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REFERENCE: B-5728

PROJECT: 45684

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ALAMANCE
 PROJECT DESCRIPTION REPLACE BRIDGE NO. 112 OVER
REEDY FORK CREEK ON NC 87 (-L-)

SITE DESCRIPTION STA. 21+77.00 -L-

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5728	1	19

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

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

PERSONNEL

C. DRISCOLL
TRIGON EXPLORATION

INVESTIGATED BY C. DRISCOLL
 DRAWN BY C. DRISCOLL
 CHECKED BY T. WELLS
 SUBMITTED BY KLEINFELDER, INC
 DATE MARCH 2021

Prepared in the Office of:



KLEINFELDER
 Bright People. Right Solutions.
 422 GALLIMORE DAIRY ROAD, SUITE B
 GREENSBORO, NC 27409
 NC FIRM LICENSE NO. F-1312



DocuSigned by:
Thomas R. Wells 3/4/2021
 7DA5D2D0518F4B0 SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

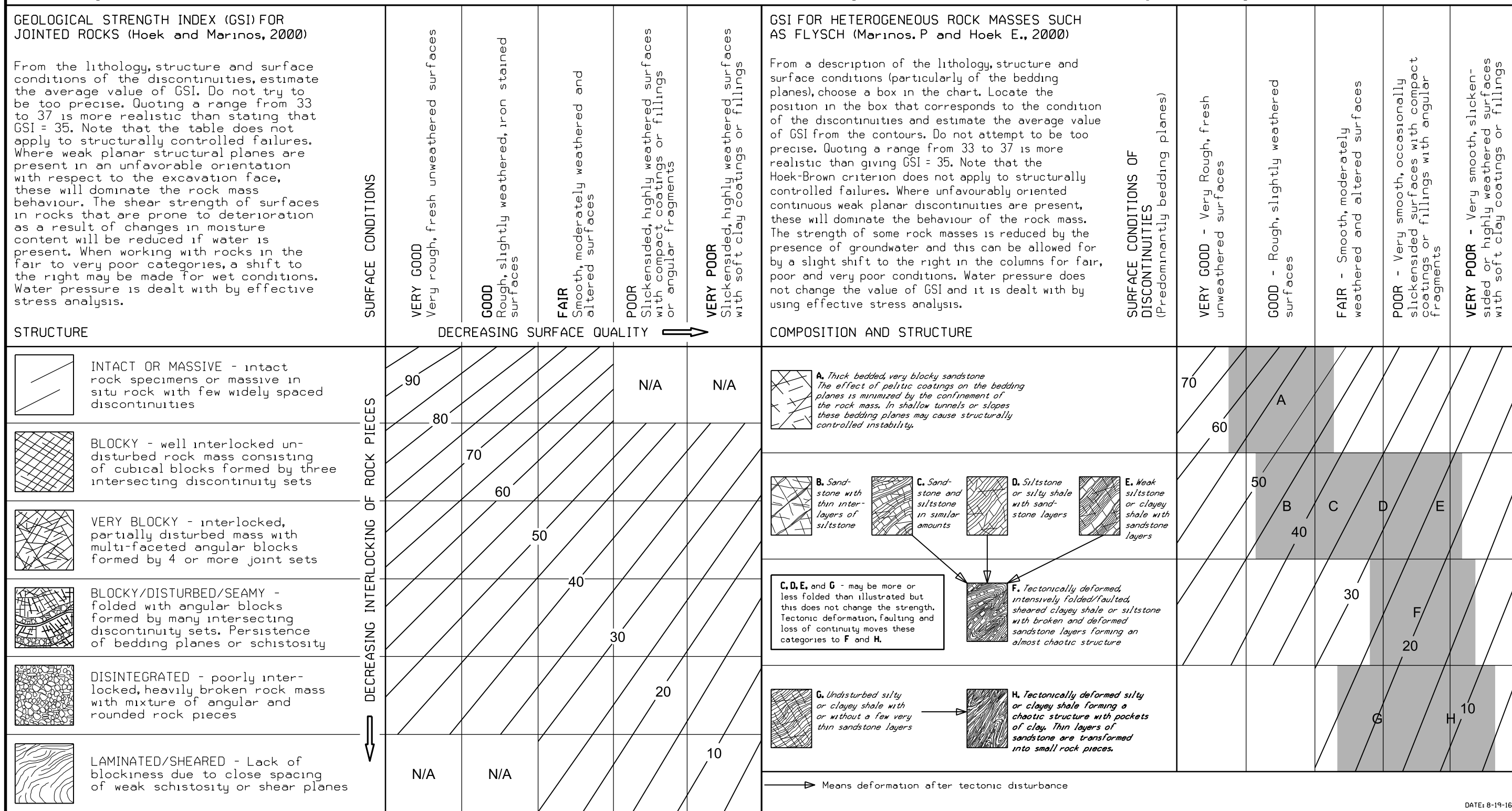
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

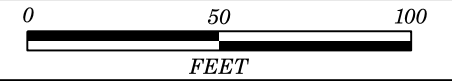
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

