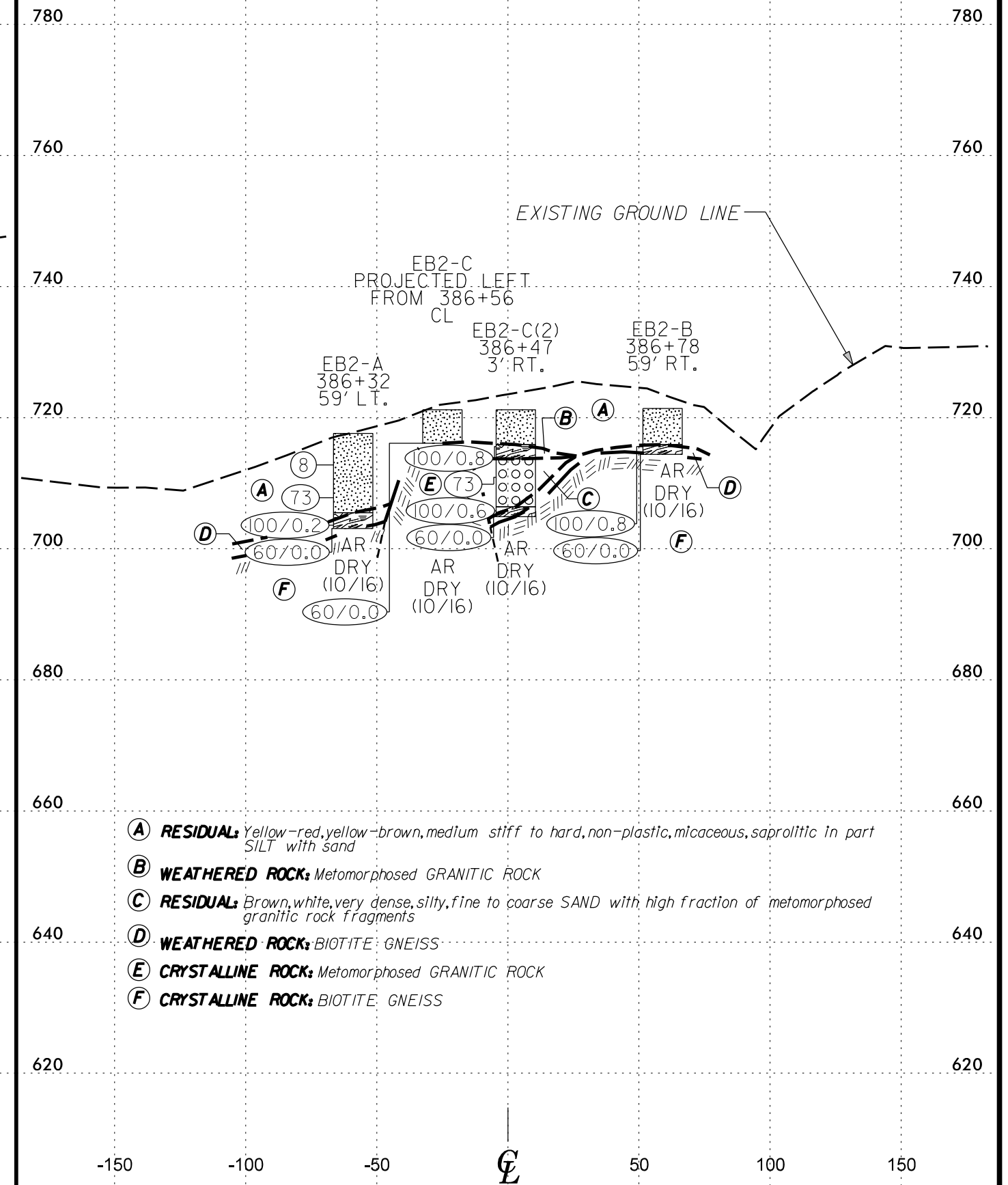
**BENT 1 - CROSS SECTION  
 STA. 383+75**

CROSS SECTION CREATED FROM r2707c\_ls\_fin.tin FILE DATED 11-16-2016  
110° SKEW  
-L-



HORIZ. SCALE 0 50 100 (FEET) VE = 2.5:1 **BENT 2 - CROSS SECTION STA. 385+15**

CROSS SECTION CREATED FROM r2707c\_ls\_fin.tin FILE DATED 11-16-2016  
111° SKEW  
-L-



HORIZ. SCALE 0 20 40 (FEET) VE = 2.5:1 **END BENT 2 - CROSS SECTION STA. 386+55**



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.										
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 382+26		OFFSET 59 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 737.8 ft		TOTAL DEPTH 39.6 ft		NORTHING 581,211		EASTING 1,236,175										
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Morgan, M.		START DATE 10/16/16		COMP. DATE 10/16/16		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						
740														737.8	0.0	GROUND SURFACE
																<b>ROADWAY EMBANKMENT</b> Red, stiff, non-plastic, micaceous, slightly clayey to clayey <b>SILT</b> with trace sand and gravel (A-5).
735	733.2	4.6	3	4	5								M			
730	728.2	9.6	2	4	4								M			
725	723.2	14.6	3	5	5								M			
720	718.2	19.6	1	3	4								M			
715	713.2	24.6	3	7	5								M			
710	708.2	29.6	3	4	3								M			
705	703.2	34.6	13	10	10								M			
700	698.2	39.6											M			
														699.8	38.0	<b>RESIDUAL</b> Brown-red, medium stiff, non-plastic, micaceous, saprolitic in part, sandy <b>SILT</b> with gravel and trace fine roots (A-4).
														709.9	27.9	Brown, medium stiff, low plasticity, faintly saprolitic, micaceous, clayey <b>SILT</b> with little gravel (A-5).
														704.9	32.9	Brown, very stiff, non-plastic, micaceous, <b>SILT</b> with rock fragments (A-4).
														698.2	39.6	<b>WEATHERED ROCK</b> Biotite Gneiss (inferred by drill penetration rate)
																Boring Terminated with Standard Penetration Test Refusal at Elevation 698.2 ft on Crystalline Rock (Biotite Gneiss).

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.										
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)									
BORING NO. EB1-C		STATION 382+49		OFFSET 13 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 737.4 ft		TOTAL DEPTH 44.7 ft		NORTHING 581,148		EASTING 1,236,217										
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Morgan, M.		START DATE 10/16/16		COMP. DATE 10/16/16		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						
740														737.4	0.0	GROUND SURFACE
																<b>ROADWAY EMBANKMENT</b> Red, orange, stiff, non-plastic, micaceous, sandy <b>SILT</b> with trace gravel in part (A-4).
735	732.7	4.7	3	4	6								M			
730	727.7	9.7	2	4	5								M			
725	722.7	14.7	2	5	4								M			
720	717.7	19.7	2	4	5								M			
715	712.7	24.7	2	2	3								M			
710	707.7	29.7	5	6	15								M			
705	702.7	34.7	3	5	6								M			
700	697.7	39.7	16	17	20								M			
695	692.7	44.7											W			
														719.4	18.0	Red, stiff, low plasticity, micaceous, slightly sandy, clayey <b>SILT</b> (A-5).
														714.4	23.0	<b>RESIDUAL</b> Red-brown, brown, medium stiff, slightly micaceous, clayey <b>SILT</b> with scattered roots (A-5).
														709.4	28.0	Brown, stiff to hard, non-plastic, saprolitic, micaceous, slightly sandy to sandy <b>SILT</b> with rock fragments (A-4).
																Boring Terminated with Standard Penetration Test Refusal at Elevation 692.7 ft on Crystalline Rock (Biotite Gneiss).
																Boring caved at depth higher than static water level - water in samples starting at 39.7'. Boring was offset due to a ditch and new location was obtained using a handheld GPS unit.

NCDOT BORE DOUBLE R2707C\_GEO\_BRDG\_FIRST BROAD RIVER.GPJ\_NC\_DOT\_GDT 11/30/16

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.									
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 382+64		OFFSET 59 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 736.7 ft		TOTAL DEPTH 42.1 ft		NORTHING 581,108		EASTING 1,236,244									
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Morgan, M.		START DATE 10/16/16		COMP. DATE 10/16/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
740															
															736.7
735															
	732.2	4.5													
			3	4	3										
730															
	727.2	9.5													
			2	3	5										
725															
	722.2	14.5													
			4	4	4										
720															
	717.2	19.5													
			3	4	6										
715															
	712.2	24.5													
			2	5	9										
710															
	707.2	29.5													
			1	2	2										
705															
	702.2	34.5													
			3	4	4										
700															
	697.2	39.5													
			10	90/0.3											
695															
	694.6	42.1													
															60/0.0
															60/0.0

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.									
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)								
BORING NO. B1-A WBL		STATION 383+54		OFFSET 59 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 709.4 ft		TOTAL DEPTH 41.1 ft		NORTHING 581,246		EASTING 1,236,300									
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Morgan, M.		START DATE 10/25/16		COMP. DATE 10/25/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
710															
															709.4
705															
	704.7	4.7													
			2	3	2										
700															
	699.7	9.7													
			2	1	1										
695															
	694.7	14.7													
			1	1	1										
690															
	689.7	19.7													
			WOH	2	2										
685															
	684.7	24.7													
			1	1	2										
680															
	680.5	28.9													
			60/0.0												60/0.0
675															
670															

