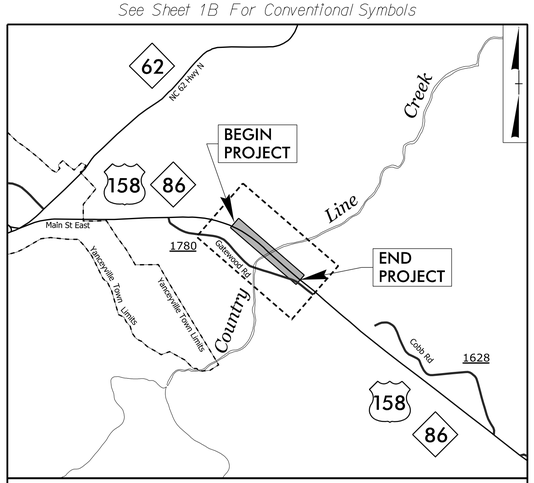
09/08/99

TIP PROJECT: BR-0069

CONTRACT: C204762

STRUCTURES

See Sheet 1B For Conventional Symbols



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CASWELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0069	1	

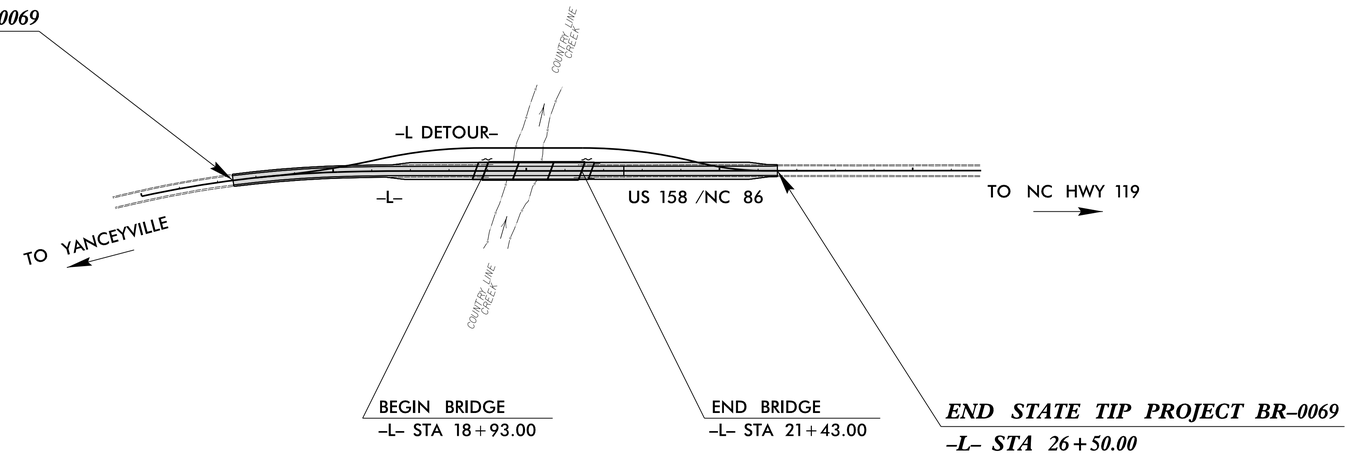
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
67069.1.1	N/A	PE
67069.2.1	N/A	ROW/UTIL
67069.3.1	N/A	CONST

LOCATION: BRIDGE NO. 160001 OVER COUNTRY LINE CREEK ON US 158 /NC 86

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

NAD 83/NA 2011

BEGIN STATE TIP PROJECT BR-0069
-L- STA 12+40.00



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2023 = 8,525
ADT 2043 = 10,025
K = TBD %
D = TBD %
T = 10 % *
V = 60 MPH
* TTST = 6% DUAL 4%
FUNC CLASS =
PRINCIPAL RURAL ARTERIAL
-REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BR-0069	=	0.220
LENGTH STRUCTURE TIP PROJECT BR-0069	=	0.047
TOTAL LENGTH TIP PROJECT BR-0069	=	0.267

Prepared for NCDOT In the Office of:
moffatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC License NO.: F-0105

2024 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 15, 2023

LETTING DATE:
MAY 28, 2024

TRENT HUFFMAN, P.E.
PROJECT ENGINEER

PAUL JACOB, P.E.
PROJECT STRUCTURAL ENGINEER

DAVID STUTTS, P.E.
NCDOT CONTACT

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

3/18/2024
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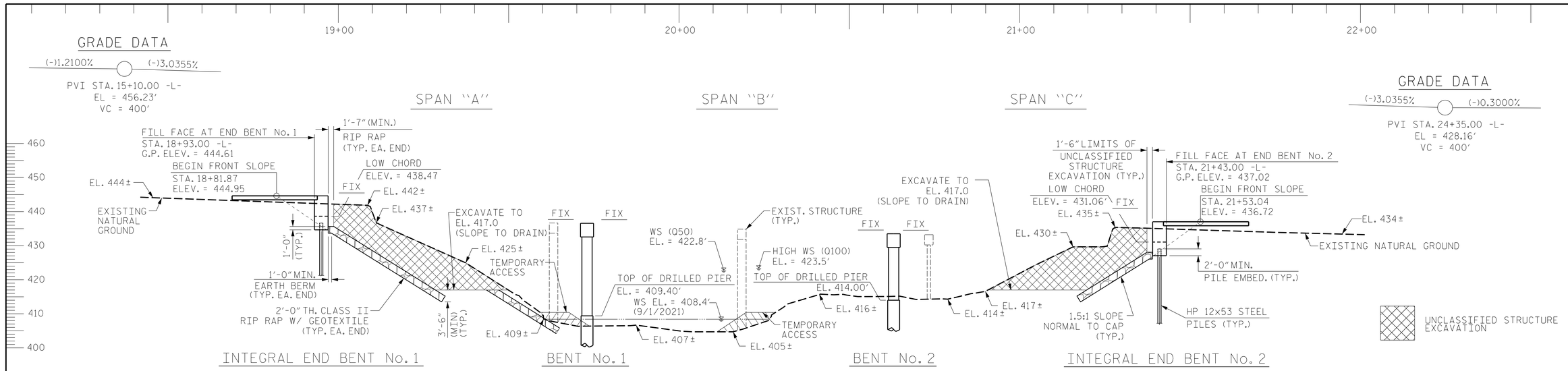
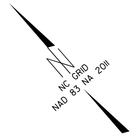
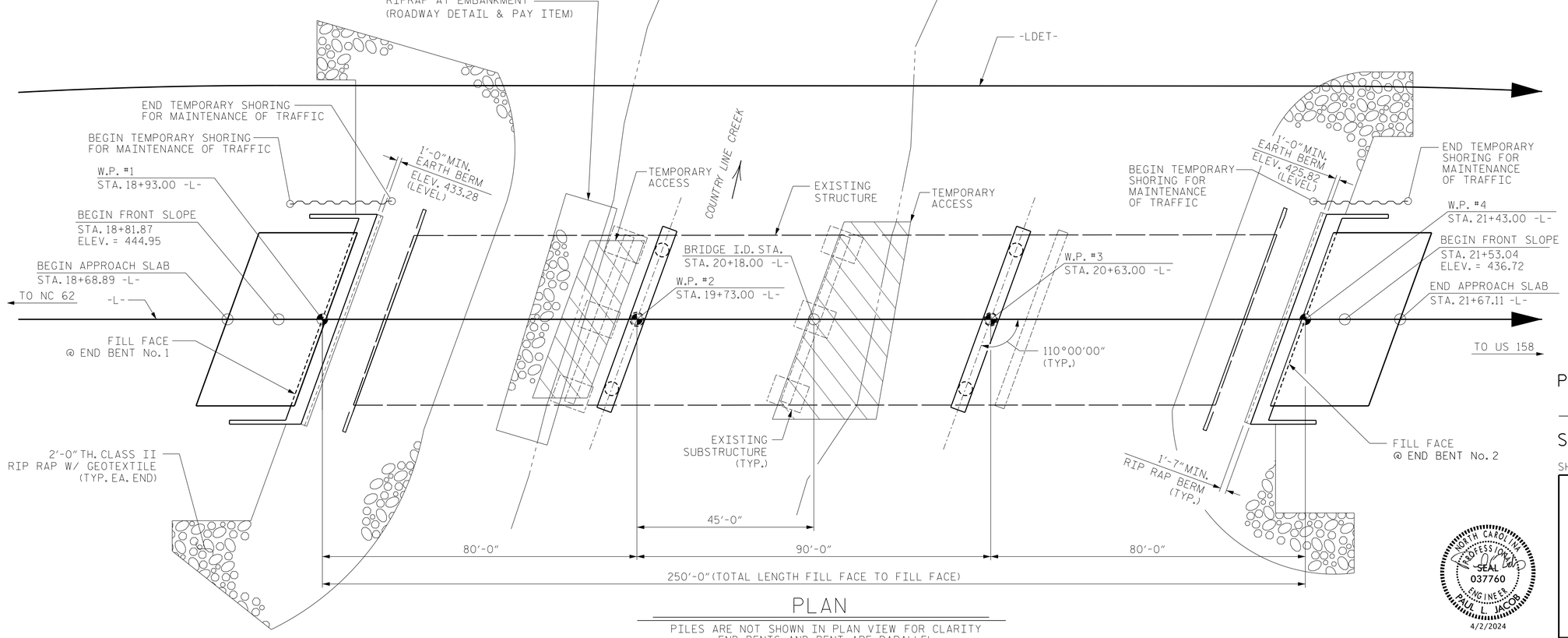
jloftus



SECTION ALONG -L-

(SECTION TAKEN AT RIGHT ANGLES TO END BENTS AND BENT)





PLAN

PILES ARE NOT SHOWN IN PLAN VIEW FOR CLARITY
END BENTS AND BENT ARE PARALLEL

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 1 OF 4 REPLACES BRIDGE NO. 160001

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER
COUNTRY LINE CREEK
ON US 158/NC 86
BETWEEN NC 62 & US 158

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

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

DRAWN BY : J. WEIGER DATE : 6-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

moffatt & nichol
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(919) 781-4626 VOICE (919) 781-4869 FAX
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3/20/2024
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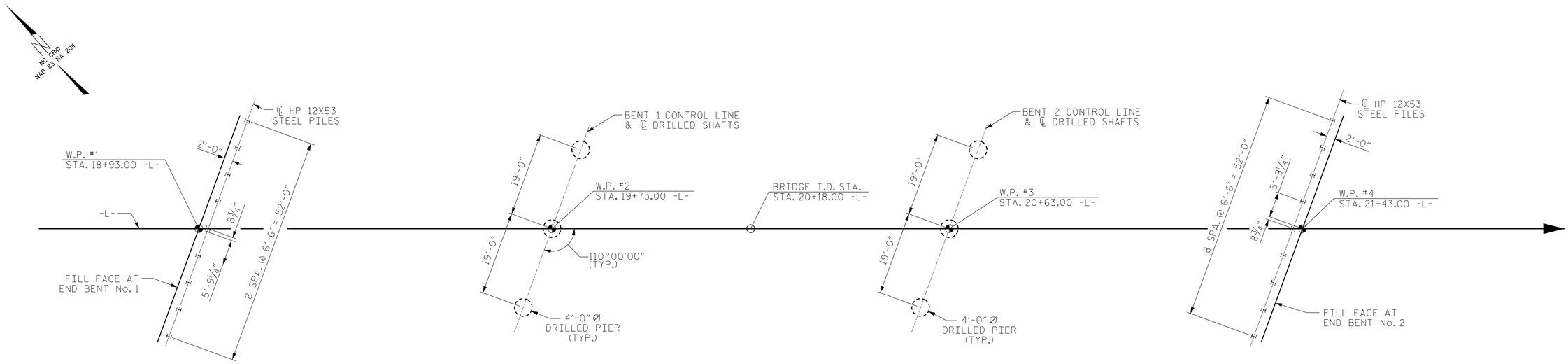
jloftus



INTEGRAL END BENT 1 | BENT 1 | BENT 2 | INTEGRAL END BENT 2

FOUNDATION LAYOUT

ALL BENTS ARE PARALLEL
(DIMENSION LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES AT BOTTOM OF CAP OR FOOTING)

FOUNDATION NOTES:

1. FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
2. FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
3. IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30,000-60,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 1 AND 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 2 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

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

DRAWN BY : J. WEIGER DATE : 5-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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3/20/2024
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JLoftus

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")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Lenth per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-6	105	436.28	25			175							
End Bent 1, Pile 7-9	105	436.28	20			175							
End Bent 2, Piles 1-5	105	428.82	50			175							
End Bent 2, Piles 6-9	105	428.82	50			175							

*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.

$$^{**}RDR = \frac{Factored\ Resistance + Factored\ Downdrag\ Load + Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Downdrag\ Resistance + \frac{Nominal\ Scour\ Resistance}{Scour\ Resistance\ Factor}$$

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 TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-6	105			0.60			1.00
End Bent 1, Pile 7	105			0.60			1.00
End Bent 1, Piles 8-9	105			0.60			1.00
End Bent 2, Piles 1-5	105			0.60			1.00
End Bent 2, Piles 6-9	105			0.60			

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

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")	Factored Resistance per Pier TONS	Minimum Pier Tip (Tip No Higher Than) Elevation FT	Required Tip Resistance per Pier TSF	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 or MAYBE	Permanent Steel Casing Tip Elevation (Elev Not To Extend Casing Below) FT	Permanent Steel Casing Length* per Pier Lin FT
Bent 1, Piers 1-2	970	387.0	10	395		22.4	9.4	13.0	YES	396.4	13.0
Bent 1, Pier 3	970	379.0	10	395		30.4	18.1	12.3	YES	396.4	13.0
Bent 2, Piers 1-2	970	364.0	10	410		50.0	21.9	28.1	MAYBE	411.0	3.0
Bent 2, Pier 3	970	373.0	10	410		41.0	12.7	28.3	MAYBE	411.0	3.0

*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.

SUMMARY OF DYNAMIC PILE TESTING/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing				Pile Order Lengths	
End Bent/ Bent No	Dynamic Pile Testing Required? YES or MAYBE	Dynamic Pile Testing Test Pile Length FT	Total Dynamic Pile Testing Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or PDA
End Bent 1	MAYBE	30	1		
End Bent 2	MAYBE	55			

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

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 Required? YES or MAYBE	Steel Pile Points			Steel Pile Tips Required? YES
		Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	
End Bent 1, Piles 1-9				YES	
TOTAL QTY:				9	

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

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) Required? YES or MAYBE	Crosshole Sonic Logging (CSL) Required?* YES or MAYBE	Total CSL Tube Length (For All Tubes) per Pier Lin FT	Shaft Inspection Device (SID) Required? YES or MAYBE	Pile Integrity Test (PIT) Required? MAYBE
Bent 1, Piers 1-2		MAYBE	96		MAYBE
Bent 1, Pier 3		MAYBE	128		MAYBE
Bent 2, Piers 1-2		MAYBE	206		MAYBE
Bent 2, Pier 3		MAYBE	170		MAYBE
TOTAL QTY:		6	902		2

*CSL Tubes are required if CSL Testing is or may be required. The number of CSL Tubes per drilled pier is equal to one tube per foot of design pier diameter with at least 4 tubes per pier. The length of each CSL Tube is equal to the drilled pier length plus 1.5 ft.

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

NOTES:

1. The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Matthew Mark Lattin #052709) on 02-21-2023.
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 will determine the need for PDA Testing, Pipe Pile Plates, CSL Testing, and PITs when these items may be required.

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JAMES

4/5/2024

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE AND DRILLED PIER FOUNDATION TABLES

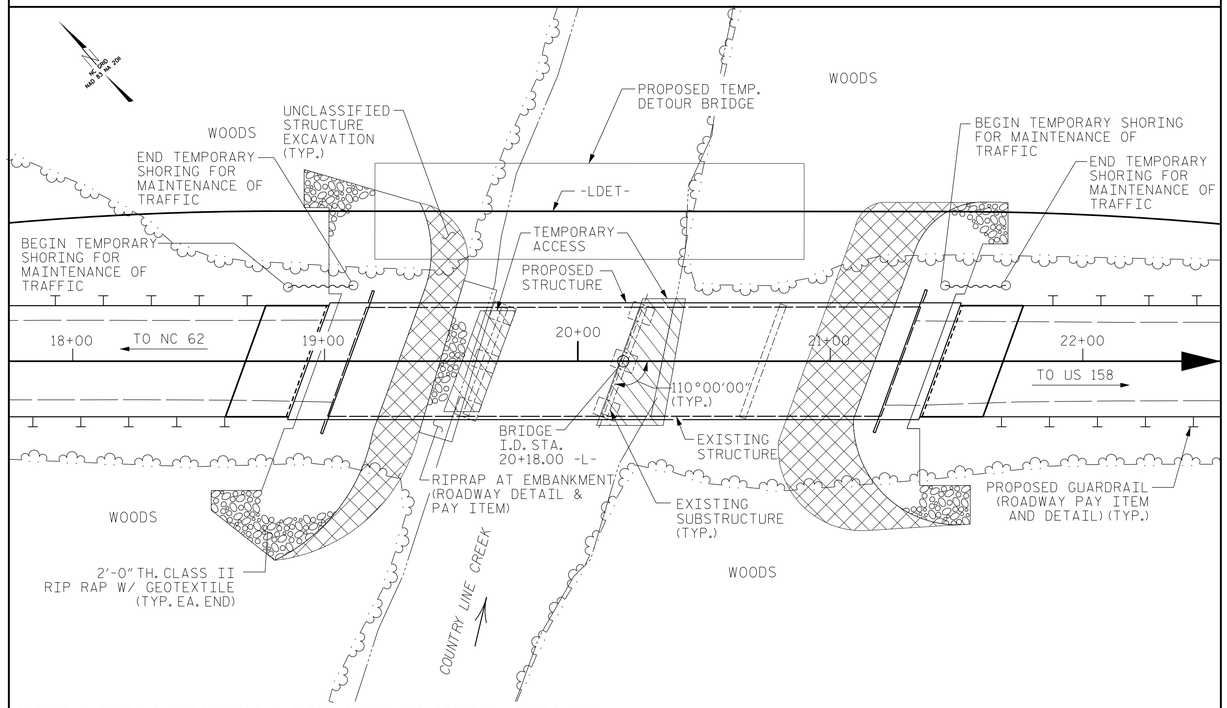
REVISIONS

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

SHEET NO. S-3

TOTAL SHEETS 38

BM #2 - RAILROAD SPIKE IN 16" OAK, 246.26' RIGHT OF STA. 25+64.88 -L-, EL. 418.82



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD= HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF 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.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 20+18.00 -L-.

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

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 20+18.00 -L-."

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 65 FT. LEFT OF -L- AND 80 FT. RIGHT OF -L- AT END BENT 1 AND 65 FT. LEFT OF -L- AND 70 FT. RIGHT OF -L- AT END BENT 2 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.

TEMPORARY SHORING WILL BE REQUIRED IN THE AREAS INDICATED IN THE PLAN VIEW.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY STRUCTURE AT STATION 17+10.00 -LDET- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

THE BRIDGE RAILS ON THE TEMPORARY STRUCTURE SHALL BE DESIGNED FOR THE AASHTO LRFD TEST LEVEL 3 (TL-3) CRASH TEST CRITERIA. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY STRUCTURE, SEE SPECIAL PROVISIONS.

THE EXISTING STRUCTURE CONSISTS OF FOUR SPANS (55', 55', 55' & 55') WITH A CLEAR ROADWAY WIDTH OF 43'-4" WITH A REINFORCED CONCRETE DECK ON STEEL I-BEAMS. THE SUBSTRUCTURE CONSISTS OF CONCRETE ABUTMENTS ON STEEL PILES, CONCRETE CAP AND COLUMNS AT BENTS 1 & 2, AND CONCRETE CAP ON STEEL PILES AT BENT 3. THE EXISTING STRUCTURE LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETIORATE DURING CONSTRUCTION OF THE DETOUR BRIDGE, A LOAD LIMIT MAY BE POSTED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. THE INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

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

THE SCOUR CRITICAL ELEVATION FOR BENT #1 IS ELEVATION 396.4. THE SCOUR CRITICAL ELEVATION FOR BENT #2 IS ELEVATION 411.0. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

TOTAL BILL OF MATERIAL

	CONSTRUCTION MAINTENANCE & REMOVAL OF TEMPORARY STRUCTURE AT STA. 17+10 -LDET-	CONSTRUCTION MAINTENANCE & REMOVAL OF TEMPORARY ACCESS AT STA. 20+18 -L-	REMOVAL OF EXISTING STRUCTURE AT STA. 20+18 -L-	ASBESTOS ASSESSMENT	4'-0" Ø DRILLED PIERS IN SOIL	4'-0" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STA. 20+18 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS AT STA. 20+18 -L-	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL
	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.
SUPERSTRUCTURE										11,729	12,146				
END BENT 1												42.4		6,219	
BENT 1					38.3	36.9	39.0	3				57.0		14,694	3,658
BENT 2					84.5	56.5	9.0	3				49.1		16,953	4,693
END BENT 2												42.0		6,089	
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	122.8	93.4	48.0	6	LUMP SUM	11,729	12,146	190.5	LUMP SUM	43,955	8,351

HYDRAULIC DATA

DESIGN DISCHARGE	10500 CFS
FREQUENCY OF DESIGN FLOOD	50 YR.
DESIGN HIGHWATER ELEV.	422.8 FT.
DRAINAGE AREA	101 SQ. MI.
BASE DRAINAGE (Q100)	12000 CFS
BASE HIGHWATER ELEV.	423.5 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	26000 CFS
FREQUENCY OF OVERTOPPING FLOOD	500+ YR.
*OVERTOPPING FLOOD ELEV.	427.4 FT.

* OCCURS AT STA. 26+50 -L-

TOTAL BILL OF MATERIAL

	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES		STEEL PILE POINTS	DYNAMIC PILE TESTING	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	NO.	LIN.FT.	EACH	NO.	LIN.FT.	EACH	EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE	15	1232.5						496.46			LUMP SUM
END BENT 1			9	9	210	9			847	896	
BENT 1											
BENT 2											
END BENT 2			9	9	450				547	579	
TOTAL	15	1232.5	18	18	660	9	1	496.46	1,394	1,475	LUMP SUM

DRAWN BY : J. WEIGER DATE : 6-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

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PROJECT NO. BR-0069
CASWELL COUNTY
STATION: 20+18.00 -L-
SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
BRIDGE OVER
COUNTRY LINE CREEK
ON US 158/NC 86
BETWEEN NC 62 & US 158

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

SHEET NO. S-4
TOTAL SHEETS 38

3/26/2024
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JLoftus

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × 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 RATING		HL-93 (INVENTORY)	N/A	1	1.07	--	1.75	0.84	1.31	B	EL	44.07	1.02	1.45	B	I	79.94	0.80	0.80	1.07	B	I	44.07	
		HL-93 (OPERATING)	N/A		1.70	--	1.35	0.84	1.70	B	EL	44.07	1.02	1.91	B	I	79.94	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.46	52.56	1.75	0.84	1.79	B	EL	44.07	1.02	1.97	B	I	79.94	0.80	0.82	1.46	B	I	44.07	
		HS-20 (OPERATING)	36.000		2.32	83.52	1.35	0.84	2.32	B	EL	44.07	1.02	2.58	B	I	79.94	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.41	46.04	1.40	0.82	5.14	A	I	38.47	1.02	6.16	B	I	79.94	0.80	0.79	3.41	B	I	44.07	
		SNGARBS2	20.000		2.49	49.80	1.40	0.82	3.79	A	I	38.47	1.02	4.31	B	I	79.94	0.80	0.79	2.49	B	I	44.07	
		SNAGRIS2	22.000		2.34	51.48	1.40	0.82	3.56	A	I	38.47	1.02	3.98	B	I	79.94	0.80	0.79	2.34	B	I	44.07	
		SNCOTTS3	27.250		1.70	46.32	1.40	0.82	2.54	A	I	38.47	1.02	2.98	B	I	79.94	0.80	0.79	1.70	B	I	44.07	
		SNAGGRS4	34.925		1.40	48.90	1.40	0.82	2.11	A	I	38.47	1.02	2.36	B	I	79.94	0.80	0.79	1.40	B	I	44.07	
		SNS5A	35.550		1.37	48.70	1.40	0.82	2.07	A	I	38.47	1.02	2.38	B	I	79.94	0.80	0.79	1.37	B	I	44.07	
		SNS6A	39.950		1.25	49.94	1.40	0.82	1.89	A	I	38.47	1.02	2.15	B	I	79.94	0.80	0.79	1.25	B	I	44.07	
		SNS7B	42.000		1.19	49.98	1.40	0.82	1.80	A	I	38.47	1.02	2.09	B	I	79.94	0.80	0.79	1.19	B	I	44.07	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.52	50.16	1.40	0.82	2.31	A	I	38.47	1.02	2.78	A	I	79.94	0.80	0.79	1.52	B	I	44.07	
		TNT4A	33.075		1.52	50.27	1.40	0.82	2.32	A	I	38.47	1.02	2.68	B	I	79.94	0.80	0.79	1.52	B	I	44.07	
		TNT6A	41.600		1.24	51.58	1.40	0.82	1.89	A	I	38.47	1.02	2.21	B	I	79.94	0.80	0.79	1.24	B	I	44.07	
		TNT7A	42.000		1.24	52.08	1.40	0.82	1.90	A	I	38.47	1.02	2.17	B	I	79.94	0.80	0.79	1.24	B	I	44.07	
		TNT7B	42.000		1.27	53.34	1.40	0.82	1.95	A	I	38.47	1.02	2.05	B	I	79.94	0.80	0.79	1.27	B	I	44.07	
		TNAGRIT4	43.000		1.22	52.46	1.40	0.82	1.86	A	I	38.47	1.02	2.11	B	I	79.94	0.80	0.79	1.22	B	I	44.07	
		TNAGT5A	45.000		1.15	51.75	1.40	0.82	1.76	A	I	38.47	1.02	1.96	B	I	79.94	0.80	0.79	1.15	B	I	44.07	
		TNAGT5B	45.000	3	1.14	51.30	1.40	0.82	1.74	A	I	38.47	1.02	1.89	B	I	79.94	0.80	0.79	1.14	B	I	44.07	
EMERGENCY VEHICLE (EV)		EV2	28.750		1.75	50.31	1.30	0.82	2.88	A	I	38.47	1.02	3.18	B	I	79.94	0.80	0.79	1.75	B	I	44.07	
		EV3	43.000	4	1.15	49.45	1.30	0.82	1.89	A	I	38.47	1.02	2.18	B	I	79.94	0.80	0.79	1.15	B	I	44.07	

LOAD FACTORS:

	LIMIT STATE	γ_{DC}	γ_{DW}
DESIGN LOAD RATING FACTORS	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.

