



July 16, 2024

MEMORANDUM TO: Matthew J. Alexander, P.E.
State Geotechnical Engineer

FROM: Brian D. Keaney, P.E.
Senior Project Manager

WBS NUMBER: 67004.1.1
TIP NUMBER: BR-0004
PROJECT NUMBER: 44305
COUNTY: Beaufort & Hyde
DESCRIPTION: Bridge No. 66 On US 264 Over Pungo River

SUBJECT: Pavement and Subgrade Investigation Report

HDR Engineering, Inc. of the Carolinas (HDR) has completed the evaluation of the pavement and subgrade investigation for this project and presents the following.

The proposed work consists of constructing a bridge on US 264 over Pungo River. A bridge replacement with approach roadways is proposed along an offset alignment south of the existing alignment. The project consists of relocation of existing US 264 to a 2-lane undivided roadway with 12-foot travel lanes and 8-foot shoulders for the bridge and approach roadways. The project is also proposed to improve the US 264/ Gum Neck Road intersection, located on the south side of US 264 at the river, and consolidates the two intersections into one 2-lane undivided roadway with 11-foot travel lanes on Gum Neck Road (SR 1712). The proposed bridge replacement structure is currently planned to be six (6) spans at 102 feet each, totaling 612 feet in length.

The subgrade beneath the existing roadway consists of roadway embankment, alluvial, and undivided coastal plain fine sand (A-2-4, A-3) and clay (A-6, A-7-6).

Anticipated borrow will likely consist of common borrow material conforming to coastal area criteria 1018-2 (B) of the Standard Specification.

The length of this project is 0.5 miles.

The existing pavement is in good condition consisting of low severity, transverse and longitudinal cracking to no pavement distress.



AREAS OF SPECIAL GEOTECHNICAL INTEREST

A. Highly Plastic Clays:

Locations of clays with PI of 16 or greater

LINE	STATION AND OFFSET	PI
-L-	12+00 RT	34

B. Trapped Water within the Pavement:

Trapped water was not encountered during this investigation.

C. Soils with a High Moisture Content:

Locations of soils that were classified as wet to saturated:

LINE	STATION AND OFFSET	MOISTURE CONTENT
-L-	12+00 RT	21%
-L-	26+90 RT	18-22%
-L-	30+00 CL	24%
-Y1A-	12+23 LT	19%

D. Groundwater:

The locations where the groundwater was observed within 6 feet of proposed subgrade during this investigation:

LINE	STATION AND OFFSET	MOISTURE CONTENT
-L-	12+00 RT	Sat.-Wet
-L-	17+00 CL	Sat.-Wet
-L-	37+00 RT	Sat.-Wet
-Y1-	11+56 CL	Sat.-Wet
-Y1A-	12+23 LT	Sat.-Wet

If you should have any questions or need additional information, please contact me at (919) 232-6630 or at brian.keaney@hdrinc.com.

Sincerely,
HDR Engineering, Inc. of the Carolinas

Saket Kabra, P.E.
Geotechnical Engineer

Brian D. Keaney, P.E.
Senior Project Manager



ATTACHMENT 1:

Pavement and Subgrade Inventory

17

REFERENCE: BR-0004

PROJECT: 67004

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

PAVEMENT &
SUBGRADE INVESTIGATION

COUNTY BEAUFORT & HYDE
PROJECT DESCRIPTION BRIDGE NO. 66 ON US 264
OVER PUNGO RIVER

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
4-6	PLAN SHEETS
7	PAVEMENT DATA SHEET
8-9	DCP RESULTS GRAPHS
10-11	DCP RAW DATA LOGS
12-13	PAVEMENT CORE PHOTOS
14	PAVEMENT CORE EVALUATION SHEET
15-17	LAB RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0004	1	17

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 1919 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

MAD PERSONNEL

K. TACKETT

C. SWAFFORD

INVESTIGATED BY HDR

DRAWN BY C. SWAFFORD

CHECKED BY P. ZHANG

SUBMITTED BY HDR

DATE JULY 2024

HDR HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116



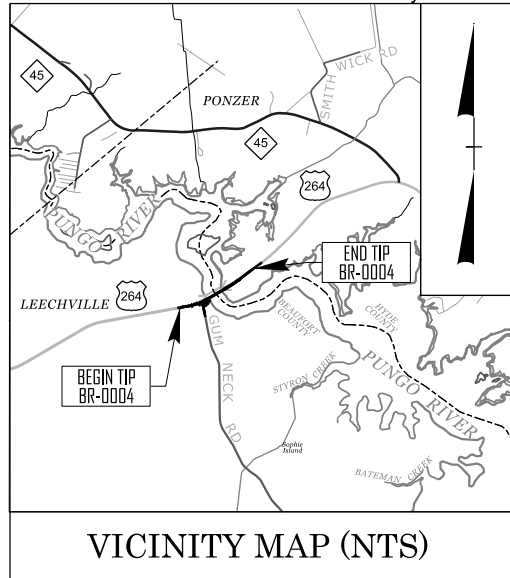
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**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

**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, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></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 DISLOADED 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 (IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH ODD 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>																																																																																																																																															
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<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>DRILL UNITS:</p> <p><input checked="" type="checkbox"/> CME-45</p> <p><input type="checkbox"/> CME-55</p> <p><input type="checkbox"/> CME-550</p> <p><input type="checkbox"/> VANE SHEAR TEST</p> <p><input type="checkbox"/> PORTABLE HOIST</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>										<p>ADVANCING TOOLS:</p> <p><input type="checkbox"/> CLAY BITS</p> <p><input checked="" type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER</p> <p><input type="checkbox"/> 8" HOLLOW AUGERS</p> <p><input type="checkbox"/> HARD FACED FINGER BITS</p> <p><input type="checkbox"/> TUNG-CARBIDE INSERTS</p> <p><input type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER</p> <p><input type="checkbox"/> TRICONE _____ * STEEL TEETH</p> <p><input type="checkbox"/> TRICONE _____ * TUNG-CARB.</p> <p><input type="checkbox"/> CORE BIT</p> <p><input checked="" type="checkbox"/> KESSLER DCP</p>										<p>HAMMER TYPE:</p> <p><input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL</p> <p>CORE SIZE:</p> <p><input type="checkbox"/> -B _____ <input type="checkbox"/> -H _____</p> <p><input type="checkbox"/> -N _____</p> <p>HAND TOOLS:</p> <p><input type="checkbox"/> POST HOLE DIGGER</p> <p><input type="checkbox"/> HAND AUGER</p> <p><input type="checkbox"/> SOUNDING ROD</p> <p><input type="checkbox"/> VANE SHEAR TEST</p> <p><input type="checkbox"/></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>BENCH MARK:</p> <p style="text-align: right;">ELEVATION: _____ FEET</p>																																																																																																																											

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols



FIELD INSPECTION PLAN SET

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BEAUFORT & HYDE COUNTY

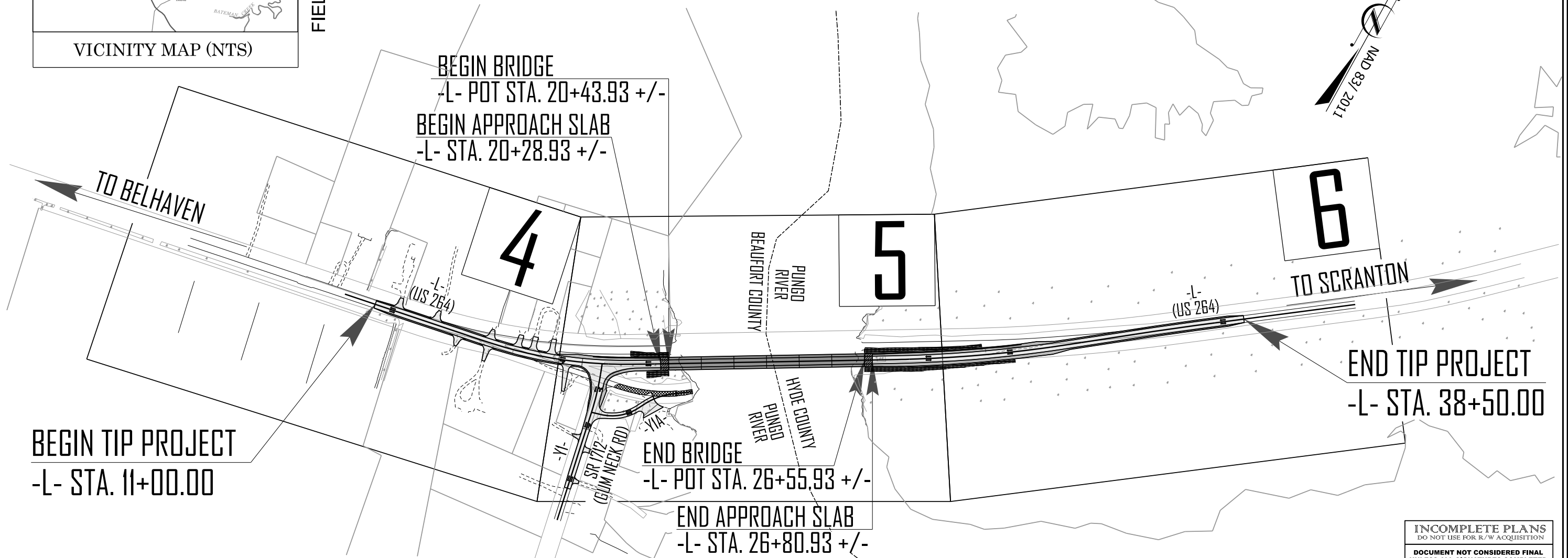
LOCATION: BRIDGE NO. 66 ON US. 264 OVER PUNGO RIVER

TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0004	11	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
67004.1.1	N/A	P.E.	

