

REFERENCE: B-5372

PROJECT: 46087

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<u>SHEET NO.</u>	<u>DESCRIPTION</u>
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**STATE OF NORTH CAROLINA**  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 GEOTECHNICAL ENGINEERING UNIT

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY CABARRUS  
 SITE DESCRIPTION REPLACE BRIDGE NO.109 ON  
SR 1706 (EAST 1ST. STREET) OVER US 29

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5372	1	11

**CAUTION NOTICE**

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

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

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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

PERSONNEL

C. RANIERI, GIT

A. STURCHIO

T. BEARD

INVESTIGATED BY F&R, Inc.

DRAWN BY T.T. WALKER

CHECKED BY P. ALTON, P.E.

SUBMITTED BY C. WANG, P.E.

DATE SEPTEMBER 2022

SINCE **Prepared in the Office of:**  
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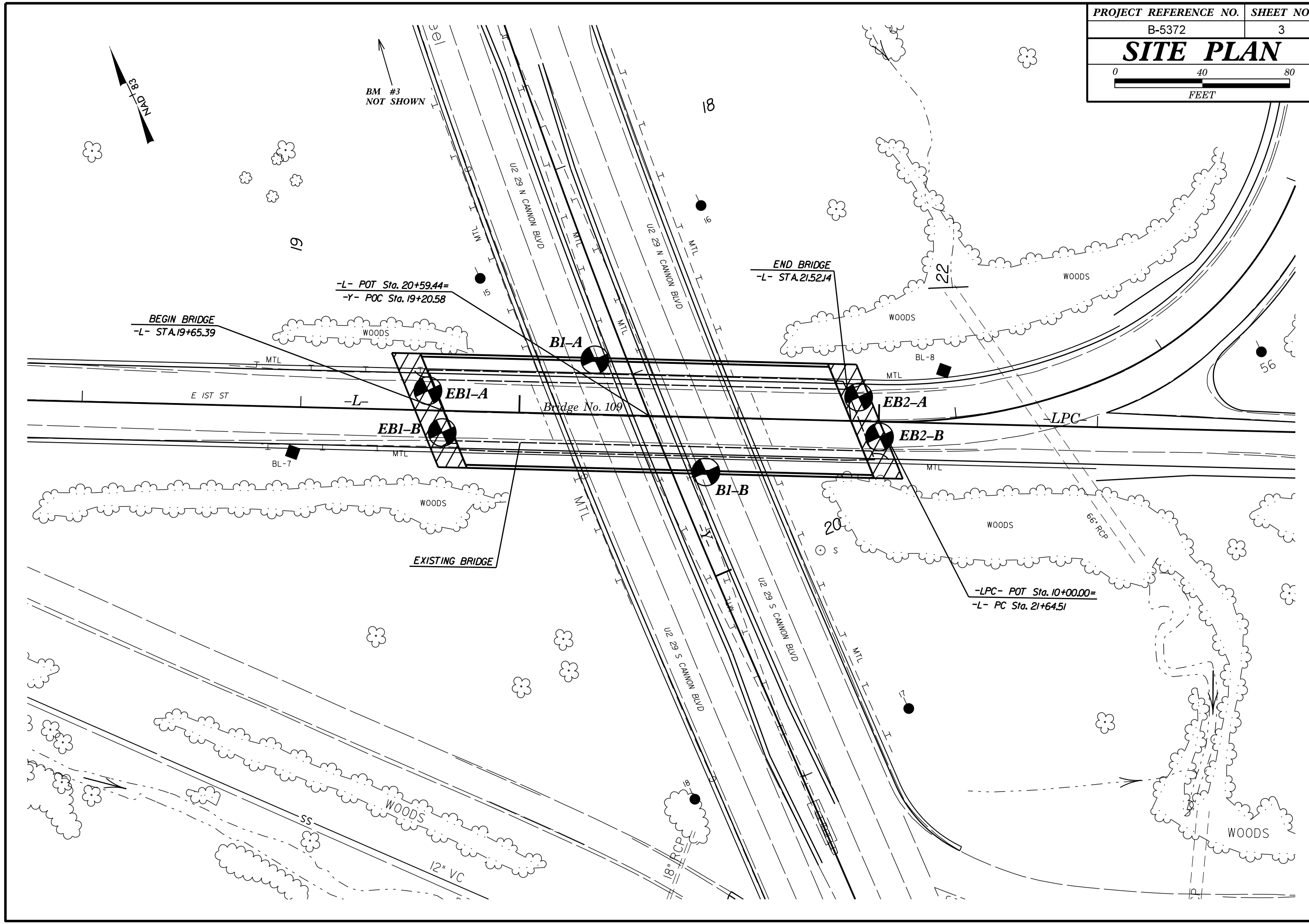


DocuSigned by:  
Cheng Wang 09/28/2022  
 17112245839493 SIGNATURE DATE

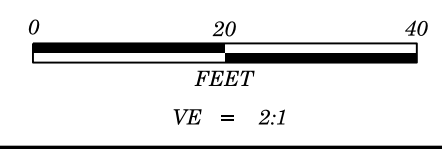
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 UNLESS ALL SIGNATURES COMPLETED**

