TIP PROJECT: R-5963A

CONTRACT:

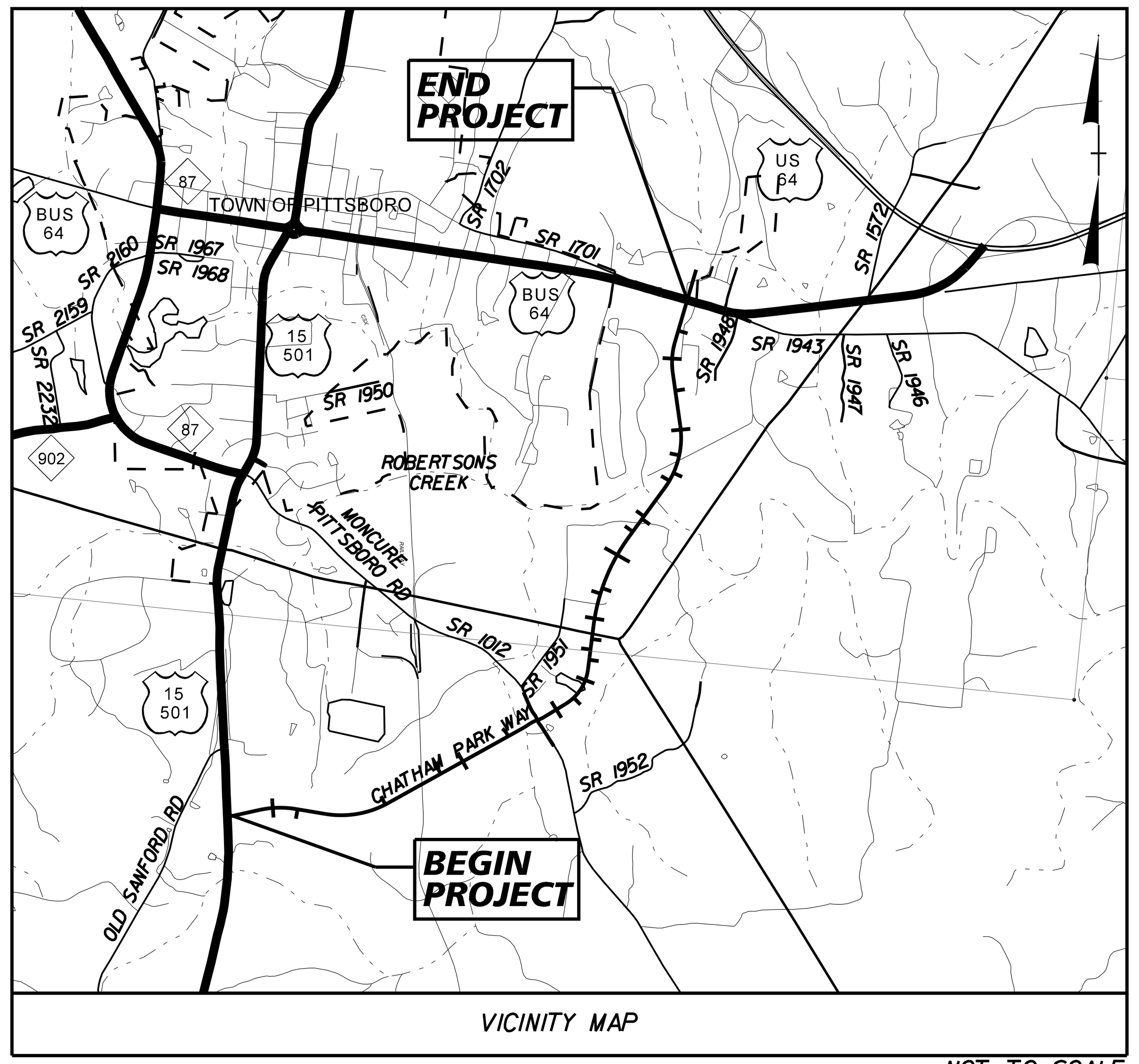
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5963A		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
48599.1.1		P.E.

SEE SHEET 1A FOR INDEX OF SHEETS
SEE SHEET 1B FOR CONVENTIONAL PLAN SHEET SYMBOLS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CHATHAM COUNTY



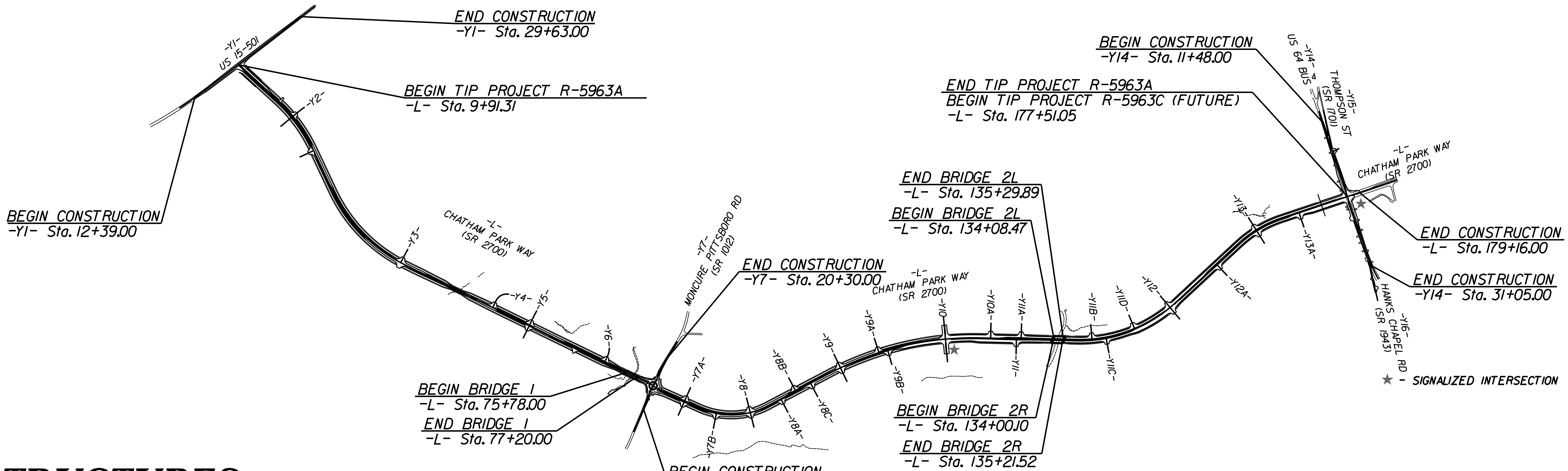
NOT TO SCALE

- - - - PITTSBORO CITY LIMITS

LOCATION: SR 2700 (CHATHAM PARK WAY) FROM US 15–501 SOUTH OF PITTSBORO TO US 64 BUSINESS, CONSTRUCT ROADWAY ON NEW LOCATION

TYPE OF WORK: GRADING, DRAINAGE, UTILITIES, BRIDGES, PAVING, SIGNALS, AND RETAINING WALLS

NC GRID
NAD 1983/NA 2011



STRUCTURES

R-5963A DESIGN DATA

ADT 2025 = 0
ADT 2045 = 31000
K = 7%
D = 55
T = 5%*
V = 50 MPH
* (TTST 2% + DUAL 3%)
FUNCTIONAL CLASSIFICATION:
RURAL
MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5963A	=	3.124 MILES
LENGTH STRUCTURE TIP PROJECT R-5963A	=	0.050 MILES
TOTAL LENGTH TIP PROJECT R-5963A	=	3.174 MILES

PLANS PREPARED FOR THE NCDOT BY:

Kimley»Horn

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 19, 2024

LETTING DATE:
MAY 20, 2025

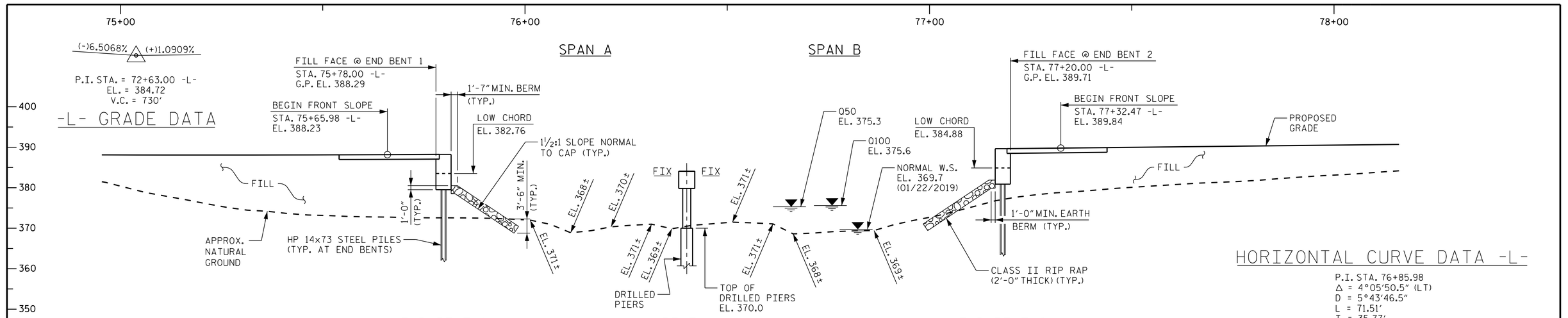
ANDREW L. PHILLIPS, P.E.
PROJECT ENGINEER

BEKAH M. KROL, P.E.
PROJECT DESIGN ENGINEER

JEFFREY A. STRODER, P.E.
PROJECT MANAGER
NCDOT HIGHWAY DIVISION 8

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

3/18/2025 K:\RDT_Structures_Bridge\NCOI036734 - R-5963A&B\Cad\Dgn\R-5963A_SMU_TSH.dgn

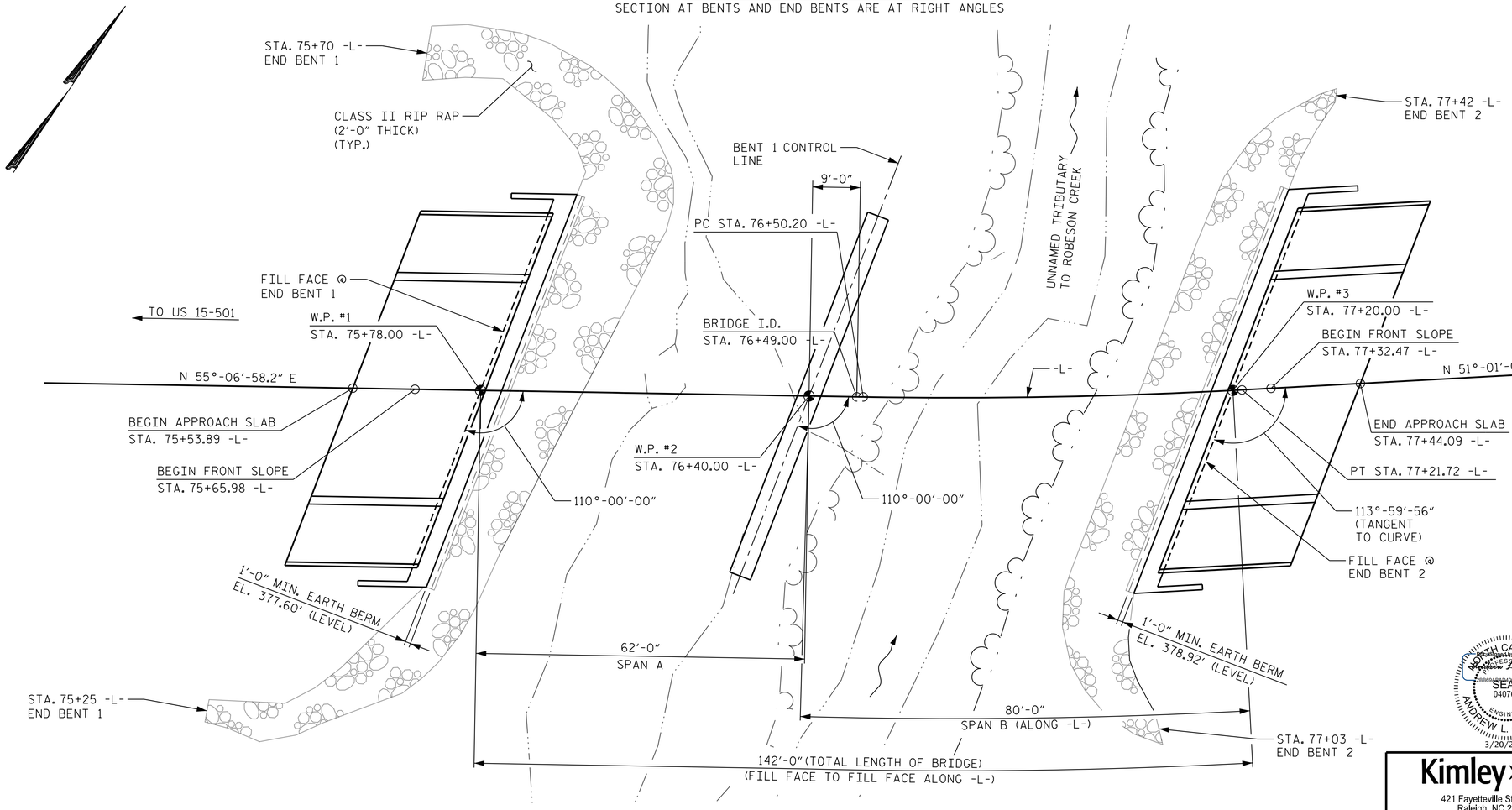


HORIZONTAL CURVE DATA -L-

P.I. STA. 76+85.98
Δ = 4°05'50.5" (LT)
D = 5°43'46.5"
L = 71.51'
T = 35.77'
R = 1,000.00'

SECTION ALONG -L-

SECTION AT BENTS AND END BENTS ARE AT RIGHT ANGLES



PLAN

PILES AND DRILLED PIERS NOT SHOWN IN PLAN VIEW FOR CLARITY.

HYDRAULIC DATA

DESIGN DISCHARGE	1500 CFS
FREQUENCY OF DESIGN FLOOD	50-YR
DESIGN HIGH WATER	375.3 FT
DRAINAGE AREA	2.28 SQ MI
BASE DISCHARGE (Q100)	1700 CFS
BASE HIGH WATER ELEVATION	375.6 FT

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	20,000 CFS
FREQUENCY OF OVERTOPPING FLOOD	>500-YR
OVERTOPPING FLOOD ELEVATION	388.13 FT
LOW POINT @ 75+23 -L-	

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 76+49.00 -L-

SHEET 1 OF 5 BRIDGE NO. 180540

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER UNNAMED TRIBUTARY TO ROBESON CREEK ON CHATHAM PARK WAY BETWEEN US 15-501 AND SR 1012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-01
1			3			TOTAL SHEETS
2			4			46

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

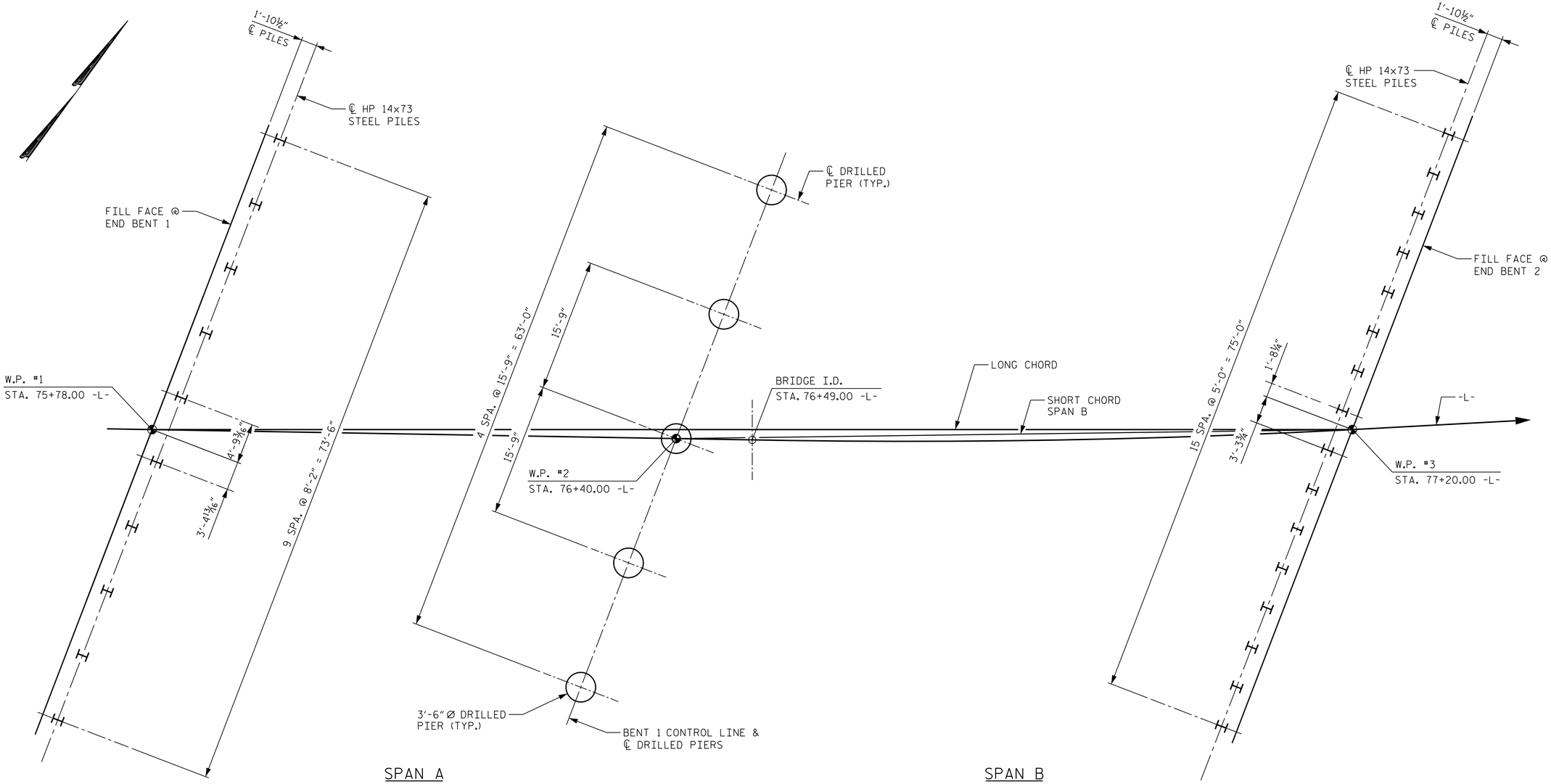
Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

3/18/2025
K:\ROT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_G01_180540.dgn

BRIDGE 1



FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO PILE AND DRILLED PIER CENTERLINE)

NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FILL HOLES FOR PILE EXCAVATION AT END BENT NO. 1 AND END BENT NO. 2 WITH CONCRETE OR GROUT.

BEFORE FILLING HOLES FOR PILE EXCAVATION AT END BENT NO. 1 AND END BENT NO. 2, DRIVE PILES TO THE REQUIRED DRIVING RESISTANCE.

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

INSTALL PERMANENT STEEL CASINGS AT END BENT NO. 1 BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION 367.0 FT.

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER UNNAMED TRIBUTARY TO ROBESON CREEK ON CHATHAM PARK WAY BETWEEN US 15-501 AND SR 1012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-02
1			3			TOTAL SHEETS
2			4			46

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 76+49.00 -L-

SHEET 2 OF 5

BRIDGE 1

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Number of Piles per Line	Factored Resistance per Pile KIPS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles **			Drilled-In Piles		
						Minimum Pile Tip (Tip No Higher Than) Elevation FT	Required Driving Resistance (RDR)* per pile KIPS	Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elevation Not To Predrill Below) FT	Maximum Predrilling Diameter INCHES	Pile Excavation (Bottom of Hole) Elevation FT	Pile Excavation Not In Soil per Pile LIN FT	Pile Excavation In Soil per Pile LIN FT
End Bent No. 1, Piles 1-5	5	220	See Substructure Plans	20			370					363	5	10.7
End Bent No. 1, Piles 6-10	5	220	See Substructure Plans	20			370					362	5.3	11.4
End Bent No. 2, Piles 1-8	8	240	See Substructure Plans	20			400					365	6	8.9
End Bent No. 2, Piles 9-16	8	240	See Substructure Plans	20			400					367	3.5	9.5
TOTAL QUANTITY:													127.5	257.7

$$^{*}RDR = \frac{Factored\ Resistance + Factored\ Drag\ Load + Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Drag\ Load\ Resistance + Nominal\ Resistance\ from\ Scourable\ Material$$

** Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile KIPS	Factored Drag Load per Pile KIPS	Factored Dead Load * per Pile KIPS	Dynamic Resistance Factor	Nominal Drag Resistance per Pile KIPS	Nominal Scour Resistance per Pile KIPS
End Bent No. 1, Piles 1-10	220			0.6		
End Bent No. 2, Piles 1-16	240			0.6		

* Factored Dead Load is factored weight of pile above the ground line.

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates EACH	Steel Pile Points		
		Pipe Pile Cutting Shoes EACH	Pipe Pile Conical Points EACH	H-Pile Points EACH
End Bent No. 1, Piles 1-10				10
End Bent No. 2, Piles 1-16				16
TOTAL QUANTITY:				26

SUMMARY OF DPT/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing (DPT)		
End Bent / Bent No (e.g., "Bent 1 - Bent 3")	DPT Test Pile Length FT	DPT Testing Quantity EACH
End Bent No.1 - End Bent No. 2		1
TOTAL QUANTITY:		1

Pile Order Lengths for Concrete Piles	
End Bent / Bent No (e.g., "Bent 1 - Bent 3")	Pile Order Length Basis* EST or DPT

* EST = Pile order lengths from estimated pile lengths; DPT = Pile order lengths based on Dynamic Pile Testing. For groups of end bents/bents with pile order lengths based on DPT testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the DPT.

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Number of Piers per Line	Factored Resistance per Pier KIPS	Required Drilled Pier Tip Elevation FT	Required Tip Resistance per Pier KSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier LIN FT	Drilled Pier Length* per Pier LIN FT	Drilled Pier Length Not In Soil* per Pier LIN FT	Drilled Pier Length In Soil* per Pier LIN FT	Permanent Steel Casing Required? YES	Permanent Steel Casing Tip Elevation (Elevation Not To Extend Casing Below) FT	Permanent Steel Casing Length** per Pier LIN FT
Bent No. 1, Piers 1-2	2	770	340.00	10	365.00	22		25.7	4.8	YES	362.00	8
Bent No. 1, Piers 3-5	3	770	337.00	10	365.00	27		29.8	5.6	YES	364.00	6
TOTAL QUANTITY:								140.8	26.4			34

* Drilled Pier Length, Drilled Pier Length Not in Soil and Drilled Pier Length in Soil represent estimated drilled pier quantities and are measured and paid for as either "____ Dia. Drilled Piers" or "____ Dia. Drilled Piers Not in Soil" and "____ Dia. Drilled Piers in Soil" in accordance with Article 411-7 of the NCDOT Standard Specifications. For bents with a not in soil pay item, drilled piers through air or water will be paid at the contract unit price for "__Dia. Drilled Piers in Soil."

** Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation and is measured and paid for as "Permanent Steel Casing for ____ Dia. Drilled Pier" in accordance with Article 411-7 of the NCDOT Standard Specifications.

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pier(s) #(-#) (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) EACH	Crosshole Sonic Logging (CSL) EACH	Thermal Integrity Profiler (TIP) EACH	Shaft Inspection Device (SID) EACH	Pile Integrity Test (PIT) EACH
Bent No. 1, Piers 1-2		1			
Bent No. 1, Piers 3-5		1			
TOTAL QUANTITY:		2			

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Kelly de Montbrun, #045542) on 012-30-2024.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer may adjust the quantity for DPT Testing, Pipe Pile Plates, Permanent Steel Casing, SPTs, TIPs, CSL Testing, SID Inspections and PITs when necessary.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS
3/20/2025

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NC LICENSE # F-0102

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
PILE AND DRILLED PIER FOUNDATION TABLES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-03
1			3			TOTAL SHEETS
2			4			46

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 76+49.00 -L-

SHEET 3 OF 5

BRIDGE 1

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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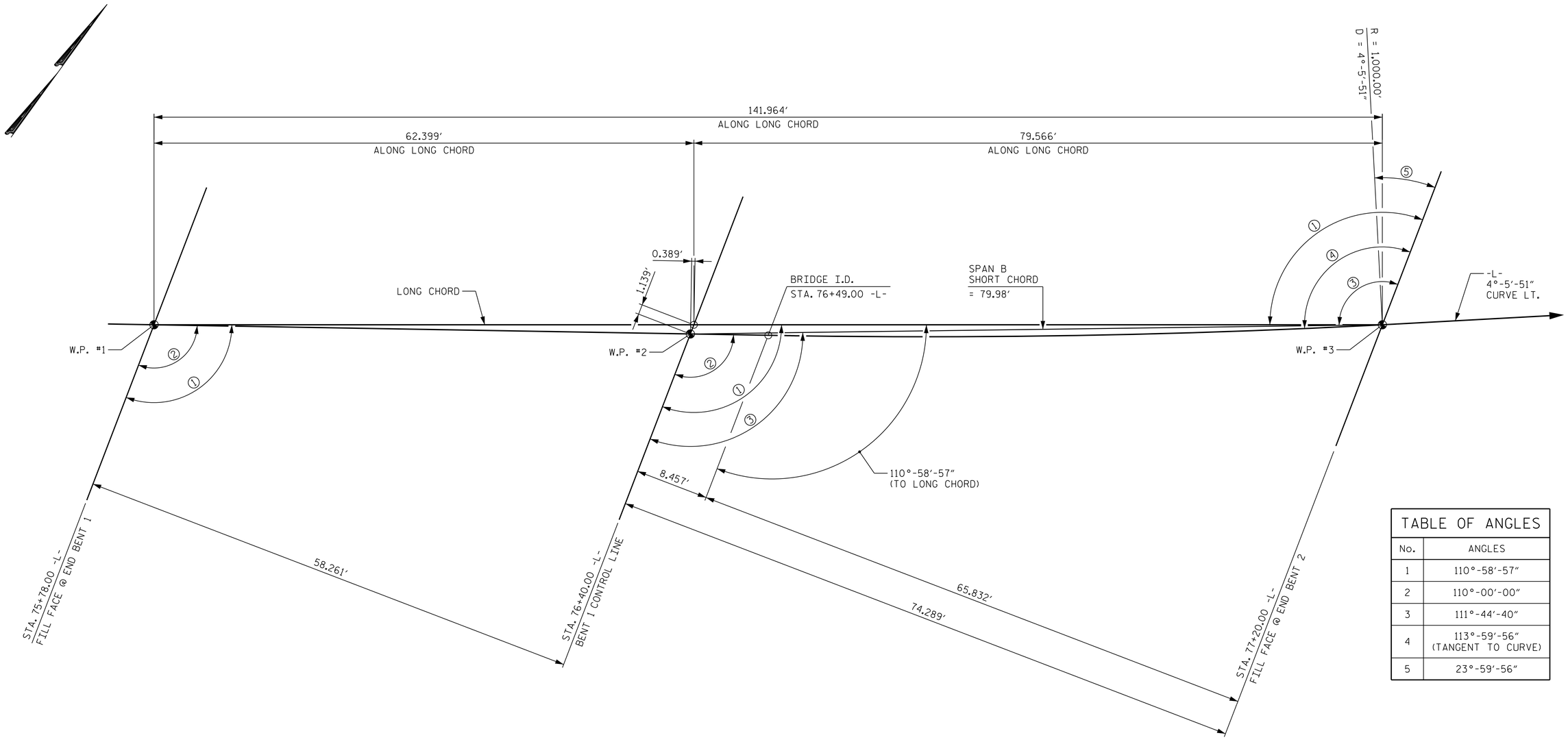

TABLE OF ANGLES	
No.	ANGLES
1	110°-58′-57″
2	110°-00′-00″
3	111°-44′-40″
4	113°-59′-56″ (TANGENT TO CURVE)
5	23°-59′-56″

LONG CHORD LAYOUT

ALL BENTS ARE PARALLEL

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER UNNAMED TRIBUTARY TO ROBESON CREEK ON CHATHAM PARK WAY BETWEEN US 15-501 AND SR 1012

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-04
1			3			TOTAL SHEETS
2			4			46

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DESIGN ENGINEER OF RECORD:	A. L. PHILLIPS	DATE: 11/2024

3/18/2025
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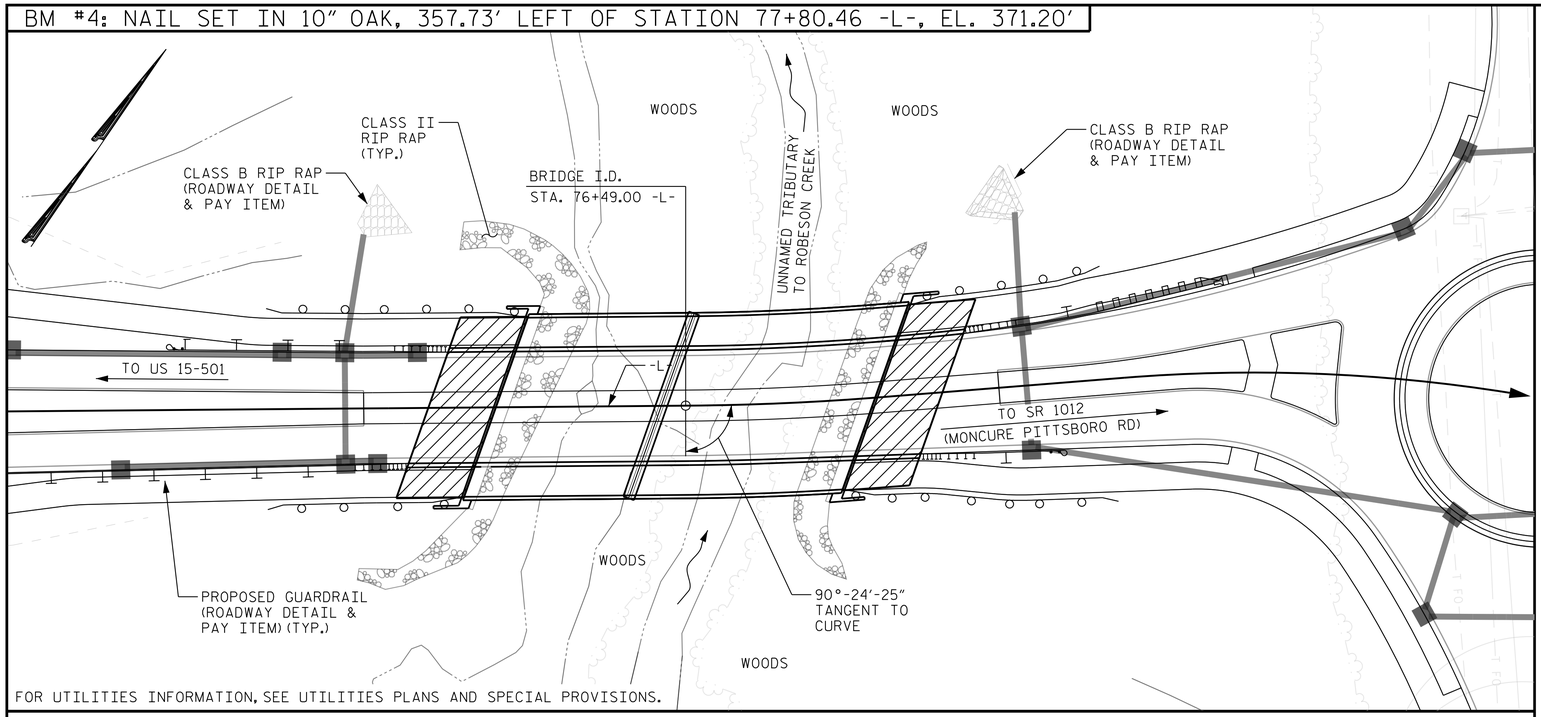
BRIDGE 1



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

PRESTRESSED CONCRETE DECK PANELS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES".

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE SCOUR CRITICAL ELEVATION FOR BENT NO.1 IS ELEVATION 365 FEET. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

TOTAL BILL OF MATERIAL

	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	3'-6"Ø DRILLED PIERS IN SOIL	3'-6"Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 3'-6"Ø DRILLED PIER	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL
	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.
SUPERSTRUCTURE							9,616	10,619		LUMP SUM		
END BENT 1	110.5	51.5							54.9		7,122	
BENT 1			26.4	140.8	34.0	2			51.9		17,771	4,895
END BENT 2	147.2	76.0							58.4		6,972	
TOTAL	257.7	127.5	26.4	140.8	34.0	2	9,616	10,619	165.2	LUMP SUM	31,685	4,895

TOTAL BILL OF MATERIAL (CONT.)

	45" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 14x73 STEEL PILES	HP 14x73 STEEL PILES		STEEL PILE POINTS	DYNAMIC PILE TESTING	TWO BAR METAL RAIL	CONCRETE BARRIER RAIL	1'-2" x 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	NO.	LIN. FT.	LIN. FT.	NO.	LIN. FT.	EA.	EA.	LIN. FT.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE	16	1,111						264.5	380.46	280.46			LUMP SUM
END BENT 1			10	10	200	10					340	378	
BENT 1													
END BENT 2			16	16	320	16					240	267	
TOTAL	16	1,111	26	26	520	26	1	264.5	380.46	280.46	580	645	LUMP SUM

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER UNNAMED TRIBUTARY TO ROBESON CREEK ON CHATHAM PARK WAY BETWEEN US 15-501 AND SR 1012

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-05
1			3			TOTAL SHEETS
2			4			46

BRIDGE 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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3/18/2025
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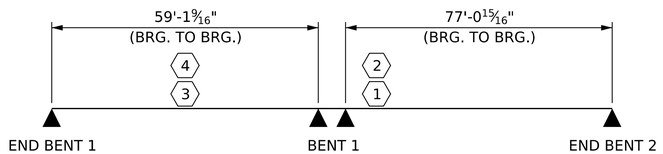
LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.06	--	1.75	0.720	1.52	B	I	38.540	0.960	1.18	B	I	7.170	0.80	0.720	1.06	B	I	38.540	
		HL-93 (OPERATING)	N/A		1.55	--	1.35	0.720	1.97	B	I	38.540	0.960	1.55	B	I	7.170	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.41	50.76	1.75	0.720	2.01	B	I	38.540	0.960	1.52	B	I	7.170	0.80	0.720	1.41	B	I	38.540	
		HS-20 (OPERATING)	36.000		1.99	71.64	1.35	0.720	2.61	B	I	38.540	0.960	1.99	B	I	7.170	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		3.21	43.34	1.40	0.770	5.47	A	I	29.570	0.960	4.73	B	I	7.170	0.80	0.720	3.21	B	I	38.540	
		SNGARBS2	20.000		2.38	47.60	1.40	0.770	4.18	A	I	29.570	0.960	3.33	B	I	7.170	0.80	0.720	2.38	B	I	38.540	
		SNAGRIS2	22.000		2.25	49.50	1.40	0.770	4.01	A	I	29.570	0.960	3.08	B	I	7.170	0.80	0.720	2.25	B	I	38.540	
		SNCOTTS3	27.250		1.60	43.60	1.40	0.770	2.72	A	I	29.570	0.960	2.31	B	I	7.170	0.80	0.720	1.60	B	I	38.540	
		SNAGGRS4	34.925		1.33	46.45	1.40	0.770	2.32	A	I	29.570	0.960	1.90	B	I	7.170	0.80	0.720	1.33	B	I	38.540	
		SNS5A	35.550		1.30	46.22	1.40	0.770	2.26	A	I	29.570	0.960	1.92	B	I	7.170	0.80	0.720	1.30	B	I	38.540	
		SNS6A	39.950		1.19	47.54	1.40	0.770	2.10	A	I	29.570	0.960	1.74	B	I	7.170	0.80	0.720	1.19	B	I	38.540	
		SNS7B	42.000		1.13	47.46	1.40	0.770	2.00	A	I	29.570	0.960	1.70	B	I	7.170	0.80	0.720	1.13	B	I	38.540	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.45	47.85	1.40	0.770	2.56	A	I	29.570	0.960	2.09	B	I	7.170	0.80	0.720	1.45	B	I	38.540	
		TNT4A	33.075		1.46	48.29	1.40	0.770	2.58	A	I	29.570	0.960	2.04	B	I	7.170	0.80	0.720	1.46	B	I	38.540	
		TNT6A	41.600		1.19	49.50	1.40	0.770	2.12	A	I	29.570	0.960	1.81	B	I	7.170	0.80	0.720	1.19	B	I	38.540	
		TNT7A	42.000		1.19	49.98	1.40	0.770	2.13	A	I	29.570	0.960	1.78	B	I	7.170	0.80	0.720	1.19	B	I	38.540	
		TNT7B	42.000		1.23	51.66	1.40	0.770	2.20	A	I	29.570	0.960	1.66	B	I	7.170	0.80	0.720	1.23	B	I	38.540	
		TNAGRIT4	43.000		1.17	50.31	1.40	0.770	2.10	A	I	29.570	0.960	1.61	B	I	7.170	0.80	0.720	1.17	B	I	38.540	
		TNAGT5A	45.000		1.11	49.95	1.40	0.770	1.98	A	I	29.570	0.960	1.59	B	I	69.900	0.80	0.720	1.11	B	I	38.540	
		TNAGT5B	45.000	3	1.10	49.50	1.40	0.770	1.95	A	I	29.570	0.960	1.53	B	I	7.170	0.80	0.720	1.10	B	I	38.540	
EMERGENCY VEHICLE (EV)		EV2	45.000		1.68	75.60	1.30	0.770	3.20	A	I	29.570	0.960	2.49	B	I	7.170	1.80	0.720	1.68	B	I	38.540	
		EV3	45.000	4	1.10	49.50	1.30	0.770	2.08	A	I	29.570	0.960	1.65	B	I	7.170	2.80	0.720	1.10	B	I	38.540	



LRFR SUMMARY

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γDC	γDW
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.

2.

3.

4.

(#) CONTROLLING LOAD RATING
(1) DESIGN LOAD RATING (HL-93)
(2) DESIGN LOAD RATING (HS-20)
(3) LEGAL LOAD RATING * *
(4) EMERGENCY VEHICLE LOAD RATING **
* * SEE CHART FOR VEHICLE TYPE
GIRDER LOCATION
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS

3/20/2025

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NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-06
1			3			TOTAL SHEETS
2			4			46

BRIDGE 1 STD. NO. LRFR1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : D. D. LOWERY	DATE : 11/2024	
CHECKED BY : R. M. KROL	DATE : 11/2024	
DRAWN BY : MAA 1/08	REV. 11/12/08RR	MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11	MAA/GM
	REV. 04/23	BNB/AAI

3/18/2025 K:\ROT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_RFR1_180540.dgn

NOTES

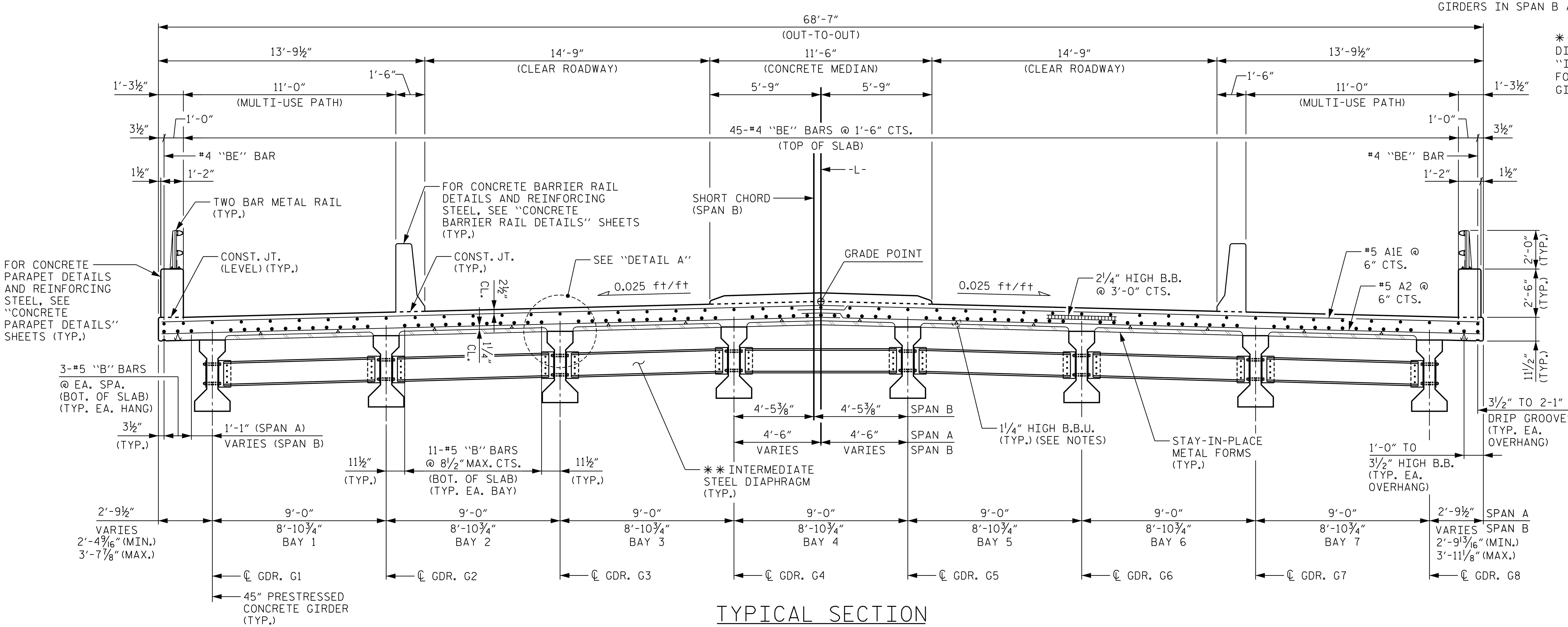
PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

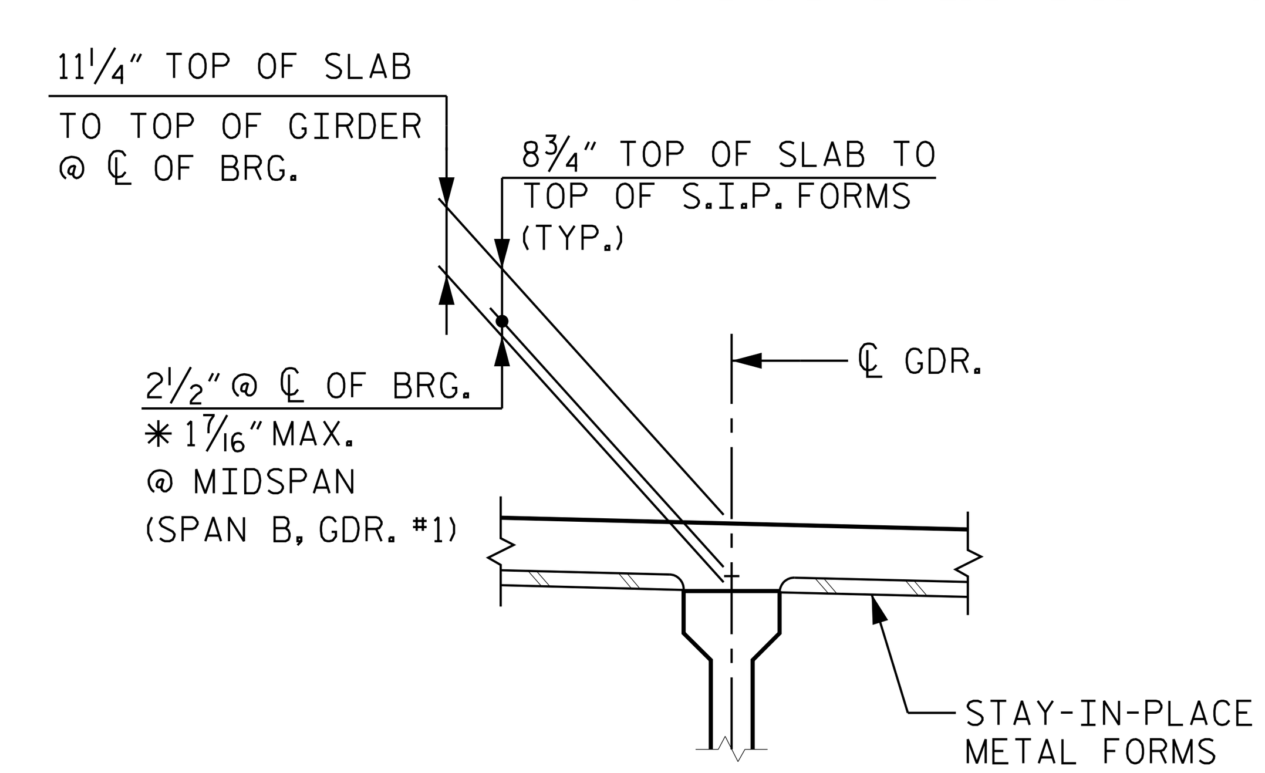
GIRDERS IN SPAN B ARE PARALLEL TO THE SHORT CHORD.

✱✱ FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE III PRESTRESSED CONCRETE GIRDERS" SHEET.


68'-7"
(OUT-TO-OUT)
13'-9½"
14'-9"
(CLEAR ROADWAY)
11'-6"
(CONCRETE MEDIAN)
14'-9"
(CLEAR ROADWAY)
13'-9½"
1'-3½"
11'-0"
(MULTI-USE PATH)
1'-6"
5'-9"
5'-9"
1'-6"
11'-0"
(MULTI-USE PATH)
1'-3½"
3½"
1'-0"
45-#4 "BE" BARS @ 1'-6" CTS.
(TOP OF SLAB)
1'-0"
3½"
#4 "BE" BAR
-L-
#4 "BE" BAR
1½"
1'-2"
1'-2"
1½"
TWO BAR METAL RAIL
(TYP.)
FOR CONCRETE BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL DETAILS" SHEETS (TYP.)
SHORT CHORD
(SPAN B)
FOR CONCRETE PARAPET DETAILS AND REINFORCING STEEL, SEE "CONCRETE PARAPET DETAILS" SHEETS (TYP.)
CONST. JT.
(LEVEL) (TYP.)
CONST. JT.
(TYP.)
SEE "DETAIL A"
GRADE POINT
#5 A1E @ 6" CTS.
#5 A2 @ 6" CTS.
2'-0" (TYP.)
2'-6" (TYP.)
2½" CL.
0.025 ft/ft
0.025 ft/ft
2¼" HIGH B.B.
@ 3'-0" CTS.
1¼" CL.
11½" (TYP.)
3-#5 "B" BARS
@ EA. SPA.
(BOT. OF SLAB)
(TYP. EA. HANG)
3½"
(TYP.)
1'-1" (SPAN A)
VARIES (SPAN B)
11½"
(TYP.)
11-#5 "B" BARS
@ 8½" MAX. CTS.
(BOT. OF SLAB)
(TYP. EA. BAY)
11½"
(TYP.)
✱✱ INTERMEDIATE STEEL DIAPHRAGM
(TYP.)
4'-5⅜"
4'-5⅜"
SPAN B
4'-6"
4'-6"
SPAN A
VARIES
VARIES
SPAN B
1¼" HIGH B.B.U.
(TYP.) (SEE NOTES)
STAY-IN-PLACE METAL FORMS
(TYP.)
3½" TO 2-1"
DRIP GROOVES
(TYP. EA. OVERHANG)
1'-0" TO
3½" HIGH B.B.
(TYP. EA. OVERHANG)
2'-9½"
VARIES
2'-4⁹⁄₁₆" (MIN.)
3'-7⅞" (MAX.)
9'-0"
8'-10¾"
BAY 1
9'-0"
8'-10¾"
BAY 2
9'-0"
8'-10¾"
BAY 3
9'-0"
8'-10¾"
BAY 4
9'-0"
8'-10¾"
BAY 5
9'-0"
8'-10¾"
BAY 6
9'-0"
8'-10¾"
BAY 7
2'-9½"
SPAN A
VARIES
SPAN B
2'-9¹³⁄₁₆" (MIN.)
3'-11⅛" (MAX.)
℄ GDR. G1
℄ GDR. G2
℄ GDR. G3
℄ GDR. G4
℄ GDR. G5
℄ GDR. G6
℄ GDR. G7
℄ GDR. G8
45" PRESTRESSED CONCRETE GIRDER
(TYP.)

TYPICAL SECTION

(SHOWING INTERMEDIATE DIAPHRAGM)



DETAIL "A"

(TYP. EA. GDR. @ EA. BENT)

✱ BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 1 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

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Phone (919) 677-2000
NC LICENSE # F-0102

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DRAWN BY: D. D. LOWERY	DATE: 11/2024
CHECKED BY: E. W. SPRABERRY	DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS	DATE: 11/2024

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

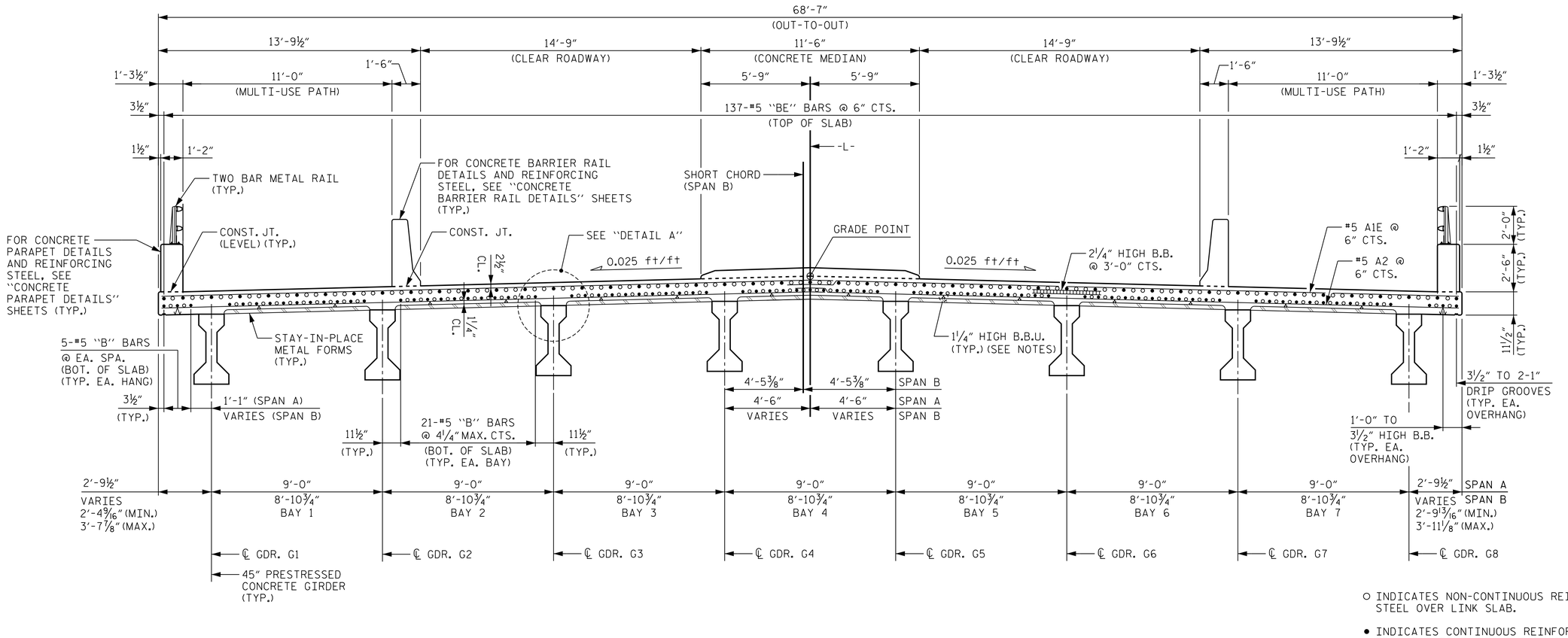
SHEET NO. S1-07

TOTAL SHEETS 46

BRIDGE 1

K:\RDI_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_TS1_180540.dgn

3/18/2025



○ INDICATES NON-CONTINUOUS REINFORCING STEEL OVER LINK SLAB.

● INDICATES CONTINUOUS REINFORCING STEEL FROM END BENT 1 TO END BENT 2.

TYPICAL SECTION

(SHOWING LINK SLAB)

NOTES

FOR SUPERSTRUCTURE NOTES, SEE "TYPICAL SECTION" SHEET 1 OF 4.

FOR "DETAIL A", SEE "TYPICAL SECTION" SHEET 1 OF 4.