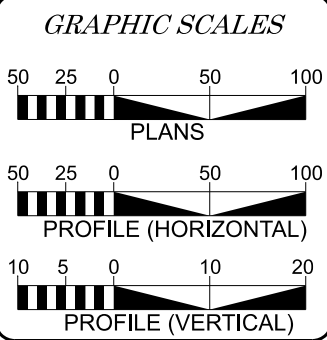
TIP PROJECT: BR-0004

CONTRACT:



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

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.



DESIGN DATA

ADT 2025 = 2,763
ADT 2045 = 3,800

K = 9 %
D = 55 %
T = 17 % *
V = 60 MPH

(* TTST 3% + DUAL 14%)
FUNC CLASS = RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BR-0004 = 0.405 MILES
LENGTH STRUCTURE TIP PROJECT BR-0004 = 0.116 MILES
TOTAL LENGTH TIP PROJECT BR-0004 = 0.521 MILES

NCDOT CONTACT: CATHERINE A. HOSSACK-MEYER, PE
PROJECT MANAGER

HDR HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: OCTOBER 31, 2024
LETTING DATE: SEPTEMBER 16, 2025

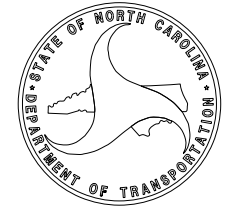
DOMENICA A. COLETTI, PE
PROJECT ENGINEER

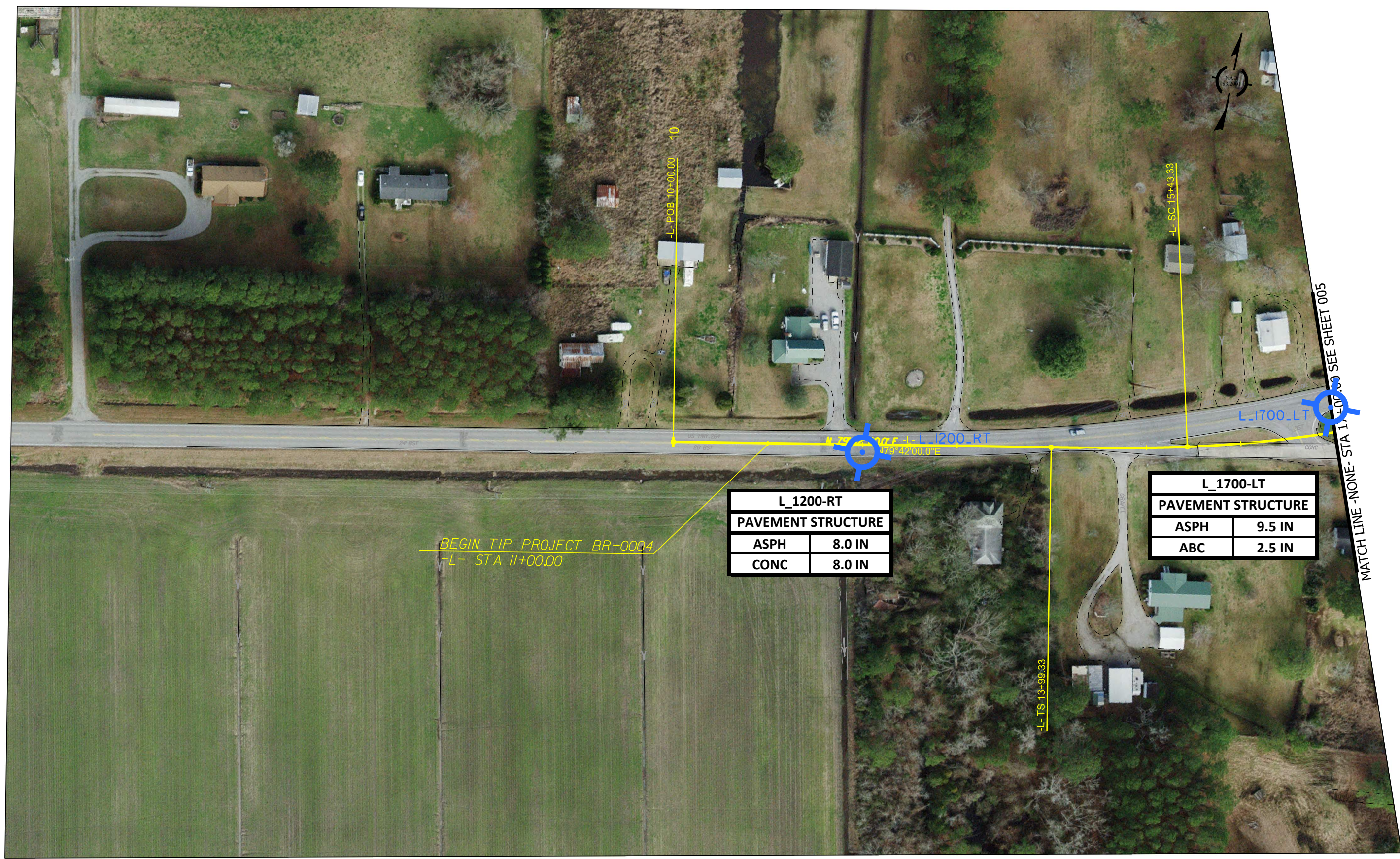
JORDAN C. BOND, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____
ROADWAY DESIGN ENGINEER

SIGNATURE: _____
P.E.





