

REFERENCE: BR-0168

PROJECT: 67168

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY FORSYTH
PROJECT DESCRIPTION REPLACE BRIDGE 330289 ON
SR-4000 (UNIVERSITY PARKWAY) OVER US-52
SITE DESCRIPTION BRIDGE 330289 ON SR-4000 AT -L-
STA. 20+73.79

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-8	BORE LOGS
9	SOIL LABORATORY TEST RESULTS
10	SITE PHOTOGRAPHS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0168	1	

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.

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

- P. BARRERA
- H. AGOPIAN
- C. ALLEN
- M. ULMER
- M. LATTIN
- BRIDGER DRILLING

INVESTIGATED BY ESP, Associates, Inc.
 DRAWN BY P. BARRERA
 CHECKED BY H. AGOPIAN
 SUBMITTED BY ESP Associates, Inc.
 DATE August 2024

 **ESP ASSOCIATES, INC.**
 7011 ALBERT PICK RD
 SUITE E
 GREENSBORO, NC 27409
 WWW.ESPASSOCIATES.COM



Signed by: 
 F2818ECD1DE2420 SIGNATURE DATE 09/03/2024

**DOCUMENT NOT CONSIDERED FINAL
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

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																																																												
<p>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</p>										<p>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.</p>										<p>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:</p>										<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. 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 (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																												
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="5">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <td>GROUP CLASS.</td> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</td> <td>A-2-5</td> <td>A-2-6</td> <td>A-2-7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SYMBOL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>% PASSING #10 #40 #200</td> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 35 MX 35 MX</td> <td>40 MX 35 MX</td> <td>41 MN 35 MX</td> <td>41 MN 35 MX</td> <td>40 MX 36 MN</td> <td>41 MN 36 MN</td> <td>40 MX 36 MN</td> <td>41 MN 36 MN</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>MATERIAL PASSING #40 LL PI</td> <td>-</td> <td>-</td> <td>40 MX 10 MN</td> <td>41 MN 11 MN</td> <td>41 MN 11 MN</td> <td>40 MX 11 MN</td> <td>40 MX 11 MN</td> <td>40 MX 11 MN</td> <td>40 MX 11 MN</td> <td>41 MN 11 MN</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>NO MX</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p style="text-align: center;">WEATHERING</p> <p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (IV 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.</p> <p>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.</p> <p>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.</p> <p>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</p> <p>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</p> <p>VERY SEVERE (IV 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</p> <p>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.</p>										<p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p>									
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<p style="text-align: center;">COLOR</p> <p>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.</p>										<p style="text-align: center;">RECOMMENDATION SYMBOLS</p> <p> UNDERCUT</p> <p> SHALLOW UNDERCUT</p> <p> UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</p> <p> UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p> <p> UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p>																																																																																																																																																																																																
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<p style="text-align: center;">INDURATION</p> <p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p> <p>FRIABLE - RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p> <p>MODERATELY INDURATED - GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p> <p>INDURATED - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p> <p>EXTREMELY INDURATED - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>										<p style="text-align: center;">NOTES:</p> <p>F.J.A.D. FILLED IN AFTER DRILLING</p> <p>BORING COORDINATES WERE OBTAINED FROM THE FILE "br0168.ncdot.fs.ORD.230725.dgn", AND THE BORING ELEVATIONS WERE OBTAINED FROM A BORING HUB SURVEY</p>																																																																																																																																																																																																
<p style="text-align: center;">COLOR</p> <p>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.</p>										<p style="text-align: center;">RECOMMENDATION SYMBOLS</p> <p> UNDERCUT</p> <p> SHALLOW UNDERCUT</p> <p> UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</p> <p> UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p> <p> UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</p>																																																																																																																																																																																																
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GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67168.1.1		TIP BR-0168		COUNTY FORSYTH		GEOLOGIST P. Barrera											
SITE DESCRIPTION Replace bridge 330289 on SR-4000 (University Parkway) over US-52.							GROUND WTR (ft)										
BORING NO. B1-B		STATION 20+37		OFFSET 65 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 805.2 ft		TOTAL DEPTH 73.5 ft		NORTHING 887,225		EASTING 1,623,626											
DRILL RIG/HAMMER EFF./DATE BRI3895 CME-55 91% 03/14/2024			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER K. Campbell		START DATE 06/20/24		COMP. DATE 06/21/24		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
810																	
805	804.2	1.0	3	6	9										805.2	0.0	GROUND SURFACE
	801.7	3.5	6	7	10												RESIDUAL Brown, Orange, and Black, Sandy SILT, low plasticity, trace Mica
800	799.2	6.0	7	12	13												
	796.7	8.5	2	5	6										797.2	8.0	Brown, Orange, and Grey, Sandy SILT, low plasticity, trace Mica
795	791.7	13.5	5	6	14												
	786.7	18.5	4	7	6												
790	781.7	23.5	9	15	20												
	776.7	28.5	13	10	15												
785	771.7	33.5	6	12	25												
	766.7	38.5	28	50	39												
780	761.7	43.5	100/0.3												761.7	43.5	WEATHERED ROCK MICA SCHIST
	756.7	48.5	100/0.2														
775	751.7	53.5	60/0.0														
	746.7	58.5	60/0.0														
770	741.7	63.5	60/0.0														
	736.7	68.5	60/0.0														
765	731.7	73.5	60/0.0														
																	Boring Terminated with Standard