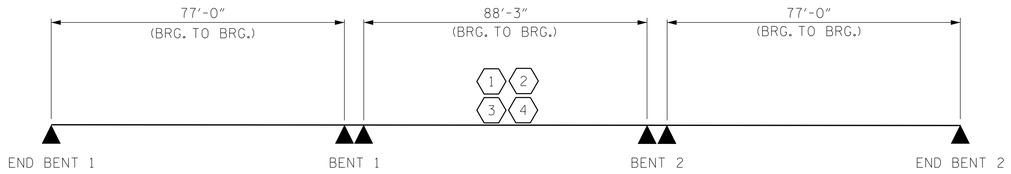
(#) CONTROLLING LOAD RATING

- (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. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L JACOB
4/2/2024

ASSEMBLED BY : J. WEIGER	DATE : 5-2023		
CHECKED BY : J. LOFTUS	DATE : 7-2023		
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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NC License NO.: F-0105

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1			3			TOTAL SHEETS
2			4			38

STD. NO. LRFR1

3/20/2024
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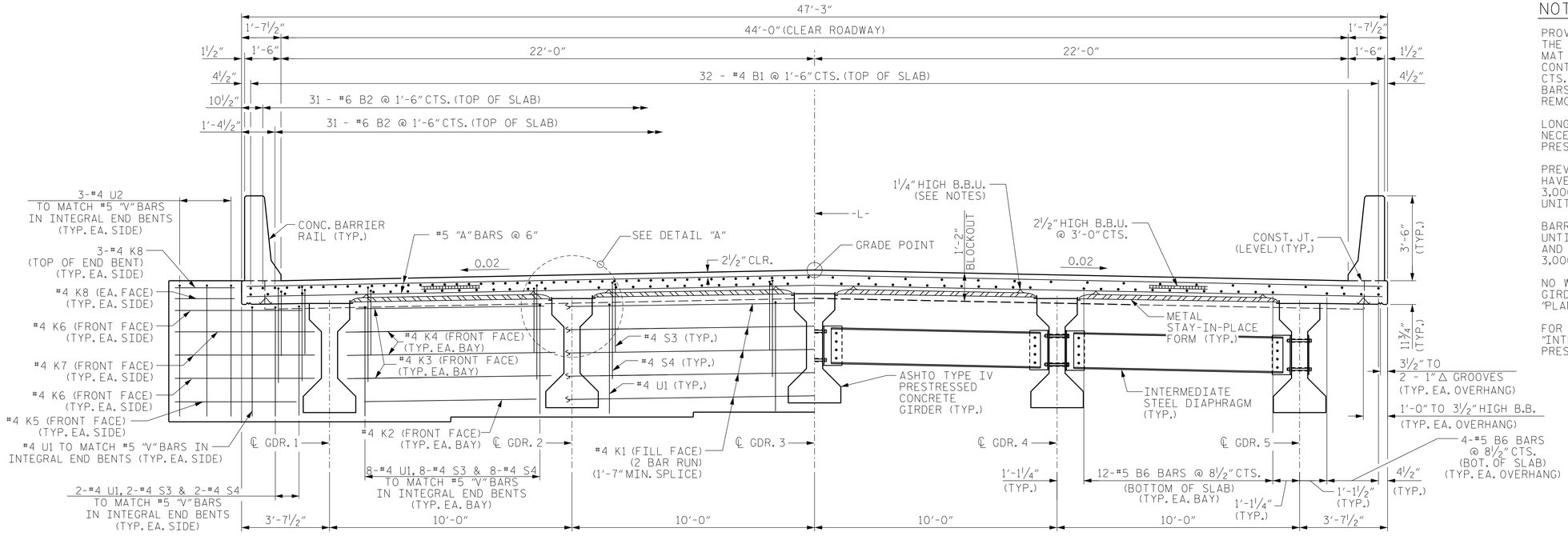
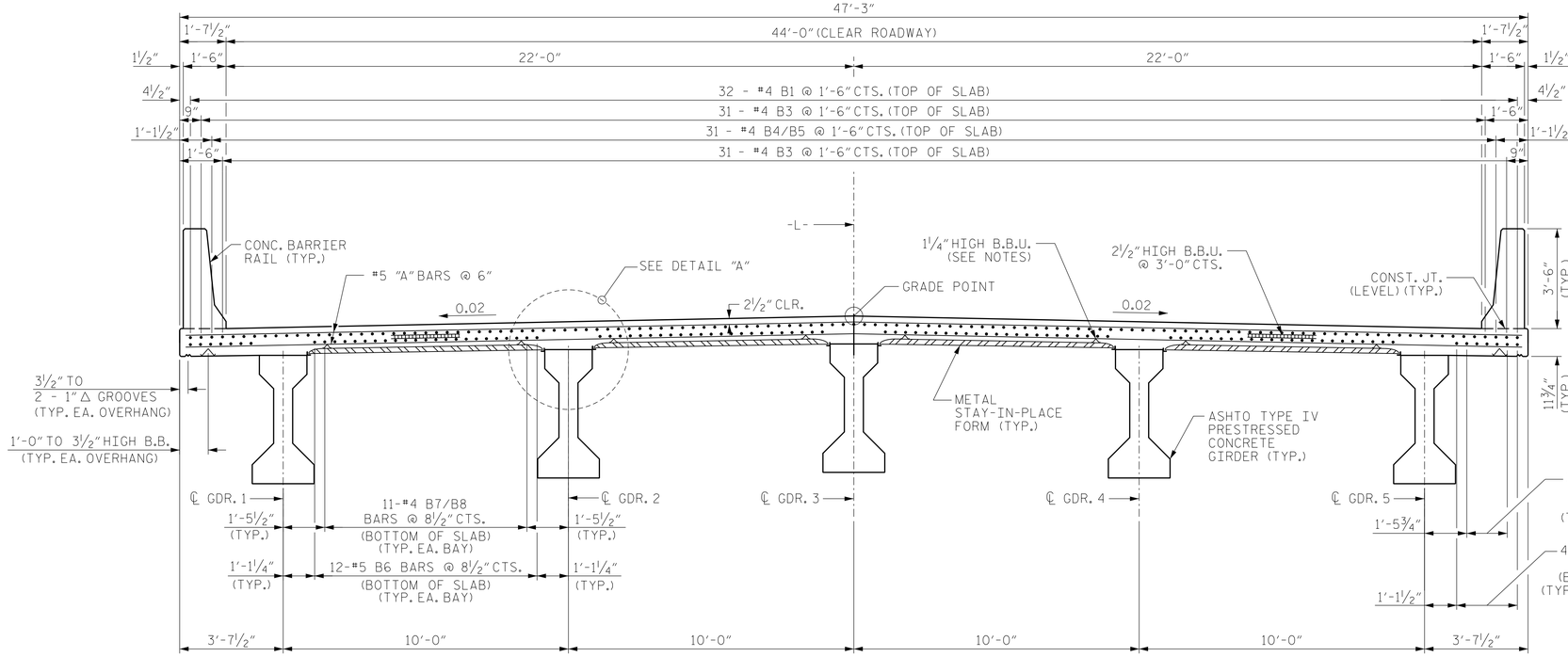
JLoftus



HALF SECTION AT INTEGRAL END BENT DIAPHRAGM

HALF SECTION AT INTERMEDIATE DIAPHRAGM

TYPICAL SECTION



TYPICAL SECTION THROUGH LINK SLAB

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.

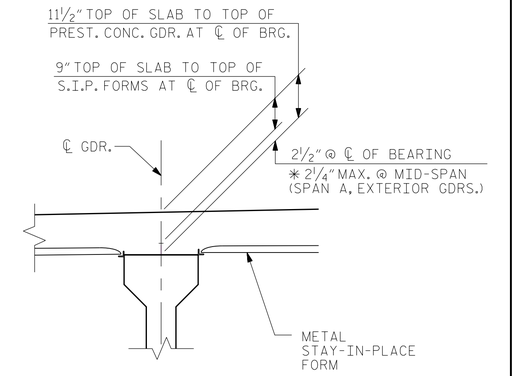
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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.

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

NO WELDING OF FORMS OR FALSEWORK TO THE TOP OF THE GIRDER WILL BE PERMITTED IN THE LINK SLAB AREA. SEE "PLAN OF SPANS" SHEETS FOR LOCATIONS.

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



DETAIL "A"

* BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL SECTION

DRAWN BY : J. WEIGER DATE : 5-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

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1			3			TOTAL SHEETS
2			4			38

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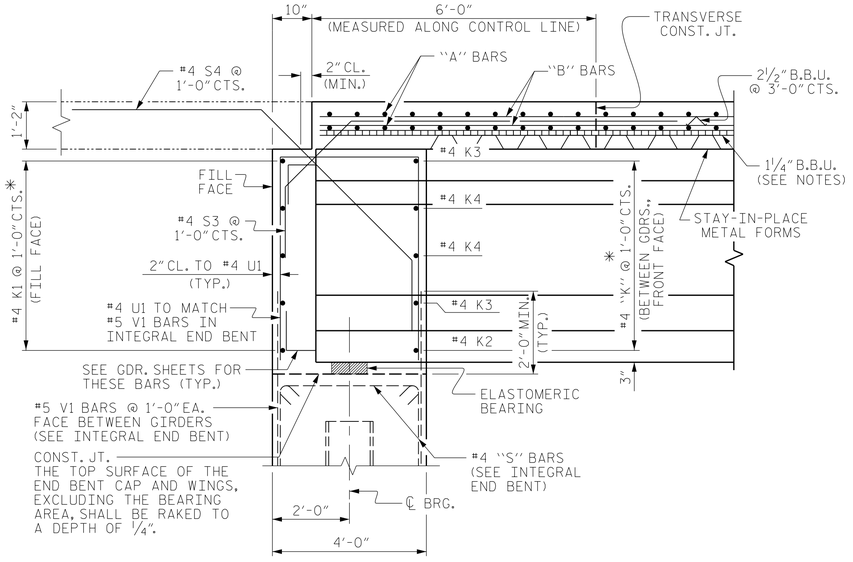
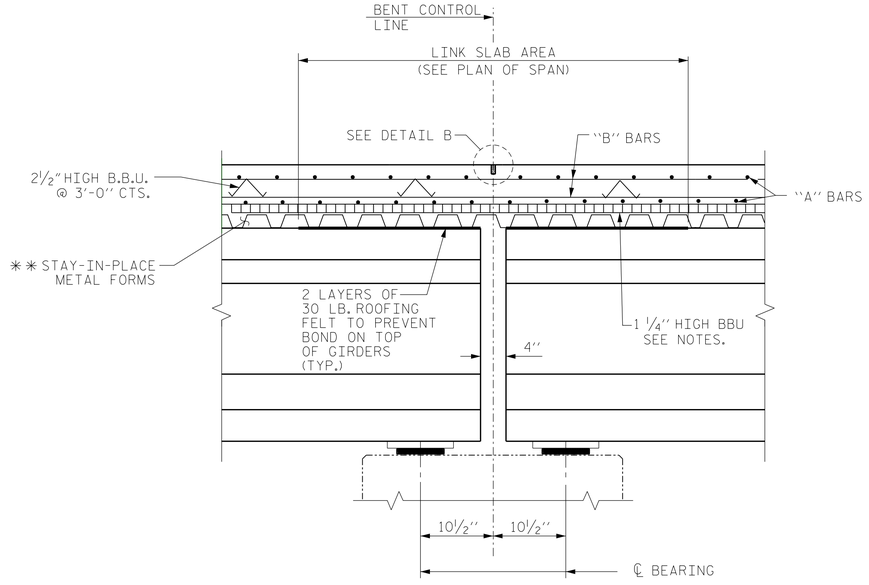


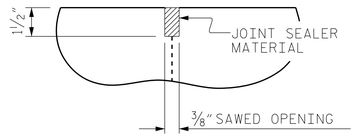
SECTION THRU INTEGRAL END BENT DIAPHRAGM

* 1'-0" CTS. IS MAX. SPACING



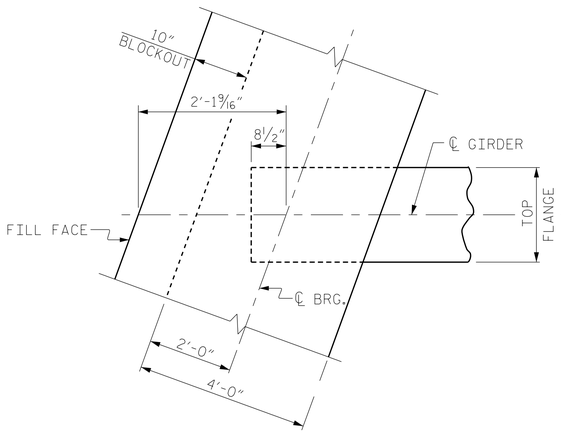
SECTION @ LINK SLAB

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



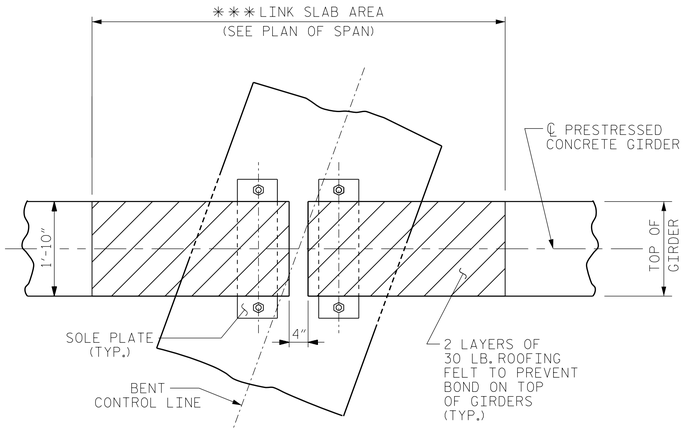
DETAIL "B"

A 1½" DEEP CONTRACTION JOINT AT BENT CONTROL LINE SHALL BE SAWN WITHIN 24 HOURS OF POURING THE 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.



PLAN @ END BENT

END BENT #1 SHOWN, END BENT #2 SIMILAR



PLAN @ BENT

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

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL SECTION DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
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DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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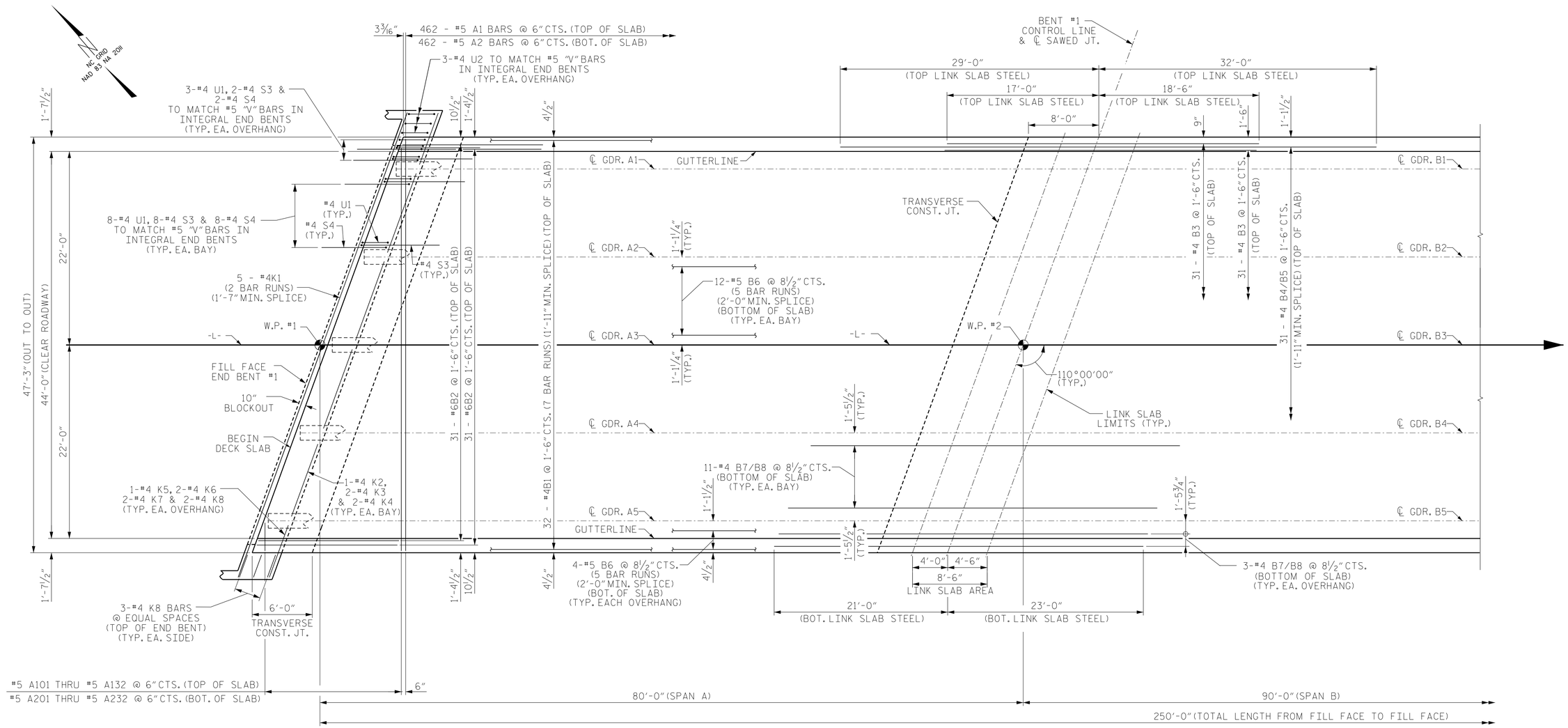
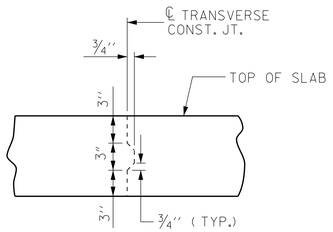
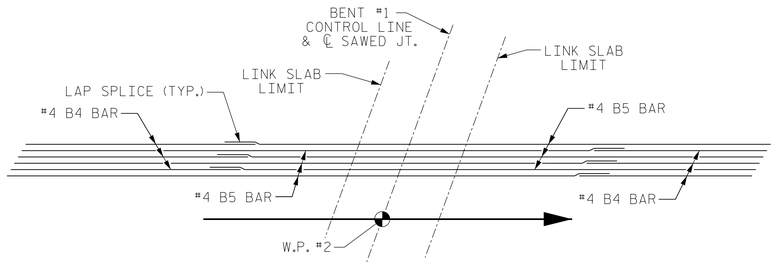


PLAN OF SPAN A



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



PLACEMENT OF B4/B5 & B7/B8 BARS

NOTES: B4/B5 BARS IN TOP OF SLAB SHOWN, B7/B8 BARS IN BOTTOM OF SLAB SIMILAR.
REINFORCEMENT SPLICES SHALL NOT BE PLACED INSIDE THE LINK SLAB LIMITS. ALTERNATE THE PLACEMENT OF ADJACENT BARS AS SHOWN IN THE ABOVE FIGURE.

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN A

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037760 PAUL L. JACOB
4/2/2024

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
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DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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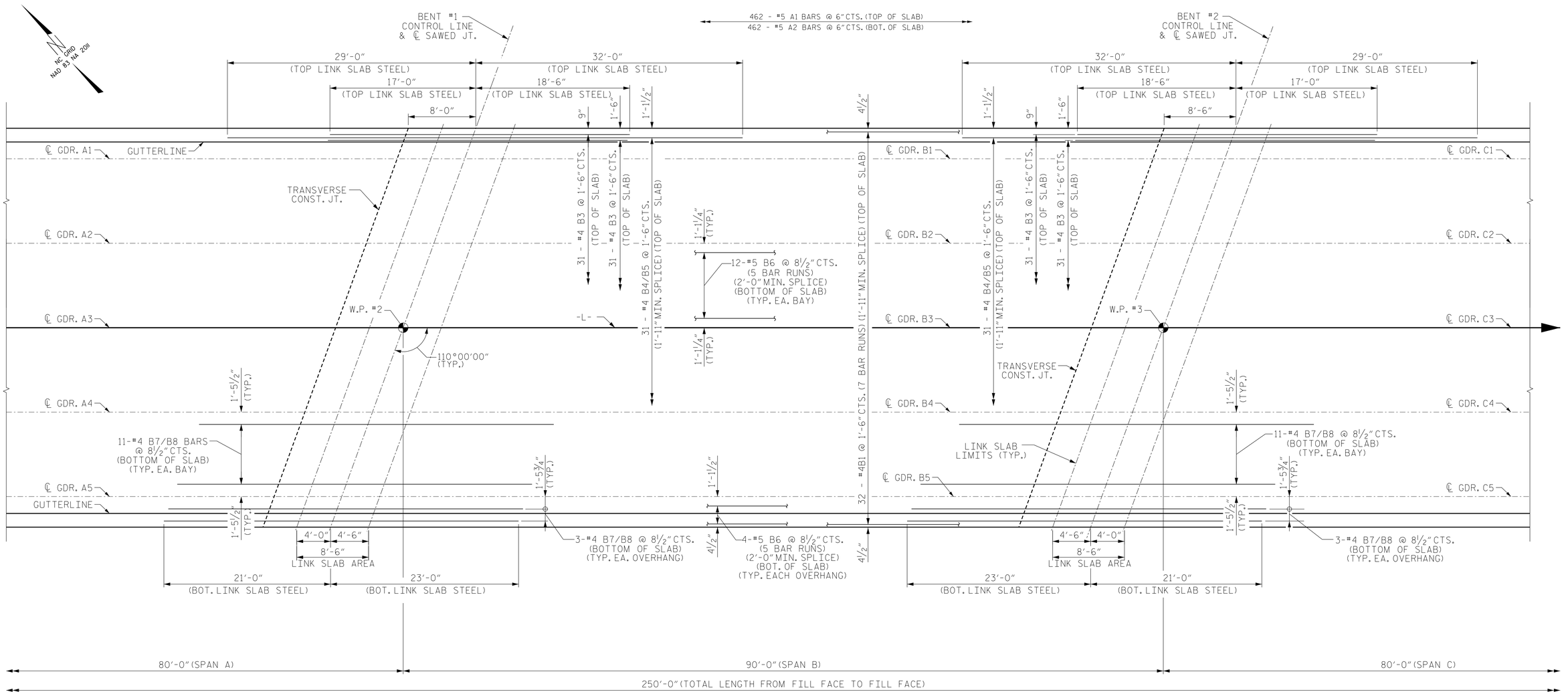

PLAN OF SPAN B

FOR TRANSVERSE JOINT DETAIL, SEE SHEET S-8.
FOR B4/B5 & B7/B8 BAR PLACEMENT, SEE SHEET S-8.

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN B

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037760 PAUL L. JACOB
4/2/2024

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1			3			TOTAL SHEETS
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CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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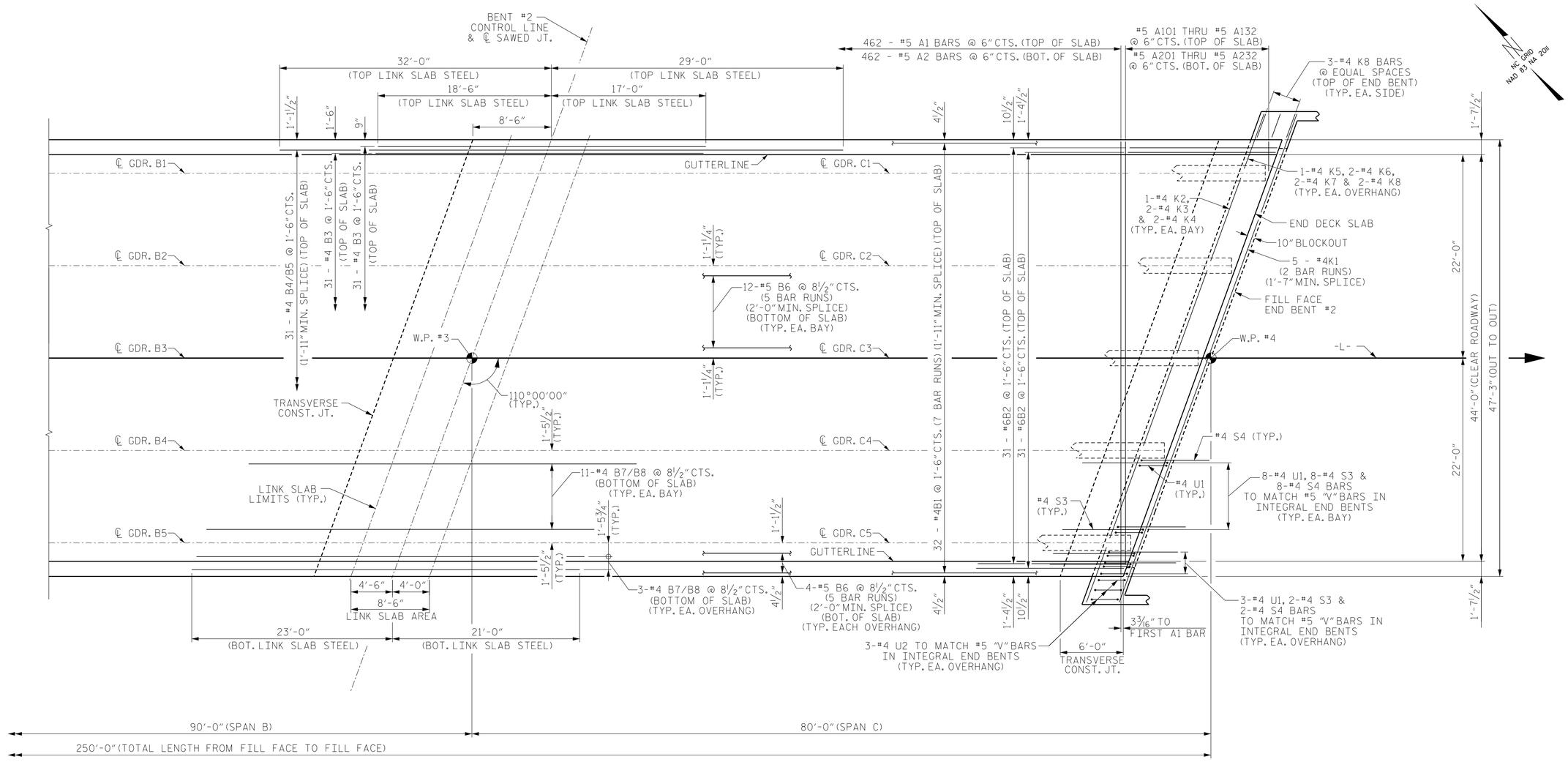

PLAN OF SPAN C

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE SHEET S-8.
FOR B4/B5 & B7/B8 BAR PLACEMENT DETAIL, SEE SHEET S-8.