NCDOT BORE DOUBLE R2707C\_GEO\_BRDG\_FIRST BROAD RIVER.GPJ\_NC\_DOT.GDT 11/30/16

# GEOTECHNICAL BORING REPORT

## CORE LOG

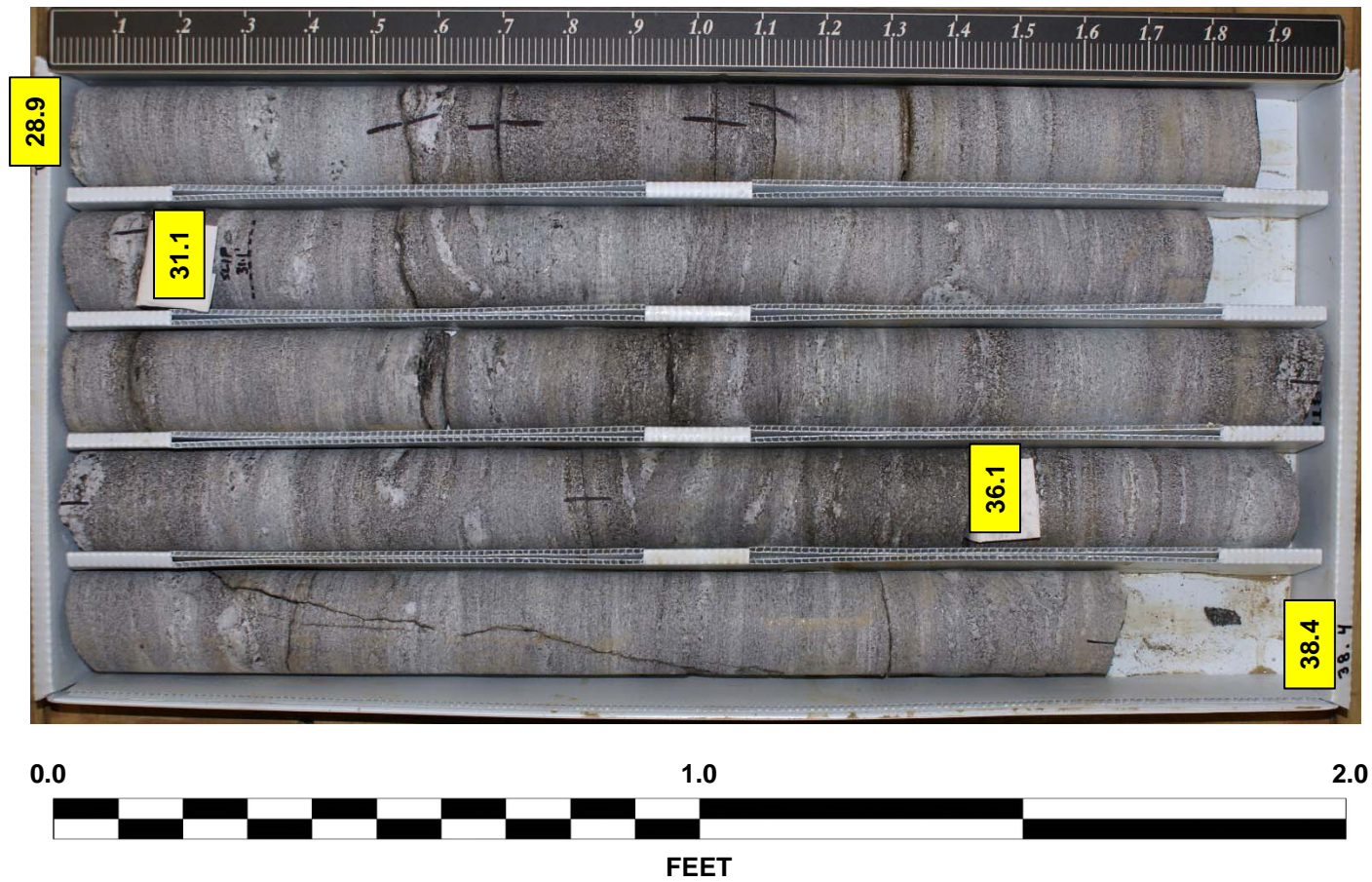
WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.					
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)				
BORING NO. B1-A WBL		STATION 383+54		OFFSET 59 ft LT		ALIGNMENT -L-					
COLLAR ELEV. 709.4 ft		TOTAL DEPTH 41.1 ft		NORTHING 581,246		EASTING 1,236,300					
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic					
DRILLER Morgan, M.		START DATE 10/25/16		COMP. DATE 10/25/16		SURFACE WATER DEPTH N/A					
CORE SIZE NQ2		TOTAL RUN 12.2 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %			
680.5	680.5	28.9	2.2	1:35/0.2	(2.2)	(2.0)	(12.0)	(11.1)		Begin Coring @ 28.9 ft <b>CRYSTALLINE ROCK</b> Gray, black, fresh to very slightly weathered, hard, close to moderately close fracture spacing. <b>BIOTITE GNEISS</b> with small pods and veins medium to coarse crystalline feldspar and quartz. 12 0°-15° joints, some with faint iron oxide stain; 1 80° joint at 36.9'-37.8', with some calcite infill, no stain, partially healed to healed GSI=75	28.9
675	678.3	31.1	5.0	1:44 1:49	100%	91%	98%	91%			680.5
670	673.3	36.1	5.0	1:53 2:09 2:07	(5.0)	(4.7)					668.3
670	668.3	41.1	5.0	1:59 1:45	(4.8)	(4.4)					668.3
				1:54 1:28 1:39 1:29 1:35	96%	88%				Boring Terminated at Elevation 668.3 ft in Crystalline Rock (Biotite Gneiss).	41.1