BEGIN TIP PROJECT BR-0004
-L- STA 11+00.00

-L- POB 10+00.00 10

-L- SC 15+43.33

-L- TS 13+99.33

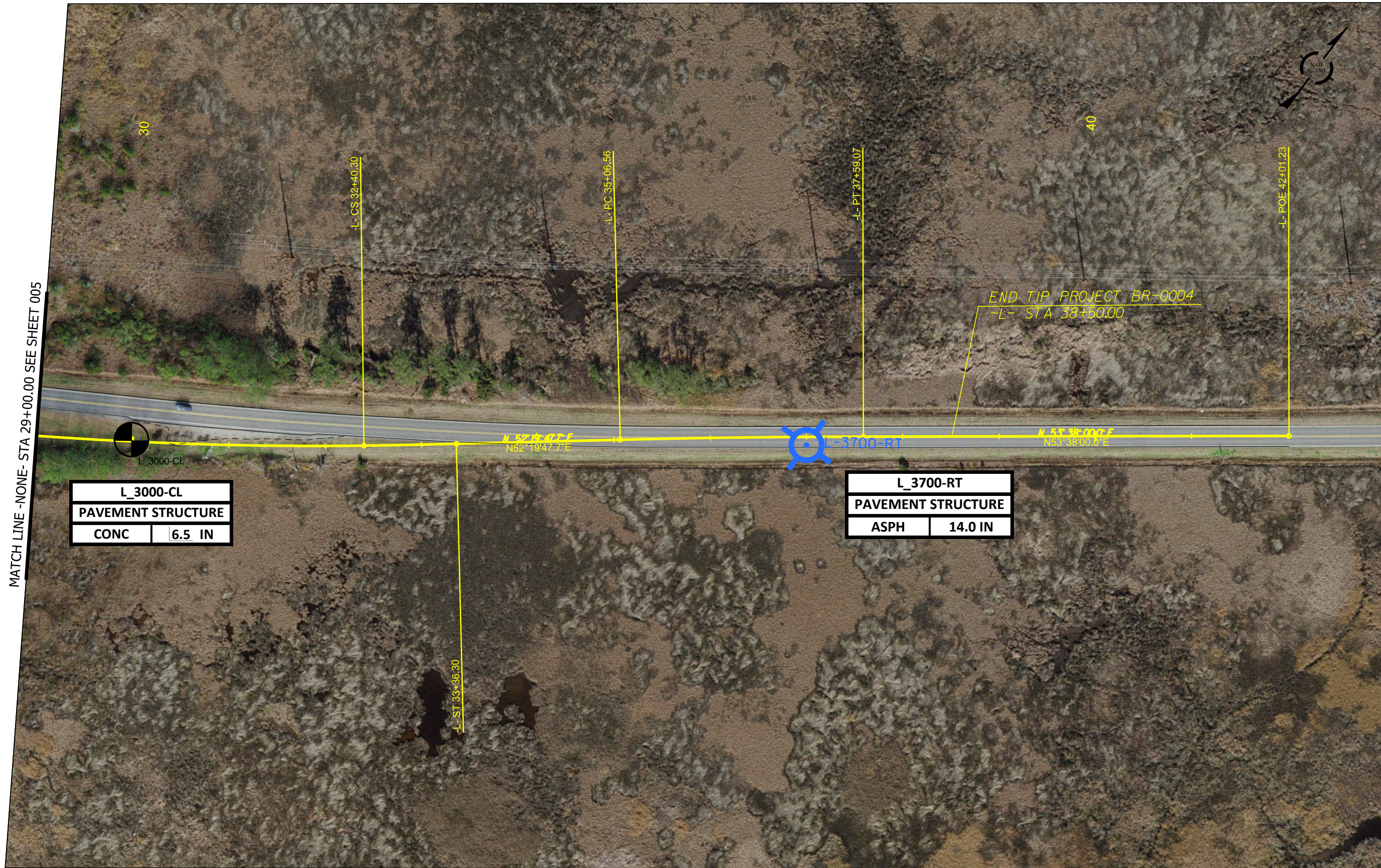
L_1200-RT	
PAVEMENT STRUCTURE	
ASPH	8.0 IN
CONC	8.0 IN

L_1700-LT	
PAVEMENT STRUCTURE	
ASPH	9.5 IN
ABC	2.5 IN

MATCH LINE - NONE - STA 14+00.00 SEE SHEET 005

REVISIONS

MATCH LINE - NONE - STA 29+00.00 SEE SHEET 005



L_3000-CL	
PAVEMENT STRUCTURE	
CONC	6.5 IN

L_3700-RT	
PAVEMENT STRUCTURE	
ASPH	14.0 IN

END TIP PROJECT BR-0004
-L- STA 38+50.00

BR-0004

006

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY



ROADWAY DESIGN UNIT
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PREPARED BY

MDR Engineering, Inc. of the Carolinas
3800 Parkside Dr., Suite 100, Raleigh, NC 27606
N.C. B.E.L.S. License Number: P-0116

REVISIONS

PAVEMENT INVESTIGATION DATA SHEET

Project:	Bridge No. 66 on US 264 over Pungo River		
TIP:	BR-0004	WBS No.:	67004.1.1

Route:	US 264
County:	Beaufort & Hyde County

Position (Sta., Lane, Shldr.)	Cut/Fill (Est. of Amount)	Width				Crown "C" or Super "S"	Gross to Top of Soil (in)	Thickness				Pavement Layering	Subgrade				GPS Coordinates	
		Lane(s) (ft)	Shoulder(s) (ft)	Offset FW (ft)				Asphalt (in)	Concrete (in)	ABC (in)	Stabilized Subgrade Soil (in)		Description	Sample Number	AASHTO Classification	Soil Moisture	Asphalt Notes	Northing
L_1200-RT *	FILL (2')	10.0	2.25	4.0	C	16.0	8.0	8.0	0.0	0.0	ASPHALT			N/A	N/A	Low severity longitudinal and transverse pavement cracking to no pavement distress	671,854	2,741,899
											CONCRETE			N/A	N/A			
											ROADWAY EMBANKMENT	1.3 - 1.9': Gray, CLAY (A-7-6), tr. F-C sand	S-18a	A-7-6	21			
											ALLUVIAL	1.9 - 10.1': Gray, F-C silty and clayey SAND (A-2-4, A-2-6)		A-2-4 / A-2-6	M			
L_1700-LT	FILL (5')	11.0	2.75	4.5	C	12.0	9.5	0.0	2.5	0.0	ASPHALT					Low severity longitudinal and transverse pavement cracking to no pavement distress	671,991	2,742,377
											CONCRETE							
											ROADWAY EMBANKMENT	1.0 - 5.0': Brown and gray, F-C silty SAND (A-2-4), tr. clay		A-2-4	M			
L_2690-RT	FILL (3')	N/A	N/A	N/A	N/A	5.5	N/A	5.5	N/A	0.0	CONCRETE					SPT boring where concrete from abandoned road was encountered.	672,426	2,743,263
											ROADWAY EMBANKMENT	0.5 - 3.0': Brown, sandy slightly plastic SILT (A-4(2))	SS-68	A-4(2)	18			
											ALLUVIAL	3.0 - 8.0': Brown, soft, sandy slightly plastic SILT (A-4(4))	SS-70	A-4(4)	22			
L_3000-CL	AT GRADE	N/A	N/A	N/A	N/A	6.5	N/A	6.5	N/A	0.0	CONCRETE					SPT boring where concrete from abandoned road was encountered.	672,606	2,743,517
											ALLUVIAL	0.6 - 5.5': Gray, sandy slightly plastic SILT (A-4(3))	SS-48	A-4(3)	24			
L_3700-RT	FILL (5.5')	10.0	1.75	1.3	C	14.0	14.0	0.0	0.0	0.0	ASPHALT					Low severity longitudinal and transverse pavement cracking to no pavement distress	673,011	2,744,088
											ROADWAY EMBANKMENT	1.2 - 5.5': Black, F silty SAND (A-2-4)		A-2-4	W			
Y1_1156-CL	FILL (3')	8.0	1.25	4	C	1.0	1.0	0.0	0.0	0.0	ASPHALT					Low severity longitudinal and transverse pavement cracking to no pavement distress	671,872	2,742,555
											ROADWAY EMBANKMENT	0.1 - 3.0': Brown, SAND and GRAVEL (A-1-b), tr-little silt		A-1-b	M			
											UCP	3.0 - 5.0': Tan and orange, C SAND (A-3)		A-3	M			
Y1A_1223-LT	AT GRADE	13.0	0.0	3.5 (FROM EOP)	C	7.0	0.0	7.0	0.0	0.0	CONCRETE					Moderate to severe longitudinal cracking on concrete	672,021	2,742,707
											ALLUVIAL	0.6 - 2.0': Gray, CLAY (A-6), trace F-C sand	SS-1	A-6	19			

NOTES: *SPT boring performed below pavement core and DCP test

OSL = Outside Lane	CTL = Center Turn Lane	OSS = Outside Shoulder	PS = Paved Shoulder	RT = Right	NB = Northbound
ISL = Inside Lane	RTL = Right Turn Lane	ISS = Inside Shoulder	RT LN = Right Lane	LT = Left	SB = Southbound
CL = Center Lane	DECEL = Deceleration Lane	GM = Grass Median	LT LN = Left Lane	(I) = Inside	FW = From White
LTL = Left Turn Lane	ACCEL = Acceleration Lane	OGS = Outside Grass Shoulder	COL = Collector Lane	(O) = Outside	FY = From Yellow