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF SPAN C

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037760 PAUL L. JACOBS
4/2/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			38

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CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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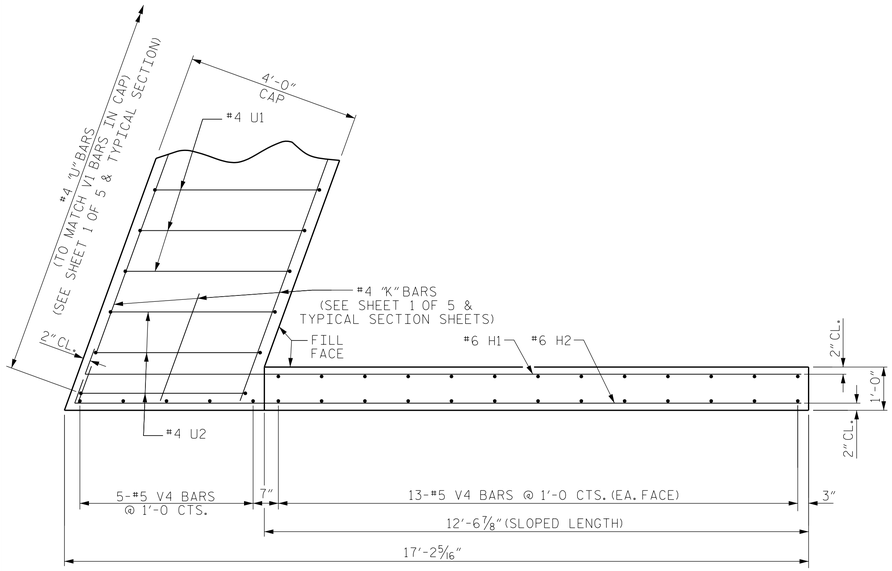
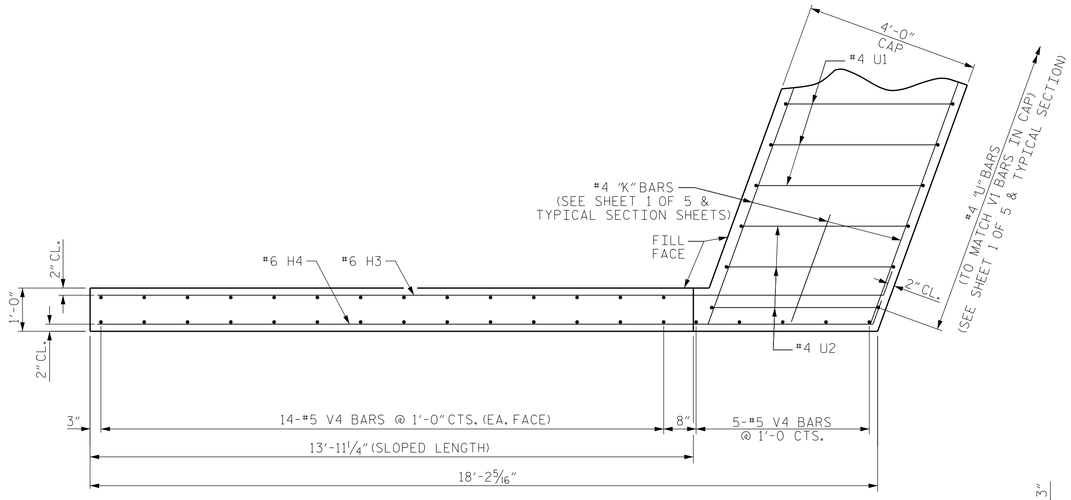
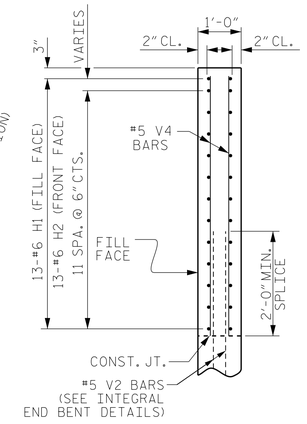


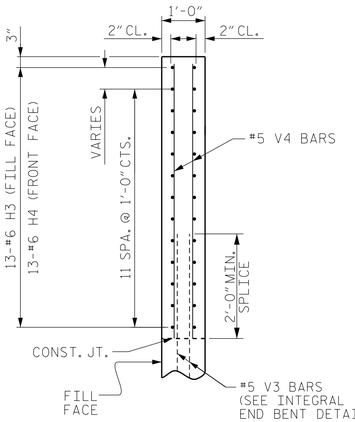
PLAN OF WING (W1)



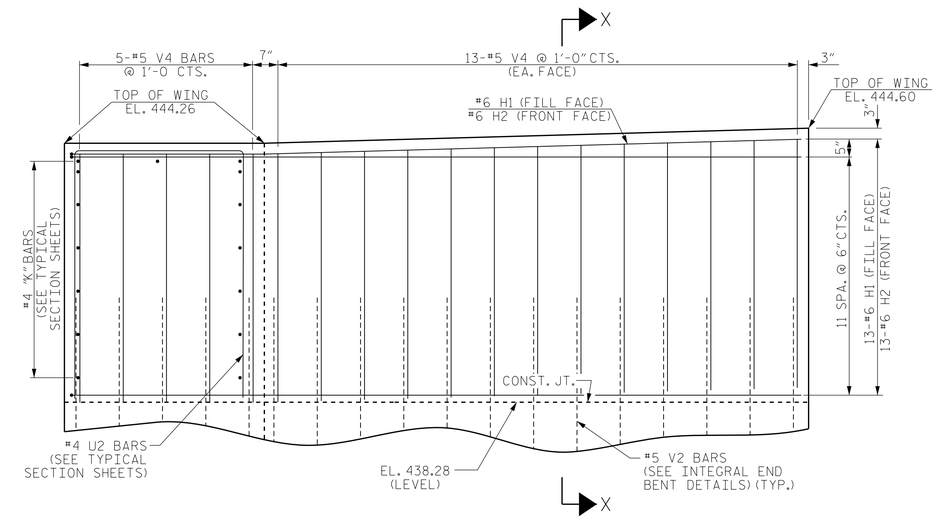
PLAN OF WING (W2)



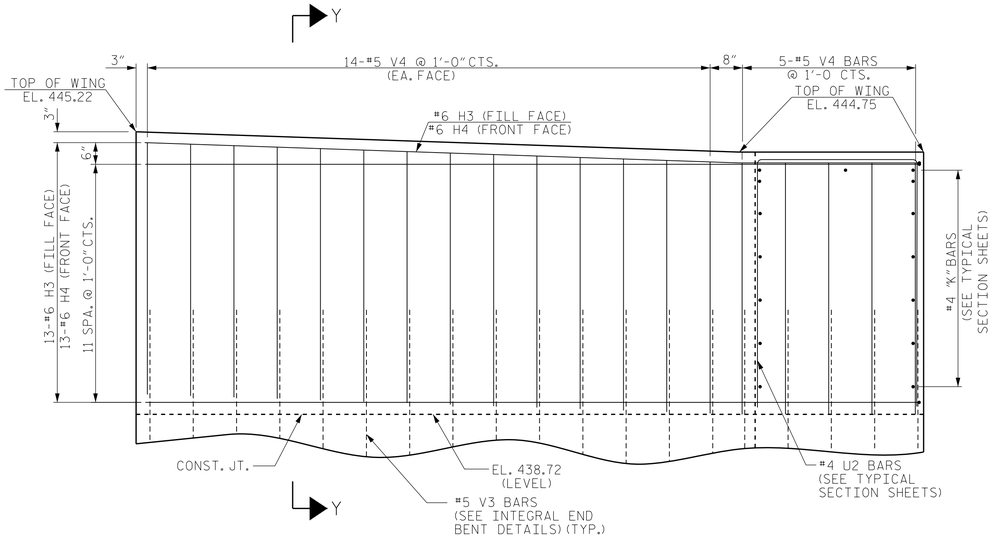
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
UPPER WING DETAILS
AT INTEGRAL END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			38

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

DRAWN BY : M. ROSEMOND DATE : 6-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

moffatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC License NO.: F-0105

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3/20/2024
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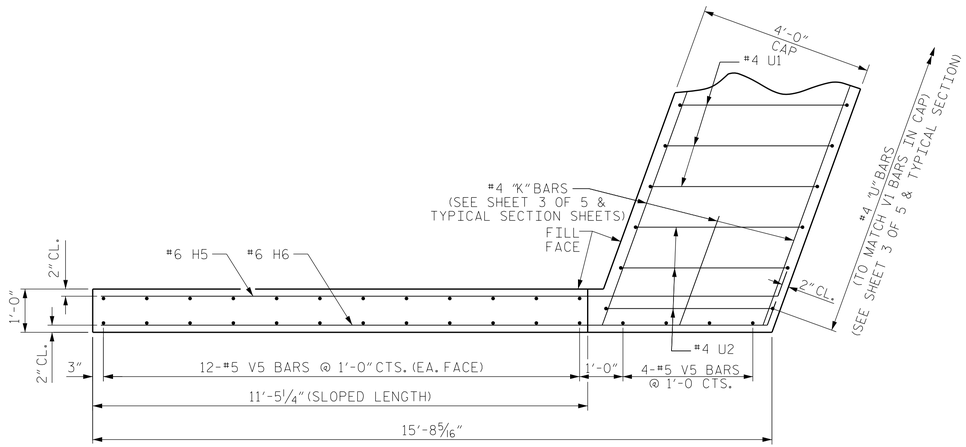
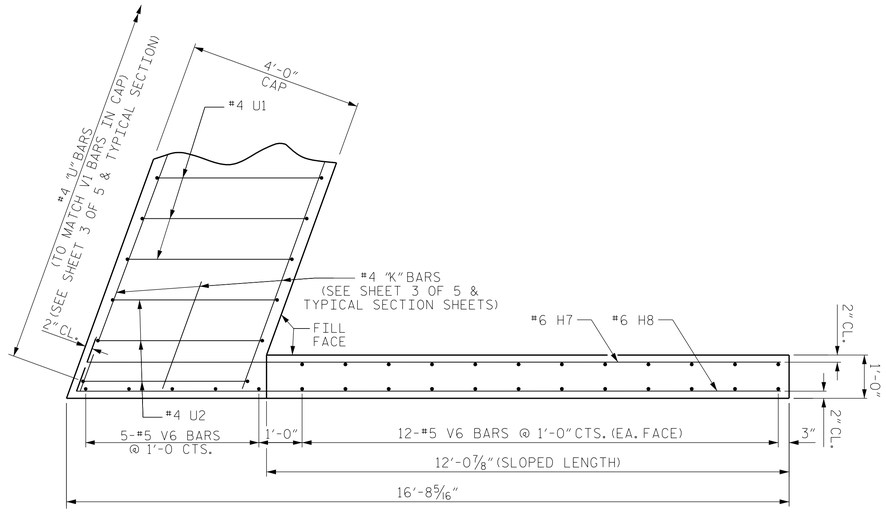
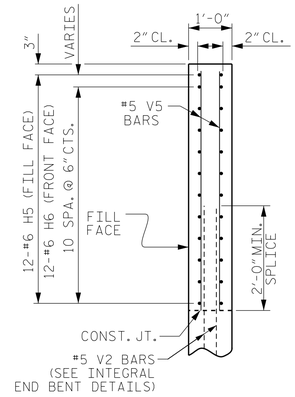
JLoftus



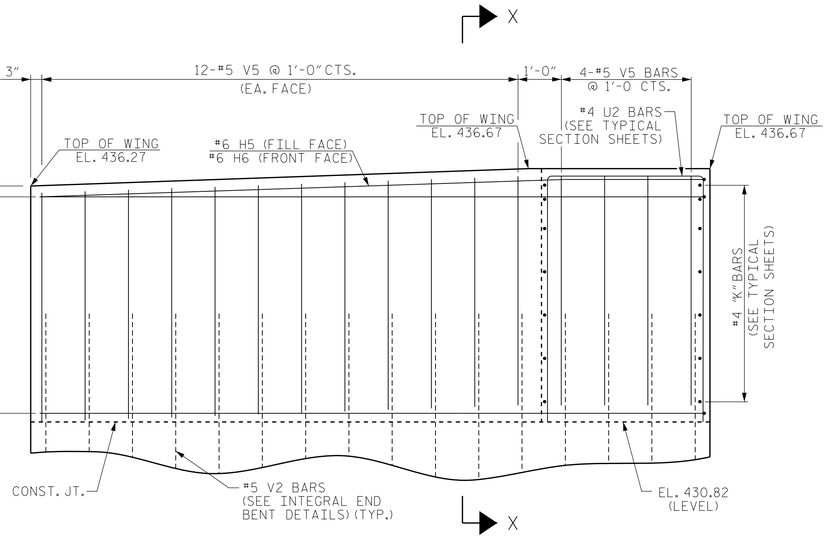
PLAN OF WING (W3)



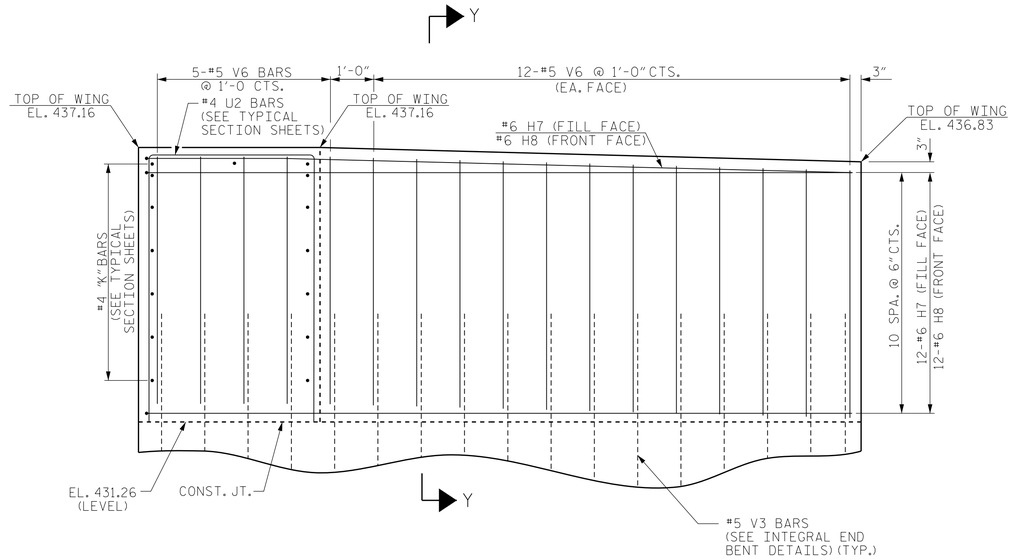
PLAN OF WING (W4)



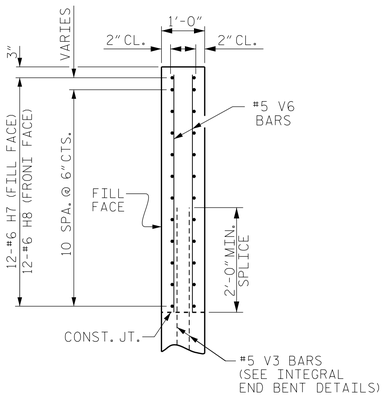
SECTION X-X



ELEVATION OF WING (W3)



ELEVATION OF WING (W4)



SECTION Y-Y

WING DETAILS

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPANS
UPPER WING DETAILS
AT INTEGRAL END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

DRAWN BY : M. ROSEMOND DATE : 6-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

moffatt & nichol
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1			3			TOTAL SHEETS
2			4			38

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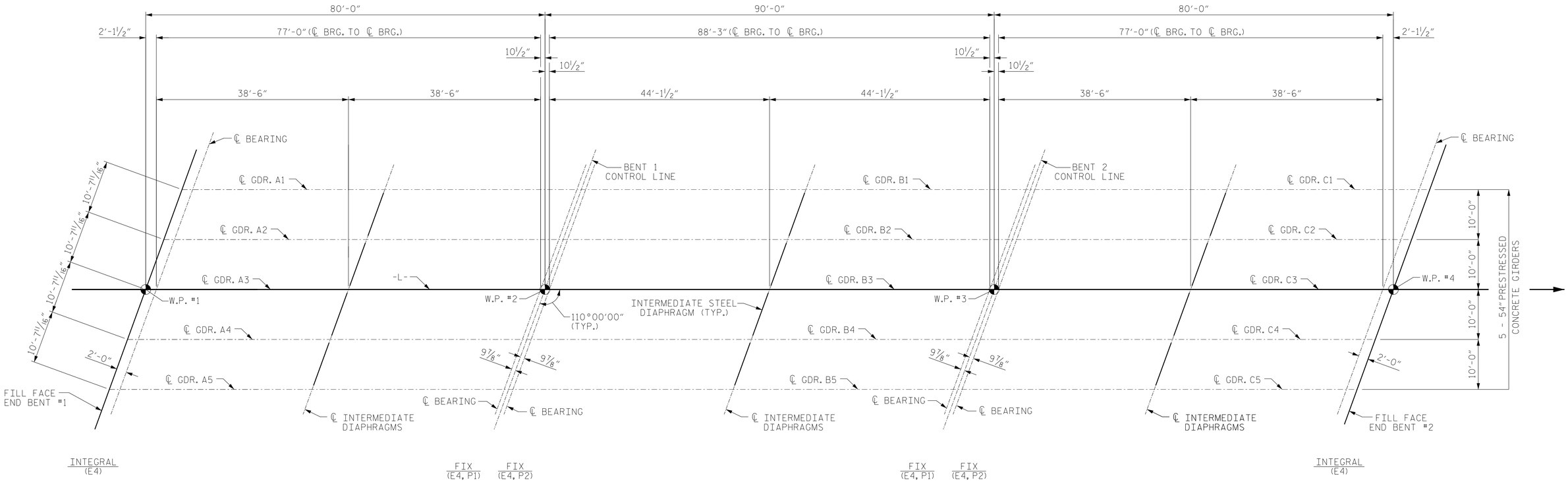

SPAN A

SPAN B

SPAN C

FRAMING PLAN

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

FRAMING PLAN

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L JACOB
4/2/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : J. WEIGER DATE : 2-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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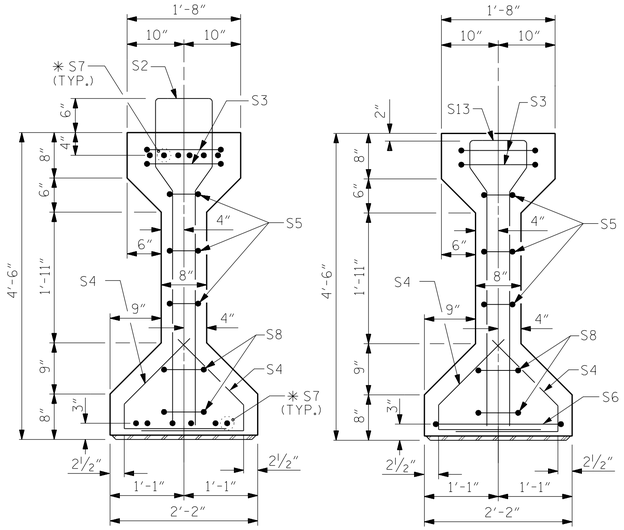
JLoftus



SECTION A-A

SECTION B-B

SECTION C-C

(S1 BARS NOT SHOWN)

✳ FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

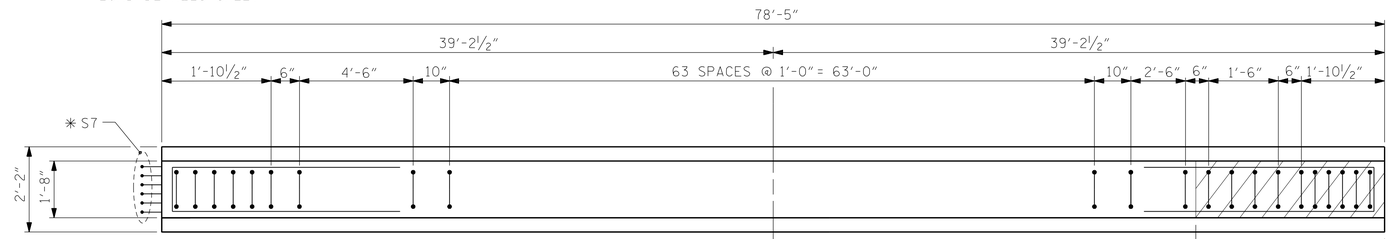
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- △ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

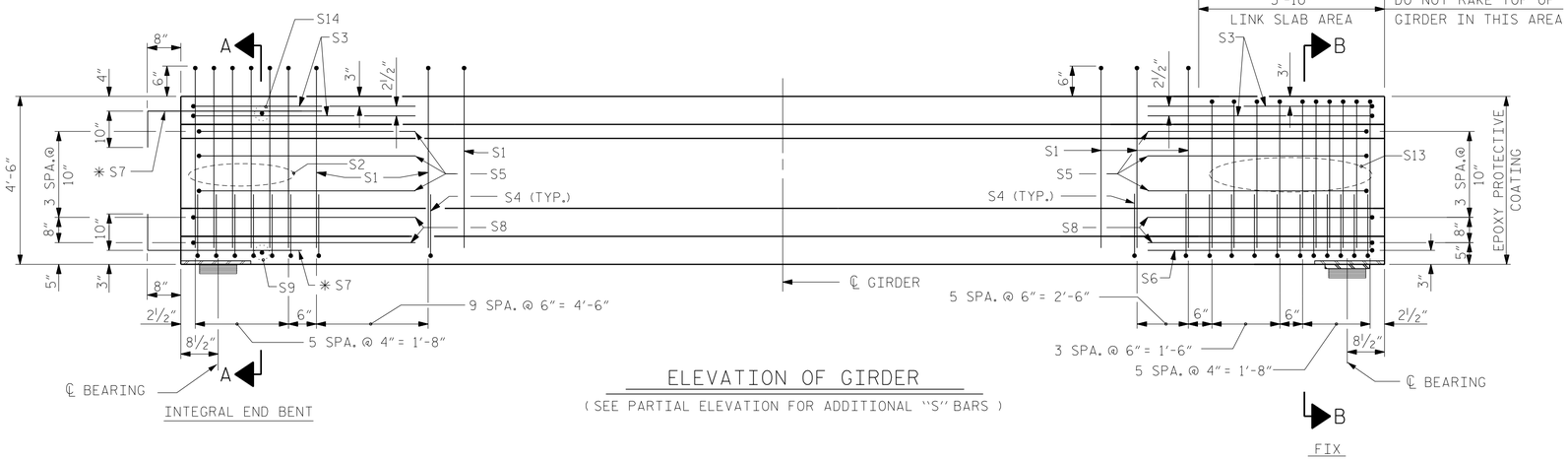
AT END OF GIRDER

AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

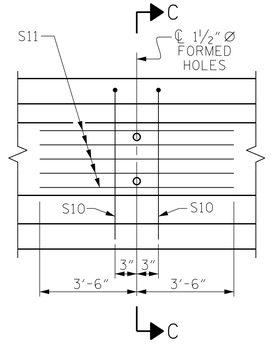


INTEGRAL END BENT

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

FIX



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

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

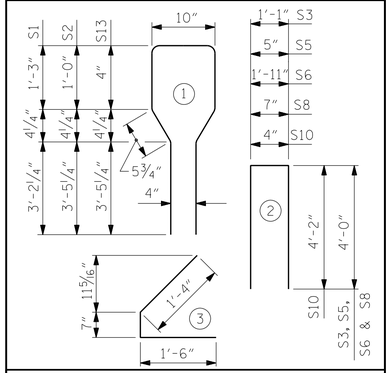
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	80	#4	1	10'-8"	570
S2	6	#6	1	10'-8"	96
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✳ S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	10	#6	1	9'-4"	140
S14	1	#3	STR	1'-4"	1

✳ NOTE: S7 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 (LB.)	8500 PSI CONCRETE (C.Y.)	0.6" Ø L.R. STRANDS (No.)
EXTERIOR GIRDER	1,129	15.9	26
INTERIOR GIRDER	1,129	15.9	26

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	78'-5"	392'-1"

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER SPAN A

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

DRAWN BY :	J. WEIGER — DATE : 1-2023
CHECKED BY :	J. LOFTUS — DATE : 8-2023
DESIGN ENGINEER OF RECORD:	J. LOFTUS — DATE : 3-2024

moffatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
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2			4			38