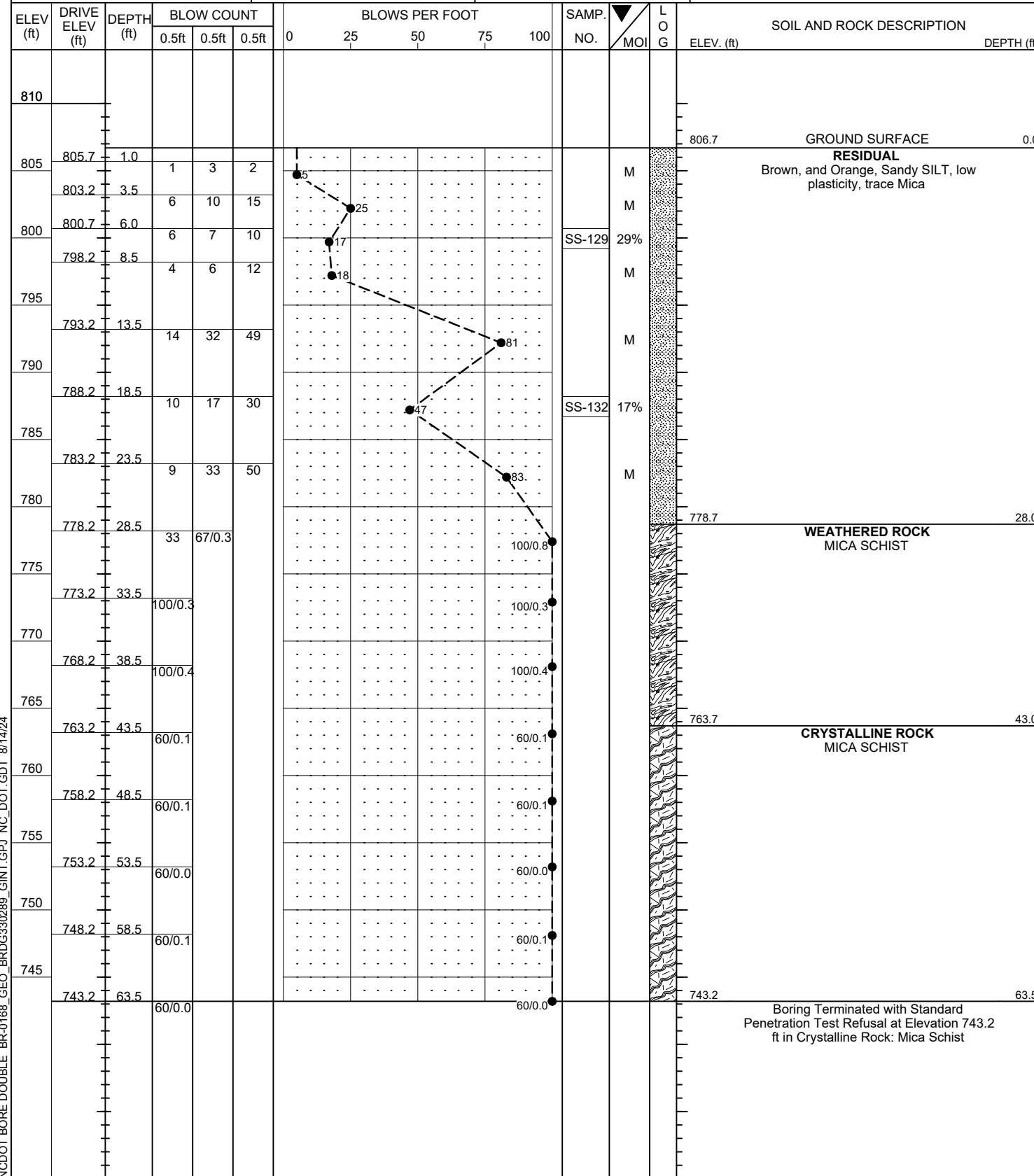
NCDOT BORE DOUBLE BR-0168_GEO_BRDG330289_GINT.GPJ NC_DOT_GDT 8/14/24

WBS 67168.1.1		TIP BR-0168		COUNTY FORSYTH		GEOLOGIST P. Barrera											
SITE DESCRIPTION Replace bridge 330289 on SR-4000 (University Parkway) over US-52.							GROUND WTR (ft)										
BORING NO. B1-B		STATION 20+37		OFFSET 65 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 805.2 ft		TOTAL DEPTH 73.5 ft		NORTHING 887,225		EASTING 1,623,626											
DRILL RIG/HAMMER EFF./DATE BRI3895 CME-55 91% 03/14/2024			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER K. Campbell		START DATE 06/20/24		COMP. DATE 06/21/24		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
730																	
																	Penetration Test Refusal at Elevation 731.7 ft in Crystalline Rock: Mica Schist