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

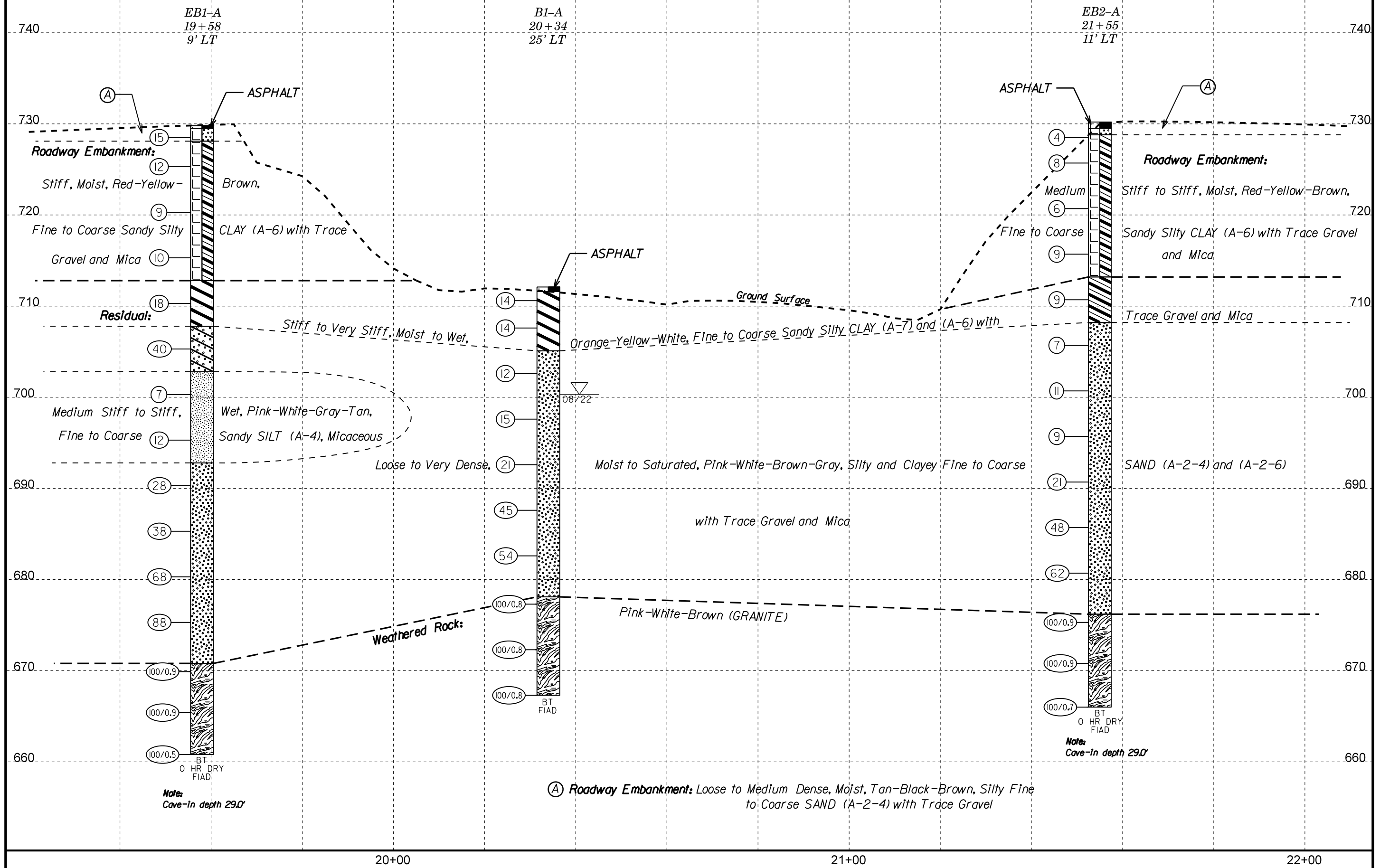
Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. Includes sub-sections like SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, and COLOR.



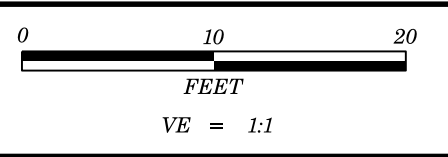
GROUNDLINE TAKEN FROM .TIN FILE RECEIVED FROM NCDOT ON 08/01/2022.  
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
 PROJECTED ONTO THE PROFILE