K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_TS2_180540.dgn

3/18/2025

DRAWN BY: D. D. LOWERY	DATE: 11/2024
CHECKED BY: E. W. SPRABERRY	DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS	DATE: 11/2024

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS
3/20/2025

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NC LICENSE # F-0102

PROJECT NO. R-5963A

CHATHAM COUNTY

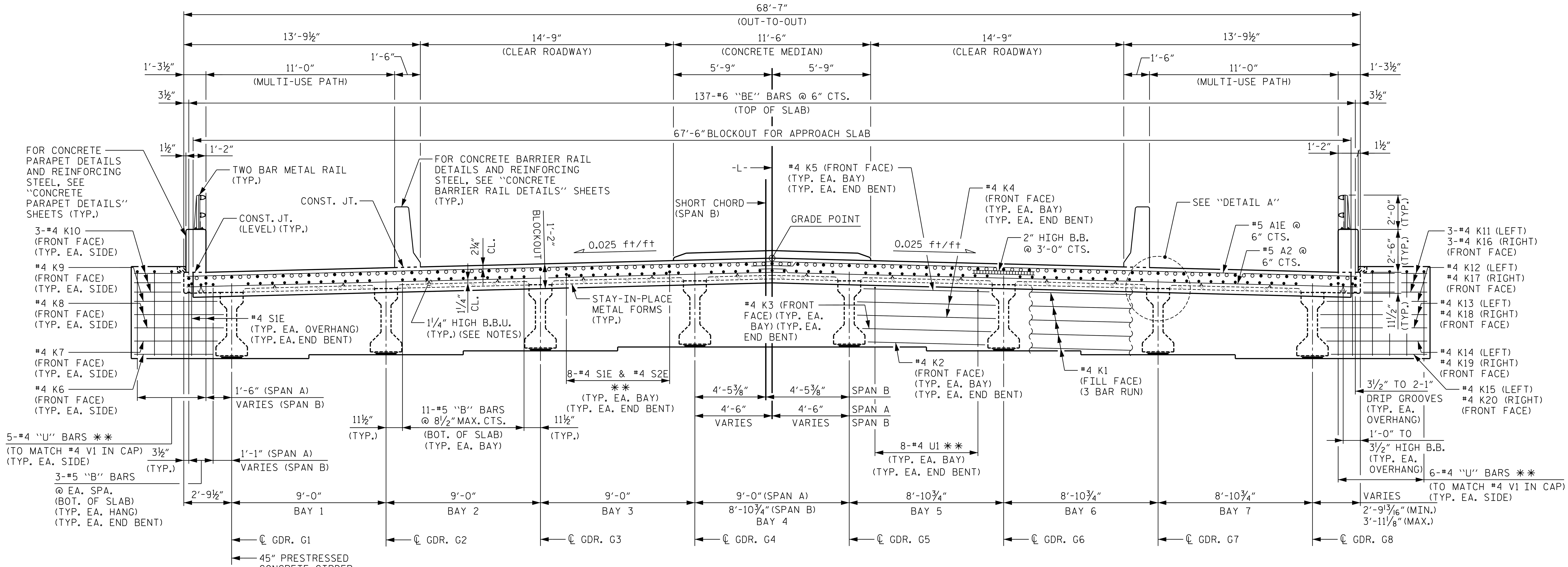
STATION: 76+49.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-08
1			3			TOTAL SHEETS
2			4			46

BRIDGE 1



END BENT 1 - HALF SECTION

END BENT 2 - HALF SECTION

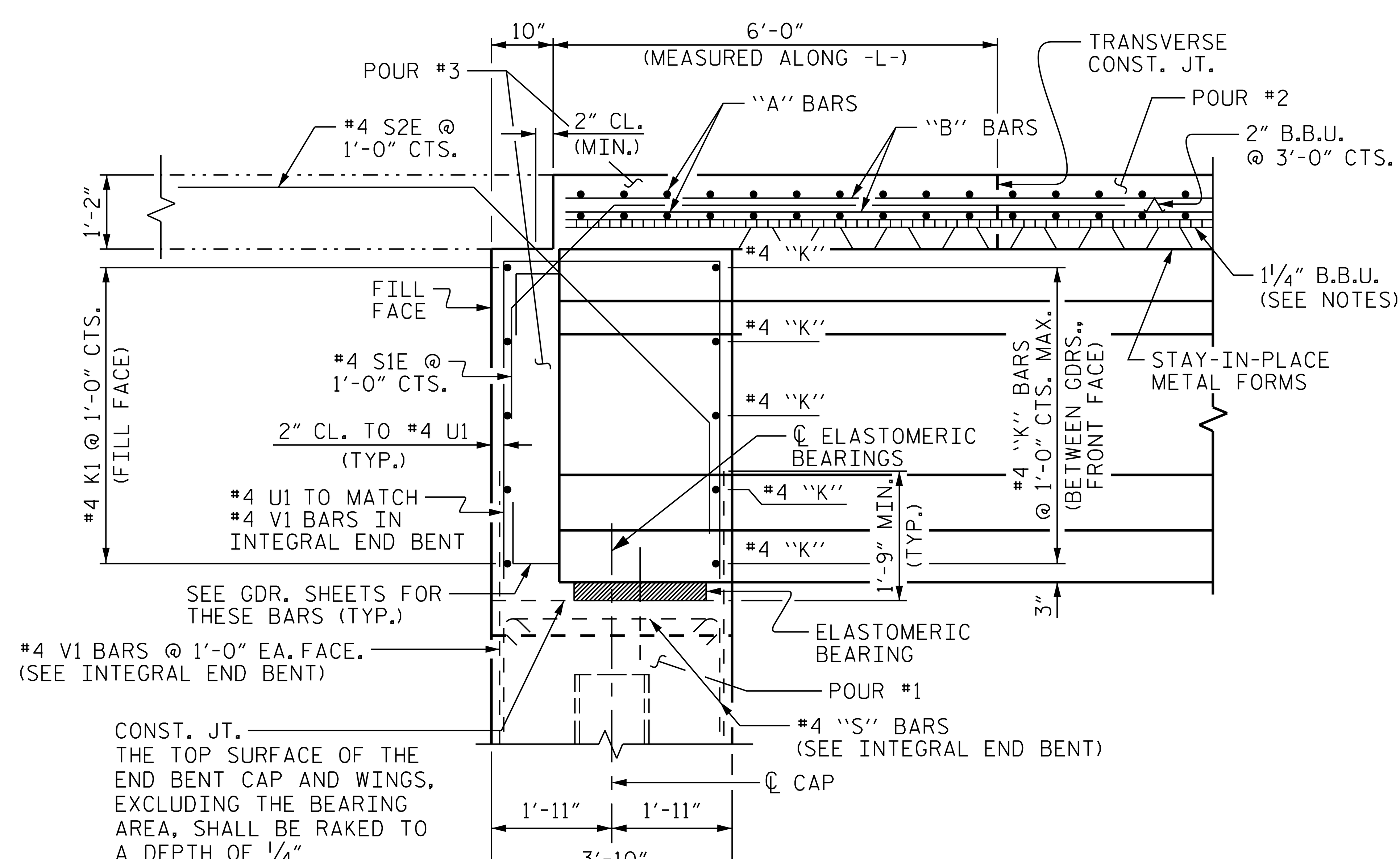
TYPICAL SECTION

(SHOWING INTEGRAL END BENT DIAPHRAGM)

○ INDICATES NON-CONTINUOUS REINFORCING STEEL OVER INTEGRAL END BENT.

● INDICATES CONTINUOUS REINFORCING STEEL FROM END BENT 1 TO END BENT 2.

** #4 S1E, #4 S2E AND #4 U1 BARS TO MATCH WITH THE #4 "V" BARS IN INTEGRAL END BENT CAP.



SECTION THRU INTEGRAL END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

NOTES

FOR SUPERSTRUCTURE NOTES, SEE "TYPICAL SECTION" SHEET 1 OF 4.

FOR "DETAIL A", SEE "TYPICAL SECTION" SHEET 1 OF 4.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

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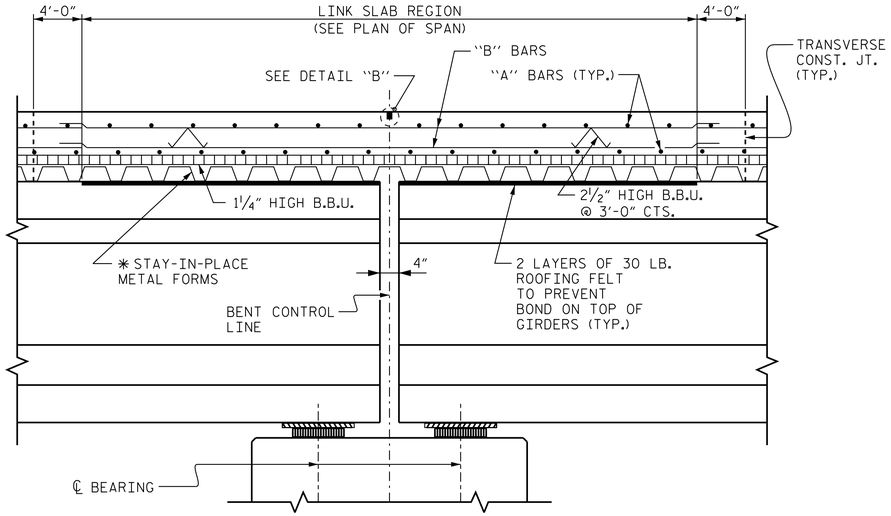
1				3				TOTAL SHEETS
2				4				46

DRAWN BY: D.D. LOWERY DATE: 11/2024
CHECKED BY: E.W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 11/2024

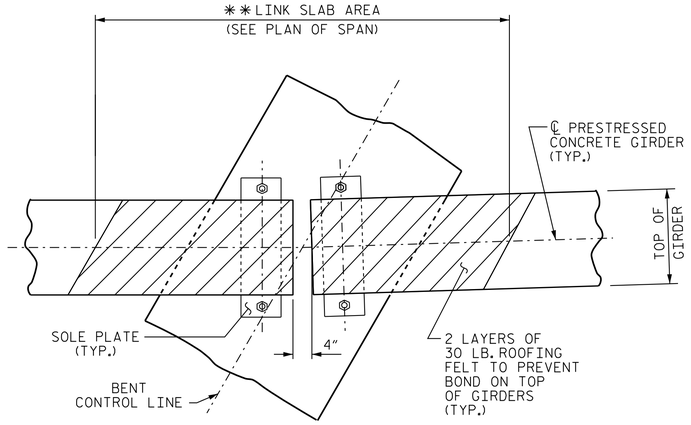
3/18/2025 K:\RDI_Structures_Bridge\NC\011036734 - R-5963A&B\Cadd\Bridge_1\R-5963A_SMU_TS3_180540.dgn

BRIDGE 1



SECTION @ LINK SLAB

* METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO THE GIRDER FLANGES IN THE REGION OF THE LINK SLAB.



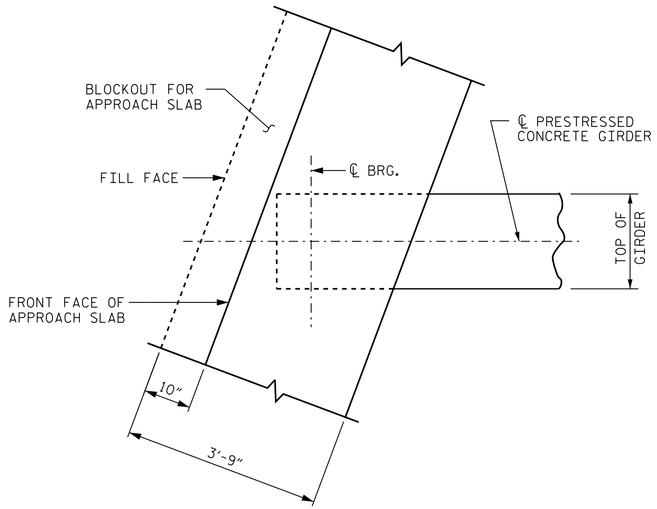
PLAN @ BENT

** THE TOP OF THE GIRDER IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH (NOT RAKED) AND FREE OF STIRRUPS/STUDS, DECK FORMWORK ATTACHMENTS, AND OVERHANG FALSEWORK/ FORMWORK ATTACHMENTS.

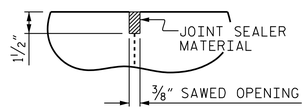
NOTES

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL SEE "BILL OF MATERIAL" SHEET.

NO WELDING OF FORMS OR FALSEWORK TO THE TOP OF THE GIRDER WILL BE PERMITTED IN THE LINK SLAB AREA.



PLAN OF GIRDER @ INTEGRAL END BENT



DETAIL "B"

A 1½" DEEP, ⅜" WIDE CONTRACTION JOINT AT BENT CONTROL LINE SHALL BE SAWN WITHIN 24 HOURS OF POURING THE LINK SLAB DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 4 OF 4

NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
040769
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3/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

LINK SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-10
1			3			TOTAL SHEETS
2			4			46

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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BRIDGE 1

229-#5 A1E @ 6" CTS. (TOP OF SLAB) (2 BAR RUN)
229-#5 A2 @ 6" CTS. (BOTTOM OF SLAB) (2 BAR RUN)

3-#5 B7 @ 8½" CTS. (BOT. OF SLAB) (TYP. EA. OVERHANG)

BENT 1 CONTROL LINE

2'-0" MIN. SPLICE (TYP.)

SEE "DETAIL B" ON SHEET 3 OF 6

GUTTERLINE

℄ GDR. AG1

BAY 1

℄ GDR. BG1

℄ GDR. AG2

BAY 2

℄ GDR. BG2

11-#5 B7 @ 8½" CTS. (BOT. OF SLAB) (TYP. EA. BAY)

℄ GDR. AG3

℄ GDR. BG3

TRANSVERSE CONST. JT.

BAY 3

GUTTERLINE

℄ GDR. AG4

℄ GDR. BG4

BAY 4

SHORT CHORD (SPAN B)

℄ GDR. AG5

℄ GDR. BG5

110°-00'-00"

TRANSVERSE CONST. JT.

GUTTERLINE

BAY 5

℄ GDR. AG6

℄ GDR. BG6

BEGIN DECK SLAB

BAY 6

℄ GDR. AG7

℄ GDR. BG7

BAY 7

GUTTERLINE

℄ GDR. AG8

℄ GDR. BG8

45-#4 B1E @ 1'-6" CTS. (LAP TO "BE" BARS) (TOP OF SLAB)

137-#6 B4E @ 6" CTS. (LAP TO #4 B1E) (TOP OF SLAB)

#4 B1E (LAP TO "BE" BARS) (TYP. EA. OVERHANG)

1'-1" (TYP.)

3½" (TYP.)

11½" (TYP.)

1'-4½"

1'-3½"

1'-6" INTERIOR CONCRETE BARRIER

11'-0" (MULTI-USE PATH)

14'-9" (CLEAR ROADWAY)

33'-0"

33'-9" (LIMITS OF APPROACH SLAB)

11'-6" (CONCRETE MEDIAN)

67'-6"

68'-7" (OUT TO OUT)

35'-5⅛"

34'-9¾"

10" BLOCKOUT

FILL FACE @ END BENT 1

SEE DETAIL "A"

-L-

W.P. #1

W.P. #2

Ⓐ

6'-0"

13'-10¼" DISTANCE TO FIRST MAIN BAR (ALONG -L-)

1'-11" MIN. SPLICE (TYP.)

4'-0" 3'-2" 4'-0"

7'-2" LINK SLAB REGION

SEE "DETAIL A" ON SHEET 3 OF 6

Ⓐ SEE ENLARGED DETAIL, ON THIS SHEET.

✳ #5 A101E THRU #5 A107E AND #5 A201 THRU #5 A207 ARE 2 BAR RUNS.

#5 A101E THRU #5 A149E @ 6" CTS. (TOP OF SLAB) ✳
#5 A201 THRU #5 A249 @ 6" CTS. (BOTTOM OF SLAB) ✳

6"

62'-0" (W.P. #1 TO W.P. #2)

80'-0" ALONG -L- (W.P. #2 TO W.P. #3)

142'-0" ALONG -L- (W.P. #1 TO W.P. #3)

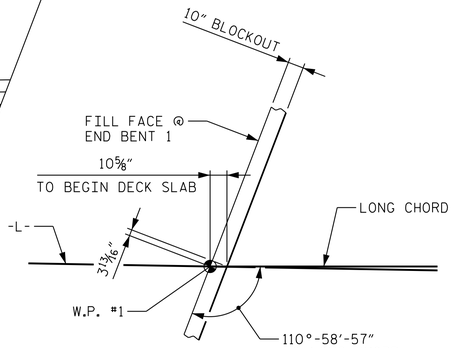
SPAN A

PART PLAN OF SPANS

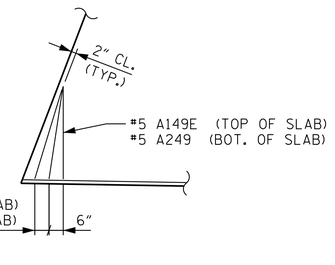
#5 "A" BARS ARE TO BE PLACED PERPENDICULAR TO -L- IN SPAN A AND PERPENDICULAR TO THE SHORT CHORD IN SPAN B.

NOTES:

FOR NOTES SEE "PLAN OF SPAN" SHEET 3 OF 6.



DETAIL "A"



ENLARGED DETAIL

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
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Phone (919) 677-2000
NC LICENSE # F-0102

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-11
1			3			TOTAL SHEETS
2			4			46

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

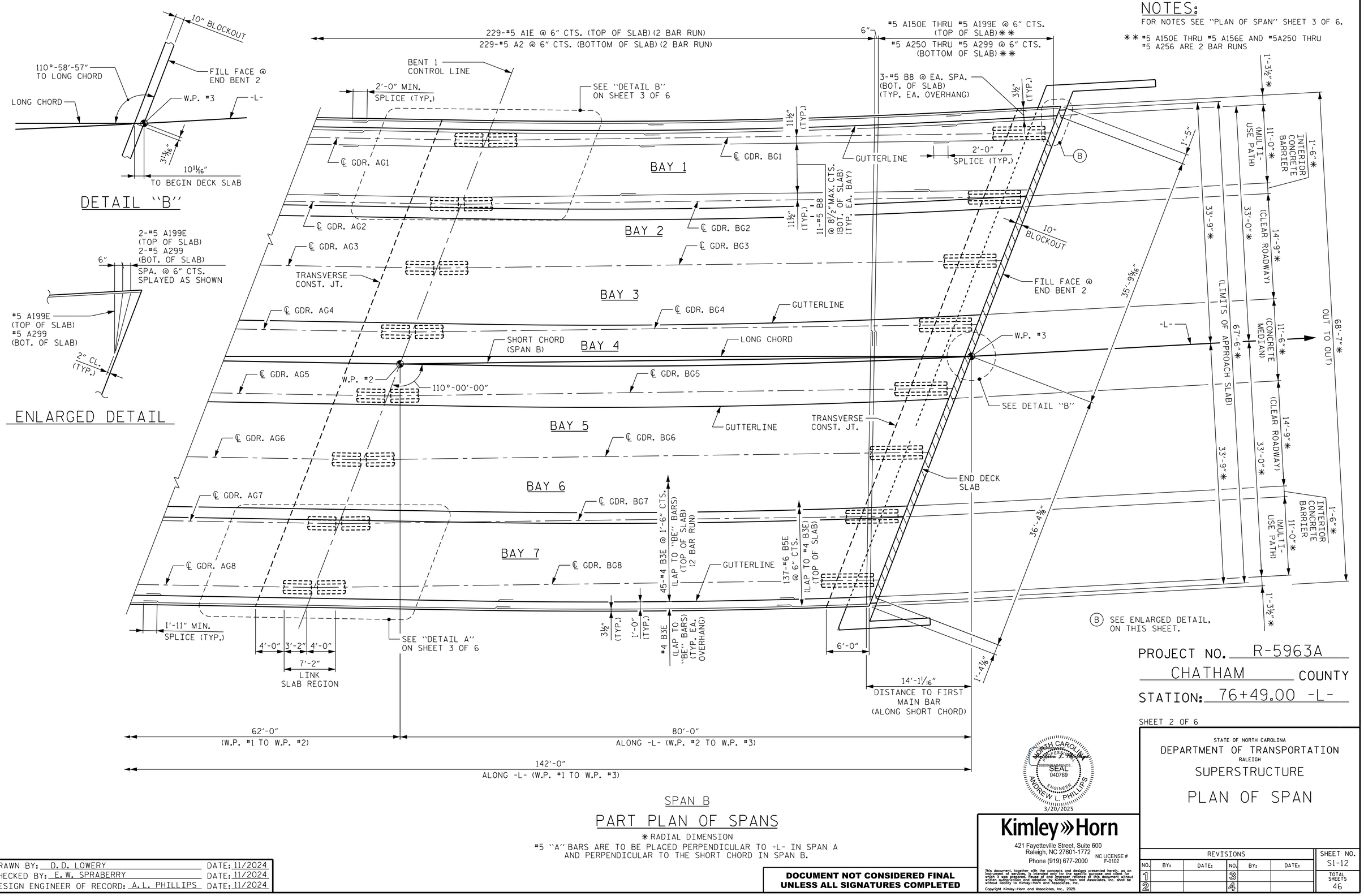
3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_S1_180540.dgn

BRIDGE 1

NOTES:

FOR NOTES SEE ''PLAN OF SPAN'' SHEET 3 OF 6.

** #5 A150E THRU #5 A156E AND #5A250 THRU #5 A256 ARE 2 BAR RUNS



SPAN B

PART PLAN OF SPANS

* RADIAL DIMENSION

#5 ''A'' BARS ARE TO BE PLACED PERPENDICULAR TO -L- IN SPAN A AND PERPENDICULAR TO THE SHORT CHORD IN SPAN B.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPAN

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-12
1			3			TOTAL SHEETS
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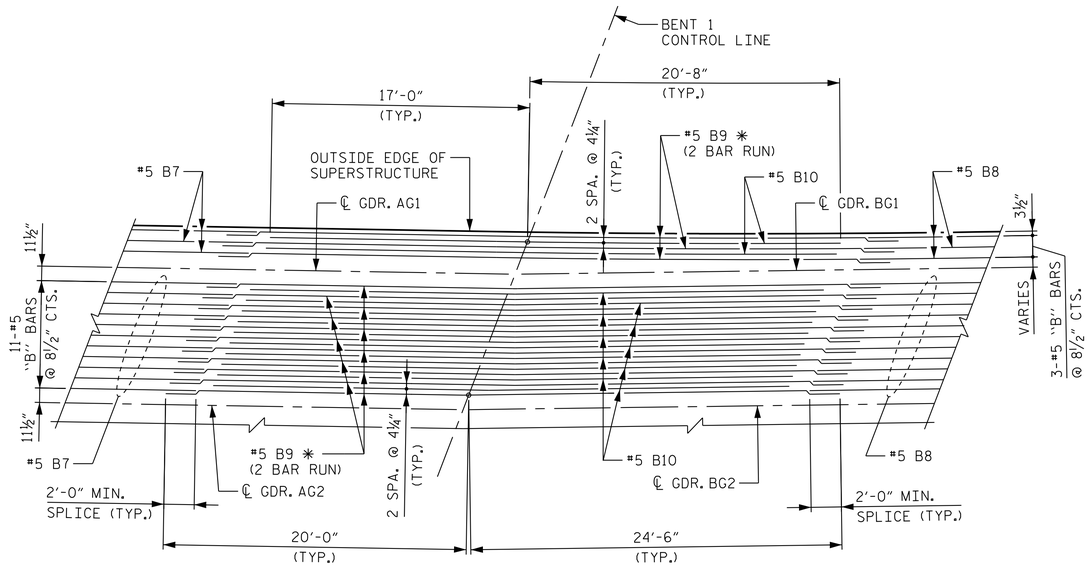
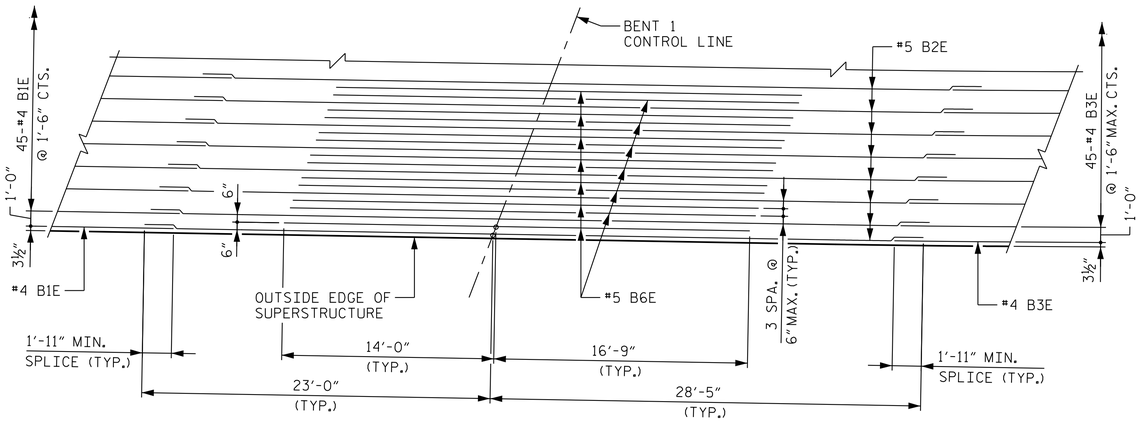
BRIDGE 1



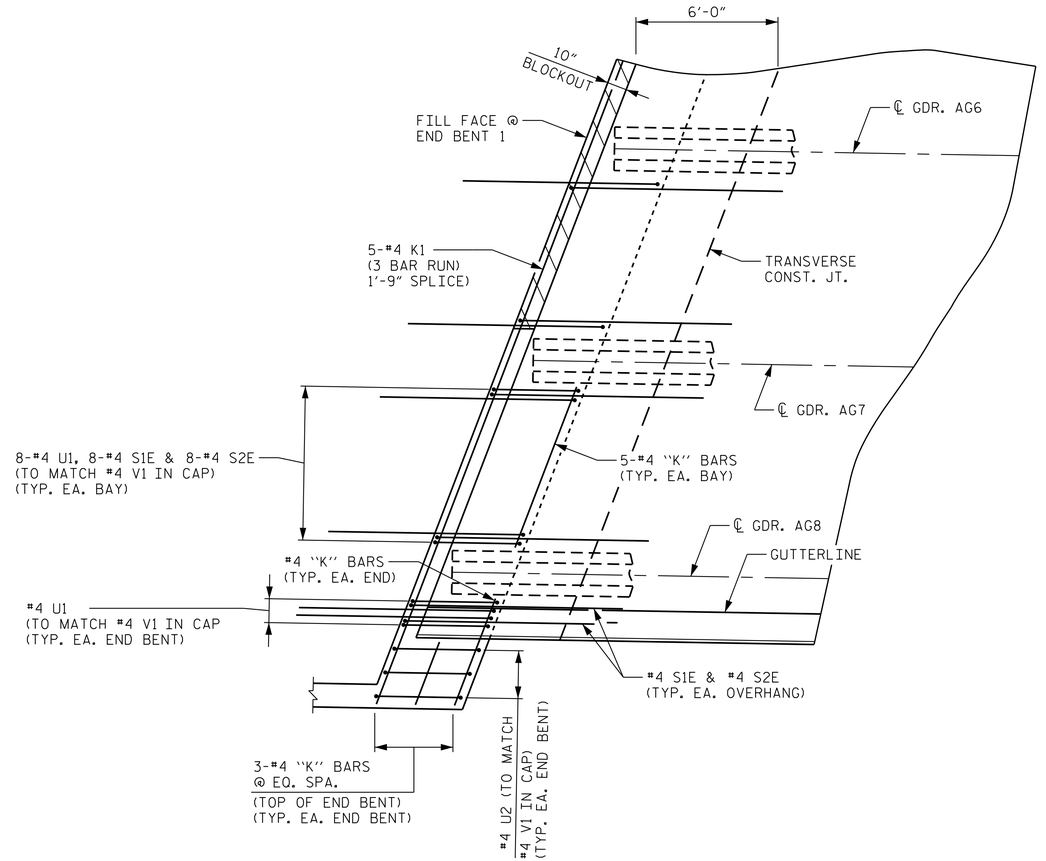
DETAIL "B"

✱ #5 B9 ARE SPLICED WITH CONTINUOUS #5 "B" BARS
LEFT OVERHANG SHOWN, RIGHT OVERHANG SIMILAR
BAY 1 SHOWN, ALL OTHER BAYS SIMILAR



DETAIL "A"

LONGITUDINAL TOP OF SLAB REINFORCING IS SYMMETRICAL ABOUT -L-



END BENT DIAPHRAGM ENLARGEMENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

NOTES

FOR POUR SEQUENCE AND LOCATION OF CONSTRUCTION JOINTS, SEE SUPERSTRUCTURE "BILL OF MATERIAL" SHEET.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

FOR CONCRETE BARRIER RAIL REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.

FOR CONCRETE PARAPET REINFORCING STEEL SEE "CONCRETE PARAPET DETAILS" SHEET.

INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY, SEE "FRAMING PLAN" SHEET.

FOR LINK SLAB DETAILS, SEE "LINK SLAB DETAILS" SHEET.

NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
040769
ENGINEER
ANDREW L. PHILLIPS
3/20/2025

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PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 76+49.00 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-13
1			3			TOTAL SHEETS
2			4			46

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CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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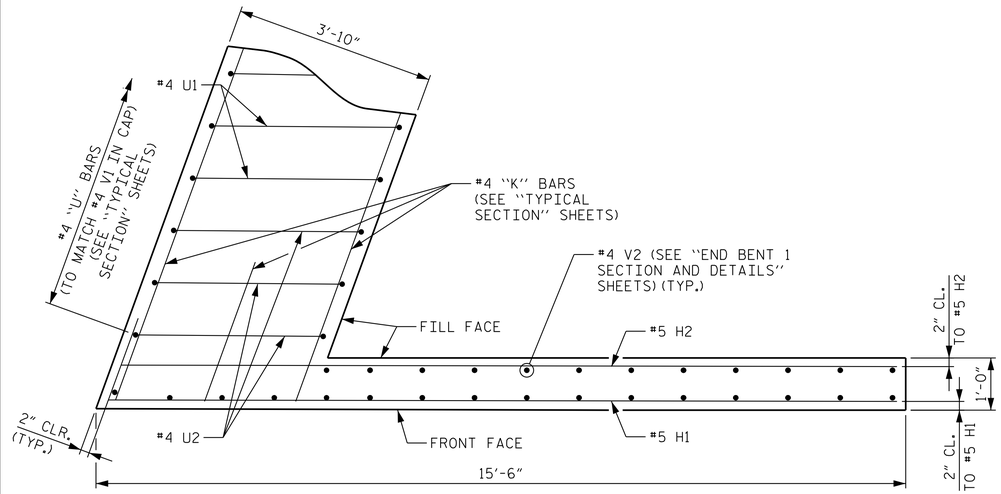
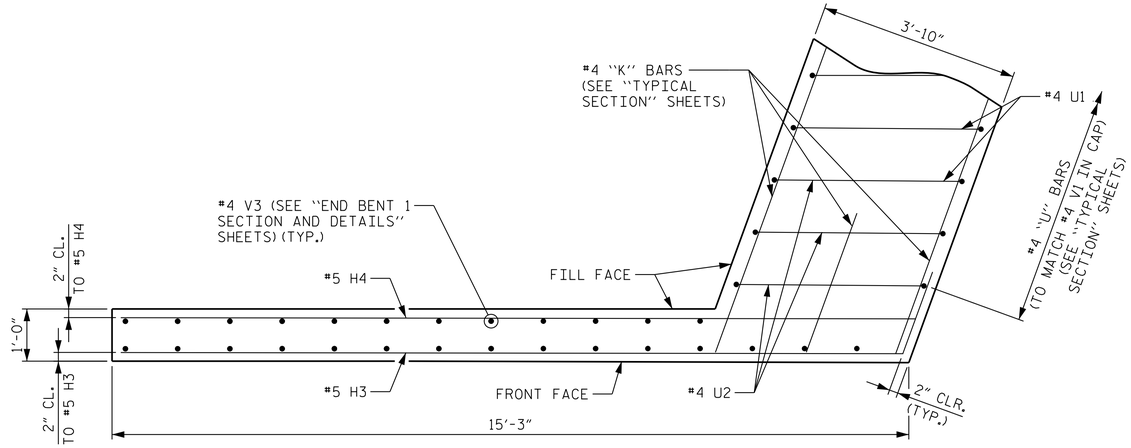
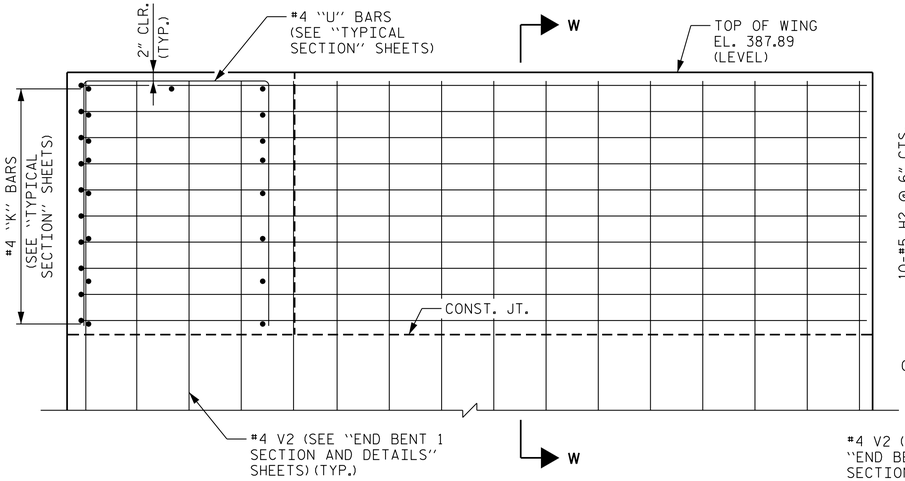
BRIDGE 1



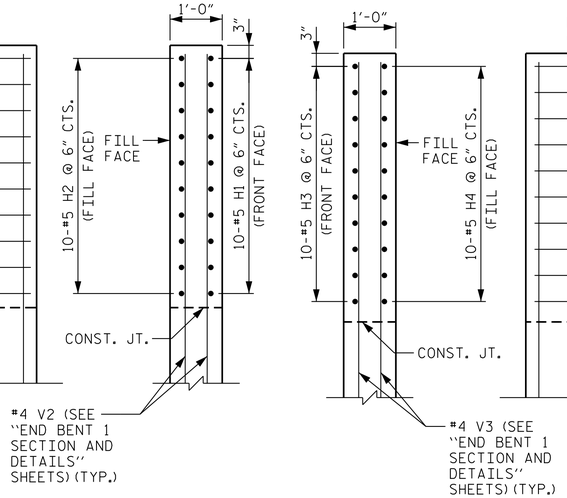
PLAN OF WING W1



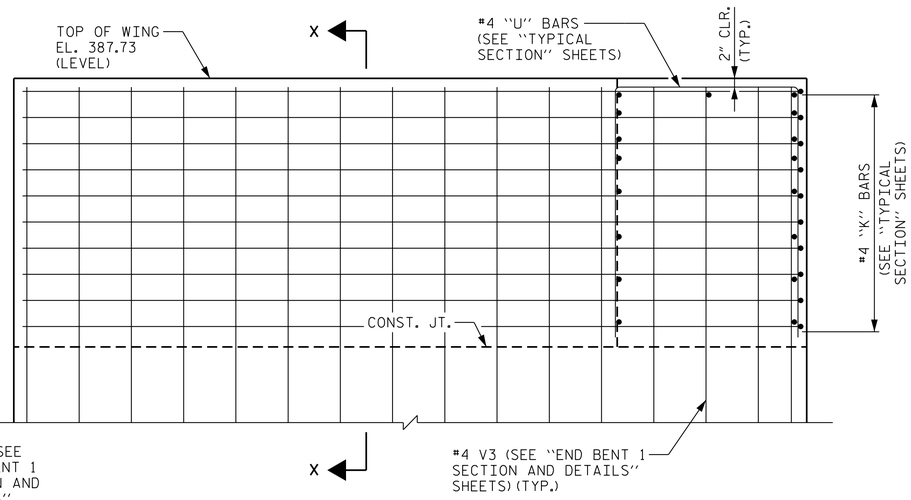
PLAN OF WING W2



ELEVATION OF WING W1



SECTION W-W SECTION X-X



ELEVATION OF WING W2

UPPER WINGS AT INTEGRAL END BENT 1

FOR LOWER WING REINFORCING STEEL AND DETAILS, SEE "END BENT 1 SECTION AND DETAILS" SHEETS

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 4 OF 6

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

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SUPERSTRUCTURE

PLAN OF SPAN DETAILS @ END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-14
1			3			TOTAL SHEETS
2			4			46

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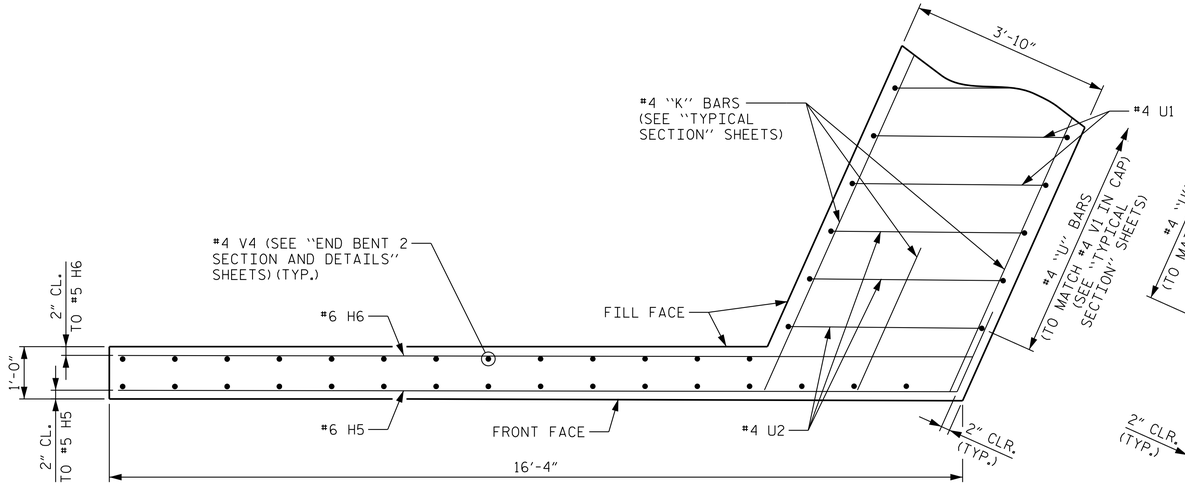
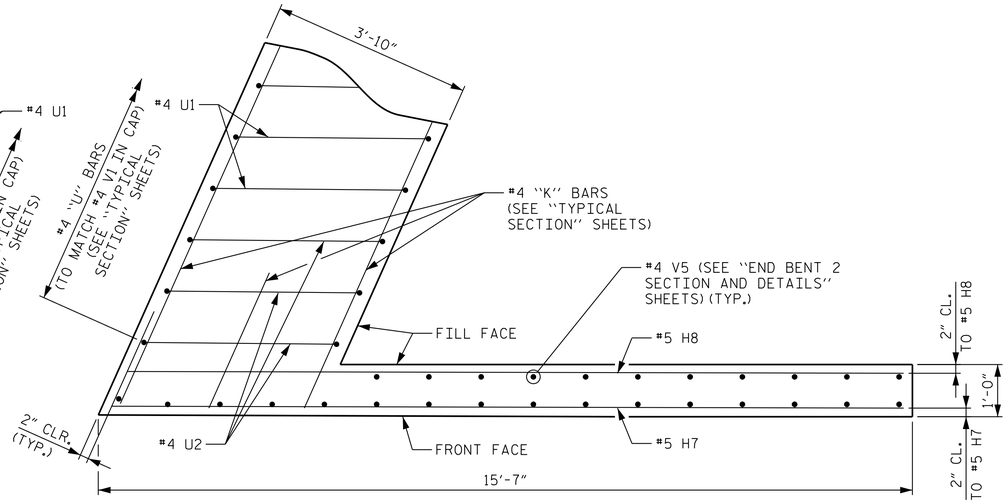
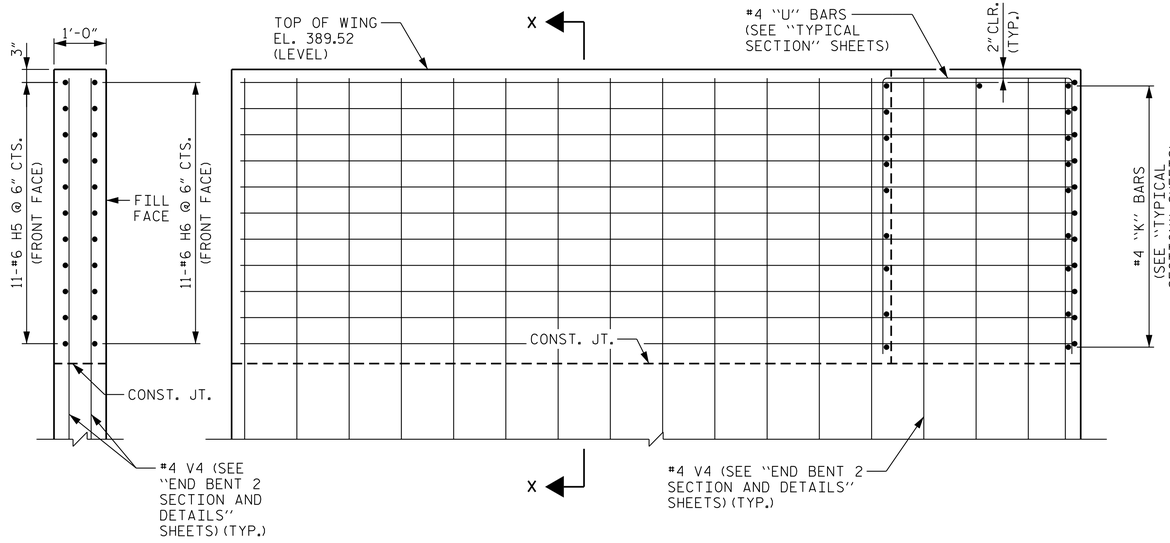
BRIDGE 1



PLAN OF WING W3

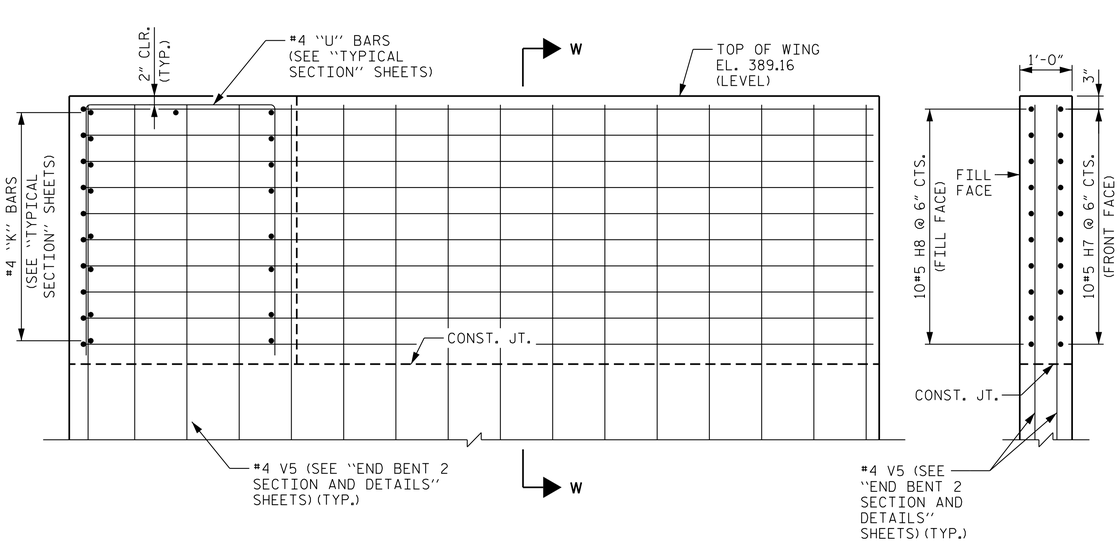


PLAN OF WING W4



SECTION X-X

ELEVATION OF WING W3



ELEVATION OF WING W4

SECTION W-W

UPPER WINGS AT INTEGRAL END BENT 2

FOR LOWER WING REINFORCING STEEL AND DETAILS, SEE "END BENT 1 SECTION AND DETAILS" SHEETS

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 5 OF 6

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN DETAILS @ END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-15
1			3			TOTAL SHEETS
2			4			46

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DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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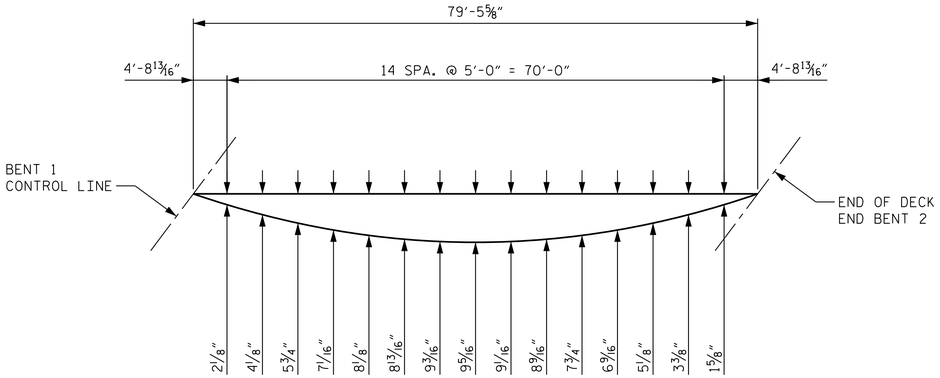
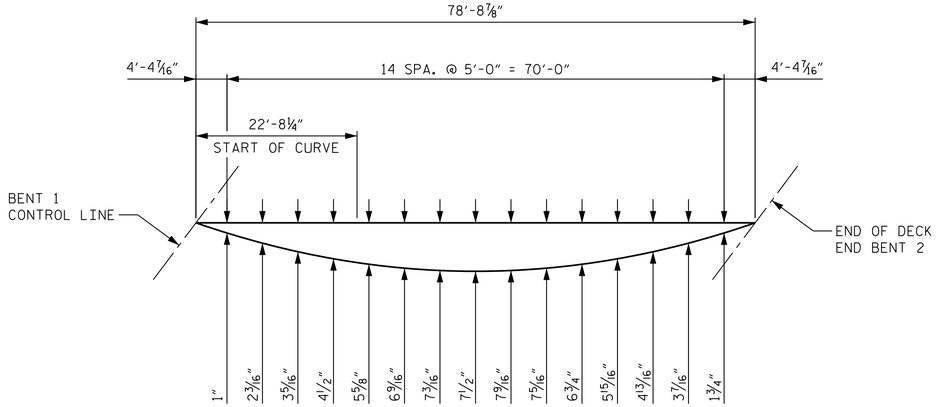
BRIDGE 1



SPAN B ARC OFFSETS - LEFT SLAB EDGE



SPAN B ARC OFFSETS - RIGHT SLAB EDGE

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L PHILLIPS
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1			3			TOTAL SHEETS
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DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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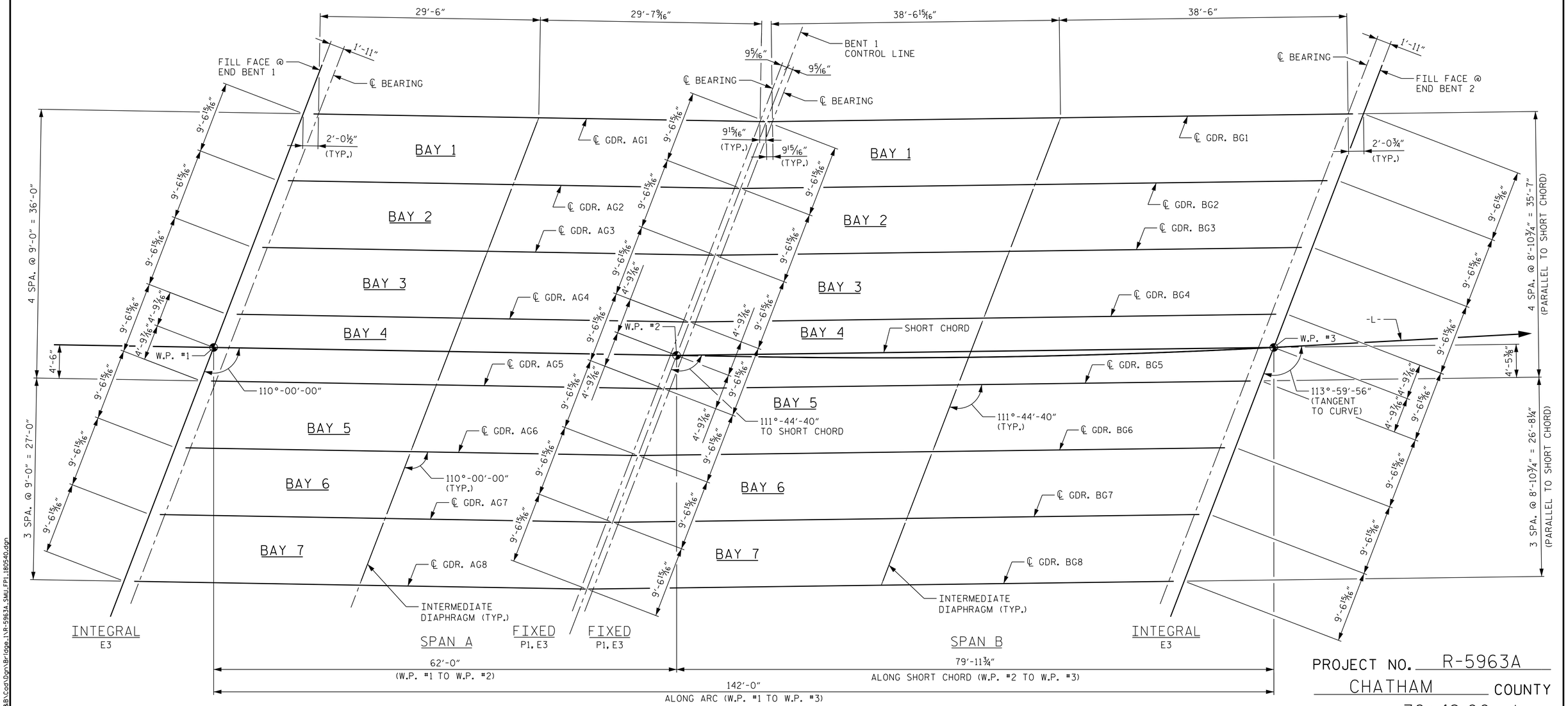
BRIDGE 1

NOTES

FOR STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE III PRESTRESSED CONCRETE GIRDER" SHEET.