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

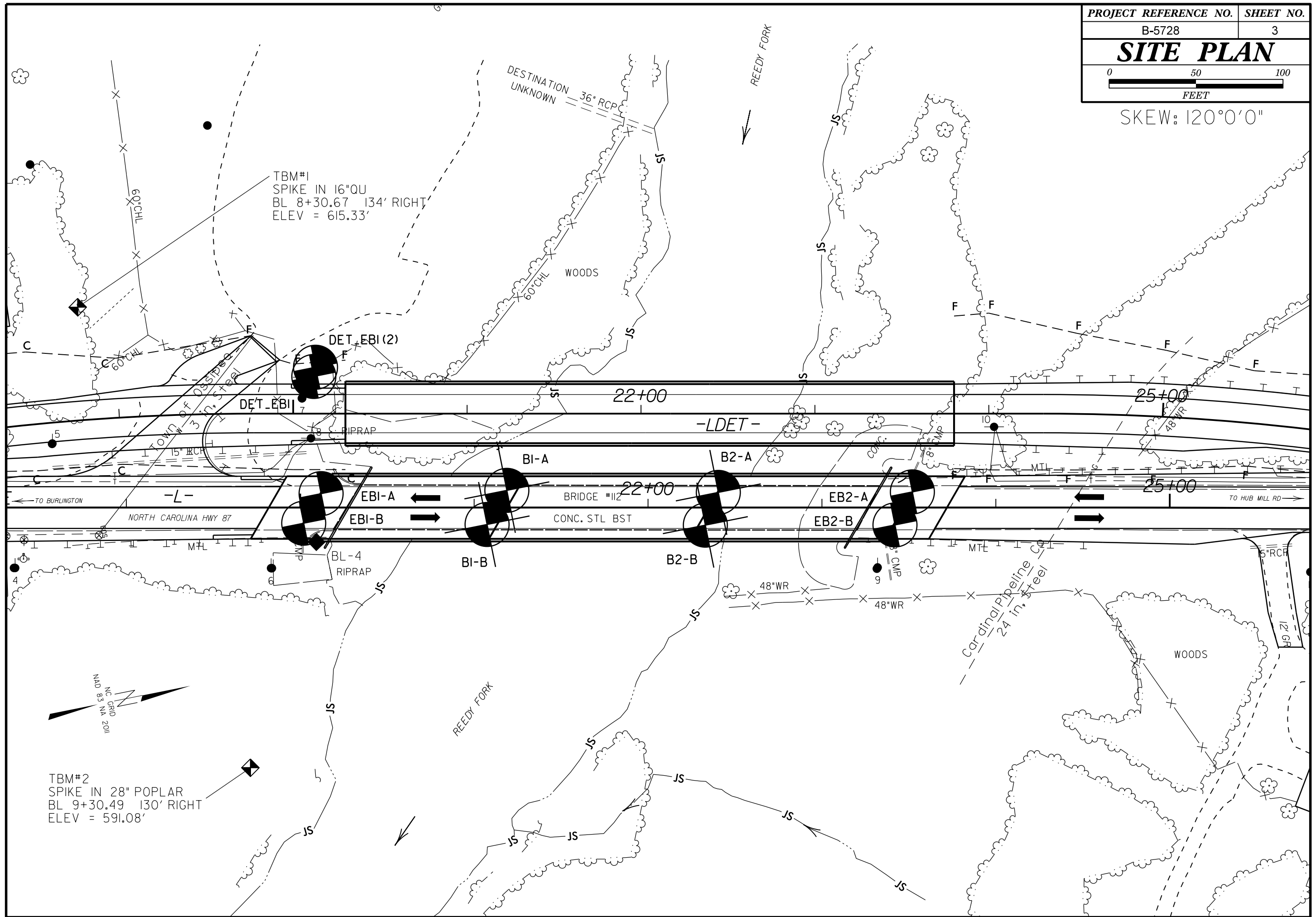
AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