CONE PENETROMETER RESULTS

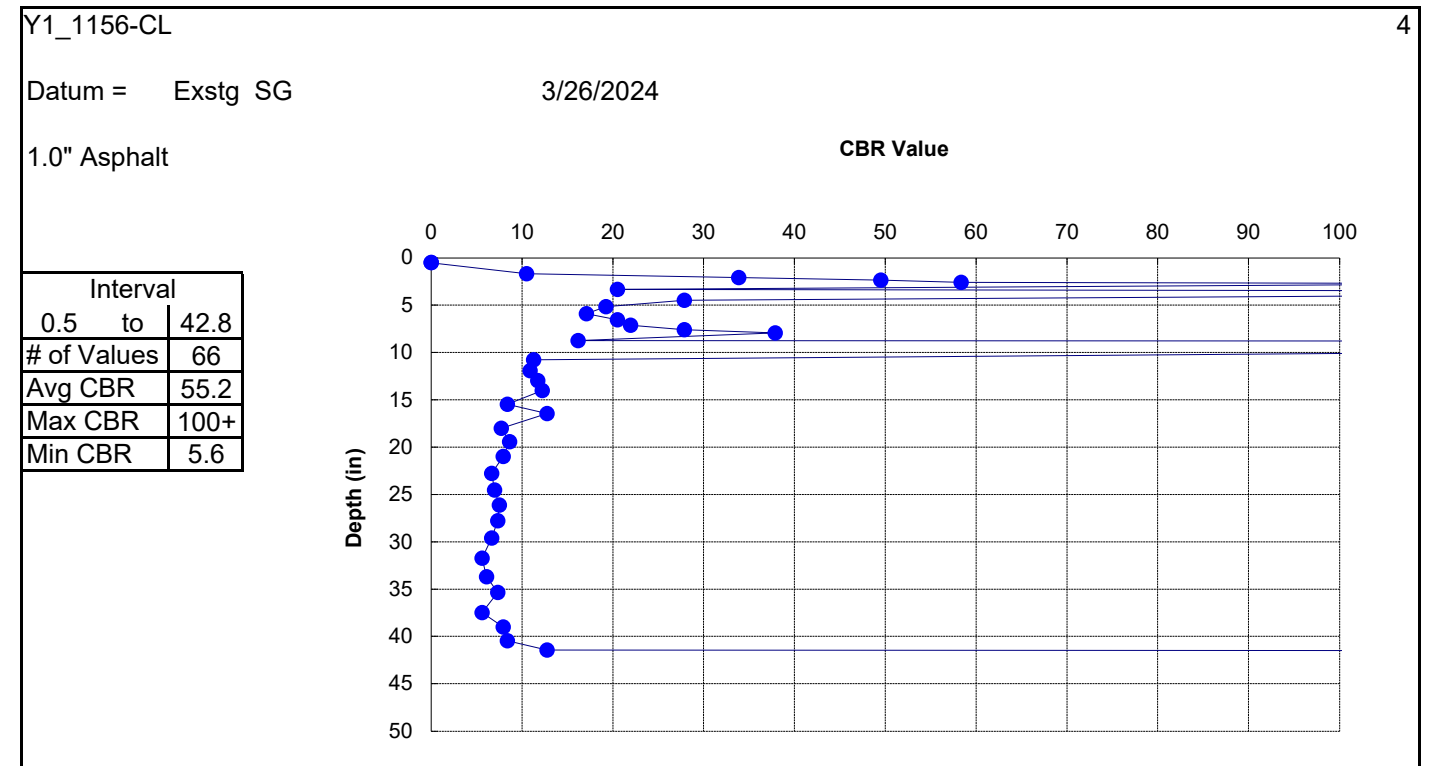
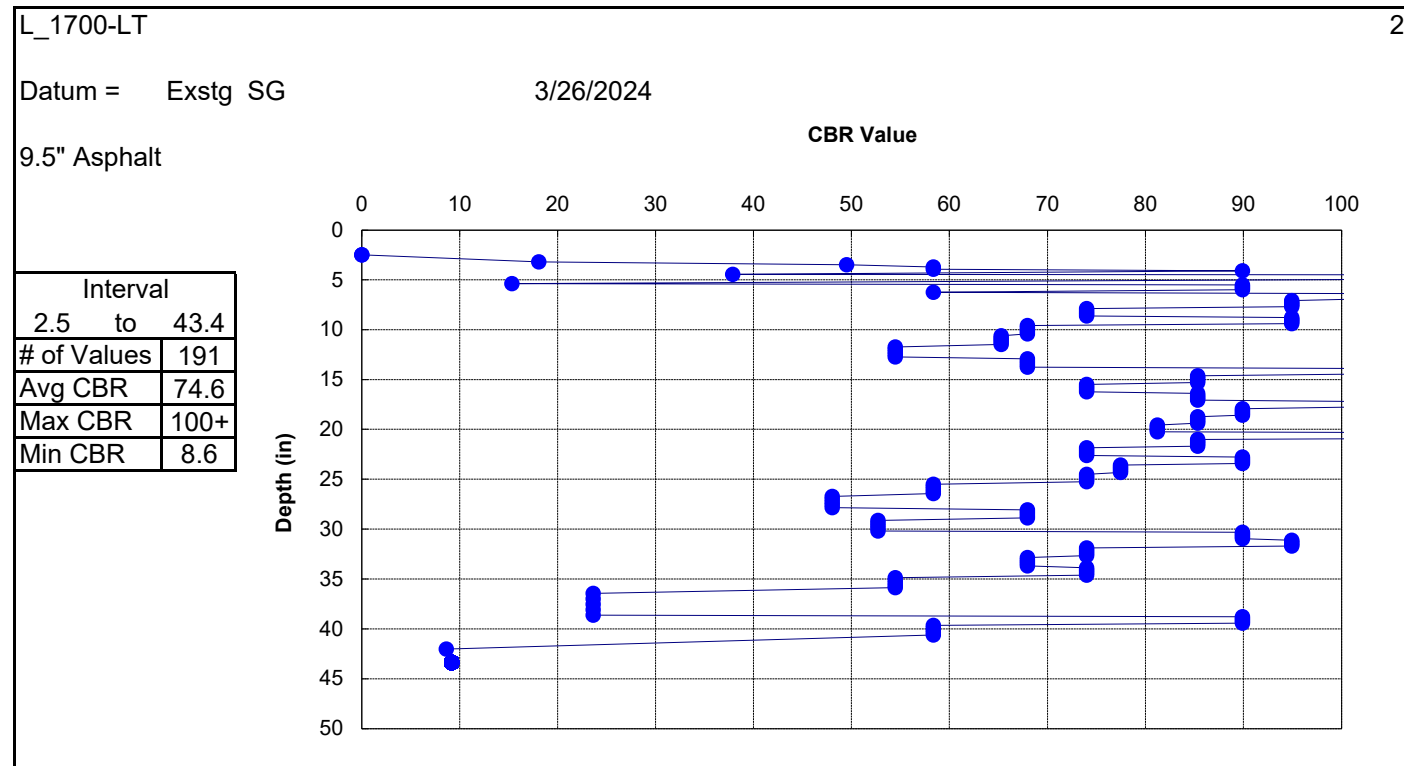
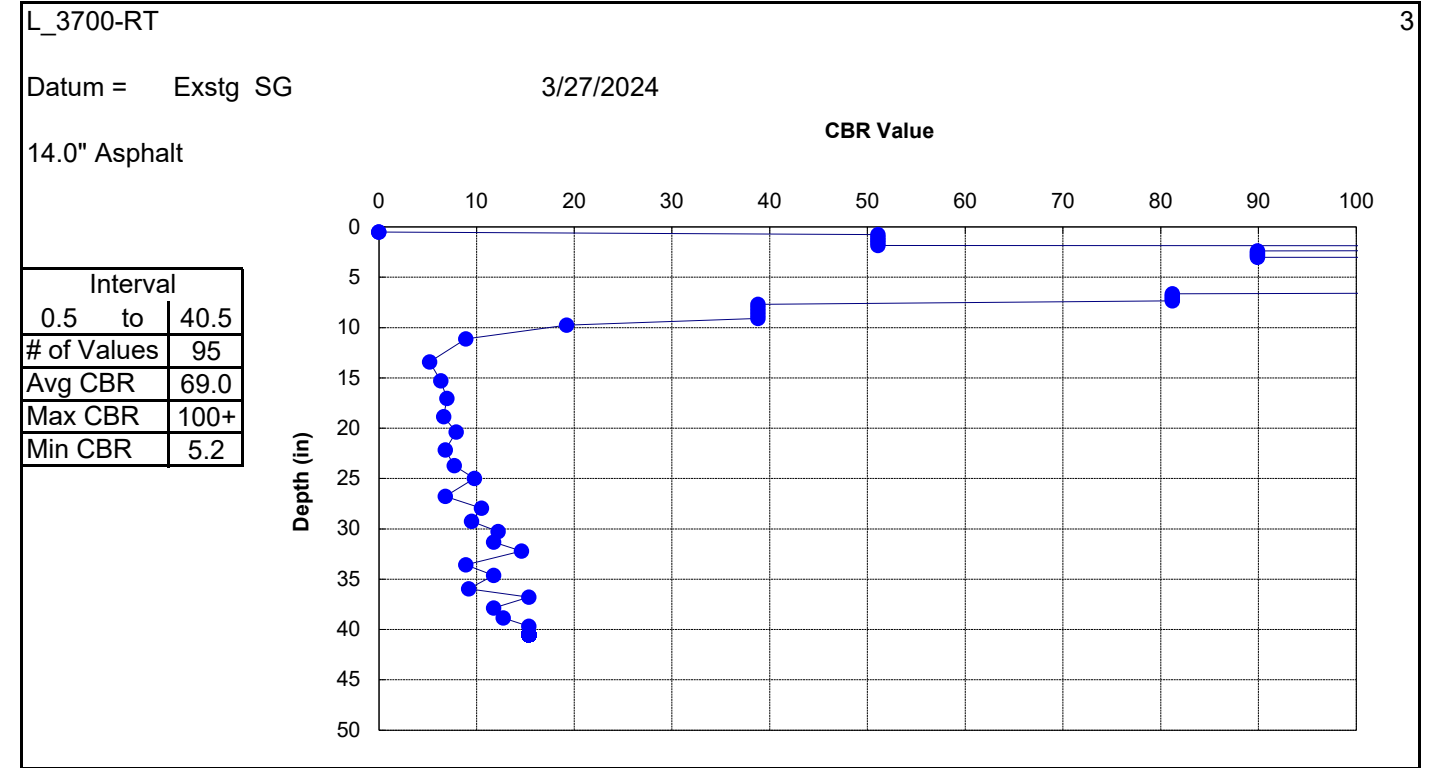
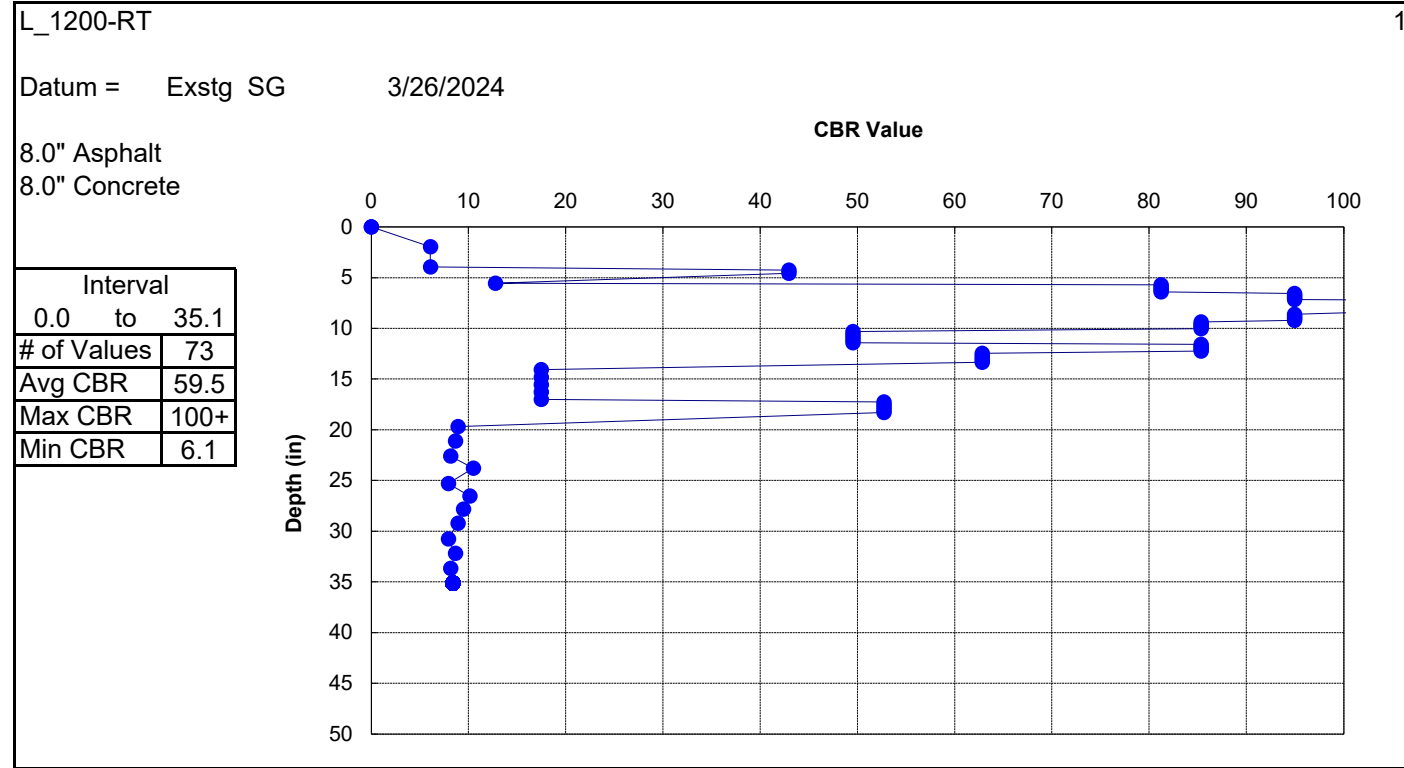
CONE PENETROMETER RESULTS