FRAMING PLAN

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L PHILLIPS
3/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
FRAMING PLAN

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-17
1			3			TOTAL SHEETS
2			4			46

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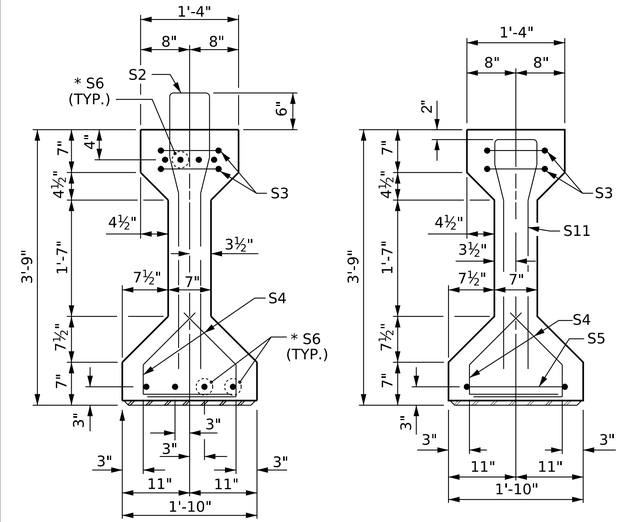
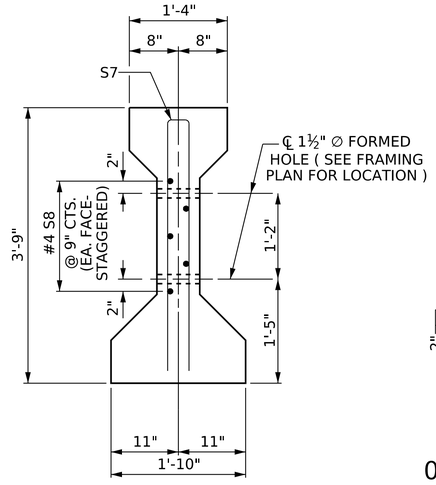


SECTION A-A

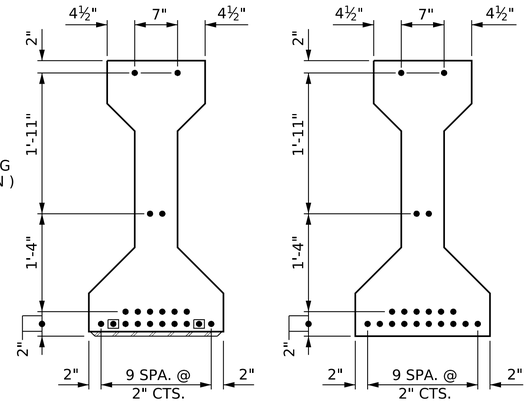
* FOR S6 BARS, SEE DETAIL "A" ON SHEET 3 OF 4

SECTION B-B



SECTION C-C

(S1 BARS NOT SHOWN)



0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- • FULLY BONDED STRANDS
- ⊡ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

0.6"Ø L.R. GRADE 270 STRANDS

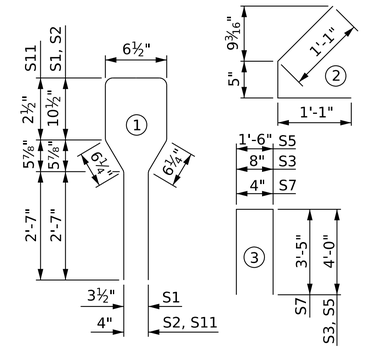
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	48	#4	1	8'-6"	273
S2	20	#6	1	8'-6"	255
S3	4	#4	3	8'-8"	23
S4	56	#4	2	2'-9"	103
S5	1	#4	3	9'-6"	6
* S6	8	#5	STR	3'-8"	31
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23
S10	1	#3	STR	1'-0"	1
S11	8	#6	1	7'-2"	86

* NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES



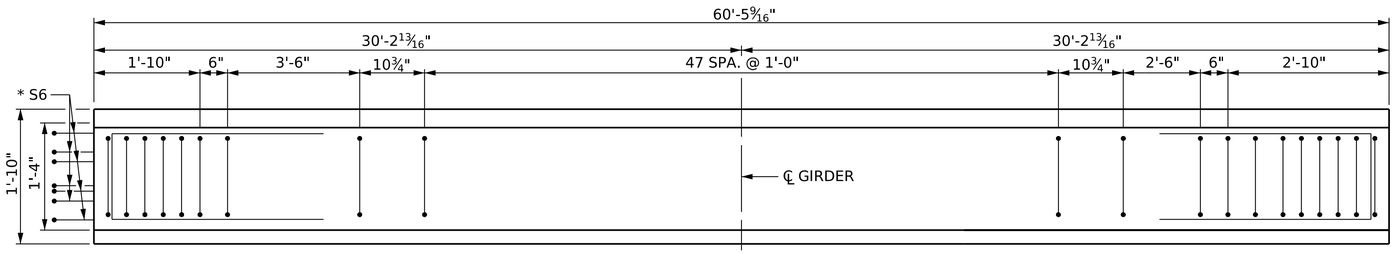
ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

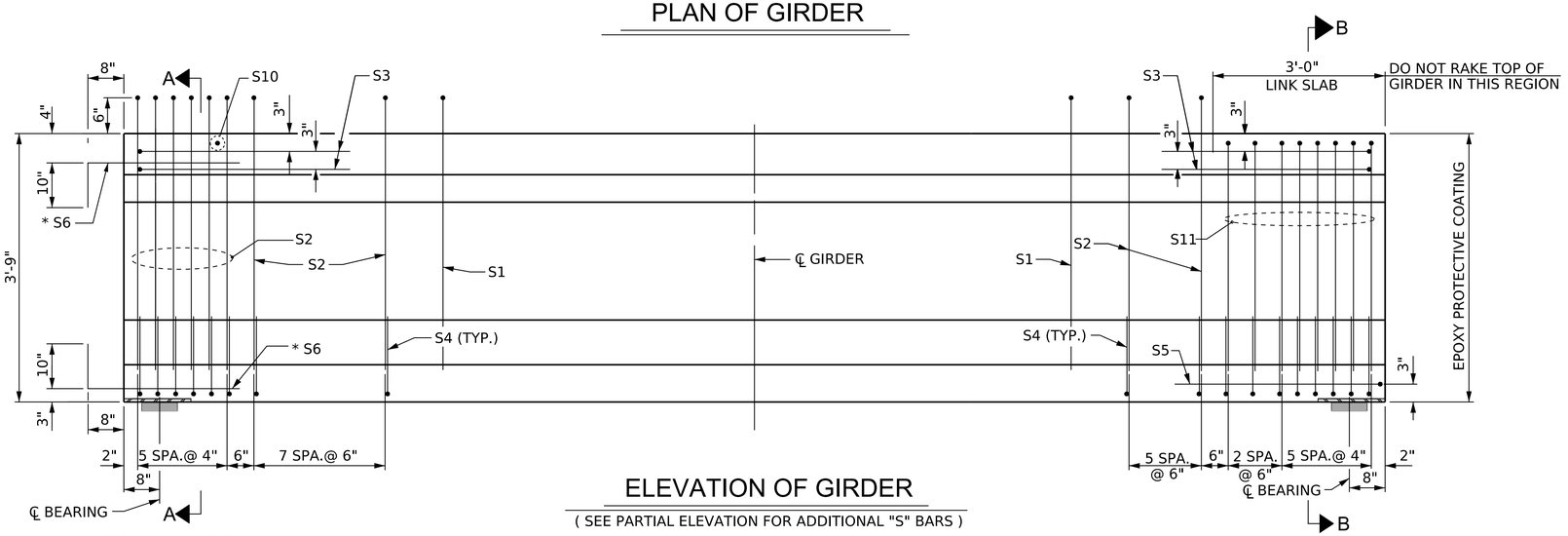
	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" ∅ L. R. STRANDS
	LB.	C.Y.	No.
GDR. AG1-AG8	816	8.7	20

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	60'-5⁹⁄₁₆"	483'-8½"

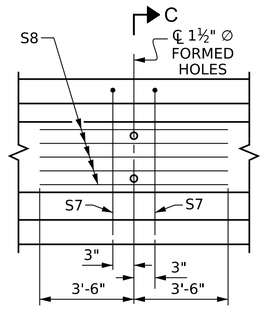


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-8

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 1 OF 4

NORTH CAROLINA
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE III
PRESTRESSED CONCRETE GIRDER
LINK SLAB

SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-18
1			3			TOTAL SHEETS
2			4			46

ASSEMBLED BY :	D. D. LOWERY	DATE : 11/2024
CHECKED BY :	R. M. KROL	DATE : 11/2024
DRAWN BY :	BNB 09/21	
CHECKED BY :	AAI 09/21	

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BRIDGE 1 STD. NO. PCG5

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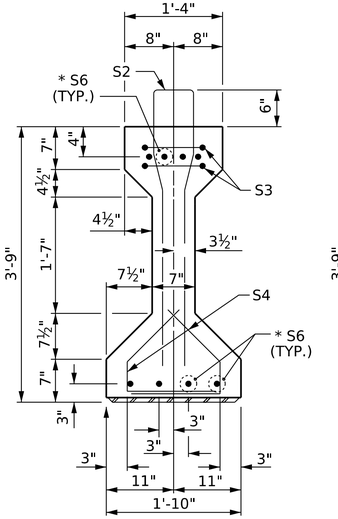
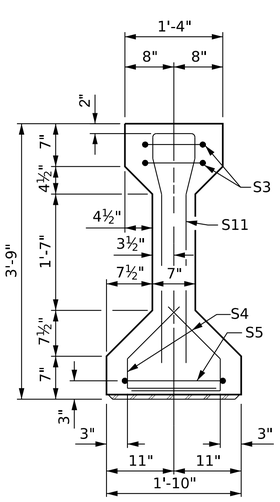
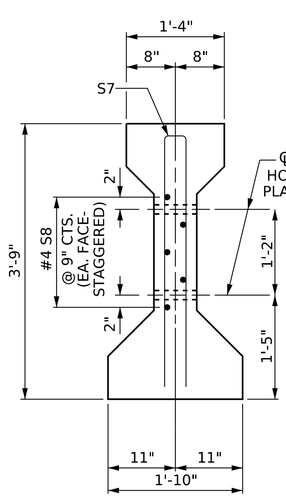


SECTION A-A

* FOR S6 BARS, SEE DETAIL "A" ON SHEET 3 OF 4

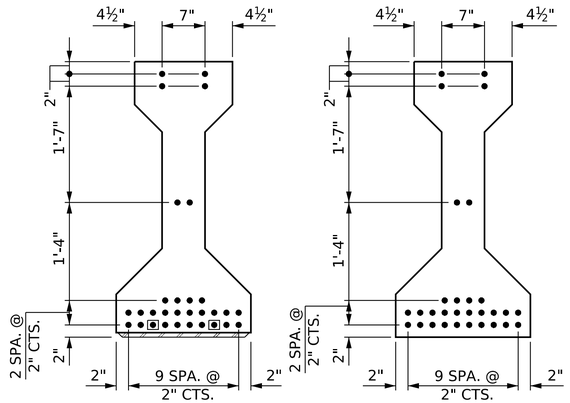


SECTION B-B



SECTION C-C

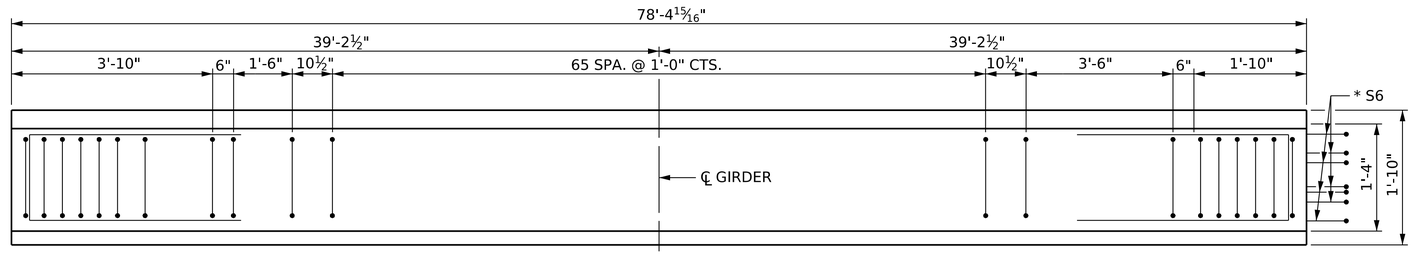
(S1 BARS NOT SHOWN)



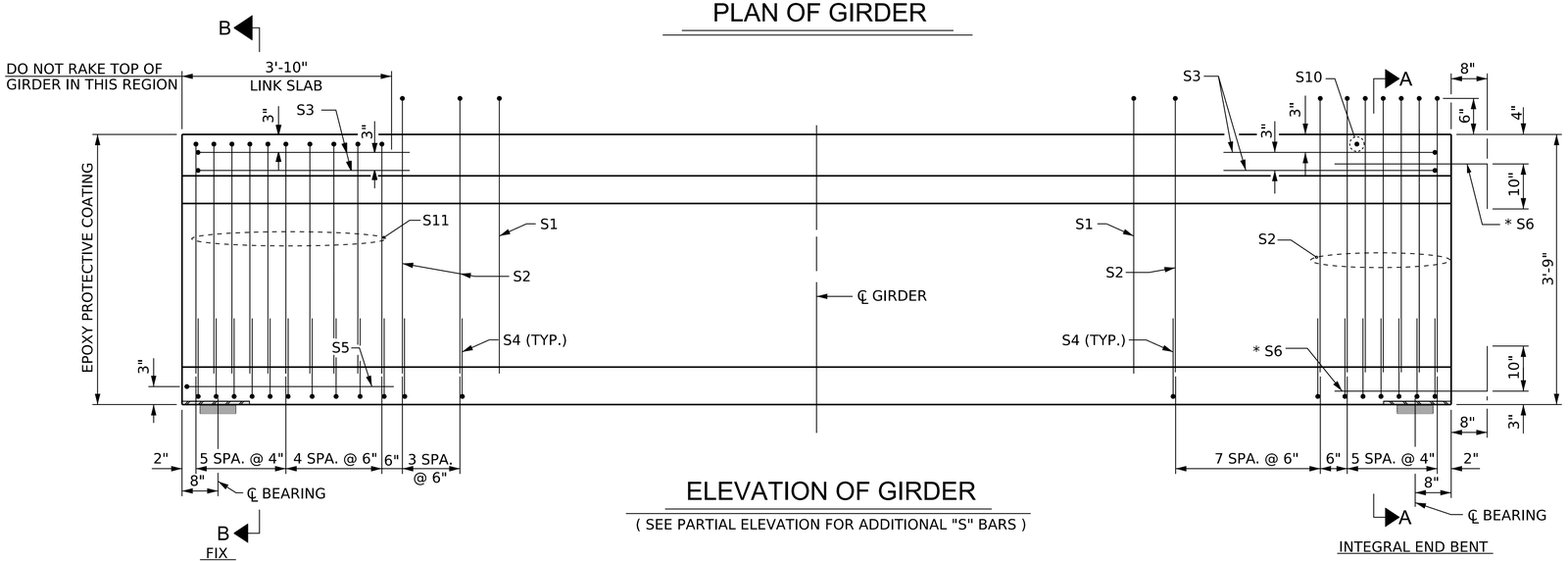
0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- • FULLY BONDED STRANDS
- ⊡ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

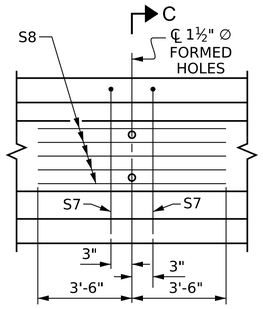


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-8

0.6"Ø L.R. GRADE 270 STRANDS

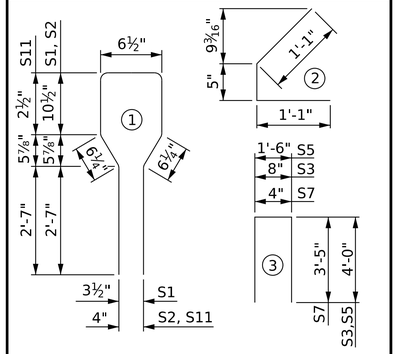
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	66	#4	1	8'-6"	375
S2	18	#6	1	8'-6"	230
S3	4	#4	3	8'-8"	23
S4	56	#4	2	2'-9"	103
S5	1	#4	3	9'-6"	6
* S6	8	#5	STR	3'-8"	31
S7	2	#5	3	7'-2"	15
S8	5	#4	STR	7'-0"	23
S10	1	#3	STR	1'-0"	1
S11	10	#6	1	7'-2"	108

* NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8,000 PSI CONCRETE	0.6" ∅ L. R. STRANDS
	LB.	C.Y.	No.
GDR. BG1-BG8	915	11.3	30

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	78'-4 15/16"	627'-3½"

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE III
PRESTRESSED CONCRETE GIRDER
LINK SLAB

SPAN B

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

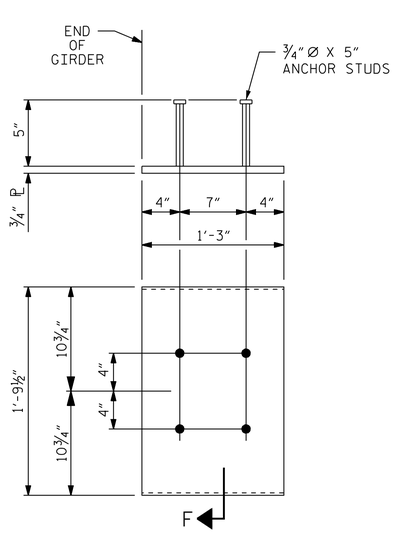
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-19
1			3			TOTAL SHEETS
2			4			46

ASSEMBLED BY : D. D. LOWERY DATE : 11/2024
CHECKED BY : R. M. KROL DATE : 11/2024
DRAWN BY : BNB 09/21
CHECKED BY : AAI 09/21

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

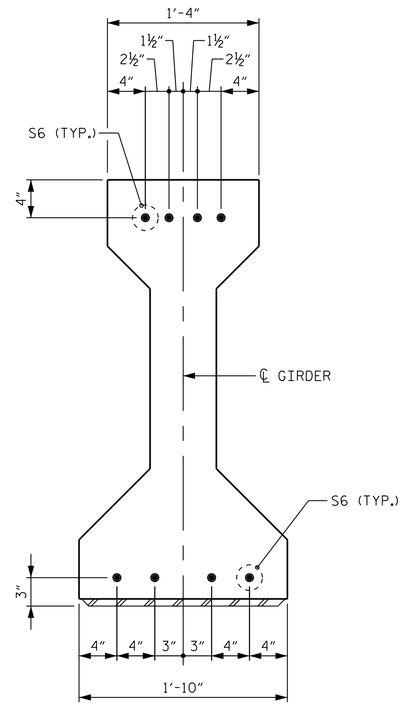
BRIDGE 1 STD. NO. PCG5

3/18/2025 K:\RDT_Structures_Bridge\NC\01036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_02_180540.dgn

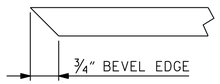


EMBEDDED PLATE "B-1" DETAILS
FOR AASHTO TYPE III GIRDER

(2 REQ'D PER GIRDER)



DETAIL A



SECTION "F"

(SEE NOTES)

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO BOTH SIDES AND BOTTOM OF END 2 FEET OF GIRDER AND END OF GIRDER SURFACES AS INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,000 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF ¼" EXCEPT IN THE LINK SLAB AREA SHOWN IN PLANS.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-20
1			3			TOTAL SHEETS
2			4			46

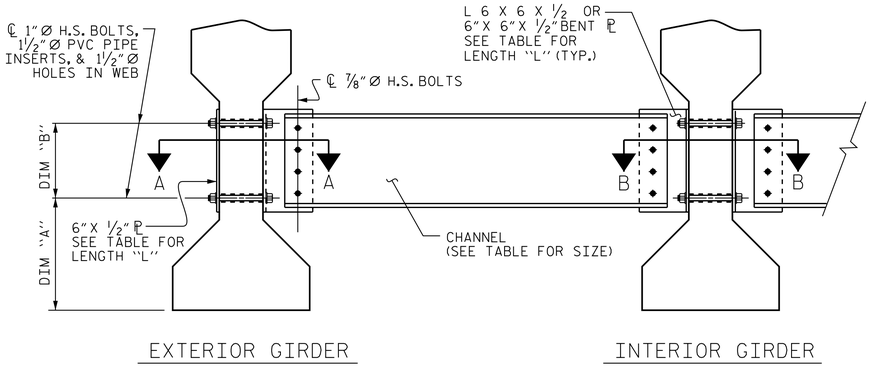
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : D.D. LOWERY	DATE : 11/2024		
CHECKED BY : R.M. KROL	DATE : 11/2024		
DRAWN BY : ELR 11/91	REV. 2/15	MAA/TMG	
CHECKED BY : GRP 11/91	REV. 12/17	MAA/THC	
	REV. 10/23	BNB/AKP	

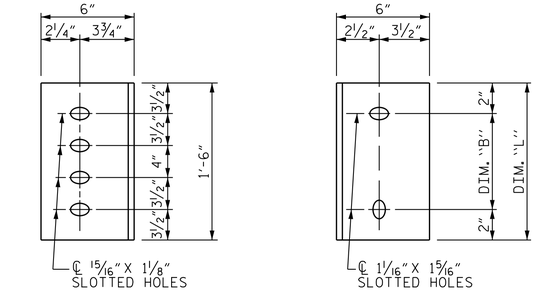
3/18/2025

K:\RDT_Structures_Bridge\NC\01103734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_G3_180540.dgn

BRIDGE 1 STD. NO. PCG9



PART SECTION AT INTERMEDIATE DIAPHRAGM



CONNECTOR PLATE DETAILS

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

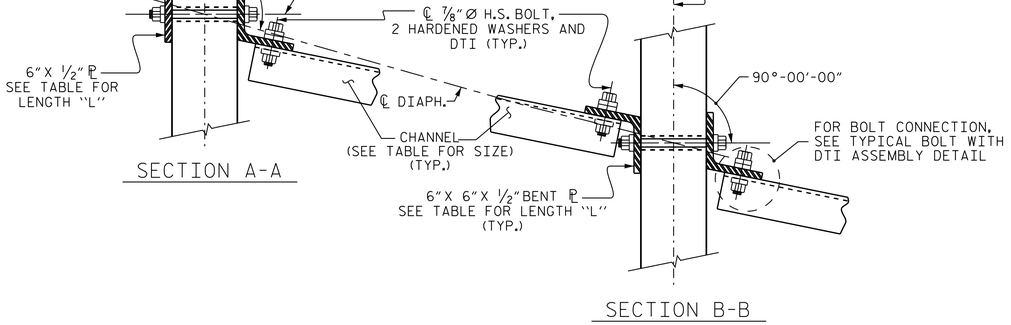
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼"PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

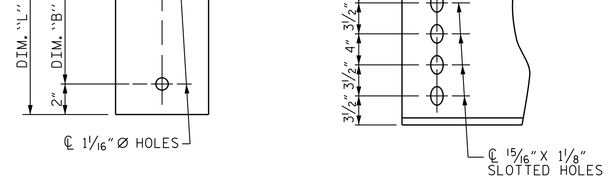
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

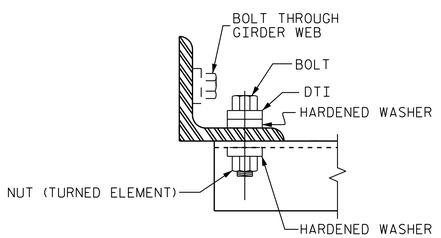


CONNECTION DETAILS



TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
III	MC 18 x 42.7	1'-5"	1'-2"	1'-6"



PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE III PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-21
1			3			TOTAL SHEETS
2			4			46

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
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ASSEMBLED BY : D. D. LOWERY	DATE : 11/2024		
CHECKED BY : R. M. KROL	DATE : 11/2024		
DRAWN BY : TLA 6/05	REV. 5/1/06RRR	KMM/GM	
CHECKED BY : VC 6/05	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THC	

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BRIDGE 1 STD. NO. PCG10

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN A																				
	GIRDERS AG1 AND AG8																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.014	0.028	0.042	0.054	0.065	0.074	0.081	0.086	0.090	0.091	0.090	0.086	0.081	0.074	0.065	0.054	0.042	0.028	0.014	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.006	0.012	0.018	0.023	0.028	0.032	0.035	0.038	0.039	0.040	0.039	0.038	0.035	0.032	0.028	0.023	0.018	0.012	0.006	0.000
FINAL CAMBER ↑	0	1/8"	3/16"	5/16"	3/8"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	5/16"	3/16"	1/8"	0
	GIRDERS AG2 AND AG7																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.014	0.028	0.042	0.054	0.065	0.074	0.081	0.086	0.090	0.091	0.090	0.086	0.081	0.074	0.065	0.054	0.042	0.028	0.014	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.007	0.014	0.020	0.027	0.032	0.037	0.041	0.044	0.045	0.046	0.045	0.044	0.041	0.037	0.032	0.027	0.020	0.014	0.007	0.000
FINAL CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	1/2"	9/16"	9/16"	9/16"	1/2"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0
	GIRDERS AG3 AND AG6																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.014	0.028	0.042	0.054	0.065	0.074	0.081	0.086	0.090	0.091	0.090	0.086	0.081	0.074	0.065	0.054	0.042	0.028	0.014	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.007	0.014	0.020	0.027	0.033	0.038	0.041	0.045	0.046	0.047	0.046	0.045	0.041	0.038	0.033	0.027	0.020	0.014	0.007	0.000
FINAL CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0
	GIRDERS AG4 AND AG5																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.014	0.028	0.042	0.054	0.065	0.074	0.081	0.086	0.090	0.091	0.090	0.086	0.081	0.074	0.065	0.054	0.042	0.028	0.014	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.006	0.013	0.019	0.025	0.030	0.034	0.038	0.041	0.042	0.043	0.042	0.041	0.038	0.034	0.030	0.025	0.019	0.013	0.006	0.000
FINAL CAMBER ↑	0	1/8"	3/16"	1/4"	3/8"	7/16"	1/2"	1/2"	9/16"	9/16"	9/16"	9/16"	9/16"	1/2"	1/2"	7/16"	3/8"	1/4"	3/16"	1/8"	0

✳ INCLUDES FUTURE WEARING SURFACE.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN B																				
	GIRDER BG1																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.054	0.080	0.103	0.124	0.141	0.155	0.165	0.171	0.174	0.171	0.165	0.155	0.141	0.124	0.103	0.080	0.054	0.028	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.017	0.035	0.052	0.069	0.082	0.095	0.103	0.112	0.115	0.118	0.115	0.112	0.103	0.095	0.082	0.069	0.052	0.035	0.017	0.000
FINAL CAMBER ↑	0	1/8"	1/4"	5/16"	7/16"	1/2"	9/16"	5/8"	5/8"	11/16"	11/16"	11/16"	5/8"	5/8"	9/16"	1/2"	7/16"	5/16"	1/4"	1/8"	0
	GIRDERS BG2 AND BG7																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.054	0.080	0.103	0.124	0.141	0.155	0.165	0.171	0.174	0.171	0.165	0.155	0.141	0.124	0.103	0.080	0.054	0.028	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.020	0.039	0.058	0.077	0.092	0.107	0.117	0.126	0.129	0.133	0.129	0.126	0.117	0.107	0.092	0.077	0.058	0.039	0.020	0.000
FINAL CAMBER ↑	0	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	7/16"	1/2"	1/2"	1/2"	1/2"	1/2"	7/16"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	0
	GIRDERS BG3 AND BG6																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.054	0.080	0.103	0.124	0.141	0.155	0.165	0.171	0.174	0.171	0.165	0.155	0.141	0.124	0.103	0.080	0.054	0.028	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.020	0.040	0.059	0.078	0.093	0.108	0.118	0.128	0.131	0.134	0.131	0.128	0.118	0.108	0.093	0.078	0.059	0.040	0.020	0.000
FINAL CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	7/16"	1/2"	1/2"	1/2"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/16"	0
	GIRDERS BG4 AND BG5																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.054	0.080	0.103	0.124	0.141	0.155	0.165	0.171	0.174	0.171	0.165	0.155	0.141	0.124	0.103	0.080	0.054	0.028	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.019	0.037	0.055	0.074	0.088	0.102	0.111	0.120	0.123	0.127	0.123	0.120	0.111	0.102	0.088	0.074	0.055	0.037	0.019	0.000
FINAL CAMBER ↑	0	1/8"	3/16"	5/16"	3/8"	7/16"	7/16"	1/2"	9/16"	9/16"	9/16"	9/16"	9/16"	1/2"	7/16"	7/16"	3/8"	5/16"	3/16"	1/8"	0
	GIRDER BG8																				
TWENTIETH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.028	0.054	0.080	0.103	0.124	0.141	0.155	0.165	0.171	0.174	0.171	0.165	0.155	0.141	0.124	0.103	0.080	0.054	0.028	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.019	0.037	0.056	0.074	0.088	0.102	0.111	0.120	0.123	0.127	0.123	0.120	0.111	0.102	0.088	0.074	0.056	0.037	0.019	0.000
FINAL CAMBER ↑	0	1/8"	3/16"	5/16"	3/8"	7/16"	7/16"	1/2"	9/16"	9/16"	9/16"	9/16"	9/16"	1/2"	7/16"	7/16"	3/8"	5/16"	3/16"	1/8"	0

✳ INCLUDES FUTURE WEARING SURFACE.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 76+49.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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STATE OF NORTH CAROLINA
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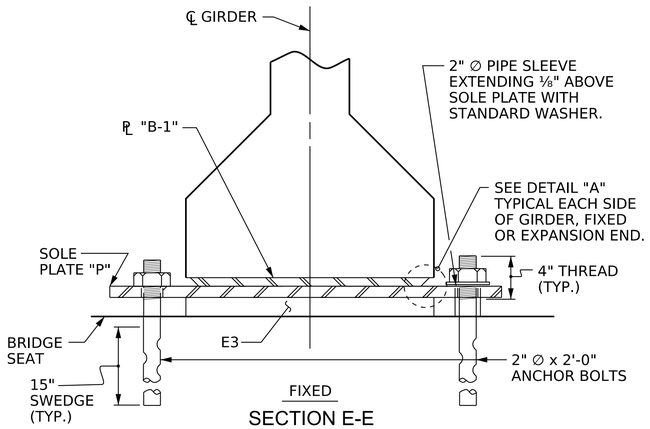
GIRDER DEFLECTION AND CAMBER SCHEDULES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-22
1			3			TOTAL SHEETS
2			4			46

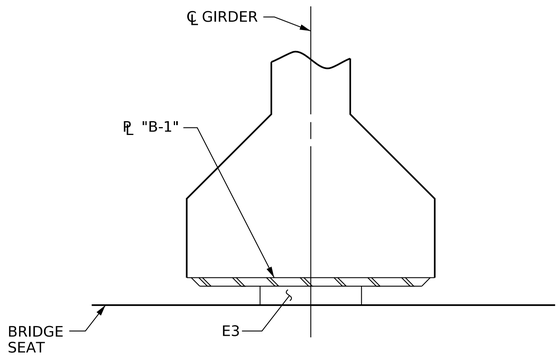
BRIDGE 1

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_DLL180540.dgn



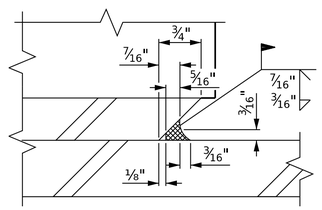
FIXED

SECTION E-E

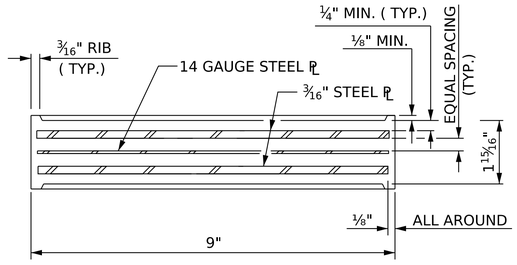


SECTION F-F

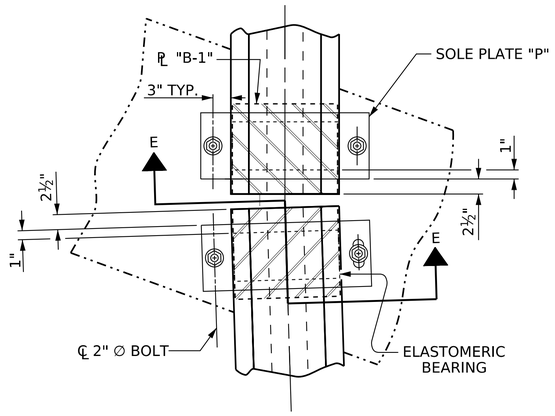
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k



DETAIL "A"

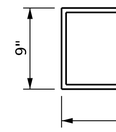


TYPICAL SECTION OF ELASTOMERIC BEARINGS



TYPICAL PLAN

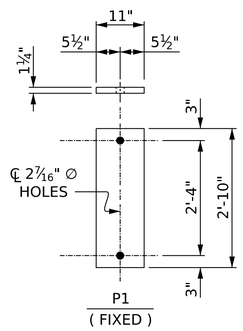
(SHOWING INTERIOR BENT)



E3 (32 REQ'D)

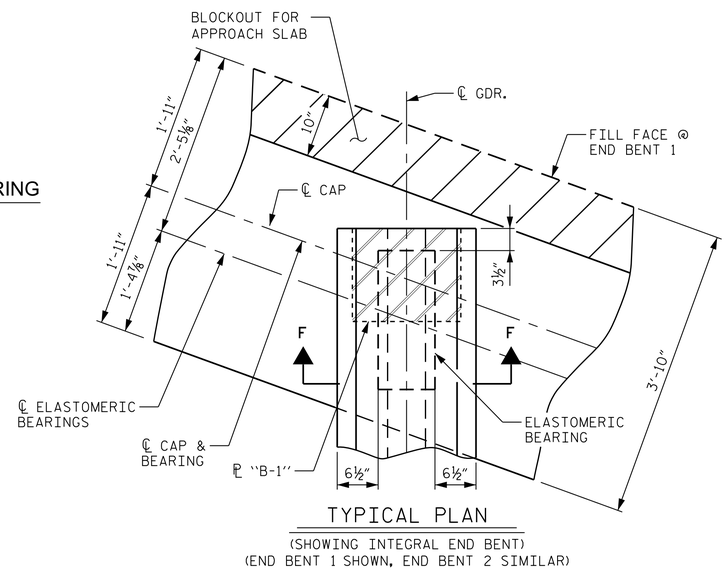
PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



P1 (16 REQ'D)

SOLE PLATE DETAILS ("P")



TYPICAL PLAN

(SHOWING INTEGRAL END BENT)
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF ½ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2" ∅ PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE STANDARD SPECIFICATIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

PROJECT NO. R-5963A

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-23
1			3			TOTAL SHEETS
2			4			46

BRIDGE 1 STD. NO. EB3

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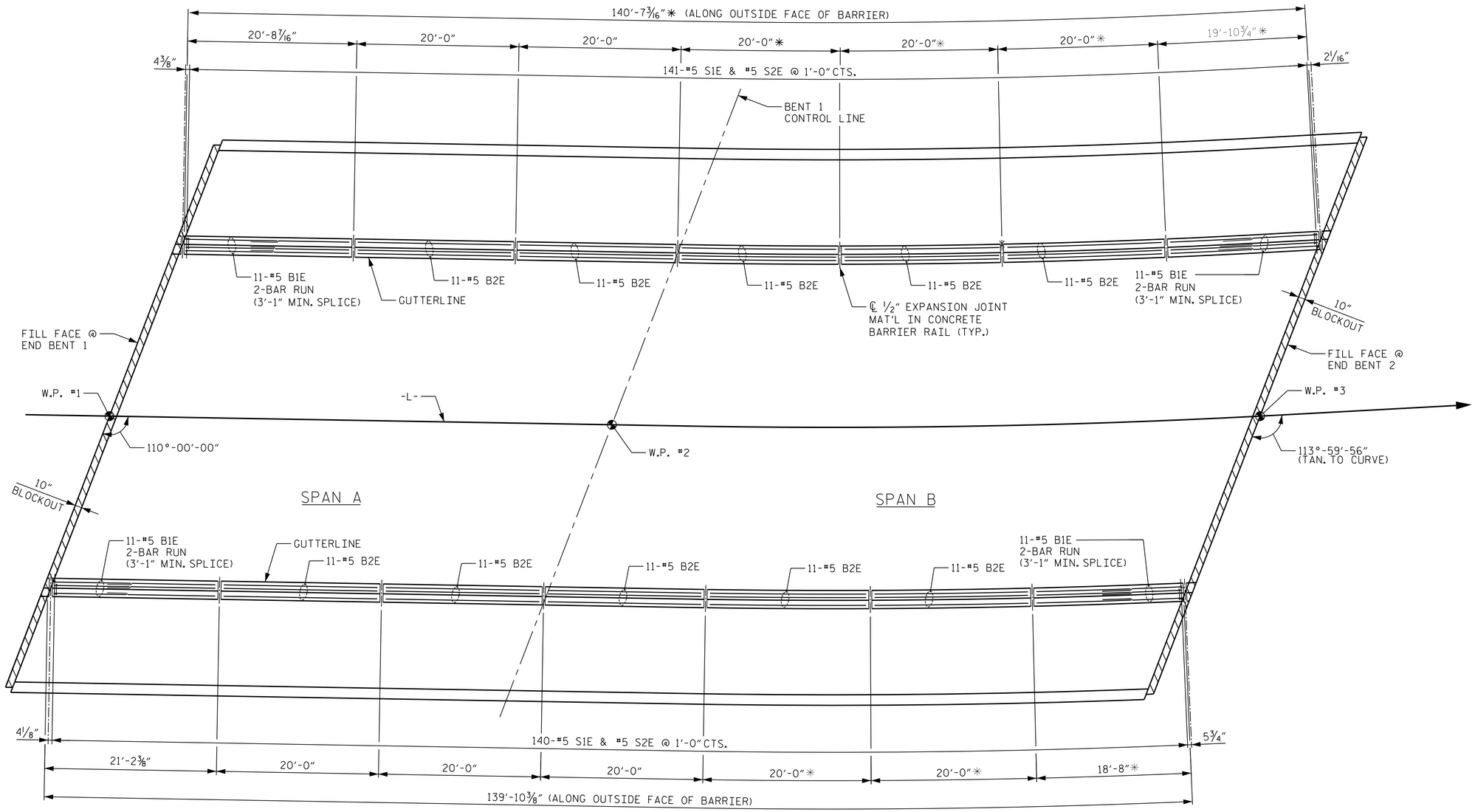
ASSEMBLED BY : D. D. LOWERY	DATE : 11/2024	
CHECKED BY : R. M. KROL	DATE : 11/2024	
DRAWN BY : WJH 8/89	REV. 12/17	MAA/THC
CHECKED BY : CRK 8/89	REV. 10/21	BNB/AAI
	REV. 10/23	BNB/SNM

3/18/2025 K:\RDT_Structures_Bridge\NC\01036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_BG1_180540.dgn



(A) SEE "PLAN AT END BENT" DETAIL ON SHEET 2 OF 2 FOR LOCATIONS AND BAR TYPES.

PLAN OF BARRIER RAIL

* ARC DIMENSIONS MEASURED ALONG OUTSIDE EDGE OF BARRIER RAIL

NOTES

ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF CONCRETE BARRIER RAIL.

FOR BARRIER RAIL ON APPROACH SLAB, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 3 OF 3.

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3/18/2025

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS
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PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 76+49.00 -L-

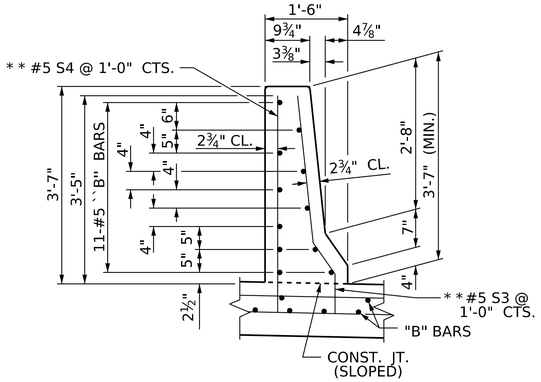
SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

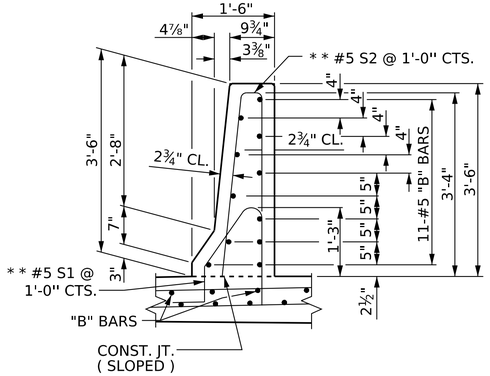
CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-24
1			3			TOTAL SHEETS
2			4			46

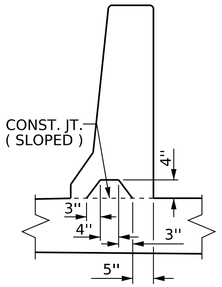
BRIDGE 1



OPTIONAL SECTION THRU RAIL



SECTION THRU RAIL



SECTION S-S

AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

NOTES

THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

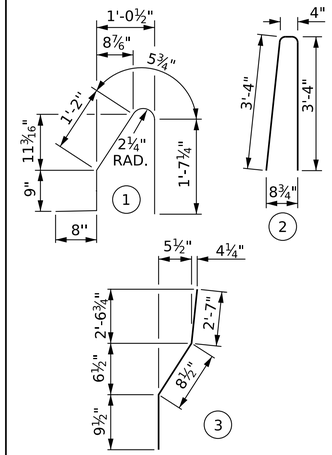
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3, S4, S5 AND S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, S4, S5 AND S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

** THE CONTRACTOR MAY USE ADHESIVELY ANCHORED #5 S3 & #5 S4 BARS. LEVEL 2 FIELD TESTING IS REQUIRED AND THE YIELD LOAD OF THE #5 S3 & #5 S4 IS 18.6 KIPS. FOR ADHESIVELY ANCHORED BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

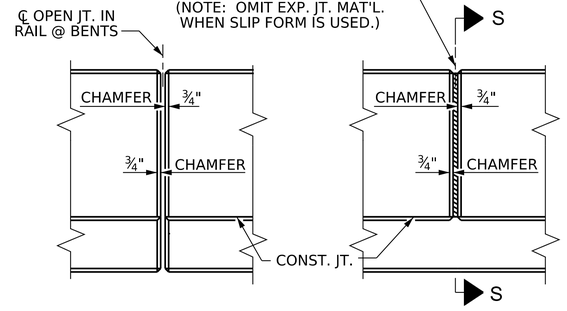
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1E	88	#5	STR	12'-0"	1,102
* B2E	110	#5	STR	19'-8"	2,256
* S1E	281	#5	1	4'-8"	1,368
* S2E	281	#5	2	7'-0"	2,052
* S3E	281	#5	3	4'-1"	1,197
* S4E	281	#5	STR	3'-11"	1,148

** FOR OPTIONAL ADHESIVE ANCHORING (NOT INCLUDED IN TOTAL QUANTITY)

* EPOXY COATED REINFORCING STEEL	6,777 LBS.
CLASS AA CONCRETE	76.3 CU. YDS.
CONCRETE BARRIER RAIL	280.46 LIN. FT.



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-25
1			3			TOTAL SHEETS
2			4			46

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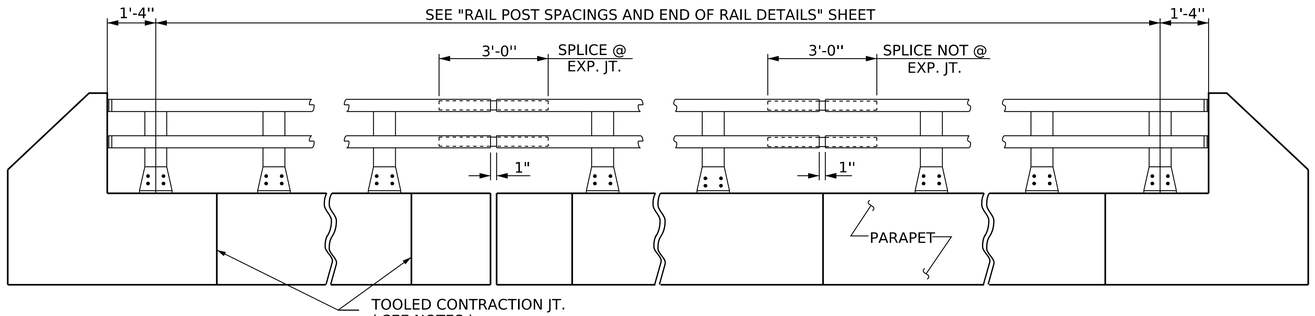
ASSEMBLED BY : D. D. LOWERY	DATE : 11/2024	
CHECKED BY : R. M. KROL	DATE : 11/2024	
DRAWN BY : ARB 5/87	REV. 7/12	MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC

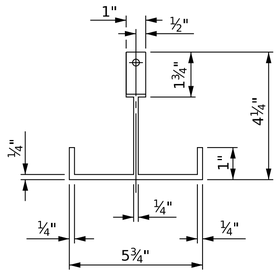
3/18/2025 K:\RDT_Structures_Bridge\NC\0110367J4 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_BR2_180540.dgn

BRIDGE 1 STD. CBR1

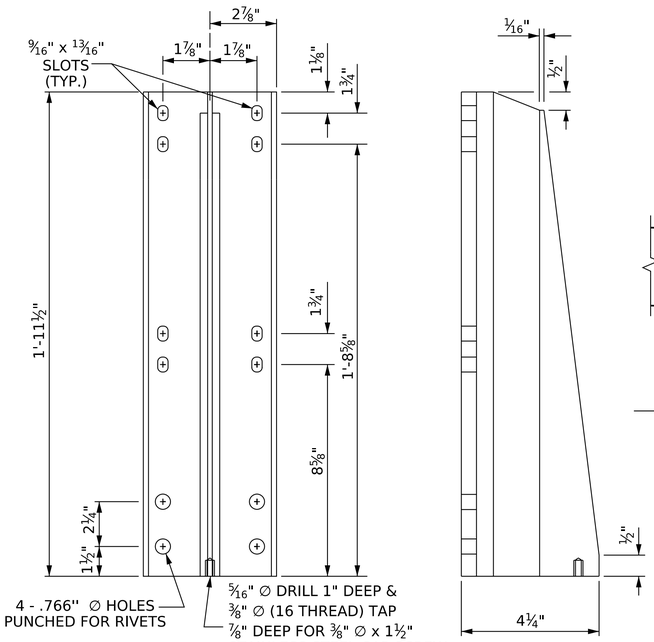


ELEVATION

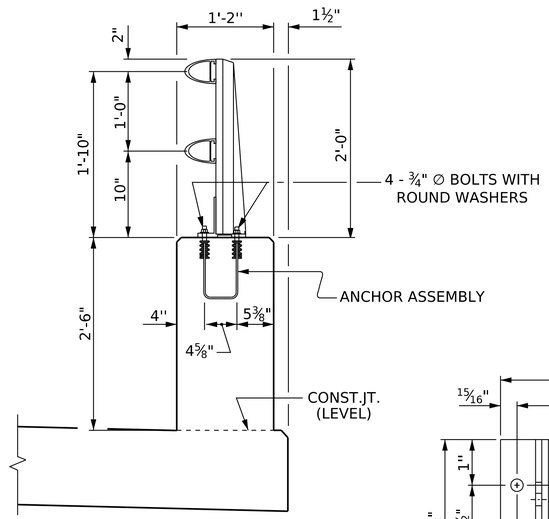
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



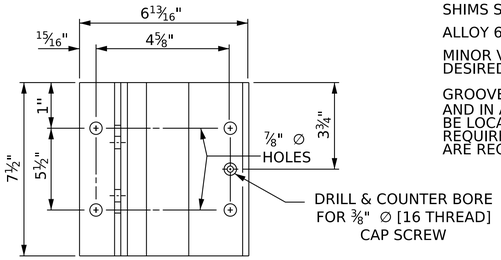
PLAN



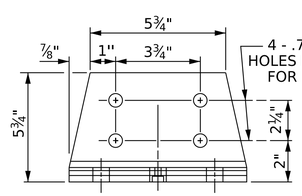
DETAILS OF POST



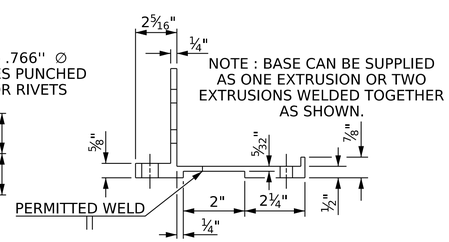
SECTION THRU PARAPET AND RAIL



PLAN

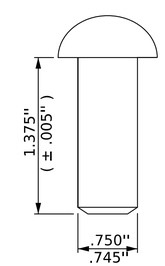


FRONT ELEVATION



SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER ``2 BAR METAL RAIL ALTERNATE''. ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIALS AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: ASTM A36 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO ASTM A123.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 264.5 LIN. FT.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

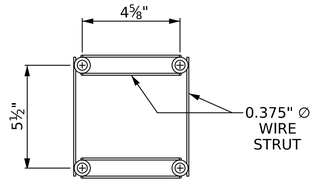
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-26
1			3			TOTAL SHEETS
2			4			46

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

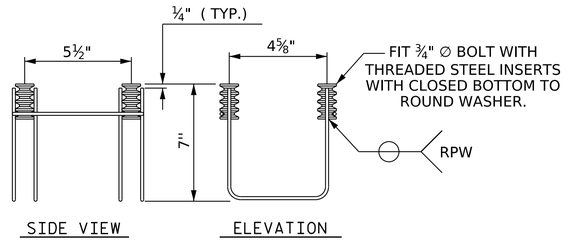
ASSEMBLED BY : D. D. LOWERY	DATE : 11/2024		
CHECKED BY : R. M. KROL	DATE : 11/2024		
DRAWN BY : EEM 6/94	REV. 6/13	MAA/GM	
CHECKED BY : RGW 6/94	REV. 12/17	MAA/THC	
	REV. 10/23	BNB/SNM	

3/18/2025 K:\RDT_Structures_Bridge\NC\01036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_2MRL_180540.dgn

BRIDGE 1 STD. NO. BMR3



PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(46 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR ¾" FERRULES.

B. 4 - ¾" ∅ x 2½" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ¾" ∅ x 2½" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" ∅ WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

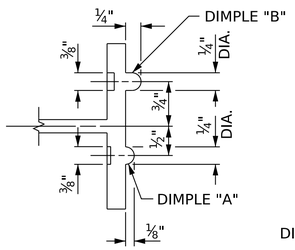
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF ASTM A123.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

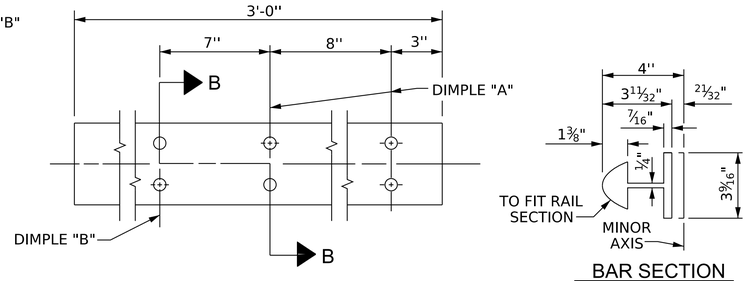
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾" ∅ BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

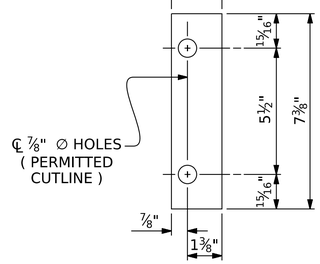


SECTION B-B

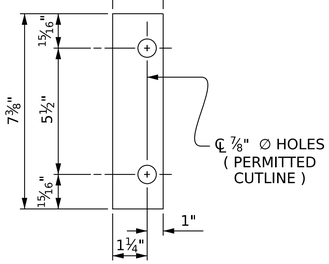


EXPANSION BAR DETAILS

BAR SECTION



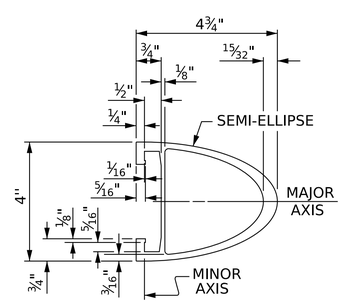
FRONT PLATE



REAR PLATE

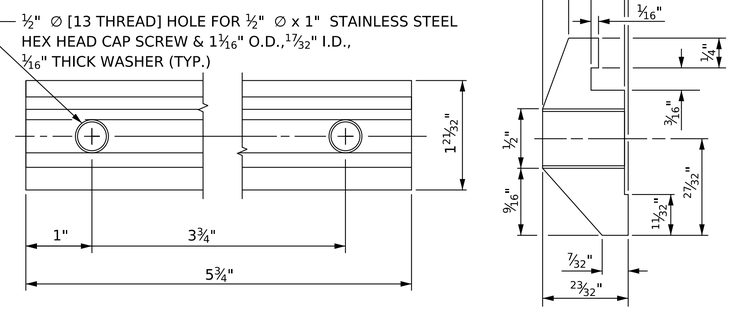
SHIM DETAILS

NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



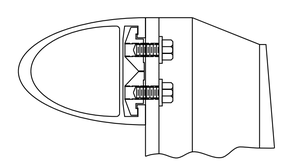
RAIL SECTION

½" ∅ [13 THREAD] HOLE FOR ½" ∅ x 1" STAINLESS STEEL HEX HEAD CAP SCREW & 1 1/16" O.D., 17/32" I.D., 1/16" THICK WASHER (TYP.)

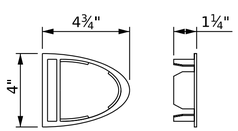


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
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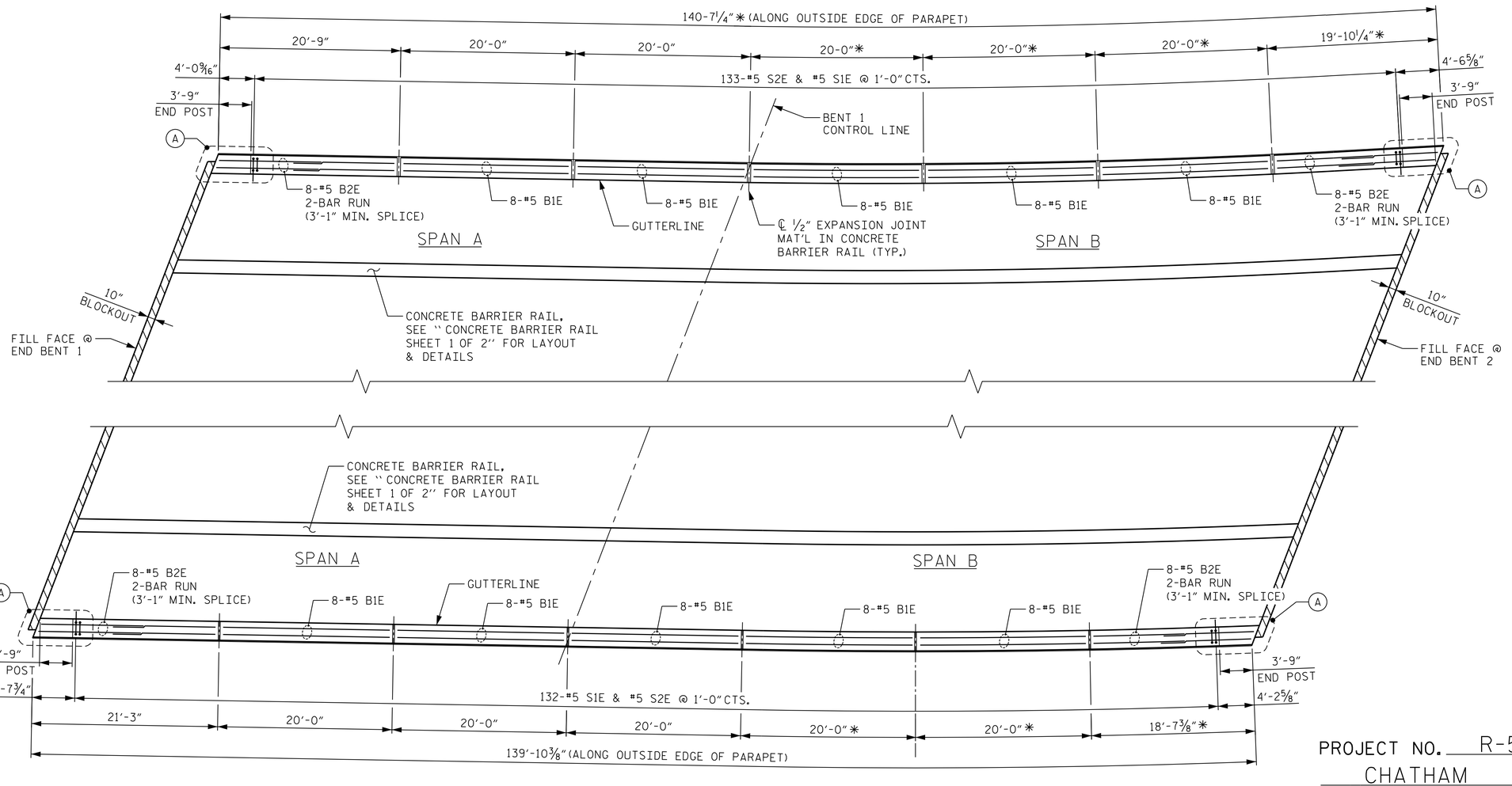
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-27
1			3			TOTAL SHEETS
2			4			46

BRIDGE 1 STD. NO. BMR4

ASSEMBLED BY : D. D. LOWERY	DATE : 11/2024		
CHECKED BY : R. M. KROL	DATE : 11/2024		
DRAWN BY : EEM 6/94	REV. 10/11	MAA/GM	
CHECKED BY : RGW 6/94	REV. 12/17	MAA/THC	
	REV. 10/23	BNB/SNM	

3/18/2025

K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_2MR2_180540.dgn



(A) SEE "CONCRETE PARAPET DETAILS SHEET" FOR DETAILS ON SHEET 2 OF 3 FOR SPACING OF S3 BARS.

CONCRETE PARAPET LAYOUT

✱ ARC DIMENSIONS MEASURED ALONG OUTSIDE EDGE OF PARAPET

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET LAYOUT

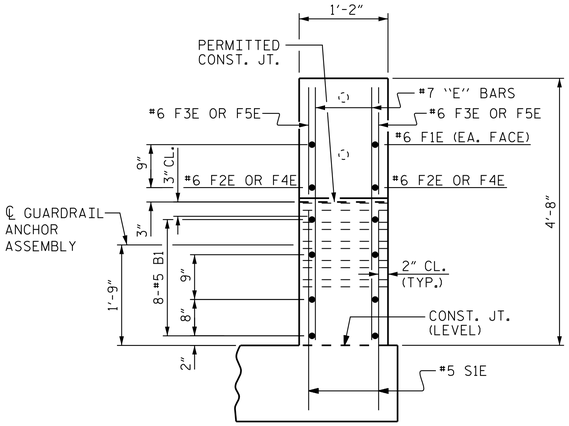
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-28
1			3			TOTAL SHEETS
2			4			46

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

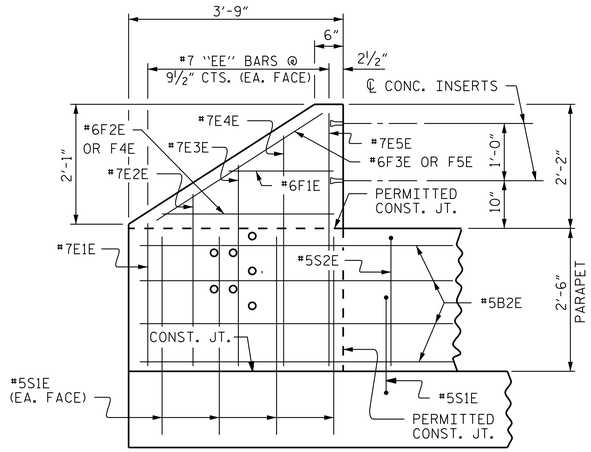
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BRIDGE 1

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963AAB\Cad\Dgn\Bridge_1\R-5963A_SMU_2MR3_180540.dgn



END VIEW



ELEVATION

NOTES:

THE PARAPET IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN PARAPET AND END POSTS SHALL BE EPOXY COATED.