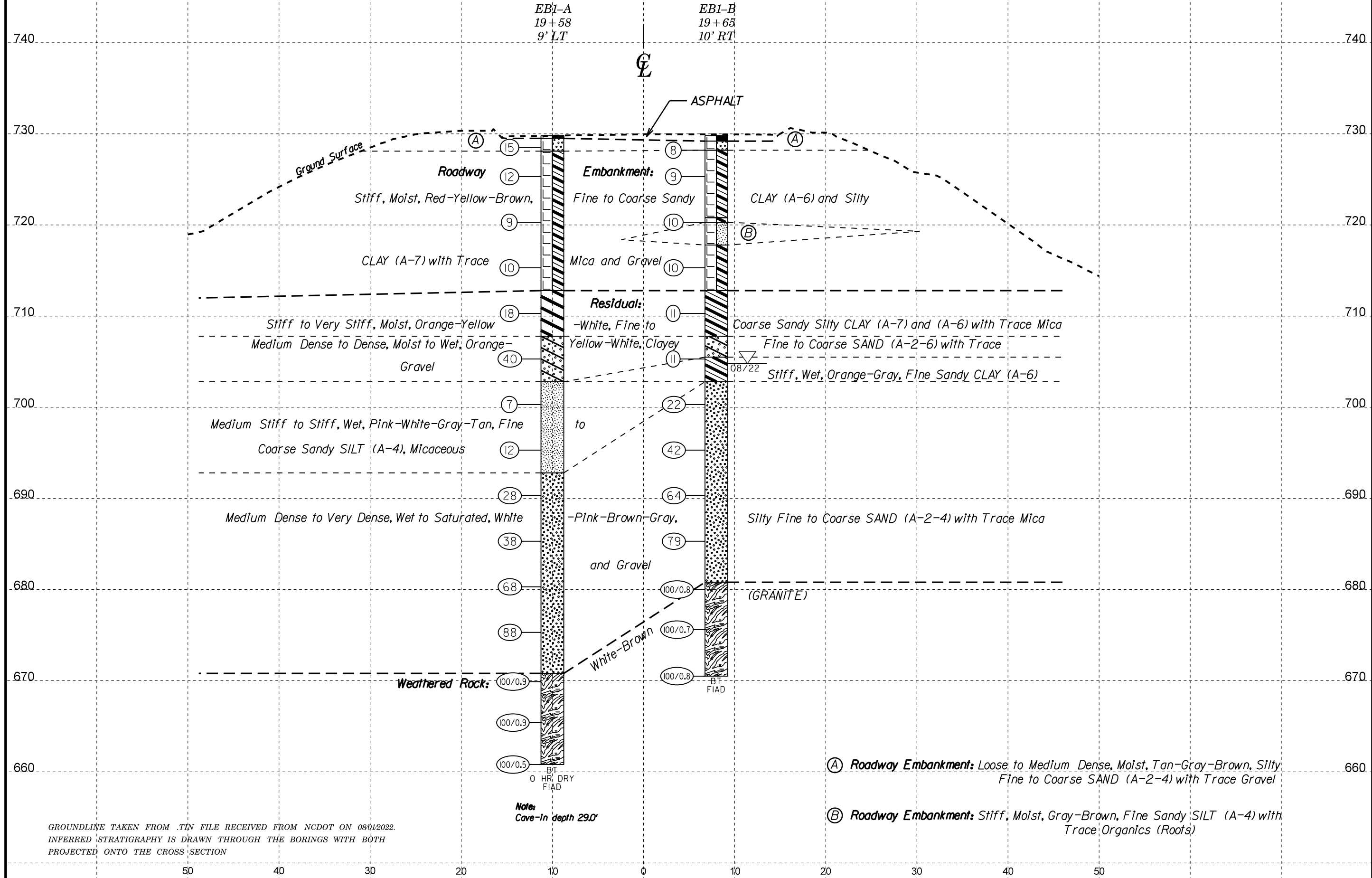
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
B-5372	4
<b>PROFILE BORINGS PROJECTED ALONG CENTERLINE OF -L-</b>	



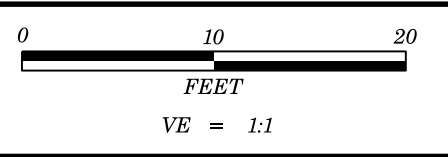
Ⓐ Roadway Embankment: Loose to Medium Dense, Moist, Tan-Black-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Gravel



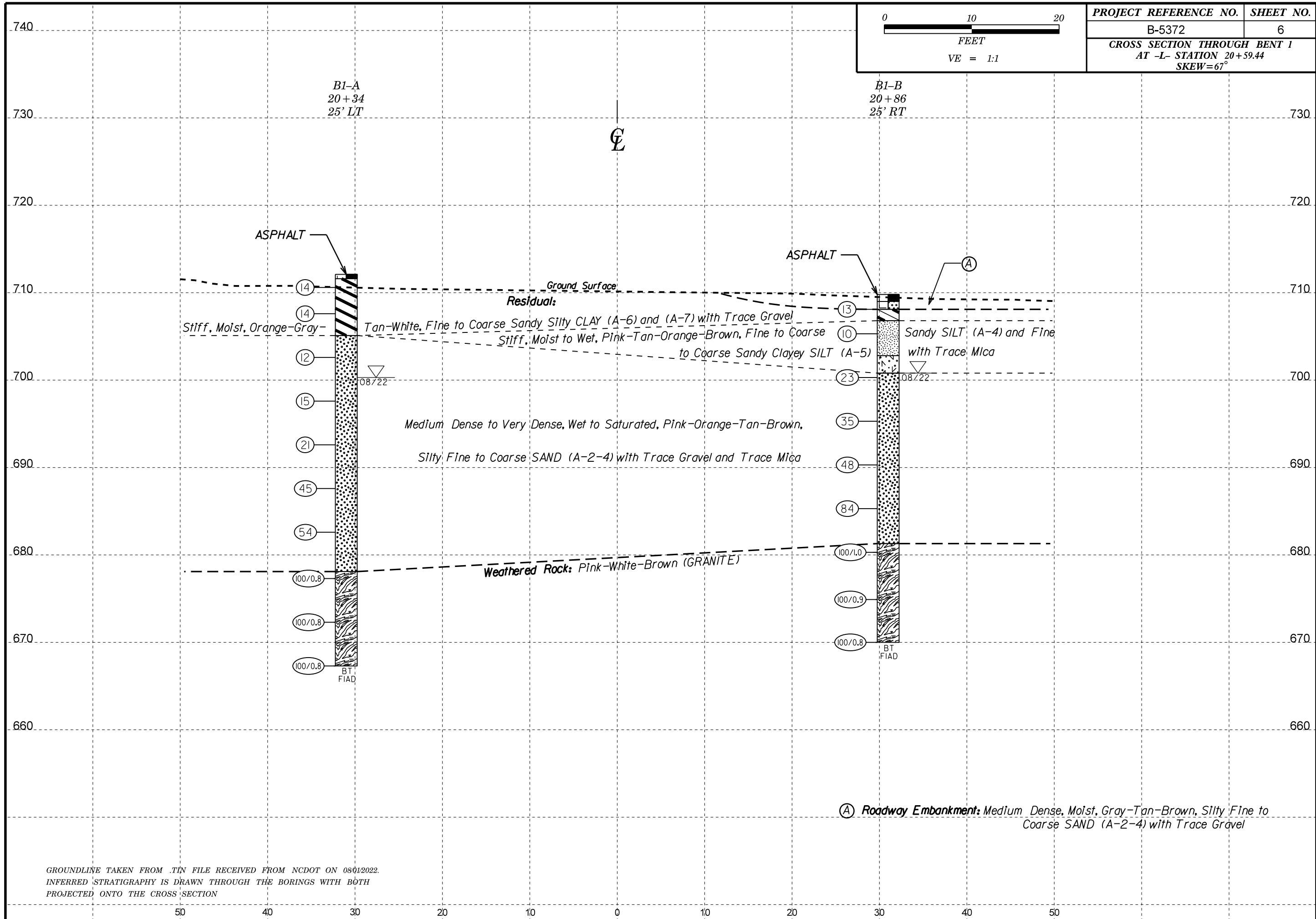
<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
B-5372	5
<b>CROSS SECTION THROUGH END BENT 1</b>	
AT -L- STATION 19+65.39	
SKEW=67°	