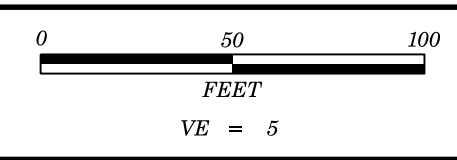


SITE PLAN

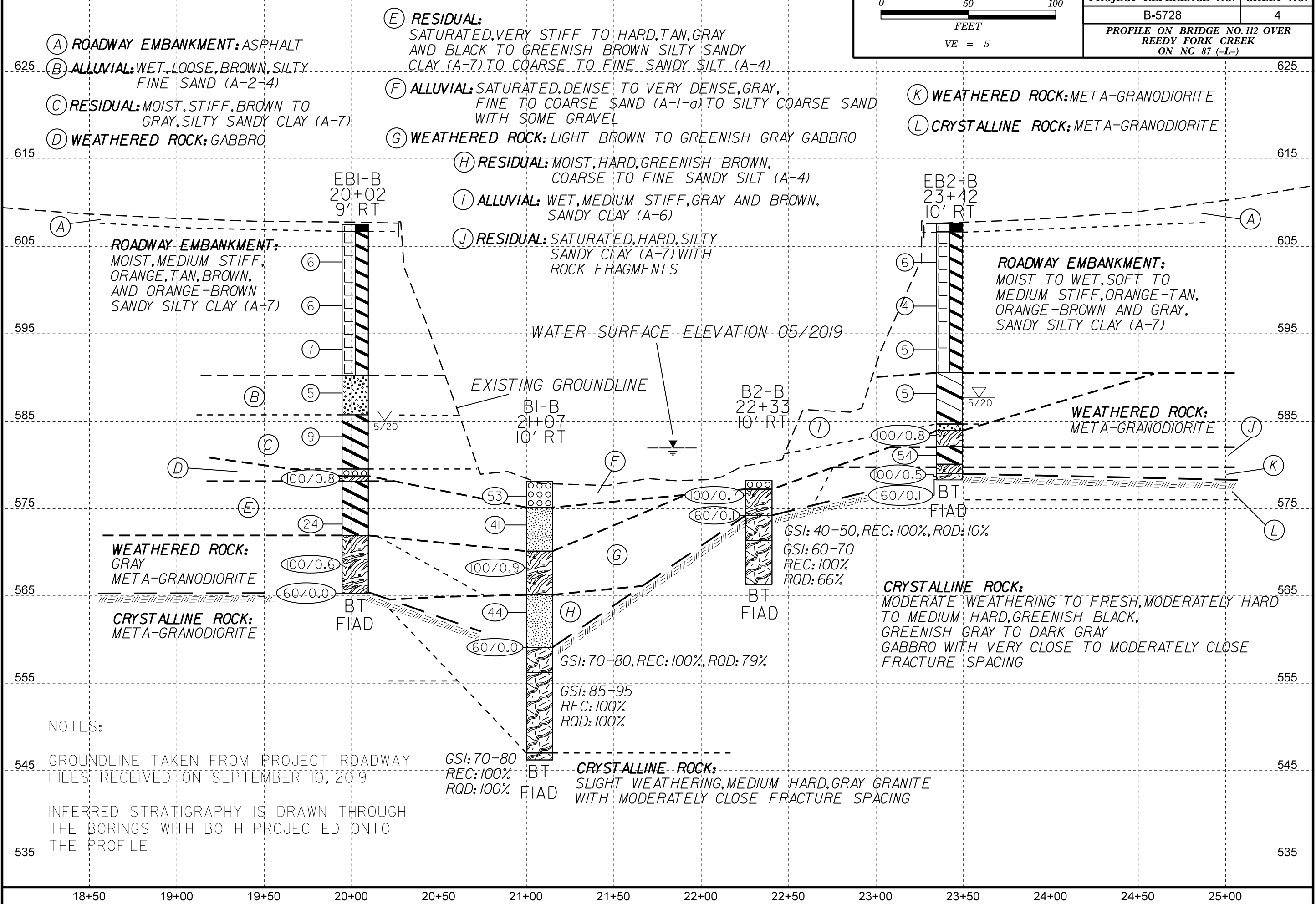


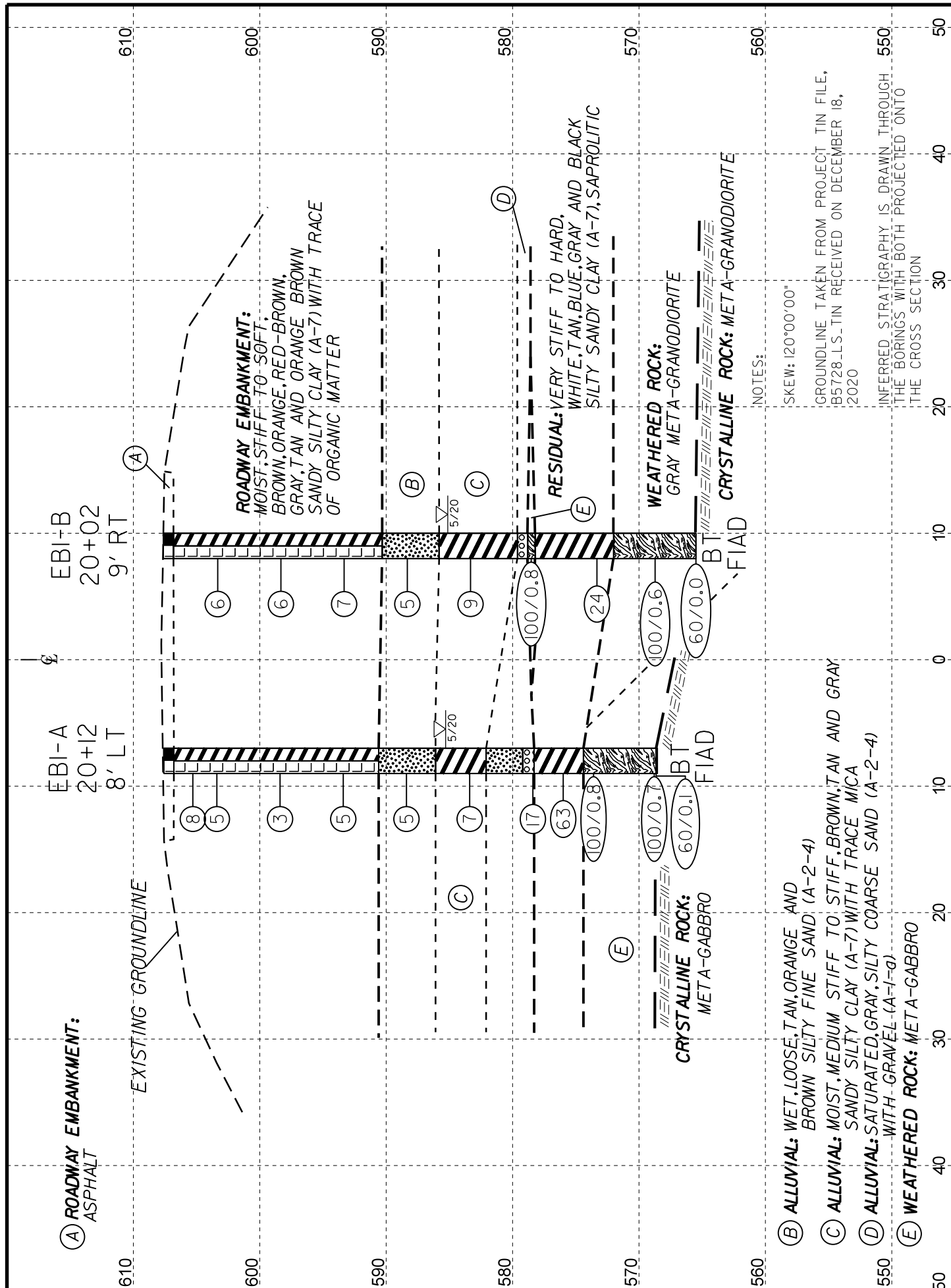
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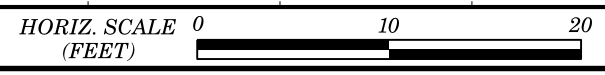
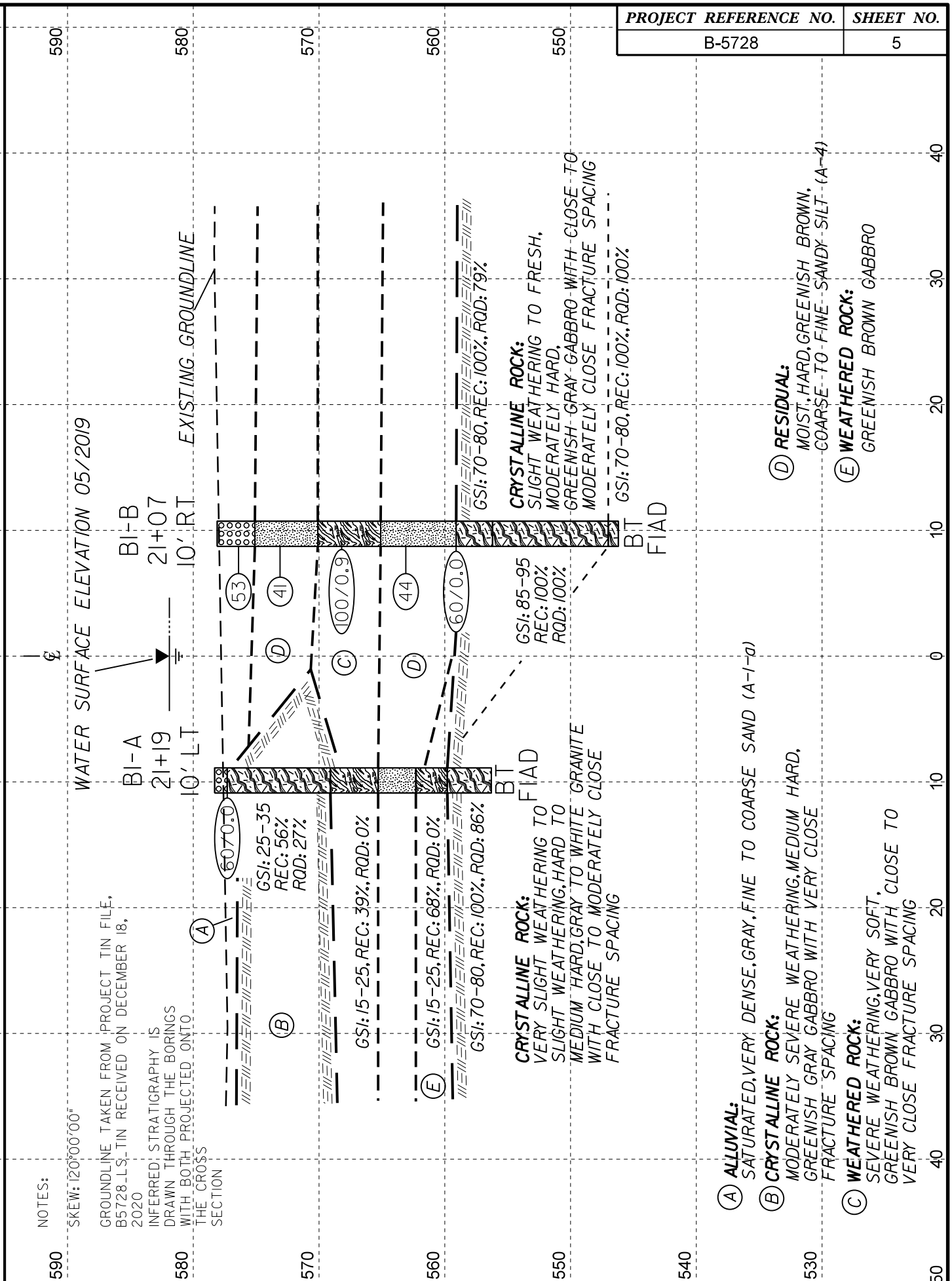