THE #5S1E & #5S2E BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE ½" EXPANSION JOINT MATERIAL IN PARAPET.

FOR DETAILS OF CONCRETE INSERTS IN END POSTS, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

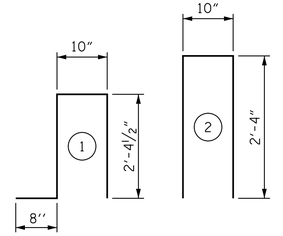
FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAIL" SHEET.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

CONCRETE IN PARAPETS SHALL BE CLASS AA NORMAL WEIGHT CONCRETE.

THE #5 S3 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM. AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

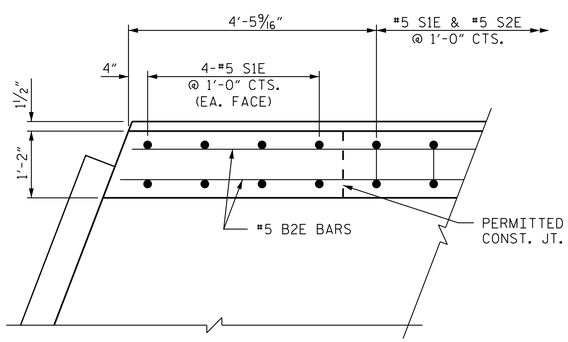
BILL OF MATERIAL

2 CONCRETE PARAPETS AND 4 END POSTS

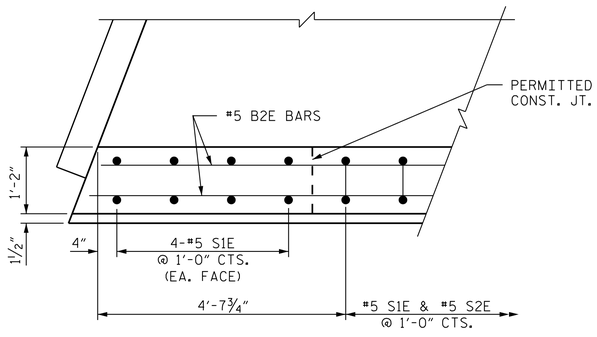
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1E	80	#5	STR	19'-8"	1,641
✳B2E	64	#5	STR	12'-0"	801
✳ E1	8	#7	STR	2'-6"	41
✳ E2	8	#7	STR	3'-0"	49
✳ E3	8	#7	STR	3'-6"	57
✳ E4	8	#7	STR	4'-0"	65
✳ E5	8	#7	STR	4'-4"	71
✳ F1	8	#6	STR	1'-10"	22
✳ F2	4	#6	STR	3'-0"	18
✳ F3	4	#6	STR	3'-5"	21
✳ F4	4	#6	STR	3'-3"	20
✳ F5	4	#6	STR	3'-9"	23
✳S1E	281	#5	1	6'-3"	1,832
✳S2E	265	#5	2	5'-6"	1,520

✳EPOXY COATED REINFORCING STEEL	6,181 LBS.
CLASS AA CONCRETE	30.7 C.Y.
1'-2" X 2'-6" CONCRETE PARAPET	280.46 LIN. FT.

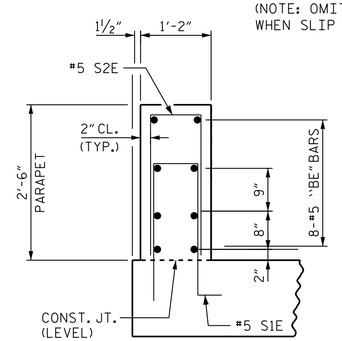
PARAPET AND END POST FOR TWO BAR RAIL



PLAN OF LEFT PARAPET

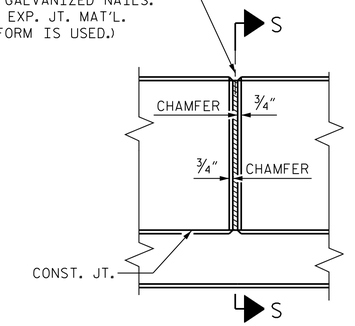


PLAN OF RIGHT PARAPET

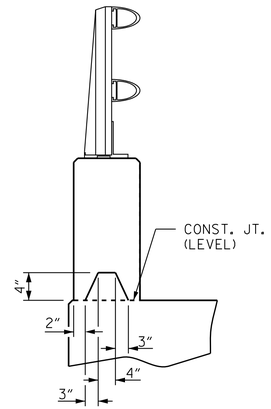


SECTION THRU PARAPET

℄ ½" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS. (NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)

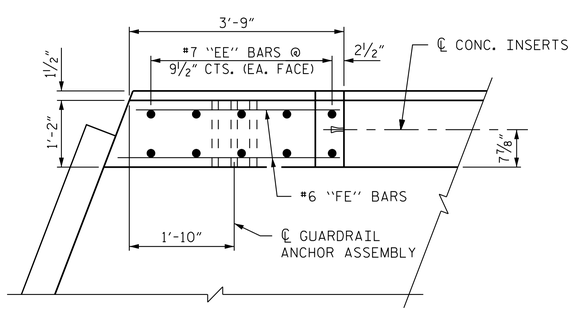


ELEVATION AT EXPANSION JOINTS

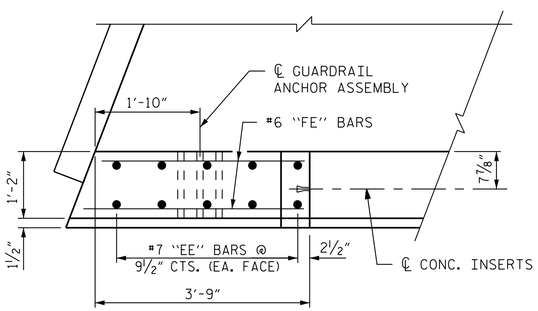


SECTION S-S

AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



PLAN OF LEFT END POST



PLAN OF RIGHT END POST

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS
Andrew L. Phillips
3/20/2025

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Raleigh, NC 27601-1772
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REVISIONS						SHEET NO.
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DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: A. L. PHILLIPS DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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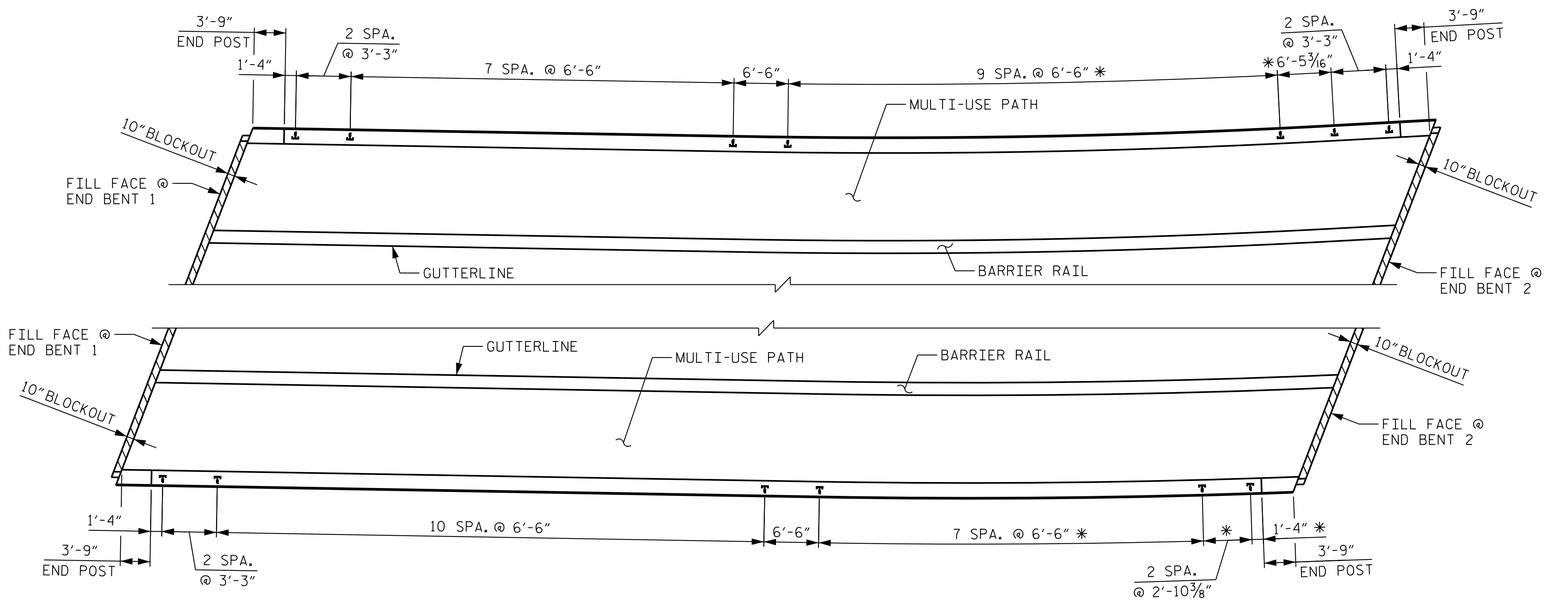
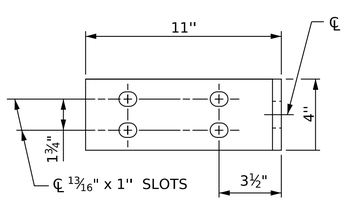
3/18/2025 K:\RDT_Structures_Bridge\NC\01103673 4 - R-5963A&B\Cad\Dgn\Bridge.1\R-5963A_SMU_2MR4_180540.dgn

BRIDGE 1

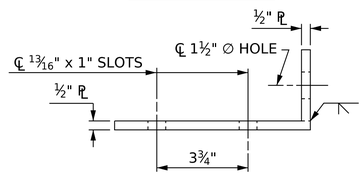


PLAN OF RAIL POST SPACINGS

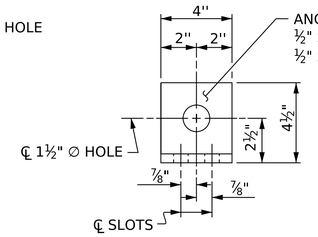
* DENOTES ARC DIMENSION



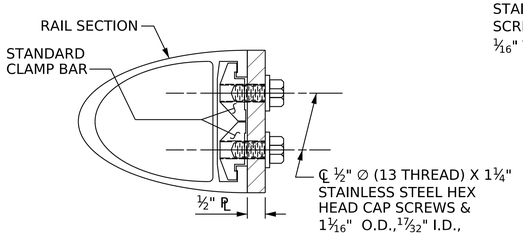
ELEVATION



TOP VIEW

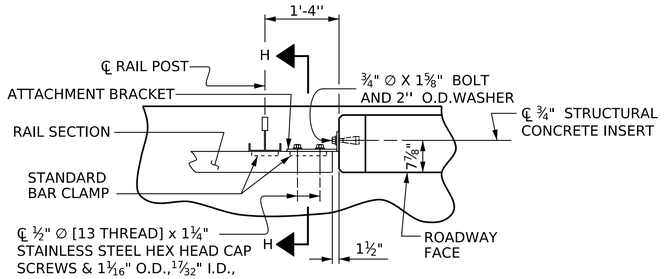


END VIEW (FIX AND EXP.)

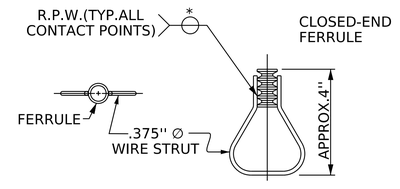


SECTION H-H (FIX)

FIXED



PLAN - RAIL AND END POST



STRUCTURAL CONCRETE INSERT

* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

DETAILS FOR ATTACHING METAL RAIL TO END POST

NOTES

STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½".

B. 1 - ¾" ∅ x 1⅝" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾" ∅ x 1⅝" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" ∅ WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. ½" PLATES SHALL CONFORM TO ASTM A36 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾" ∅ x 1⅝" BOLT WITH 2'' O.D. WASHER IN PLACE. THE ¾" ∅ x 1⅝" BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

E. ½" ∅ PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" ∅ x 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾" ∅ x 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" ∅ x 1⅝" BOLT SHALL APPLY TO THE ¾" ∅ x 6½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS

FOR ONE OR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-30
1			3			TOTAL SHEETS
2			4			46

BRIDGE 1 STD. NO. BMR2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : O.D. LOWERY	DATE : 11/2024	
CHECKED BY : A.L. PHILLIPS	DATE : 11/2024	
DRAWN BY : FCJ 1/88	REV. 10/1/11	MAA/GM
CHECKED BY : CRK 3/89	REV. 12/17	MAA/THC
	REV. 10/23	BNB/SNM

3/18/2025

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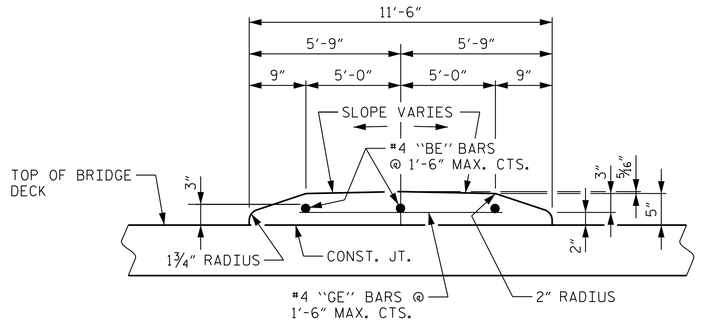


SECTION THRU MEDIAN

NUMBER OF "BE" BARS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. REFER TO PLAN VIEW OF MEDIAN FOR "BE" BAR PLACEMENT.

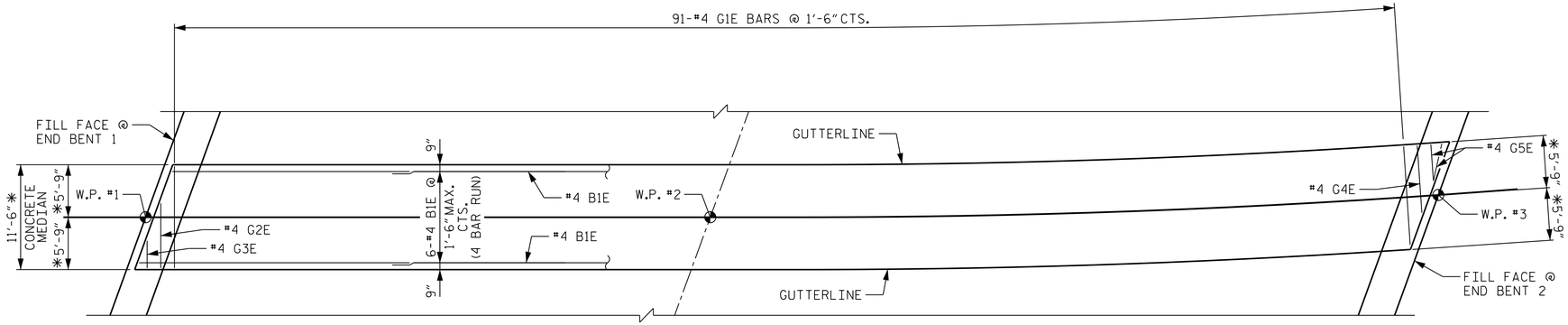
BILL OF MATERIAL

MEDIAN

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1E	32	#4	STR	36'-5"	778
G1E	91	#4	STR	10'-0"	608
G2E	1	#4	STR	6'-6"	4
G3E	1	#4	STR	2'-4"	2
G4E	1	#4	STR	6-10"	5
G5E	2	#4	STR	3'-5"	5

EPOXY COATED REINFORCING STEEL 1,402 LBS.

"E" DENOTES EPOXY COATED REINFORCING STEEL.



PLAN OF MEDIAN

* DIMENSIONS MEASURED @ FILL FACE

NOTES

ALL REINFORCING STEEL IN THE CONCRETE MEDIAN SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE MEDIAN IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED IN SEGMENTS LESS THAN 10 FEET IN LENGTH.

FOR MEDIAN ON APPROACH SLAB, SEE APPROACH SLAB SHEETS.

MEDIAN ON THE BRIDGE IS PAID FOR AS PART OF THE REINFORCED CONCRETE DECK PAY ITEM.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

MEDIAN DETAILS

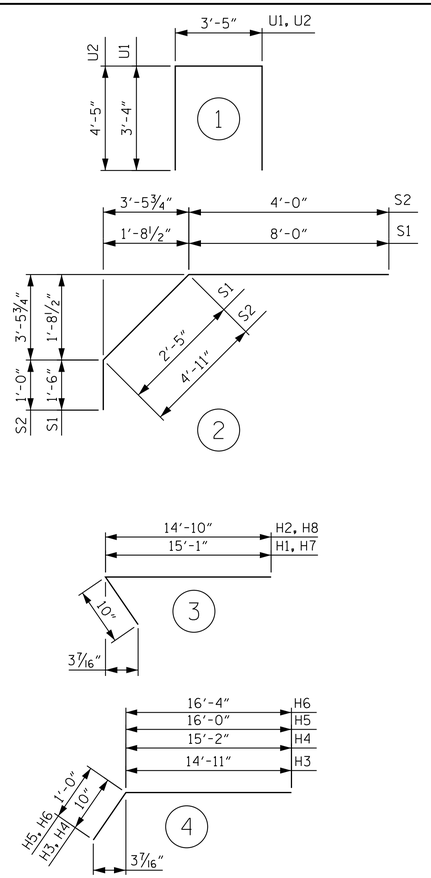
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-31
1			3			TOTAL SHEETS
2			4			46

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_MD1_180540.dgn

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

REINFORCING STEEL SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1E	458	#5	STR	35'-4"	16,879
A2	458	#5	STR	35'-2"	16,779
A101E	2	#5	STR	35'-2"	73
A102E	2	#5	STR	34'-6"	72
A103E	2	#5	STR	33'-9"	70
A104E	2	#5	STR	33'-1"	69
A105E	2	#5	STR	32'-5"	68
A106E	2	#5	STR	31'-9"	66
A107E	2	#5	STR	31'-0"	65
A108E	1	#5	STR	58'-2"	61
A109E	1	#5	STR	56'-9"	59
A110E	1	#5	STR	55'-5"	58
A111E	1	#5	STR	54'-0"	56
A112E	1	#5	STR	52'-8"	55
A113E	1	#5	STR	51'-3"	54
A114E	1	#5	STR	49'-11"	52
A115E	1	#5	STR	48'-6"	51
A116E	1	#5	STR	47'-2"	49
A117E	1	#5	STR	45'-10"	48
A118E	1	#5	STR	44'-5"	46
A119E	1	#5	STR	43'-1"	45
A120E	1	#5	STR	41'-8"	44
A121E	1	#5	STR	40'-4"	42
A122E	1	#5	STR	38'-11"	41
A123E	1	#5	STR	37'-7"	39
A124E	1	#5	STR	36'-2"	38
A125E	1	#5	STR	34'-10"	36
A126E	1	#5	STR	33'-5"	35
A127E	1	#5	STR	32'-1"	33
A128E	1	#5	STR	30'-8"	32
A129E	1	#5	STR	29'-4"	31
A130E	1	#5	STR	27'-11"	29
A131E	1	#5	STR	26'-7"	28
A132E	1	#5	STR	25'-2"	26
A133E	1	#5	STR	23'-10"	25
A134E	1	#5	STR	22'-5"	23
A135E	1	#5	STR	21'-1"	22
A136E	1	#5	STR	19'-8"	21
A137E	1	#5	STR	18'-4"	19
A138E	1	#5	STR	16'-11"	18
A139E	1	#5	STR	15'-7"	16
A140E	1	#5	STR	14'-2"	15
A141E	1	#5	STR	12'-10"	13
A142E	1	#5	STR	11'-5"	12
A143E	1	#5	STR	10'-1"	11
A144E	1	#5	STR	8'-8"	9
A145E	1	#5	STR	7'-4"	8
A146E	1	#5	STR	5'-11"	6
A147E	1	#5	STR	4'-7"	5
A148E	1	#5	STR	3'-2"	3

REINFORCING STEEL SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A149E	2	#5	STR	1'-10"	4
A150E	2	#5	STR	35'-1"	73
A151E	2	#5	STR	34'-5"	72
A152E	2	#5	STR	33'-9"	70
A153E	2	#5	STR	33'-1"	69
A154E	2	#5	STR	32'-5"	68
A155E	2	#5	STR	31'-9"	66
A156E	2	#5	STR	31'-1"	65
A157E	1	#5	STR	58'-3"	61
A158E	1	#5	STR	56'-11"	59
A159E	1	#5	STR	55'-7"	58
A160E	1	#5	STR	54'-2"	57
A161E	1	#5	STR	52'-10"	55
A162E	1	#5	STR	51'-6"	54
A163E	1	#5	STR	50'-2"	52
A164E	1	#5	STR	48'-10"	51
A165E	1	#5	STR	47'-6"	50
A166E	1	#5	STR	46'-2"	48
A167E	1	#5	STR	44'-10"	47
A168E	1	#5	STR	43'-6"	45
A169E	1	#5	STR	42'-2"	44
A170E	1	#5	STR	40'-10"	43
A171E	1	#5	STR	39'-6"	41
A172E	1	#5	STR	38'-1"	40
A173E	1	#5	STR	36'-9"	38
A174E	1	#5	STR	35'-5"	37
A175E	1	#5	STR	34'-1"	36
A176E	1	#5	STR	32'-9"	34
A177E	1	#5	STR	31'-5"	33
A178E	1	#5	STR	30'-1"	31
A179E	1	#5	STR	28'-9"	30
A180E	1	#5	STR	27'-5"	29
A181E	1	#5	STR	26'-1"	27
A182E	1	#5	STR	24'-9"	26
A183E	1	#5	STR	23'-5"	24
A184E	1	#5	STR	22'-1"	23
A185E	1	#5	STR	20'-9"	22
A186E	1	#5	STR	19'-5"	20
A187E	1	#5	STR	18'-1"	19
A188E	1	#5	STR	16'-9"	17
A189E	1	#5	STR	15'-5"	16
A190E	1	#5	STR	14'-1"	15
A191E	1	#5	STR	12'-9"	13
A192E	1	#5	STR	11'-5"	12
A193E	1	#5	STR	10'-1"	11
A194E	1	#5	STR	8'-9"	9
A195E	1	#5	STR	7'-5"	8
A196E	1	#5	STR	6'-1"	6
A197E	1	#5	STR	4'-9"	5
A198E	1	#5	STR	3'-5"	4

REINFORCING STEEL SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A199E	2	#5	STR	2'-1"	4
A201	2	#5	STR	34'-11"	73
A202	2	#5	STR	34'-2"	71
A203	2	#5	STR	33'-7"	70
A204	2	#5	STR	32'-10"	69
A205	2	#5	STR	32'-1"	67
A206	2	#5	STR	31'-5"	66
A207	2	#5	STR	30'-9"	64
A208	1	#5	STR	58'-2"	61
A209	1	#5	STR	56'-9"	59
A210	1	#5	STR	55'-5"	58
A211	1	#5	STR	54'-0"	56
A212	1	#5	STR	52'-8"	55
A213	1	#5	STR	51'-3"	54
A214	1	#5	STR	49'-11"	52
A215	1	#5	STR	48'-6"	51
A216	1	#5	STR	47'-2"	49
A217	1	#5	STR	45'-10"	48
A218	1	#5	STR	44'-5"	46
A219	1	#5	STR	43'-1"	45
A220	1	#5	STR	41'-8"	44
A221	1	#5	STR	40'-4"	42
A222	1	#5	STR	38'-11"	41
A223	1	#5	STR	37'-7"	39
A224	1	#5	STR	36'-2"	38
A225	1	#5	STR	34'-10"	36
A226	1	#5	STR	33'-5"	35
A227	1	#5	STR	32'-1"	33
A228	1	#5	STR	30'-8"	32
A229	1	#5	STR	29'-4"	31
A230	1	#5	STR	27'-11"	29
A231	1	#5	STR	26'-7"	28
A232	1	#5	STR	25'-2"	26
A233	1	#5	STR	23'-10"	25
A234	1	#5	STR	22'-5"	23
A235	1	#5	STR	21'-1"	22
A236	1	#5	STR	19'-8"	21
A237	1	#5	STR	18'-4"	19
A238	1	#5	STR	16'-11"	18
A239	1	#5	STR	15'-7"	16
A240	1	#5	STR	14'-2"	15
A241	1	#5	STR	12'-10"	13
A242	1	#5	STR	11'-5"	12
A243	1	#5	STR	10'-1"	11
A244	1	#5	STR	8'-8"	9
A245	1	#5	STR	7'-4"	8
A246	1	#5	STR	5'-11"	6
A247	1	#5	STR	4'-7"	5
A248	1	#5	STR	3'-2"	3
A249	2	#5	STR	1'-10"	4

REINFORCING STEEL SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A250	2	#5	STR	34'-10"	73
A251	2	#5	STR	34'-2"	71
A252	2	#5	STR	33'-5"	70
A253	2	#5	STR	32'-9"	68
A254	2	#5	STR	32'-1"	67
A255	2	#5	STR	31'-5"	66
A256	2	#5	STR	30'-9"	64
A257	1	#5	STR	58'-3"	61
A258	1	#5	STR	56'-11"	59
A259	1	#5	STR	55'-7"	58
A260	1	#5	STR	54'-2"	57
A261	1	#5	STR	52'-10"	55
A262	1	#5	STR	51'-6"	54
A263	1	#5	STR	50'-2"	52
A264	1	#5	STR	48'-10"	51
A265	1	#5	STR	47'-6"	50
A266	1	#5	STR	46'-2"	48
A267	1	#5	STR	44'-10"	47
A268	1	#5	STR	43'-6"	45
A269	1	#5	STR	42'-2"	44
A270	1	#5	STR	40'-10"	43
A271	1	#5	STR	39'-6"	41
A272	1	#5	STR	38'-1"	40
A273	1	#5	STR	36'-9"	38
A274	1	#5	STR	35'-5"	37
A275	1	#5	STR	34'-1"	36
A276	1	#5	STR	32'-9"	34
A277	1	#5	STR	31'-5"	33
A278	1	#5	STR	30'-1"	31
A279	1	#5	STR	28'-9"	30
A280	1	#5	STR	27'-5"	29
A281	1	#5	STR	26'-1"	27
A282	1	#5	STR	24'-9"	26
A283	1	#5	STR	23'-5"	24
A284	1	#5	STR	22'-1"	23
A285	1	#5	STR	20'-9"	22
A286	1	#5	STR	19'-5"	20
A287	1	#5	STR	18'-1"	19
A288	1	#5	STR	16'-9"	17
A289	1	#5	STR	15'-5"	16
A290	1	#5	STR	14'-1"	15
A291	1	#5	STR	12'-9"	13
A292	1	#5	STR	11'-5"	12
A293	1	#5	STR	10'-1"	11
A294	1	#5	STR	8'-9"	9
A295	1	#5	STR	7'-5"	8
A296	1	#5	STR	6'-1"	6
A297	1	#5	STR	4'-9"	5
A298	1	#5	STR	3'-5"	4
A299	2	#5	STR	2'-1"	4

REINFORCING STEEL SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1E	47	#4	STR	29'-8"	931
B2E	47	#5	STR	51'-5"	2,520
B3E	47	#4	STR	38'-4"	1,204
B4E	137	#6	STR	12'-2"	2,504
B5E	137	#6	STR	15'-10"	3,258
B6E	90	#5	STR	30'-9"	2,887
B7	83	#5	STR	43'-0"	3,722
B8	83	#5	STR	56'-5"	4,884
B9	83	#5	STR	44'-6"	3,852
B10	74	#5	STR	37'-8"	2,907
H1	10	#5	3	15'-11"	166
H2	10	#5	3	15'-8"	163
H3	10	#5	4	15'-9"	164
H4	10	#5	4	16'-0"	167
H5	11	#6	4	17'-0"	281
H6	11	#6	4	17'-4"	286
H7	10	#5	3	15'-11"	166
H8	10	#5	3	15'-8"	163
K1	30	#4	STR	28'-4"	568
K2	14	#4	STR	7'-3"	68
K3	14	#4	STR	8'-3"	77
K4	28	#4	STR	8'-7"	161
K5	14	#4	STR	7'-9"	72
K6	2	#4	STR	4'-9"	6
K7	2	#4	STR	5'-3"	7
K8	4	#4	STR	5'-5"	14
K9	2	#4	STR	5'-1"	7
K10	12	#4	STR	2'-8"	21
K11	6	#4	STR	2'-11"	12
K12	1	#4	STR	6'-4"	4
K13	2	#4	STR	6'-6"	9
K14	1	#4	STR	6'-1"	4
K15	1	#4	STR	5'-10"	4
K16	6	#4	STR	3'-2"	13
K17	1	#4	STR	6'-6"	4
K18	2	#4	STR	6'-9"	9
K19	1	#4	STR	6'-4"	4
K20	1	#4	STR	6'-1"	4
S1E	116	#4	2	11'-11"	923
S2E	116	#4	2	9'-11"	768
U1E	122	#4	1	10'-3"	835
U2E	12	#4	1	12'-3"	98

REINFORCING STEEL	38,399 LBS.
EPOXY COATED REINFORCING STEEL	36,445 LBS.

"E" DENOTES EPOXY COATED REINFORCING

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

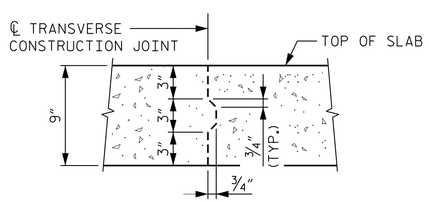
SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	94.5		
POUR 2	158.5		
POUR 3	117.5		
MEDIAN	24.9		
TOTALS **	395.4	38,399	36,445

** QUANTITIES FOR CONCRETE BARRIER RAILS AND PARAPETS NOT INCLUDED.

GROOVING BRIDGE FLOORS

APPROACH SLABS	2,700	SQ.FT.
BRIDGE DECK	7,919	SQ.FT.
TOTAL	10,619	SQ.FT.



TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB

REINFORCING STEEL IN SLAB NOT SHOWN, LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 76+49.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-32
1			3			TOTAL SHEETS
2			4			46

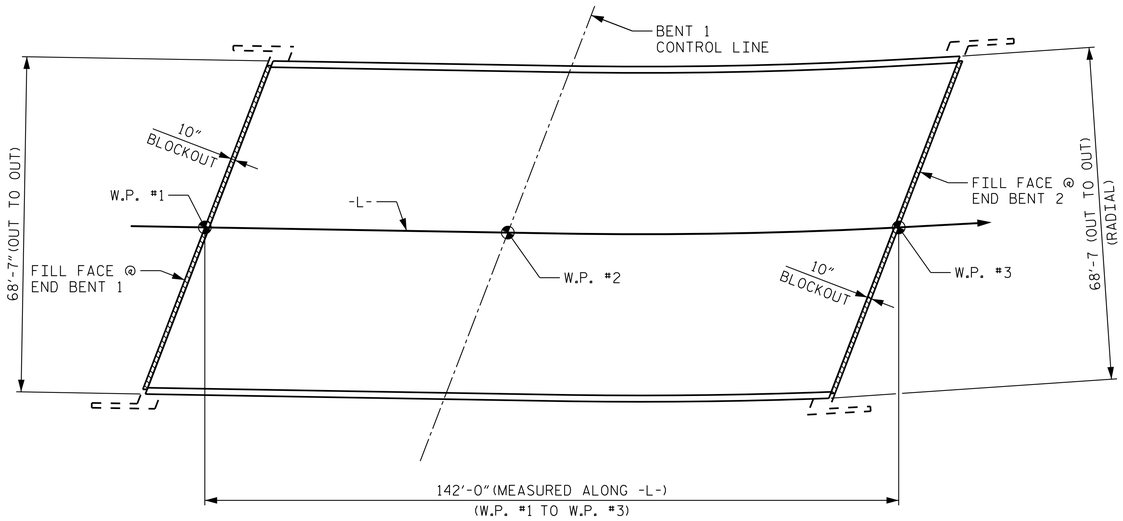
BRIDGE 1

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

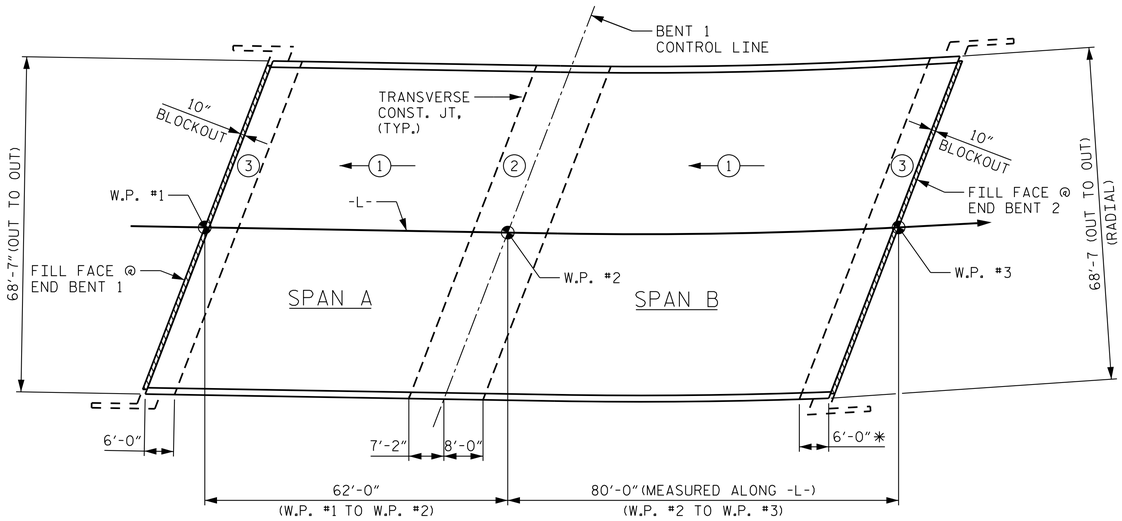
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

3/18/2025
K:\RDT_Structures_Bridge\NC\01036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_BMI_180540.dgn



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE SLAB

(SQ. FT. = 9,616)

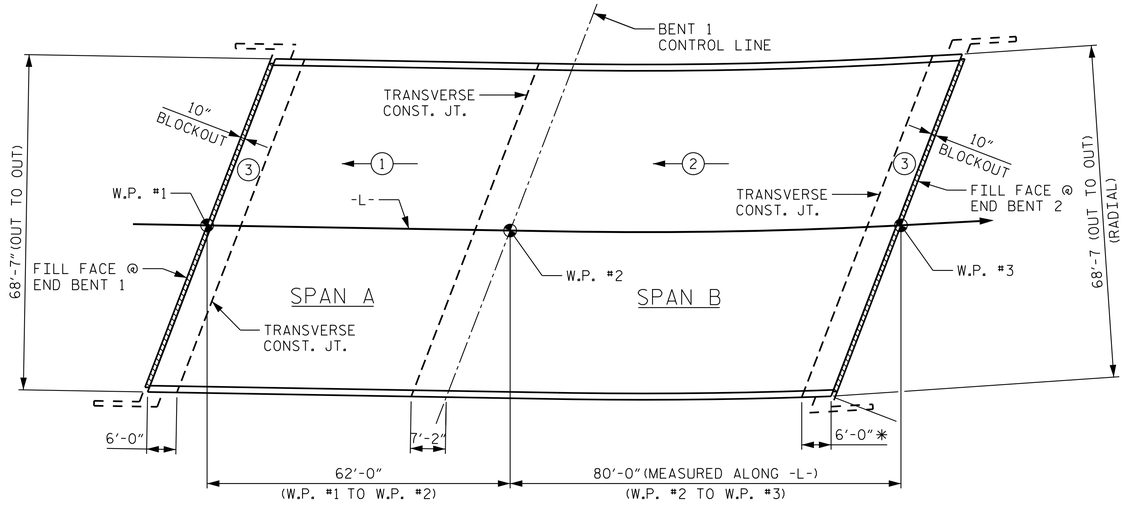


OPTIONAL POUR SEQUENCE

POUR ② & POUR ③ CAN NOT BE STARTED UNTIL ① POURS REACH A MINIMUM OF 3,000 PSI

—(#)→ DENOTES POUR NUMBER AND DIRECTION.

* MEASURED ALONG ARC



POUR SEQUENCE

POUR ② & POUR ③ CAN NOT BE STARTED UNTIL ① POURS REACH A MINIMUM OF 3,000 PSI

—(#)→ DENOTES POUR NUMBER AND DIRECTION.

* MEASURED ALONG ARC

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-33
1			3			TOTAL SHEETS
2			4			46

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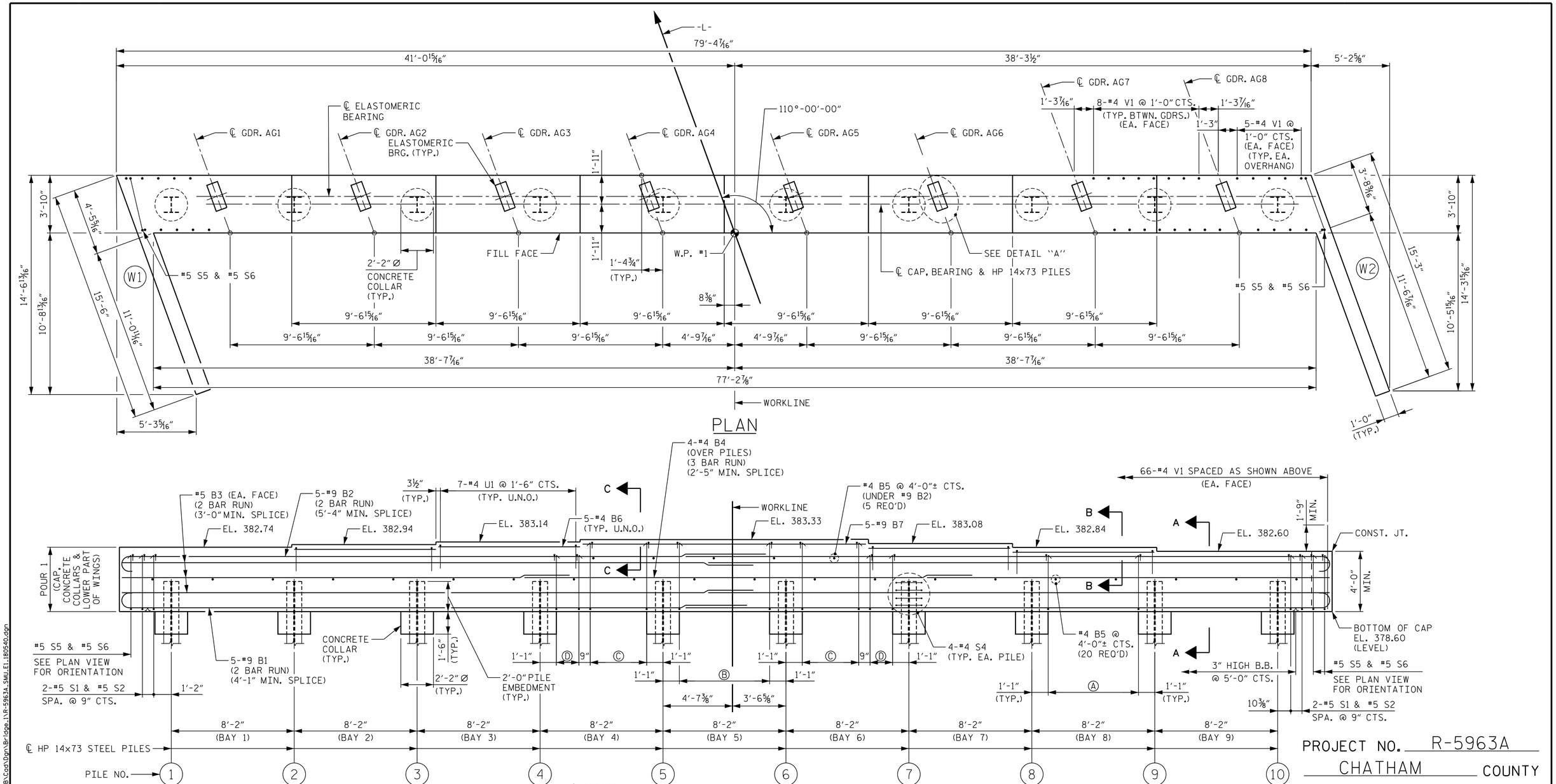
DRAWN BY:	D. D. LOWERY	DATE: 11/2024
CHECKED BY:	E. W. SPRABERRY	DATE: 11/2024
DESIGN ENGINEER OF RECORD:	A. L. PHILLIPS	DATE: 11/2024

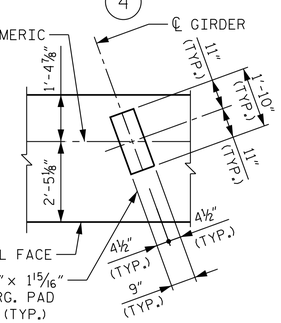
3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_BM2_180540.dgn

BRIDGE 1



PLAN

ELEVATION



DETAIL "A"

NOTES

FOR PILE SPLICE DETAILS, AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

FOR SECTION A-A, PARTIAL SECTION B-B AND PARTIAL SECTION C-C, SEE SHEET 3 OF 3.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

THE TOP SURFACE OF POUR #1 OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

Ⓐ - 9-#5 S1 & #5 S2 @ 9" CTS. (TYP. @ BAYS 1 - 3 & 7 - 9)

Ⓑ - 9-#5 S3 & #5 S2 @ 9" CTS. (BAY 5 ONLY)

Ⓒ - 6-#5 S3 & #5 S2 @ 9" CTS.

Ⓓ - 3-#5 S1 & #5 S2 @ 9" CTS.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 76+49.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

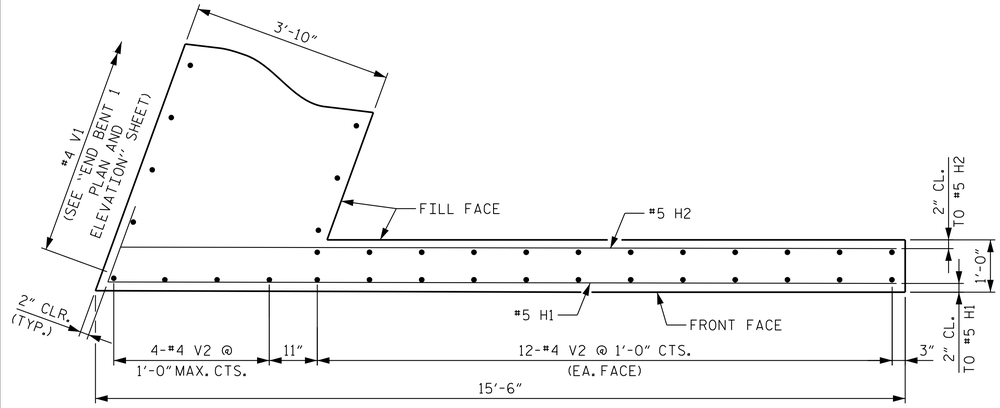
END BENT 1 PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-34
1			3			TOTAL SHEETS
2			4			46

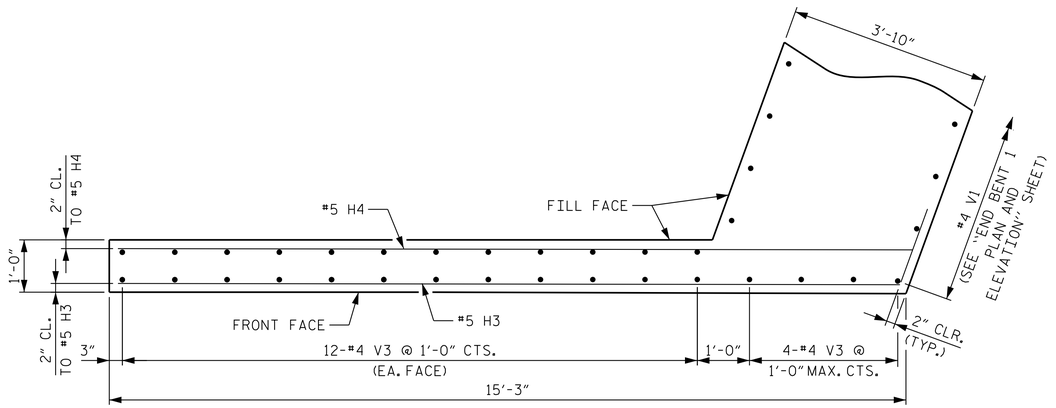
DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

BRIDGE 1

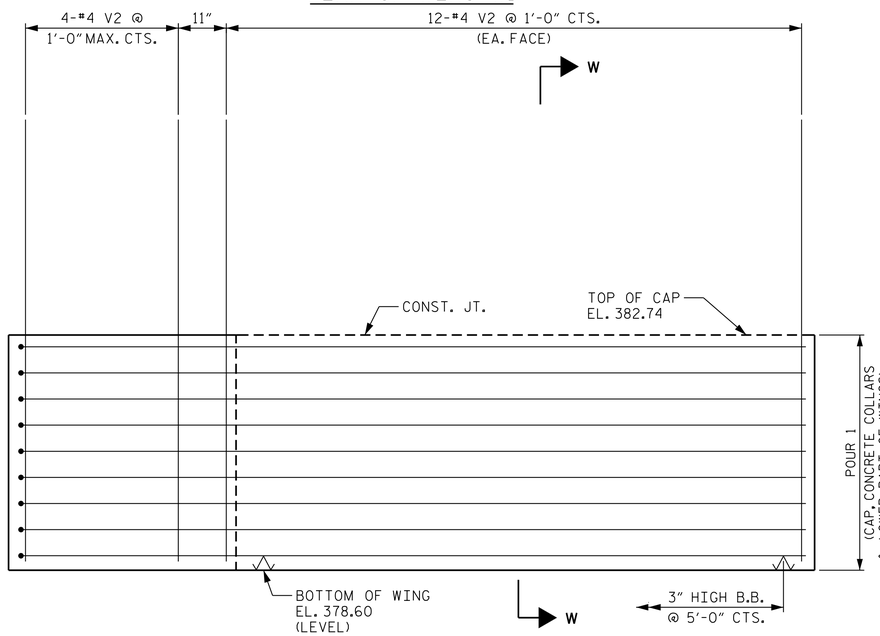
3/18/2025 K:\ROT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_E1_180540.dgn



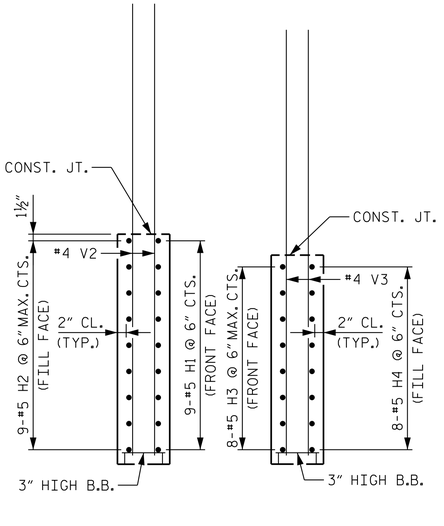
PLAN OF WING W1



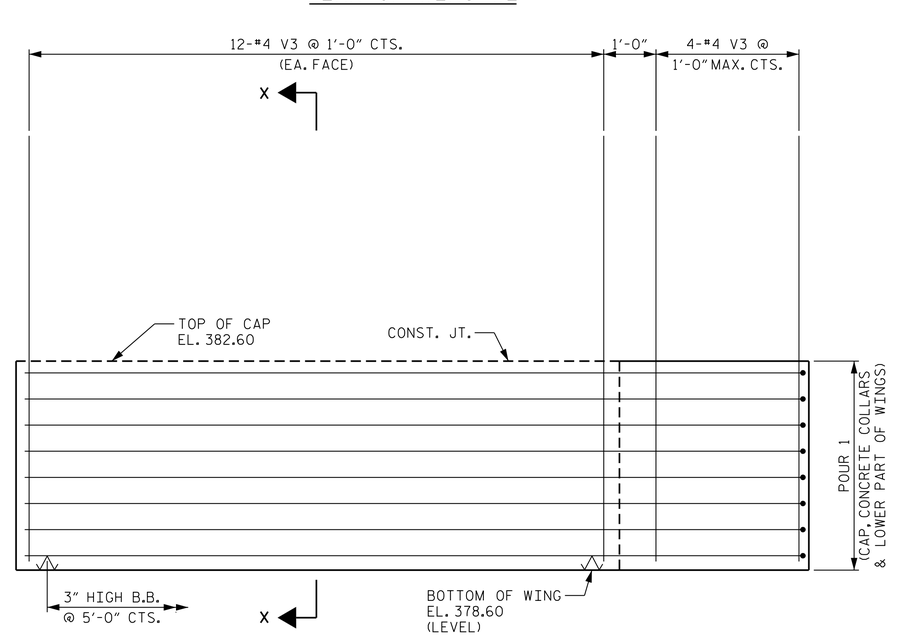
PLAN OF WING W2



ELEVATION OF WING W1



SECTION W-W SECTION X-X



ELEVATION OF WING W2

LOWER WINGS AT INTEGRAL END BENT 1

FOR LOWER WING REINFORCING STEEL AND DETAILS, SEE "END BENT 1 SECTION AND DETAILS" SHEETS

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
SECTION AND DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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1			3			TOTAL SHEETS
2			4			46

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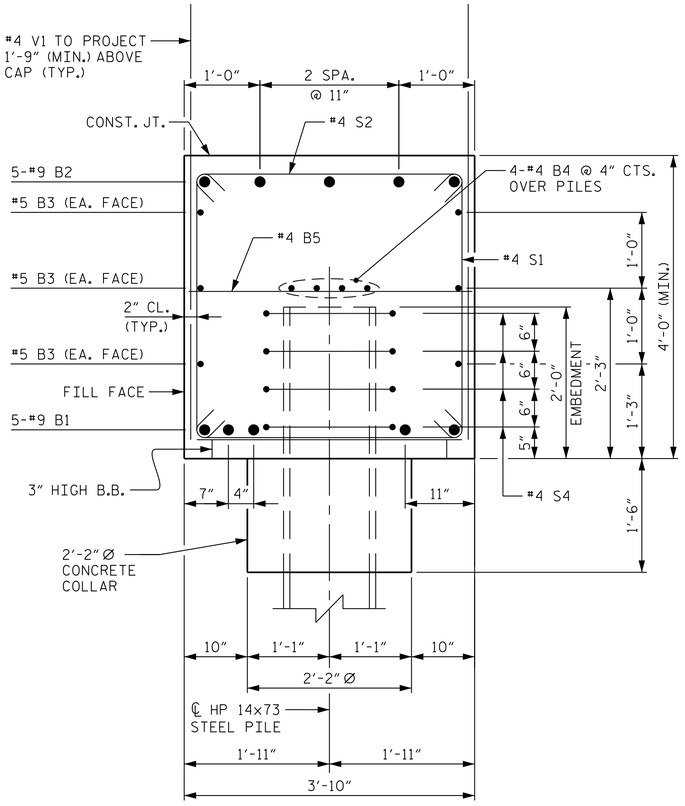
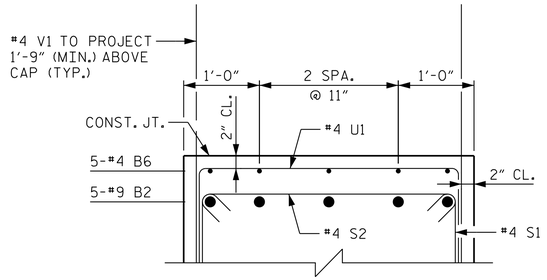
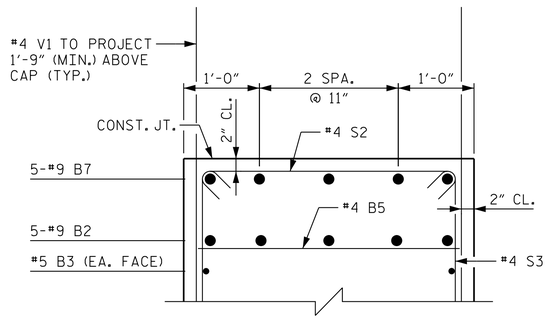
BRIDGE 1



SECTION A-A

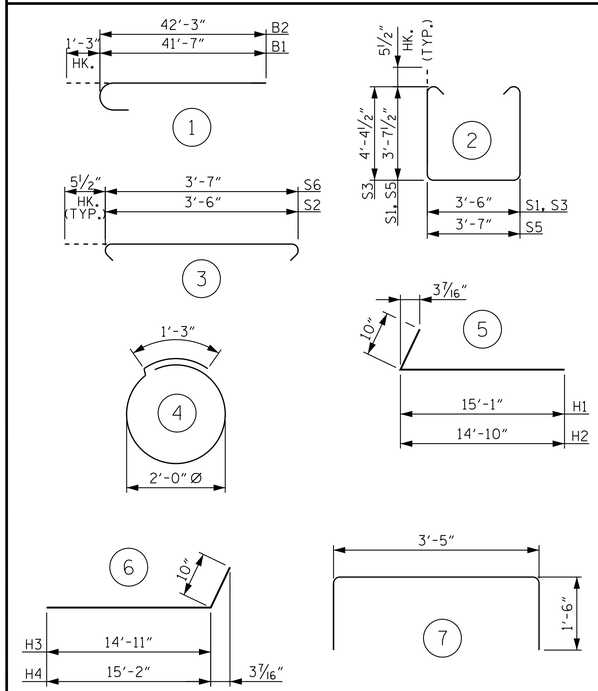


PARTIAL SECTION B-B



PARTIAL SECTION C-C

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

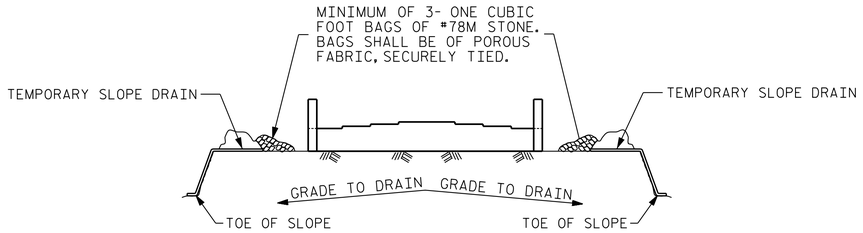
BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	42'-10"	1,456
B2	10	#9	1	43'-6"	1,479
B3	12	#5	STR	41'-1"	514
B4	12	#4	STR	28'-0"	224
B5	25	#4	STR	3'-5"	57
B6	20	#4	STR	9'-2"	122
B7	5	#9	STR	18'-9"	319
H1	8	#5	5	15'-11"	133
H2	8	#5	5	15'-8"	131
H3	8	#5	6	15'-9"	131
H4	8	#5	6	16'-0"	134
S1	64	#5	2	11'-8"	779
S2	85	#5	3	4'-5"	392
S3	21	#5	2	13'-2"	288
S4	40	#4	4	7'-7"	203
S5	2	#5	2	11'-9"	25
S6	2	#5	3	4'-6"	9
U1	28	#4	7	6'-5"	120
V1	66	#4	STR	6'-4"	279
V2	28	#4	STR	8'-10"	165
V3	28	#4	STR	8'-8"	162

REINFORCING STEEL 7,122 LBS.