NCDOT CORE DOUBLE R2707C\_GEO\_BRDG\_FIRST BROAD RIVER.GPJ NC\_DOT.GDT 11/30/16

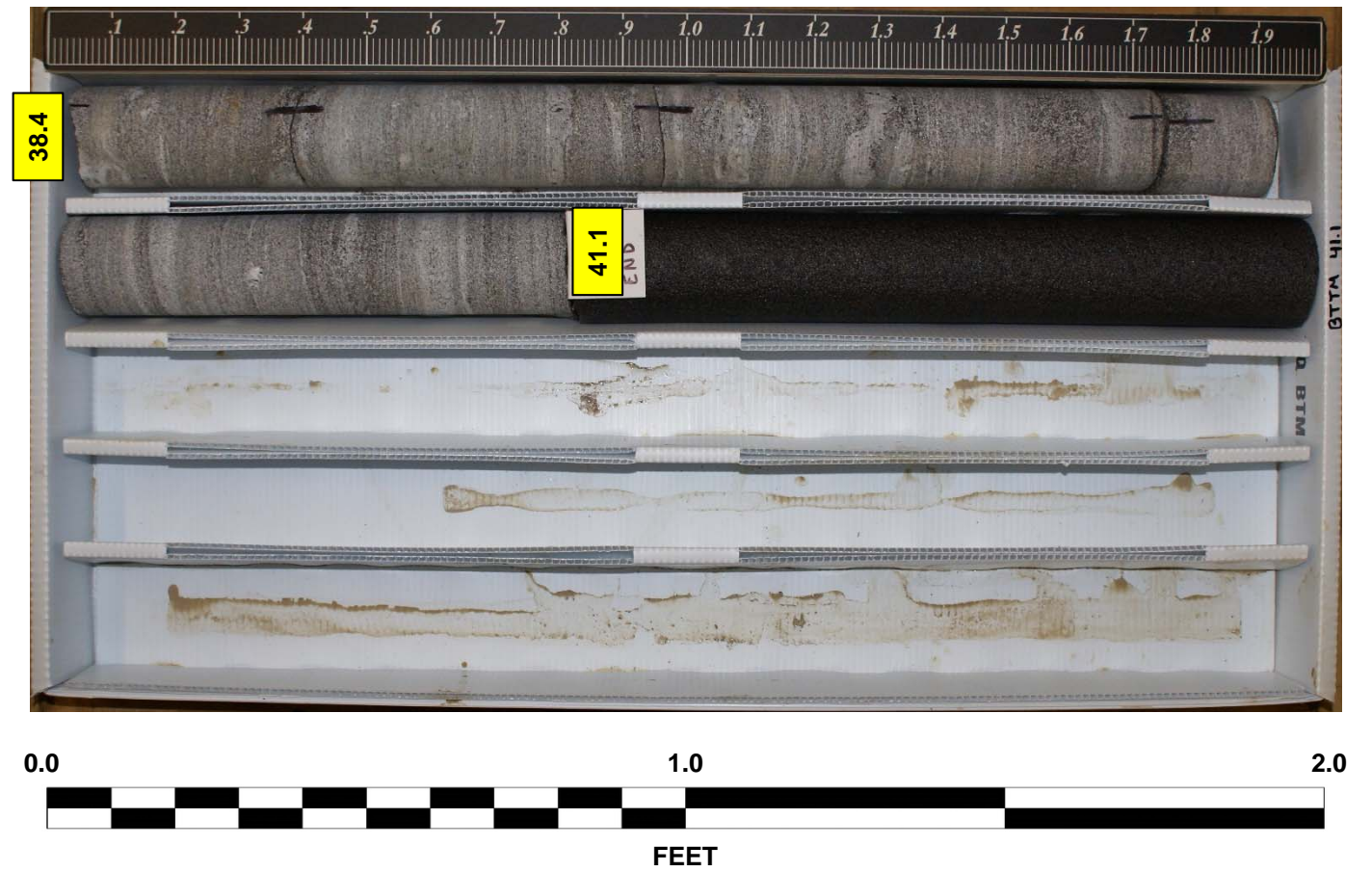
# CORE PHOTOGRAPHIC RECORD

Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827

**B1-A WBL**  
**STA. 383+54 @ 59' LT.**  
**Box 1 of 2: 28.9 – 38.4 FEET**



**B1-A WBL**  
**STA. 383+54 @ 59' LT.**  
**Box 2 of 2: 38.4 – 41.1 FEET**





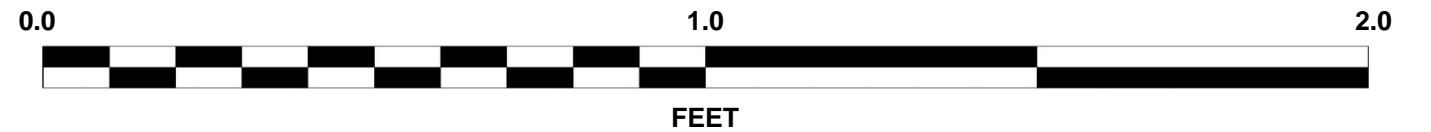
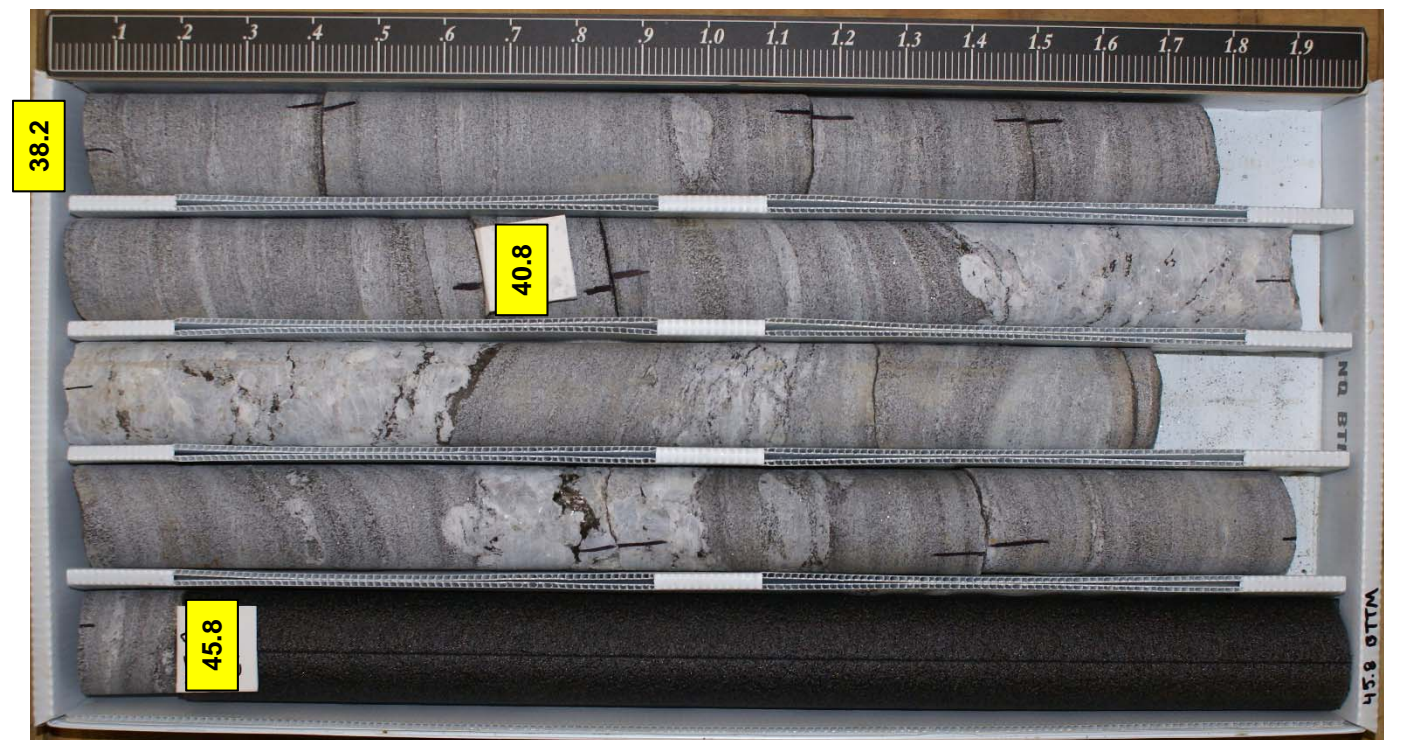
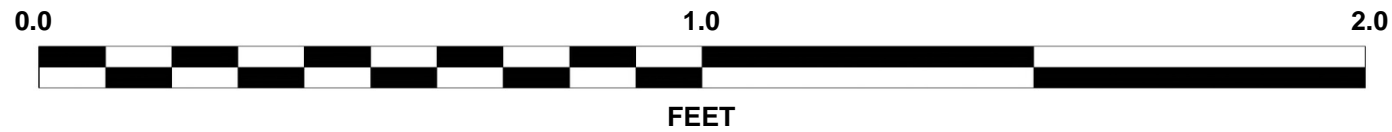


# CORE PHOTOGRAPHIC RECORD

Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827

**B1-B WBL**  
**STA. 383+70 @ 13' LT.**  
**Box 1 of 2: 28.8 – 38.2 FEET**

**B1-B WBL**  
**STA. 383+70 @ 13' LT.**  
**Box 2 of 2: 38.2 – 45.8 FEET**





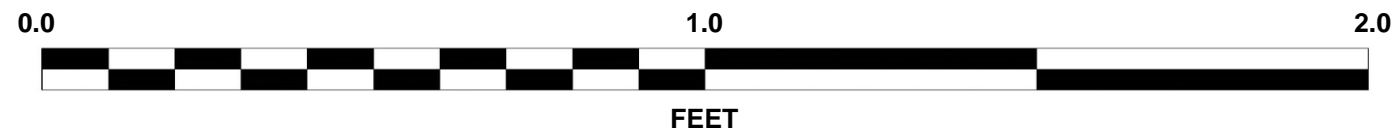




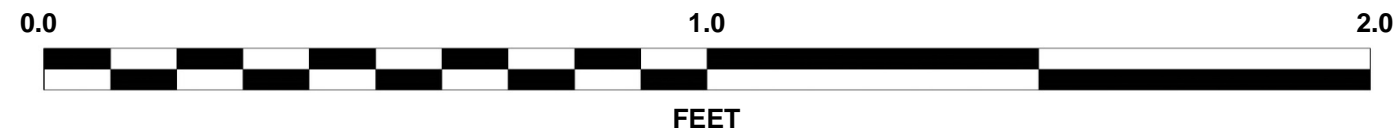
# CORE PHOTOGRAPHIC RECORD

Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827

**B1-A EBL**  
**STA. 383+82 @ 19' RT.**  
**Box 1 of 2: 28.4 – 38.5 FEET**



**B1-A EBL**  
**STA. 383+82 @ 19' RT.**  
**Box 2 of 2: 38.5 – 46.2 FEET**



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.										
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)									
BORING NO. B1-B EBL		STATION 384+04		OFFSET 88 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 709.5 ft		TOTAL DEPTH 50.7 ft		NORTHING 581,117		EASTING 1,236,386										
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Morgan, M.		START DATE 10/17/16		COMP. DATE 10/18/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
710														709.5	0.0	GROUND SURFACE
705	705.1	4.4	2	1	1	2						M				ALLUVIAL Red, brown, soft, low plasticity, micaceous, SILT with some fine roots and trace clay (A-5).
700	700.1	9.4										M				
695	695.1	14.4	WOH	1	1							W	696.8	12.7		Brown, soft, non-plastic, micaceous, slightly clayey in part, sandy SILT (A-4).
690	690.1	19.4		1	2	2						W				
685	685.1	24.4		1	1	1						Sat.				
680	680.1 679.5	29.4 30.0		29	60/0.1								681.5	28.0		RESIDUAL Brown, hard, non-plastic, saprolitic, micaceous, sandy SILT with rock fragments (A-4). <b>CRYSTALLINE ROCK</b> Biotite Gneiss Biotite Gneiss
675													679.6 679.5	29.9 30.0		
670																
665																
660																
														658.8	50.7	Boring Terminated at Elevation 658.8 ft in Crystalline Rock (Biotite Gneiss).  Boring was offset due to a large drainage ditch and new location was obtained using a handheld GPS unit.