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jloftus

3/20/2024
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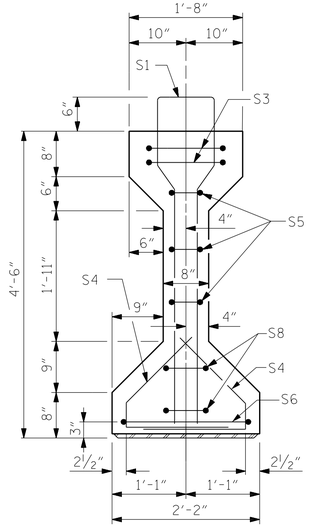
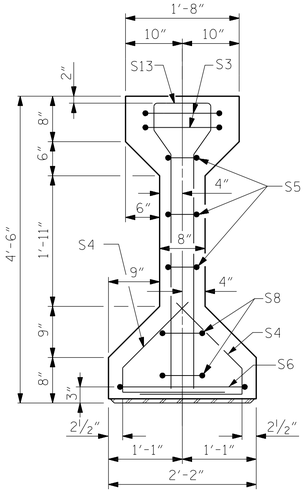
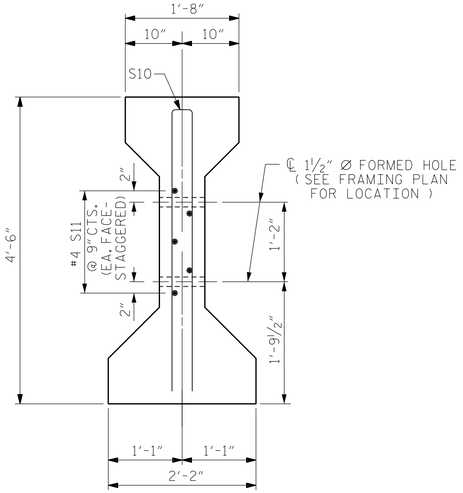
jloftus



SECTION A-A

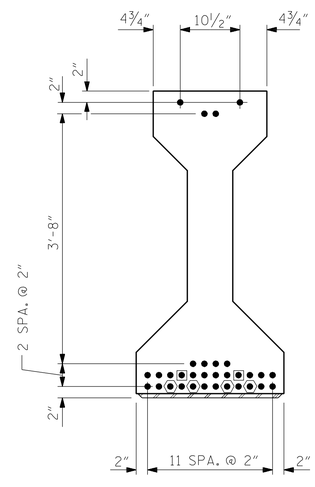


SECTION B-B

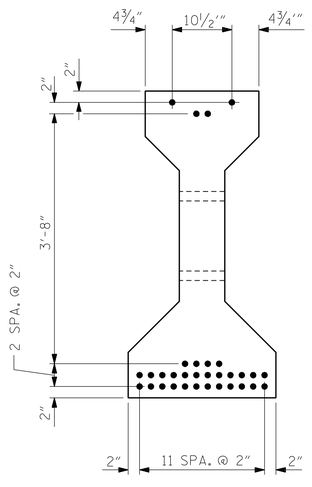


SECTION C-C

(S1 BARS NOT SHOWN)



AT END OF GIRDER

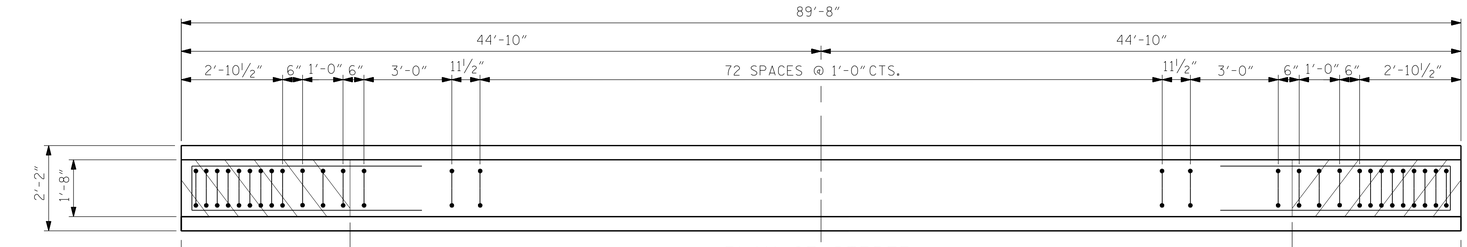


AT ℄ OF GIRDER

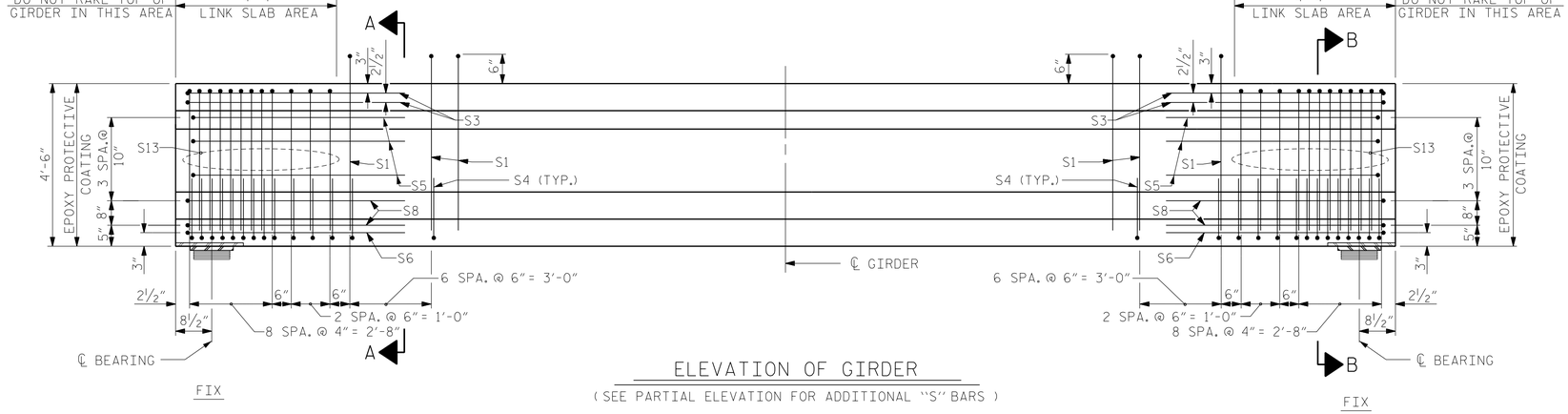
0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

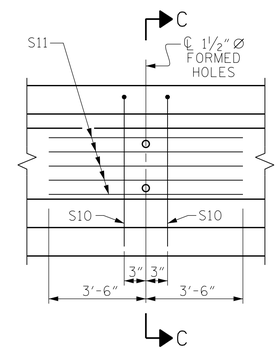


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR ALL GIRDERS

0.6" Ø L. R. GRADE 270 STRANDS

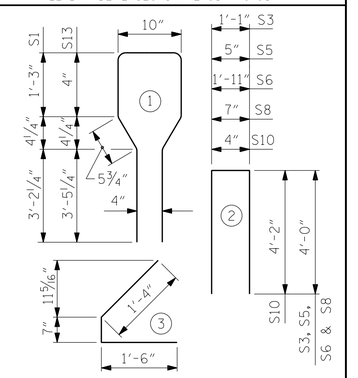
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	87	#4	1	10'-8"	620
S3	4	#4	2	9'-1"	24
S4	76	#4	3	3'-5"	173
S5	6	#4	2	8'-5"	34
S6	2	#4	2	9'-11"	13
S8	4	#4	2	8'-7"	23
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	24	#6	1	9'-4"	336

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	1,264	18.2	32
INTERIOR GIRDER	1,264	18.2	32

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	89'-8"	448'-4"

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER SPAN B

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037760 PAUL L. JACOB
4/2/2024

DRAWN BY : J. WEIGER DATE : 1-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

moffatt & nichol
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RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
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2			4			38

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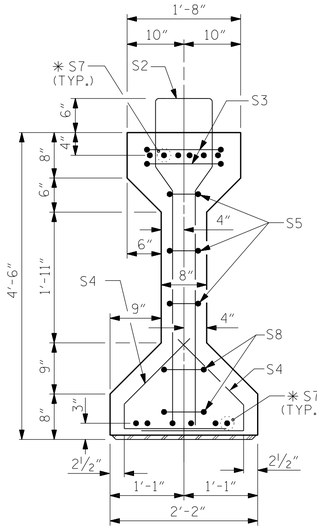
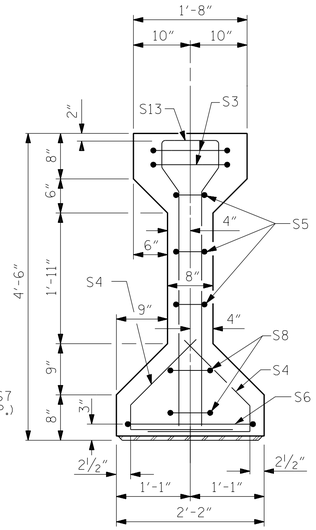
JLoftus

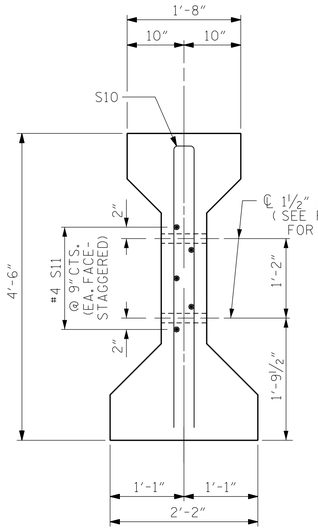


SECTION A-A

✱FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



SECTION B-B

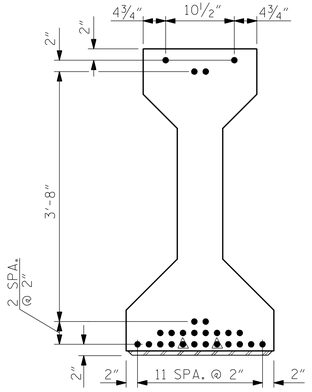


SECTION C-C

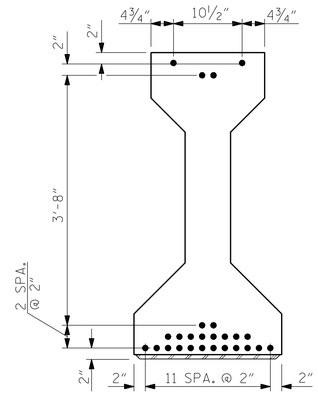
(S1 BARS NOT SHOWN)

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- △ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

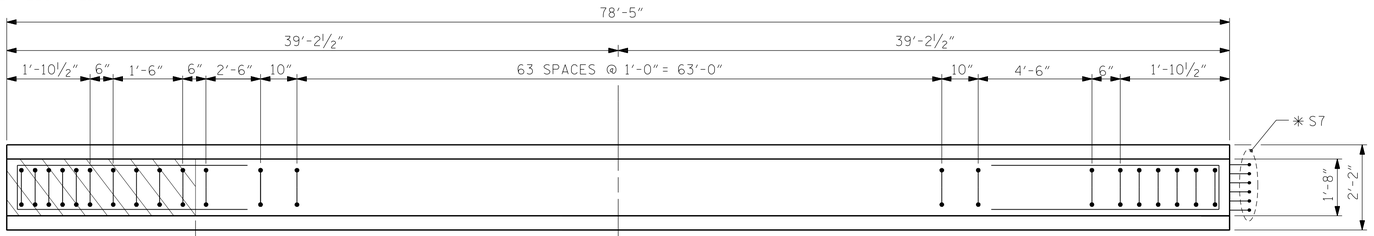


AT END OF GIRDER

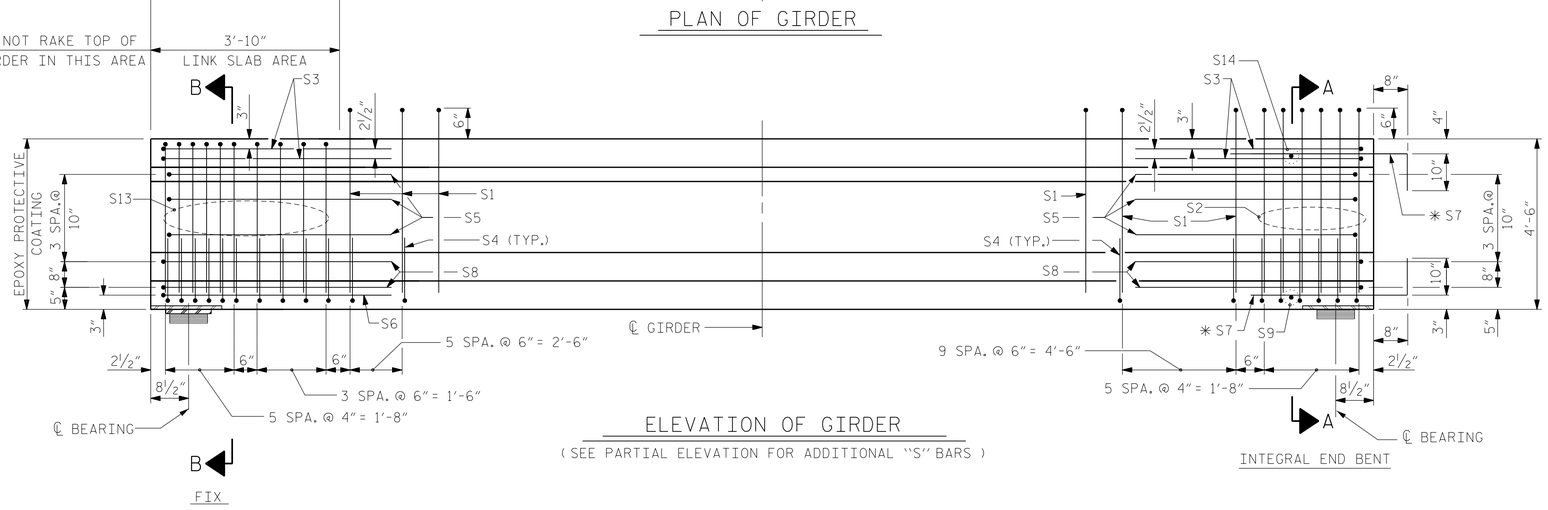


AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

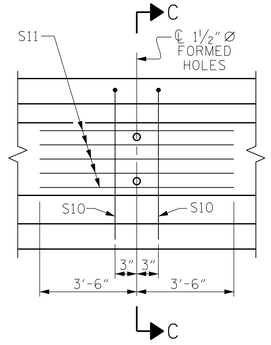


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

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

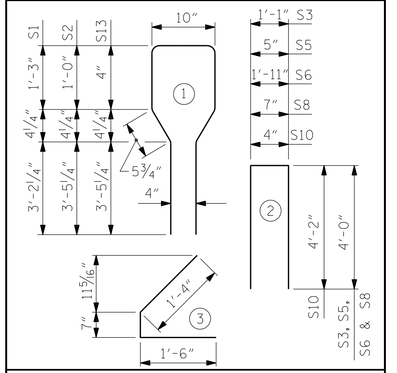
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	80	#4	1	10'-8"	570
S2	6	#6	1	10'-8"	96
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✱S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	10	#6	1	9'-4"	140
S14	1	#3	STR	1'-4"	1

✱NOTE: S7 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	8500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	1,129	15.9	26
INTERIOR GIRDER	1,129	15.9	26

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	78'-5"	392'-1"

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER SPAN C

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : J. WEIGER DATE : 1-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

moffatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC License NO.: F-0105

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3/20/2024
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jloftus

3/20/2024
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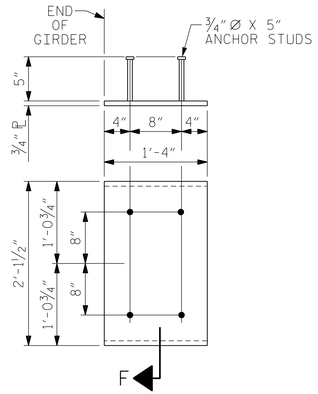
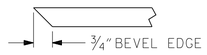
jloftus



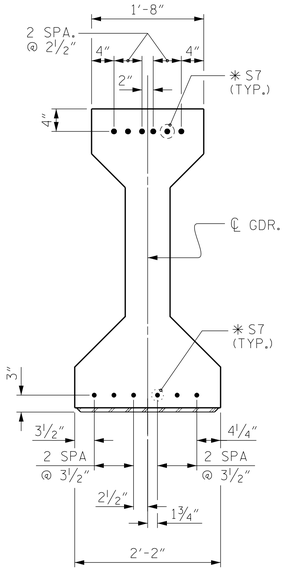
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)



AT INTEGRAL END BENTS

DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)

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 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 6500 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" AND THE PORTION WITHIN THE LINK SLAB AREA, SHALL BE RAKED TO A DEPTH OF ¼".

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

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. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

ASSEMBLED BY : J. WEIGER	DATE : 06-2023
CHECKED BY : J. LOFTUS	DATE : 07-2023
DRAWN BY : ELR 11/91	REV. 2/15 MAA/TMC
CHECKED BY : GRP 11/91	REV. 12/17 MAA/THC
	REV. 10/23 BNB/AKP

moffatt & nichol
4700 FALLS OF NEUSE ROAD, SUITE 300
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NC License NO.: F-0105

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
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2			4			38

STD. NO. PCG9 (Sht. 3a)

3/20/2024
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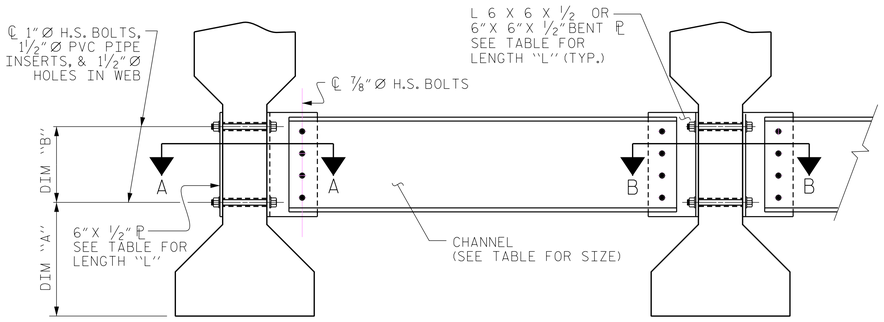
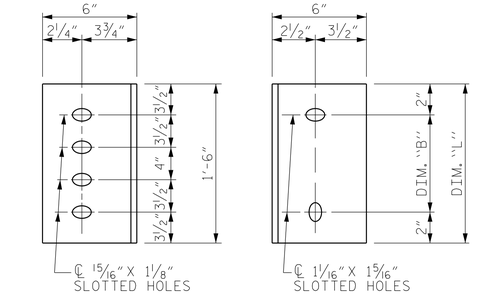
JLOFTUS



EXTERIOR GIRDER INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE WEB FACE

CONNECTOR PLATE DETAILS

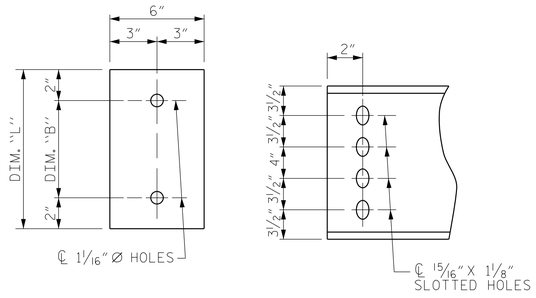
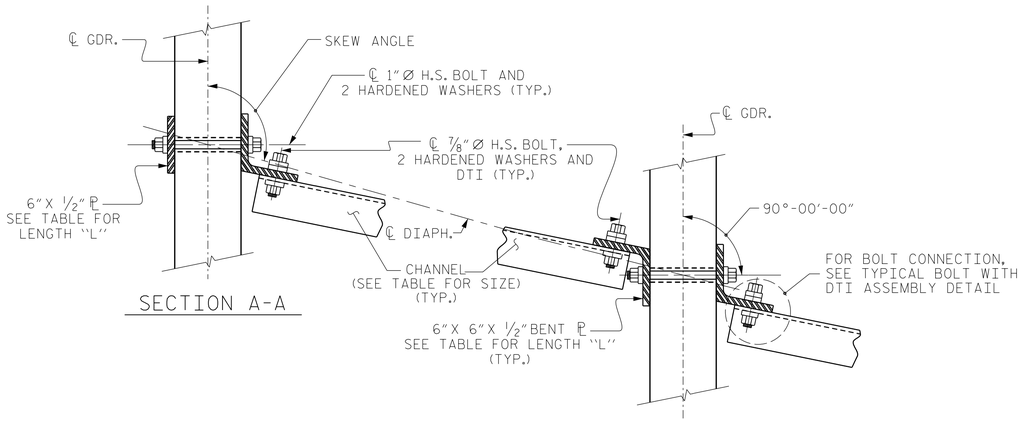
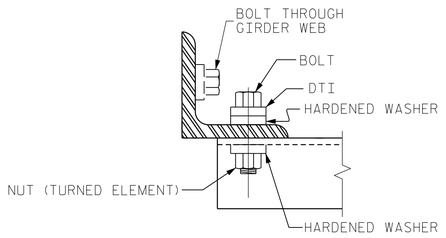


PLATE DETAILS CHANNEL END



CONNECTION 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 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.

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9½"	1'-2"	1'-6"

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS

NORTH CAROLINA PROFESSIONAL ENGINEERS SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

ASSEMBLED BY : J. WEIGER	DATE : 2-2023
CHECKED BY : J. LOFTUS	DATE : 7-2023
DRAWN BY : TLA 6/05	REV. 5/1/06 KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

moffatt & nichol
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NC License NO.: F-0105

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2			4			38

STD. NO. PCG10 (SHT 4)

3/20/2024
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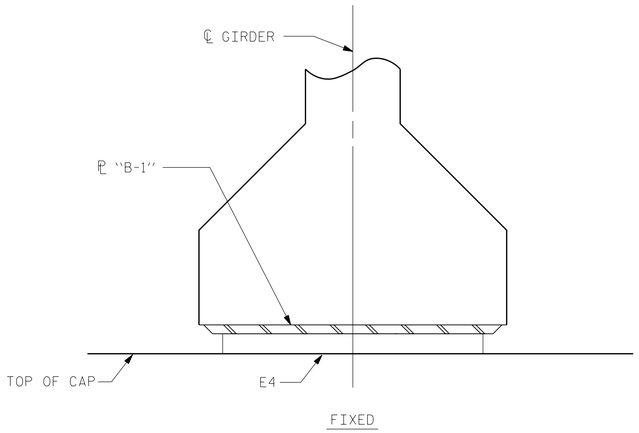
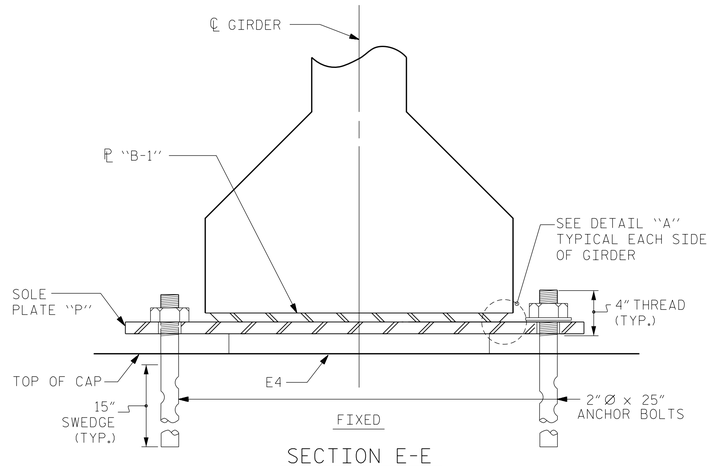
JLoftus



FIXED

SECTION F-F

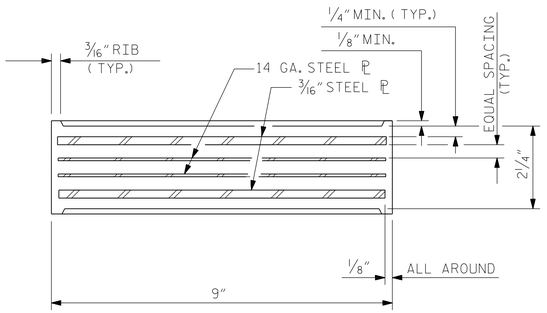
(AT INTERGAL END BENTS)



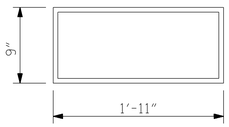
FIXED

SECTION E-E

(AT BENTS)



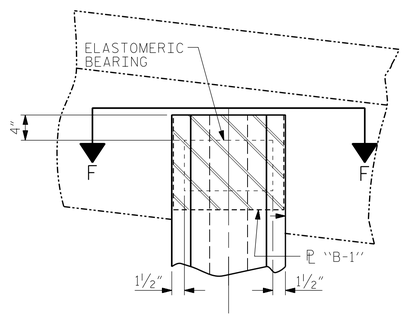
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 (30 REQ'D)

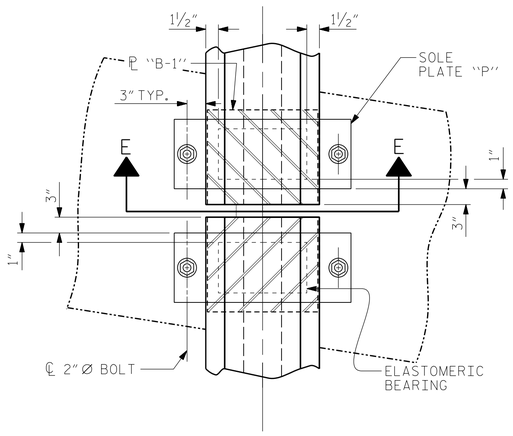
PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



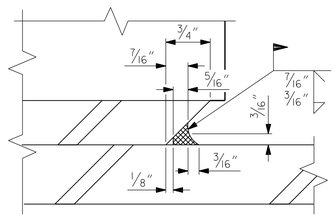
TYPICAL PLAN

(SHOWING INTEGRAL END BENT)

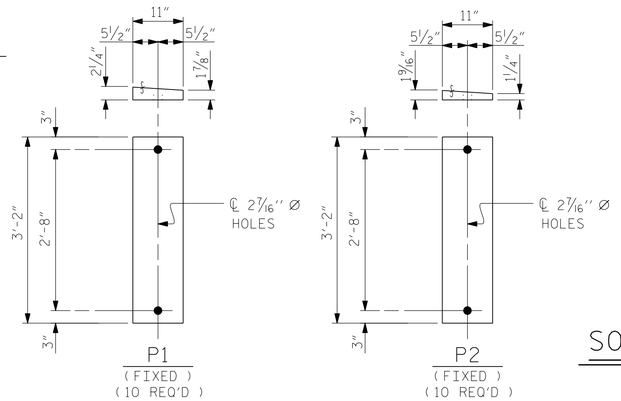


TYPICAL PLAN

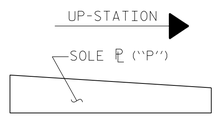
(SHOWING BENT)