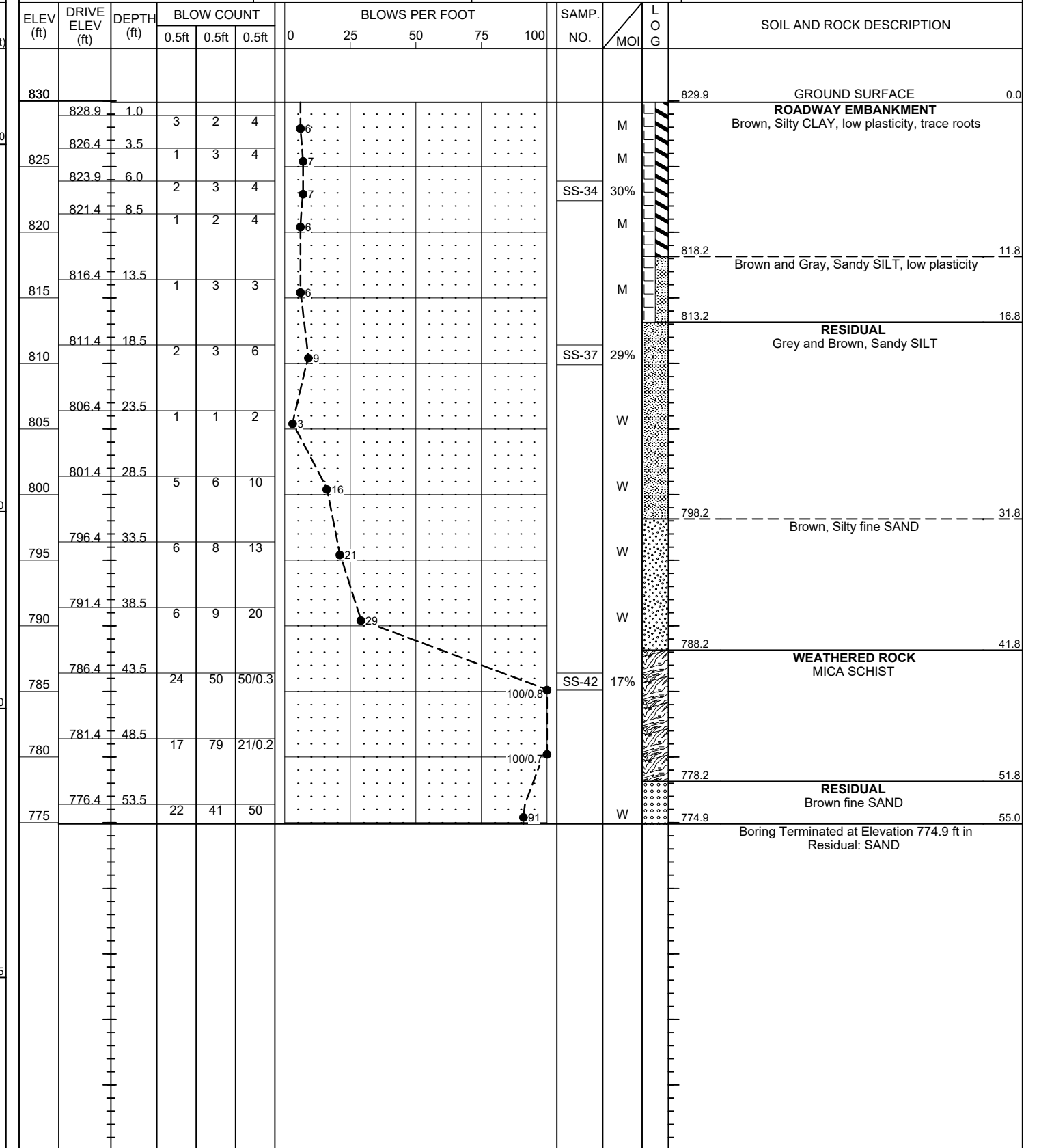
GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67168.1.1	TIP BR-0168	COUNTY FORSYTH	GEOLOGIST P. Barrera
SITE DESCRIPTION Replace bridge 330289 on SR-4000 (University Parkway) over US-52.			GROUND WTR (ft)
BORING NO. B1-C	STATION 20+75	OFFSET 6 ft RT	ALIGNMENT -L-
COLLAR ELEV. 806.7 ft	TOTAL DEPTH 63.5 ft	NORTHING 887,280	EASTING 1,623,582
DRILL RIG/HAMMER EFF./DATE BRI3895 CME-55 91% 03/14/2024		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER K. Campbell	START DATE 06/18/24	COMP. DATE 06/19/24	SURFACE WATER DEPTH N/A



WBS 67168.1.1	TIP BR-0168	COUNTY FORSYTH	GEOLOGIST H. Agopian & C. Allen
SITE DESCRIPTION Replace bridge 330289 on SR-4000 (University Parkway) over US-52.			GROUND WTR (ft)
BORING NO. EB2-A	STATION 22+52	OFFSET 28 ft LT	ALIGNMENT -L-
COLLAR ELEV. 829.9 ft	TOTAL DEPTH 55.0 ft	NORTHING 887,459	EASTING 1,623,607
DRILL RIG/HAMMER EFF./DATE BRI3895 CME-55 91% 03/14/2024		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER J. Anderson	START DATE 06/11/24	COMP. DATE 06/11/24	SURFACE WATER DEPTH N/A