NCDOT BORE DOUBLE R2707C\_GEO\_BRDG\_FIRST BROAD RIVER.GPJ NC\_DOT.GDT 11/30/16

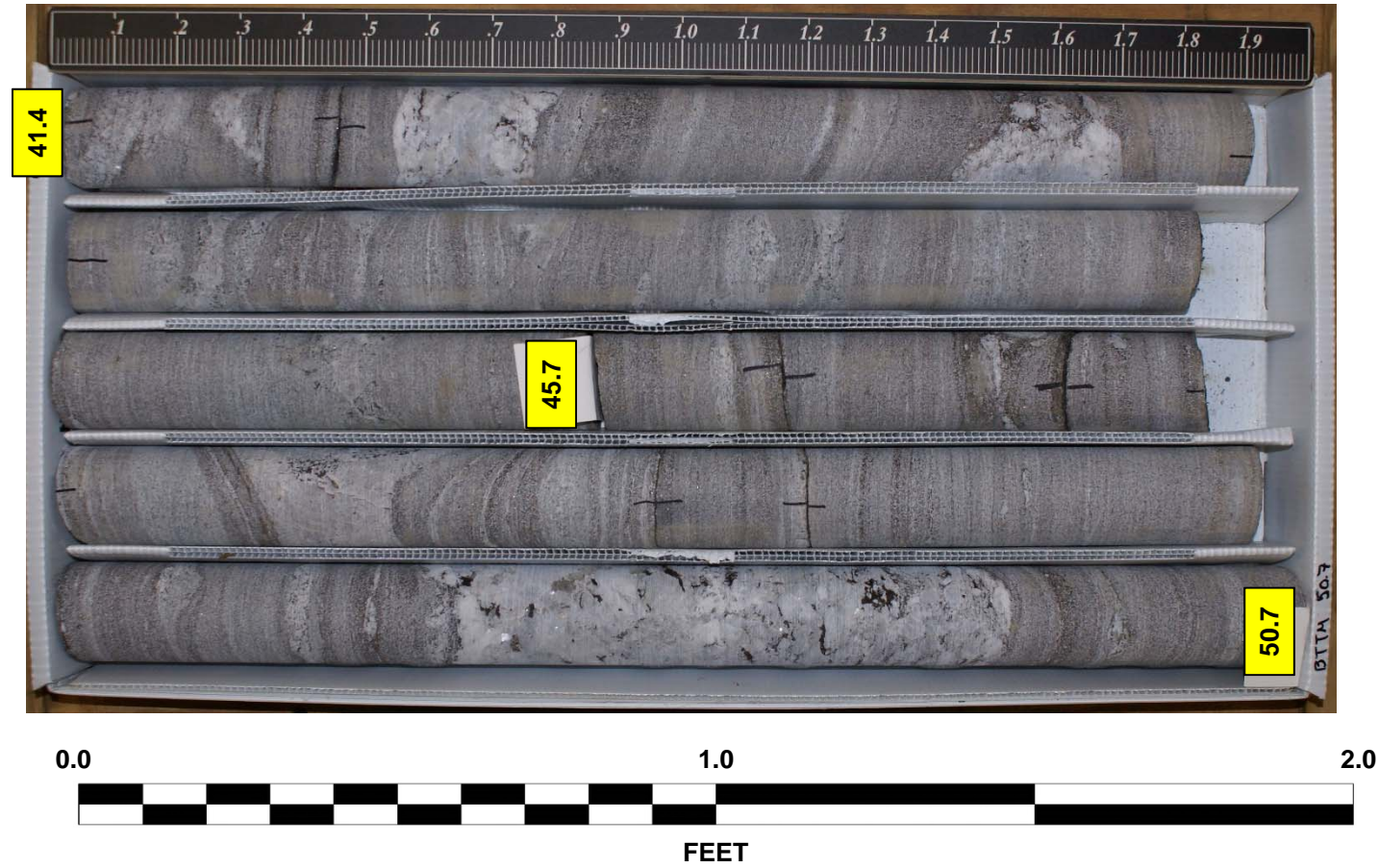
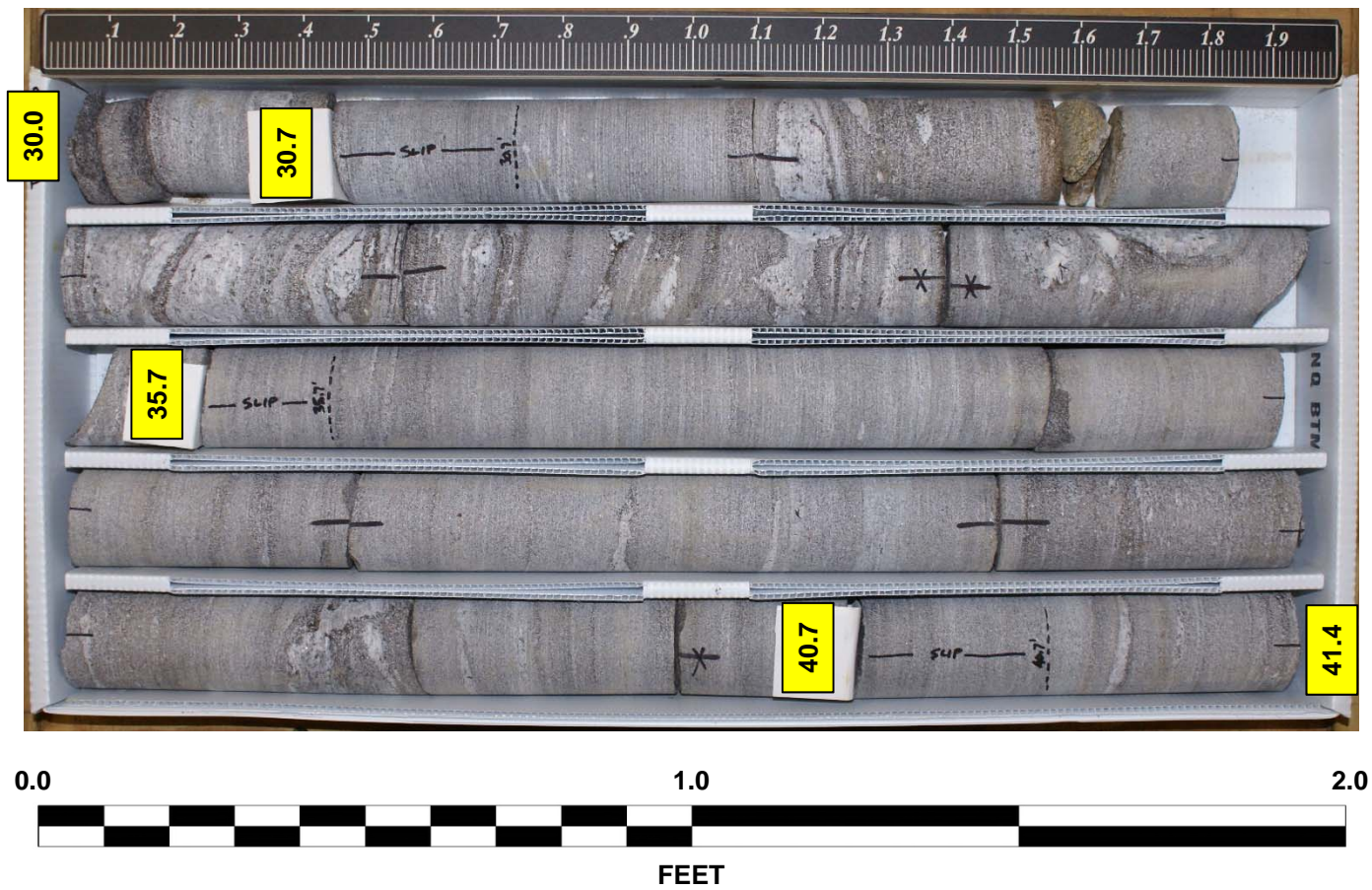


# CORE PHOTOGRAPHIC RECORD

Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827

**B1-B EBL**  
**STA. 384+04 @ 88' RT.**  
**Box 1 of 2: 30.0 – 41.4 FEET**

**B1-B EBL**  
**STA. 384+04 @ 88' RT.**  
**Box 2 of 2: 41.4 – 50.7 FEET**





# GEOTECHNICAL BORING REPORT

## CORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.							
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)						
BORING NO. B2-A WBL		STATION 384+94		OFFSET 59 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 708.4 ft		TOTAL DEPTH 50.9 ft		NORTHING 581,281		EASTING 1,236,436							
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic							
DRILLER Morgan, M.		START DATE 10/29/16		COMP. DATE 10/29/16		SURFACE WATER DEPTH N/A							
CORE SIZE NQ2		TOTAL RUN 20.9 ft											
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)		
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %					
678.4	678.4	30.0	0.9	0:53/0.9	(0.2)	(0.0)	(19.1)	(17.9)		<p style="text-align: center;">Begin Coring @ 30.0 ft</p> <p style="text-align: center;"><b>CRYSTALLINE ROCK</b></p> <p>Gray, black, very slight weathering with seam moderately severely weathered at 30.0'-31.6', hard, close to wide fracture spacing, <b>BIOTITE GNEISS</b> with coarsely crystalline quartz and feldspar veins, traces pyrite.</p> <p>18 0°-10° joints, some with heavy iron oxide stain; 1 25° joint with muscovite &lt;1mm; 1 45° joint healed; 2 90° joints healed</p> <p>UCS=14,262 PSI, GSI=69</p>	30.0		
675	677.5	30.9	5.0	0:56 1:05 1:31 1:50 2:05	(0.2) (4.1) 82%	(0.0) (4.0) 80%	91%	86%					
670	672.5	35.9	5.0	1:55 2:08 2:02	(5.0) 100%	(4.6) 92%							
665	667.5	40.9	5.0	1:57 2:24									
660	662.5	45.9	5.0	1:50 1:45 1:48 1:40 1:36	(5.0) 100%	(4.5) 90%							
	660												
	657.5	50.9	5.0	1:38 1:47 1:38 1:46 2:00	(4.8) 96%	(4.8) 96%							
	657.5	50.9										50.9	