PROJECT NO.	67004.1.1
PROJECT NAME	BR-0004
ROUTE	-L-
COUNTY	BEAUFORT & HYDE

GEOTECH(S)	K. TACKETT
GEOLOGIST(S)	C. SWAFFORD

PROJECT NO.	67004.1.1
PROJECT NAME	BR-0004
ROUTE	-L- & -Y1-
COUNTY	BEAUFORT & HYDE

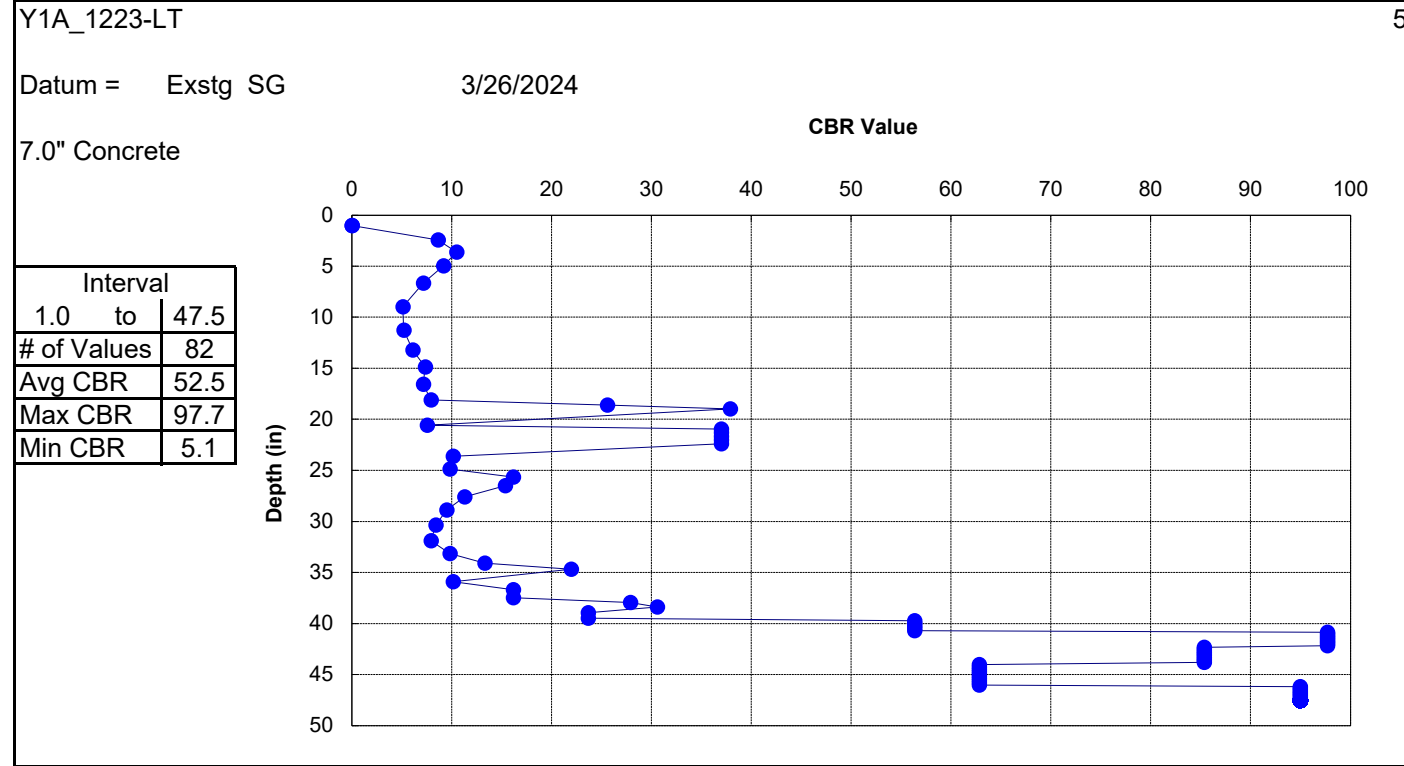
GEOTECH(S)	K. TACKETT
GEOLOGIST(S)	C. SWAFFORD