NCDOT BORE DOUBLE BR-0168_GEO_BRDG330289_GINT.GPJ_NC_DOT_GDT_8/14/24

SOILS LABORATORY TESTS RESULTS

WBS NO.: 67168.1.1

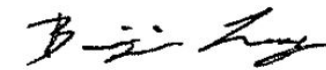
TIP NO.: BR-0168

COUNTY: Forsyth

SITE DESCRIPTION: Replace bridge 330289 on SR-4000 (University Parkway) over US-52

BORING NO.	SAMPLE NO.	BORING LOCATION	DEPTH INTERVAL (FT)	AASHTO CLASS	N	L.L	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
								CSE. SAND	F. SAND	SILT	CLAY	10	40	200		
EB1-A	SS-48	-L- STA. 19+28, 38' LT	8.5-10.0	A-5 (4)	10	50	5	8.9	43.4	31.9	15.9	97.2	92.4	58.0	30.7	-
EB1-A	SS-51	-L- STA. 19+28, 38' LT	23.5-25.0	A-6 (7)	10	40	12	13.5	25.9	36.1	24.5	99.9	92.7	66.9	33.8	-
EB1-A	SS-54	-L- STA. 19+28, 38' LT	38.5-40.0	A-4 (3)	33	34	8	10.8	46.2	31.0	12.0	100.0	96.2	54.6	24.3	-
EB1-B	SS-88	-L- STA. 19+05, 42' RT	6.0-7.5	A-7-6 (13)	7	44	25	10.7	31.2	13.2	44.9	97.9	93.0	63.1	20.3	-
EB1-B	SS-91	-L- STA. 19+05, 42' RT	18.5-20.0	A-6 (0)	13	35	11	35.2	32.8	10.6	21.3	96.9	77.8	35.1	20.7	-
EB1-C	SS-101	-L- STA. 19+30, 5' RT	3.5-5.0	A-7-6 (19)	9	52	31	10.7	24.8	12.0	52.6	96.0	91.0	66.5	25.6	-
EB1-C	SS-106	-L- STA. 19+30, 5' RT	23.5-25.0	A-5 (3)	7	44	6	9.2	44.9	32.5	13.4	97.7	93.5	56.9	34.9	-
EB1-C	SS-109	-L- STA. 19+30, 5' RT	38.5-40.0	A-4 (1)	27	34	7	19.3	38.6	30.5	11.6	94.1	84.0	47.2	22.6	-
B1-A	SS-143	-L- STA. 20+91, 31' LT	3.5-5.0	A-4 (0)	12	37	8	25.1	40.7	24.8	9.4	83.7	73.2	35.8	23.3	-
B1-A	SS-146	-L- STA. 20+91, 31' LT	13.5-15.0	A-7-5 (2)	21	42	11	20.1	47.5	25.1	7.3	99.2	90.6	41.6	29.4	-