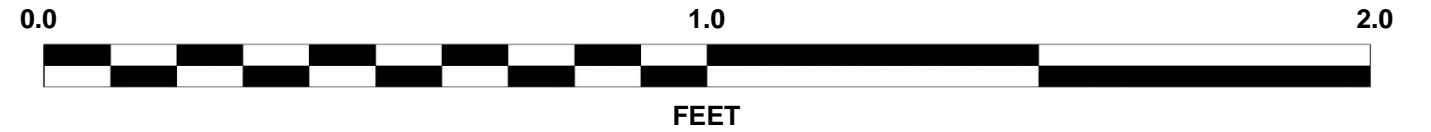
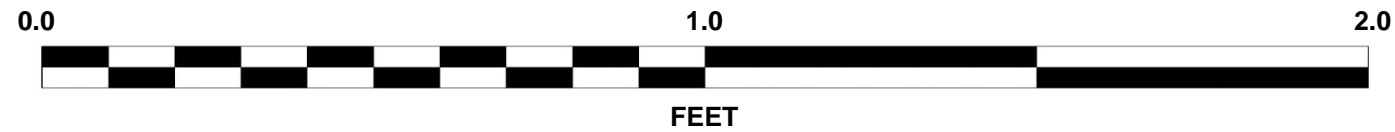
NCDOT CORE DOUBLE R2707C\_GEO\_BRDG\_FIRST BROAD RIVER.GPJ NC\_DOT.GDT 11/30/16

# CORE PHOTOGRAPHIC RECORD

Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827

**B2-A WBL**  
**STA. 384+94 @ 59' LT.**  
**Box 1 of 2: 30.0 – 40.9 FEET**

**B2-A WBL**  
**STA. 384+94 @ 59' LT.**  
**Box 2 of 2: 40.9 – 50.9 FEET**







# GEOTECHNICAL BORING REPORT

## CORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.					
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)				
BORING NO. B2-B WBL		STATION 385+10		OFFSET 13 ft LT		ALIGNMENT -L-					
COLLAR ELEV. 708.3 ft		TOTAL DEPTH 40.7 ft		NORTHING 581,240		EASTING 1,236,463					
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic					
DRILLER Morgan, M.		START DATE 10/29/16		COMP. DATE 10/29/16		SURFACE WATER DEPTH N/A					
CORE SIZE NQ2		TOTAL RUN 14.3 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %			
681.9	681.9	26.4	4.3	1:37/0.3	(4.2)	(3.9)	(13.8)	(13.2)		Begin Coring @ 26.4 ft <b>CRYSTALLINE ROCK</b> Gray, black, scattered brown-orange stain, very slight to slight weathering with seam moderately severely weathered 32.7'-32.9', hard, close to wide fracture spacing. <b>BIOTITE GNEISS</b> with pods and veins coarsely crystalline feldspar and quartz. 16 0°-15° joints, some with iron oxide stain GSI=76	26.4
680				1:30	98%	91%					
	677.6	30.7		1:28							
675			5.0	1:31	(4.6)	(4.3)					
	672.6	35.7		1:20	92%	86%					
670			5.0	1:04	(5.0)	(5.0)					
	667.6	40.7		1:53	100%	100%				40.7	
Boring Terminated at Elevation 667.6 ft in Crystalline Rock (Biotite Gneiss).											

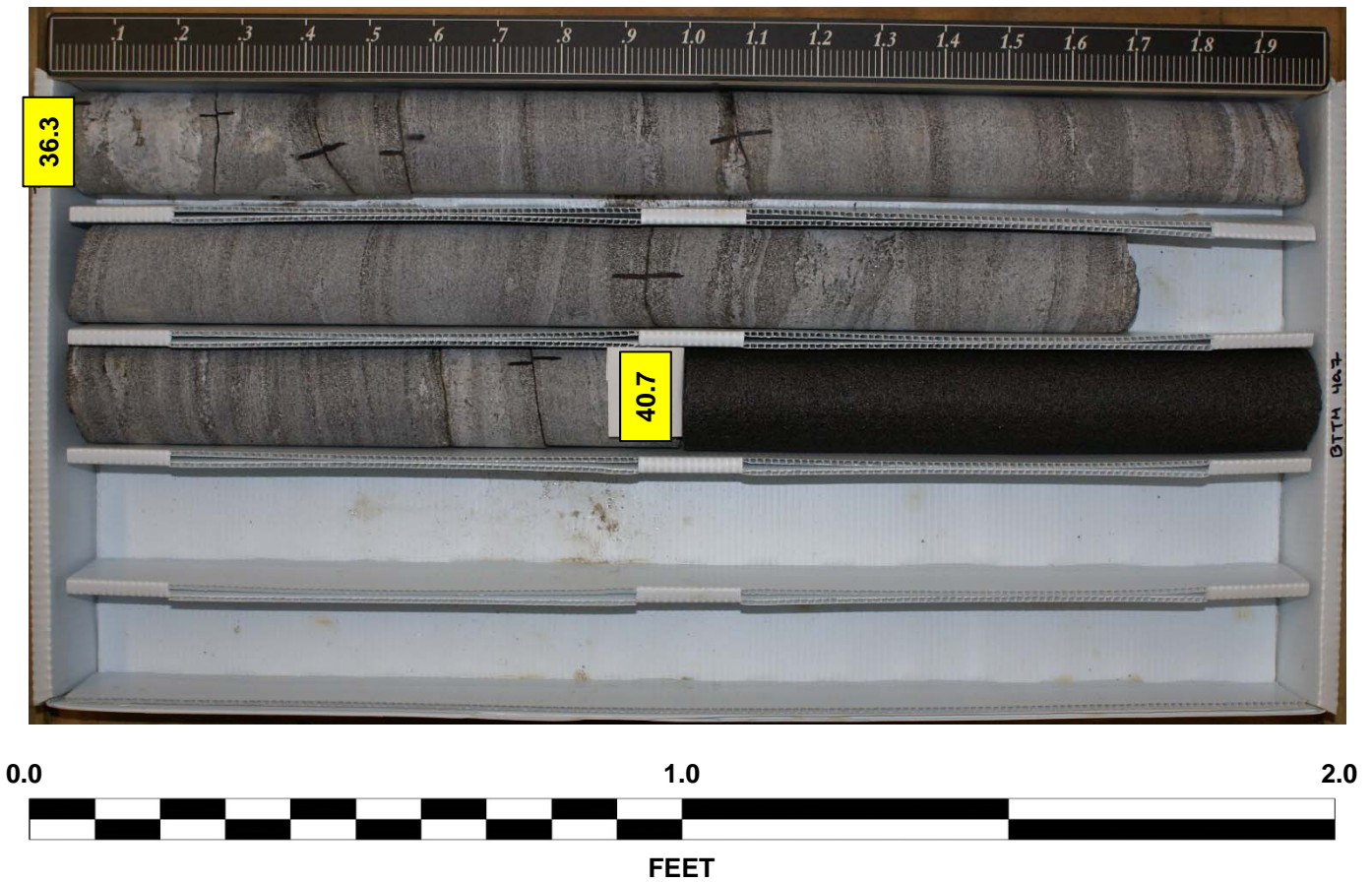
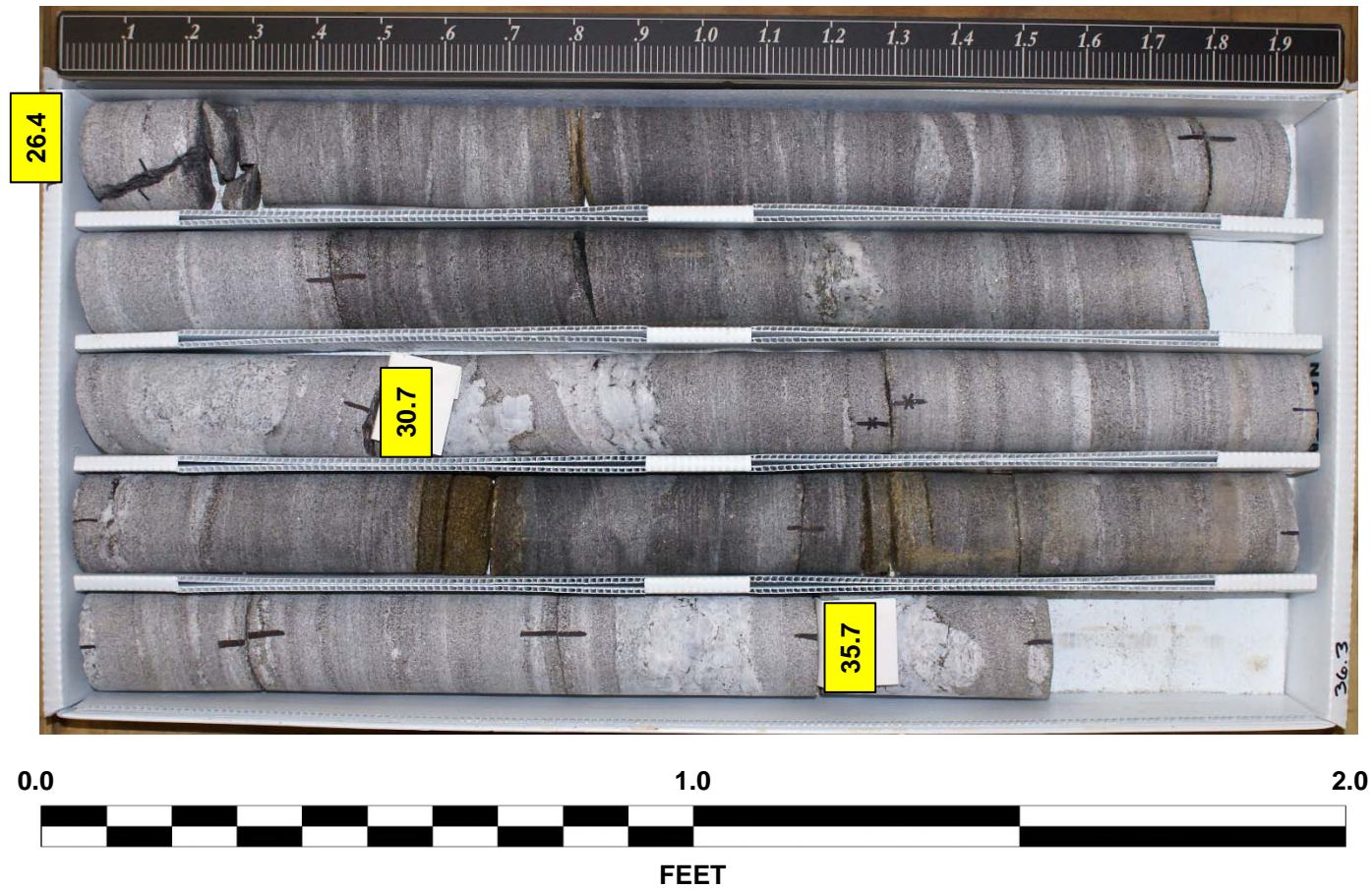
NCDOT CORE DOUBLE R2707C\_GEO\_BRDG\_FIRST BROAD RIVER.GPJ NC\_DOT.GDT 11/30/16