CONE PENETROMETER RESULTS

PROJECT NO.	67004.1.1
PROJECT NAME	BR-0004
ROUTE	-Y1A-
COUNTY	BEAUFORT & HYDE

GEOTECH(S)	K. TACKETT
GEOLOGIST(S)	C. SWAFFORD



CONE PENETROMETER DATA CODE SHEET				PROJECT NUMBER				PROJECT I.D.				ROUTE				CONE PENETROMETER DATA CODE SHEET				PROJECT NUMBER				PROJECT I.D.				ROUTE			
				67004.1.1				BR-0004				US 264								67004.1.1				BR-0004				US 264			
				COUNTY				GEOLOGIST				TECHNICIANS								COUNTY				GEOLOGIST				TECHNICIANS			
				BEAUFORT & HYDE				SWAFFORD				MID-ATLANTIC DRILLING								BEAUFORT & HYDE				SWAFFORD				MID-ATLANTIC DRILLING			
Station (location) information				Date run				Station (location) information				Date run				Station (location) information				Date run				Station (location) information				Date run			
L 1200-RT				3/26/2024				L 1700-LT				3/26/2024				L 3700-RT				3/27/2024				Y1_1156-CL				3/26/2024			
Type	cut or fill			Datum or reference surface			Type	cut or fill			Datum or reference surface			Type	cut or fill			Datum or reference surface			Type	cut or fill			Datum or reference surface						
KDCP	FILL			EXSTG SG			KDCP	FILL			EXSTG SG			KDCP	FILL			EXSTG SG			KDCP	FILL			EXSTG SG						
Begin DCP 0.0 in. below datum							Begin DCP 2.5 in. below datum							Begin DCP 0.5 in. below datum							Begin DCP 0.5 in. below datum										
0.0	43.2						0.0	29.3	51.9	80.2				0.0	13.9					0.0	105.1										
5.0	43.9						1.8	29.7	52.3	80.6				0.7	14.2					3.0	105.3										
10.0	44.5						2.5	30.0	52.7	81.1				1.4	14.4					4.0	105.5										
10.8	45.2						3.1	30.4	53.1	81.6				2.0	14.7					4.7	105.7										
11.6	45.8						3.7	30.8	53.6	82.2				2.7	14.9					5.3	105.9										
14.1	46.5						4.1	31.2	54.0	82.9				3.4	15.2					5.6	106.1										
14.5	50.0						5.0	31.7	54.5	83.5				3.6	15.6					7.2	106.4										
15.0	53.6						5.2	32.1	54.9	84.2				3.8	16.1					7.5	106.7										
15.4	57.4						7.3	32.5	55.4	84.8				4.0	16.5					7.9	106.9										
15.9	60.4						7.7	33.0	55.9	86.2				4.2	17.0					8.2	107.2										
16.3	64.3						8.1	33.5	56.4	87.6				4.4	17.4					8.6	107.5										
16.7	67.4						8.5	33.9	56.8	89.0				4.8	18.3					8.9											
17.1	70.7						8.9	34.4	57.3	90.4				5.2	19.2					10.1											
17.4	74.2						9.5	34.9	57.8	91.8				5.6	20.0					11.8											
17.8	78.1						9.9	35.3	58.4	92.2				6.0	20.9					13.7											
18.2	81.7						10.2	35.7	59.0	92.6				6.4	21.8					15.3											
18.5	85.5						10.6	36.2	59.6	93.0				6.5	23.5					16.8											
18.8	89.2						10.9	36.6	60.2	93.4				6.6	27.0					18.0											
19.1							11.3	37.0	60.8	93.8				6.8	32.8					18.9											
19.4							11.7	37.4	61.5	94.4				6.9	37.6					20.9											
19.7							12.1	37.7	62.2	95.0				7.0	42.0					21.1											
20.1							12.4	38.1	63.0	95.6				7.1	46.6					21.4											
20.4							12.8	38.4	63.7	96.2				7.3	50.5					21.6											
20.8							13.2	38.8	64.4	96.8				7.4	55.0					21.9											
21.1							13.7	39.2	64.9	100.4				7.5	59.0					22.1											
21.5							14.2	39.6	65.4	103.8				7.7	62.2					22.3											
21.9							14.6	40.0	66.0				7.8	66.7						22.6											
22.3							15.1	40.4	66.5				7.9	69.7						22.8											
22.6							15.6	40.8	67.0				8.0	73.0						23.1											
23.0							16.0	41.2	67.7				8.2	75.6						23.3											
23.4							16.4	41.6	68.3				8.3	78.3						26.1											
23.8							16.7	42.1	69.0				8.6	80.5						29.0											
24.2							17.1	42.5	69.6				9.0	84.0						31.7											
24.7							17.5	42.9	70.3				9.3	86.7						34.3											
25.1							18.0	43.3	70.7				9.6	90.1						38.0											
25.5							18.5	43.8	71.1				10.0	92.2						40.5											
26.2							19.1	44.2	71.5				10.3	94.9						44.5											
26.9							19.6	44.7	71.9				10.6	97.4						48.1											
27.6							20.1	45.1	72.3				10.9	99.5						52.0											
28.3							20.6	45.4	72.7				11.3	101.6						56.6											
29.0							21.2	45.7	73.1				11.6							61.0											
29.4							21.7	46.0	73.4				11.7							65.1											
29.8							22.3	46.3	73.8				11.8							69.3											
30.3							22.8	46.6	74.2				11.9							73.9											
30.7							23.4	47.0	74.7				12.0							79.3											
31.1							24.1	47.4	75.2				12.1							84.3											
31.7							24.7	47.9	75.6				12.2							88.5											
32.2							25.4	48.3	76.1				12.3							93.9											
32.8							26.0	48.7	76.6				12.4							97.8											
33.3							26.5	49.2	77.1				12.5							101.5											
33.9							27.0	49.7	77.6				12.6							104.0											
35.8							27.6	50.1	78.2				12.9							104.2											
37.6							28.1	50.6	78.7				13.1							104.4											
39.5							28.6	51.1	79.2				13.4							104.6											
41.3							29.0	51.5	79.7				13.6							104.8											



CONE PENETROMETER DATA CODE SHEET		PROJECT NUMBER		PROJECT I.D.		ROUTE	
		67004.1.1		BR-0004		US 264	
		COUNTY		GEOLOGIST		TECHNICIANS	
		BEAUFORT & HYDE		SWAFFORD		MID-ATLANTIC DRILLING	
Station (location) information		Date run		Station (location) information		Date run	
Y1A_1223-LT		3/26/2024					
Type	cut or fill	Datum or reference surface		Type	cut or fill	Datum or reference surface	
KDCP	AT GRADE	EXSTG SG					
Begin DCP 1.0 in. below datum							
0.0	106.2						
3.6	106.6						
6.6	107.0						
10.0	107.4						
14.3	107.9						
20.2	108.3						
26.0	108.7						
31.0	109.3						
35.2	109.8						
39.5	110.4						
43.4	110.9						
44.7	111.5						
45.6	112.1						
49.7	112.6						
50.6	113.2						
51.5	113.7						
52.5	114.3						
53.4	114.7						
54.3	115.1						
57.4	115.4						
60.6	115.8						
62.6	116.2						
64.7	116.6						
67.5	117.0						
70.8	117.3						
74.5	117.7						
78.4	118.1						
81.6							
84.0							
85.5							
88.6							
90.6							
92.6							
93.8							
94.9							
96.3							
97.7							
98.3							
98.9							
99.6							
100.2							
100.8							
101.2							
101.5							
101.9							
102.3							
102.7							
103.0							
103.4							
103.8							
104.1							
104.5							
104.9							
105.3							
105.8							

BR-0004 PAVEMENT CORE PHOTOGRAPHS

L_1200 - RT (16.0")



L_1700 - LT (9.5")



L_3700 - RT (14.0")



BR-0004 PAVEMENT CORE PHOTOGRAPHS

Y1_1156-CL (1.0")



Y1A_1223 - LT (7.0")



PAVEMENT CORE EVALUATION
67004.1.1 (BR-0004) BEAUFORT HYDE

LINE	STATION	ABC (in)	LAYER THICKNESS (in)	LAYER	LIFT(S)	REMARKS
-L-	12+00	0.00	5.00	S	1	Low severity delamination at 2", good asphalt condition and low severity weathering and oxidation.
			3.00	SD	N/A	
			8.00	C	N/A	
-L-	17+00	2.50	6.00	S	2	Good asphalt condition and low to no weathering and oxidation
			3.50	SA	N/A	
-L-	37+00	0.00	7.00	S	4	Lifts 1 & 2: Good asphalt condition and low to no weathering and oxidation. Lift 3 & 4: Very fine aggregate, moderate asphalt condition, and moderate weathering and oxidation.
			7.00	SA	N/A	
-Y1-	11+56	0.00	1.00	S	1	Moderate asphalt condition and low to moderate weathering and oxidation
-Y1A-	12+23	0.00	7.00	C	N/A	Void space ranging from .25 to 2 inches; moderate to high severity void space in aggregate

S = SURFACE COURSE

SA = SAND ASPHALT

SD = SURFACE DRESSING

C = CONCRETE

-L- SOIL TEST RESULTS

Boring No.	SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			MOISTURE	ORGANIC	NORTHING	EASTING
								C.SAND	F.SAND	SILT	CLAY	10	40	200				
L 1200 RT	SS-18a	12+00	8' RT	1.5-1.9	A-7-6	49	34	ND	ND	ND	ND	ND	ND	21	NT	671854	2741899	
L 1700 CL	BS-3	17+00	27' LT	0.0-5.0	A-2-4	17	NP	14.3	55.6	22.0	8.1	93.6	88.6	32.4	NT	NT	671993	2742385
L 2690 LT	BS-1	26+90	29' LT	0.0-3.0	A-2-4	19	NP	36.0	46.0	12.9	5.1	86.5	69.1	19.5	NT	NT	672426	2743263
L 2690 RT	SS-68	26+90	22' RT	0.5-2.0	A-4 [4]	23	9	6.2	26.6	38.2	29.0	99.9	98.5	71.3	18	NT	672426	2743263
L 2690 RT	SS-70	26+90	22' RT	5.9-7.4	A-4 [2]	21	7	6.5	32.6	38.9	22.0	99.5	97.8	64.5	22	NT	672426	2743263
L 3000 CL	SS-48	30+00	CL	3.4-4.9	A-4 [3]	25	8	4.5	28.4	44.0	23.1	100.0	99.2	71.0	24	NT	672606	2743517
Y1A 1223 LT	SS-1	12+23	10' LT	0.6-2.0	A-6	20	6	ND	ND	ND	ND	ND	ND	19	NT	672021	2742707	