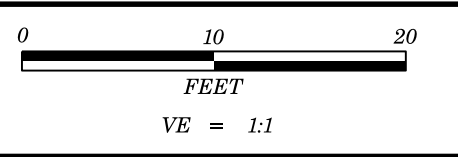
GROUNDLINE TAKEN FROM TIN FILE RECEIVED FROM NCDOT ON 08/01/2022.  
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
PROJECTED ONTO THE CROSS SECTION



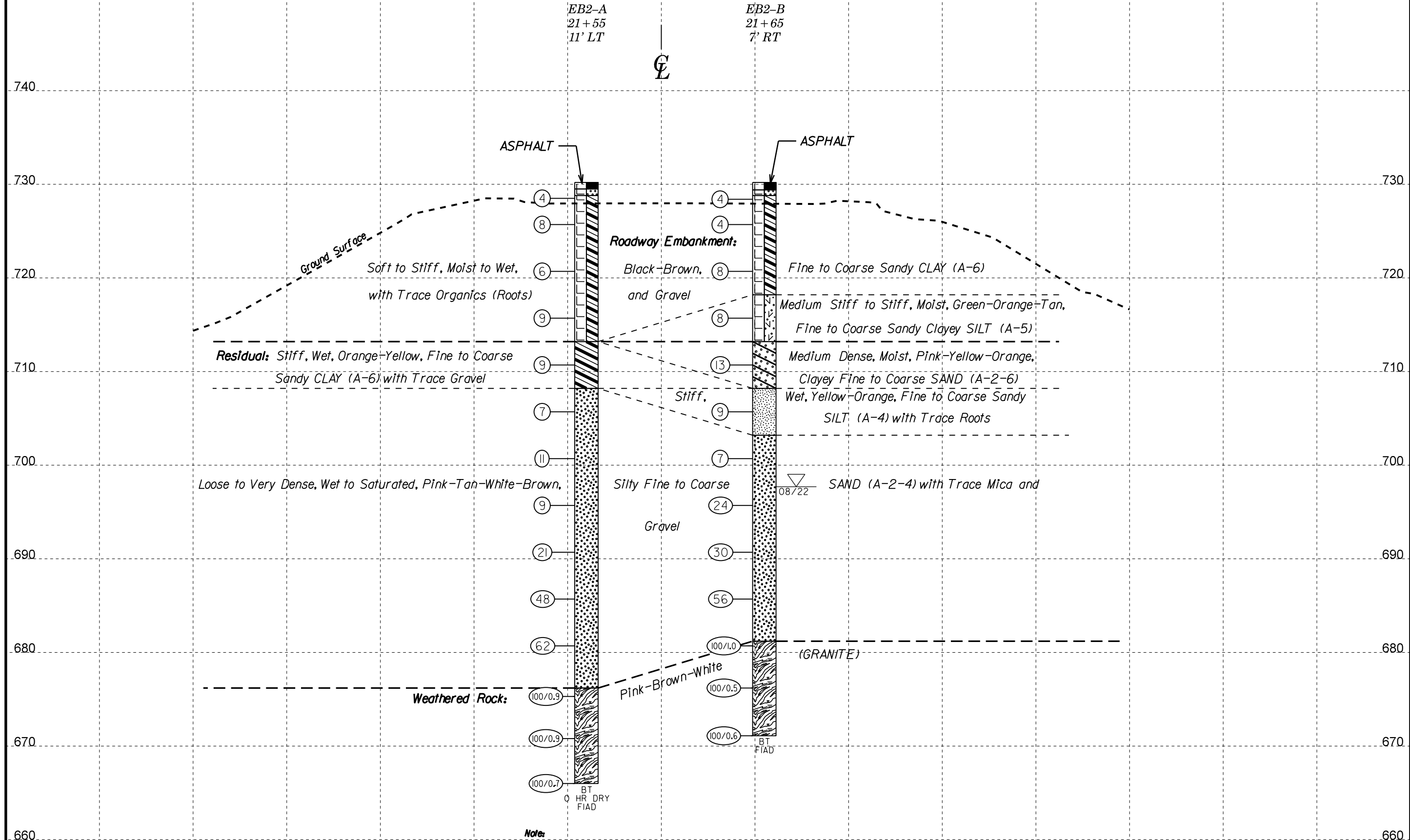
PROJECT REFERENCE NO.	SHEET NO.
B-5372	6
CROSS SECTION THROUGH BENT 1 AT -L- STATION 20+59.44 SKEW=67°	