# CORE PHOTOGRAPHIC RECORD

Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827

**B2-B WBL**  
**STA. 385+10 @ 13' LT.**  
**Box 1 of 2: 26.4 – 36.3 FEET**

**B2-B WBL**  
**STA. 385+10 @ 13' LT.**  
**Box 2 of 2: 36.3 – 40.7 FEET**





# GEOTECHNICAL BORING REPORT

## CORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.						
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)					
BORING NO. B2-A EBL		STATION 385+22		OFFSET 19 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 704.8 ft		TOTAL DEPTH 40.9 ft		NORTHING 581,212		EASTING 1,236,482						
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic						
DRILLER Morgan, M.		START DATE 10/28/16		COMP. DATE 10/28/16		SURFACE WATER DEPTH N/A						
CORE SIZE NQ2		TOTAL RUN 15.9 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %				
679.8	679.8	25.0	0.9	1:23/0.9	(0.9)	(0.6)	(14.5)	(13.0)		<p style="text-align: center;">Begin Coring @ 25.0 ft</p> <p style="text-align: center;"><b>CRYSTALLINE ROCK</b></p> <p>Gray, black, brown-orange stain, very slight weathering with seams moderately severely weathered 26.6'-27.3', 28.9'-29.8' and 34.2'-34.3', hard, close to moderately close fracture spacing, <b>BIOTITE GNEISS</b> with veins and pods coarsely crystalline feldspar and quartz. 23 0°-15° joints, some with iron oxide stain, some with muscovite &lt;1mm GSI=65</p>	25.0	
678.9	678.9	25.9	5.0	1:26	100%	67%						
675	675			1:17 1:17 0:42 1:51	(3.8) 76%	(3.2) 64%						
670	670	30.9	5.0	2:07 2:03 2:05 1:47 1:55	(4.9) 98%	(4.3) 86%						
665	665	35.9	5.0	1:58 1:48 1:58 2:10 1:58	(4.9) 98%	(4.9) 98%						
663.9	663.9	40.9		1:58							663.9	40.9
Boring Terminated at Elevation 663.9 ft in Crystalline Rock (Biotite Gneiss).												

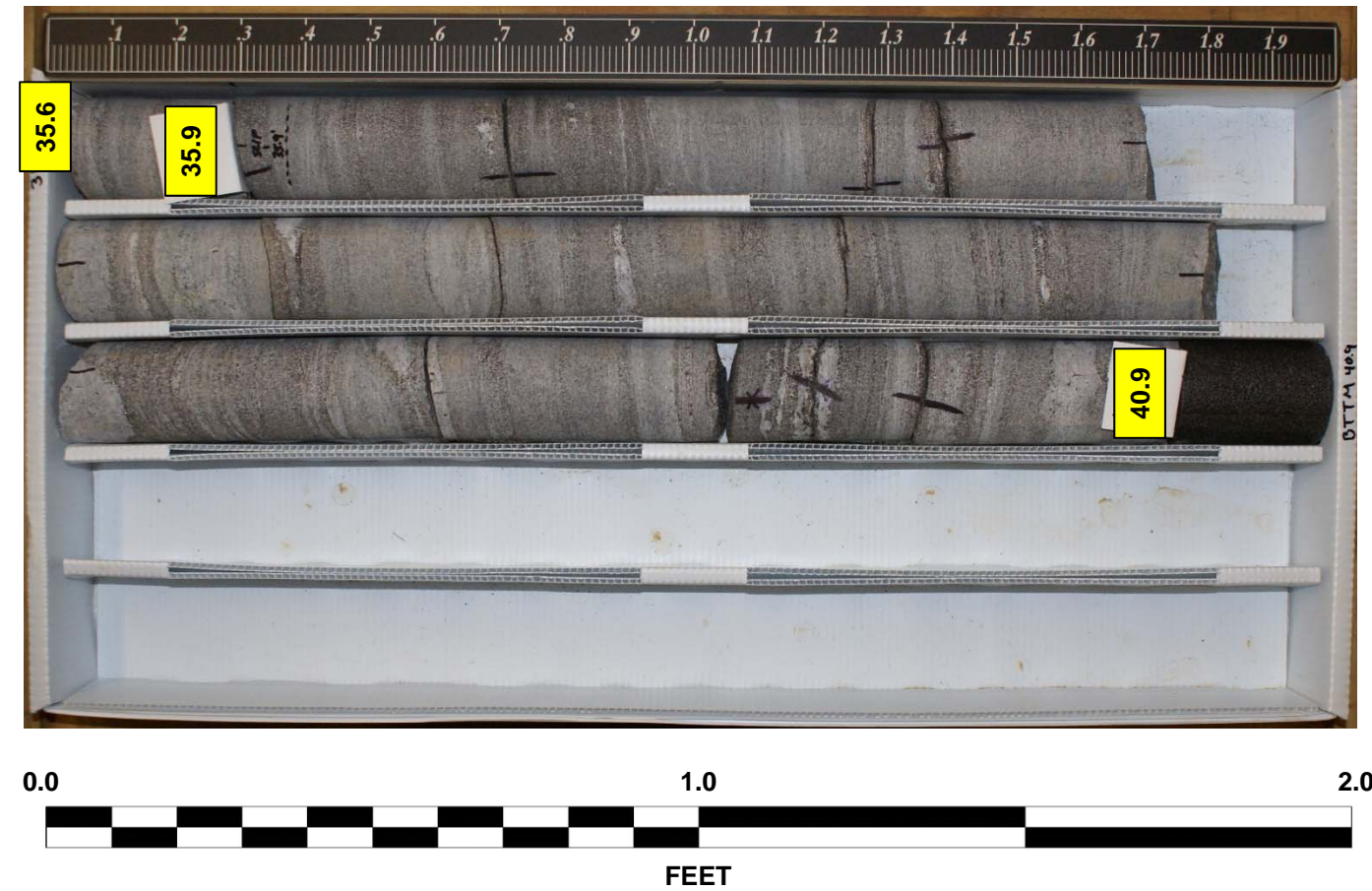
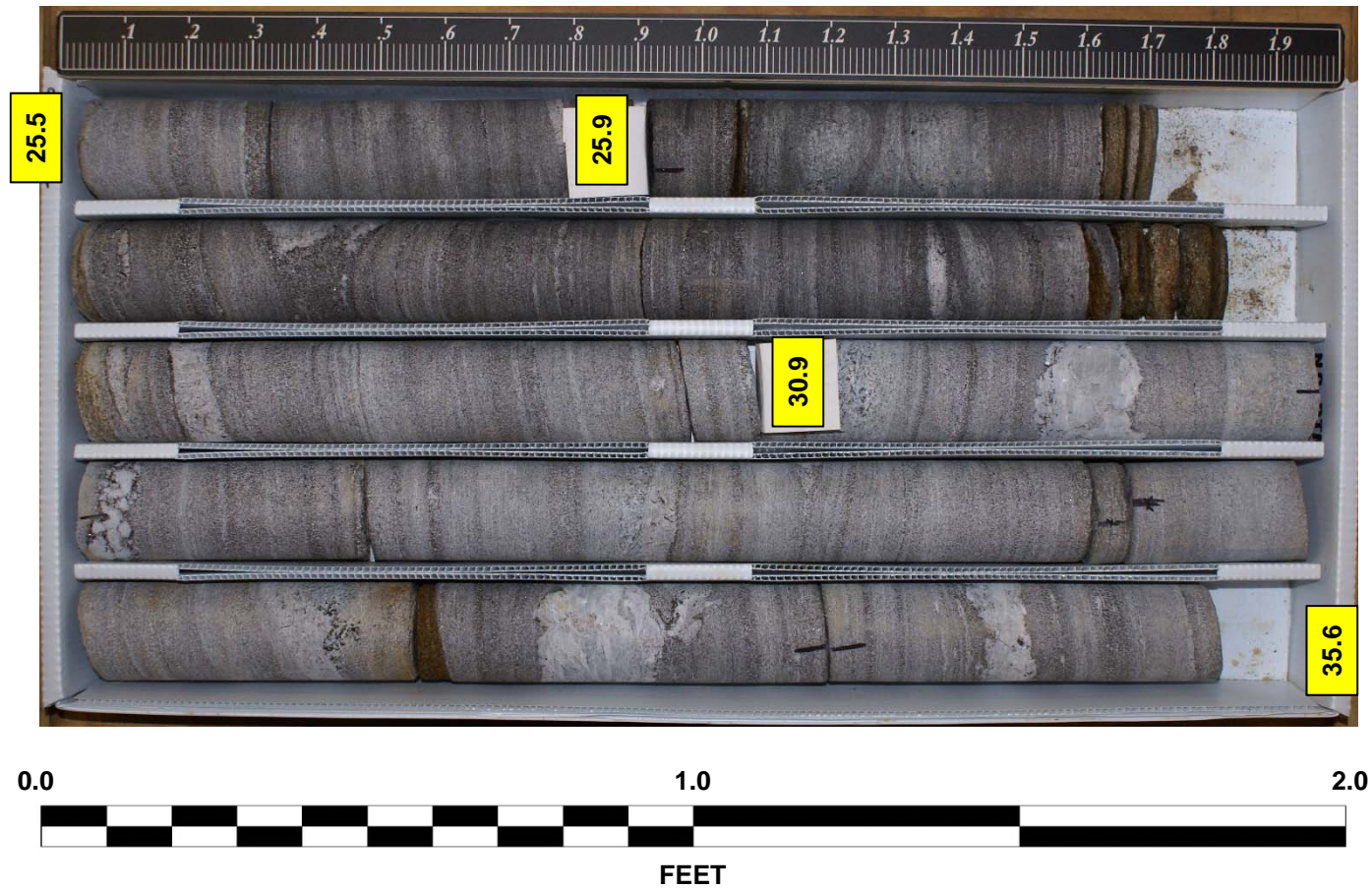
NCDOT CORE DOUBLE R2707C\_GEO\_BRDG\_FIRST BROAD RIVER.GPJ NC\_DOT.GDT 11/30/16