CLASS A CONCRETE BREAKDOWN
POUR 1 (CAP, LOWER WING WALLS, & COLLARS) 54.9 C.Y.

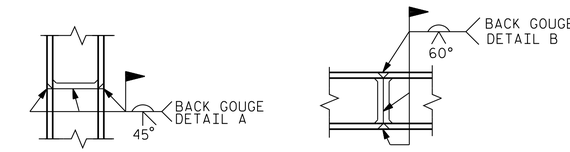


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

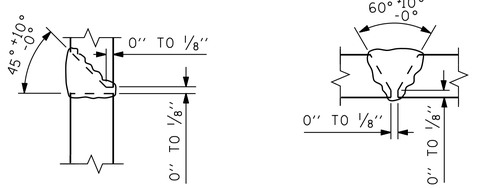
TEMPORARY DRAINAGE AT END BENT



✳PILE VERTICAL

✳PILE HORIZONTAL OR VERTICAL

✳POSITION OF PILE DURING WELDING.



DETAIL "A"

DETAIL "B"

HP PILE SPLICE DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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CHATHAM COUNTY
STATION: 76+49.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 1 SECTION AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-36
1			3			TOTAL SHEETS
2			4			46

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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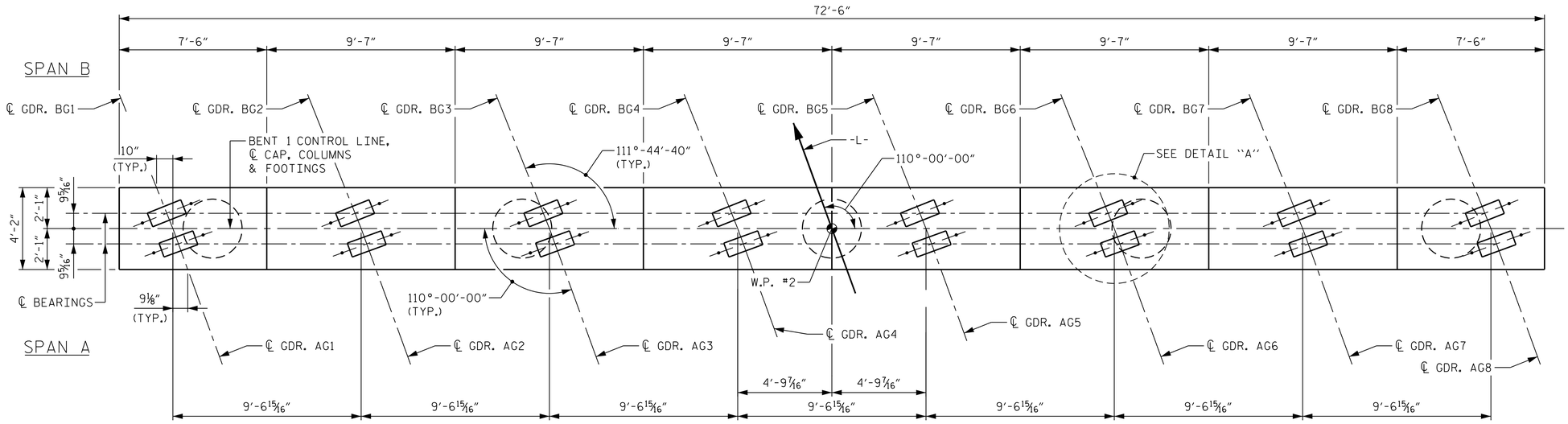
BRIDGE 1



NOTES:

FOR "VIEW X-X", SEE "BENT 1" SHEET 2 OF 2.

FOR "SECTION A-A", "SECTION B-B" AND "SECTION C-C", SEE "BENT 1" SHEET 2 OF 2.

FOR REINFORCING BILL OF MATERIAL, SEE "BENT 1" SHEET 2 OF 2.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN STEEL AND ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

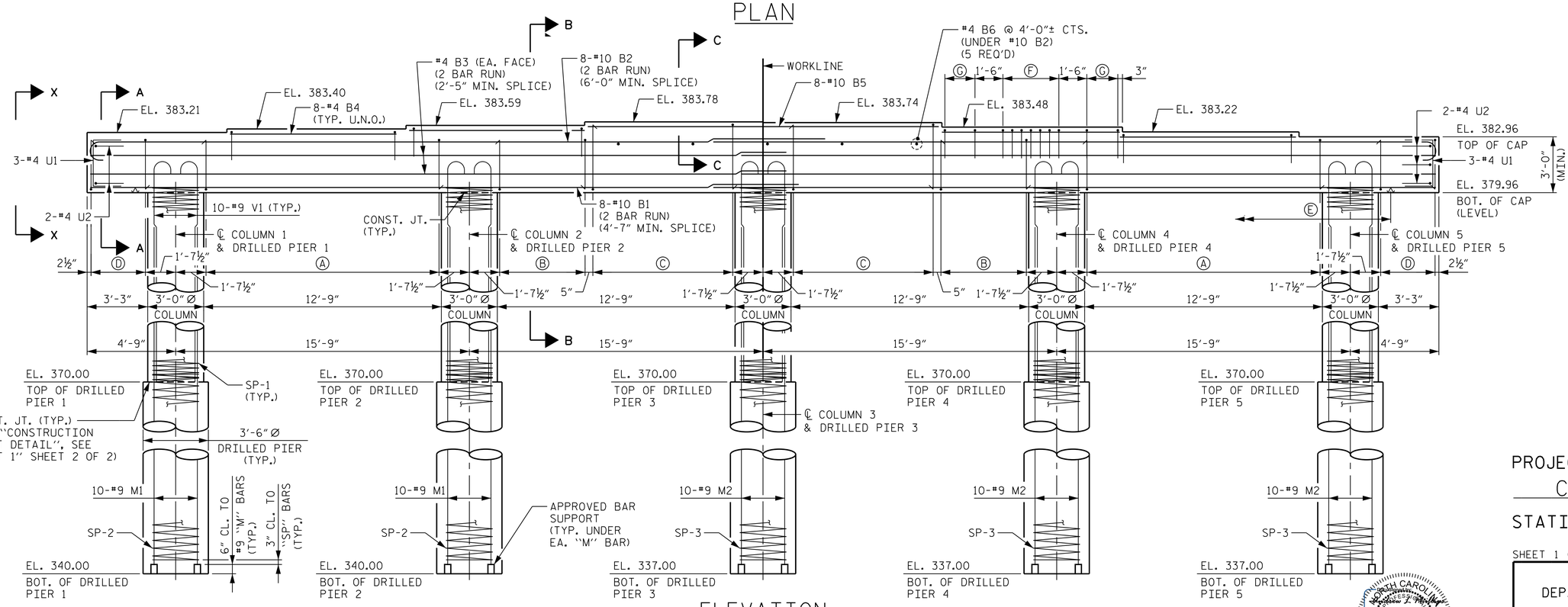
FOR ADDITIONAL NOTES, SEE "GENERAL DRAWING" SHEET 2 OF 3.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3' OF EXTRA LENGTH.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL".

PLAN



ELEVATION

Ⓐ 31-#5 S1 (INVERT ALT. PAIRS) @ 5" CTS.
Ⓑ 12-#5 S1 (INVERT ALT. PAIRS) @ 5" CTS.
Ⓒ 19-#5 S2 (INVERT ALT. PAIRS) @ 5" CTS.
Ⓓ 8-#5 S1 (INVERT ALT. PAIRS) @ 5" CTS.
Ⓔ 3" HIGH B.B. @ 5'-0" CTS. MAX.
Ⓕ 7-#4 U3 @ 6" CTS. (TYP. BRG. SEATS 1-8)
Ⓖ 2-#4 U3 @ 1'-6" CTS. (TYP. BRG. SEATS 2, 3, 6 & 7)

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 76+49.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1
PLAN AND ELEVATION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS ENGINEER
3/20/2025

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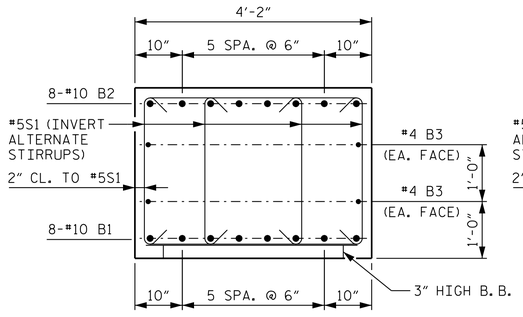
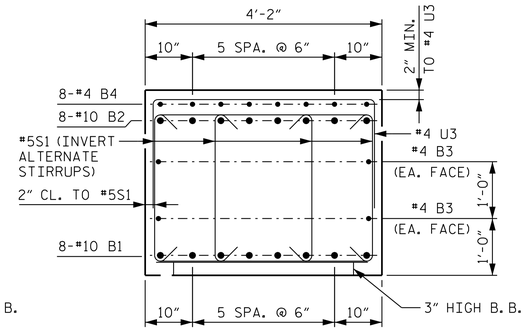
3/18/2025

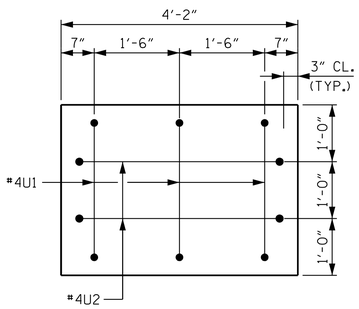
BRIDGE 1



SECTION A-A

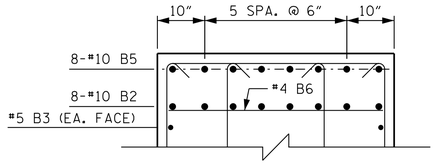


SECTION B-B

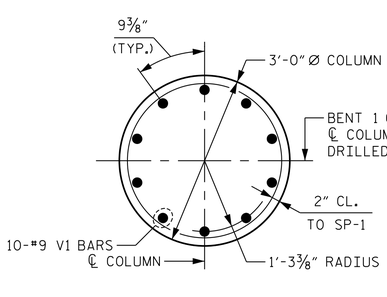


VIEW X-X

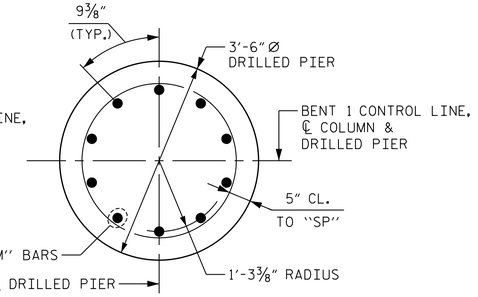
(RIGHT END SHOWN, LEFT END SIMILAR)



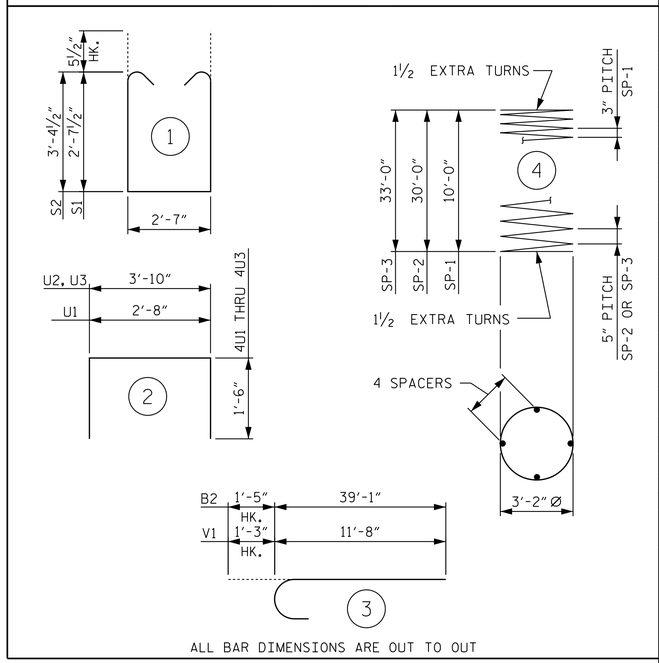
PARTIAL SECTION C-C



SECTION D-D



SECTION E-E



BILL OF MATERIAL

BENT 1

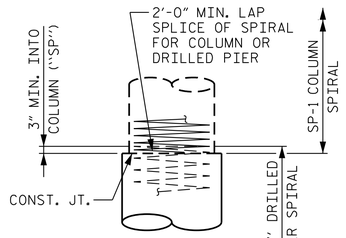
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#10	STR	38'-5"	2,645
B2	16	#10	3	40'-6"	2,788
B3	8	#4	STR	37'-4"	200
B4	32	#4	STR	9'-3"	198
B5	8	#10	STR	18'-8"	643
B6	5	#4	STR	3'-10"	13
S1	204	#5	1	8'-9"	1,862
S2	76	#5	1	10'-3"	812
M1	20	#9	STR	33'-9"	2,295
M2	30	#9	STR	36'-9"	3,749
U1	6	#4	2	5'-8"	23
U2	4	#4	2	6'-10"	18
U3	72	#4	2	6'-10"	329
V1	50	#9	3	12'-11"	2,196
REINFORCING STEEL					17,771 LBS.
SP-1	6	*	4	363'-3"	1,455
SP-2	2	**	4	625'-1"	1,304
SP-3	3	**	4	682'-8"	2,136
SPIRAL REINFORCING STEEL					4,895 LBS.

** THE "SP" SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

* THE "SP" SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

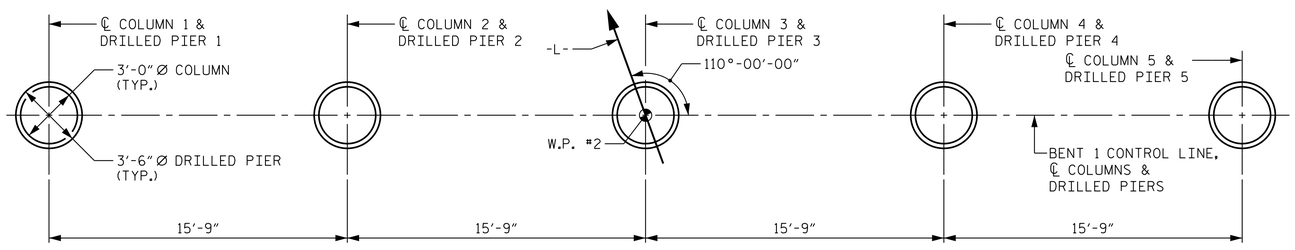
BENT 1 TOTAL QUANTITIES

CLASS A CONCRETE	
POUR 2 (COLUMNS)	C.Y. 13.0
POUR 3 (CAP)	C.Y. 38.9
TOTAL CLASS A CONCRETE	C.Y. 51.9
DRILLED PIERS, CONCRETE	
POUR 1	C.Y. 56.8
3'-6" Ø DRILLED PIERS IN SOIL	LIN. FT. 26.4
3'-6" Ø DRILLED PIERS NOT IN SOIL	LIN. FT. 140.8
PERMANENT STEEL CASING FOR 3'-6" Ø DRILLED PIERS	LIN. FT. 34.0
CSL TUBES	LIN. FT. 264.0

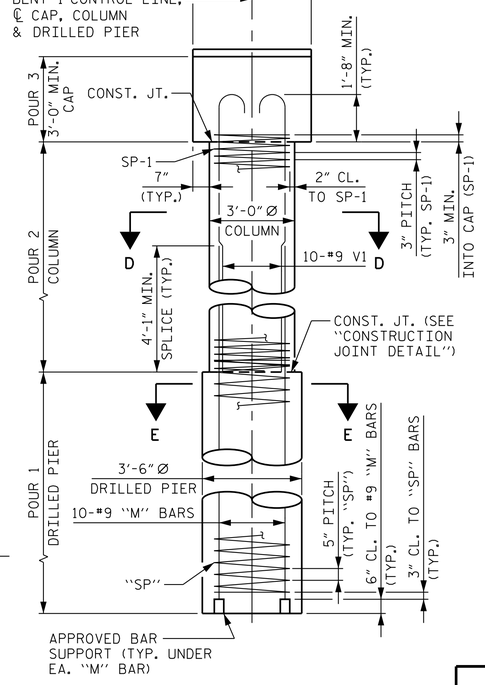


DETAIL "A"

CONSTRUCTION JOINT DETAIL



PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-38
1			3			TOTAL SHEETS
2			4			46

BRIDGE 1

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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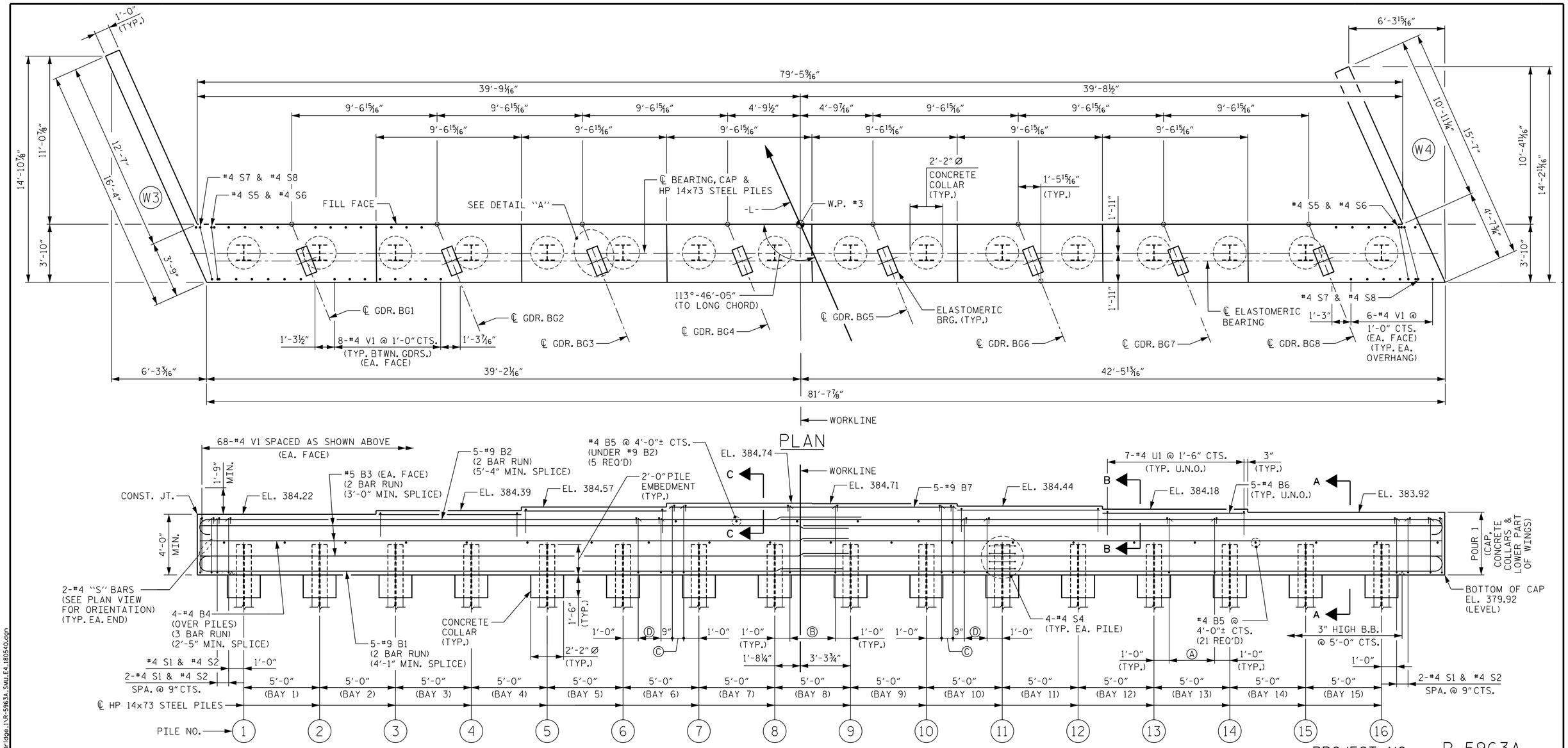
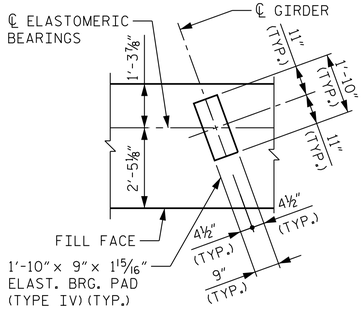
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_B2_180540.dgn



PLAN

ELEVATION



DETAIL "A"

Ⓐ - 5-#4 S1 & #4 S2 @ 9" CTS. (TYP. @ BAYS 1 - 5 & 11 - 15)

Ⓑ - 5-#4 S3 & #4 S2 @ 9" CTS. (TYP. @ BAYS 7- 9)

Ⓒ - 2-#4 S3 & #4 S2 @ 9" CTS.

Ⓓ - 3-#4 S1 & #4 S2 @ 9" CTS.

NOTES

FOR PILE SPLICE DETAILS, AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

FOR SECTION A-A, PARTIAL SECTION B-B AND PARTIAL SECTION C-C, SEE SHEET 3 OF 3.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

THE TOP SURFACE OF POUR #1 OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
PLAN AND ELEVATION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-39
1			3			TOTAL SHEETS
2			4			46

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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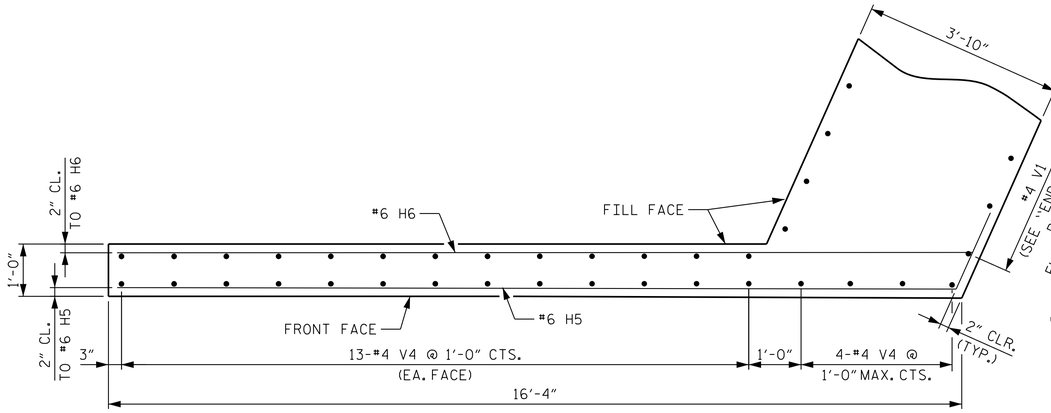
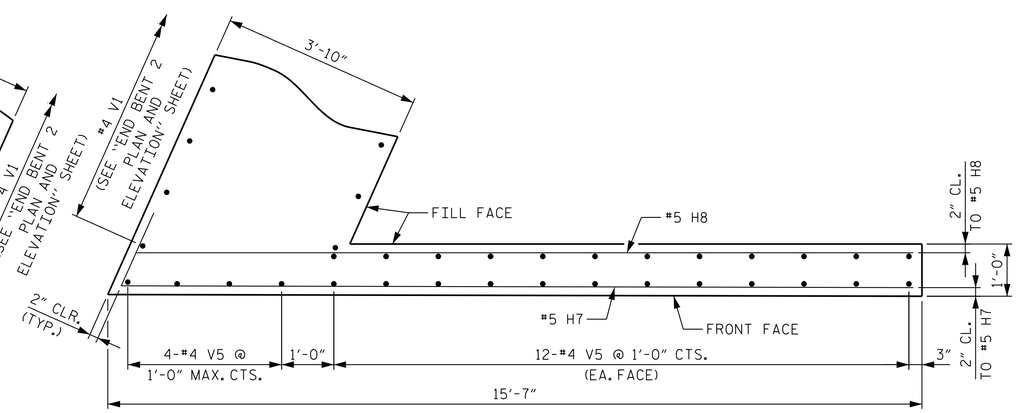
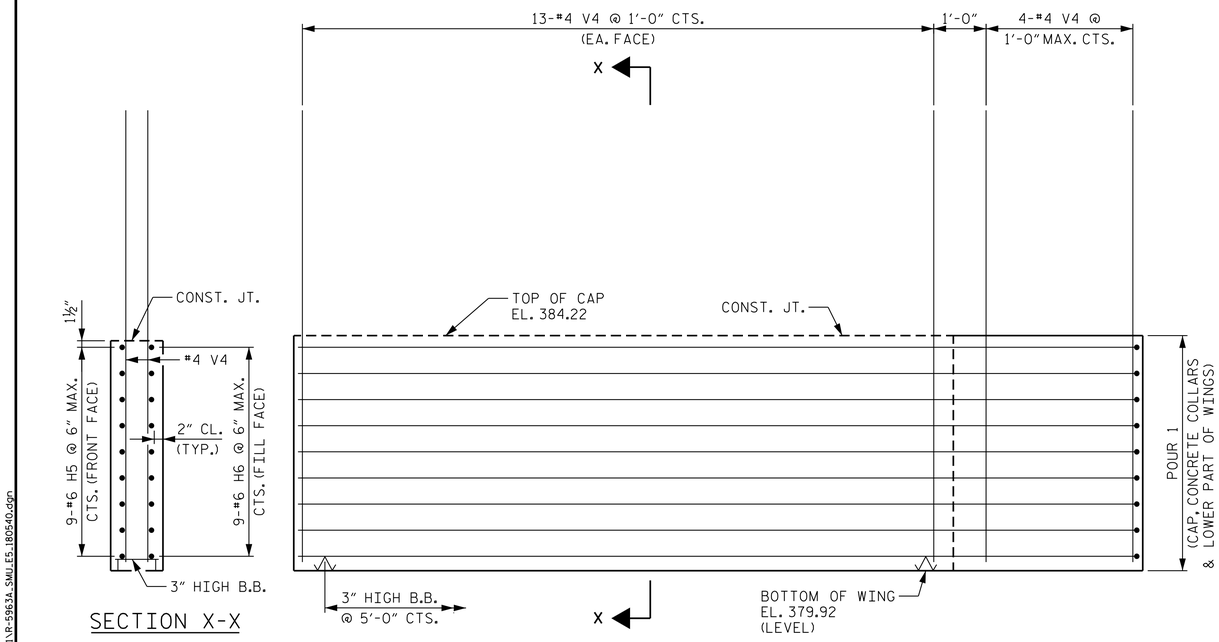
BRIDGE 1



PLAN OF WING W3

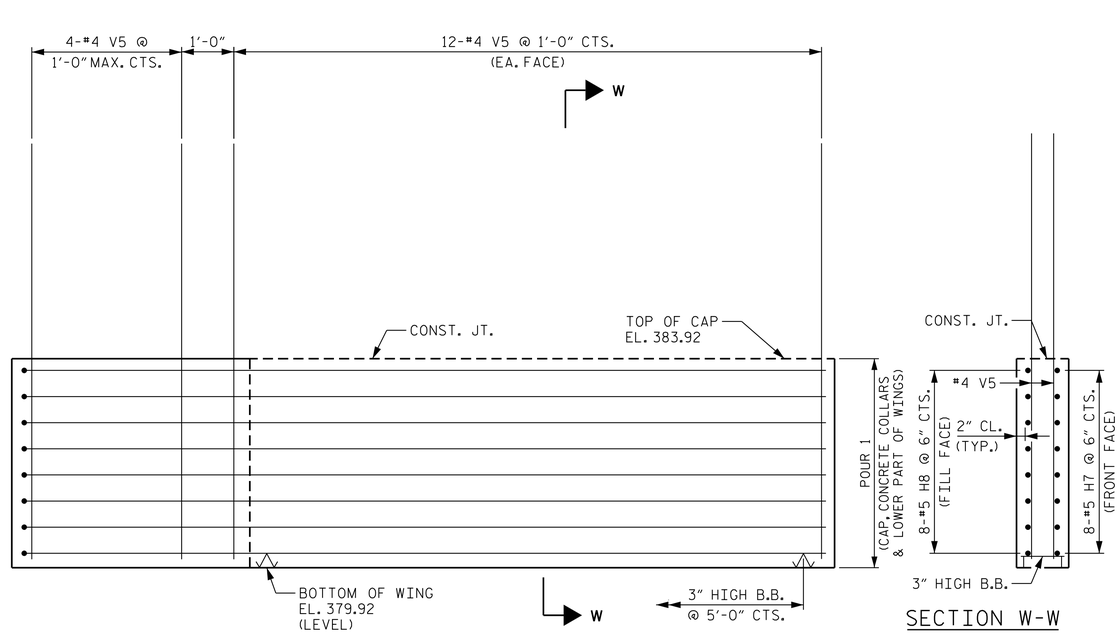


PLAN OF WING W4



SECTION X-X

ELEVATION OF WING W3



SECTION W-W

ELEVATION OF WING W4

LOWER WINGS AT INTEGRAL END BENT 2

FOR LOWER WING REINFORCING STEEL AND DETAILS, SEE "END BENT 2 SECTION AND DETAILS" SHEETS

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
SECTION AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-40
1			3			TOTAL SHEETS
2			4			46

DRAWN BY: D. D. LOWERY DATE: 11/2024
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DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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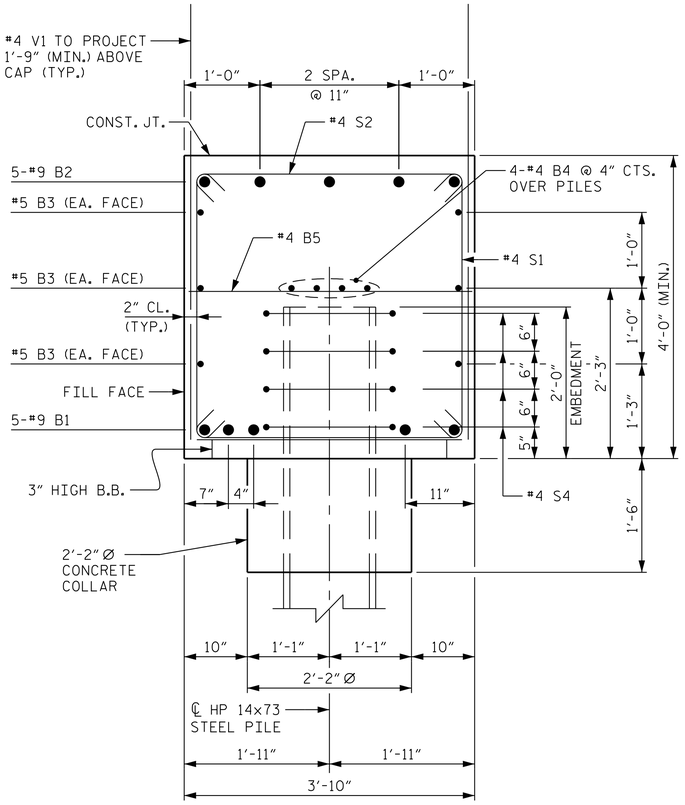
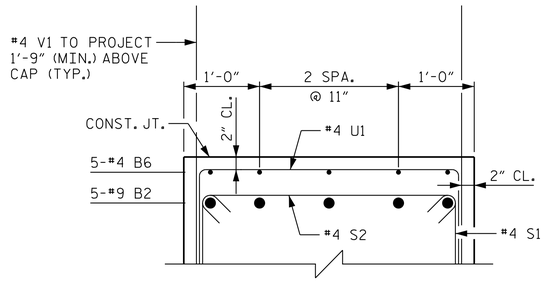
BRIDGE 1

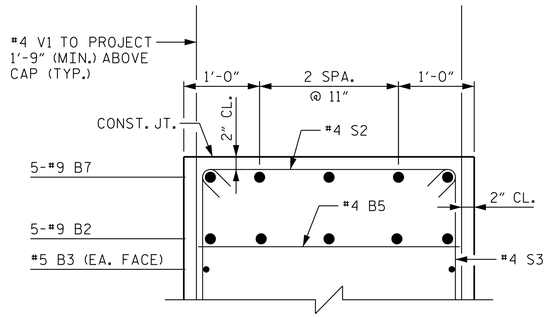
3/18/2025 K:\RDT_Structures_Bridge\NC\01103734 - R-5963A&B\Cad\Dgn\Bridge1\R-5963A_SMU_E5_180540.dgn



SECTION A-A

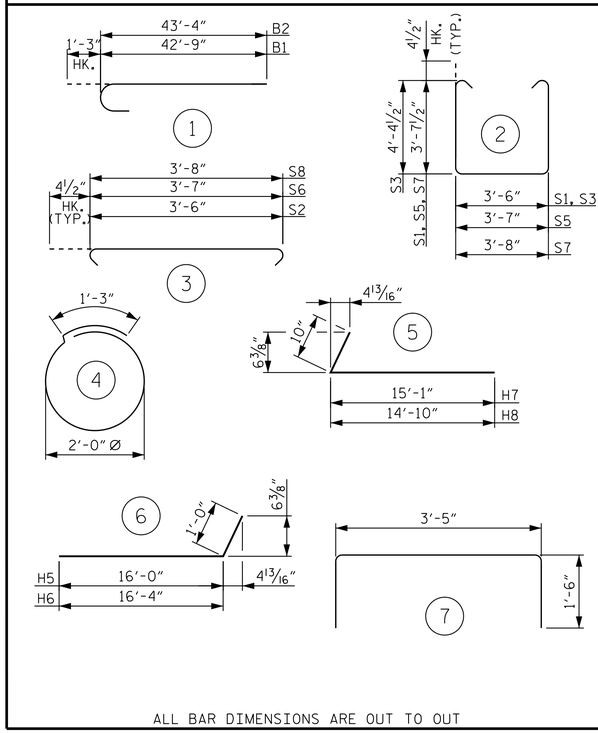


PARTIAL SECTION B-B



PARTIAL SECTION C-C

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

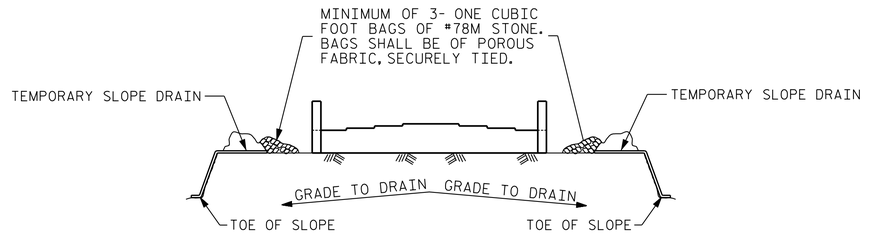
END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	44'-0"	1,496
B2	10	#9	1	44'-7"	1,516
B3	12	#5	STR	42'-2"	528
B4	12	#4	STR	28'-9"	230
B5	26	#4	STR	3'-5"	59
B6	20	#4	STR	9'-2"	122
B7	5	#9	STR	18'-9"	319
H5	9	#6	6	17'-0"	230
H6	9	#6	6	17'-4"	234
H7	8	#5	5	15'-11"	133
H8	8	#5	5	15'-8"	131
S1	60	#4	2	11'-6"	461
S2	79	#4	3	4'-3"	224
S3	19	#4	2	13'-0"	165
S4	64	#4	4	7'-7"	324
S5	2	#4	2	11'-7"	15
S6	2	#4	3	4'-4"	6
S7	2	#4	2	11'-8"	16
S8	2	#4	3	4'-5"	6
U1	28	#4	7	6'-5"	120
V1	68	#4	STR	6'-5"	291
V4	30	#4	STR	9'-1"	182
V5	28	#4	STR	8'-9"	164

REINFORCING STEEL 6,972 LBS.

CLASS A CONCRETE BREAKDOWN

POUR 1 (CAP, LOWER WING WALLS, & COLLARS) 58.4 C.Y.

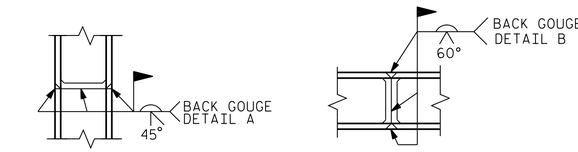


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

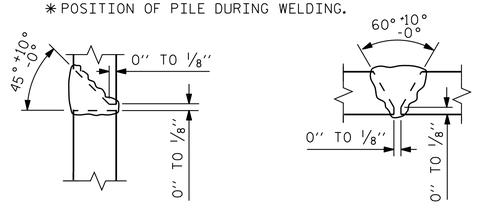
TEMPORARY DRAINAGE AT END BENT



✳ PILE VERTICAL

✳ PILE HORIZONTAL OR VERTICAL

✳ POSITION OF PILE DURING WELDING.



DETAIL "A"

DETAIL "B"

HP PILE SPLICE DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS ENGINEER
3/20/2025

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT 2 SECTION AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-41
1			3			TOTAL SHEETS
2			4			46

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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Raleigh, NC 27601-1772
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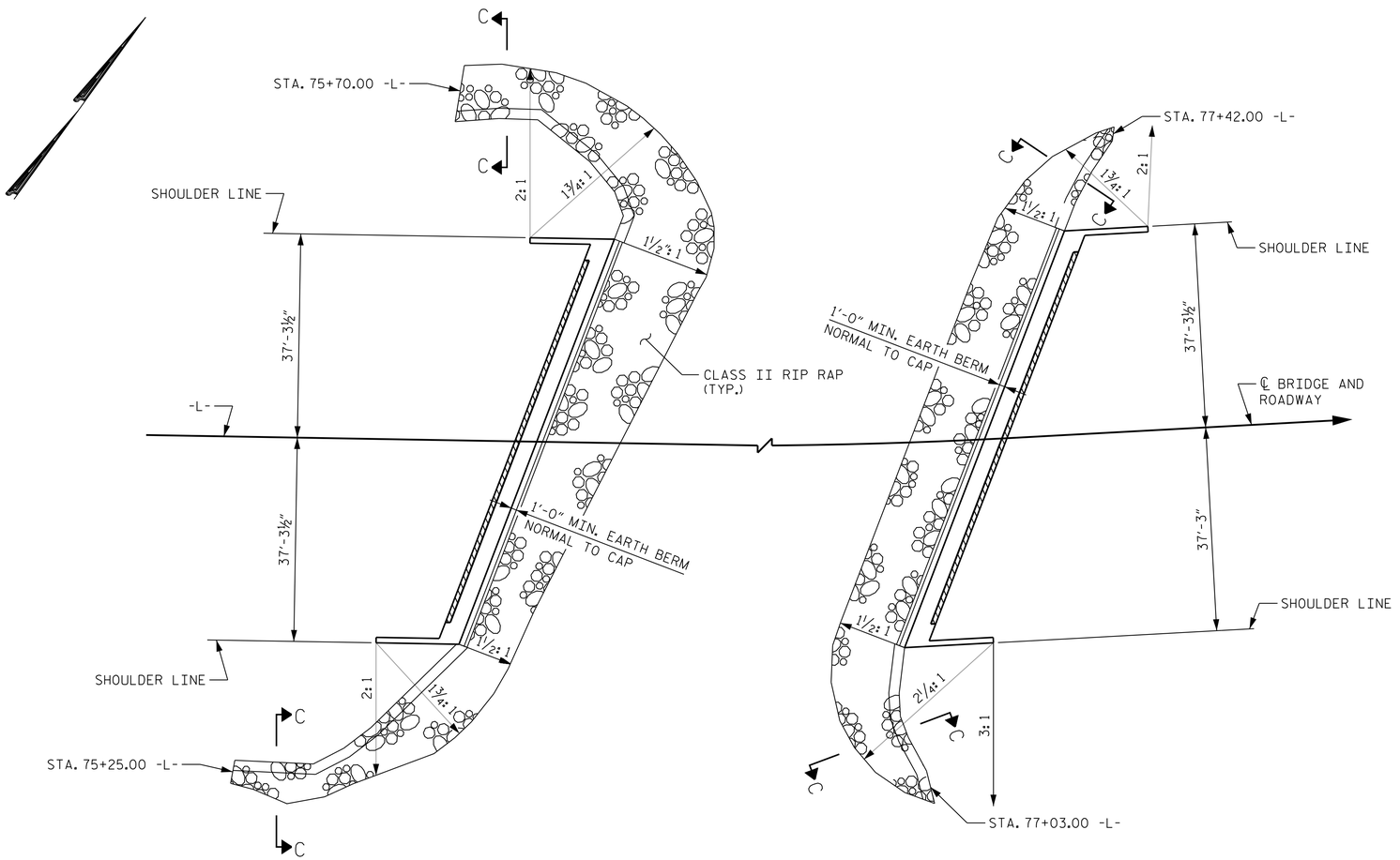
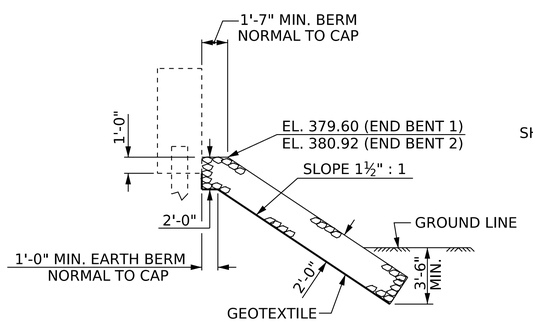
BRIDGE 1

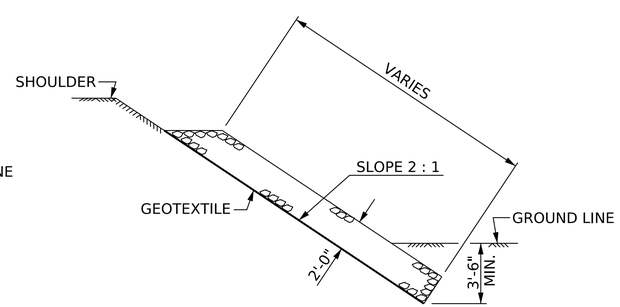


END BENT 1

END BENT 2



℄ SECTION



SECTION C-C

BERM RIP RAPPED

ESTIMATED QUANTITIES

BRIDGE @ STA. 76+49.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	340	378
END BENT 2	240	267

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
RIP RAP DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

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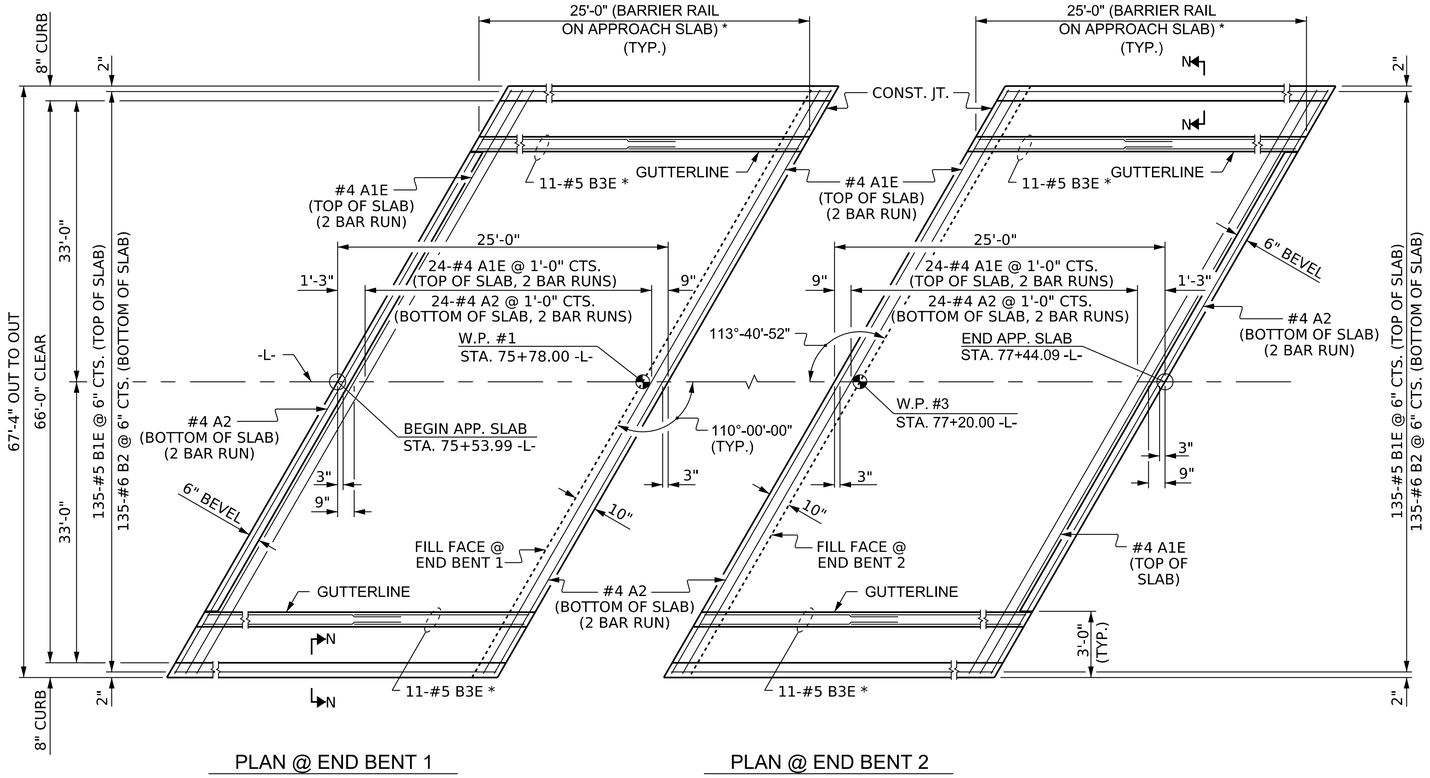
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-42
1			3			TOTAL SHEETS
2			4			46

ASSEMBLED BY : D.D. LOWERY	DATE : 11/2024	
CHECKED BY : R.M. KROL	DATE : 11/2024	
DRAWN BY : REK 1/84	REV. 10/1/11	MAA/GM
CHECKED BY : RDU 1/84	REV. 12/21/11	MAA/GM
	REV. 12/17	MAA/THC

3/18/2025

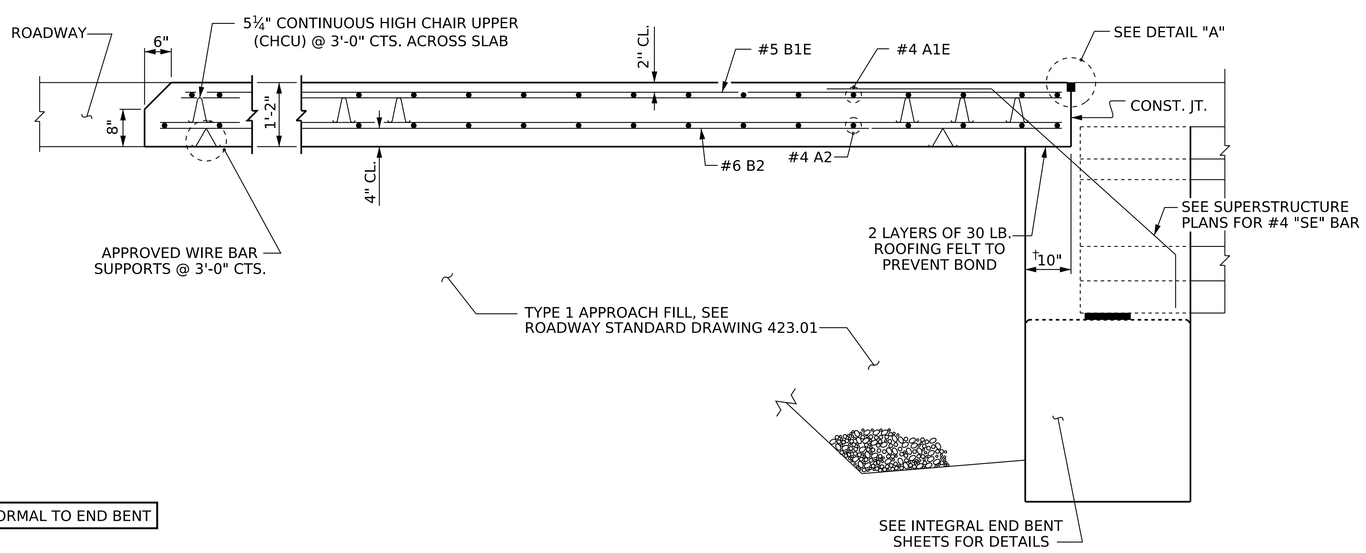
K:\RDT_Structures_Bridge\NC\01103673 4 - R-5963A&B\Cad\Dgn\Bridge_1\R-5963A_SMU_RR1_180540.dgn

BRIDGE 1 STD. NO. RR1



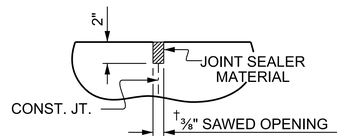
PLAN @ END BENT 1 PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS
FOR CONCRETE MEDIAN, SEE SHEET 2 OF 3.

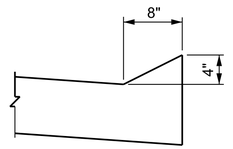


†NORMAL TO END BENT

SECTION THRU SLAB



DETAIL "A"



SECTION N-N

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

BILL OF MATERIAL
FOR ONE APPROACH SLAB
(2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1E	52	#4	STR	36'-8"	1,274
A2	52	#4	STR	36'-6"	1,268
B1E	135	#5	STR	24'-1"	3,391
B2	135	#6	STR	24'-7"	4,985
REINFORCING STEEL					6,253 LBS.
EPOXY COATED REINFORCING STEEL					4,665 LBS.
CLASS AA CONCRETE					72.6 C.Y.

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

* FOR BARRIER RAIL ON APPROACH SLAB DETAILS, REINFORCING, AND BILL OF MATERIALS, SEE SHEET 3 OF 3.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 1 OF 3

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-43
1			3			TOTAL SHEETS
2			4			46

BRIDGE 1 STD. NO. BAS5

ASSEMBLED BY : D. D. LOWERY	DATE : 11/2024	
CHECKED BY : R. M. KROL	DATE : 11/2024	
DRAWN BY : TLA 10/05	REV. 12/17	MAA/THC
CHECKED BY : GM 5/06	REV. 06/19	BNB/THC
	REV. 07/23	BNB/SNM

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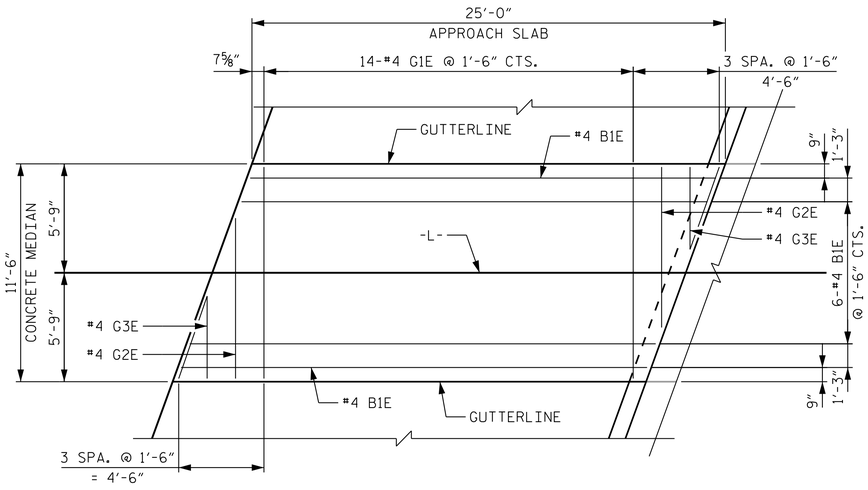
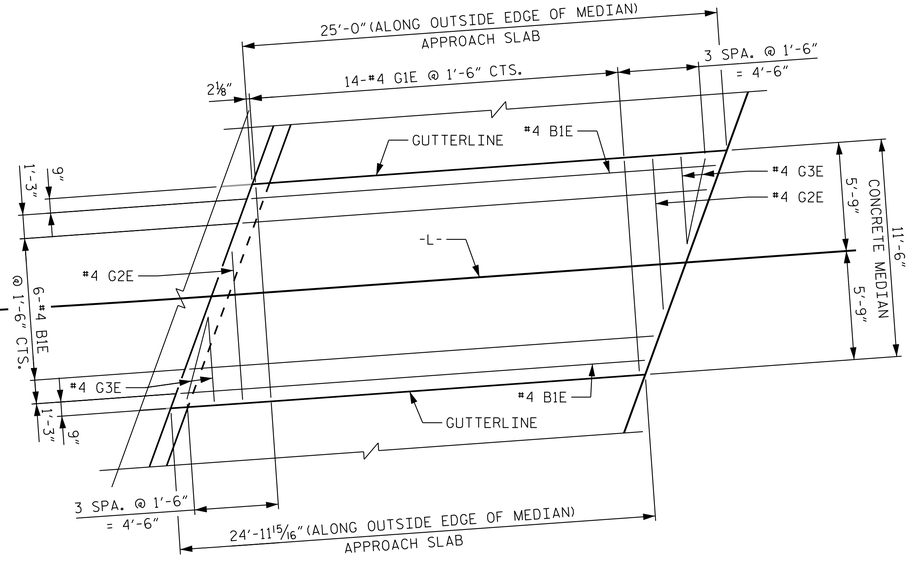
BILL OF MATERIAL

APPROACH SLAB AT EB #1						APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1E	8	#4	STR	24'-7"	131	B1E	8	#4	STR	24'-7"	131
G1E	14	#4	STR	10'-0"	94	G1E	14	#4	STR	10'-0"	94
G2E	2	#4	STR	7'-10"	10	G2E	2	#4	STR	7'-3"	10
G3E	4	#4	STR	3'-9"	10	G3E	4	#4	STR	3'-11"	10
EPOXY COATED REINFORCING STEEL				LBS.	245	EPOXY COATED REINFORCING STEEL				LBS.	245
CLASS AA CONCRETE (MEDIAN)				C.Y.	4.4	CLASS AA CONCRETE (MEDIAN)				C.Y.	4.4

"E" INDICATES EPOXY COATED REINFORCING STEEL.