B1-B	SS-158	-L- STA. 20+37, 65' RT	3.5-5.0	A-4 (0)	17	36	8	25.3	43.0	23.9	7.7	95.2	81.7	38.9	21.2	-
B1-B	SS-161	-L- STA. 20+37, 65' RT	13.5-15.0	A-4 (2)	20	38	10	19.9	46.4	23.7	10.0	97.9	86.9	43.3	26.8	-
B1-B	SS-164	-L- STA. 20+37, 65' RT	28.5-30.0	A-2-4 (0)	25	32	7	30.2	38.3	21.5	10.0	78.1	63.0	30.3	15.6	-
B1-C	SS-129	-L- STA. 20+75, 6' RT	6.0-7.5	A-4 (3)	17	40	10	17.8	39.4	26.4	16.3	98.1	89.2	51.3	29.0	-
B1-C	SS-132	-L- STA. 20+75, 6' RT	18.5-20.0	A-4 (1)	47	33	8	21.1	42.3	26.2	10.4	99.8	88.8	46.8	16.7	-
EB2-A	SS-34	-L- STA. 22+52, 28' LT	6.0-7.5	A-7-5 (6)	7	41	11	12.7	29.5	27.6	30.2	98.9	92.7	64.0	30.4	-
EB2-A	SS-37	-L- STA. 22+52, 28' LT	18.5-20.0	A-4 (1)	9	34	6	20.6	36.6	24.9	17.9	98.9	88.6	49.9	29.0	-
EB2-A	SS-42	-L- STA. 22+52, 28' LT	43.5-45.0	A-4 (0)	100/0.8	25	4	28.4	35.0	20.7	15.9	99.2	85.6	42.7	17.3	-
EB2-B	SS-08	-L- STA. 21+99, 68' RT	8.5-10.0	A-7-5 (21)	6	62	32	14.2	24.4	13.6	47.8	98.6	90.5	65.9	43.0	-
EB2-B	SS-10	-L- STA. 21+99, 68' RT	18.5-20.0	A-7-5 (20)	6	57	27	10.1	21.8	16.1	52.0	98.2	93.0	71.7	22.5	-
EB2-B	SS-13	-L- STA. 21+99, 68' RT	33.5-35.0	A-4 (2)	35	34	8	16.7	42.3	27.7	13.3	99.8	93.6	49.5	24.4	-
EB2-C	SS-114	-L- STA. 22+01, 7' RT	3.5-5.0	A-7-6 (3)	4	43	19	18.9	29.4	19.1	32.6	68.5	61.3	39.8	16.3	-
EB2-C	SS-116	-L- STA. 22+01, 7' RT	8.5-10.0	A-7-5 (7)	5	48	18	13.5	30.6	24.7	31.1	83.5	77.3	53.2	n.d.*	-
EB2-C	SS-119	-L- STA. 22+01, 7' RT	23.5-25.0	A-7-5 (18)	7	54	23	8.9	24.0	13.7	53.4	99.5	95.1	72.5	24.8	-