DETAIL "A"



SOLE PLATE DETAILS ("P")



SOLE ℄ PLACEMENT DETAIL

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2"Ø 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. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, 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.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L.(NO IMPACT)	
TYPE V	365 k

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037760 PAUL L. JACOB
4/2/2024

DRAWN BY : J. WEIGER DATE : 2-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

moffatt & nichol
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3/20/2024
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JLoftus

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6"Ø LOW RELAXATION	SPANS A & C GIRDERS 1 & 5																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.014	0.027	0.039	0.051	0.061	0.070	0.077	0.082	0.085	0.086	0.085	0.082	0.077	0.070	0.061	0.051	0.039	0.027	0.014	0.000
✳DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.010	0.019	0.028	0.038	0.045	0.052	0.057	0.062	0.064	0.065	0.064	0.062	0.057	0.053	0.045	0.038	0.029	0.019	0.010	0.000
FINAL CAMBER ↑	0	1/16"	1/8"	1/8"	1/8"	3/16"	3/16"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	3/16"	3/16"	1/8"	1/8"	1/8"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6"Ø LOW RELAXATION	SPANS A & C GIRDERS 2 & 4																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.014	0.027	0.039	0.051	0.061	0.070	0.077	0.082	0.085	0.086	0.085	0.082	0.077	0.070	0.061	0.051	0.039	0.027	0.014	0.000
✳DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.010	0.021	0.031	0.041	0.049	0.057	0.062	0.067	0.069	0.071	0.069	0.067	0.062	0.057	0.049	0.041	0.031	0.021	0.010	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6"Ø LOW RELAXATION	SPANS A & C GIRDER 3																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.014	0.027	0.039	0.051	0.061	0.070	0.077	0.082	0.085	0.086	0.085	0.082	0.077	0.070	0.061	0.051	0.039	0.027	0.014	0.000
✳DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.010	0.021	0.031	0.041	0.050	0.058	0.063	0.068	0.070	0.072	0.070	0.068	0.063	0.058	0.050	0.041	0.031	0.021	0.010	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6"Ø LOW RELAXATION	SPAN B GIRDERS 1 & 5																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.022	0.044	0.064	0.083	0.099	0.113	0.124	0.133	0.138	0.139	0.138	0.133	0.124	0.113	0.099	0.083	0.064	0.044	0.022	0.000
✳DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.017	0.033	0.050	0.066	0.079	0.091	0.099	0.107	0.110	0.113	0.110	0.107	0.099	0.091	0.079	0.066	0.050	0.033	0.017	0.000
FINAL CAMBER ↑	0	1/16"	1/8"	3/16"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	3/16"	1/8"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6"Ø LOW RELAXATION	SPAN B GIRDERS 2 & 4																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.022	0.044	0.064	0.083	0.099	0.113	0.124	0.133	0.138	0.139	0.138	0.133	0.124	0.113	0.099	0.083	0.064	0.044	0.022	0.000
✳DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.018	0.036	0.054	0.071	0.085	0.098	0.107	0.116	0.120	0.122	0.120	0.116	0.107	0.098	0.085	0.071	0.054	0.036	0.018	0.000
FINAL CAMBER ↑	0	1/16"	1/8"	1/8"	1/8"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	1/8"	1/8"	1/8"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6"Ø LOW RELAXATION	SPAN B GIRDER 3																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.022	0.044	0.064	0.083	0.099	0.113	0.124	0.133	0.138	0.139	0.138	0.133	0.124	0.113	0.099	0.083	0.064	0.044	0.022	0.000
✳DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.018	0.037	0.054	0.072	0.086	0.100	0.109	0.118	0.121	0.124	0.121	0.118	0.109	0.100	0.086	0.072	0.054	0.037	0.018	0.000
FINAL CAMBER ↑	0	1/16"	1/16"	1/8"	1/8"	1/8"	1/8"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	3/16"	1/8"	1/8"	1/8"	1/8"	1/16"	1/16"	0

NOTES

✳ INCLUDES FUTURE WEARING SURFACE

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

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB

4/2/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : J. WEIGER DATE : 6-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

moffatt & nichol
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(919) 781-4626 VOICE (919) 781-4869 FAX
NC License NO.: F-0105

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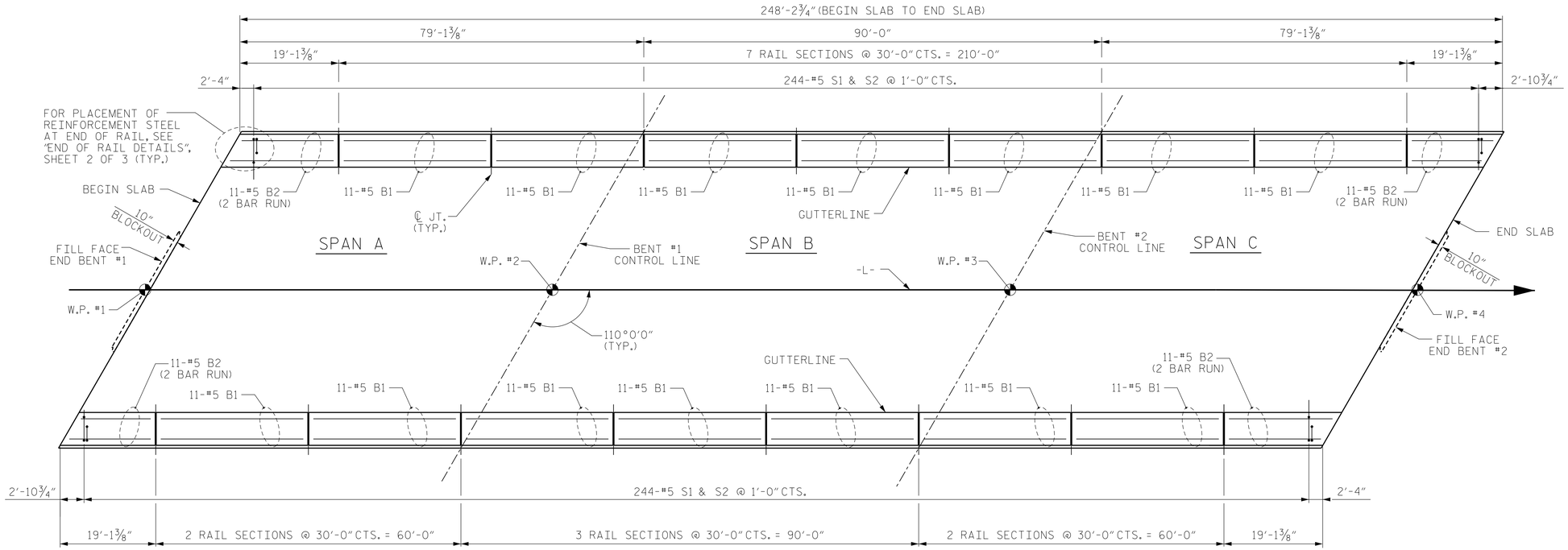
NOTES:

#5 S1 AND S2 BARS MAY BE SHIFTED SLIGHTLY TO MAINTAIN 2" CLEAR TO EXPANSION JOINT IN RAIL.

DIMENSIONS ARE MEASURED ALONG OUTSIDE EDGE OF BARRIER RAIL.



PLAN OF CONCRETE BARRIER RAIL

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE BARRIER RAIL PLAN

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

REVISIONS						SHEET NO.
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CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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3/20/2024
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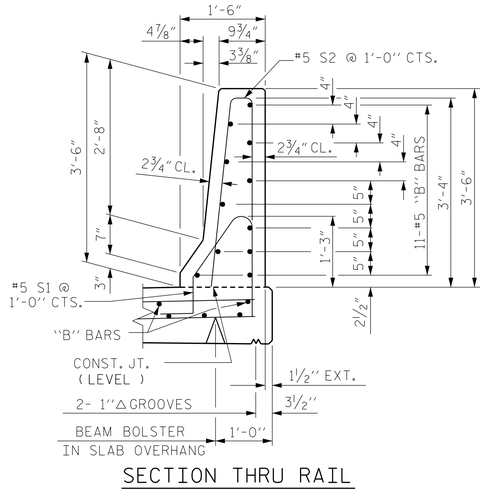
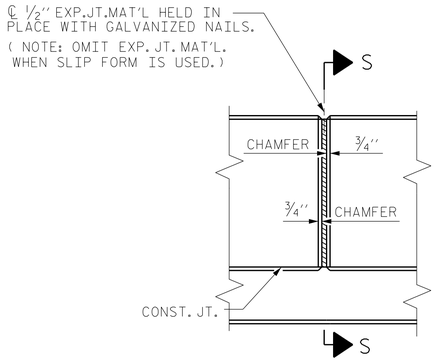
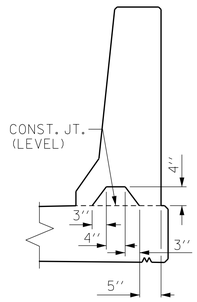
jloftus



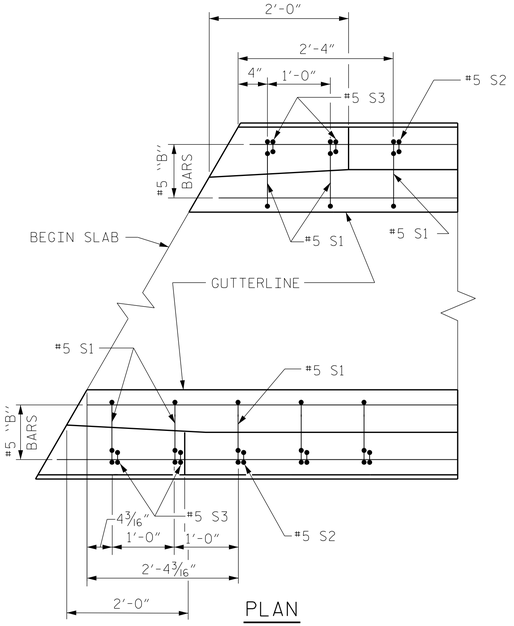
SECTION THRU RAIL





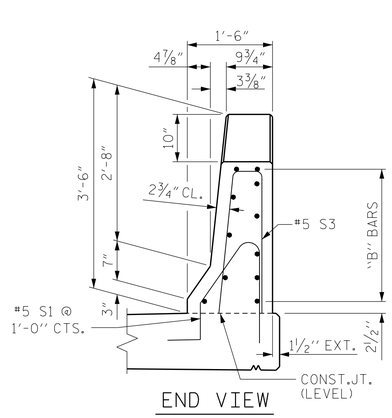
SECTION S-S

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

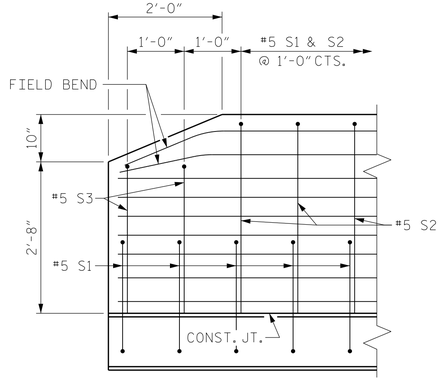


PLAN

NOTE: FOR S1 & S2 BAR SPACINGS, SEE SHEET 1 OF 3.



END VIEW



SIDE VIEW

END OF RAIL DETAILS

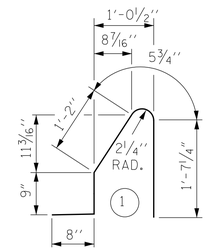
NOTES

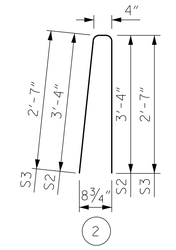
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" 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.

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	496	#5	1	4'-8"	2,414
* S2	488	#5	2	7'-0"	3,563
* S3	8	#5	2	5'-6"	46
* B1	154	#5	STR	29'-7"	4,752
* B2	88	#5	STR	11'-3"	1,033

* EPOXY COATED REINFORCING STEEL	11,808 LBS.
CLASS AA CONCRETE	67.5 CU. YDS.
CONCRETE BARRIER RAIL	496.46 LIN. FT.

ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE
BARRIER RAIL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037760 PAUL L. JACOB
4/2/2024

DRAWN BY :	J. WEIGER	DATE :	1-2023
CHECKED BY :	J. LOFTUS	DATE :	8-2023
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE :	3-2024

moffatt & nichol
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NC License NO.: F-0105

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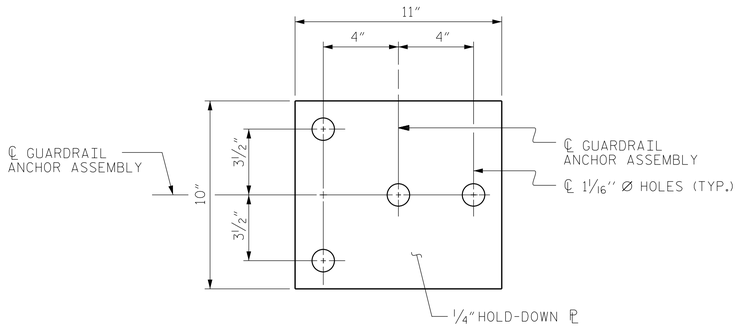
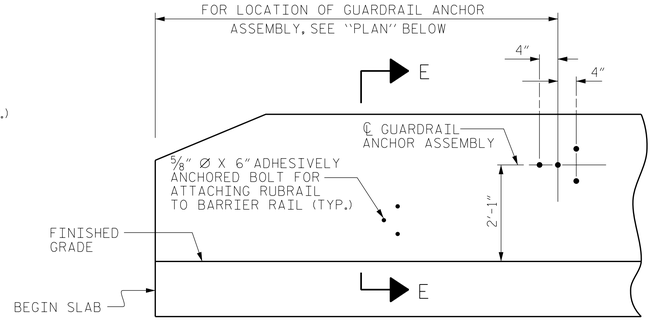
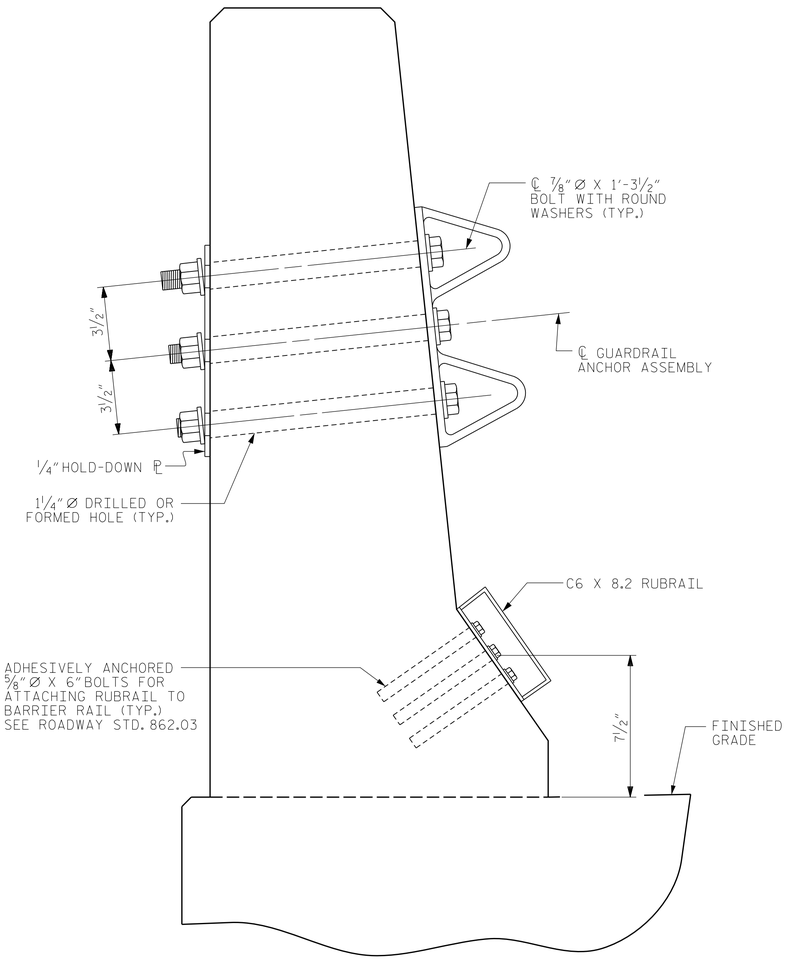
2			4			38



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 1/4" HOLD-DOWN PLATE AND 4 - 7/8" 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 7/8" 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.)

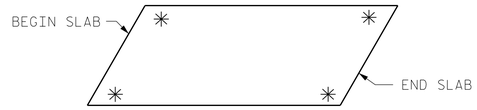
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 1 1/4" 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 5/8" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" 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. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB

4/2/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

ASSEMBLED BY : J. WEIGER	DATE : 1/2023
CHECKED BY : J. LOFTUS	DATE : 7/2023
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

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NC License NO.: F-0105

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			38

(SHT 1b) STD. NO. GRA2

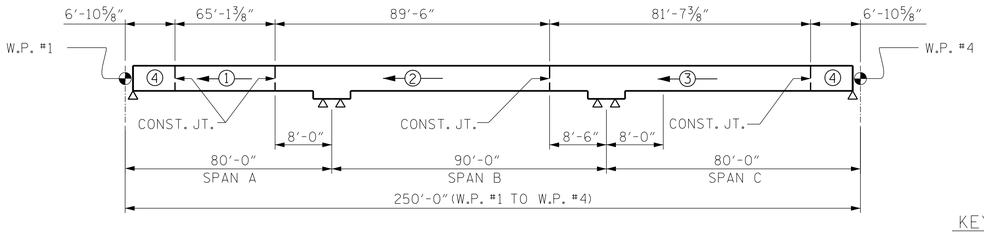
3/20/2024
Q:\RA\10011-109\BR-0069\Structures\01-CADD\02-Final Drawings\401_045_BR0069_SMU_GR01_023_160001.dgn
jloftus

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

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	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″			

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,982	SQ.FT.
BRIDGE DECK	10,164	SQ.FT.
TOTAL	12,146	SQ.FT.

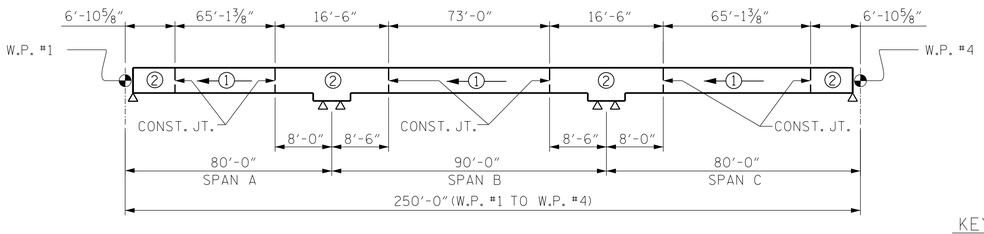


POURING SEQUENCE

POURS CAN NOT BE STARTED UNTIL ADJACENT POURS REACH A MINIMUM OF 3000 PSI.

KEY

⟵(#)— = INDICATES POUR NUMBER AND DIRECTION OF POUR

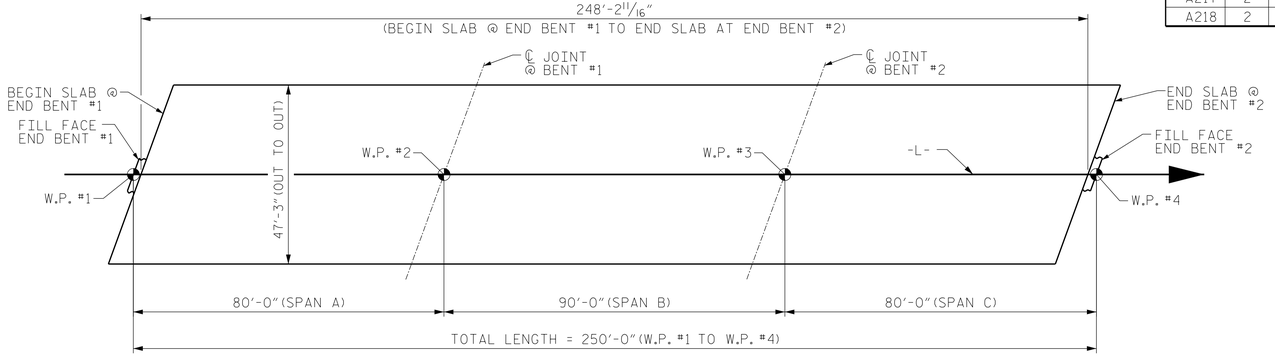


OPTIONAL POURING SEQUENCE

KEY

⟵(#)— = INDICATES POUR NUMBER AND DIRECTION OF POUR

✱ POUR ② CAN NOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3000 PSI.

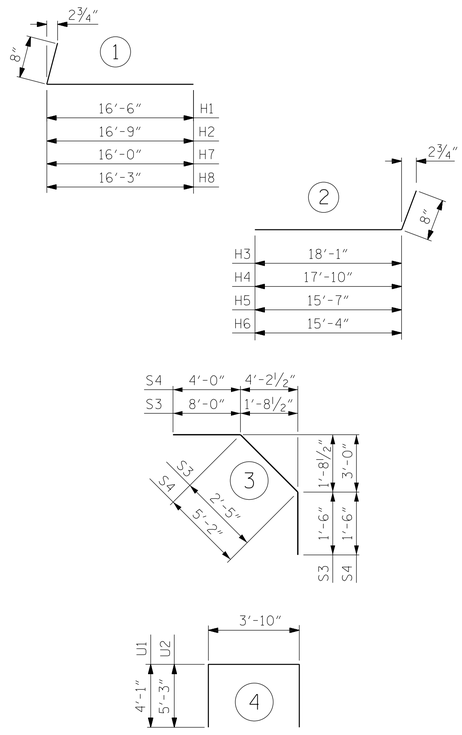


LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 11,729)

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	462	#5	STR	46′-10″	22,567	A219	2	#5	STR	21′-1″	44
A2	462	#5	STR	46′-10″	22,567	A220	2	#5	STR	19′-8″	41
						A221	2	#5	STR	18′-4″	38
✱A101	2	#5	STR	45′-9″	95	A222	2	#5	STR	16′-11″	35
✱A102	2	#5	STR	44′-5″	93	A223	2	#5	STR	15′-7″	33
✱A103	2	#5	STR	43′-0″	90	A224	2	#5	STR	14′-2″	30
✱A104	2	#5	STR	41′-8″	87	A225	2	#5	STR	12′-10″	27
✱A105	2	#5	STR	40′-3″	84	A226	2	#5	STR	11′-5″	24
✱A106	2	#5	STR	38′-11″	81	A227	2	#5	STR	10′-1″	21
✱A107	2	#5	STR	37′-7″	78	A228	2	#5	STR	8′-8″	18
✱A108	2	#5	STR	36′-2″	75	A229	2	#5	STR	7′-4″	15
✱A109	2	#5	STR	34′-10″	73	A230	2	#5	STR	5′-11″	12
✱A110	2	#5	STR	33′-5″	70	A231	2	#5	STR	4′-7′	10
✱A111	2	#5	STR	32′-1″	67	A232	2	#5	STR	3′-2′	7
✱A112	2	#5	STR	30′-8″	64						
✱A113	2	#5	STR	29′-4″	61	✱ B1	224	#4	STR	37′-1″	5,549
✱A114	2	#5	STR	27′-11″	58	✱ B2	124	#6	STR	16′-0″	2,980
✱A115	2	#5	STR	26′-7″	55	✱ B3	124	#4	STR	35′-6″	2,941
✱A116	2	#5	STR	25′-2″	52	✱ B4	62	#4	STR	23′-0″	953
✱A117	2	#5	STR	23′-10″	50	✱ B5	62	#4	STR	39′-11″	1,653
✱A118	2	#5	STR	22′-5″	47	B6	280	#5	STR	51′-3″	14,967
✱A119	2	#5	STR	21′-1″	44	B7	100	#4	STR	15′-0″	1,002
✱A120	2	#5	STR	19′-8″	41	B8	100	#4	STR	30′-7″	2,043
✱A121	2	#5	STR	18′-4″	38						
✱A122	2	#5	STR	16′-11″	35	K1	20	#4	STR	28′-11″	386
✱A123	2	#5	STR	15′-7″	33	K2	8	#4	STR	8′-0″	43
✱A124	2	#5	STR	14′-2″	30	K3	16	#4	STR	8′-6″	91
✱A125	2	#5	STR	12′-10″	27	K4	16	#4	STR	9′-7″	102
✱A126	2	#5	STR	11′-5″	24	K5	4	#4	STR	5′-5″	14
✱A127	2	#5	STR	10′-1″	21	K6	8	#4	STR	5′-9″	31
✱A128	2	#5	STR	8′-8″	18	K7	8	#4	STR	6′-3″	33
✱A129	2	#5	STR	7′-4″	15	K8	20	#4	STR	2′-8″	36
✱A130	2	#5	STR	5′-11″	12						
✱A131	2	#5	STR	4′-7′	10	H1	13	#6	1	17′-2″	335
✱A132	2	#5	STR	3′-2′	7	H2	13	#6	1	17′-5″	340
						H3	13	#6	2	18′-9″	366
A201	2	#5	STR	45′-9″	95	H4	13	#6	2	18′-6″	361
A202	2	#5	STR	44′-5″	93	H5	12	#6	2	16′-3″	293
A203	2	#5	STR	43′-0″	90	H6	12	#6	2	16′-0″	288
A204	2	#5	STR	41′-8″	87	H7	12	#6	1	16′-8″	300
A205	2	#5	STR	40′-3″	84	H8	12	#6	1	16′-11″	305
A206	2	#5	STR	38′-11″	81						
A207	2	#5	STR	37′-7″	78	✱ S3	76	#4	3	11′-11″	605
A208	2	#5	STR	36′-2″	75	✱ S4	76	#4	3	10′-8″	542
A209	2	#5	STR	34′-10″	73						
A210	2	#5	STR	33′-5″	70	U1	76	#4	4	12′-0″	609
A211	2	#5	STR	32′-1″	67	U2	12	#4	4	14′-4″	115
A212	2	#5	STR	30′-8″	64						
A213	2	#5	STR	29′-4″	61	V4	64	#5	STR	5′-9″	384
A214	2	#5	STR	27′-11″	58	V5	28	#5	STR	5′-2″	151
A215	2	#5	STR	26′-7″	55	V6	29	#5	STR	5′-4″	161
A216	2	#5	STR	25′-2″	52						
A217	2	#5	STR	23′-10″	50						
A218	2	#5	STR	22′-5″	47						