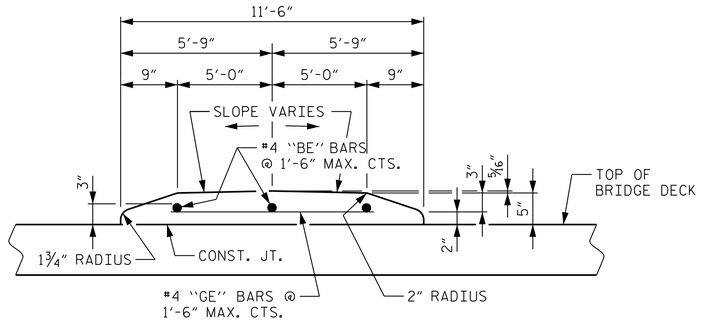


PLAN @ END BENT 1



PLAN @ END BENT 2

PLAN OF APPROACH SLAB MEDIANS



SECTION THRU MEDIAN

NUMBER OF "BE" BARS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. REFER TO PLAN VIEW OF MEDIAN FOR "BE" BAR PLACEMENT.

NOTES

ALL REINFORCING STEEL IN THE MEDIANS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED IN SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE MEDIAN ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND REACHED A MINIMUM OF 3,000 PSI.

NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR MATERIALS OR LABOR REQUIRED TO CONSTRUCT MEDIAN. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR BRIDGE APPROACH SLABS.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

MEDIAN APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-44
1			3			TOTAL SHEETS
2			4			46

BRIDGE 1

DRAWN BY: D. D. LOWERY DATE: 11/2024
CHECKED BY: E. W. SPRABERRY DATE: 11/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 11/2024

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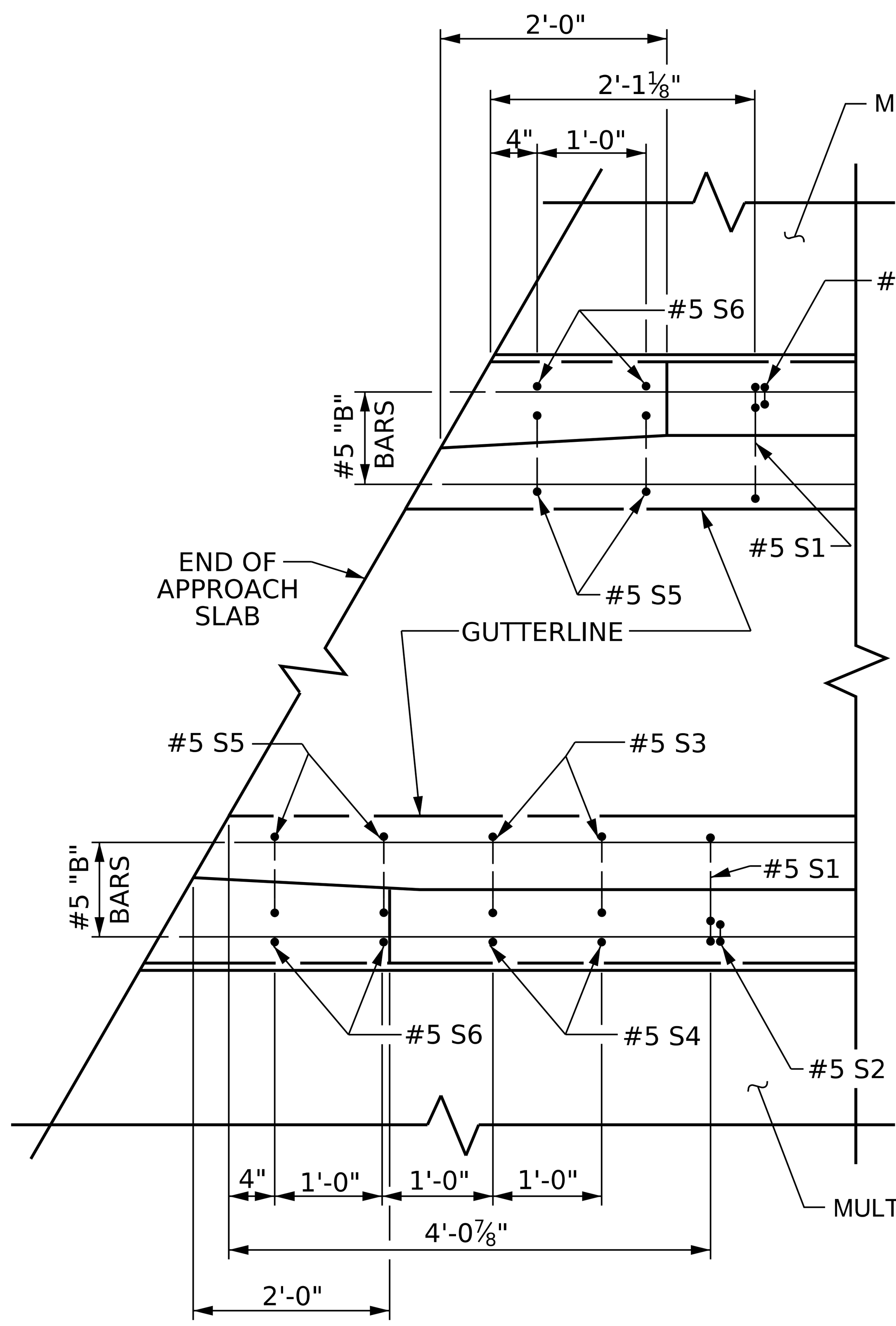
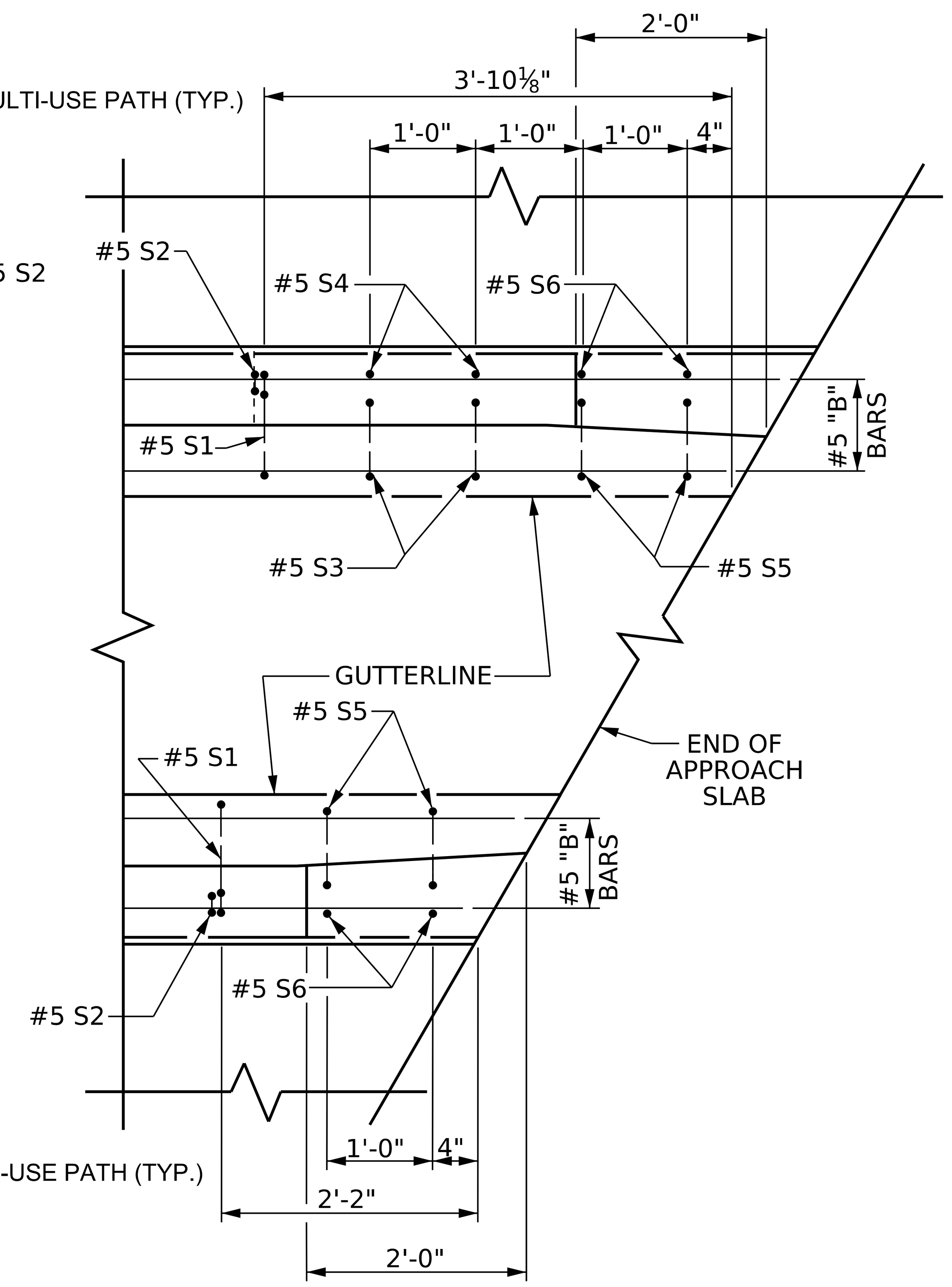


PLAN AT END BENT 1



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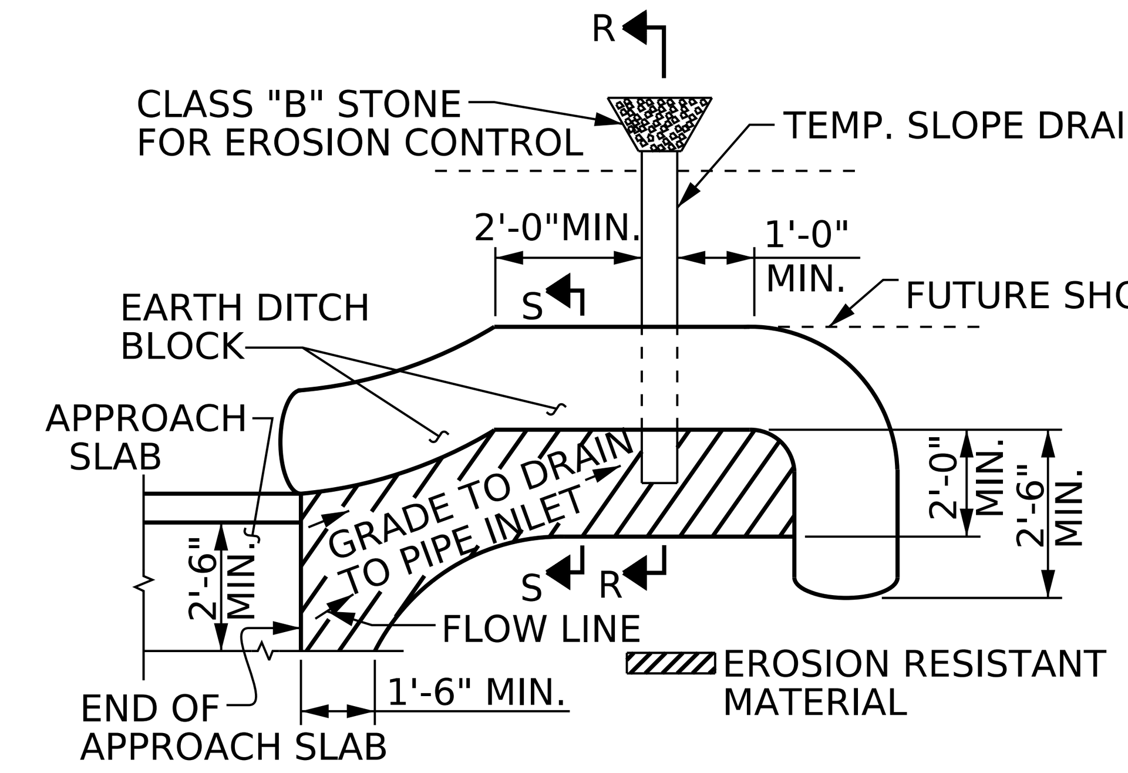
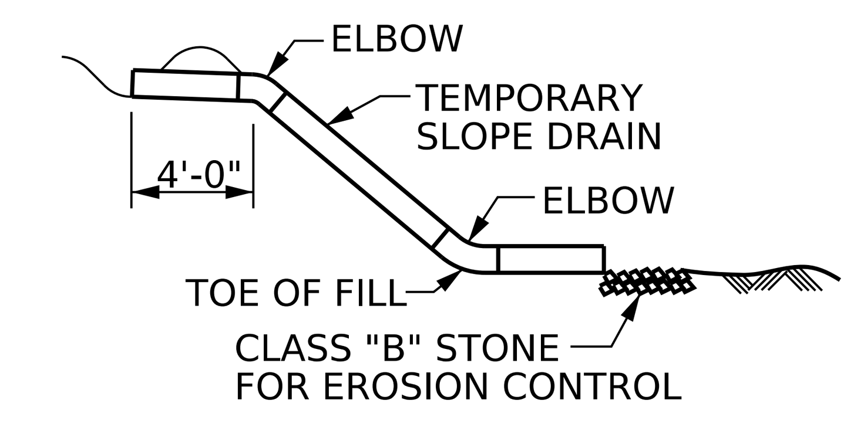
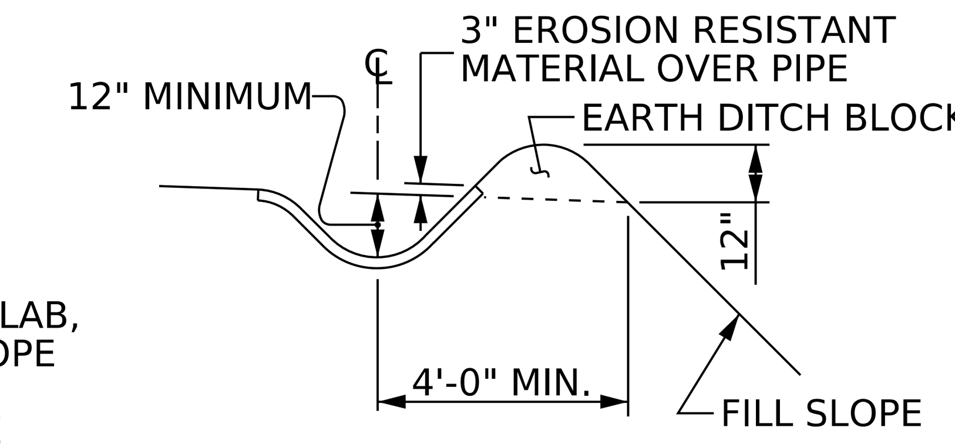


PLAN VIEW



SECTION R-R

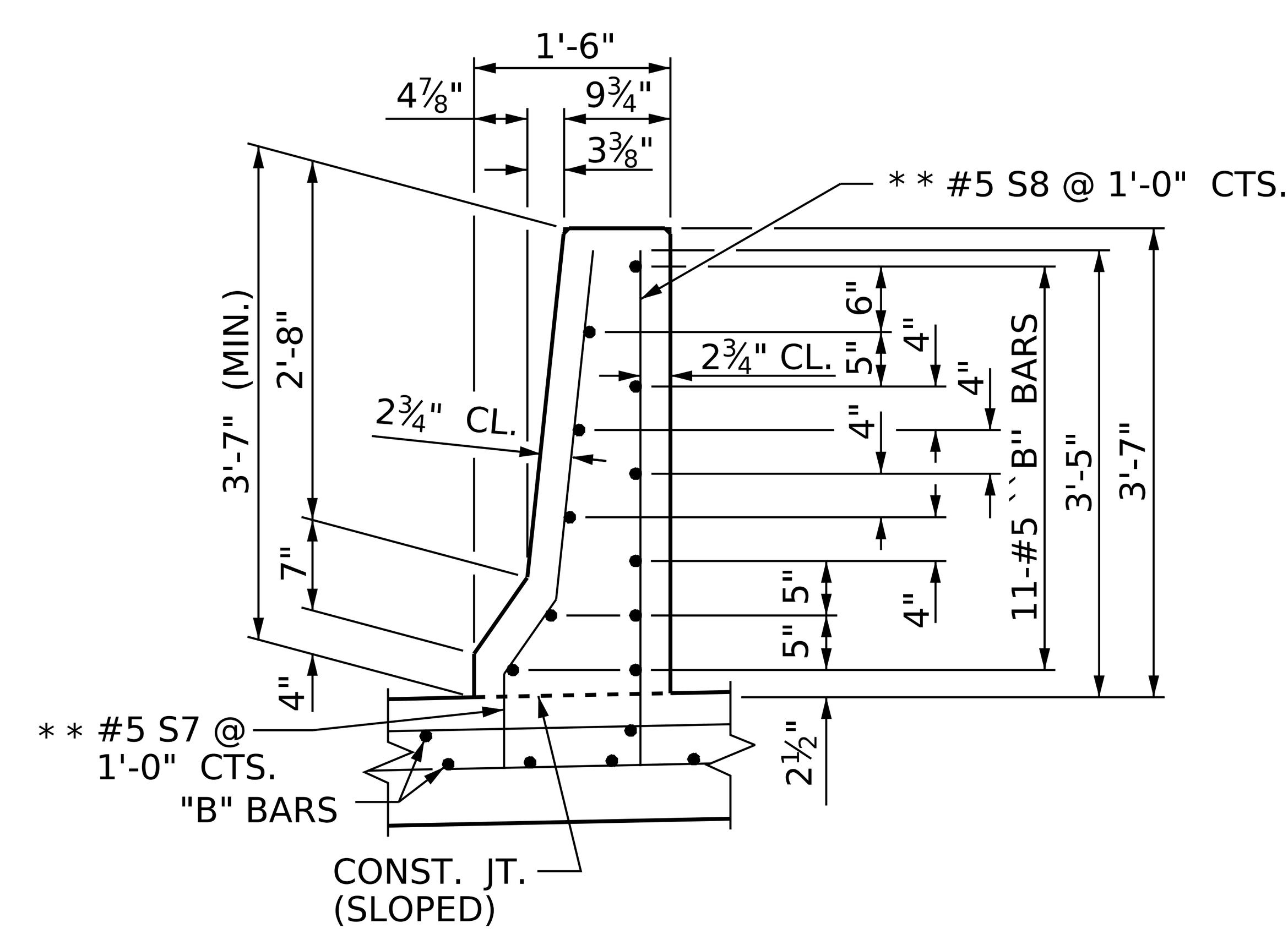


SECTION S-S

NOTE:
IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

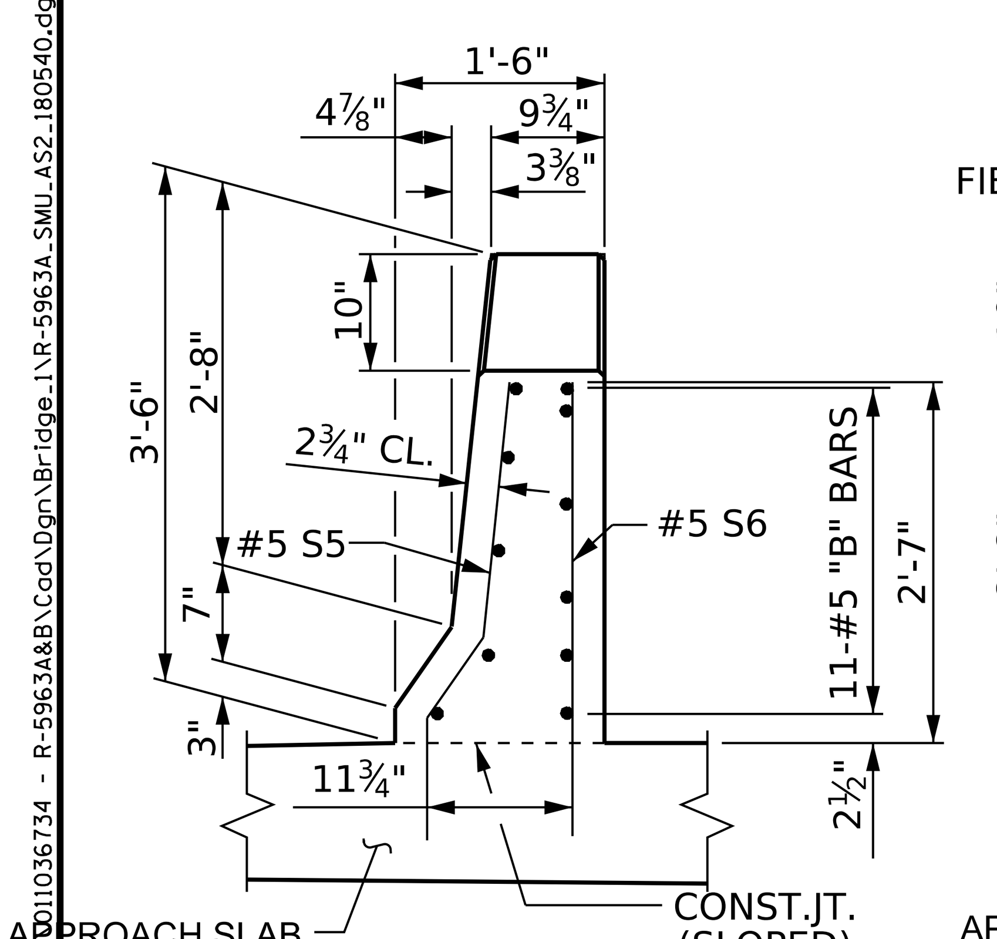
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

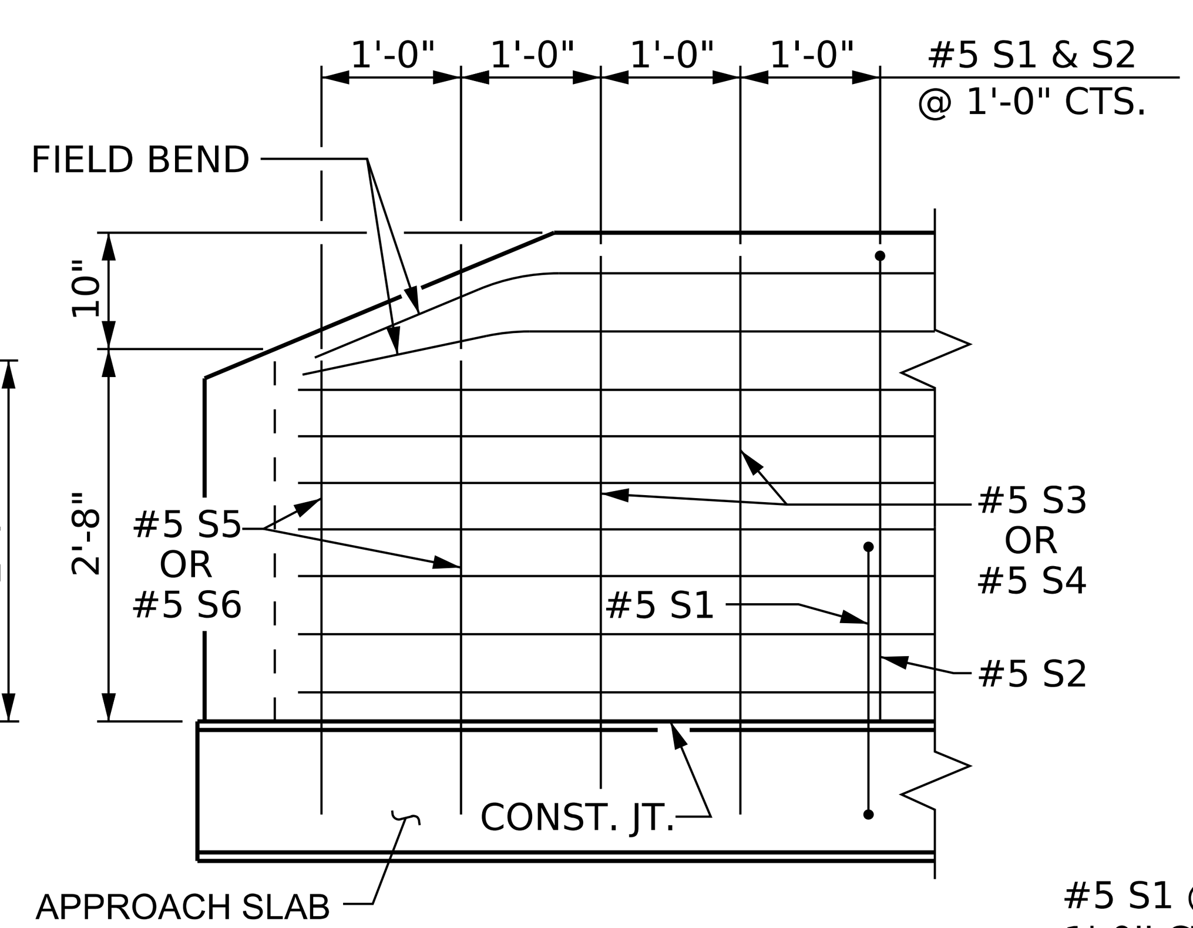


OPTIONAL SECTION THRU RAIL

** FOR OPTIONAL ADHESIVE ANCHORING (NOT INCLUDED IN TOTAL QUANTITY)

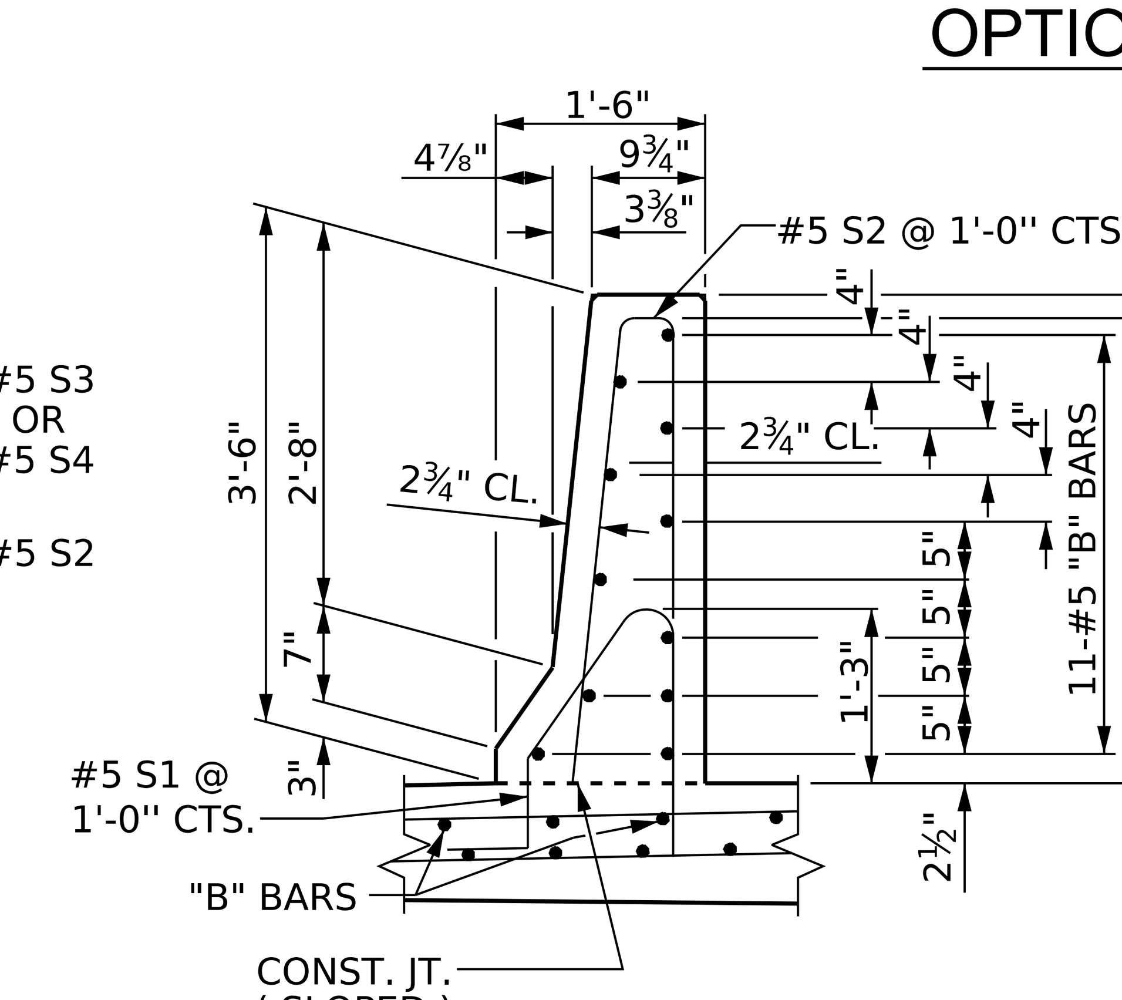


END VIEW

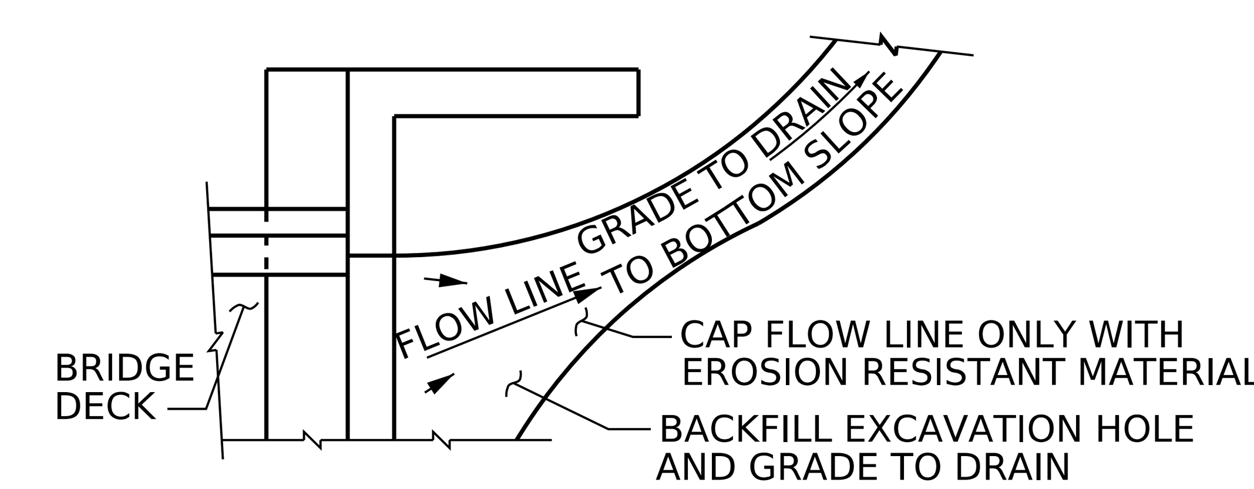


SIDE VIEW

END OF RAIL DETAILS



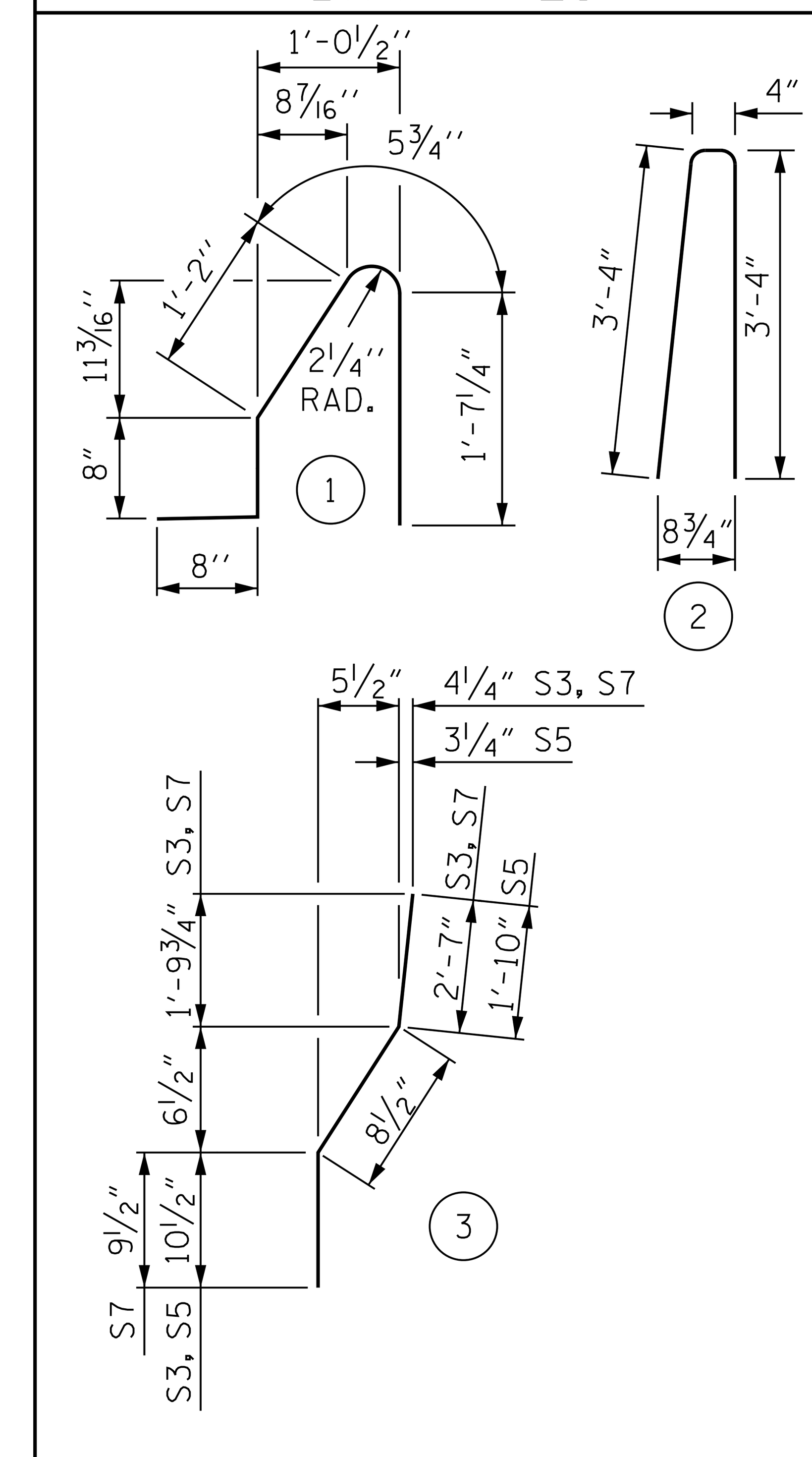
SECTION THRU RAIL



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1E	88	#5	STR	14'-1"	1,293
S1E	88	#5	1	4'-6"	428
S2E	88	#5	2	7'-0"	642
S3E	4	#5	3	4'-2"	17
S4E	4	#5	STR	4'-0"	17
S5E	8	#5	3	3'-5"	29
S6E	8	#5	STR	3'-3"	27
S7E	88	#5	3	4'-1"	375
S8E	88	#5	STR	3'-11"	359

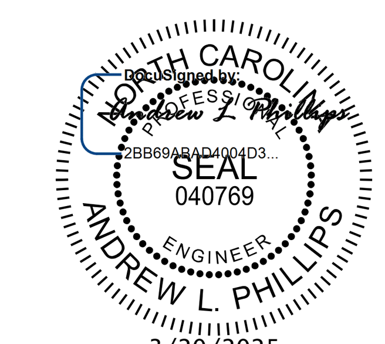
EPOXY COATED REINFORCING STEEL	2,453 LBS.
CLASS AA CONCRETE	13.5 CU. YDS.
CONCRETE BARRIER RAIL	100.0 LIN. FT.

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 76+49.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

BRIDGE APPROACH SLAB DETAILS



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NC LICENSE # F-0102

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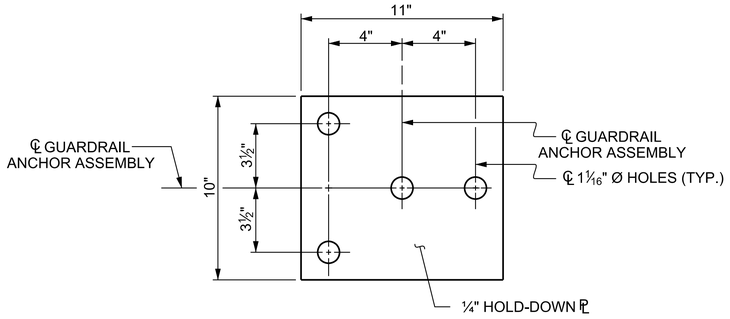
REVISIONS							
NO.	BY:	DATE:		NO.	BY:	DATE:	
1				3			
2				4			

SHEET NO. S1-45
TOTAL SHEETS 46

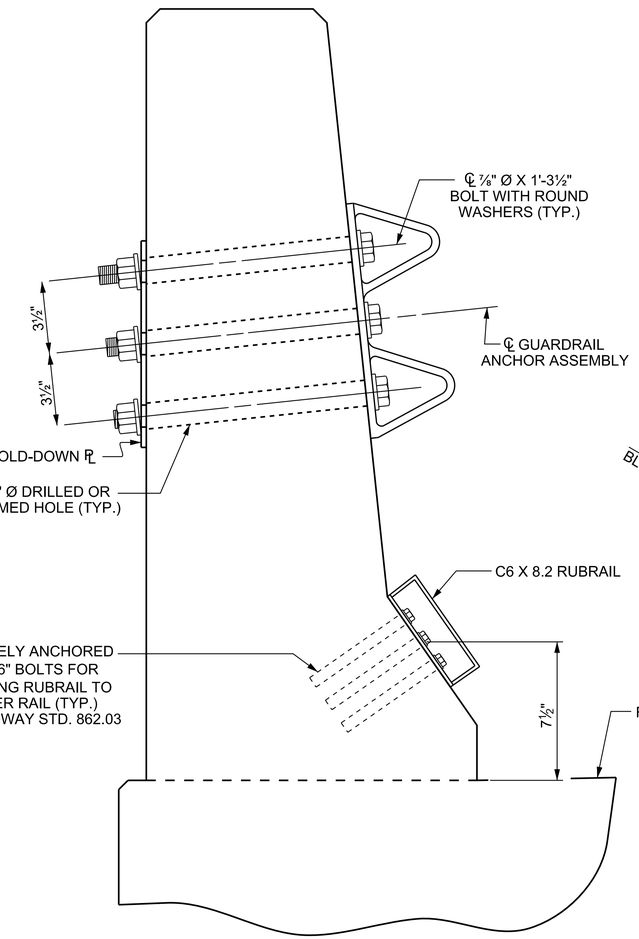
ASSEMBLED BY : D.D. LOWERY DATE : 11/2024
CHECKED BY : R.M. KROL DATE : 11/2024
DRAWN BY : TLA 10/05
CHECKED BY : GM 5/06
REV. 12/17 MAA/THC
REV. 06/19 BNB/THC
REV. 07/23 BNB/SNM

3/18/2025 K:\RDI_Structures_Bridge\W00103673A - R-5963A\Bridge_1\R-5963A_SMU_AS2_180540.dgn

BRIDGE 1 STD. NO. BAS5

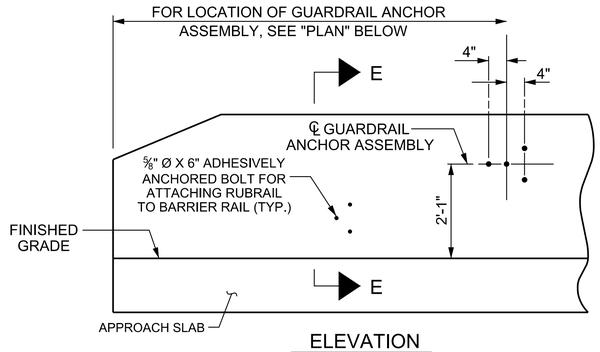


PLAN

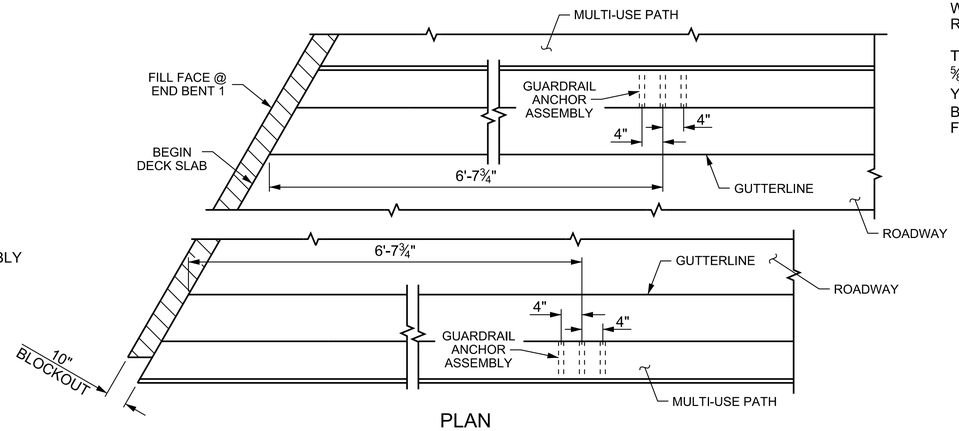


SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



ELEVATION



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼" HOLD-DOWN PLATE AND 4 -⅞"Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ⅞" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

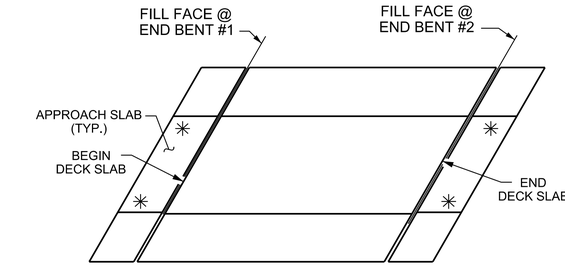
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

THE 1¼" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE ⅝" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ⅝" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 76+49.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S1-46
1			3			TOTAL SHEETS
2			4			46

ASSEMBLED BY : D. D. LOWERY	DATE : 11/2024	
CHECKED BY : R. M. KROL	DATE : 11/2024	
DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC
	REV. 5/18	MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BRIDGE 1 STD. NO. GRA3

3/18/2025
K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_LNR-5963A_SMU_GRL_180540.dgn

133+50 134+00 134+50 135+00 135+50 136+00

SPAN A

(-)6.3741% (+)0.8770%

P.I. STA. = 130+20.00 -L-
EL. = 322.70
V.C. = 700'

-L- GRADE DATA

340 330 320 310 300

FILL FACE @ END BENT 1
STA. 134+08.47 -L-
G.P. EL. 326.11

1'-7" MIN. BERM (TYP.)

BEGIN FRONT SLOPE
STA. 133+95.19 -L-
EL. 325.99

LOW CHORD
EL. 319.68

1½:1 SLOPE NORMAL TO CAP (TYP.)

Q50
EL. 316.2

Q100
EL. 316.2
(FEMA)

LOW CHORD
EL. 320.70

FILL FACE @ END BENT 2
STA. 135+29.89 -L-
G.P. EL. 327.17

EL. 313±

EL. 312±

EL. 311±

BEGIN FRONT SLOPE
STA. 135+43.07 -L-
EL. 327.29

PROPOSED GRADE

FILL

1'-0" (TYP.)

3'-6" MIN.

EL. 303±

EL. 302±

EL. 310±

1'-0" MIN. EARTH BERM (TYP.)

FILL

HP 14x73 STEEL PILES (TYP.)

EL. 309±

EL. 308±

APPROX. NATURAL GROUND

N.W.S.
EL. 304.0
(01/22/2019)

EL. 302±

EL. 308±

3'-6" MIN.

PROPOSED FLOOD BENCH EXCAVATION (EL. 309.00)

CLASS II RIP RAP (2'-0" THICK) (TYP.)

UNCLASSIFIED STRUCTURE EXCAVATION

END BENT 1
(INTEGRAL)

END BENT 2
(INTEGRAL)

SECTION ALONG -L-
SECTIONS @ END BENTS ARE @ RIGHT ANGLES

HYDRAULIC DATA

DESIGN DISCHARGE ----------5000 CFS
FREQUENCY OF DESIGN FLOOD -------50-YR
DESIGN HIGH WATER ----------316.2
DRAINAGE AREA ----------19.9 SQ MI
BASIC DISCHARGE (Q100)----------5500 CFS
BASIC HIGH WATER ELEVATION------316.7

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE ----------14600 CFS
FREQUENCY OF OVERTOPPING FLOOD --->500-YR
OVERTOPPING FLOOD ELEVATION ------324.7
LOW POINT @ STA. 132+85.33 -L-

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS.

STA. 133+83 -L-
(END BENT 1)

CLASS II RIP RAP
(2'-0" THICK)
(TYP.)

121'-5"
TOTAL LENGTH OF BRIDGE (FILL FACE TO FILL FACE)

56'-6 5/16"

64'-10 11/16"

ROBESON CREEK

STA. 135+91 -L-
(END BENT 2)

FILL FACE @ END BENT 1

FILL FACE @ END BENT 2

W.P. #1L
STA. 134+08.47 -L-

W.P. #2L
STA. 135+29.89 -L-

TO SR 1012
(MONCURE PITTSBORO RD)

BEGIN APPROACH SLAB
STA. 133+84.36 -L-

BRIDGE WORK LINE
(LEFT LANE)

BEGIN FRONT SLOPE
STA. 135+43.07 -L-

END APPROACH SLAB
STA. 135+54.00 -L-

-L-

11'-6"

N 30° 26' 47.8"E

BEGIN FRONT SLOPE
STA. 133+95.19 -L-

110°00'00" (TYP.)

BRIDGE I.D.
STA. 134+65.00 -L-

1'-0" MIN. EARTH BERM
EL. 314.36' (LEVEL)

1'-0" MIN. EARTH BERM
EL. 315.38' (LEVEL)

TO BUS US 64

PLAN
PILES NOT SHOWN IN PLAN VIEW FOR CLARITY.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS
3/20/2025

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

SHEET 1 OF 4 BRIDGE NO. 180541

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER ROBESON CREEK
ON SR 2700 (CHATHAM PARK WAY)
BETWEEN
SR 1012 AND BUS US 64

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-1
1			3			TOTAL SHEETS
2			4			35

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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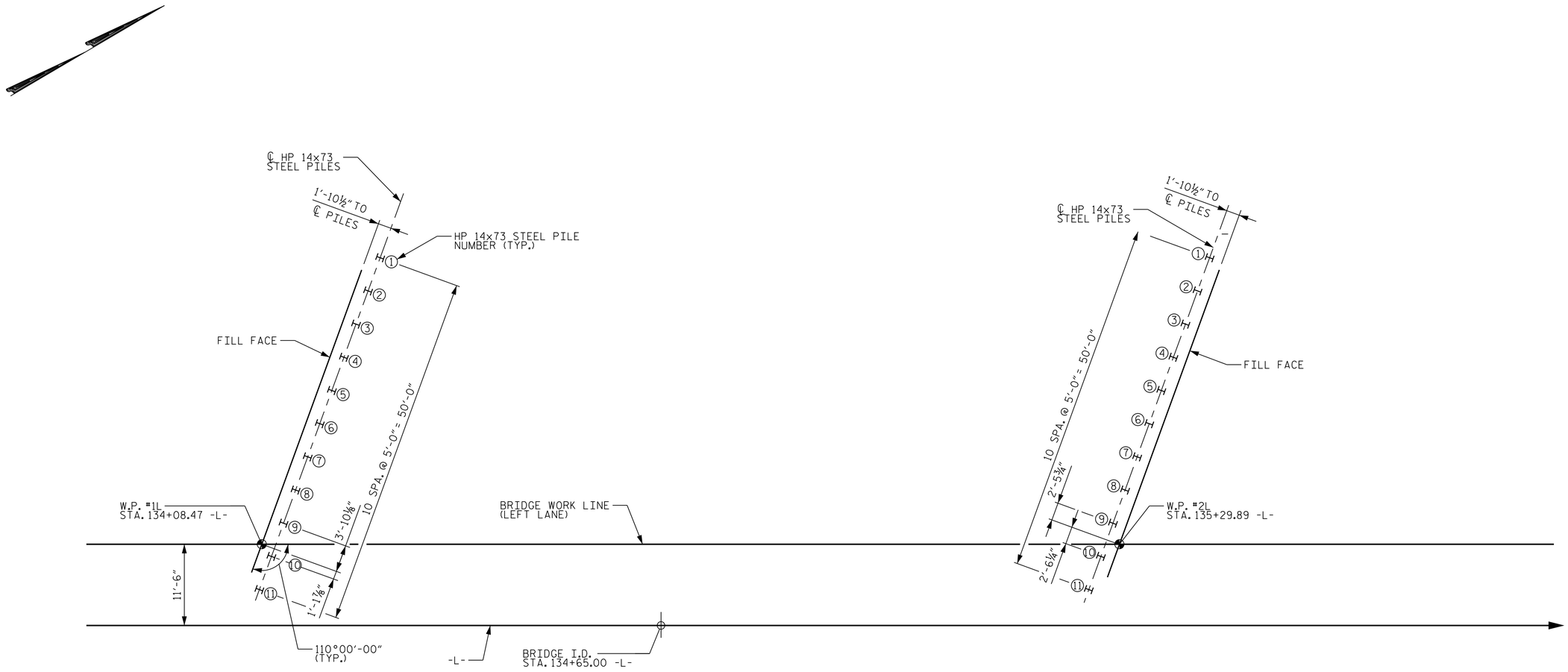
3/18/2025 K:\RDT_Structures_Bridge\NC\01036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_G01_180541.dgn

BRIDGE 2L



END BENT 1
INTEGRAL

SPAN A

END BENT 2
INTEGRAL

FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE)

NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

FILL HOLES FOR PILE EXCAVATION AT END BENT NO. 2 PILES 1-5 WITH CONCRETE OR GROUT.

BEFORE FILLING HOLES FOR PILE EXCAVATION AT END BENT NO. 2 PILES 1-5, DRIVE PILES TO THE REQUIRED DRIVING RESISTANCE.

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_FLL_180541.dgn
3/18/2025

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

SHEET 2 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS
3/20/2025

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Raleigh, NC 27601-1772
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER ROBESON CREEK
ON SR 2700 (CHATHAM PARK WAY)
BETWEEN
SR 1012 AND BUS US 64

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-2
1			3			TOTAL SHEETS
2			4			35

BRIDGE 2L

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Number of Piles per Line	Factored Resistance per Pile KIPS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles **			Drilled-In Piles		
						Minimum Pile Tip (Tip No Higher Than) Elevation FT	Required Driving Resistance (RDR)* per pile KIPS	Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elevation Not To Predrill Below) FT	Maximum Predrilling Diameter INCHES	Pile Excavation (Bottom of Hole) Elevation FT	Pile Excavation Not In Soil per Pile LIN FT	Pile Excavation In Soil per Pile LIN FT
End Bent No. 1 (Piles 1-5)	5	220	See Substructure Plans	20			390							
End Bent No. 1 (Piles 6-11)	6	220	See Substructure Plans	20			380							
End Bent No. 2 (Piles 1-5)	5	220	See Substructure Plans	15			370					306.00	3.7	6.7
End Bent No. 2 (Piles 6-11)	6	220	See Substructure Plans	25			370							
TOTAL QUANTITY:													18.5	33.5

$$^{*}RDR = \frac{Factored\ Resistance\ +\ Factored\ Drag\ Load\ +\ Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Drag\ Load\ Resistance + Nominal\ Resistance\ from\ Scourable\ Material$$

** Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile KIPS	Factored Drag Load per Pile KIPS	Factored Dead Load * per Pile KIPS	Dynamic Resistance Factor	Nominal Drag Resistance per Pile KIPS	Nominal Scour Resistance per Pile KIPS
End Bent No. 1 (Piles 1-5)	220	6.25		0.60	5	
End Bent No. 1 (Piles 6-11)	220	5		0.60	4	
End Bent No. 2 (Piles 1-11)	220			0.60		

* Factored Dead Load is factored weight of pile above the ground line.

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates EACH	Steel Pile Points		
		Pipe Pile Cutting Shoes EACH	Pipe Pile Conical Points EACH	H-Pile Points EACH
End Bent No. 1 (Piles 1-11)				11
End Bent No. 2 (Piles 1-11)				11
TOTAL QUANTITY:				22

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Kelly de Montbrun, #045542) on 01-13-2025.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
PILE FOUNDATION TABLES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-3
1			3			TOTAL SHEETS
2			4			35

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

SHEET 3 OF 4

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BRIDGE 2L

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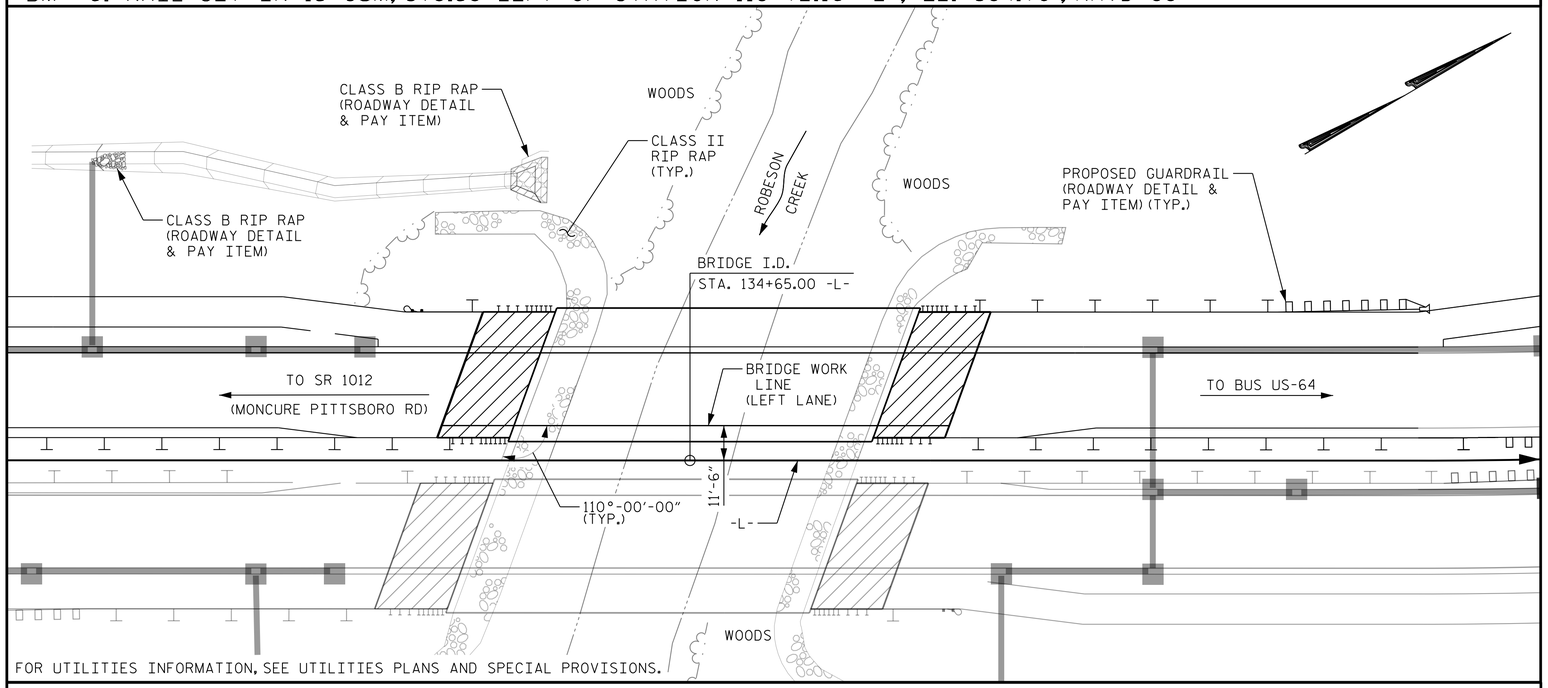
3/18/2025



LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 11'-6" RIGHT AND 50'-0" LEFT OF BRIDGE WORKLINE (LEFT LANE) AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THIS STRUCTURE WAS EVALUATED WITH "HEC-18 EVALUATING SCOUR AT BRIDGES."