# CORE PHOTOGRAPHIC RECORD

Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827

**B2-A EBL**  
**STA. 385+22 @ 19' RT.**  
**Box 1 of 2: 25.0 – 35.6 FEET**

**B2-A EBL**  
**STA. 385+22 @ 19' RT.**  
**Box 2 of 2: 35.6 – 40.9 FEET**



# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 34497.1.2		<b>TIP</b> R-2707C		<b>COUNTY</b> CLEVELAND		<b>GEOLOGIST</b> Abernathy, S.									
<b>SITE DESCRIPTION</b> Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							<b>GROUND WTR (ft)</b>								
<b>BORING NO.</b> B2-B EBL		<b>STATION</b> 385+36		<b>OFFSET</b> 59 ft RT		<b>ALIGNMENT</b> -L-									
<b>COLLAR ELEV.</b> 703.8 ft		<b>TOTAL DEPTH</b> 36.3 ft		<b>NORTHING</b> 581,176		<b>EASTING</b> 1,236,505									
<b>DRILL RIG/HAMMER EFF./DATE</b> HDR0404 CME-45C 91.5% 11/10/2015				<b>DRILL METHOD</b> H.S. Augers		<b>HAMMER TYPE</b> Automatic									
<b>DRILLER</b> Morgan, M.		<b>START DATE</b> 10/28/16		<b>COMP. DATE</b> 10/28/16		<b>SURFACE WATER DEPTH</b> 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					
705														703.8	0.0
700	698.8	5.0	1	1	1							M	ALLUVIAL Red-brown, brown, very loose, slightly silty, fine SAND (A-3).		
695	693.8	10.0	1	1	WOH							W		690.5	13.3
690	688.8	15.0	2	1	3							W	Mottled red-brown, tan, soft, low plasticity, SILT with clay and trace fine sand (A-5).		
685	683.8	20.0	76	24/0.1									WEATHERED ROCK Hornblende Gneiss	685.5	18.3
680	682.5	21.3	60/0.0							100/0.6 60/0.0			Hornblende Gneiss	682.5	21.3
675													Biotite Gneiss	680.1	23.7
670											RS-C				
														667.5	36.3
Boring Terminated at Elevation 667.5 ft in Crystalline Rock (Biotite Gneiss).															

NCDOT BORE DOUBLE R2707C\_GEO\_BRDG\_FIRST BROAD RIVER.GPJ NC\_DOT.GDT 11/30/16

# GEOTECHNICAL BORING REPORT

## CORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.						
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)					
BORING NO. B2-B EBL		STATION 385+36		OFFSET 59 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 703.8 ft		TOTAL DEPTH 36.3 ft		NORTHING 581,176		EASTING 1,236,505						
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic						
DRILLER Morgan, M.		START DATE 10/28/16		COMP. DATE 10/28/16		SURFACE WATER DEPTH N/A						
CORE SIZE NQ2		TOTAL RUN 15.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %				RQD (ft) %
682.5	682.5	21.3	5.0	1:17	(4.3)	(3.0)	(1.7)	(0.7)		Begin Coring @ 21.3 ft	21.3	
680	682.5			1:20	86%	60%	71%	29%		680.1	Light to dark gray, white, black, brown-orange stain, moderately to slightly weathered with seams moderately severely weathered, moderately hard to hard, close to very close fracture spacing,	23.7
	677.5	26.3		1:44			(12.1)	(11.1)			<b>HORNBLLENDE GNEISS</b> with quartz and feldspar pods, traces pyrite.	
			5.0	1:45			96%	88%			12 0°-5° joints with iron oxide stain	
675				1:51							GSI=29	
	675			1:58	(5.0)	(4.9)					Gray, black, brown-orange stain, very slight weathering with seams moderately severely weathered, hard, close to wide fracture spacing	
				1:46	100%	98%					<b>BIOTITE GNEISS</b>	
	672.5	31.3		2:02							17 0°-15° joints, some with iron oxide stain and/or clay <1mm; 1 60° joint with slightly rough walls	
			5.0	1:59	(4.5)	(3.9)					UCS=11,848 PSI, GSI=71	
670				1:41								
	670			1:52								
				1:59								
	667.5	36.3		1:57								
				1:46								
				1:29								
										Boring Terminated at Elevation 667.5 ft in Crystalline Rock (Biotite Gneiss).		