ND = Not Determined

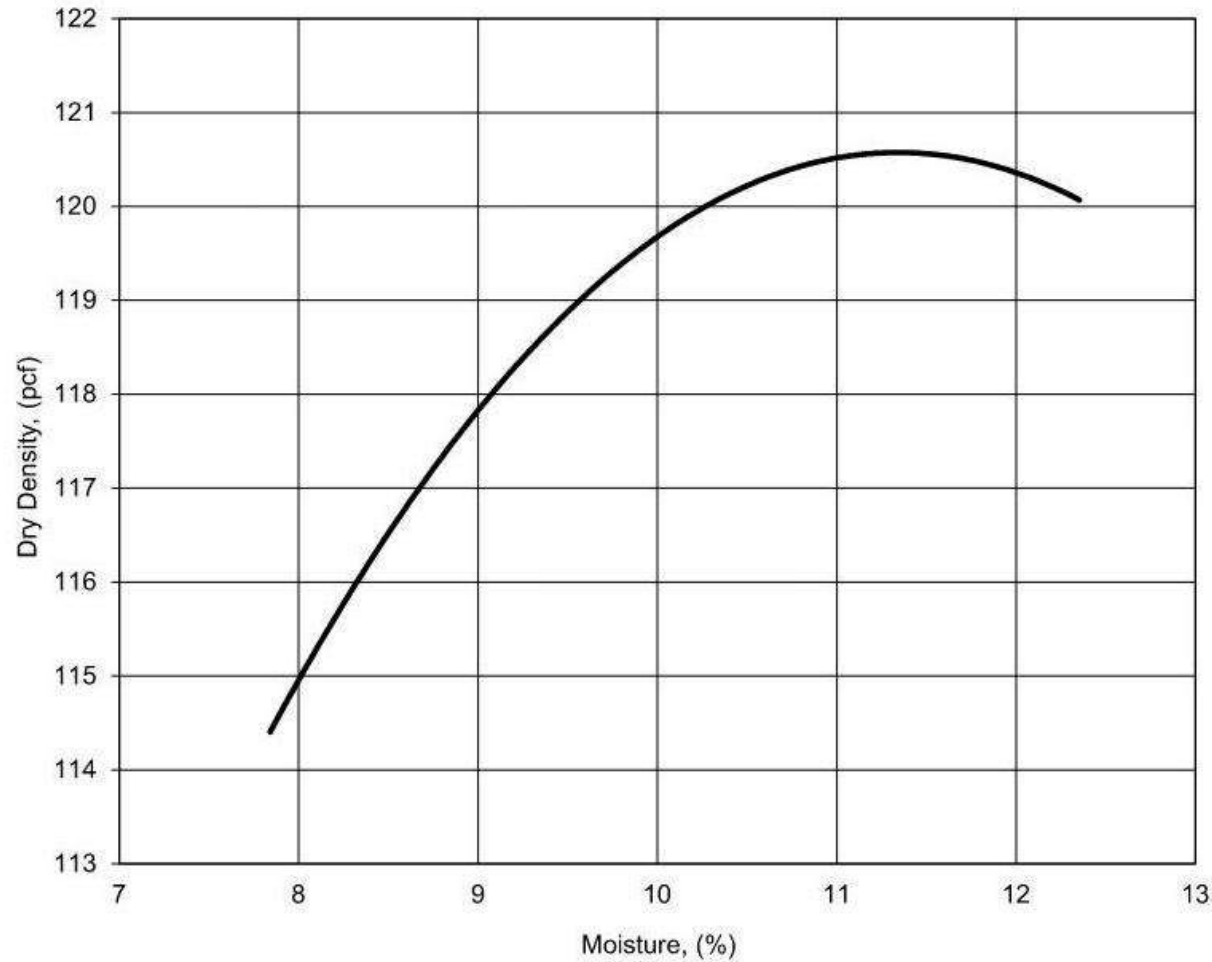
NT = Not Tested



MOISTURE-DENSITY RELATIONSHIP

Project Name : BR-0004 Bridge No. 66 on US 264 over Pungo River
 Project No. : 10397075
 Project County : Beaufort
 Project State : North Carolina
 Laboratory No. : 10397075
 Submitted By : HDR
 Soil Type : Dark Brown Silty Sand

Sample No. : BS-3
 Sample Loc. : Boring L_1700-LT
 Sample Depth : 0.0' to 5.0'
 Date Tested : 04/08/24
 Date Reported : 04/15/24



MAXIMUM DENSITY: 120.6 pcf

OPTIMUM MOISTURE: 11.3 %

COMMENTS: AASHTO: T-99; Method (C)

APPROVED BY: *KW*

hdrinc.com

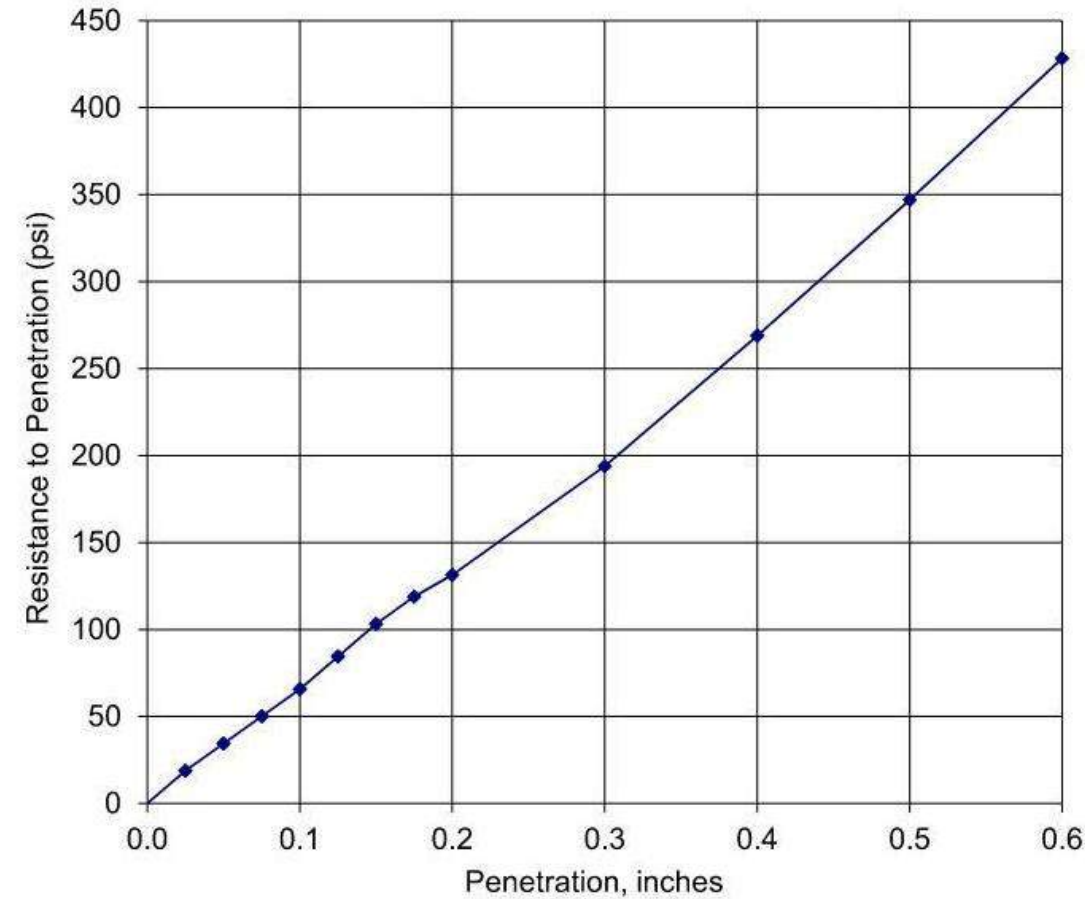
4645 Village Square Drive, Suite F, Paducah, KY 42001
 T 270.444.9691 F 270.538.1599



CALIFORNIA BEARING RATIO

Project Name : BR-0004 Bridge No. 66 on US 264 over Pungo River
 Project No. : 10397075
 Project County : Beaufort
 Project State : North Carolina
 Laboratory No. : 10397075
 Submitted By : HDR
 Soil Type : Dark Brown Silty Sand

Sample No. : BS-3
 Sample Loc. : Boring L_1700-LT
 Sample Depth : 0.0' to 5.0'
 Date Tested : 4/8/24
 Date Reported : 4/15/24



Compaction Effort = 56 Blows per layer
 Percent Compacted = 97.7
 Percent Swell = 0.02