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	✱EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	100.8		
POUR 2	138.6		
POUR 3	126.4		
POUR 4	102.9		
TOTALS✱✱	468.7	46,958	39,364

✱✱QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L JACOB
4/2/2024

DRAWN BY : J. WEIGER DATE : 7-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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4700 FALLS OF NEUSE ROAD, SUITE 300
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NC License NO.: F-0105

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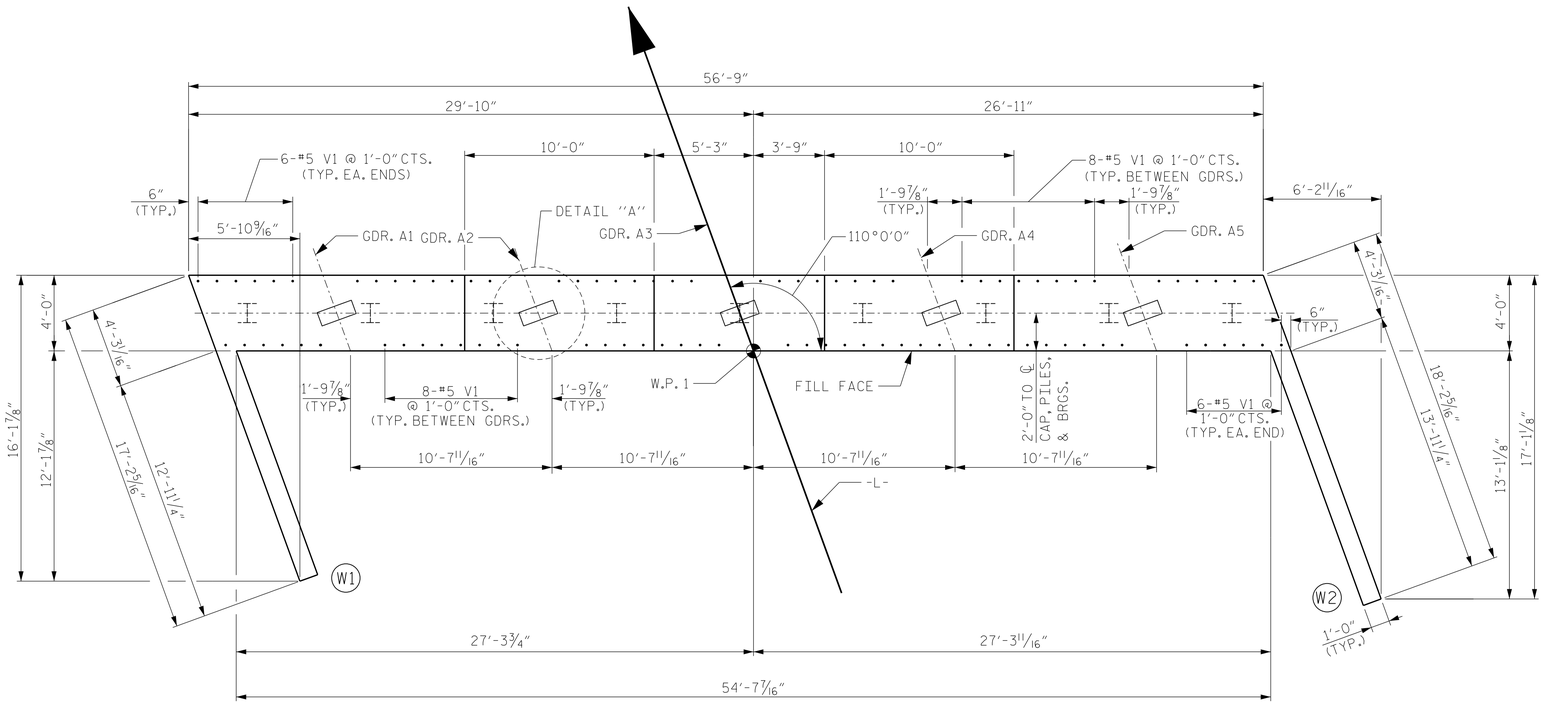
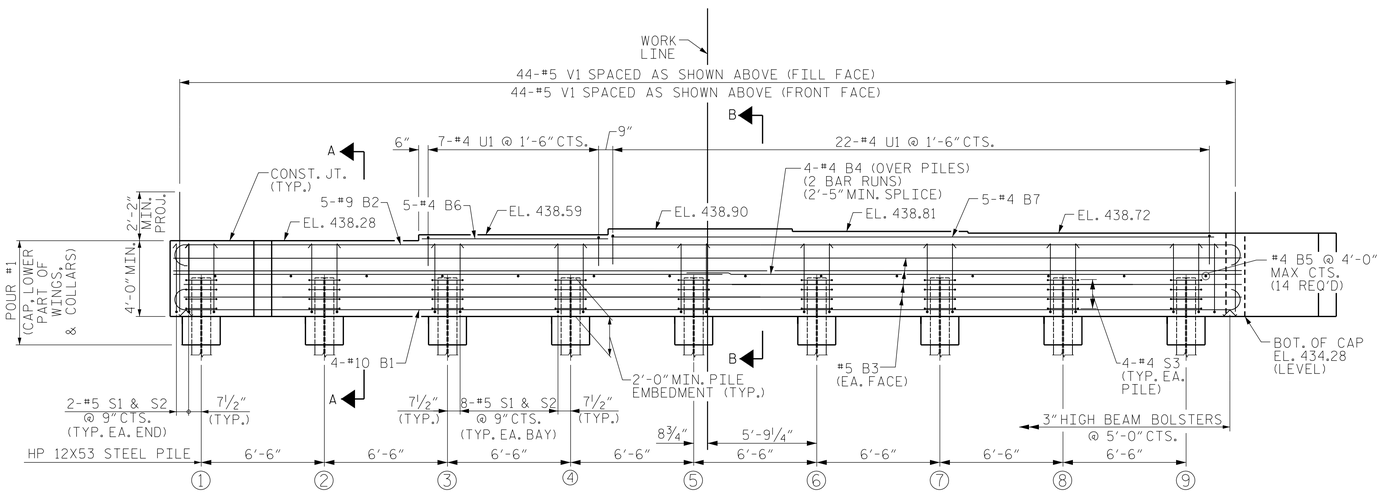


PLAN OF CAP

CONCRETE COLLARS FOR STEEL PILES NOT SHOWN FOR CLARITY.



ELEVATION

(REINFORCING IN WING NOT SHOWN FOR CLARITY)

NOTES:

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #5 V1 BARS.

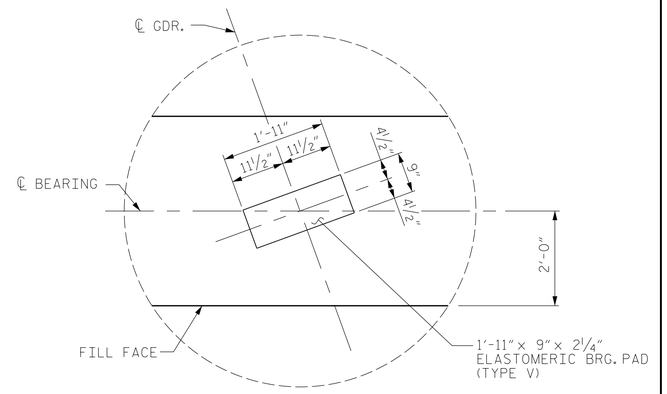
SEE THE SUPERSTRUCTURE SHEETS FOR UPPER PART OF THE INTEGRAL END BENT DETAIL.

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

FOR SECTIONS A-A & B-B, SEE SHEET 3 OF 3.

FOR "CORROSION PROTECTION FOR STEEL PILES DETAIL", SEE SHEET 3 OF 3

THE UPPER PART OF INTEGRAL PORTION AND WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE. SEE SUPERSTRUCTURE PLAN OF SPANS.



DETAIL "A"

(TYP. EACH GIRDER)

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L JACOB
4/2/2024

REVISIONS						SHEET NO.
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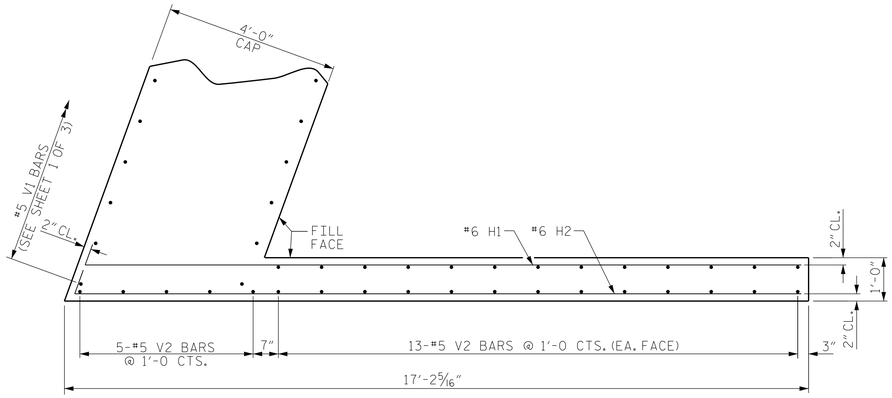
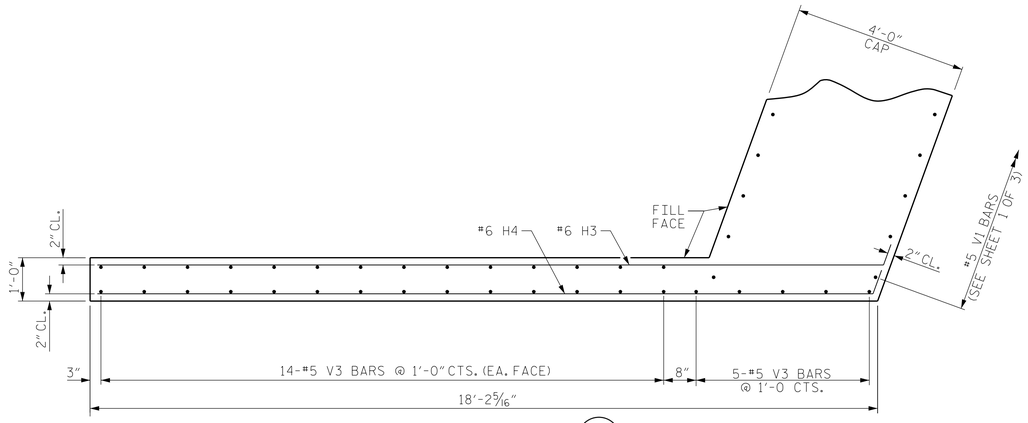
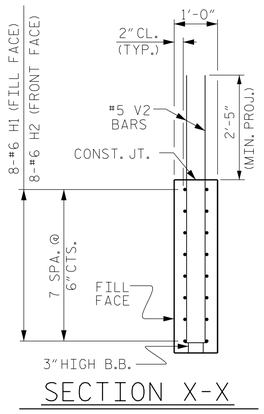


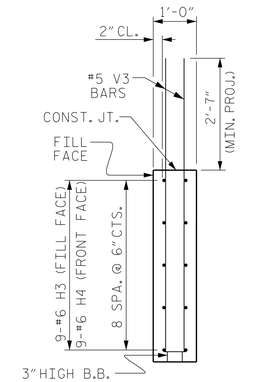
PLAN OF WING (W1)



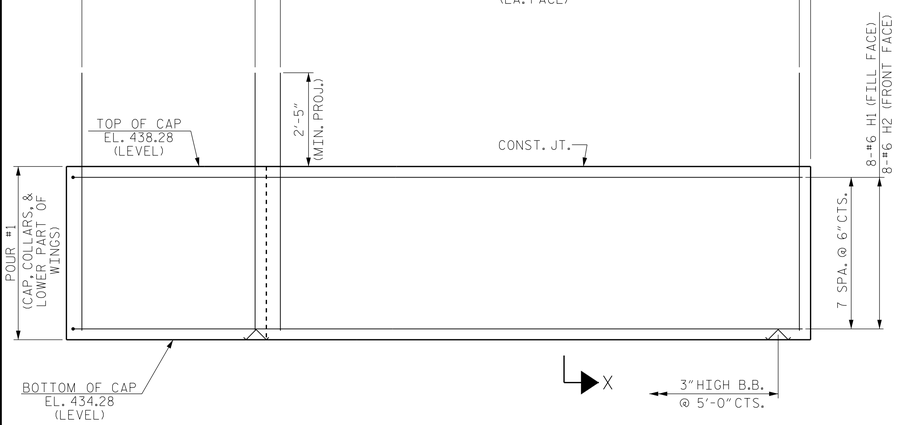
PLAN OF WING (W2)



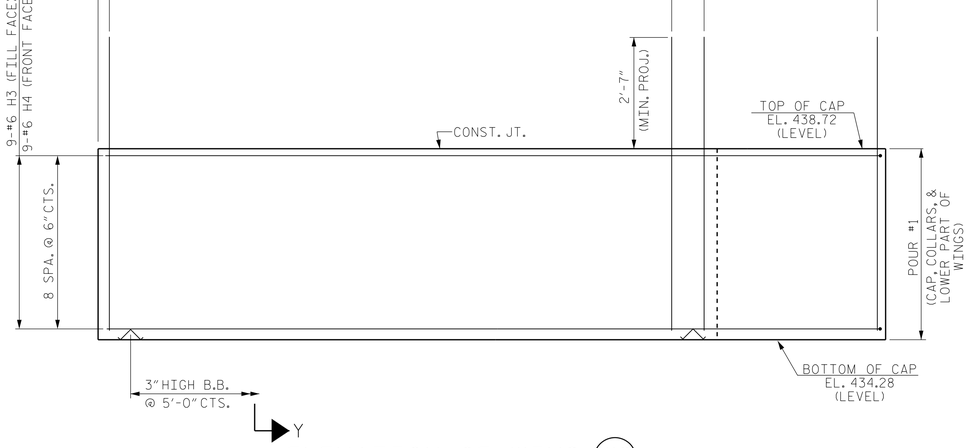
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1
WING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

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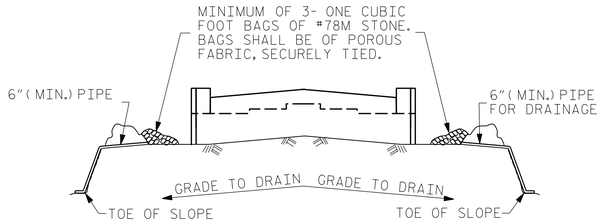
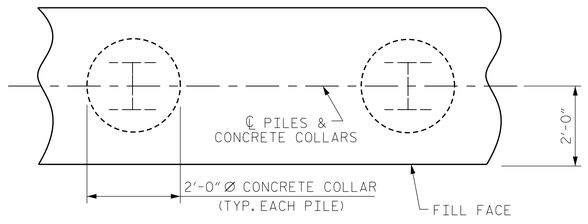


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

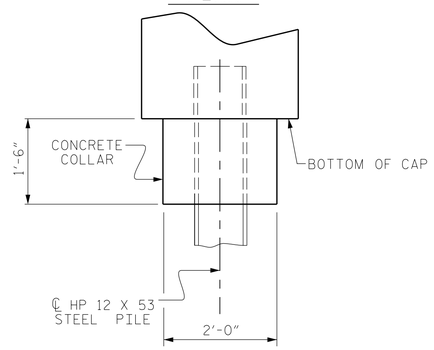
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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



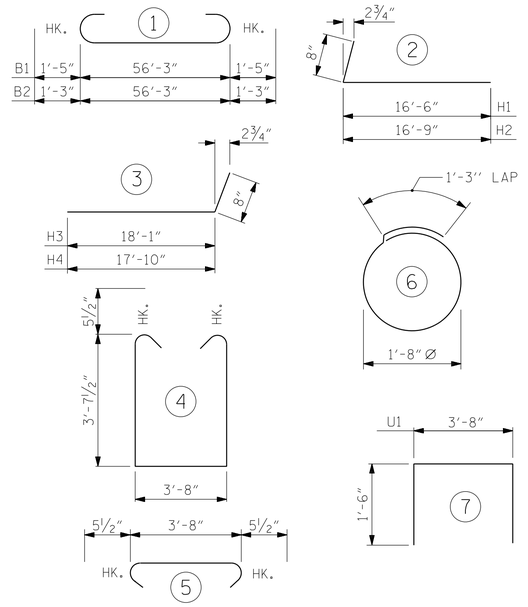
PLAN



ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR END BENT #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	59'-1"	1.017
B2	5	#9	1	58'-9"	999
B3	8	#5	STR	56'-5"	471
B4	8	#4	STR	29'-5"	157
B5	14	#4	STR	3'-8"	34
B6	5	#4	STR	9'-10"	33
B7	5	#4	STR	31'-10"	106
H1	8	#6	2	17'-2"	206
H2	8	#6	2	17'-5"	209
H3	9	#6	3	18'-9"	253
H4	9	#6	3	18'-6"	250
S1	68	#5	4	11'-10"	839
S2	68	#5	5	4'-7"	325
S3	36	#4	6	6'-6"	156
U1	29	#4	7	6'-8"	129
V1	88	#5	STR	6'-7"	604
V2	31	#5	STR	6'-2"	199
V3	33	#5	STR	6'-9"	232

REINFORCING STEEL (FOR END BENT #1) 6,219 LBS.

CLASS A CONCRETE BREAKDOWN (FOR END BENT #1)

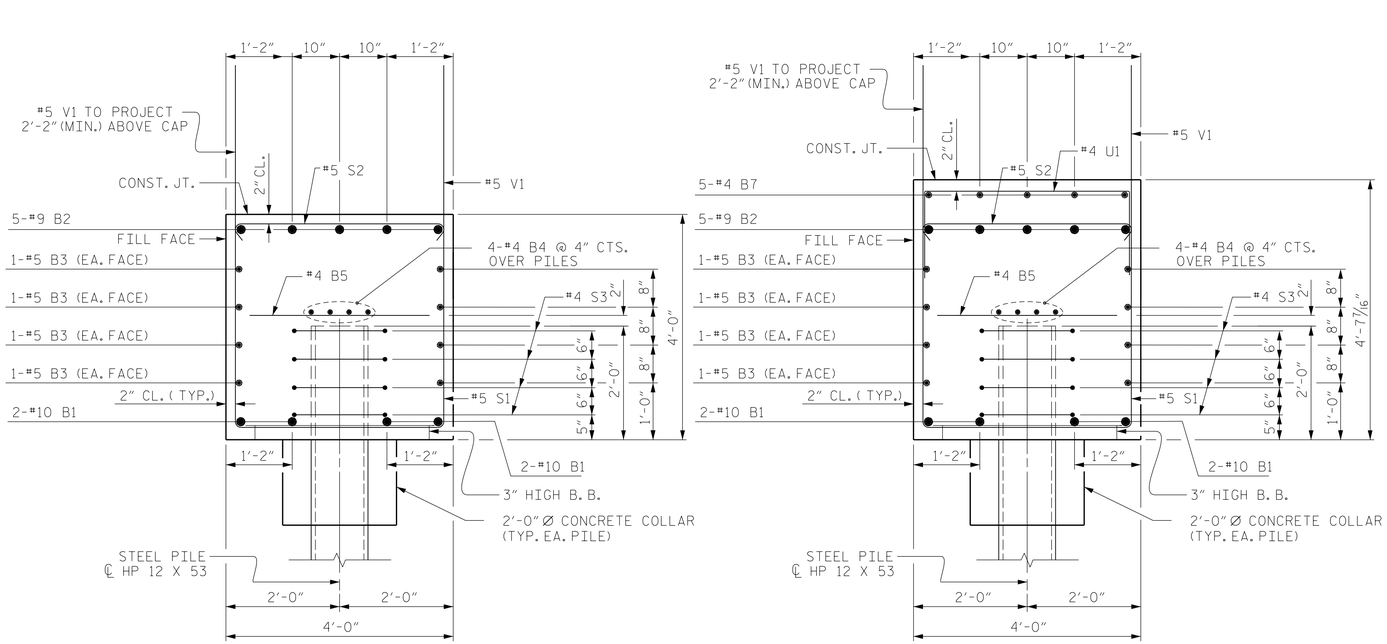
POUR #1 CAP, COLLARS & LOWER PART OF WINGS 42.4 C.Y.

TOTAL CLASS A CONCRETE 42.4 C.Y.

HP 12 X 53 STEEL PILES NO: 9
LIN. FT.= 210

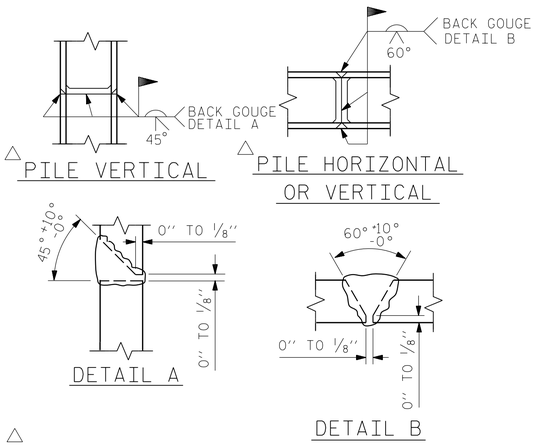
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 9

STEEL PILE POINTS NO: 9



SECTION A-A

SECTION B-B



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1 DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

DRAWN BY : J. WEIGER DATE : 6-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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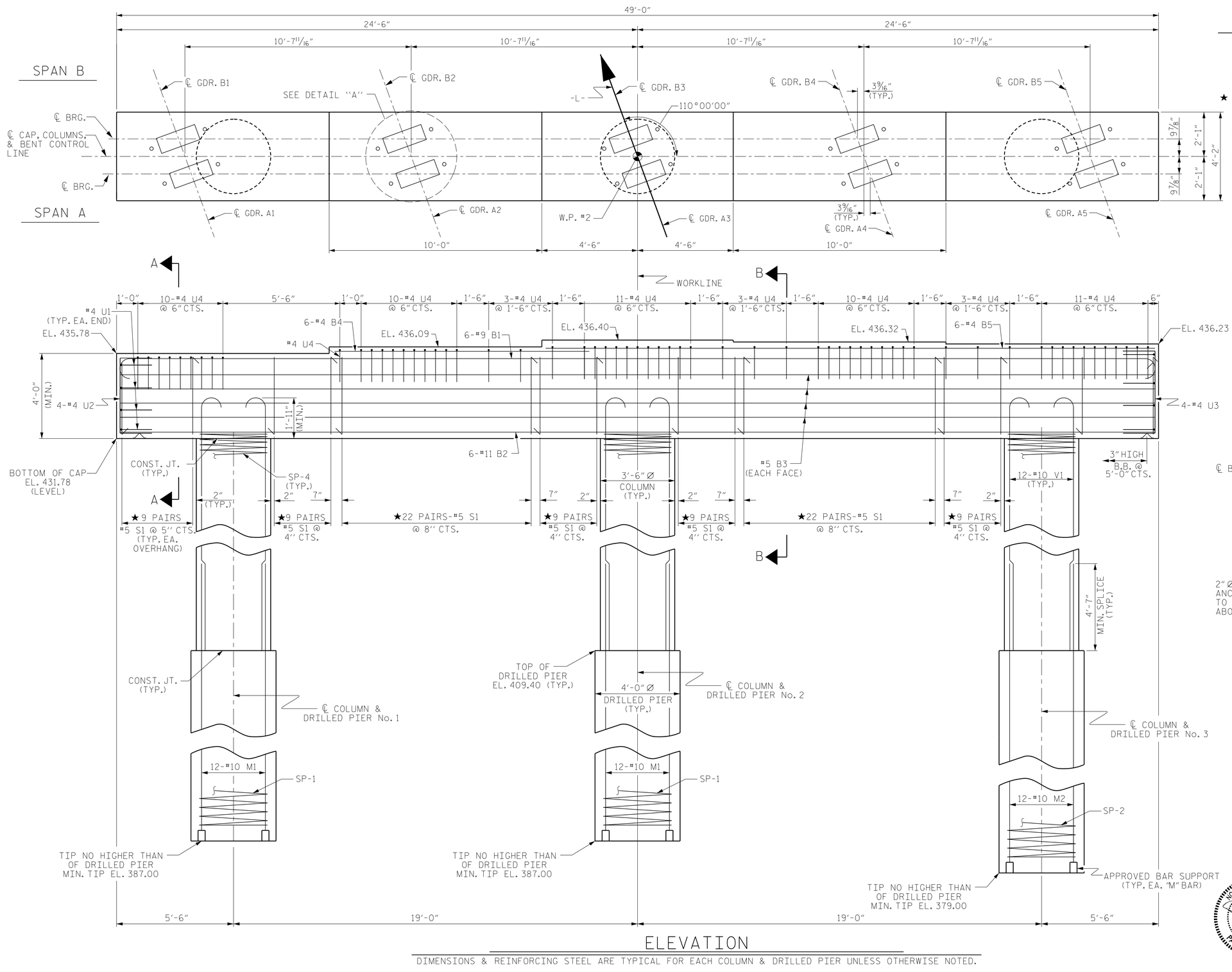
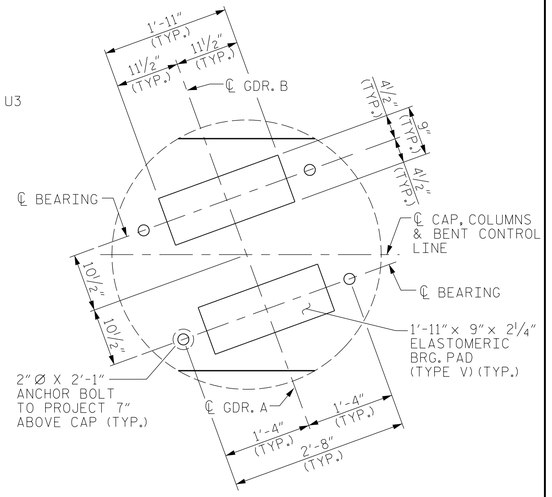


ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.