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18- EVALUATING SCOUR AT BRIDGES."

TOTAL BILL OF MATERIAL

	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	FIB 54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 14x73 STEEL PILES	HP 14x73 STEEL PILES		STEEL PILE POINTS	TWO BAR METAL RAIL	CONCRETE BARRIER RAIL	1'-2" X 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	LIN. FT.	LIN. FT.	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	EA.	NO.	LIN. FT.	EA.	LIN. FT.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE				5,434	5,938		LUMP SUM		5	589.79					112.1	289.3	119.6			LUMP SUM
END BENT 1						40.2		5,725			11	11	220	11				210	234	
END BENT 2	33.5	18.5	LUMP SUM			40.3		5,729			11	11	225	11				280	312	
TOTAL	33.5	18.5	LUMP SUM	5,434	5,938	80.5	LUMP SUM	11,454	5	589.79	22	22	445	22	112.1	289.3	119.6	490	546	LUMP SUM

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L PHILLIPS
3/20/2025

Kimley»Horn
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NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER ROBESON CREEK
ON SR 2700 (CHATHAM PARK WAY)
BETWEEN
SR 1012 AND BUS US 64

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-4
1			3			TOTAL SHEETS
2			4			35

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_CD2_180541.dgn

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.04	--	1.75	0.870	1.33	A	E	58.270	0.920	1.04	A	I	11.654	0.80	0.870	1.15	A	E	58.270	
		HL-93 (OPERATING)	N/A		1.38	--	1.35	0.870	1.92	A	E	58.270	0.920	1.38	A	I	11.654	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.48	53.28	1.75	0.870	1.72	A	E	58.270	0.920	1.48	A	I	11.654	0.80	0.870	1.67	A	E	58.270	
		HS-20 (OPERATING)	36.000		1.96	70.56	1.35	0.870	2.49	A	E	58.270	0.920	1.96	A	I	11.654	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		4.04	54.54	1.40	0.870	5.81	A	E	58.270	0.920	4.86	A	I	11.654	0.80	0.870	4.04	A	E	58.270	
		SNGARBS2	20.000		2.89	57.80	1.40	0.870	4.16	A	E	58.270	0.920	3.35	A	I	11.654	0.80	0.870	2.89	A	E	58.270	
		SNAGRIS2	22.000		2.69	59.18	1.40	0.870	3.87	A	E	58.270	0.920	3.07	A	I	11.654	0.80	0.870	2.69	A	E	58.270	
		SNCOTTS3	27.250		2.01	54.77	1.40	0.870	2.89	A	E	58.270	0.920	2.36	A	I	11.654	0.80	0.870	2.01	A	E	58.270	
		SNAGGRS4	34.925		1.63	56.93	1.40	0.870	2.35	A	E	58.270	0.920	1.89	A	I	11.654	0.80	0.870	1.63	A	E	58.270	
		SNS5A	35.550		1.60	56.88	1.40	0.870	2.30	A	E	58.270	0.920	1.89	A	I	11.654	0.80	0.870	1.60	A	E	58.270	
		SNS6A	39.950		1.45	57.93	1.40	0.870	2.08	A	E	58.270	0.920	1.70	A	I	11.654	0.80	0.870	1.45	A	E	58.270	
		SNS7B	42.000		1.38	57.96	1.40	0.870	1.98	A	E	58.270	0.920	1.64	A	I	11.654	0.80	0.870	1.38	A	E	58.270	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.76	58.08	1.40	0.870	2.53	A	E	58.270	0.920	2.06	A	I	11.654	0.80	0.870	1.76	A	E	58.270	
		TNT4A	33.075		1.76	58.21	1.40	0.870	2.54	A	E	58.270	0.920	2.02	A	I	11.654	0.80	0.870	1.76	A	E	58.270	
		TNT6A	41.600		1.43	59.49	1.40	0.870	2.05	A	E	58.270	0.920	1.71	A	I	11.654	0.80	0.870	1.43	A	E	58.270	
		TNT7A	42.000		1.42	59.64	1.40	0.870	2.05	A	E	58.270	0.920	1.68	A	I	11.654	0.80	0.870	1.42	A	E	58.270	
		TNT7B	42.000		1.45	60.90	1.40	0.870	2.09	A	E	58.270	0.920	1.62	A	I	11.654	0.80	0.870	1.45	A	E	58.270	
		TNAGRIT4	43.000		1.40	60.20	1.40	0.870	2.01	A	E	58.270	0.920	1.57	A	I	11.654	0.80	0.870	1.40	A	E	58.270	
		TNAGT5A	45.000	3	1.32	59.40	1.40	0.870	1.90	A	E	58.270	0.920	1.53	A	I	11.654	0.80	0.870	1.32	A	E	58.270	
		TNAGT5B	45.000		1.32	59.40	1.40	0.870	1.89	A	E	58.270	0.920	1.49	A	I	11.654	0.80	0.870	1.32	A	E	58.270	
EMERGENCY VEHICLE (EV)		EV2	28.750		2.03	58.36	1.30	0.870	3.15	A	E	58.270	0.920	2.49	A	I	11.654	0.80	0.870	2.03	A	E	58.270	
		EV3	43.000	4	1.34	57.62	1.30	0.870	2.08	A	E	58.270	0.920	1.64	A	I	11.654	0.80	0.870	1.34	A	E	58.270	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γDC	γDW
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

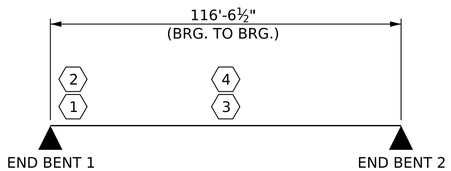
1.

2.

3.

4.

(#) CONTROLLING LOAD RATING
(1) DESIGN LOAD RATING (HL-93)
(2) DESIGN LOAD RATING (HS-20)
(3) LEGAL LOAD RATING * *
(4) EMERGENCY VEHICLE LOAD RATING **
* * SEE CHART FOR VEHICLE TYPE
GIRDER LOCATION
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-5
1			3			TOTAL SHEETS
2			4			35

ASSEMBLED BY : T. K. BOYD	DATE : 01/2025	
CHECKED BY : R.M. KROL	DATE : 01/2025	
DRAWN BY : MAA 1/08	REV. 11/12/08RR	MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11	MAA/GM
	REV. 04/23	BNB/AAI

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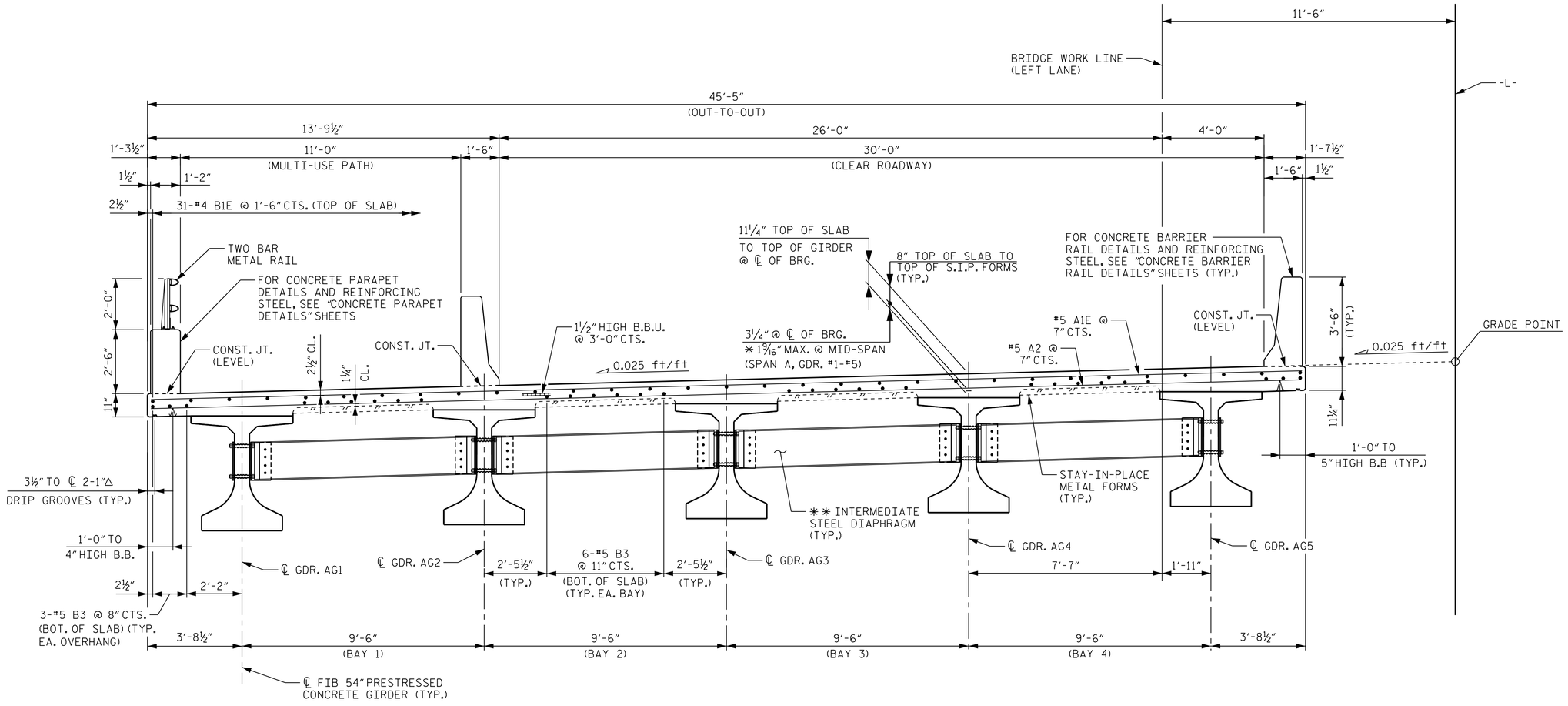

TYPICAL SECTION

(SHOWING INTERMEDIATE DIAPHRAGM)

* BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS

NOTES

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

** FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 54" FIB" SHEET.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-6
1			3			TOTAL SHEETS
2			4			35

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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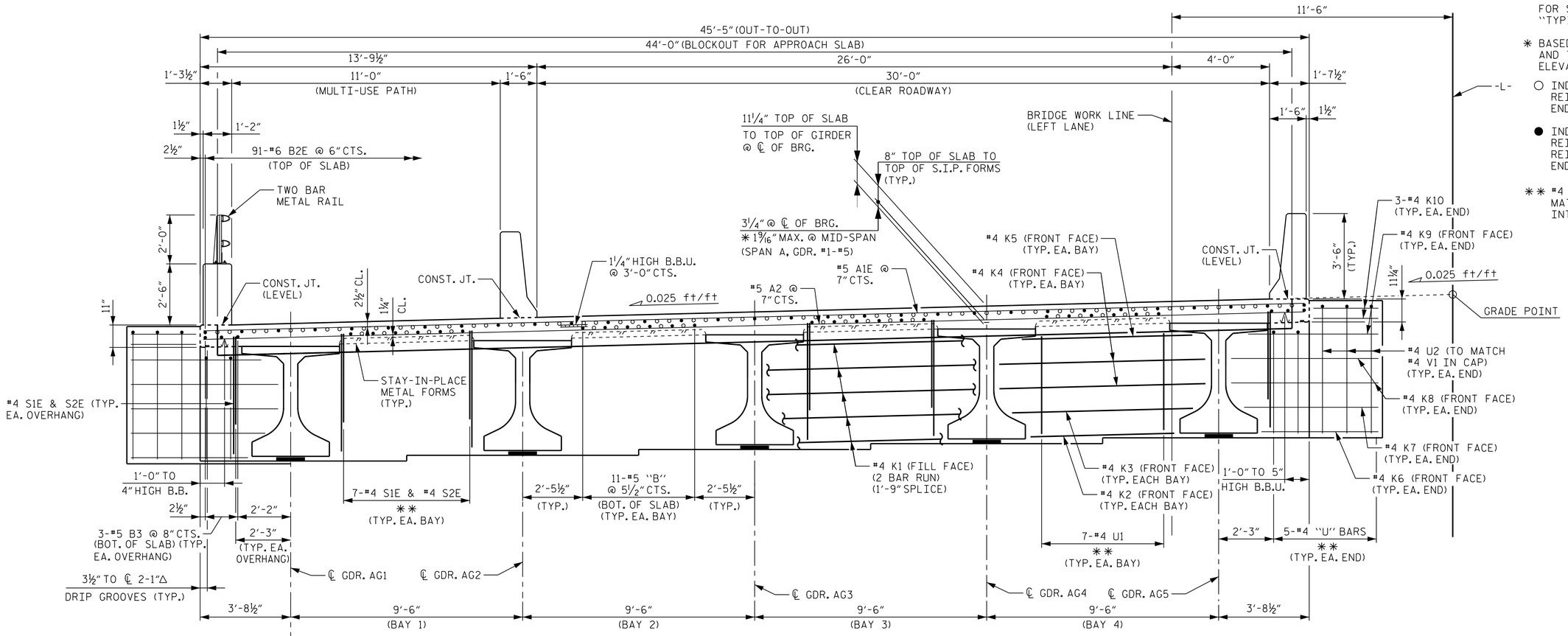
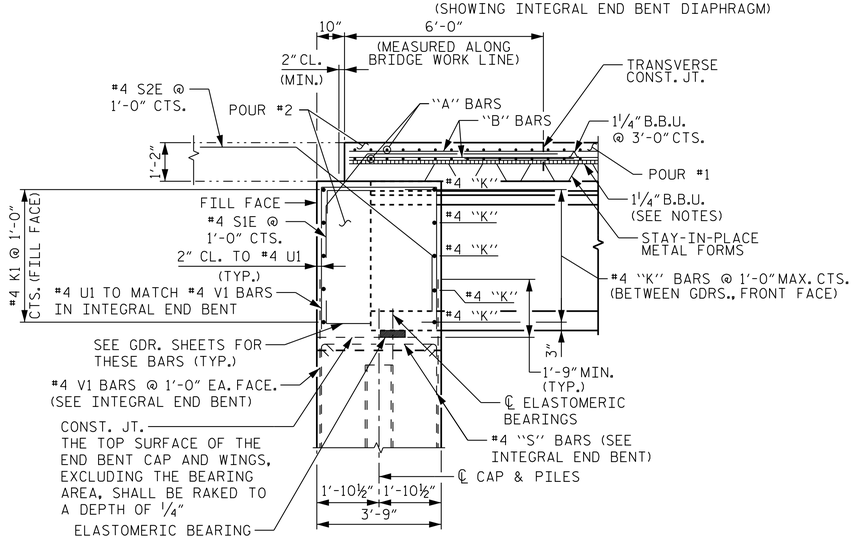


TYPICAL SECTION

(SHOWING INTEGRAL END BENT DIAPHRAGM)



SECTION THRU INTEGRAL END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

NOTES

FOR SUPERSTRUCTURE NOTES, SEE "TYPICAL SECTION" SHEET 1 OF 2.

* BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

○ INDICATES NON-CONTINUOUS REINFORCING STEEL OVER INTEGRAL END BENT.

● INDICATES CONTINUOUS REINFORCING STEEL SPLICED WITH REINFORCING STEEL OVER INTEGRAL END BENT

** #4 S1E, #4 S2E, AND #4 U1 BARS TO MATCH WITH THE #4 "V" BARS IN INTEGRAL END BENT CAP

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

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NC LICENSE # F-0102

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-7
1			3			TOTAL SHEETS
2			4			35

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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BRIDGE 2L

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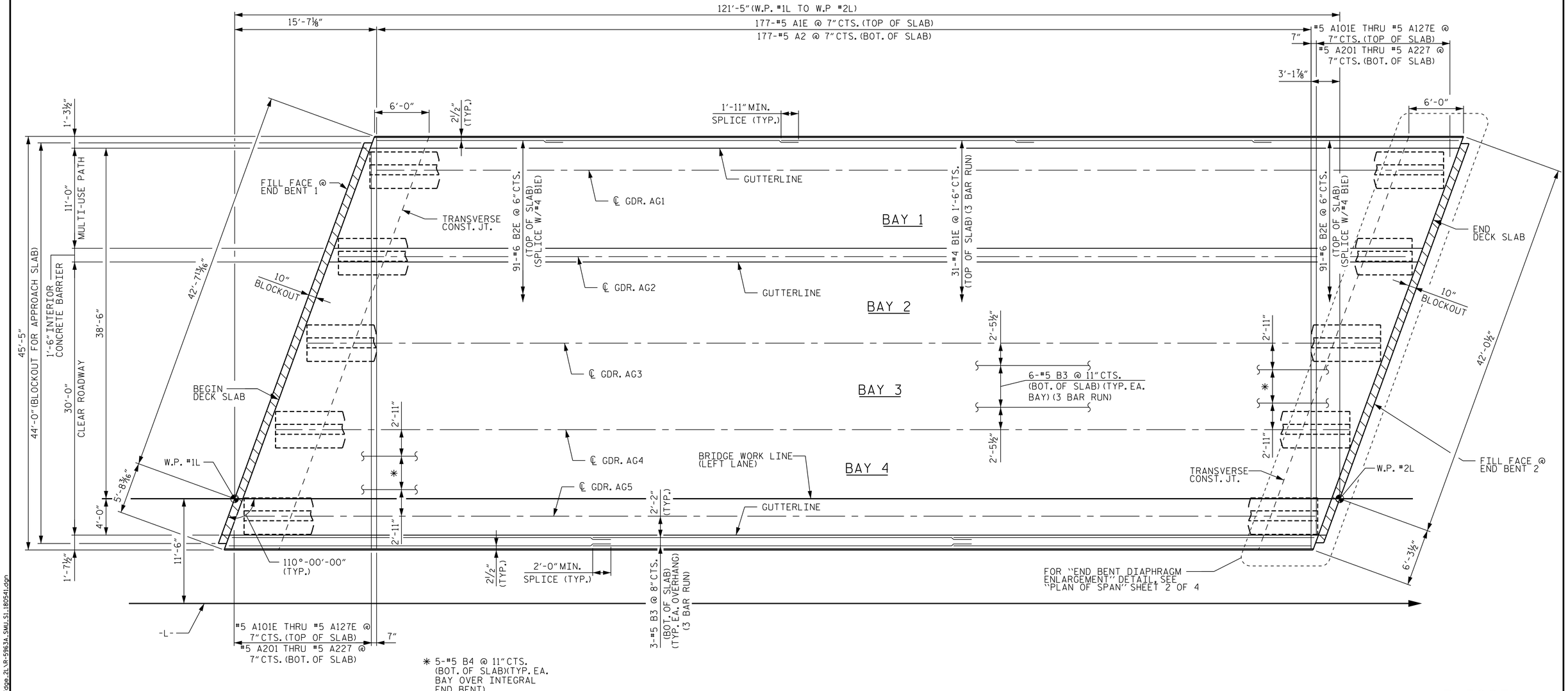

PLAN OF SPAN

NOTES:

FOR NOTES SEE "PLAN OF SPAN" SHEET 2 OF 4.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-8
1			3			TOTAL SHEETS
2			4			35

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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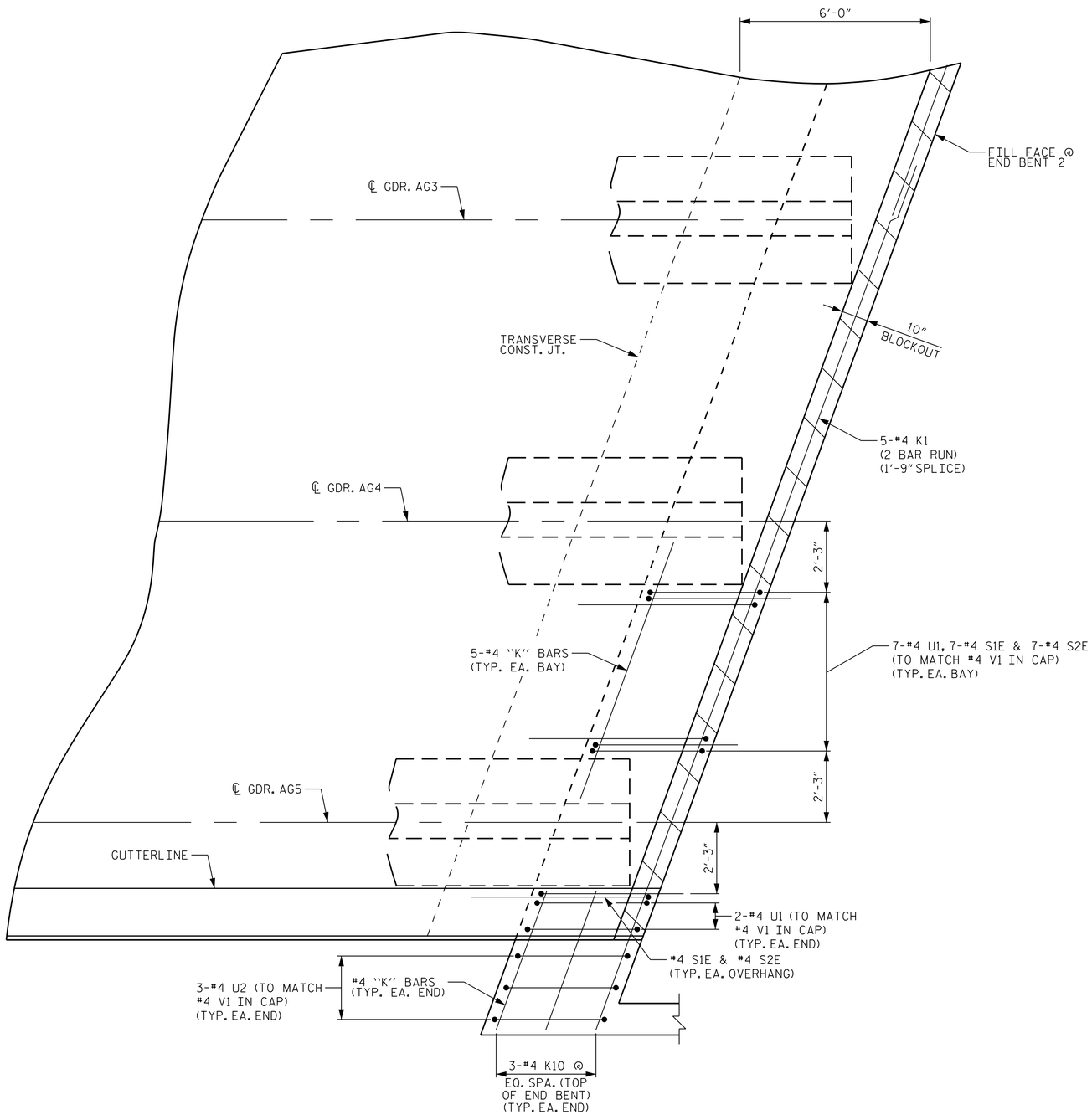
3/18/2025

BRIDGE 2L



END BENT DIAPHRAGM ENLARGEMENT

(END BENT 2 SHOWN, END BENT 1 SIMILAR)

NOTES:

FOR POUR SEQUENCE AND LOCATION OF CONSTRUCTION JOINTS, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

FOR CONCRETE BARRIER RAIL REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL DETAILS" SHEET.

FOR CONCRETE PARAPET REINFORCING STEEL, SEE "CONCRETE PARAPET DETAILS" SHEET.

INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY, SEE "FRAMING PLAN" SHEET.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

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NC LICENSE # F-0102

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-9
1			3			TOTAL SHEETS
2			4			35

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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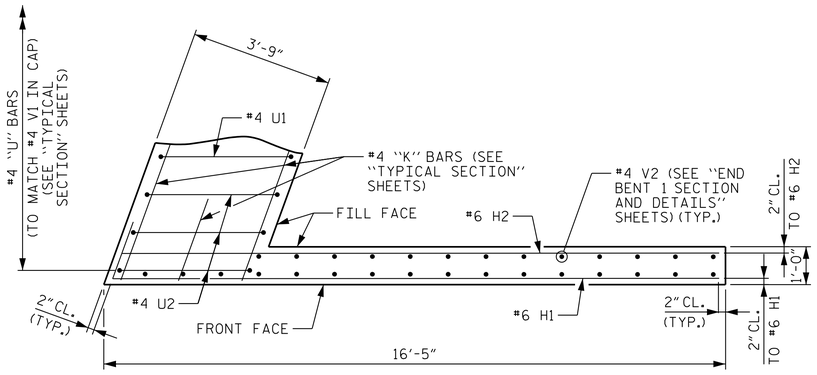
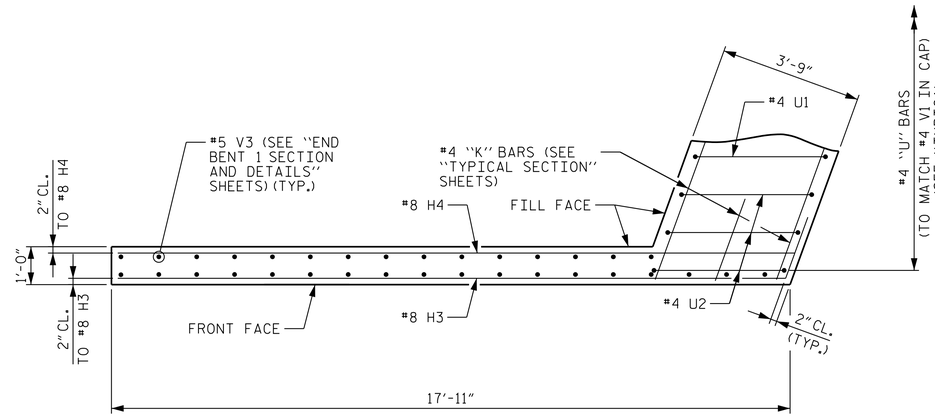
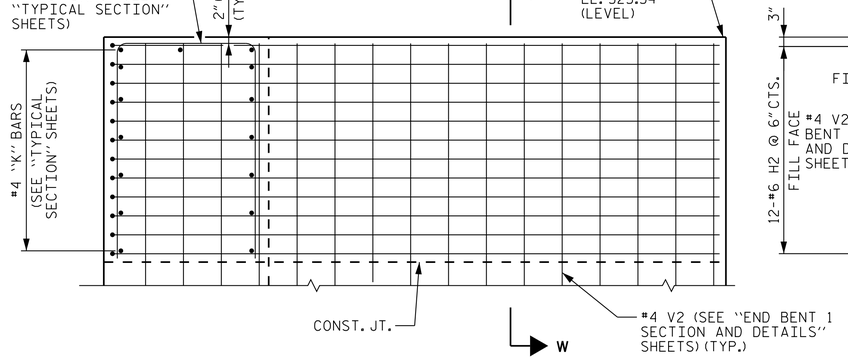
BRIDGE 2L



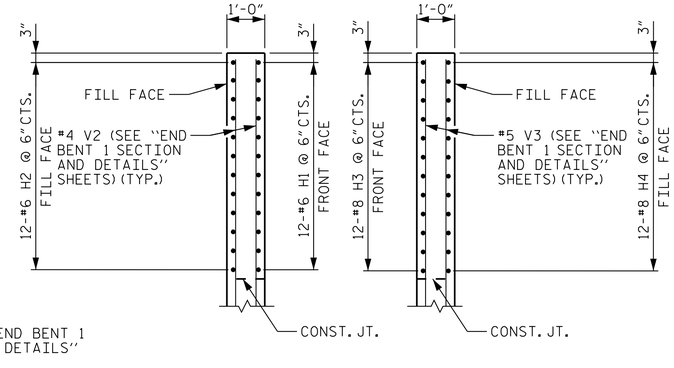
PLAN OF WING W1



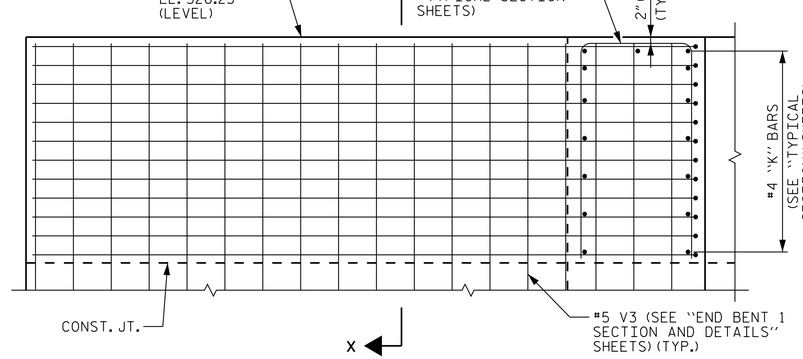
PLAN OF WING W2



ELEVATION OF WING W1



SECTION W-W SECTION X-X



ELEVATION OF WING W2

UPPER WINGS AT INTEGRAL END BENT 1

FOR LOWER WING REINFORCING STEEL AND DETAILS, SEE "END BENT 1 SECTION AND DETAILS" SHEETS

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN DETAILS @ END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-10
1			3			TOTAL SHEETS
2			4			35

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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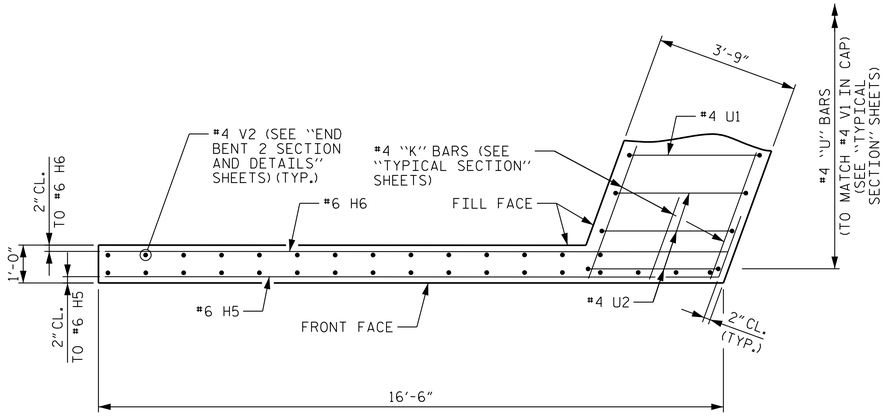
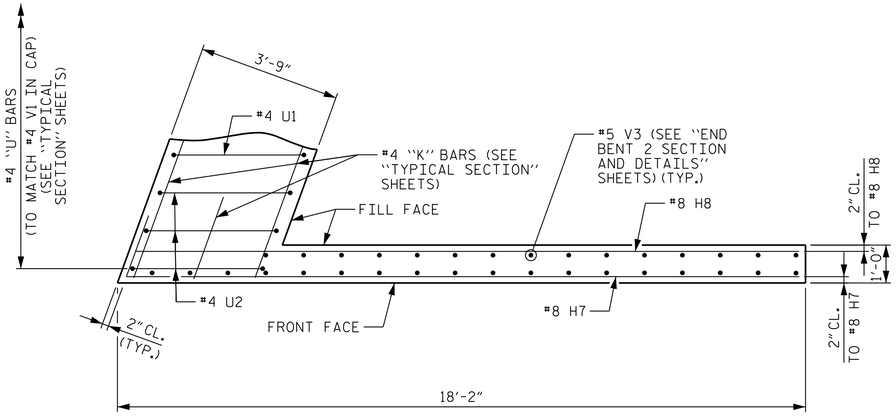
BRIDGE 2L

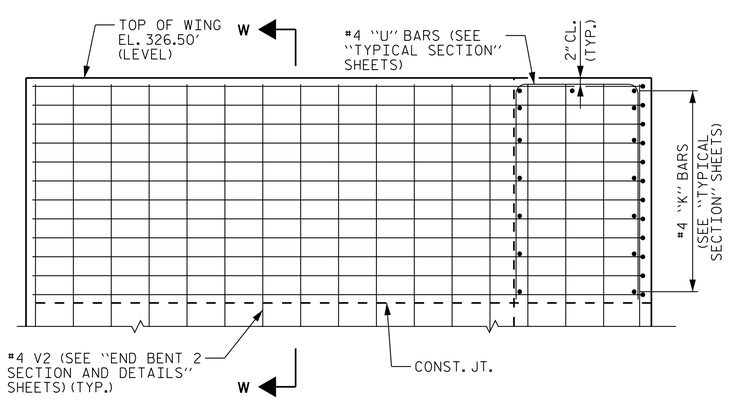
3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_S3_180541.dgn



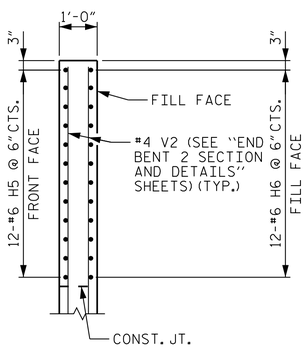
PLAN OF WING W3



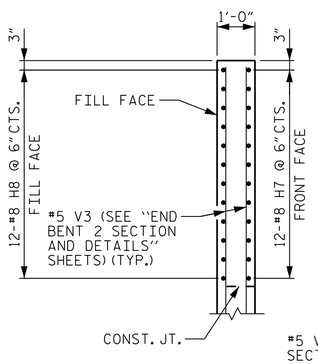
PLAN OF WING W4



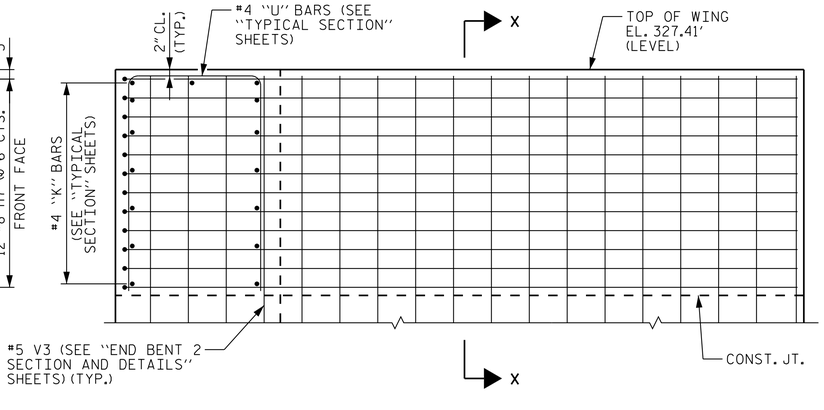
ELEVATION OF WING W3



SECTION W-W



SECTION X-X



ELEVATION OF WING W4

UPPER WINGS AT INTEGRAL END BENT 2

FOR LOWER WING REINFORCING STEEL AND DETAILS, SEE "END BENT 2 SECTION AND DETAILS" SHEETS

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN
DETAILS @ END BENT 2

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421 Fayetteville Street, Suite 600
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Phone (919) 677-2000
NC LICENSE # F-0102

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-11
1			3			TOTAL SHEETS
2			4			35

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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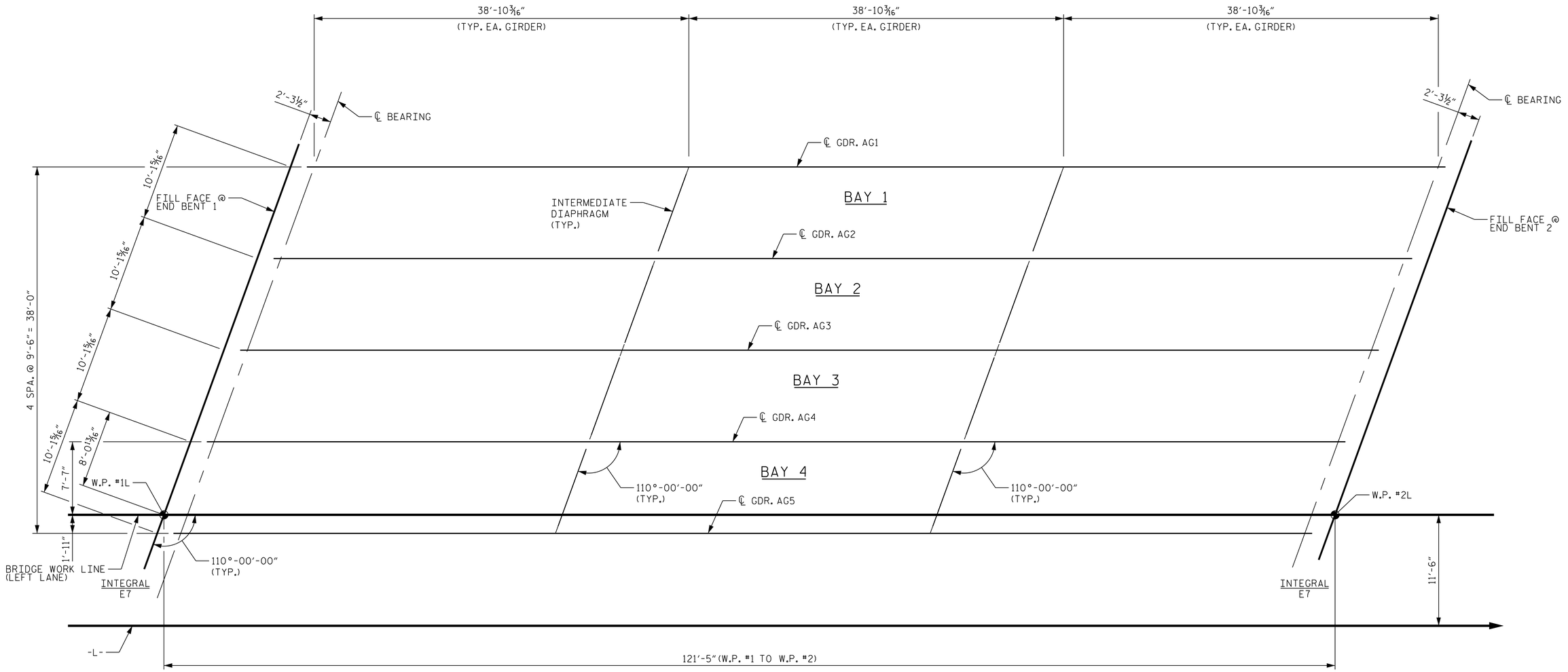
BRIDGE 2L

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_S4_180541.dgn

NOTES

FOR STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 54"F.I.B." SHEET.



FRAMING PLAN

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

NORTH CAROLINA ENGINEERING SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-12
1			3			TOTAL SHEETS
2			4			35

DRAWN BY: T. K. BOYD DATE: 01/2025
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DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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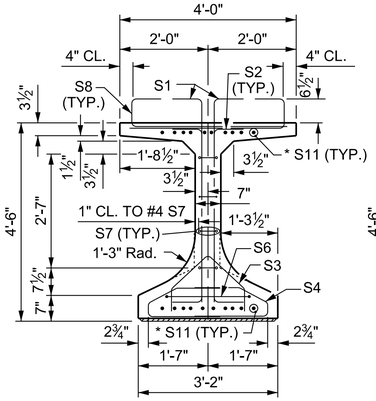
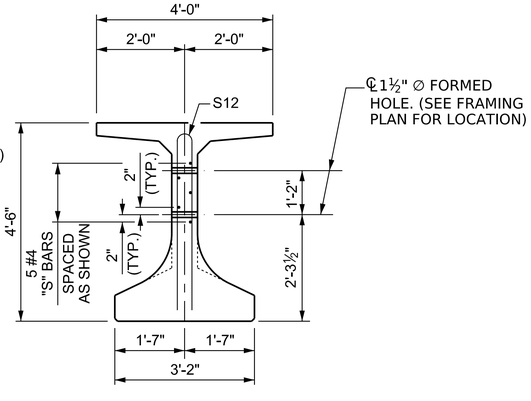


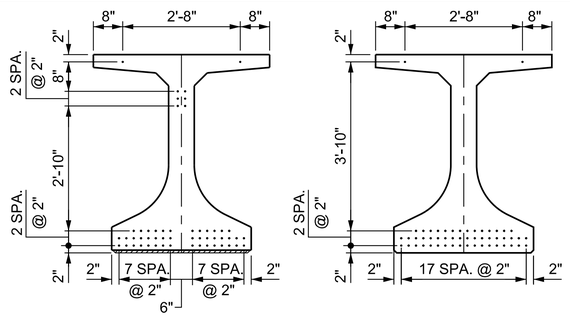
SECTION A-A

* FOR S11 BARS, SEE DETAIL "A" ON SHEET 2 OF 3



SECTION C-C

(S8 AND S10 BARS NOT SHOWN)



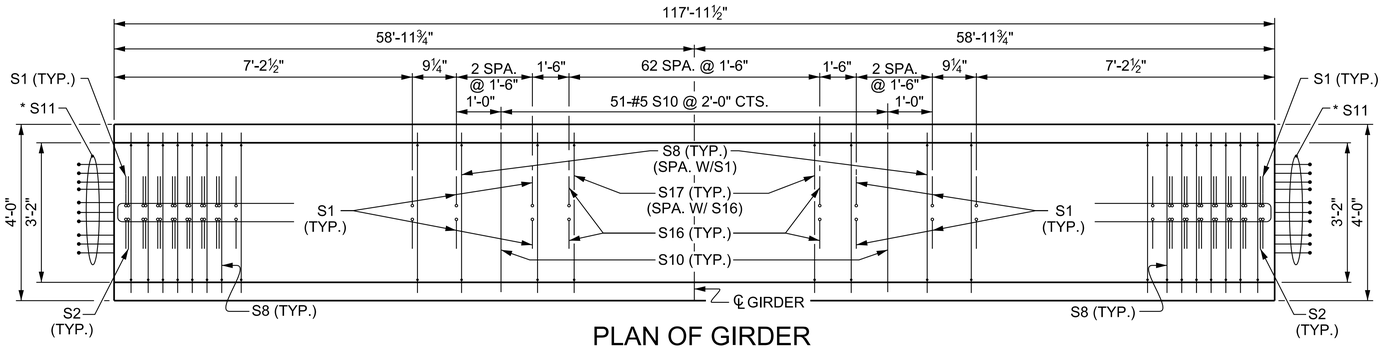
AT END OF GIRDER

AT ℄ OF GIRDER

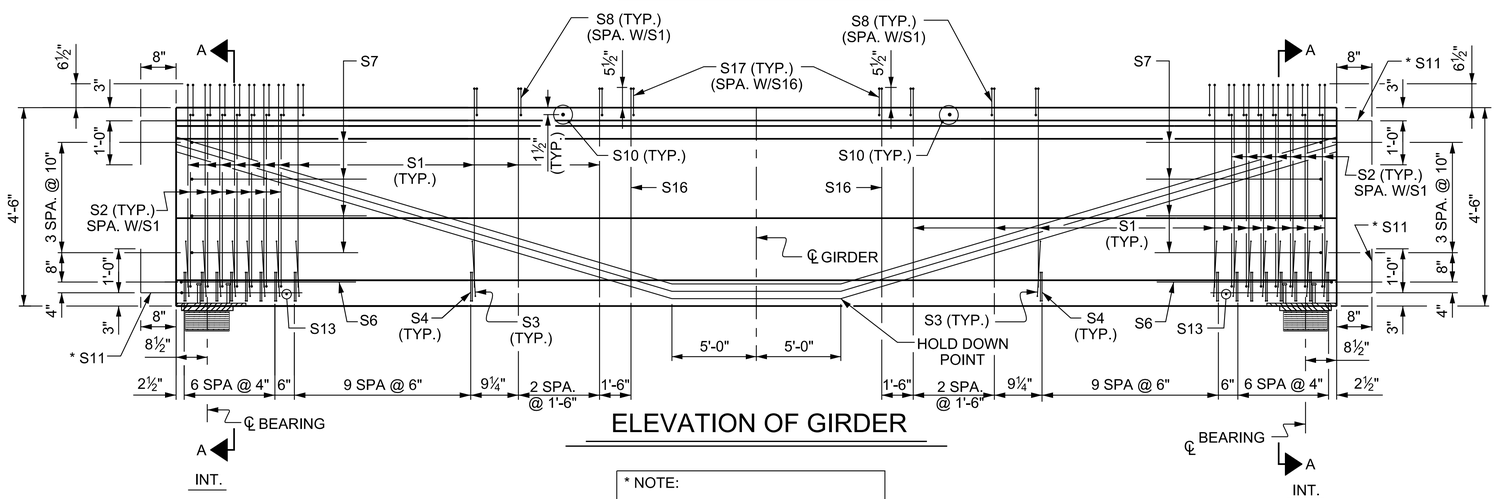
0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- FULLY BONDED STRANDS



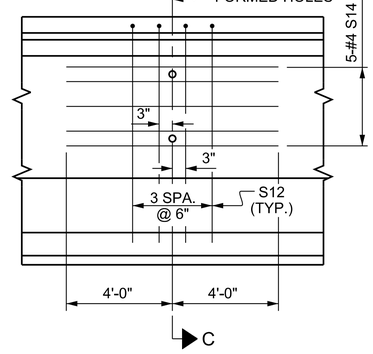
PLAN OF GIRDER



ELEVATION OF GIRDER

* NOTE:

S11 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-5

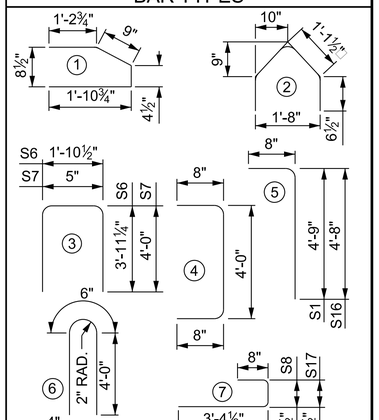
0.6"Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	80	#6	5	5'-5"	651
S2	28	#6	4	5'-4"	224
S3	34	#3	2	3'-4"	43
S4	68	#3	1	4'-3"	109
S6	2	#5	3	9'-9"	20
S7	8	#4	3	8'-5"	45
S8	80	#5	7	4'-8"	389
S10	51	#5	STR	3'-8"	195
* S11	40	#6	STR	4'-8"	280
S12	8	#5	6	8'-6"	71
S13	2	#3	STR	2'-10"	2
S14	10	#4	STR	8'-0"	53
S16	126	#5	5	5'-4"	701
S17	126	#5	7	4'-7"	602

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

REINFORCING STEEL	9,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
3,385	28.3	52

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	117'-11½"	589'-9½"

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

54" FIB PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-13
1			3			TOTAL SHEETS
2			4			35

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ASSEMBLED BY : T. K. BOYD	DATE : 01/2025
CHECKED BY : R.M. KROL	DATE : 01/2025
DRAWN BY : BNB 9/21	
CHECKED BY : AAI 9/22	

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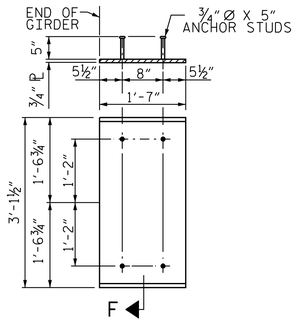
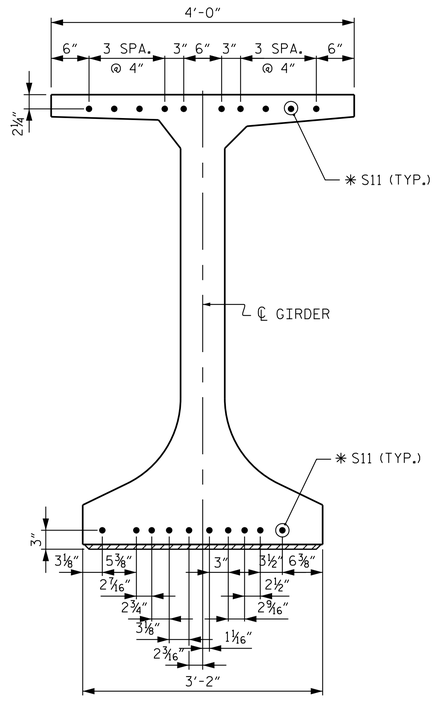
BRIDGE 2L STD. NO. FIB54

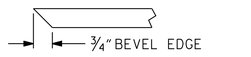


EMBEDDED PLATE ''B-1'' DETAILS FOR FIB GIRDER

(2 REQ'D PER GIRDER)



DETAIL ''A''



SECTION ''F''

(SEE NOTES)

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUB SECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,000 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF ¼".

WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN ½" OF THE THEORETICAL LOCATION SHOWN.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-14
1			3			TOTAL SHEETS
2			4			35

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Phone (919) 677-2000
NC LICENSE # F-0102

ASSEMBLED BY : T. K. BOYD	DATE : 01/2025		
CHECKED BY : R.M. KROL	DATE : 01/2025		
DRAWN BY : BNB 9/21			
CHECKED BY : AAI 9/22			

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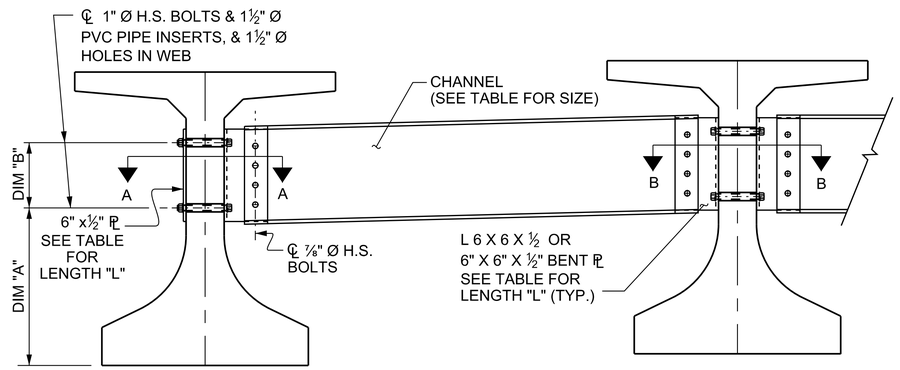
3/18/2025

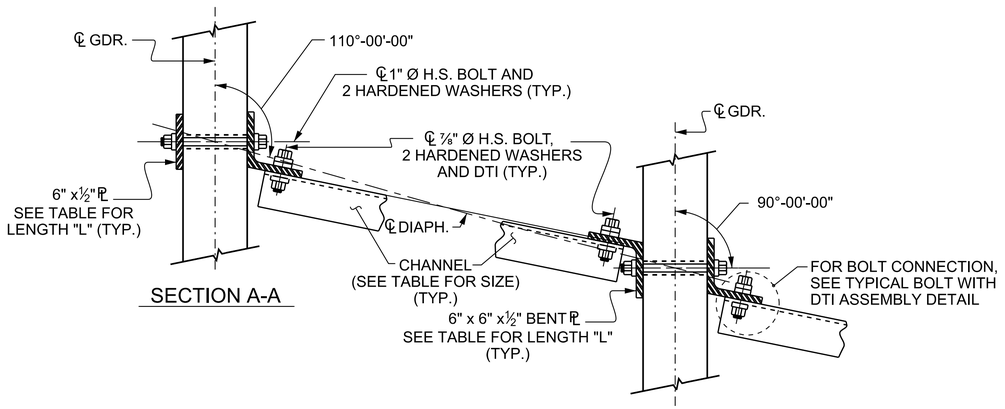
BRIDGE 2L STD. NO. FIB54



EXTERIOR GIRDER

INTERIOR GIRDER

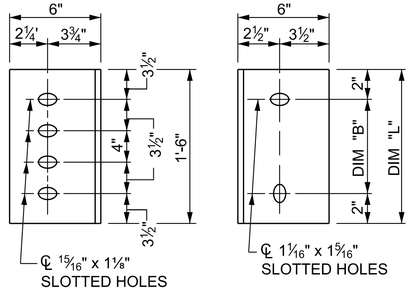
PART SECTION AT INTERMEDIATE DIAPHRAGM



SECTION A-A

SECTION B-B

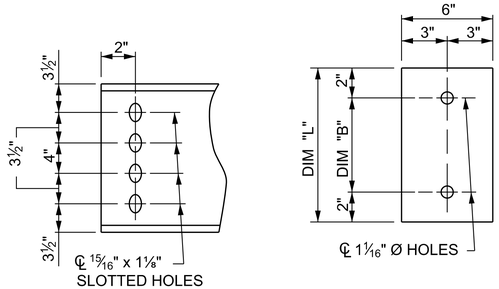
CONNECTION DETAILS



DIAPHRAGM FACE

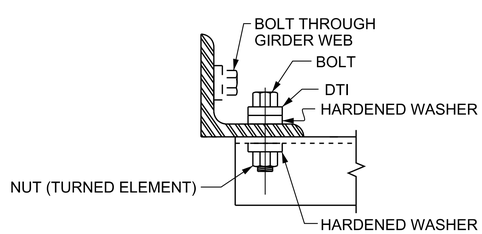
WEB FACE

CONNECTOR PLATE DETAILS



CHANNEL END

PLATE DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE ANGLE MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

THE PLATES, BENT PLATES, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
54" FIB	MC 18 x 42.7	2'-3½"	1'-2"	1'-6"

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
INTERMEDIATE
STEEL DIAPHRAGMS
FOR 54"FIB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-15
1			3			TOTAL SHEETS
2			4			35

ASSEMBLED BY : T. K. BOYD	DATE : 01/2025
CHECKED BY : R.M. KROL	DATE : 01/2025
DRAWN BY : BNB 1/21	
CHECKED BY : AAI 1/21	

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BRIDGE 2LSTD.NO.FIB 54

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DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER AG1

FORTIETH POINTS	BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.036	0.073	0.109	0.145	0.172	0.199	0.226	0.252	0.271	0.289	0.308	0.326	0.337	0.348	0.359	0.370	0.373	0.377	0.380	0.384	0.380	0.377	0.373	0.370	0.359	0.348	0.337	0.326	0.308	0.289	0.271	0.252	0.226	0.199	0.172	0.145	0.109	0.073	0.036	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.018	0.037	0.055	0.074	0.091	0.108	0.126	0.143	0.157	0.170	0.184	0.197	0.206	0.215	0.223	0.232	0.235	0.238	0.241	0.244	0.241	0.238	0.235	0.232	0.223	0.215	0.206	0.197	0.184	0.170	0.157	0.143	0.126	0.108	0.091	0.074	0.055	0.037	0.018	0.000
FINAL CAMBER ↑	0	3/16"	7/16"	5/8"	7/8"	1"	1 1/16"	1 3/16"	1 5/16"	1 3/8"	1 7/16"	1 1/2"	1 9/16"	1 9/16"	1 5/8"	1 5/8"	1 5/8"	1 11/16"	1 11/16"	1 11/16"	1 11/16"	1 11/16"	1 11/16"	1 11/16"	1 5/8"	1 5/8"	1 5/8"	1 9/16"	1 9/16"	1 1/2"	1 7/16"	1 3/8"	1 5/16"	1 3/16"	1 1/16"	1"	7/8"	5/8"	7/16"	3/16"	0

GIRDERS AG2 & AG3

FORTIETH POINTS	BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.036	0.073	0.109	0.145	0.172	0.199	0.226	0.252	0.271	0.289	0.308	0.326	0.337	0.348	0.359	0.370	0.373	0.377	0.380	0.384	0.380	0.377	0.373	0.370	0.359	0.348	0.337	0.326	0.308	0.289	0.271	0.252	0.226	0.199	0.172	0.145	0.109	0.073	0.073	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.020	0.040	0.060	0.079	0.098	0.117	0.136	0.154	0.169	0.184	0.198	0.213	0.222	0.232	0.241	0.250	0.253	0.257	0.260	0.263	0.260	0.257	0.253	0.250	0.241	0.232	0.222	0.213	0.198	0.184	0.169	0.154	0.136	0.117	0.098	0.079	0.060	0.040	0.040	0.000
FINAL CAMBER ↑	0	3/16"	3/8"	5/8"	13/16"	7/8"	1"	1 1/16"	1 3/16"	1 1/4"	1 1/4"	1 5/16"	1 3/8"	1 3/8"	1 3/8"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 3/8"	1 3/8"	1 3/8"	1 5/16"	1 1/4"	1 1/4"	1 3/16"	1 1/16"	1"	7/8"	13/16"	5/8"	3/8"	3/8"	0

GIRDER AG4

FORTIETH POINTS	BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.036	0.073	0.109	0.145	0.172	0.199	0.226	0.252	0.271	0.289	0.308	0.326	0.337	0.348	0.359	0.370	0.373	0.377	0.380	0.384	0.380	0.377	0.373	0.370	0.359	0.348	0.337	0.326	0.308	0.289	0.271	0.252	0.226	0.199	0.172	0.145	0.109	0.073	0.073	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.019	0.037	0.056	0.075	0.092	0.110	0.127	0.145	0.159	0.173	0.187	0.200	0.209	0.218	0.227	0.236	0.239	0.242	0.245	0.248	0.245	0.242	0.239	0.236	0.227	0.218	0.209	0.200	0.187	0.173	0.159	0.145	0.127	0.110	0.092	0.075	0.056	0.037	0.037	0.000
FINAL CAMBER ↑	0	3/16"	7/16"	5/8"	7/8"	15/16"	1 1/16"	1 3/16"	1 5/16"	1 5/16"	1 3/8"	1 7/16"	1 1/2"	1 9/16"	1 9/16"	1 9/16"	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 9/16"	1 9/16"	1 9/16"	1 1/2"	1 7/16"	1 3/8"	1 5/16"	1 5/16"	1 3/16"	1 1/16"	15/16"	7/8"	5/8"	7/16"	7/16"	0

GIRDER AG5

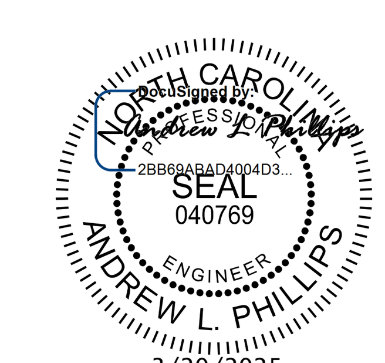
FORTIETH POINTS	BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.036	0.073	0.109	0.145	0.172	0.199	0.226	0.252	0.271	0.289	0.308	0.326	0.337	0.348	0.359	0.370	0.373	0.377	0.380	0.384	0.380	0.377	0.373	0.370	0.359	0.348	0.337	0.326	0.308	0.289	0.271	0.252	0.226	0.199	0.172	0.145	0.109	0.073	0.073	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.018	0.036	0.054	0.072	0.089	0.106	0.123	0.140	0.153	0.167	0.180	0.193	0.202	0.210	0.219	0.227	0.230	0.233	0.236	0.239	0.236	0.233	0.230	0.227	0.219	0.210	0.202	0.193	0.180	0.167	0.153	0.140	0.123	0.106	0.089	0.072	0.054	0.036	0.036	0.000
FINAL CAMBER ↑	0	1/4"	7/16"	11/16"	7/8"	1"	1 1/8"	1 1/4"	1 3/8"	1 7/16"	1 1/2"	1 9/16"	1 5/8"	1 5/8"	1 5/8"	1 11/16"	1 11/16"	1 11/16"	1 3/4"	1 3/4"	1 3/4"	1 3/4"	1 3/4"	1 11/16"	1 11/16"	1 11/16"	1 5/8"	1 5/8"	1 5/8"	1 9/16"	1 1/2"	1 7/16"	1 3/8"	1 1/4"	1 1/8"	1"	7/8"	11/16"	7/16"	7/16"	0

* INCLUDES FUTURE WEARING SURFACE.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT ''FINAL CAMBER'', WHICH IS GIVEN IN INCHES (FRACTION FORM).

K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_DL1_180541.dgn
3/18/2025

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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NC LICENSE # F-0102

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

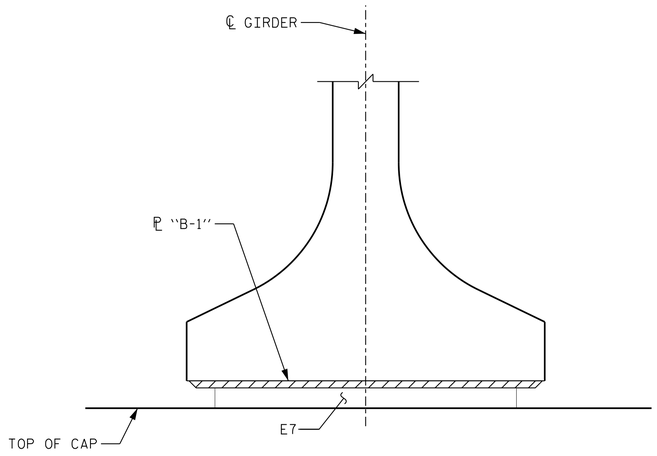
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

GIRDER DEFLECTION AND CAMBER SCHEDULES

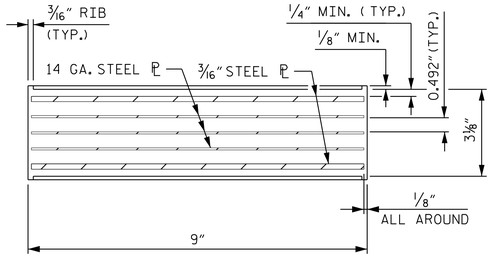
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S2-16
TOTAL SHEETS 35

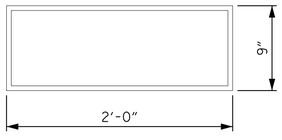
BRIDGE 2L



SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS



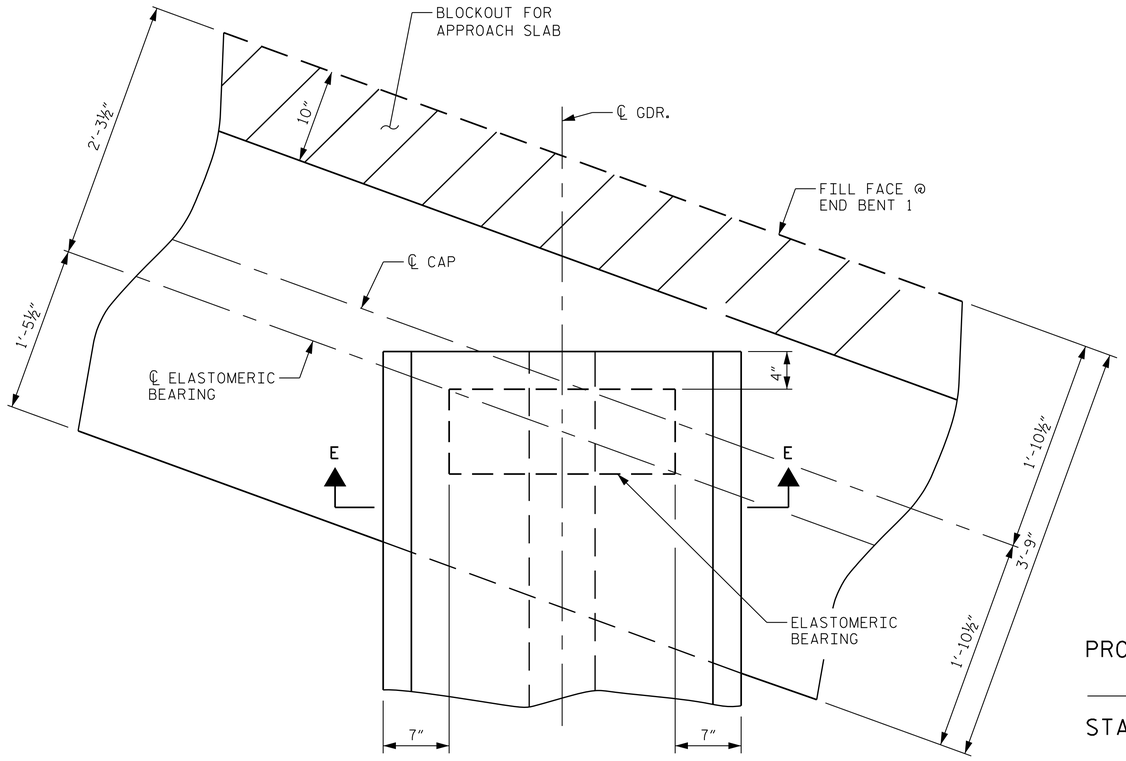
E7 (10 REQ'D)

PLAN VIEW OF
ELASTOMERIC BEARING

TYPE VIII

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L.(NO IMPACT)	
TYPE VIII	390 K

MAXIMUM ALLOWABLE EXPANSION LENGTH	
TYPE VIII	225 FT.



PLAN VIEW AT INTEGRAL END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

NOTES

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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Phone (919) 677-2000 NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

FIB SUPERSTRUCTURE

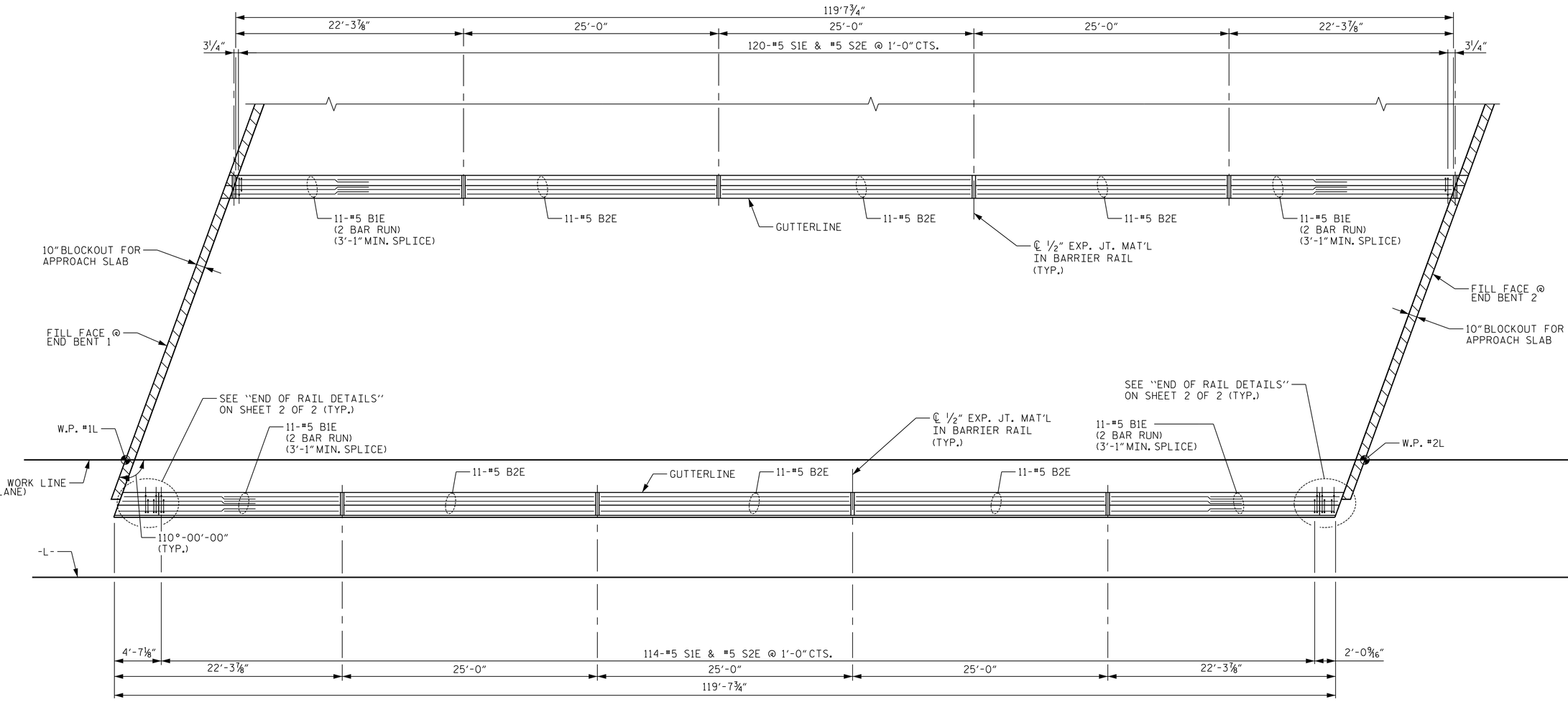
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-17
1			3			TOTAL SHEETS
2			4			35

ASSEMBLED BY : T. K. BOYD	DATE : 01/2025	
CHECKED BY : R.M. KROL	DATE : 01/2025	
DRAWN BY : WJH 8/89	REV. 1/15	MAA/TMG
CHECKED BY : CRK 8/89	REV. 12/17	MAA/THC
	REV. 10/21	BNB/AAI

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BRIDGE 2L STD. NO. EB5

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_BG1_180541.dgn



PLAN OF BARRIER RAIL

ALL DIMENSIONS ARE MEASURED ALONG THE OUTSIDE FACE OF THE BARRIER RAIL

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

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NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

CONCRETE BARRIER RAIL

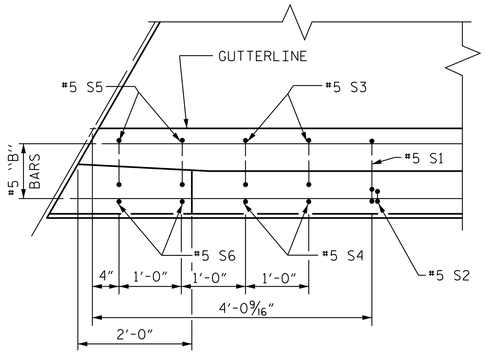
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-18
1			3			TOTAL SHEETS
2			4			35

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

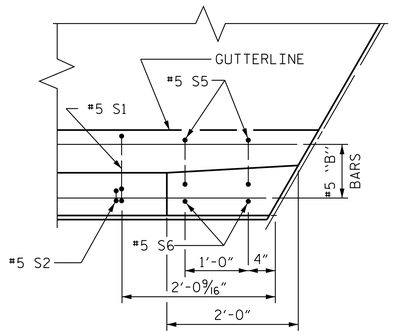
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BRIDGE 2L

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_BRI_I80541.dgn



PLAN AT
END BENT 1



PLAN AT
END BENT 2

NOTES

THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

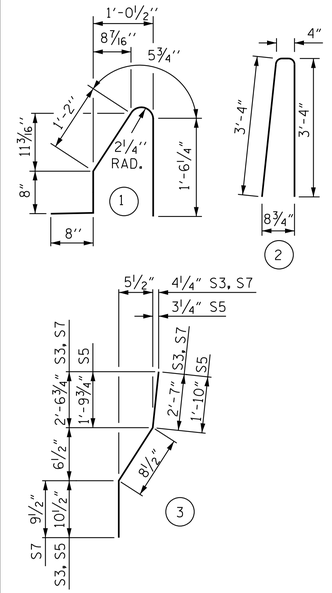
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE #5 S3, #5 S4, #5 S5 AND #5 S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, #5 S4, #5 S5 AND #5 S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

** THE CONTACTOR MAY USE ADHESIVELY ANCHORED #5 S7 & #5 S8 BARS. LEVEL 2 FIELD TESTING IS REQUIRED AND THE YIELD LOAD OF THE #5 S7 & #5 S8 IS 18.6 KIPS. FOR ADHESIVELY ANCHORED BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

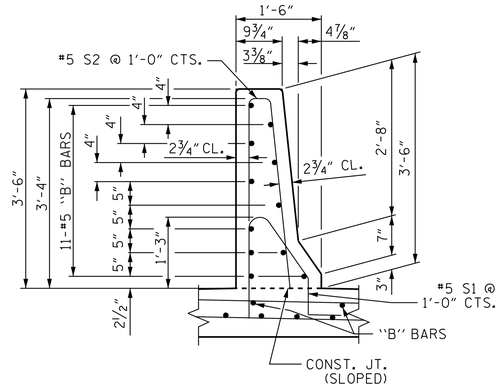
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

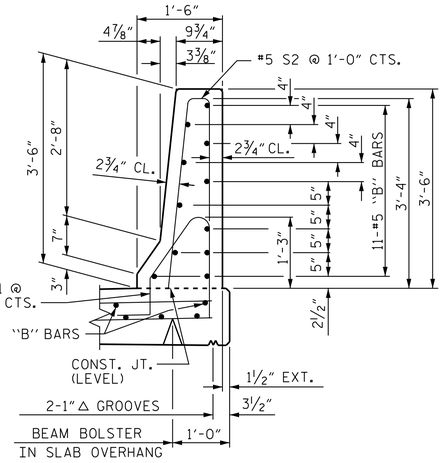
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1E	88	#5	STR	12'-9"	1,170
B2E	66	#5	STR	24'-7"	1,692
S1E	234	#5	1	4'-6"	1,098
S2E	234	#5	2	7'-0"	1,708
S3E	2	#5	3	4'-2"	9
S4E	2	#5	STR	4'-0"	8
S5E	4	#5	3	3'-5"	14
S6E	4	#5	STR	3'-3"	14
S7E	120	#5	3	4'-1"	511
S8E	120	#5	STR	3'-11"	490

** FOR OPTIONAL ADHESIVE ANCHORING (NOT INCLUDED IN TOTAL QUANTITY)

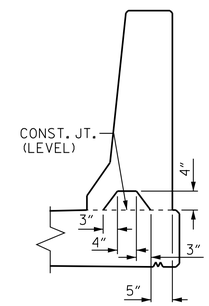
EPOXY COATED REINFORCING STEEL	5,713 LBS.
CLASS AA CONCRETE	40.2 CU. YDS.
CONCRETE BARRIER RAIL	239.3 LIN. FT.



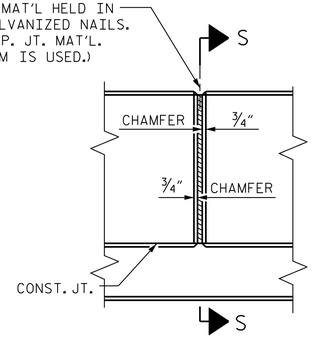
SECTION THRU INTERIOR RAIL



SECTION THRU EXTERIOR RAIL

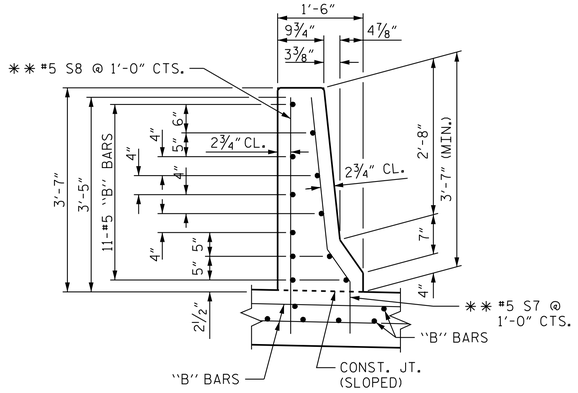


SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

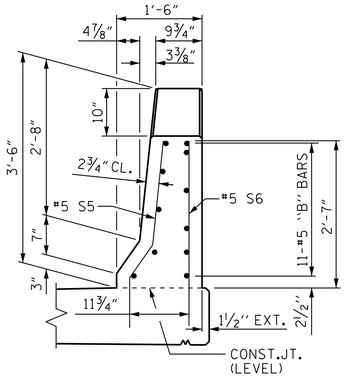


ELEVATION AT EXPANSION JOINTS

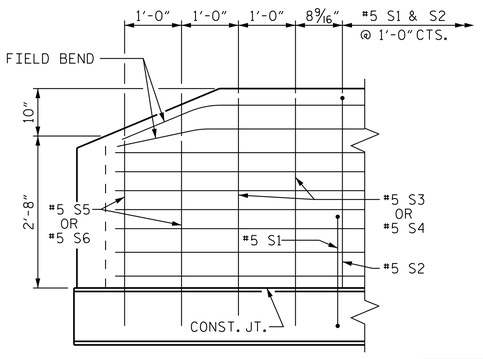
BARRIER RAIL DETAILS



OPTIONAL SECTION THRU INTERIOR RAIL



END VIEW
(EXTERIOR BARRIER RAIL)



SIDE VIEW
(EXTERIOR BARRIER RAIL)

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PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

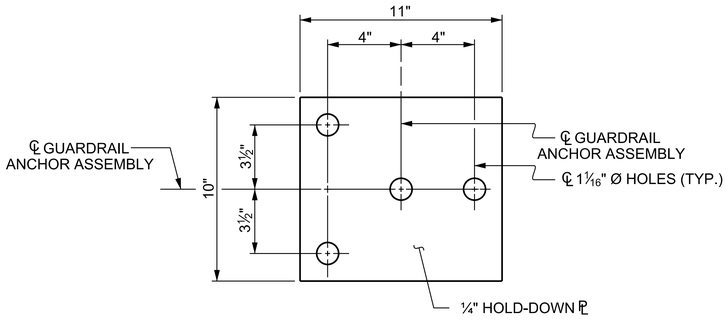
STANDARD
CONCRETE
BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-19
1			3			TOTAL SHEETS
2			4			35

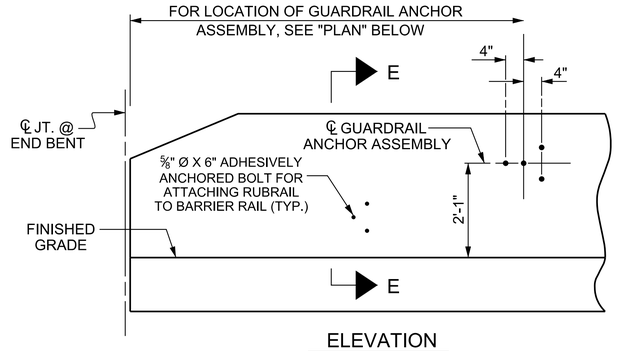
ASSEMBLED BY : T. K. BOYD	DATE : 01/2025	
CHECKED BY : R.M. KROL	DATE : 01/2025	
DRAWN BY : ARB 5/87	REV. 7/12	MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC

3/18/2025 K:\RDT_Structures_Bridge\NC\01I036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_BR2_180541.dgn

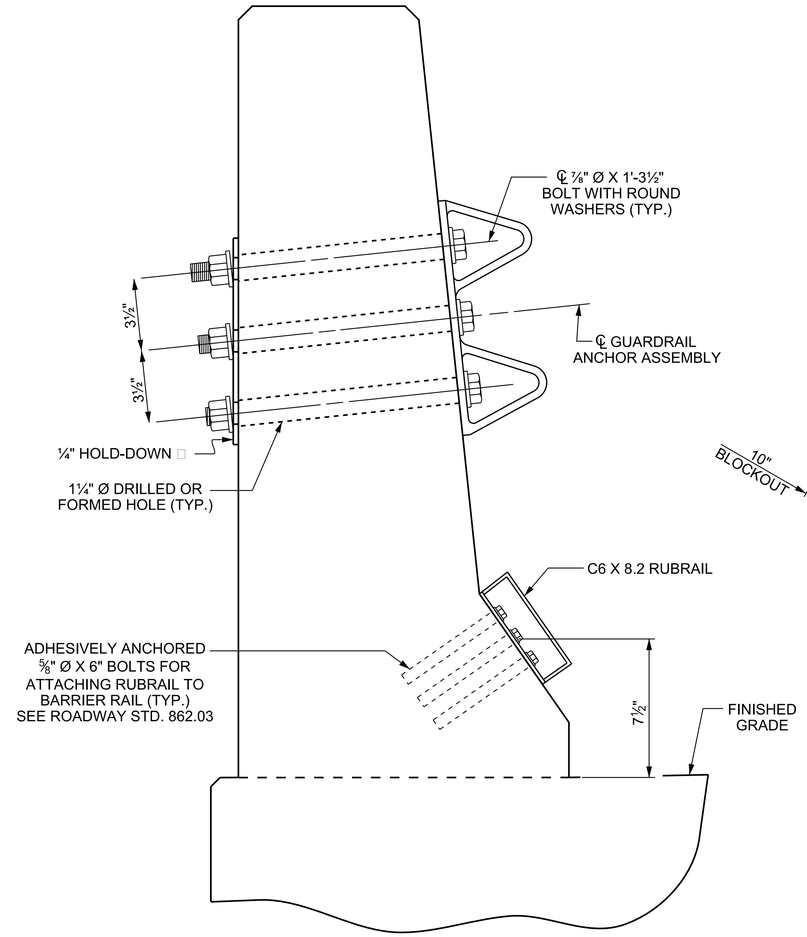
BRIDGE 2L STD. NO. CBR1



PLAN

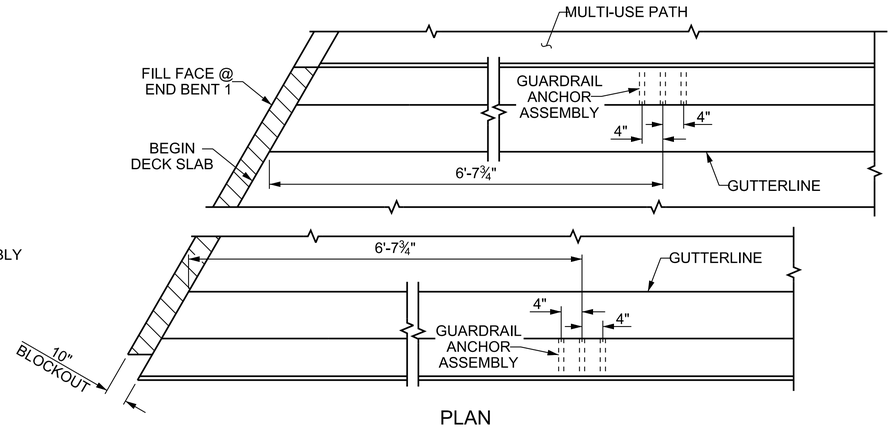


ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼" HOLD-DOWN PLATE AND 4 -⅞"Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ⅞" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

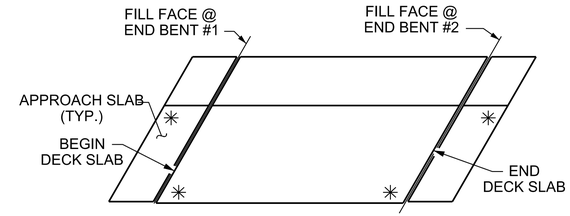
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

THE 1¼" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE ⅝" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ⅝" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
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Phone (919) 677-2000
NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

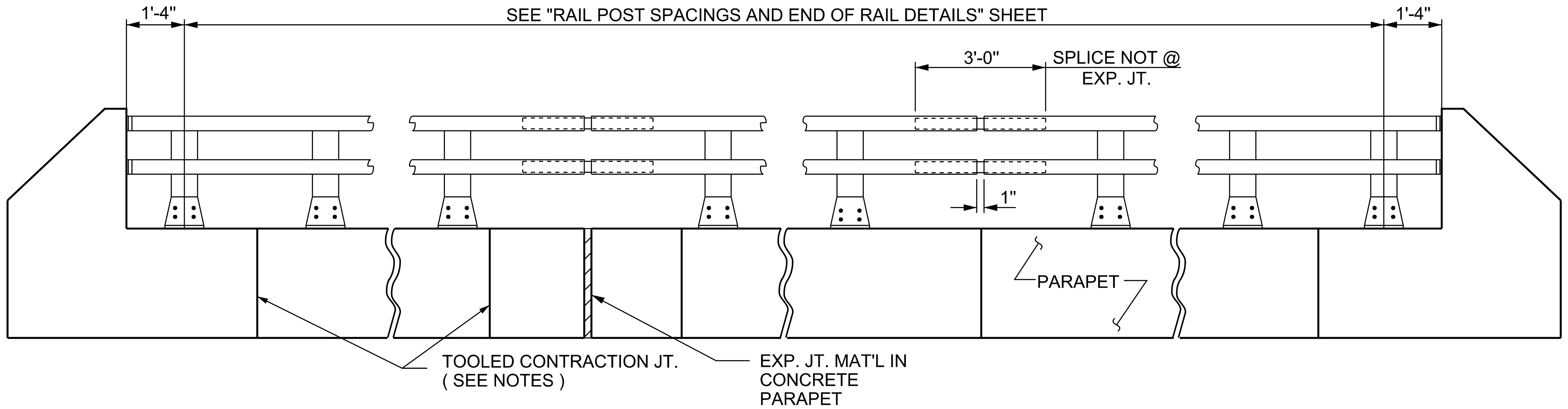
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-20
1			3			TOTAL SHEETS
2			4			35

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : T. K. BOYD		DATE : 01/2025	
CHECKED BY : R.M. KROL		DATE : 01/2025	
DRAWN BY : TLA 5/06	REV. 6/13		MAA/GM
CHECKED BY : GM 5/06	REV. 12/17		MAA/THC
	REV. 6/22		BNB/AAI

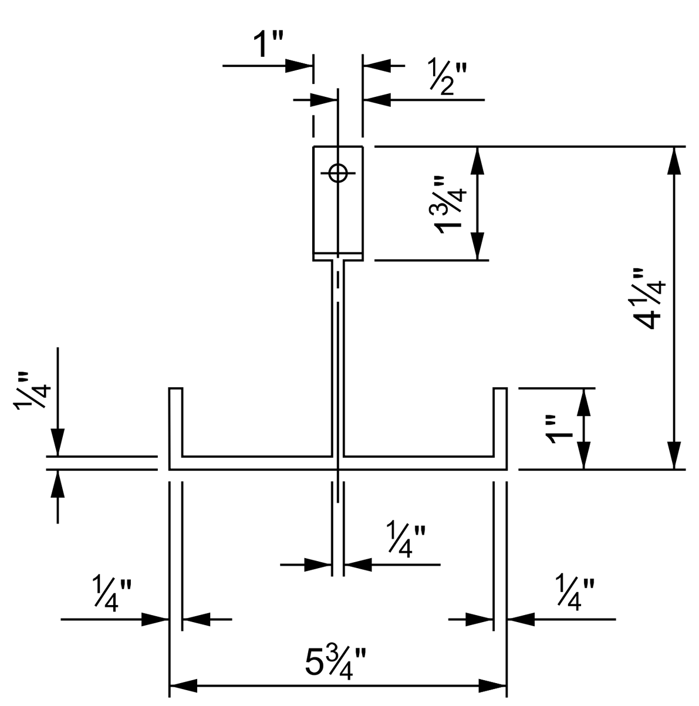
3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_GR2_180541.dgn

BRIDGE 2L STD. NO. GRA2

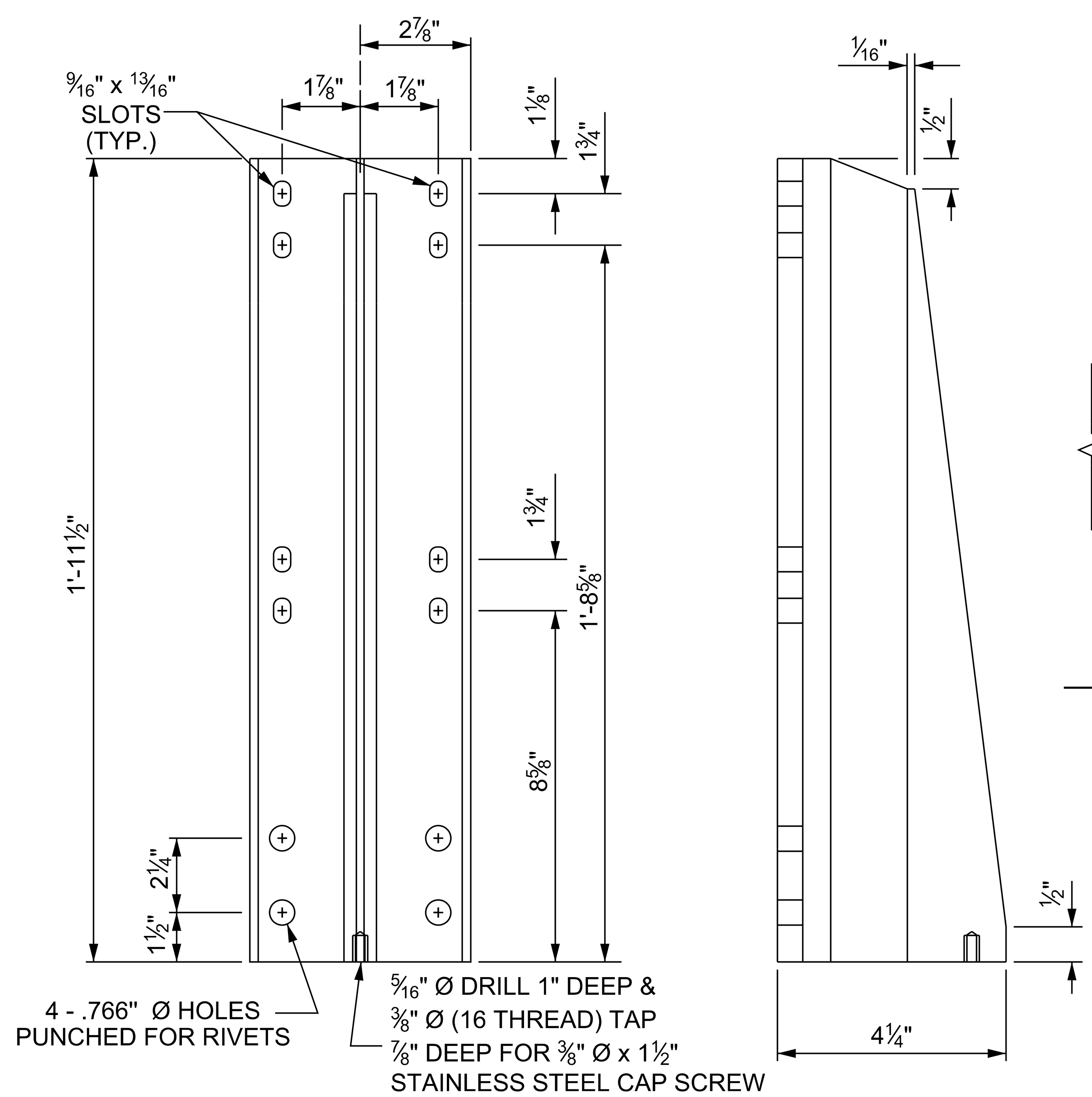


ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



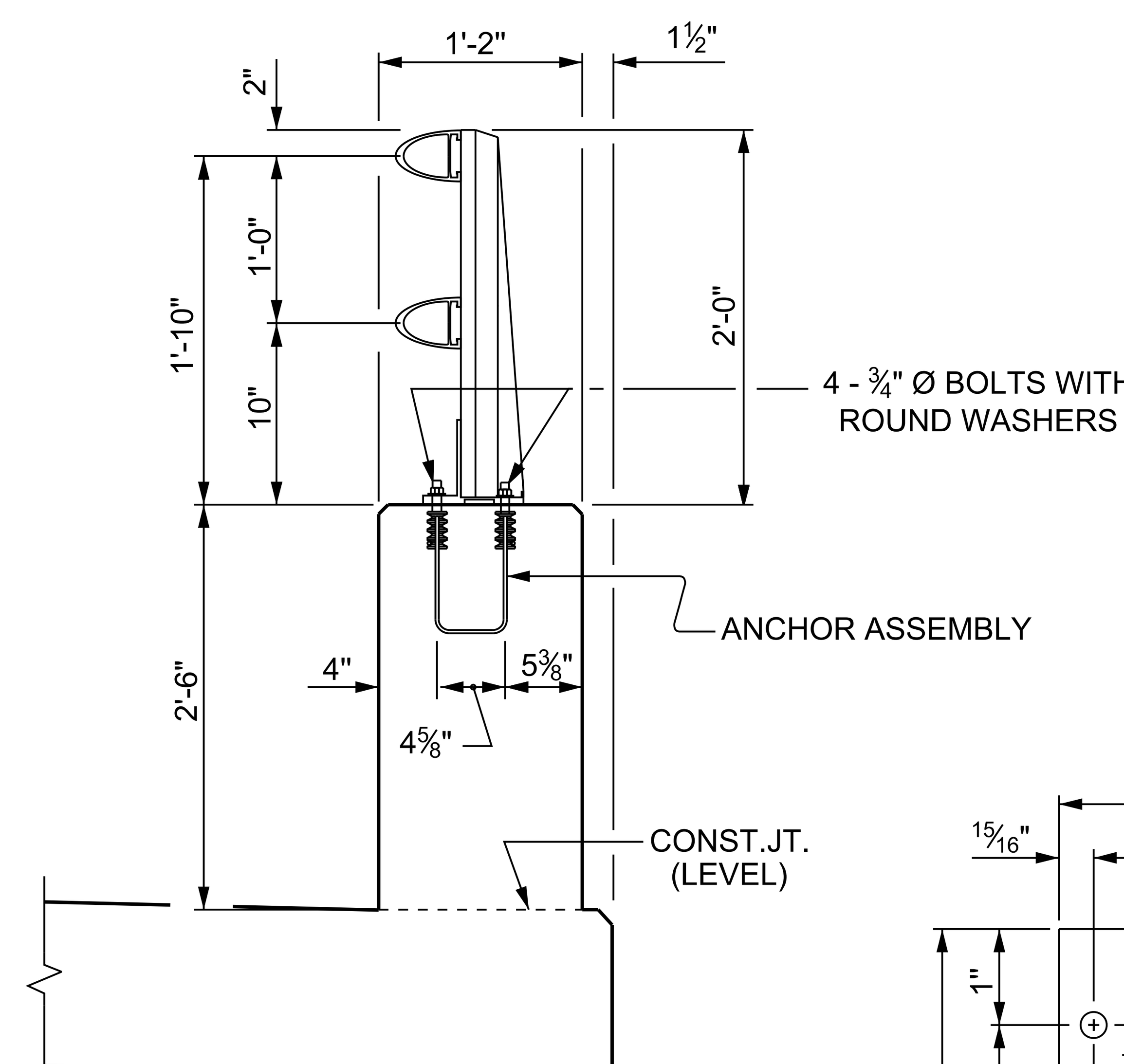
PLAN



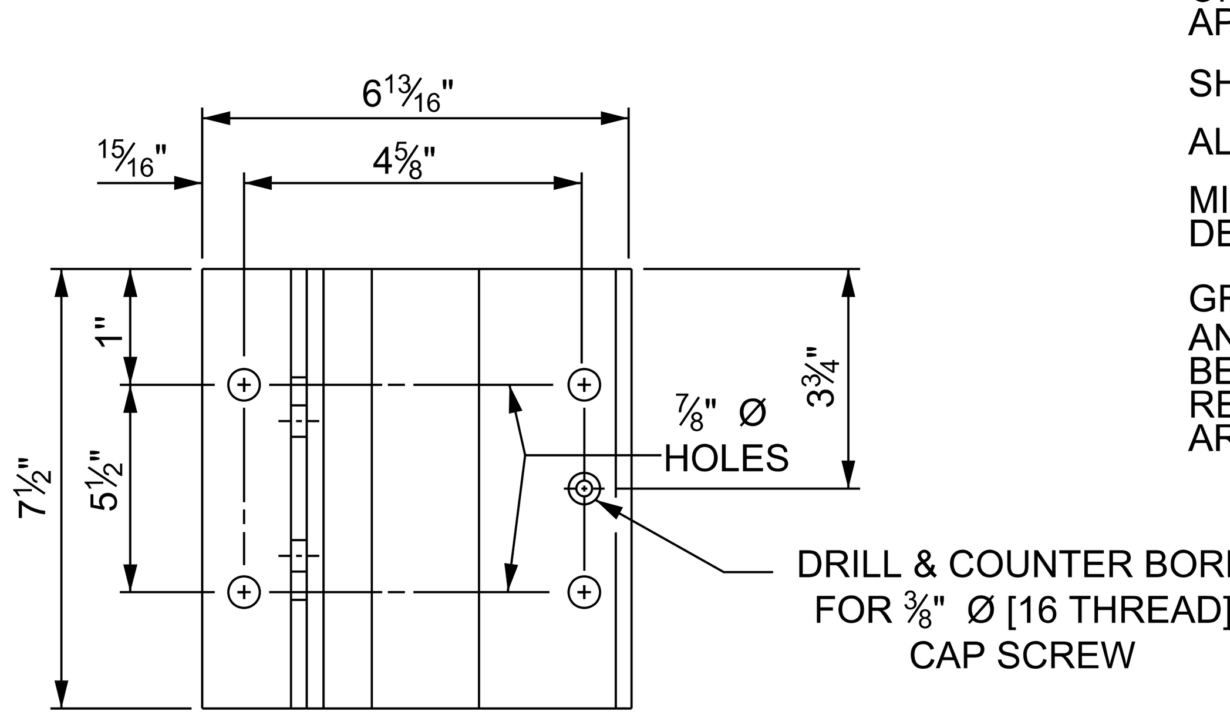
FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST



SECTION THRU PARAPET AND RAIL



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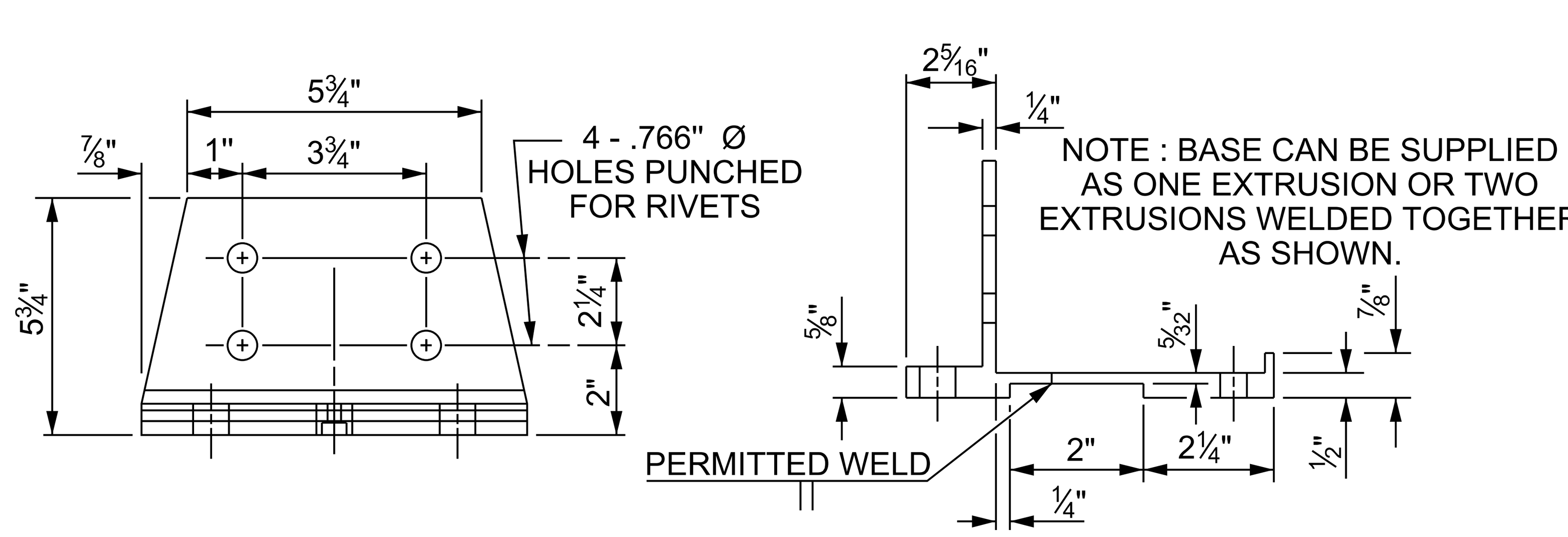
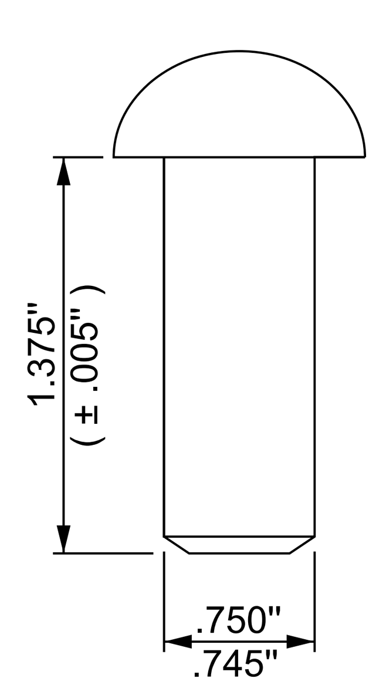


FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER ``2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIALS AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: ASTM A36 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO ASTM A123.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS,½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

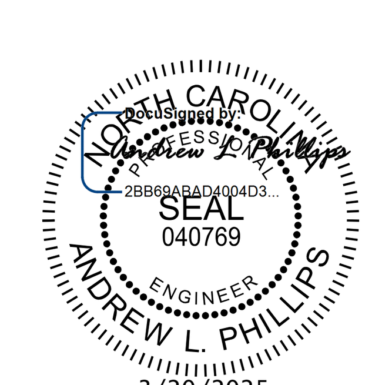
PAY LENGTH = 112.1 LIN. FT.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

Kimley»Horn
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Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

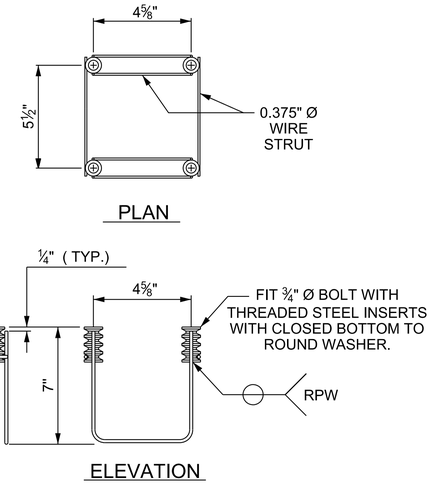
ASSEMBLED BY : T. K. BOYD	DATE : 01/2025
CHECKED BY : R.M. KROL	DATE : 01/2025

DRAWN BY : EEM 6/94	REV. 6/13	MAA/GM
CHECKED BY : RGW 6/94	REV. 12/17	MAA/THC
	REV. 10/23	BNB/SNM

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S2-21

TOTAL SHEETS 35



4-BOLT METAL RAIL ANCHOR ASSEMBLY

(20 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR ¾" FERRULES.

B. 4 - ¾" Ø x 2½" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø x 2½" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

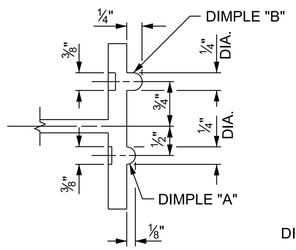
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF ASTM A123.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

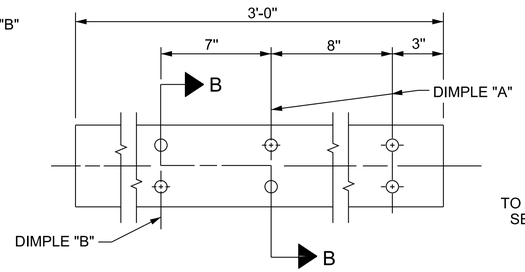
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

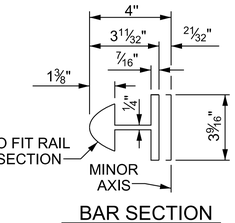
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



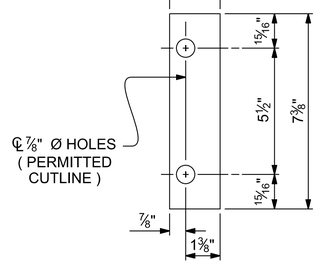
SECTION B-B



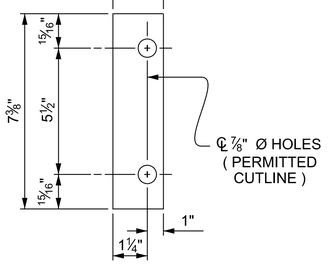
EXPANSION BAR DETAILS



BAR SECTION



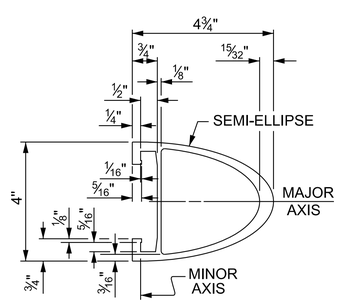
FRONT PLATE



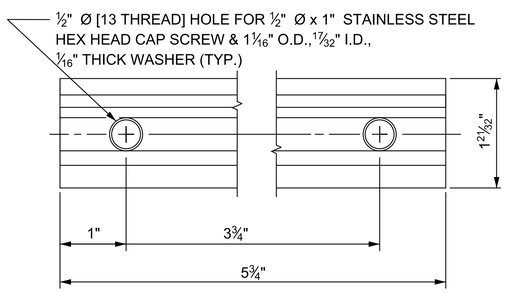
REAR PLATE

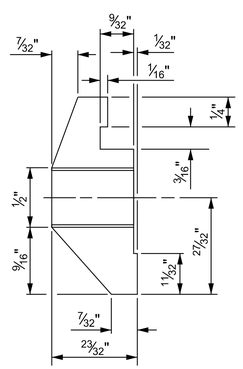
SHIM DETAILS

NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



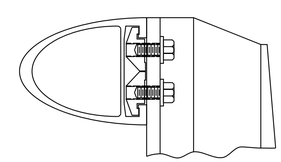
RAIL SECTION



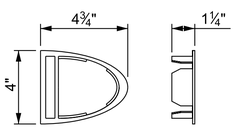


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

NORTH CAROLINA Licensed Engineer SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-22
1			3			TOTAL SHEETS
2			4			35

ASSEMBLED BY : T. K. BOYD		DATE : 01/2025	
CHECKED BY : R.M. KROL		DATE : 01/2025	
DRAWN BY : EEM 6/94	REV. 10/11		MAA/GM
CHECKED BY : RGW 6/94	REV. 12/17		MAA/THC
	REV. 10/23		BNB/SNM

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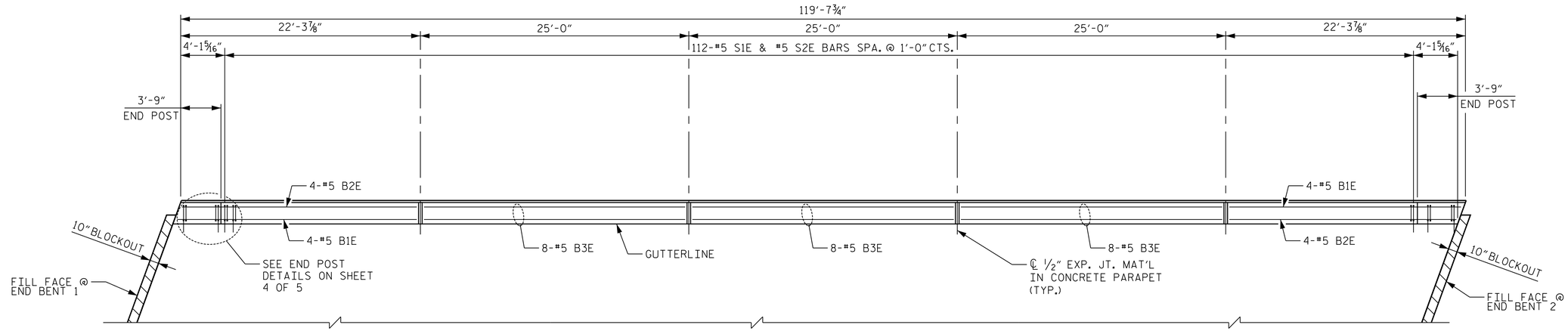
3/18/2025 K:\RDT_Structures_Bridge\NC\01036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_2MR2_180541.dgn

BRIDGE 2L STD. NO. BMR4



PLAN OF CONCRETE PARAPET

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L PHILLIPS
3/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-23
1			3			TOTAL SHEETS
2			4			35

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_2MR3_180541.dgn