NCDOT CORE DOUBLE R2707C\_GEO\_BRDG\_FIRST BROAD RIVER.GPJ NC\_DOT.GDT 11/30/16

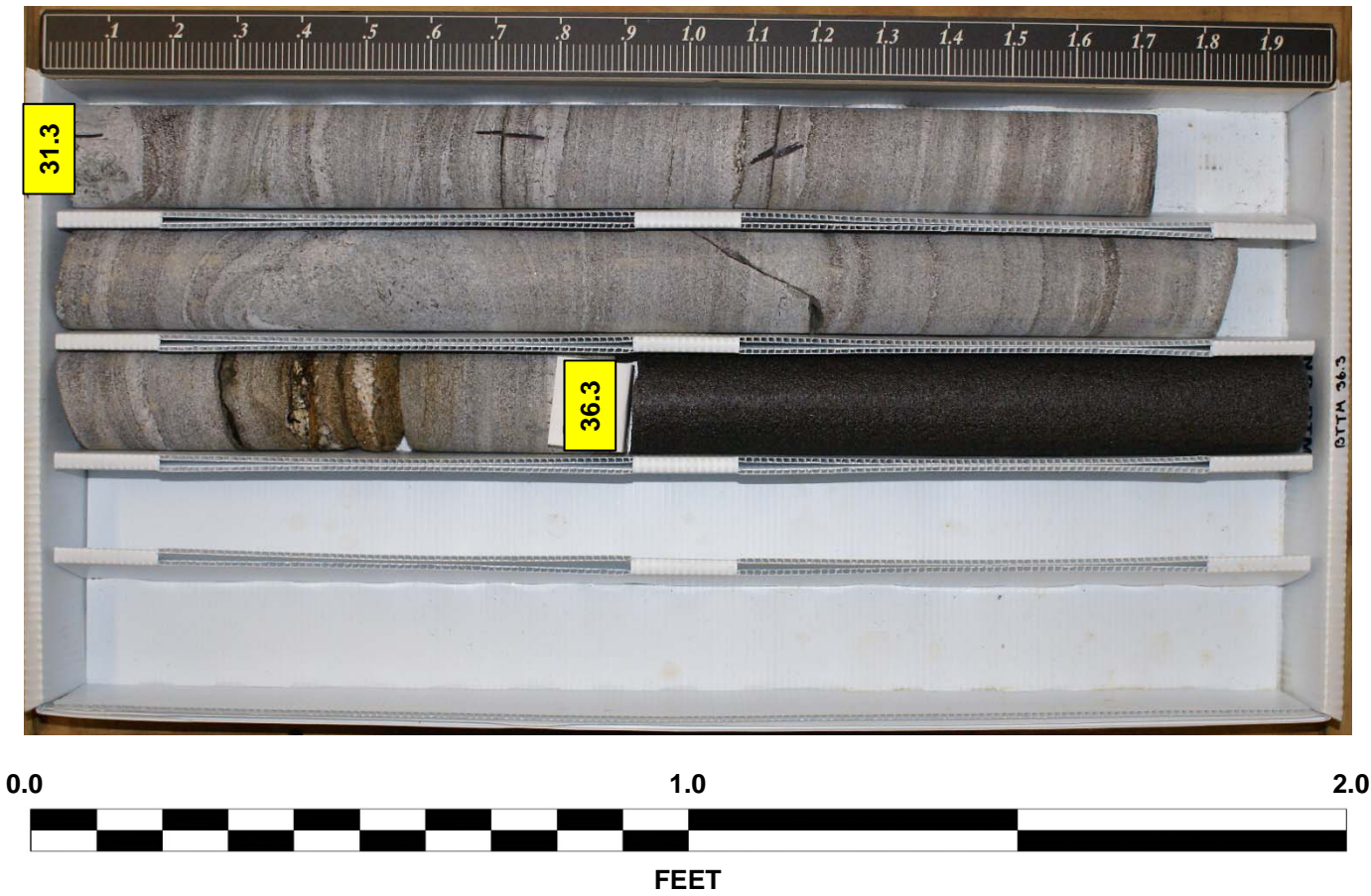
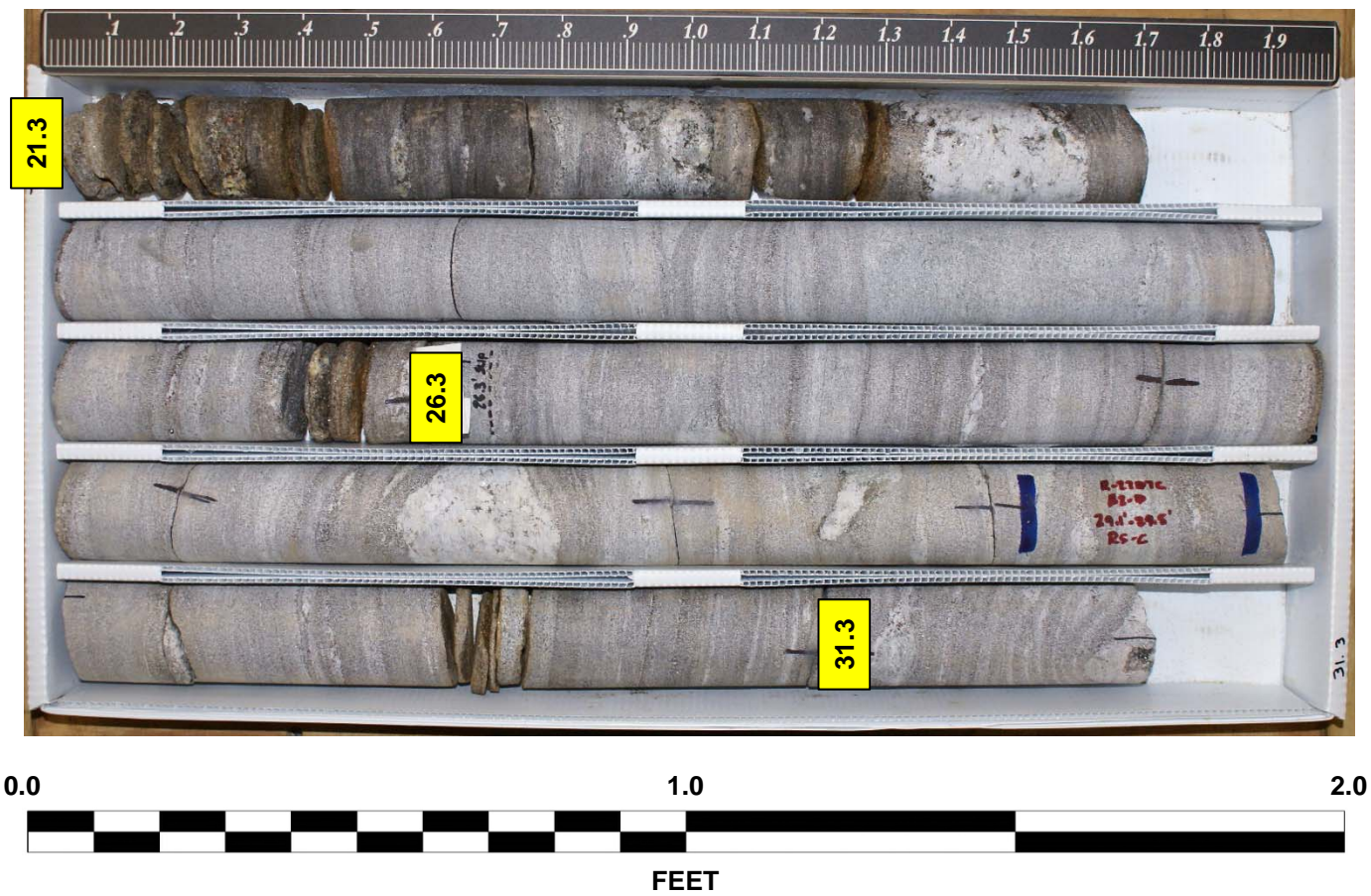


# CORE PHOTOGRAPHIC RECORD

Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827

**B2-B EBL**  
**STA. 385+36 @ 59' RT.**  
**Box 1 of 2: 21.3 – 31.3 FEET**

**B2-B EBL**  
**STA. 385+36 @ 59' RT.**  
**Box 2 of 2: 31.3 – 36.3 FEET**





# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.									
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)								
BORING NO. EB2-C(2)		STATION 386+47		OFFSET 3 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 721.2 ft		TOTAL DEPTH 16.3 ft		NORTHING 581,257		EASTING 1,236,600									
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Morgan, M.		START DATE 10/27/16		COMP. DATE 10/27/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
725															
720														721.2	GROUND SURFACE
	716.9	4.3	33	32	68/0.3									715.9	RESIDUAL Inferred as yellow-red, yellow-brown, medium stiff to hard, non-plastic, micaceous, SILT with sand (A-4).
715														713.7	WEATHERED ROCK Metamorphosed Granitic Rock
	711.9	9.3	6	21	52									706.4	RESIDUAL Brown, white, very dense, fine to coarse, silty SAND with high fraction of metamorphosed granitic rock fragments (A-1).
710														704.9	WEATHERED ROCK Biotite Gneiss
	706.9	14.3	4	76	24/0.1										Boring Terminated with Standard Penetration Test Refusal at Elevation 704.9 ft on Crystalline Rock (Biotite Gneiss).
705															Boring location obtained using a handheld GPS unit.
	704.9	16.3													

WBS 34497.1.2		TIP R-2707C		COUNTY CLEVELAND		GEOLOGIST Abernathy, S.									
SITE DESCRIPTION Bridge Nos. 466 & 467 over First Broad River on Highway US 74 Bypass Between SR 1005 and SR 1827							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 386+78		OFFSET 59 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 721.4 ft		TOTAL DEPTH 7.0 ft		NORTHING 581,208		EASTING 1,236,642									
DRILL RIG/HAMMER EFF./DATE HDR0404 CME-45C 91.5% 11/10/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Morgan, M.		START DATE 10/27/16		COMP. DATE 10/27/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
725															
720														721.4	GROUND SURFACE
	716.9	4.5	7	35	65/0.3									715.9	RESIDUAL Inferred as yellow-red, yellow-brown, medium stiff to hard, non-plastic, micaceous, SILT with sand (A-4).
715														714.4	WEATHERED ROCK Biotite Gneiss
	714.4	7.0													Boring Terminated with Standard Penetration Test Refusal at Elevation 714.4 ft on Crystalline Rock (Biotite Gneiss).

NCDOT BORE DOUBLE R2707C\_GEO\_BRDG\_FIRST BROAD RIVER.GPJ NC\_DOT.GDT 11/30/16