PROJECT REFERENCE NO.	SHEET NO.
B-5728	4
PROFILE ON BRIDGE NO. 112 OVER REEDY FORK CREEK ON NC 87 (-L-)	



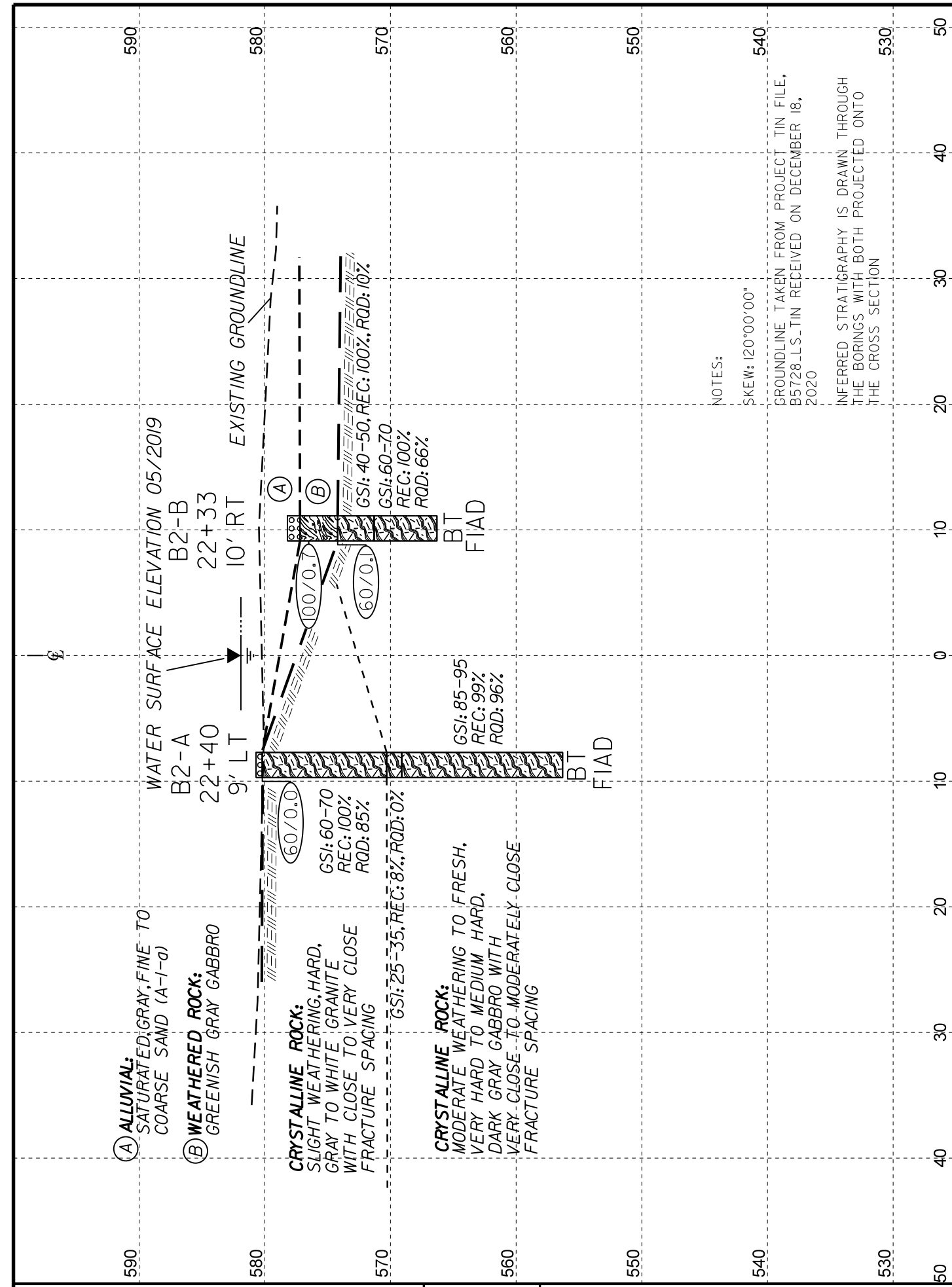


CROSS SECTION ALONG END BENT NO. 1 AT STA. 19+94.15



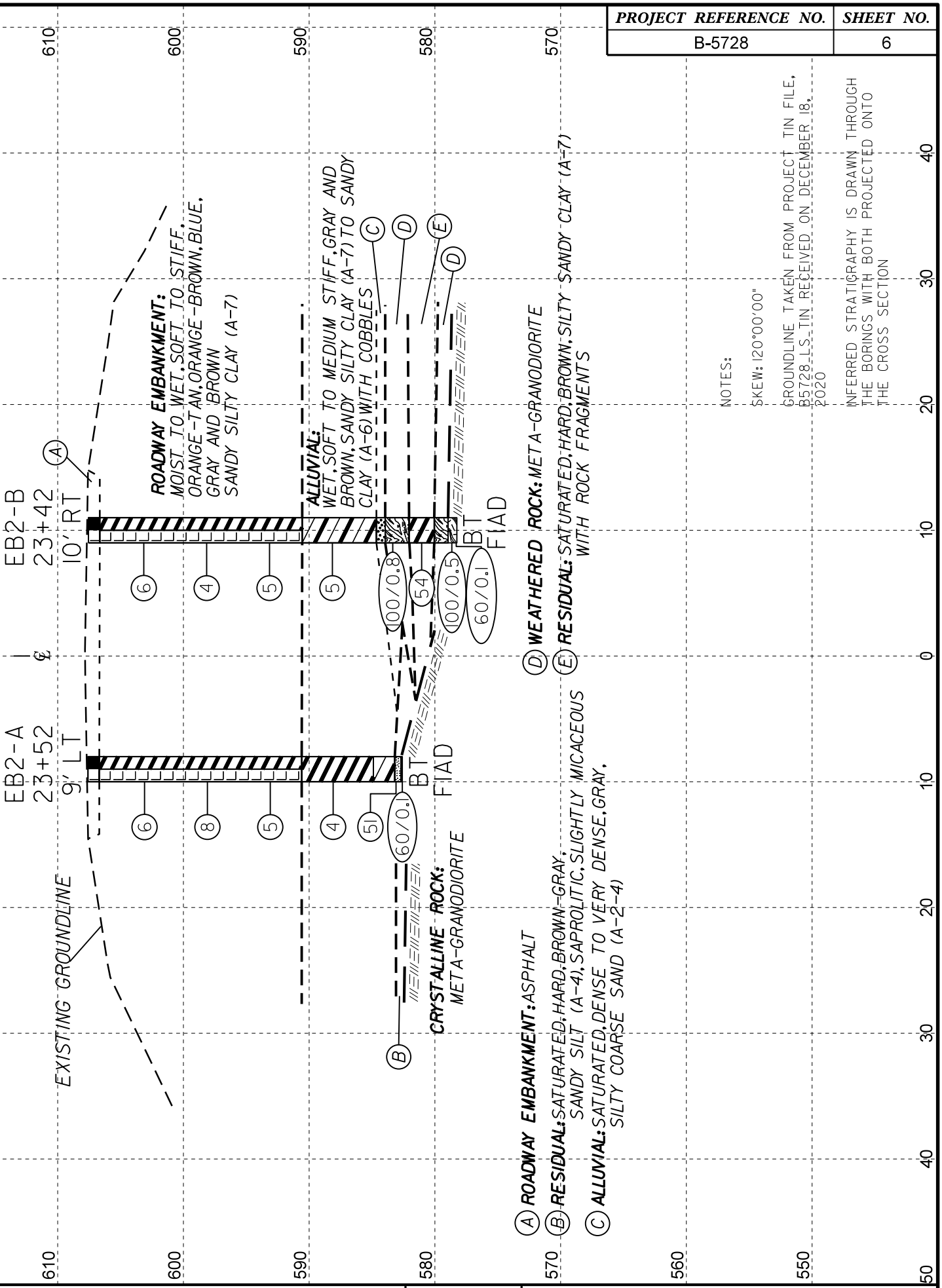
CROSS SECTION ALONG INTERIOR BENT NO. 1 AT STA. 21+18.90

- (A) **ALLUVIAL:** SATURATED, VERY DENSE, GRAY, FINE TO COARSE SAND (A-1-a)
- (B) **CRYSTALLINE ROCK:** MODERATELY SEVERE WEATHERING, MEDIUM HARD, GREENISH GRAY GABBRO WITH VERY CLOSE FRACTURE SPACING
- (C) **WEATHERED ROCK:** SEVERE WEATHERING, VERY SOFT, GREENISH BROWN GABBRO WITH CLOSE TO VERY CLOSE FRACTURE SPACING
- (D) **RESIDUAL:** MOIST, HARD, GREENISH BROWN, COARSE TO FINE SANDY SILT (A-4)
- (E) **WEATHERED ROCK:** GREENISH BROWN GABBRO



VE = 1

CROSS SECTION ALONG INTERIOR BENT NO. 2 AT STA. 22+34.90



VE = 1

CROSS SECTION ALONG END BENT NO. 2 AT STA. 23+59.66

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST N. Moore	
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)
BORING NO. EB1-A		STATION 20+12		OFFSET 8 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 607.5 ft		TOTAL DEPTH 39.0 ft		NORTHING 882,144		EASTING 1,849,335	
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic			
DRILLER D.G. Pinter		START DATE 05/26/20		COMP. DATE 05/26/20		SURFACE WATER DEPTH N/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	SAMP. NO.	LOG
			BLOWS PER FOOT				
			0	25	50	75	100
610							
							GROUND SURFACE 607.5 ELEV. (ft) 0.0
							ROADWAY EMBANKMENT Asphalt (0.0 - 0.8 Foot) 606.7 ELEV. (ft) 0.8
605	606.2	1.3	3	4	4		Brown and Orange to Red-Brown and Gray, Silty CLAY with Trace of Organic Matter (A-7)
	604.3	3.2	1	2	3		
600	599.3	8.2	1	1	2		
	594.3	13.2	2	2	3		
595	594.3	13.2	2	2	3		
	589.3	18.2	2	2	3		ALLUVIAL 590.5 ELEV. (ft) 17.0
590	589.3	18.2	2	2	3		Tan and Orange, Silty SAND (A-2-4)
	586.0	21.5					586.0 ELEV. (ft) 21.5
585	584.3	23.2	2	3	4		Tan and Brown, Silty SAND with Trace Mica (A-7)
	582.0	25.5					582.0 ELEV. (ft) 25.5
580	579.3	28.2	3	9	8		Gray, Silty Coarse SAND (A-2-4)