C.B.R. @ 0.1 In. = 6.6
 C.B.R. @ 0.2 In. = 8.8*

COMMENTS: AASHTO: T-193

APPROVED BY: *KW*

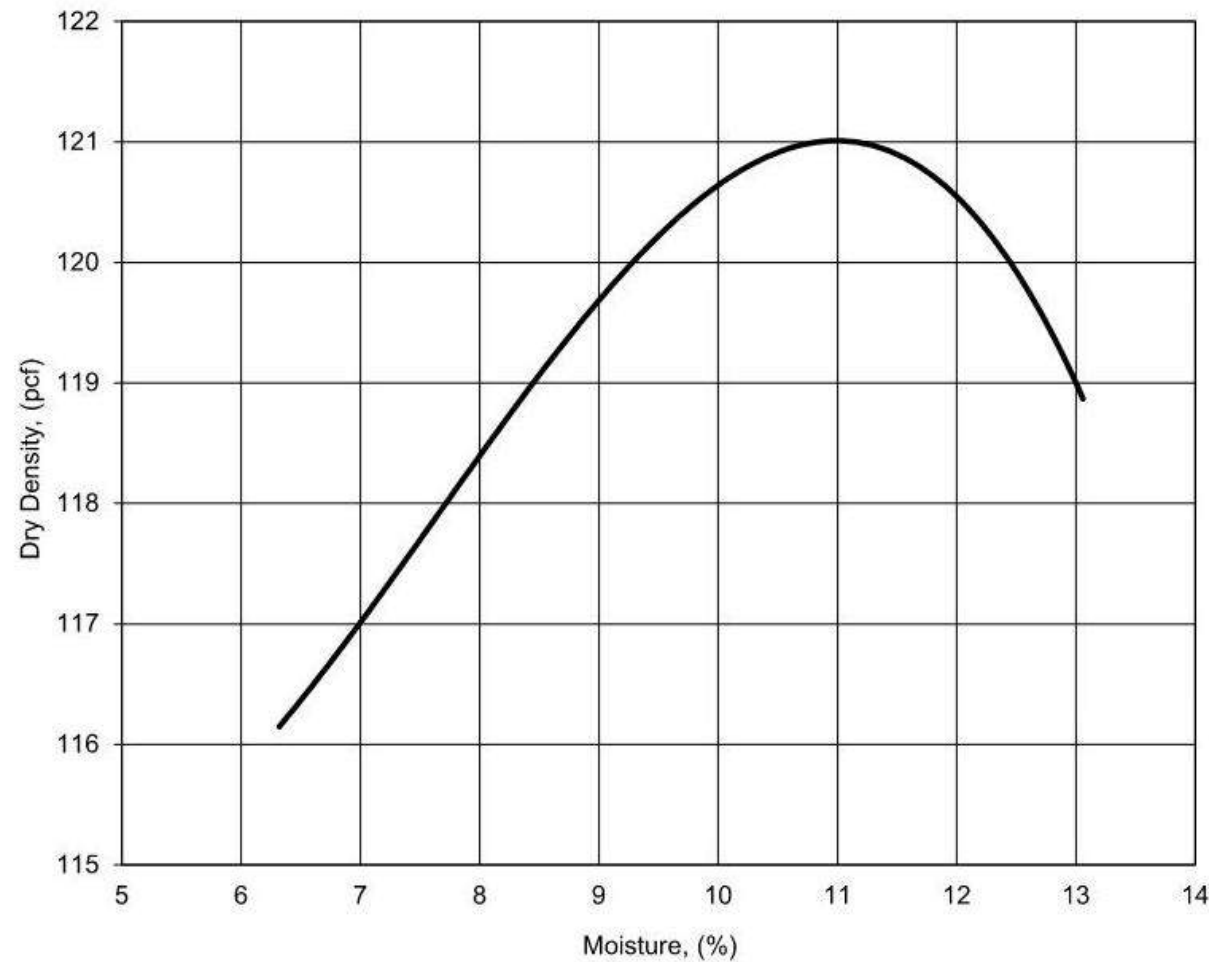
hdrinc.com

4645 Village Square Drive, Suite F, Paducah, KY 42001
 T 270.444.9691 F 270.538.1599



MOISTURE-DENSITY RELATIONSHIP

Project Name : BR-0004 Bridge No. 66 on US 264 over Pungo River	Sample No. : BS-1
Project No. : 10397075	Sample Loc. : Boring L_2690-LT
Project County : Beaufort	Sample Depth : 0.0' to 3.0'
Project State : North Carolina	Date Tested : 04/08/24
Laboratory No. : 10397075	Date Reported : 04/15/24
Submitted By : HDR	
Soil Type : Brown Silty Sand	



MAXIMUM DENSITY: 121 pcf

OPTIMUM MOISTURE: 11 %

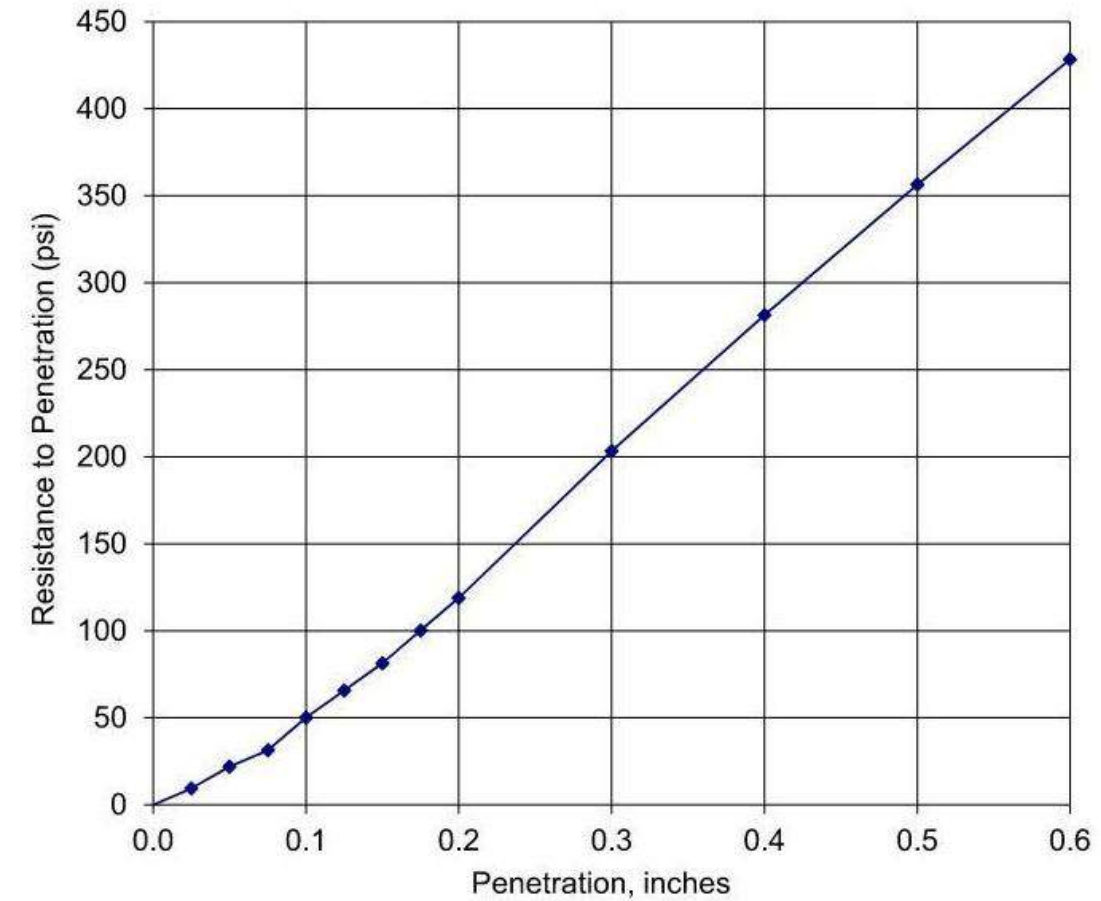
COMMENTS: AASHTO: T-99; Method (C)

APPROVED BY: KW



CALIFORNIA BEARING RATIO

Project Name : BR-0004 Bridge No. 66 on US 264 over Pungo River	Sample No. : BS-1
Project No. : 10397075	Sample Loc. : Boring L_2690-LT
Project County : Beaufort	Sample Depth : 0.0' to 3.0'
Project State : North Carolina	Date Tested : 4/8/24
Laboratory No. : 10397075	Date Reported : 4/15/24
Submitted By : HDR	
Soil Type : Brown Silty Sand	



Compaction Effort = 56 Blows per layer
 Percent Compacted = 97.5
 Percent Swell = 0.02

C.B.R. @ 0.1 In. = 5
 C.B.R. @ 0.2 In. = 7.9*

COMMENTS: AASHTO: T-193

APPROVED BY: KW