GROUNDLINE TAKEN FROM TIN FILE RECEIVED FROM NCDOT ON 08/01/2022.  
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
PROJECTED ONTO THE CROSS SECTION



<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
B-5372	7
<b>CROSS SECTION THROUGH END BENT 2</b>	
AT -L- STATION 21+50.94	
SKEW=67°	



**Note:**  
Cave-in depth 29.0'

GROUNDLINE TAKEN FROM TIN FILE RECEIVED FROM NCDOT ON 08/01/2022.  
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH  
PROJECTED ONTO THE CROSS SECTION

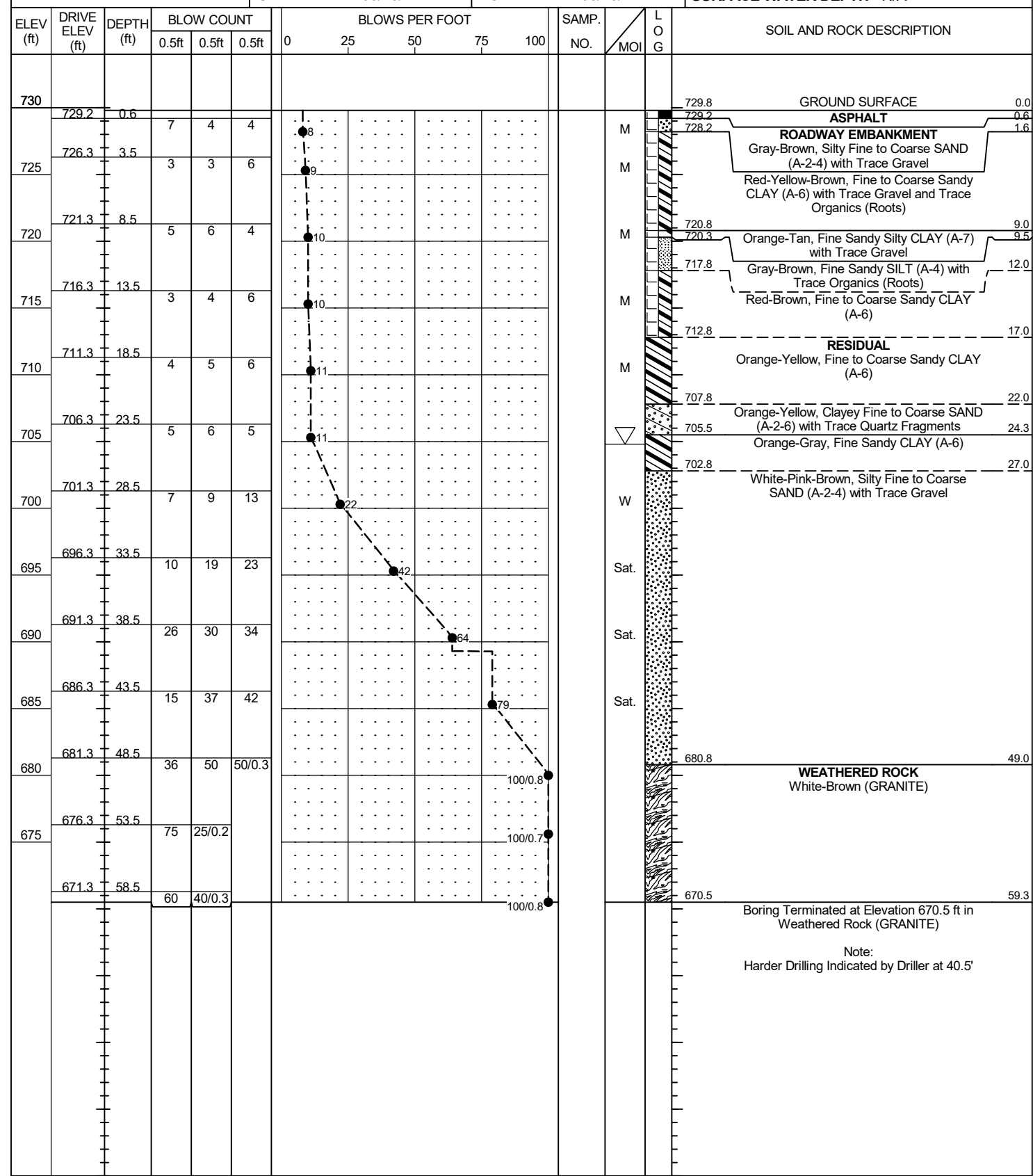
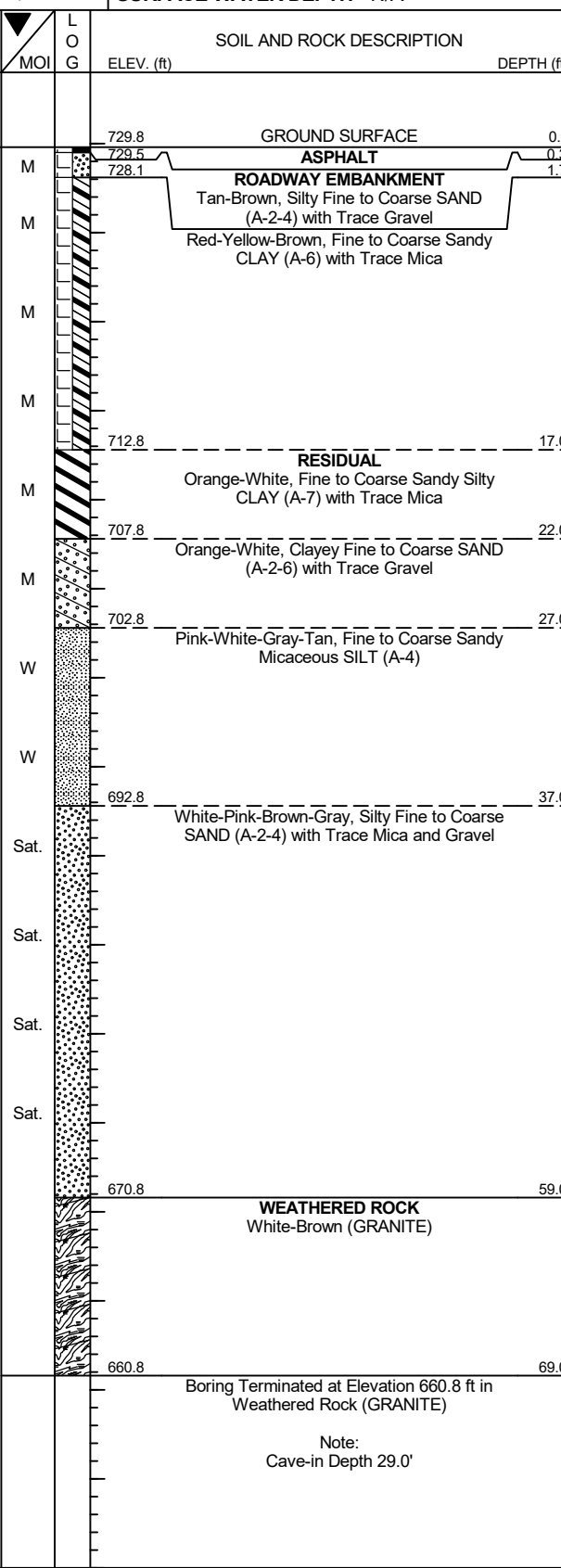
# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 46087.1.1		TIP B-5372		COUNTY CABARRUS		GEOLOGIST C. Ranieri										
SITE DESCRIPTION Replace Bridge No. 109 on SR 1706 (East 1st Street) over US 29							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 19+58		OFFSET 9 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 729.8 ft		TOTAL DEPTH 69.0 ft		NORTHING 638,175		EASTING 1,520,378										
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 87% 05/20/2022			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER A. Sturchio		START DATE 08/22/22		COMP. DATE 08/22/22		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						
730	729.5	0.3	17	11	4										729.8	0.0
	726.3	3.5	5	6	6										728.1	1.7
725	721.3	8.5	4	4	5											
720	716.3	13.5	4	5	5											
715	711.3	18.5	7	8	10											
710	706.3	23.5	11	25	15											
705	701.3	28.5	2	3	4											
700	696.3	33.5	4	6	6											
695	691.3	38.5	7	10	18											
690	686.3	43.5	9	14	24											
685	681.3	48.5	16	31	37											
680	676.3	53.5	25	38	50											
675	671.3	58.5	23	40	60/0.4											
670	666.3	63.5	40	60/0.4												
665	661.3	68.5	100/0.5													