	578.2	29.3					579.1 ELEV. (ft) 28.4
	578.2	29.3					578.2 ELEV. (ft) 29.3
							RESIDUAL 574.3 ELEV. (ft) 33.2
575	574.3	33.2	51	49/0.3			White and Tan, Silty SANDY CLAY (A-7)
							WEATHERED ROCK META-GABBRO
570	569.3	38.2	56	44/0.2			574.3 ELEV. (ft) 33.2
	568.5	38.9					568.6 ELEV. (ft) 38.9
							568.5 ELEV. (ft) 38.9
							CRYSTALLINE ROCK META-GABBRO 38.9 ELEV. (ft) 39.0
							Boring Terminated with Standard Penetration Test Refusal at Elevation 568.5 ft in Crystalline Rock: META-GABBRO

WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST N. Moore	
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)
BORING NO. EB1-B		STATION 20+02		OFFSET 9 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 607.5 ft		TOTAL DEPTH 42.1 ft		NORTHING 882,131		EASTING 1,849,350	
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic			
DRILLER D.G. Pinter		START DATE 06/02/20		COMP. DATE 06/02/20		SURFACE WATER DEPTH N/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	SAMP. NO.	LOG
			BLOWS PER FOOT				
			0	25	50	75	100
610							
							GROUND SURFACE 607.5 ELEV. (ft) 0.0
							ROADWAY EMBANKMENT Asphalt (0.0 - 0.8 Foot) 606.7 ELEV. (ft) 0.8
605	604.2	3.3	3	3	3		Orange and Tan to Brown and Orange-Brown, Silty SANDY CLAY (A-7)
600	599.2	8.3	3	3	3		
	594.2	13.3	2	3	4		
595	594.2	13.3	2	3	4		
	589.2	18.3	3	2	3		ALLUVIAL 590.2 ELEV. (ft) 17.3
590	589.2	18.3	3	2	3		Brown, Silty Fine SAND (A-2-4)
	586.0	21.5					585.7 ELEV. (ft) 21.8
585	584.2	23.3	2	4	5		Brown and Gray, Silty CLAY (A-7)
	582.0	25.5					
580	579.2	28.3	2	100/0.3			Gray, Silty Coarse SAND with Gravel (A-2-4) 28.0 ELEV. (ft) 28.8
							578.1 ELEV. (ft) 29.4
							WEATHERED ROCK META-GABBRO
575	574.2	33.3	17	14	10		RESIDUAL 571.9 ELEV. (ft) 35.6
							Tan, Gray, and Black, Silty SANDY CLAY (A-7)
570	569.2	38.3	71	29/0.1			WEATHERED ROCK META-GRANODIORITE
							Gray META-GRANODIORITE
	565.4	42.1	60/0.0				565.4 ELEV. (ft) 42.1
							Boring Terminated with Standard Penetration Test Refusal at Elevation 565.4 ft on Crystalline Rock: META-GRANODIORITE