DETAIL "A"

(TYP. EACH GIRDER)

NOTES

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

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

★ INVERT ALTERNATE STIRRUPS.

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

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

SPLICING OF LONGITUDINAL BARS IN THE DRILLED PIERS SHALL NOT BE PERMITTED.

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 FOOT BELOW THE GROUND LINE.

FOR DRILLED PIER INSTALLATION INFORMATION, SEE FOUNDATION DATA, SHEET S-3.

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

DRAWN BY : M. ROSEMOND DATE : 6-2023
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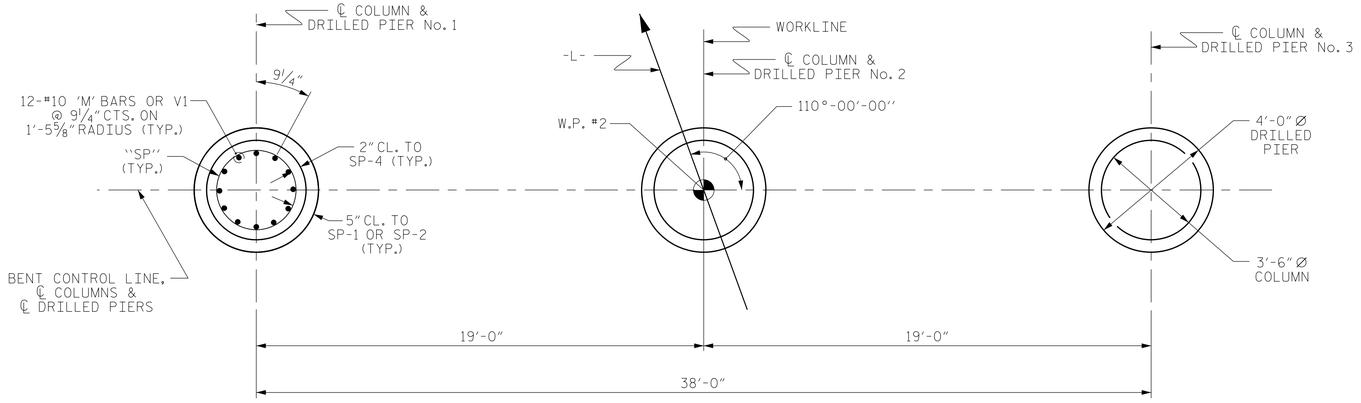
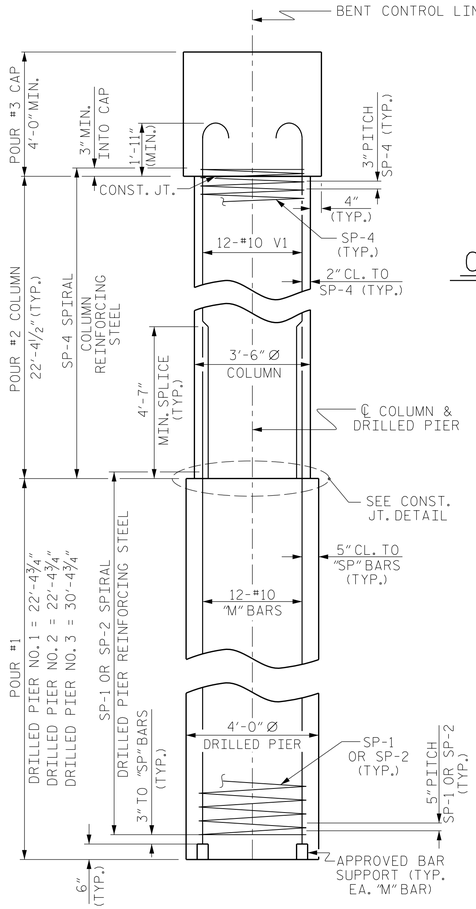
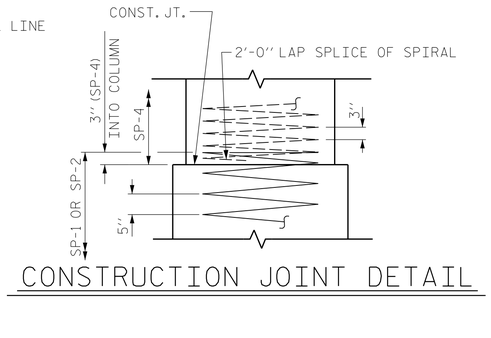


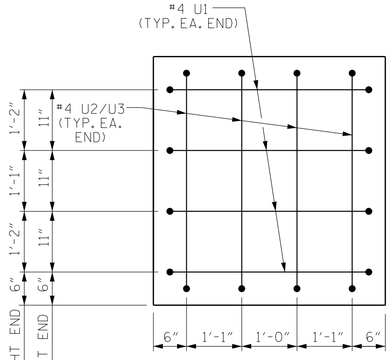
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

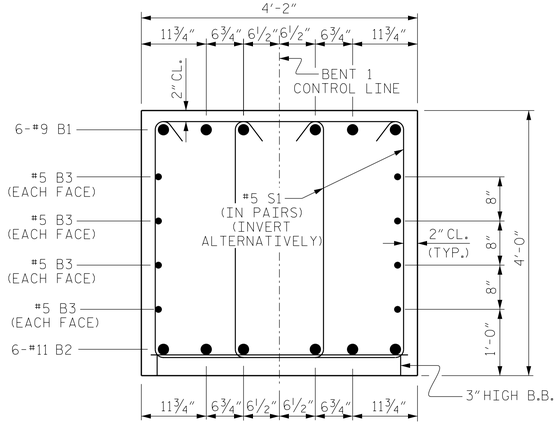


CONSTRUCTION JOINT DETAIL

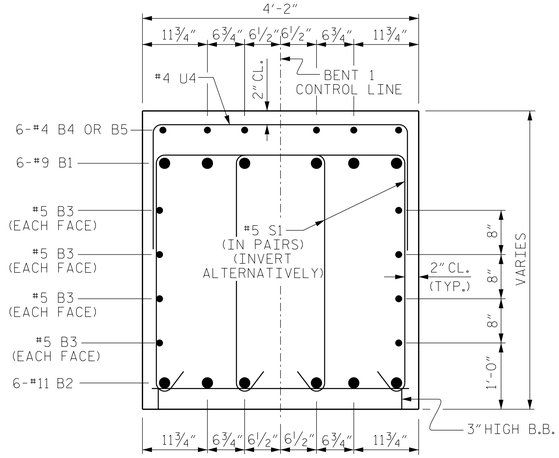


END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION A-A



SECTION B-B

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	1	51'-0"	1,040
B2	6	#11	STR	48'-8"	1,551
B3	8	#5	STR	48'-8"	406
B4	6	#4	STR	12'-0"	48
B5	6	#4	STR	28'-8"	115
M1	24	#10	STR	29'-6"	3,047
M2	12	#10	STR	37'-6"	1,936
S1	196	#5	2	10'-9"	2,198
U1	8	#4	3	6'-8"	36
U2	4	#4	3	6'-6"	17
U3	4	#4	3	6'-11"	18
U4	62	#4	3	7'-1"	293
V1	36	#10	4	25'-9"	3,989

REINFORCING STEEL (FOR ONE BENT) 14,694 LBS.

SP-1	2	✳	5	528'-7"	1,103
SP-2	1	✳	5	716'-4"	747
SP-4	3	✳✳	6	902'-3"	1,808

SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT) 3,658 LBS.

✳ THE SP-1 & SP-2 SPIRAL REINFORC. STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR

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

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

POUR #2 (COLUMNS)	24.0 C.Y.
POUR #3 (CAP)	33.0 C.Y.
TOTAL CLASS A CONCRETE	57.0 C.Y.

DRILLED PIERS: (FOR ONE BENT)

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS)	35.0 C.Y.
4'-0" Ø DRILLED PIER NOT IN SOIL	36.9 LIN. FT.
4'-0" Ø DRILLED PIER IN SOIL	38.3 LIN. FT.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER	39.0 LIN. FT.
CSL TESTING	3 EA.
CSL TUBES	320 LIN. FT.
PIT TESTING	1 EA.

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L JACOB
4/2/2024

DRAWN BY :	J. WEIGER	DATE :	6-2023
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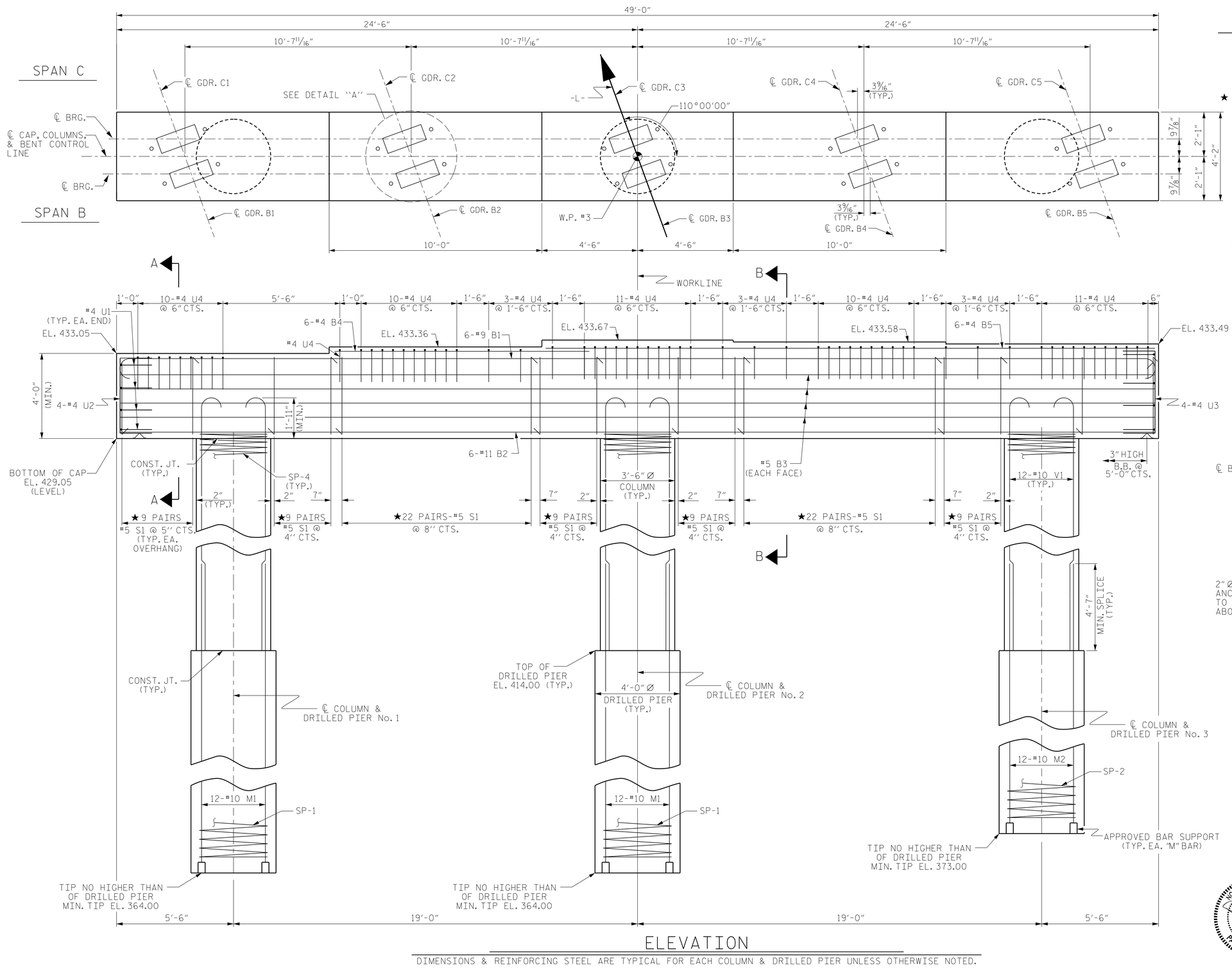
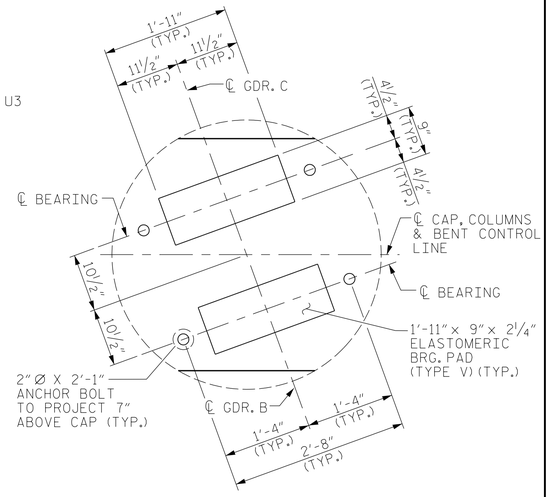
JLoftus



ELEVATION

DIMENSIONS & REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN & DRILLED PIER UNLESS OTHERWISE NOTED.



DETAIL "A"

(TYP. EACH GIRDER)

NOTES

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

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

★ INVERT ALTERNATE STIRRUPS.

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

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

SPLICING OF LONGITUDINAL BARS IN THE DRILLED PIERS SHALL NOT BE PERMITTED.

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 FOOT BELOW THE GROUND LINE.

FOR DRILLED PIER INSTALLATION INFORMATION, SEE FOUNDATION DATA, SHEET S-3.

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			38

DRAWN BY : M. ROSEMOND DATE : 6-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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NC License NO.: F-0105

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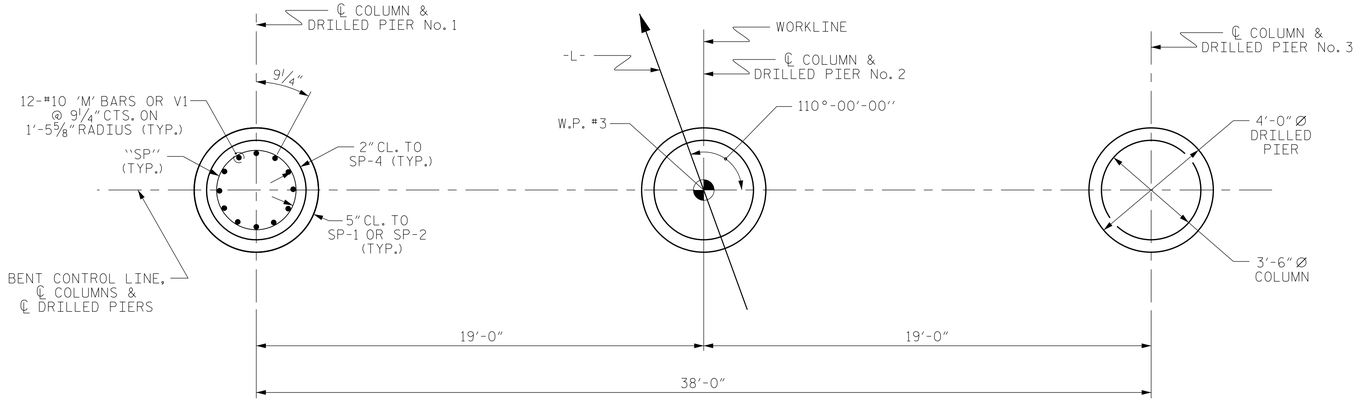
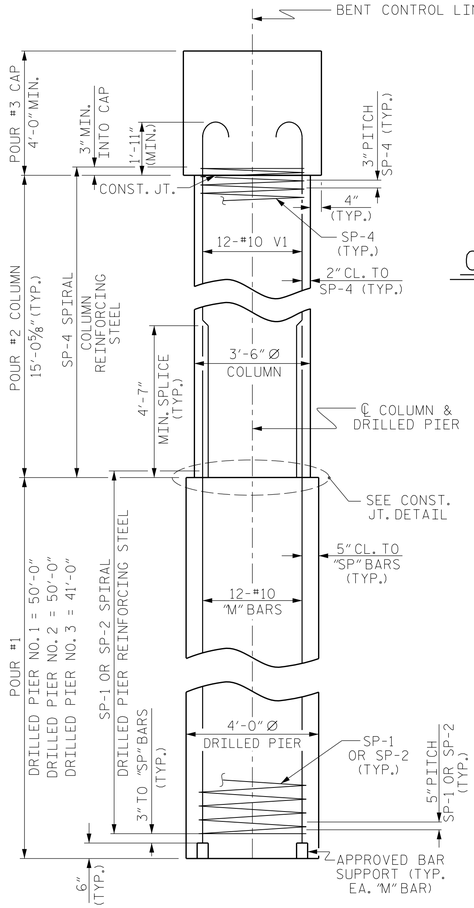
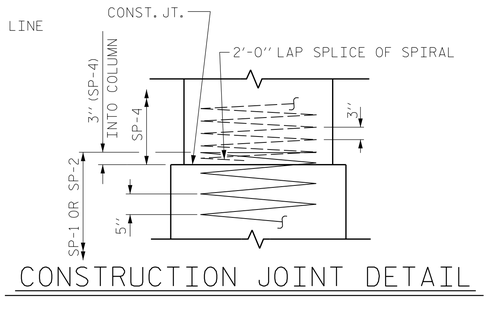
jlortus



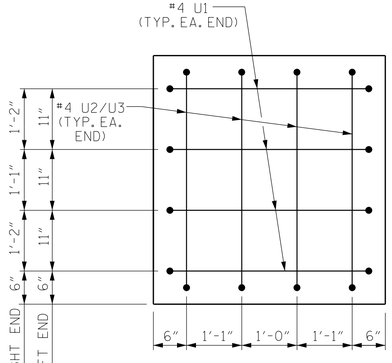
PLAN OF DRILLED PIERS & COLUMNS



END ELEVATION

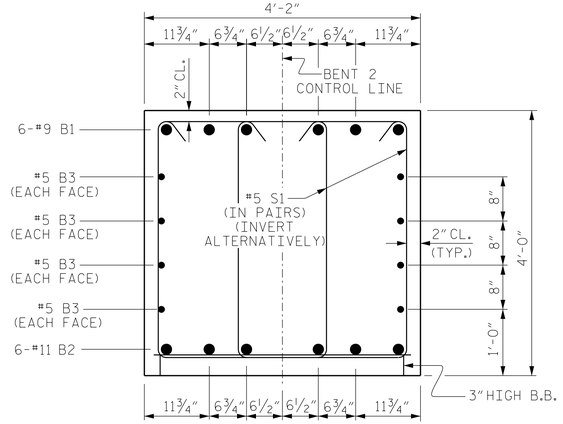


CONSTRUCTION JOINT DETAIL

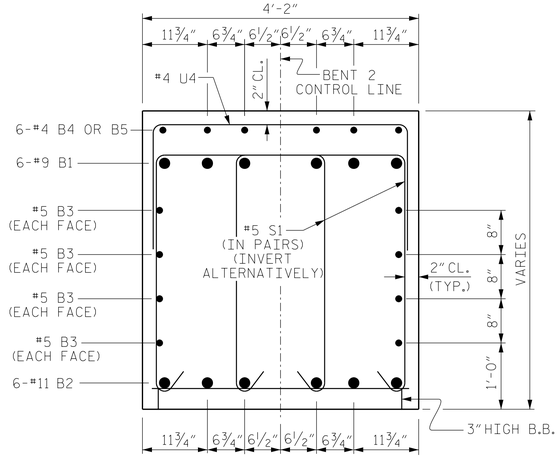


END OF CAP VIEW

(TYPICAL BOTH ENDS)

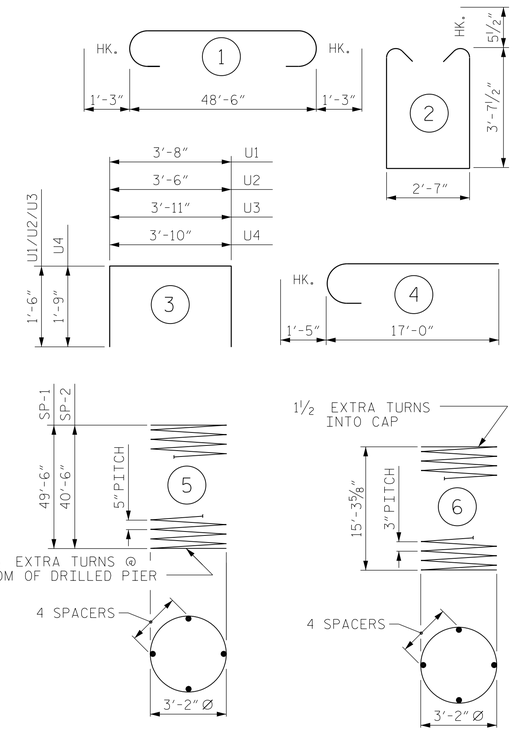


SECTION A-A



SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	1	51'-0"	1,040
B2	6	#11	STR	48'-8"	1,551
B3	8	#5	STR	48'-8"	406
B4	6	#4	STR	12'-0"	48
B5	6	#4	STR	28'-8"	115
M1	24	#10	STR	57'-1"	5,895
M2	12	#10	STR	48'-1"	2,483
S1	196	#5	2	10'-9"	2,198
U1	8	#4	3	6'-8"	36
U2	4	#4	3	6'-6"	17
U3	4	#4	3	6'-11"	18
U4	62	#4	3	7'-1"	293
V1	36	#10	4	18'-5"	2,853

REINFORCING STEEL (FOR ONE BENT) 16,953 LBS.

SP-1	2	*	5	1,176'-3"	2,454
SP-2	1	*	5	965'-1"	1,007
SP-4	3	**	6	614'-9"	1,232

SPIRAL COLUMN REINFORCING STEEL (FOR ONE BENT) 4,693 LBS.

* THE SP-1 & SP-2 SPIRAL REINFORC. STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR

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

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

POUR #2 (COLUMNS)	16.1 C.Y.
POUR #3 (CAP)	33.0 C.Y.
TOTAL CLASS A CONCRETE	49.1 C.Y.

DRILLED PIERS: (FOR ONE BENT)

DRILLED PIER CONCRETE	
POUR #1 (DRILLED PIERS)	65.7 C.Y.
4'-0" Ø DRILLED PIER NOT IN SOIL	56.5 LIN. FT.
4'-0" Ø DRILLED PIER IN SOIL	84.5 LIN. FT.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIER	9.0 LIN. FT.
CSL TESTING	3 EA.
CSL TUBES	582 LIN. FT.
PIT TESTING	1 EA.

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2
DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

DRAWN BY :	J. WEIGER	DATE :	6-2023
CHECKED BY :	J. LOFTUS	DATE :	8-2023
DESIGN ENGINEER OF RECORD:	J. LOFTUS	DATE :	3-2024

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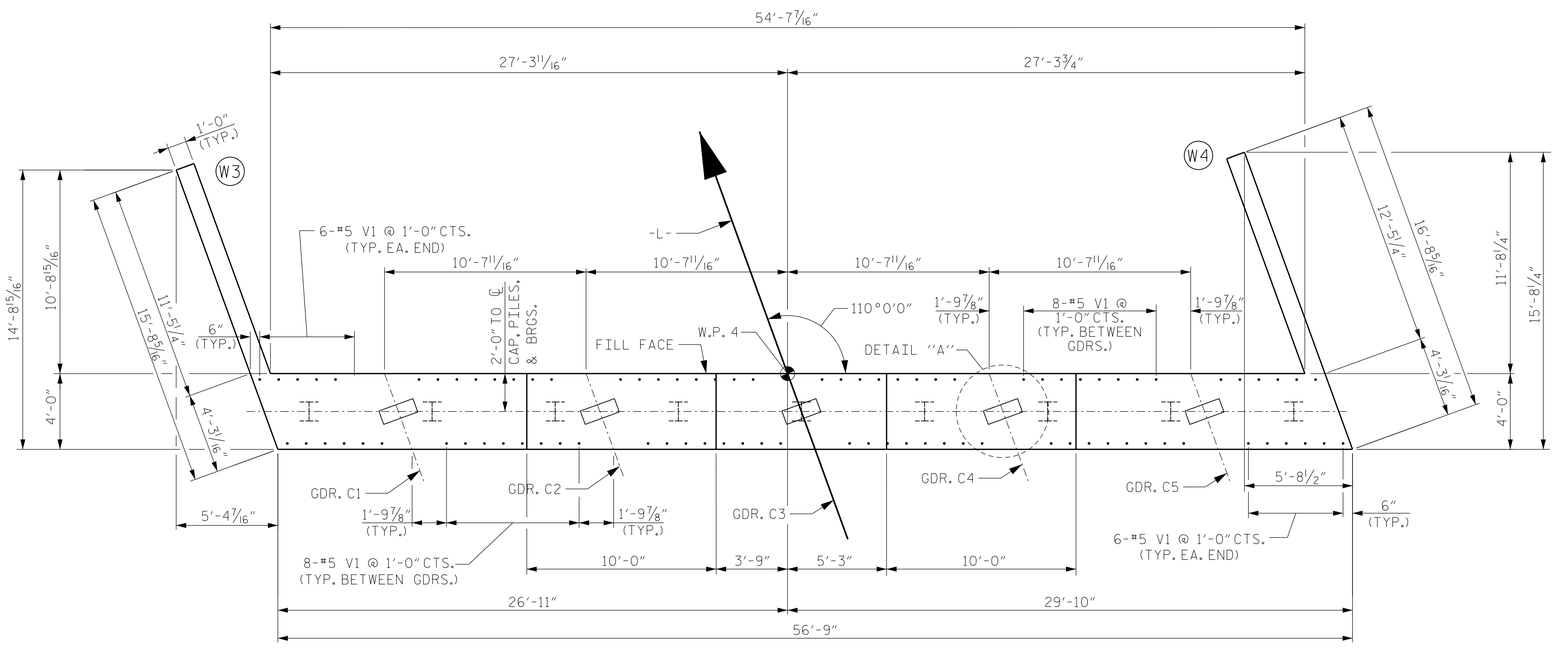
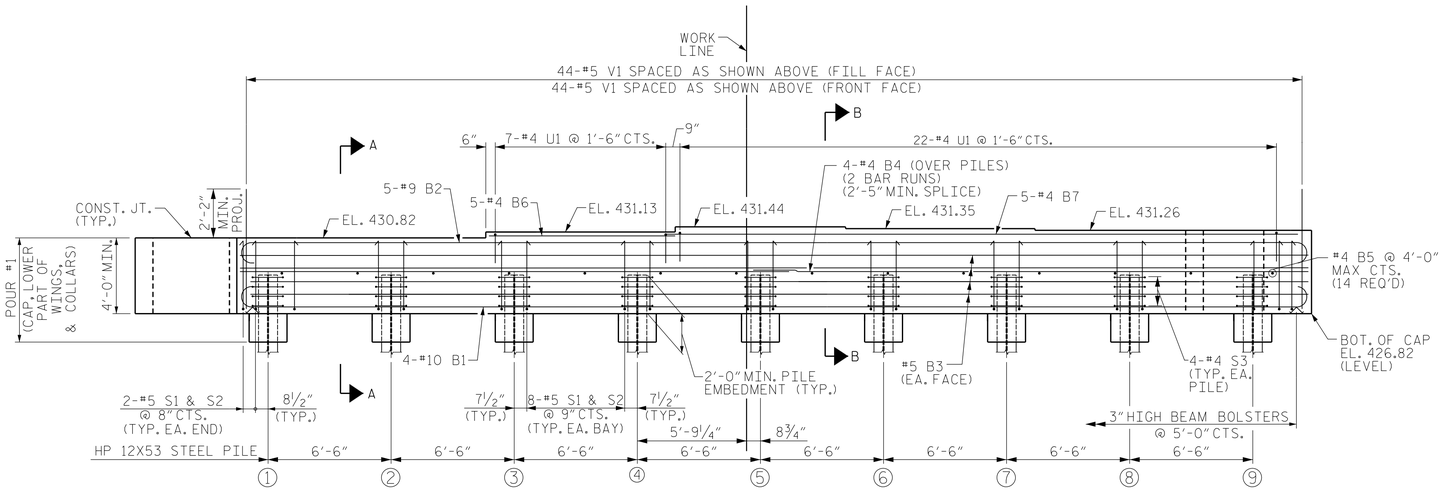


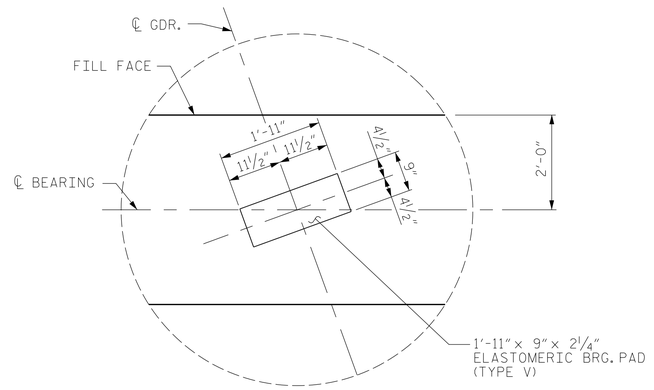
PLAN OF CAP

CONCRETE COLLARS FOR STEEL PILES NOT SHOWN FOR CLARITY.