WBS 46087.1.1		TIP B-5372		COUNTY CABARRUS		GEOLOGIST C. Ranieri										
SITE DESCRIPTION Replace Bridge No. 109 on SR 1706 (East 1st Street) over US 29							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 19+65		OFFSET 10 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 729.8 ft		TOTAL DEPTH 59.3 ft		NORTHING 638,155		EASTING 1,520,376										
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 87% 05/20/2022			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER A. Sturchio		START DATE 08/18/22		COMP. DATE 08/18/22		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						
730	729.2	0.6	7	4	4										729.8	0.0
	726.3	3.5	3	3	6										728.2	1.6
725	721.3	8.5	5	6	4											
720	716.3	13.5	3	4	6											
715	711.3	18.5	4	5	6											
710	706.3	23.5	5	6	5											
705	701.3	28.5	7	9	13											
700	696.3	33.5	10	19	23											
695	691.3	38.5	26	30	34											
690	686.3	43.5	15	37	42											
685	681.3	48.5	36	50	50/0.3											
680	676.3	53.5	75	25/0.2												
675	671.3	58.5	60	40/0.3												

NCDOT BORE DOUBLE B5372\_GEO\_BH\_BRDG.GPJ\_NC\_DOT.GDT 9/28/22



Boring Terminated at Elevation 660.8 ft in Weathered Rock (GRANITE)

Note: Cave-in Depth 29.0'

Boring Terminated at Elevation 670.5 ft in Weathered Rock (GRANITE)

Note: Harder Drilling Indicated by Driller at 40.5'