NCDOT BORE DOUBLE B5728_GEO_BRDG0112.GPJ NC_DOT.GDT 2/26/21

GEOTECHNICAL BORING REPORT

BORE LOG

GEOTECHNICAL BORING REPORT

CORE LOG

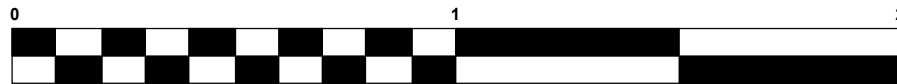
WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST C. Driscoll										
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)									
BORING NO. B1-A		STATION 21+19		OFFSET 10 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 578.3 ft		TOTAL DEPTH 22.0 ft		NORTHING 882,247		EASTING 1,849,353										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 04/27/2020			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 01/15/21		COMP. DATE 01/15/21		SURFACE WATER DEPTH 3.0ft										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
580														578.3	GROUND SURFACE	0.0
	577.3	1.0	60/0.0											577.3	ALLUVIAL Gray, Fine to Coarse SAND (A-1-a)	1.0
575															CRYSTALLINE ROCK Greenish Gray GABBRO	
570														569.1	WEATHERED ROCK Greenish Brown GABBRO	9.2
565														565.3	RESIDUAL Brown, Coarse to Fine Sandy SILT (A-4)	13.0
560														562.3	WEATHERED ROCK Greenish Brown GABBRO	16.0
														559.8	CRYSTALLINE ROCK Gray to White GRANITE	18.5
														556.3	Boring Terminated at Elevation 556.3 ft in Crystalline Rock: GRANITE	

WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST C. Driscoll						
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)					
BORING NO. B1-A		STATION 21+19		OFFSET 10 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 578.3 ft		TOTAL DEPTH 22.0 ft		NORTHING 882,247		EASTING 1,849,353						
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 04/27/2020			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic						
DRILLER R. Toothman		START DATE 01/15/21		COMP. DATE 01/15/21		SURFACE WATER DEPTH 3.0ft						
CORE SIZE NQ		TOTAL RUN 21.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
577.3	577.3	1.0	1.0	N=60/0.0 2:30/1.0	(1.0)	(0.3)		(4.6)	(2.2)		Begin Coring @ 1.0 ft	
575	576.3	2.0	5.0	3:15 4:00 2:30 2:45 3:45	100%	30%		56%	27%		CRYSTALLINE ROCK Moderately Severe Weathering, Medium Hard, Greenish Gray GABBRO with Close to Very Close Fracture Spacing	1.0
570	571.3	7.0	5.0	4:00 3:30 5:00 5:00	(2.7)	(1.2)					GSI: 25-35	
565	566.3	12.0	5.0	4:00 4:00 3:15 3:30	(2.8)	(0.0)		39%	0%		WEATHERED ROCK Severe Weathering, Very Soft, Greenish Brown GABBRO with Close to Very Close Fracture Spacing	9.2
560	561.3	17.0	5.0	4:00 3:15 3:30 4:00 4:15 3:15 3:00	(4.2)	(3.0)		(0.8)	(0.0)		GSI: 15-25	13.0
								(1.7)	(0.0)		RESIDUAL Complete Weathering, Very Soft, Brown, Sandy SILT (A-4) with Very Close Fracture Spacing	16.0
								(3.5)	(3.0)		WEATHERED ROCK Severe Weathering, Very Soft, Greenish Brown GABBRO with Very Close Fracture Spacing	18.5
								100%	86%		CRYSTALLINE ROCK Very Slight Weathering, Hard, Gray to White GRANITE with Close to Moderately Close Fracture Spacing	22.0
											GSI: 70-80	
											Boring Terminated at Elevation 556.3 ft in Crystalline Rock: GRANITE	

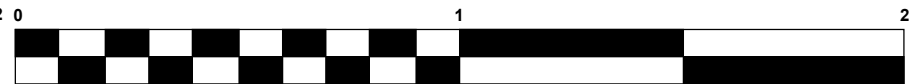
CORE PHOTOGRAPHS

B1-A

BOXES 1-3: 1.0 to 22.0 FEET



FEET



FEET

GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST C. Driscoll										
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)									
BORING NO. B1-B		STATION 21+07		OFFSET 10 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 578.1 ft		TOTAL DEPTH 31.9 ft		NORTHING 882,232		EASTING 1,849,370										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 04/27/2020			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 01/06/21		COMP. DATE 01/12/21		SURFACE WATER DEPTH 3.7ft										
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)		
580																
	577.4	0.7	14	38	15									578.1	0.0	GROUND SURFACE
																ALLUVIAL
																Gray, Fine to Coarse SAND (A-1-a)
575	574.1	4.0	19	26	15									575.1	3.0	RESIDUAL
																Greenish Brown, Coarse to Fine Sandy SILT (A-4)
570	569.1	9.0	36	64/0.4										570.1	8.0	WEATHERED ROCK
																Light Brown GABBRO
565	564.1	14.0	21	16	28									565.1	13.0	RESIDUAL
																Greenish Brown Coarse to Fine Sandy SILT (A-4)
560	559.1	19.0	60/0.0											559.1	19.0	CRYSTALLINE ROCK
																Greenish Black GABBRO
555														556.2	21.9	Greenish Gray GABBRO
550																
														547.0	31.1	Gray GRANITE
														546.2	31.9	Boring Terminated at Elevation 546.2 ft in Crystalline Rock: GRANITE

WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST C. Driscoll	
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)
BORING NO. B1-B		STATION 21+07		OFFSET 10 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 578.1 ft		TOTAL DEPTH 31.9 ft		NORTHING 882,232		EASTING 1,849,370	
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 04/27/2020			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic	
DRILLER R. Toothman		START DATE 01/06/21		COMP. DATE 01/12/21		SURFACE WATER DEPTH 3.7ft	
CORE SIZE NQ		TOTAL RUN 12.9 ft		L O G		DESCRIPTION AND REMARKS	
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.
559.1	559.1	19.0	2.9	N=60/0.0 5:00/0.9 4:00 3:15	(2.9) 100%	(2.3) 79%	
	556.2	21.9	5.0	3:30 3:30 3:30 3:30	(5.0) 100%	(5.0) 100%	
	551.2	26.9	5.0	6:30 3:00 3:45 3:30	(5.0) 100%	(5.0) 100%	
	546.2	31.9					RS-1
					(0.8) 100%	(0.8) 100%	