* - No Data

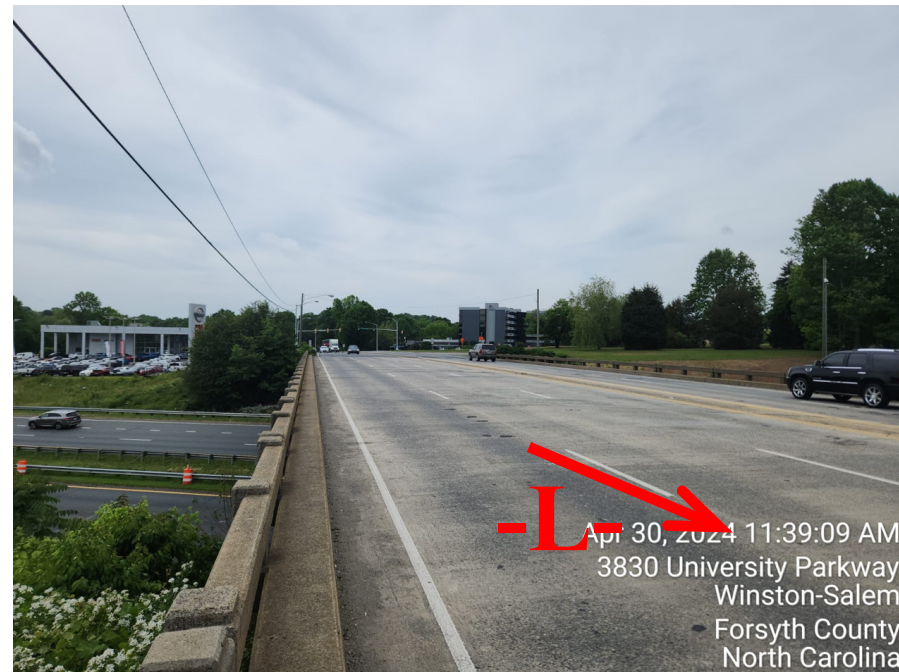


Certification No. 144-02-0718

SITE PHOTOGRAPHS

Bridge No. 330289 on SR-4000 (University Parkway) over US-52

Looking Down-station from NE corner



Looking from the west (SW corner)



Looking from the East



Looking Up-station from SE corner