# GEOTECHNICAL BORING REPORT BORE LOG

WBS 46087.1.1			TIP B-5372			COUNTY CABARRUS			GEOLOGIST C. Ranieri		
SITE DESCRIPTION Replace Bridge No. 109 on SR 1706 (East 1st Street) over US 29									GROUND WTR (ft)		
BORING NO. B1-A			STATION 20+34			OFFSET 25 ft LT			ALIGNMENT -L-		
COLLAR ELEV. 712.1 ft			TOTAL DEPTH 44.8 ft			NORTHING 638,155			EASTING 1,520,453		
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 87% 05/20/2022						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic		
DRILLER A. Sturchio			START DATE 08/23/22			COMP. DATE 08/23/22			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					
715															
710	711.6	0.5	3	6	8							M	GROUND SURFACE ASPHALT	0.0	
	708.6	3.5	10	7	7							M	RESIDUAL Orange-Gray-Tan, Fine to Coarse Sandy Silty CLAY (A-7) with Trace Gravel	6.9	
705	703.6	8.5	2	6	6							M	Pink-Orange-Tan-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Gravel and Mica	7.0	
700	698.6	13.5	6	7	8							W			
695	693.6	18.5	6	9	12							W			
690	688.6	23.5	14	20	25							Sat.			
685	683.6	28.5	12	24	30							Sat.			
680	678.6	33.5	36	52	48/0.3									100/0.8	
675	673.6	38.5	35	59	41/0.3									100/0.8	
670	668.6	43.5	38	60	40/0.3									100/0.8	

Boring Terminated at Elevation 667.3 ft in Weathered Rock (GRANITE)

Note:  
Harder Drilling Indicated by Driller at 37.7'

WBS 46087.1.1			TIP B-5372			COUNTY CABARRUS			GEOLOGIST C. Ranieri		
SITE DESCRIPTION Replace Bridge No. 109 on SR 1706 (East 1st Street) over US 29									GROUND WTR (ft)		
BORING NO. B1-B			STATION 20+86			OFFSET 25 ft RT			ALIGNMENT -L-		
COLLAR ELEV. 709.8 ft			TOTAL DEPTH 39.8 ft			NORTHING 638,087			EASTING 1,520,477		
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 87% 05/20/2022						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic		
DRILLER A. Sturchio			START DATE 08/24/22			COMP. DATE 08/24/22			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	709.1	0.7	10	8	5										
705	706.3	3.5	3	4	6							M	ROADWAY EMBANKMENT Gray-Tan-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Gravel	3.0	
700	701.3	8.5	7	11	12							W	RESIDUAL Tan-White, Fine to Coarse Sandy CLAY (A-6) Tan-Pink, Fine to Coarse Sandy SILT (A-4) with Trace Mica	7.0	
695	696.3	13.5	9	15	20							W	Pink-Orange-Brown, Fine to Coarse Sandy Clayey SILT (A-5) with Trace Mica Pink-Brown, Silty Fine to Coarse SAND (A-2-4) with Trace Mica and Gravel	9.0	
690	691.3	18.5	11	22	26							Sat.			
685	686.3	23.5	6	36	48							Sat.			
680	681.3	28.5	38	62/0.5										100/1.0	
675	676.3	33.5	35	47	53/0.4									100/0.9	
670	671.3	38.5	38	54	46/0.3									100/0.8	

Boring Terminated at Elevation 670.0 ft in Weathered Rock (GRANITE)

NCDOT BORE DOUBLE B5372\_GEO\_BH\_BRDG.GPJ\_NC\_DOT.GDT 9/28/22

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 46087.1.1		TIP B-5372		COUNTY CABARRUS		GEOLOGIST C. Ranieri										
SITE DESCRIPTION Replace Bridge No. 109 on SR 1706 (East 1st Street) over US 29							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 21+55		OFFSET 11 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 730.2 ft		TOTAL DEPTH 64.2 ft		NORTHING 638,088		EASTING 1,520,555										
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 87% 05/20/2022			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER A. Sturchio		START DATE 08/23/22		COMP. DATE 08/23/22		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						
735																
730	729.5	0.7	6	2	2											
	726.7	3.5	2	3	5											
725																
	721.7	8.5	3	3	3											
720																
	716.7	13.5	3	4	5											
715																
	711.7	18.5	3	4	5											
710																
	706.7	23.5	3	3	4											
705																
	701.7	28.5	3	5	6											
700																
	696.7	33.5	3	4	5											
695																
	691.7	38.5	7	10	11											
690																
	686.7	43.5	11	22	26											
685																
	681.7	48.5	12	25	37											
680																
	676.7	53.5	27	53	47/0.4											
675																
	671.7	58.5	35	65/0.4												
670																
	666.7	63.5	52	48/0.2												

WBS 46087.1.1		TIP B-5372		COUNTY CABARRUS		GEOLOGIST C. Ranieri										
SITE DESCRIPTION Replace Bridge No. 109 on SR 1706 (East 1st Street) over US 29							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 21+65		OFFSET 7 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 730.2 ft		TOTAL DEPTH 59.1 ft		NORTHING 638,067		EASTING 1,520,556										
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 87% 05/20/2022			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER A. Sturchio		START DATE 08/19/22		COMP. DATE 08/19/22		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						
735																
730	729.4	0.8	4	2	2											
	726.7	3.5	2	2	2											
725																
	721.7	8.5	3	4	4											
720																
	716.7	13.5	3	4	4											
715																
	711.7	18.5	6	7	6											
710																
	706.7	23.5	2	4	5											
705																
	701.7	28.5	3	3	4											
700																
	696.7	33.5	6	11	13											
695																
	691.7	38.5	8	13	17											
690																
	686.7	43.5	15	24	32											
685																
	681.7	48.5	25	47	53/0.5											
680																
	676.7	53.5	100/0.5													
675																
	671.7	58.5	76	24/0.1												