Begin Coring @ 19.0 ft

CRYSTALLINE ROCK

Slight Weathering, Moderately Hard, Greenish Black GABBRO with Close Fracture Spacing

GSI: 70-80

Fresh, Moderately Hard, Greenish Gray GABBRO with Moderately Close Fracture Spacing

GSI: 85-95

Slight Weathering, Medium Hard, Gray GRANITE with Moderately Close Fracture Spacing

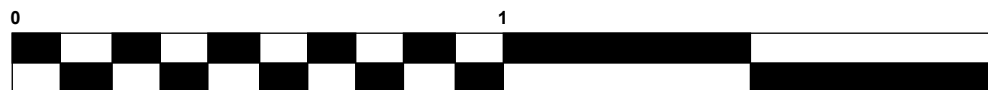
GSI: 70-80

Boring Terminated at Elevation 546.2 ft in Crystalline Rock: GRANITE

CORE PHOTOGRAPHS

B1-B

BOXES 1-2: 19.0 to 31.9 FEET



FEET

GEOTECHNICAL BORING REPORT BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

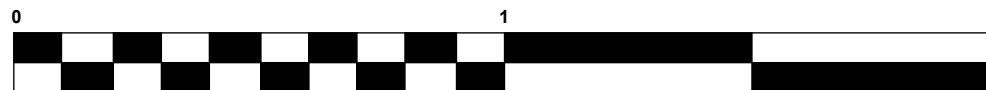
WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST C. Driscoll										
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)									
BORING NO. B2-A		STATION 22+40		OFFSET 9 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 580.7 ft		TOTAL DEPTH 24.4 ft		NORTHING 882,366		EASTING 1,849,378										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 04/27/2020			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 01/14/21		COMP. DATE 01/14/21		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 ELEV. (ft) DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
585																
580	580.2	0.5														580.7 580.2
575																
570																570.3 569.1
565																
560																
																556.3
Boring Terminated at Elevation 556.3 ft in Crystalline Rock: GABBRO																

WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST C. Driscoll						
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)					
BORING NO. B2-A		STATION 22+40		OFFSET 9 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 580.7 ft		TOTAL DEPTH 24.4 ft		NORTHING 882,366		EASTING 1,849,378						
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 04/27/2020			DRILL METHOD NW Casing W/SPT & Core			HAMMER TYPE Automatic						
DRILLER R. Toothman		START DATE 01/14/21		COMP. DATE 01/14/21		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS ELEV. (ft) DEPTH (ft)	
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
580.2		0.5	3.9	N=60/0.0 3:00/0.9 3:30 3:45 3:45	(3.9) 100%	(2.9) 74%		(9.9) 100%	(8.4) 85%			580.2 0.5 Begin Coring @ 0.5 ft CRYSTALLINE ROCK Slight Weathering, Hard, Gray to White GRANITE with Close to Very Close Fracture Spacing
575		4.4	5.0	3:00 3:45 4:30 5:15 4:30	(5.0) 100%	(4.5) 90%						575 4.4 GS: 60-70
570		9.4	5.0	3:00 1:30 3:00 2:30	(3.8) 76%	(3.4) 68%	RS-2	(0.1) 8%	(0.0) 0%			570.3 10.4 WEATHERED ROCK Severe Weathering, Medium Hard, Dark Gray, GABBRO with Very Close Fracture Spacing
565		14.4	5.0	3:15 4:00 3:30 4:45 3:15	(5.0) 100%	(4.9) 98%		(12.7) 99%	(12.3) 96%			569.1 11.6 CRYSTALLINE ROCK Fresh, Very Hard, Dark Gray, GABBRO with Moderately Close Fracture Spacing
560		19.4	5.0	4:15 2:30 4:30	(5.0) 100%	(5.0) 100%						566.3 24.4 GS: 85-95
		24.4										556.3 24.4 Boring Terminated at Elevation 556.3 ft in Crystalline Rock: GABBRO

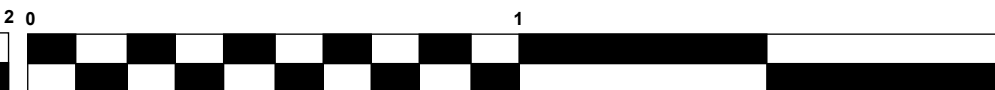
CORE PHOTOGRAPHS

B2-A

BOXES 1-3: 0.5 to 24.4 FEET



FEET



FEET

GEOTECHNICAL BORING REPORT

BORE LOG

GEOTECHNICAL BORING REPORT

CORE LOG

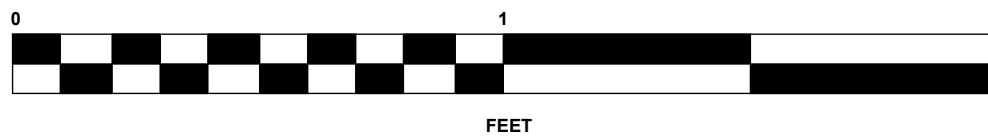
WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST C. Driscoll									
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)								
BORING NO. B2-B		STATION 22+33		OFFSET 10 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 578.2 ft		TOTAL DEPTH 11.9 ft		NORTHING 882,355		EASTING 1,849,395									
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 04/27/2020				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic									
DRILLER R. Toothman		START DATE 01/13/21		COMP. DATE 01/13/21		SURFACE WATER DEPTH 3.0ft									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
580															
	577.2	1.0	75	25/0.2										578.2 GROUND SURFACE 0.0	
														577.2 ALLUVIAL 1.0	
														574.2 WEATHERED ROCK 4.0	
														571.3 CRYSTALLINE ROCK 6.9	
														566.3 Boring Terminated at Elevation 566.3 ft in Crystalline Rock: GABBRO 11.9	

WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST C. Driscoll						
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)					
BORING NO. B2-B		STATION 22+33		OFFSET 10 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 578.2 ft		TOTAL DEPTH 11.9 ft		NORTHING 882,355		EASTING 1,849,395						
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 04/27/2020				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic						
DRILLER R. Toothman		START DATE 01/13/21		COMP. DATE 01/13/21		SURFACE WATER DEPTH 3.0ft						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
574.2	574.2	4.0	2.9	5:00/0.9	(2.9)	(0.3)		(2.9)	(0.3)		Begin Coring @ 4.0 ft	
	571.3	6.9		4:00 5:15	100%	10%		100%	10%		CRystalline Rock Moderate Weathering, Medium Hard, Dark Gray GABBRO with Very Close Fracture Spacing	4.0 6.9
			5.0	4:00 3:30 4:30	(5.0) 100%	(3.3) 66%		(5.0) 100%	(3.3) 66%		GSI: 40-50 Slight Weathering, Moderately Hard, Dark Gray GABBRO with Close to Very Close Fracture Spacing	
				4:15							GSI: 60-70 Boring Terminated at Elevation 566.3 ft in Crystalline Rock: GABBRO	11.9