NCDOT BORE DOUBLE B5372\_GEO\_BH\_BRDGG.FPJ\_NC\_DOT.GDT 9/28/22





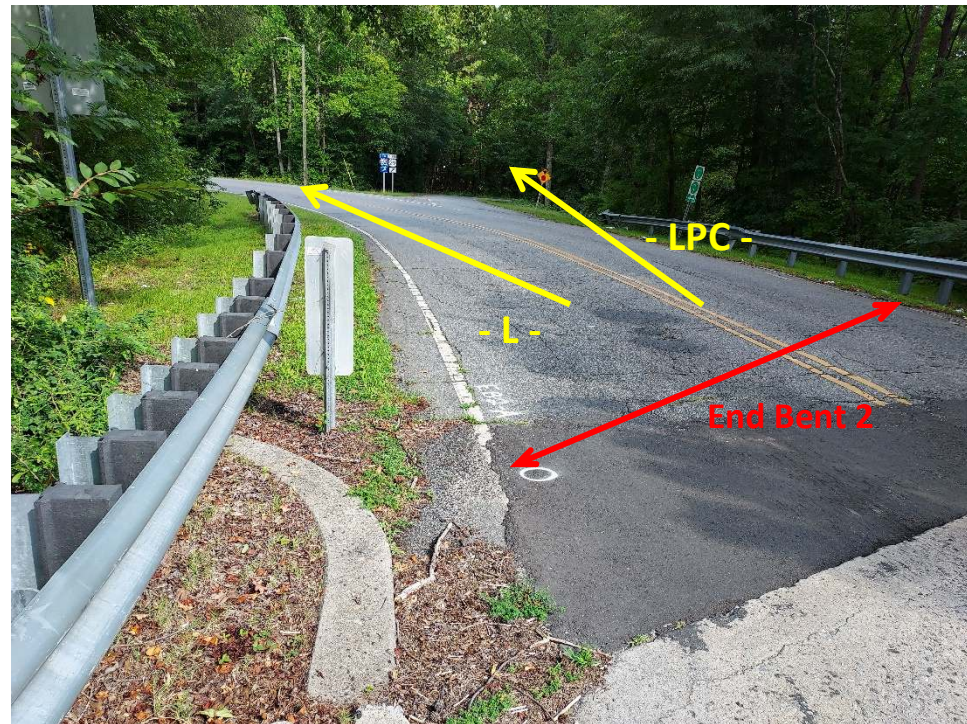
### Replace Bridge No. 109 over US 29 on SR 1706 (East 1<sup>st</sup> Street) SITE PHOTOGRAPHS



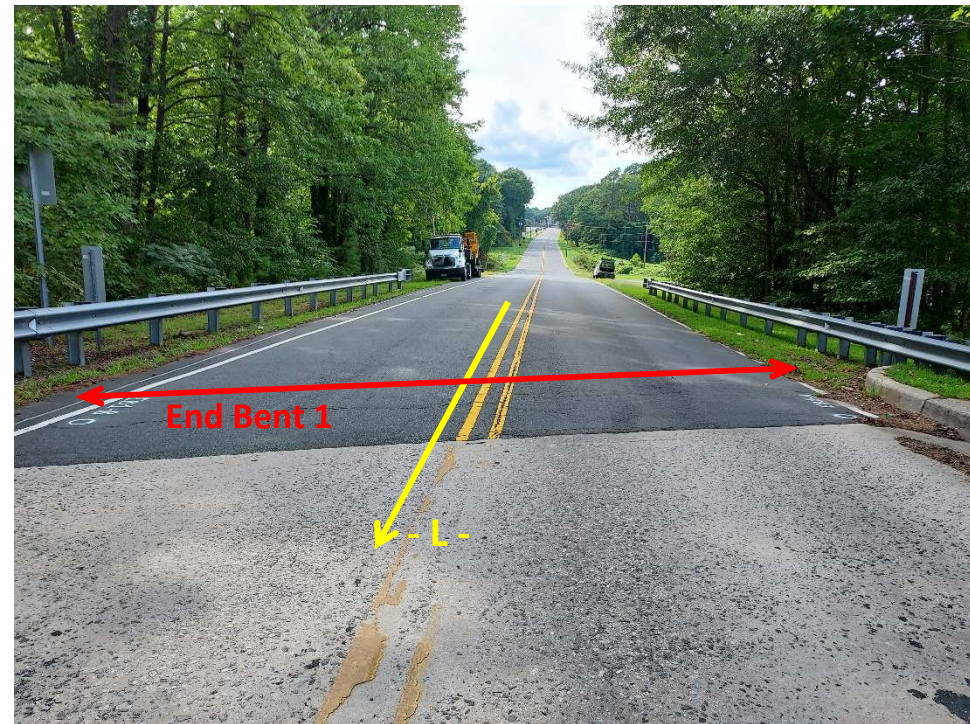
**Photograph No. 1:** View looking south from northwest side of the bridge



**Photograph No. 3:** View looking west at End Bent 2



**Photograph No. 2:** View looking east at End Bent 2



**Photograph No. 4:** View looking west at End Bent 1