CORE PHOTOGRAPHS

B2-B

BOX 1: 4.0 to 11.9 FEET



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST N. Moore								
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)							
BORING NO. EB2-A		STATION 23+52		OFFSET 9 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 607.6 ft		TOTAL DEPTH 25.0 ft		NORTHING 882,478		EASTING 1,849,401								
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER D.G. Pinter		START DATE 06/03/20		COMP. DATE 06/03/20		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				
610														607.6 GROUND SURFACE 0.0
														606.7 ROADWAY EMBANKMENT 0.9
	604.1	3.5	4	3	3								M	Orange and Tan to Blue-Gray and Brown, Sandy Silty CLAY (A-7)
600	599.1	8.5	3	4	4									
	594.1	13.5	2	2	3									
590	589.1	18.5	2	2	2									590.6 ALLUVIAL 17.0
	584.1	23.5	7	24	27									584.9 Brown-Gray, Sandy CLAY with Cobbles (A-6) 22.7
	582.7	24.9	10	60/0.1										583.2 Brown-Gray, Sandy SILT (A-4), Saprolitic, Slightly Micaceous 24.4
														582.7 WEATHERED ROCK 24.9
														582.6 RESIDUAL 25.0
														CRYSTALLINE ROCK
														Meta-Granodiorite
														Boring Terminated with Standard Penetration Test Refusal at Elevation 582.6 ft in Crystalline Rock: META-GRANODIORITE

WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST N. Moore								
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)							
BORING NO. EB2-B		STATION 23+42		OFFSET 10 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 607.5 ft		TOTAL DEPTH 29.3 ft		NORTHING 882,466		EASTING 1,849,416								
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER D.G. Pinter		START DATE 06/02/20		COMP. DATE 06/02/20		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				
610														607.5 GROUND SURFACE 0.0
														606.6 ROADWAY EMBANKMENT 0.9
	604.1	3.4	2	2	4								M	Orange-Tan and Orange-Brown to Gray, Sandy Silty CLAY (A-7)
600	599.1	8.4	WOH	2	2								M	
	594.1	13.4	1	2	3								W	
590	589.1	18.4	3	3	2								W	590.5 ALLUVIAL 17.0
	584.1	23.4	18	82/0.3										584.6 Gray, Silty Coarse SAND (A-2-4) 22.9
	582.0	25.5	32	33	21									583.9 Gray, Silty Coarse SAND (A-2-4) 23.6
														582.0 WEATHERED ROCK 25.5
														580.0 RESIDUAL 27.5
	579.1	28.4	100/0.5											578.9 Silty Sandy CLAY with Rock Fragments (A-7) 28.6
	578.3	29.2	60/0.1											578.2 WEATHERED ROCK 29.3
														CRYSTALLINE ROCK
														Meta-Granodiorite
														Boring Terminated with Standard Penetration Test Refusal at Elevation 578.2 ft in Crystalline Rock: META-GRANODIORITE

NCDOT BORE DOUBLE B5728_GEO_BRDG0112.GPJ NC_DOT.GDT 2/26/21

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST C. Driscoll										
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)									
BORING NO. DET_EB1		STATION 20+12		OFFSET 21 ft LT		ALIGNMENT -LDET-										
COLLAR ELEV. 604.6 ft		TOTAL DEPTH 14.5 ft		NORTHING 882,151		EASTING 1,849,267										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 04/27/2020				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 01/18/21		COMP. DATE 01/18/21		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)		
605	604.6	0.0	8	7	5								604.6	0.0	GROUND SURFACE	
													602.6	2.0	ARTIFICIAL FILL Brown, Silty Coarse to Fine SAND with Trace Gravel (A-2-4)	
600	601.1	3.5	2	2	2								598.6	6.0	Reddish Brown, Coarse to Fine Sandy CLAY (A-6)	
													598.6	6.0	RESIDUAL Brown, Coarse to Fine Sandy SILT (A-4)	
595	596.1	8.5	3	4	4								592.6	12.0	WEATHERED ROCK White GRANITE	
	591.1	13.5	60	40/0.2									590.1	14.5	Boring Terminated at Elevation 590.1 ft on Crystalline Rock: GRANITE	
	590.1	14.5	60/0.0												Possible Boulder at 14.5 feet. Offset boring DET_EB1 (2) 5 feet north.	

WBS 45684.1.1		TIP B-5728		COUNTY ALAMANCE		GEOLOGIST C. Driscoll										
SITE DESCRIPTION Replace Bridge No. 112 over Reedy Fork Creek on NC 87 (-L-)							GROUND WTR (ft)									
BORING NO. DET_EB1 (2)		STATION 20+13		OFFSET 27 ft LT		ALIGNMENT -LDET-										
COLLAR ELEV. 604.4 ft		TOTAL DEPTH 24.3 ft		NORTHING 882,153		EASTING 1,849,262										
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 87% 04/27/2020				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 01/18/21		COMP. DATE 01/18/21		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)		
605													604.4	0.0	GROUND SURFACE	
													602.4	2.0	ARTIFICIAL FILL Brown, Silty Coarse to Fine SAND with Trace Gravel (A-2-4)	
600													598.4	6.0	Reddish Brown, Coarse to Fine Sandy CLAY (A-6)	
													598.4	6.0	RESIDUAL Brown, Coarse to Fine Sandy SILT (A-4)	
595													592.4	12.0	WEATHERED ROCK Brown GRANITE	
	590.9	13.5	24	76/0.3											Boring Terminated at Elevation 590.1 ft on Crystalline Rock: GRANITE	
	585.9	18.5	100/0.4												Possible Boulder at 14.5 feet. Offset boring DET_EB1 (2) 5 feet north.	
	580.9	23.5	44	56/0.3											Boring Terminated at Elevation 580.1 ft in Weathered Rock: GRANITE	

NCDOT BORE DOUBLE B5728_GEO_BRD0112.GPJ NC_DOT.GDT 1/28/21

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

SHEET 18

PROJECT NO.: 45684.1.1 (B-5728)

COUNTY: ALAMANCE

REPLACE BRIDGE NO. 112 OVER REEDY FORK CREEK ON NC 87

Sample No.	Boring #	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (in)	Diameter (in)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Young's Modulus (PSI)	Splitting Tensile Strength (PSI)	Remarks
RS-1	B1-B	30.3' - 30.6'	Gabbro	CZg	100	3.92	1.98	185.9	16,270	N/A	N/A	GSI- 85-95
RS-2	B2-A	8.6' - 8.9'	Granite	PzZg	90	4.34	1.98	165.4	24,910	N/A	N/A	GSI- 60-70

SITE PHOTOGRAPHS

REPLACE BRIDGE NO. 112 OVER REEDY FORK CREEK ON NC 87 (-L-)



Looking Northeast at -L- from End Bent No. 1