ELEVATION

(REINFORCING IN WING NOT SHOWN FOR CLARITY)



DETAIL "A"

(TYP. EACH GIRDER)

NOTES:

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #5 V1 BARS.

SEE THE SUPERSTRUCTURE SHEETS FOR UPPER PART OF THE INTEGRAL END BENT DETAIL.

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

FOR SECTIONS A-A & B-B, SEE SHEET 3 OF 3.

FOR "CORROSION PROTECTION FOR STEEL PILES DETAIL", SEE SHEET 3 OF 3.

THE UPPER PART OF INTEGRAL PORTION AND WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE. SEE SUPERSTRUCTURE PLAN OF SPANS.

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

DRAWN BY : M. ROSEMOND DATE : 6-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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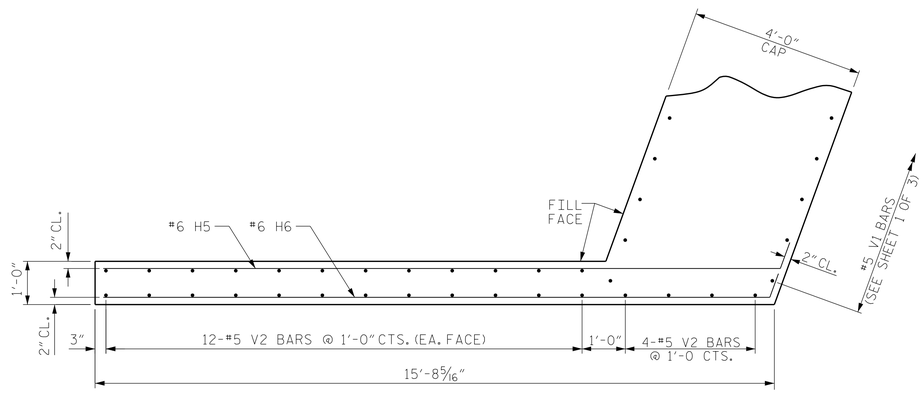
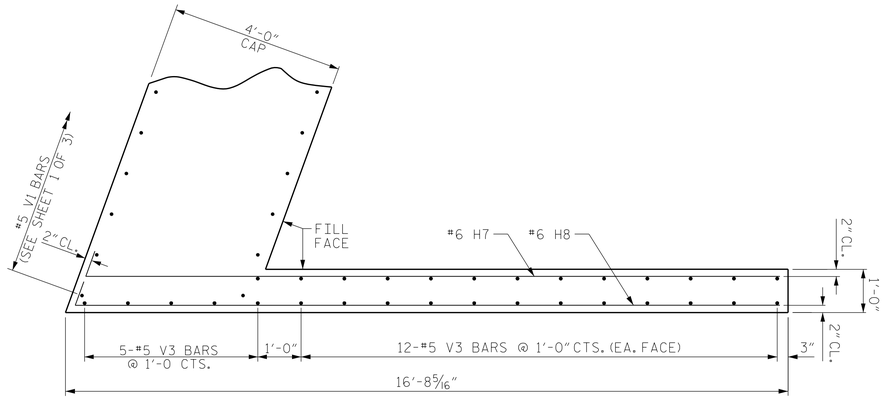
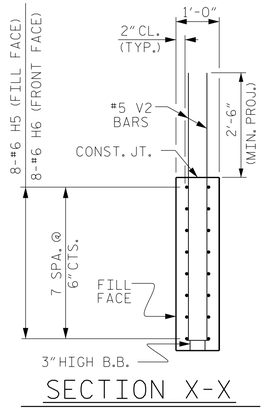


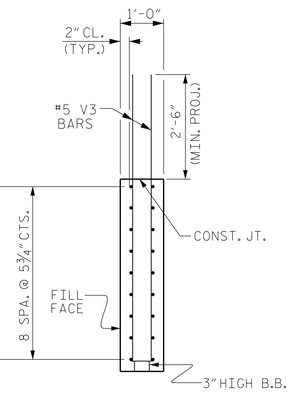
PLAN OF WING (W3)



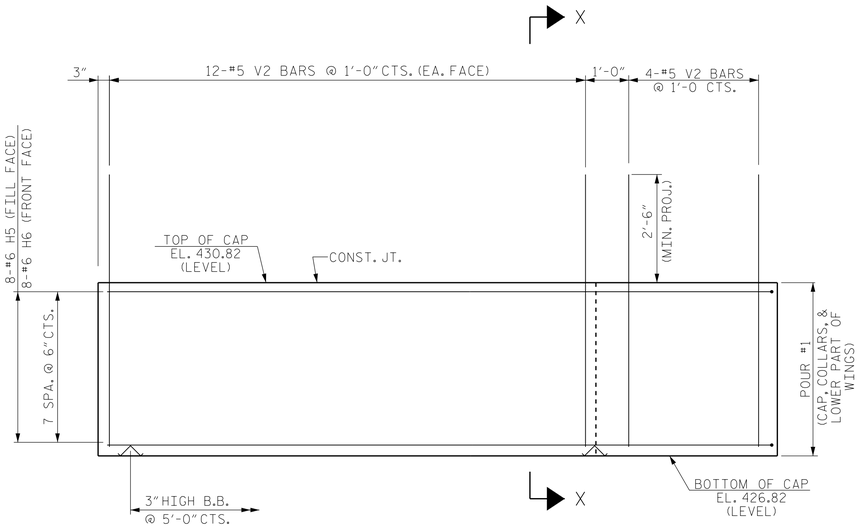
PLAN OF WING (W4)



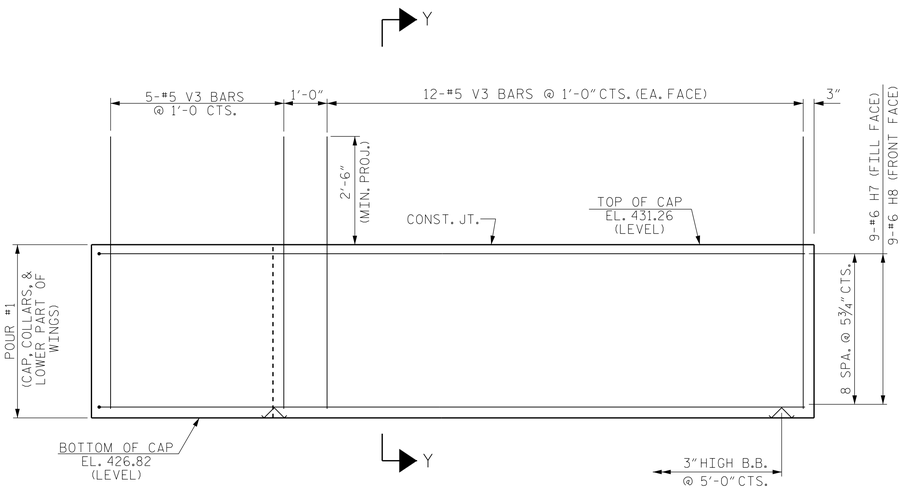
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W3)



ELEVATION OF WING (W4)

WING DETAILS

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2
WING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

DRAWN BY : J. WEIGER DATE : 6-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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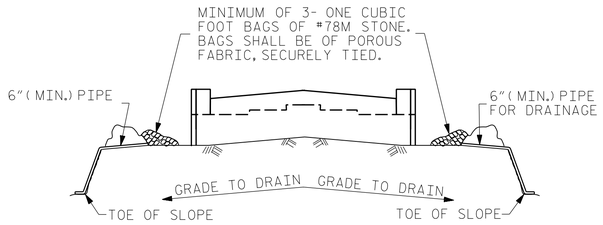
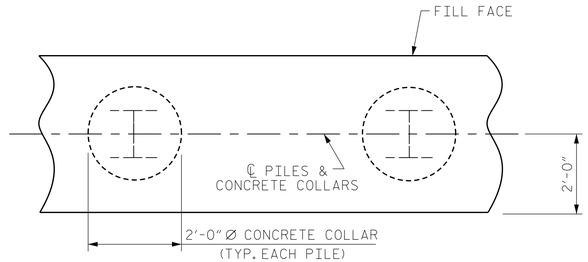


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

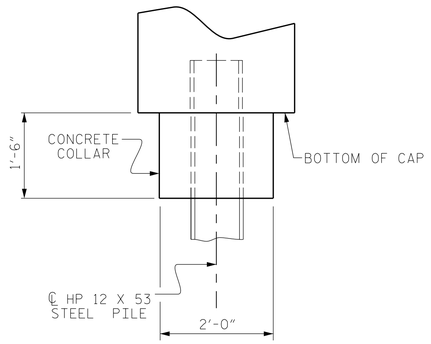
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

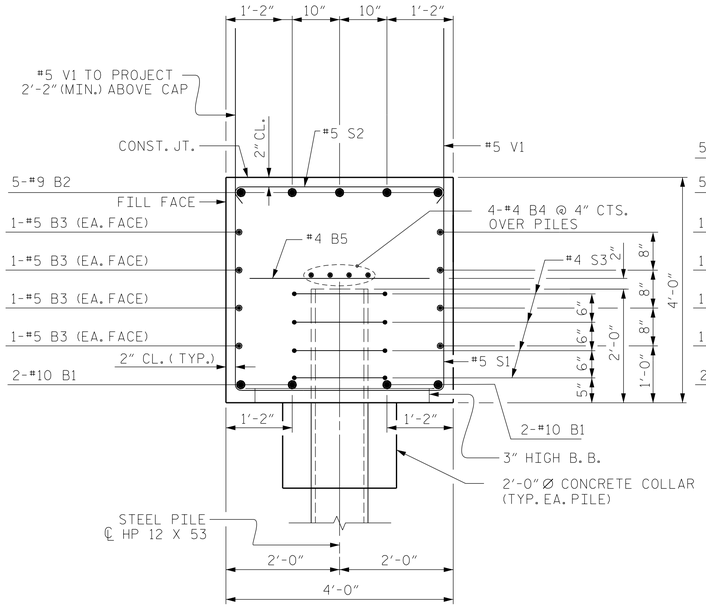


PLAN

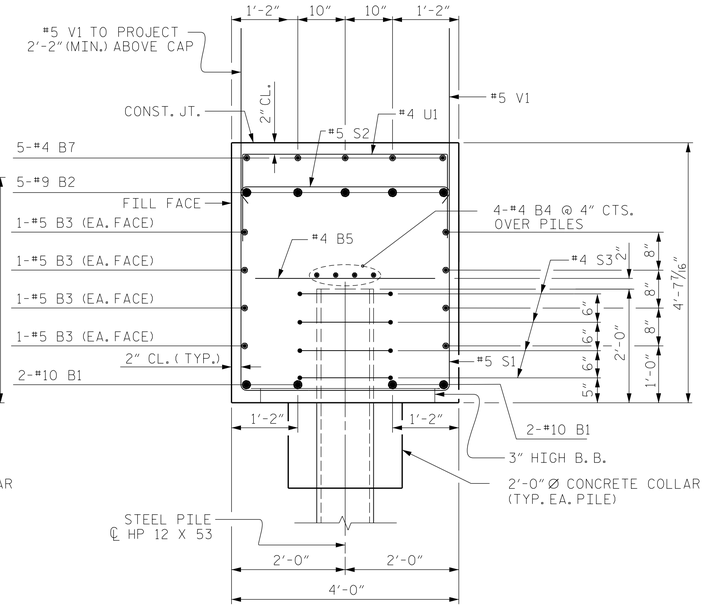


ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

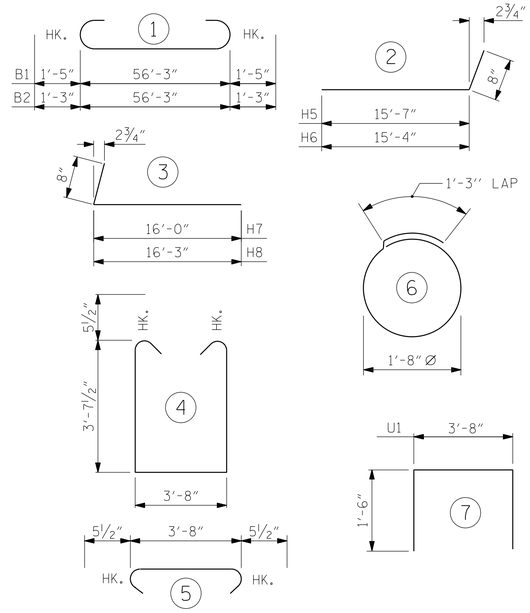


SECTION A-A



SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
FOR END BENT #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	59'-1"	1.017
B2	5	#9	1	58'-9"	999
B3	8	#5	STR	56'-5"	471
B4	8	#4	STR	29'-5"	157
B5	14	#4	STR	3'-8"	34
B6	5	#4	STR	9'-10"	33
B7	5	#4	STR	31'-10"	106
H5	8	#6	2	16'-3"	195
H6	8	#6	2	16'-0"	192
H7	9	#6	3	16'-8"	225
H8	9	#6	3	16'-11"	229
S1	68	#5	4	11'-10"	839
S2	68	#5	5	4'-7"	325
S3	36	#4	6	6'-6"	156
U1	29	#4	7	6'-8"	129
V1	88	#5	STR	6'-6"	597
V2	28	#5	STR	6'-3"	183
V3	29	#5	STR	6'-8"	202

REINFORCING STEEL (FOR END BENT #2) 6,089 LBS.

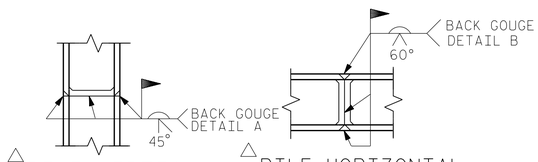
CLASS A CONCRETE BREAKDOWN (FOR END BENT #2)

POUR #1 CAP, COLLARS & LOWER PART OF WINGS 42.0 C.Y.

TOTAL CLASS A CONCRETE 42.0 C.Y.

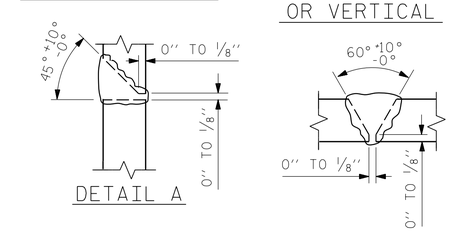
HP 12 X 53 STEEL PILES NO: 9
LIN. FT.= 450

PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 9



△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



DETAIL A

DETAIL B

△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2 DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

DRAWN BY : J. WEIGER DATE : 6-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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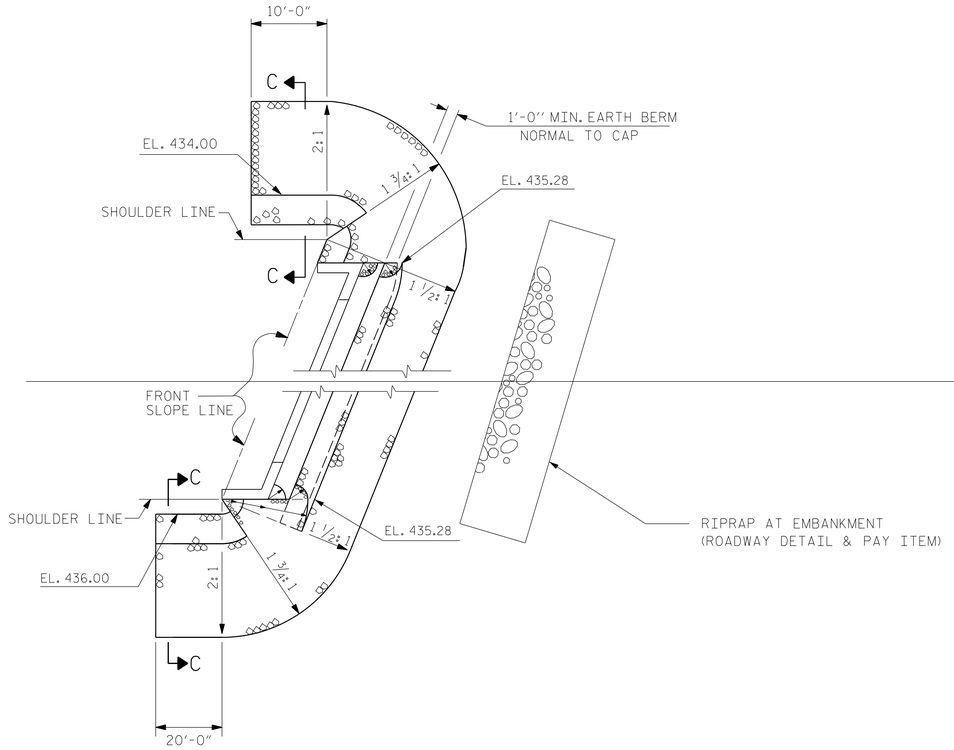
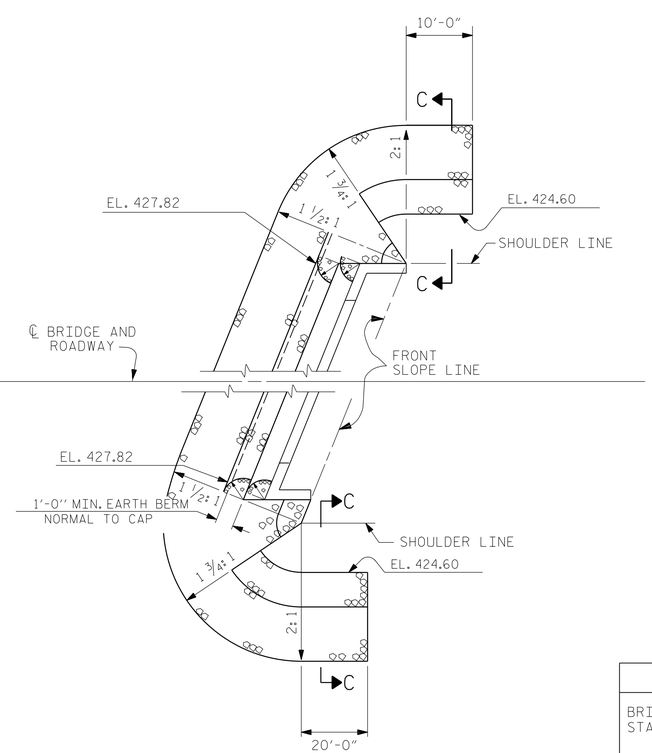


END BENT 1



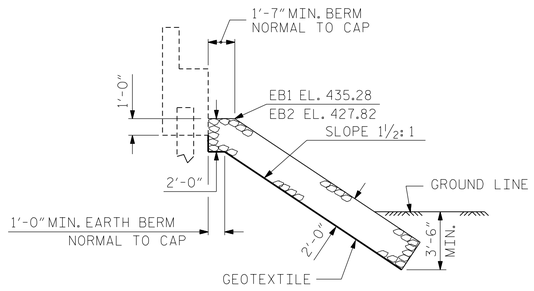
END BENT 2

NOTES :

FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

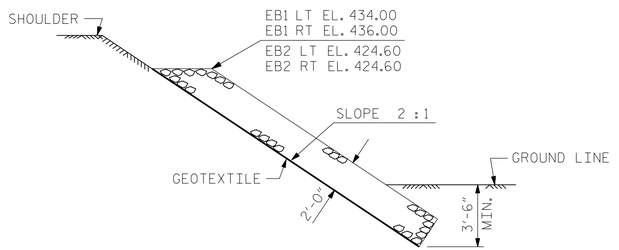
ESTIMATED QUANTITIES

BRIDGE @ STA. 20+18.00	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	847	896
END BENT 2	547	579



℄ SECTION

BERM RIP RAPPED



SECTION C-C

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L JACOB
4/2/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			38

STD. NO. RR1 (Sht 3)

ASSEMBLED BY : J. WEIGER	DATE : 1-2023
CHECKED BY : J. LOFTUS	DATE : 8-2023
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

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NC License NO.: F-0105

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jloftus

3/20/2024
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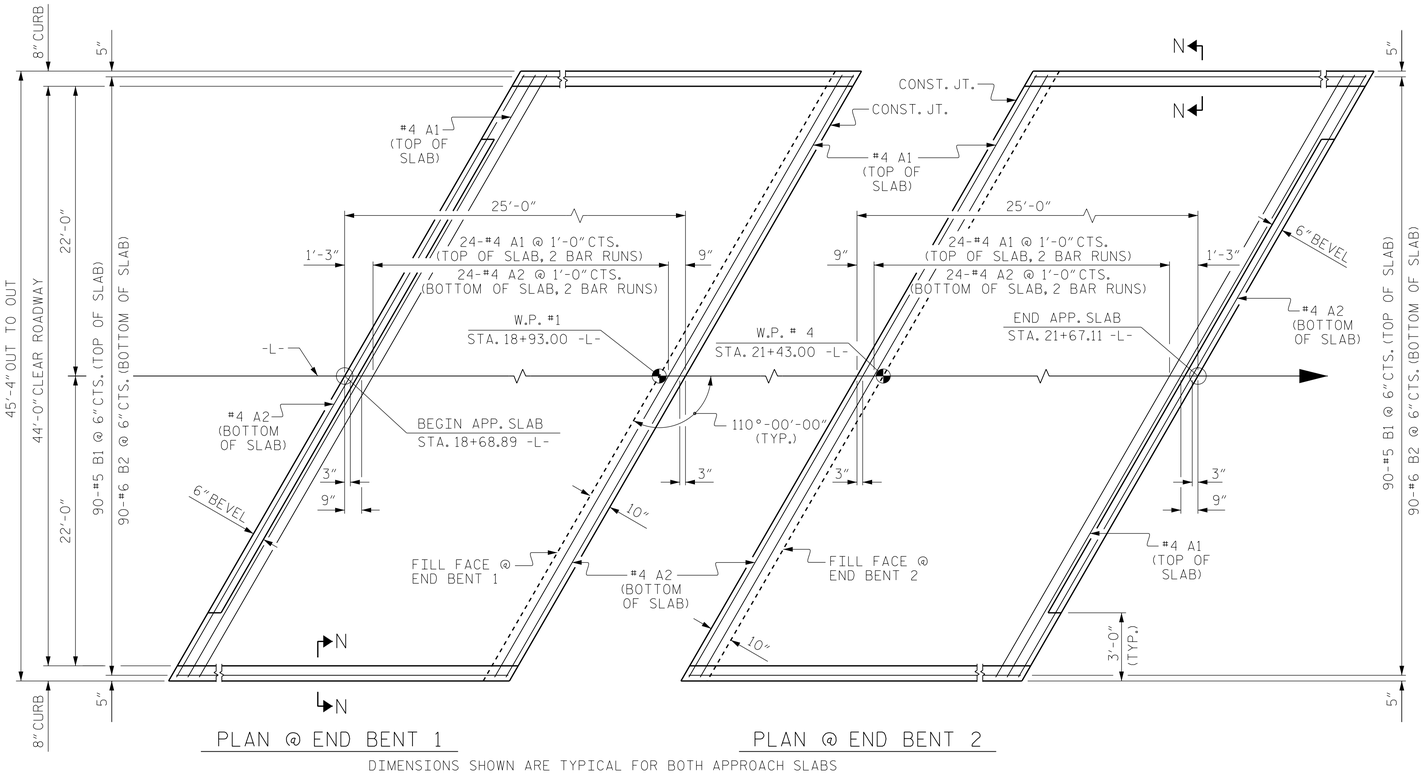
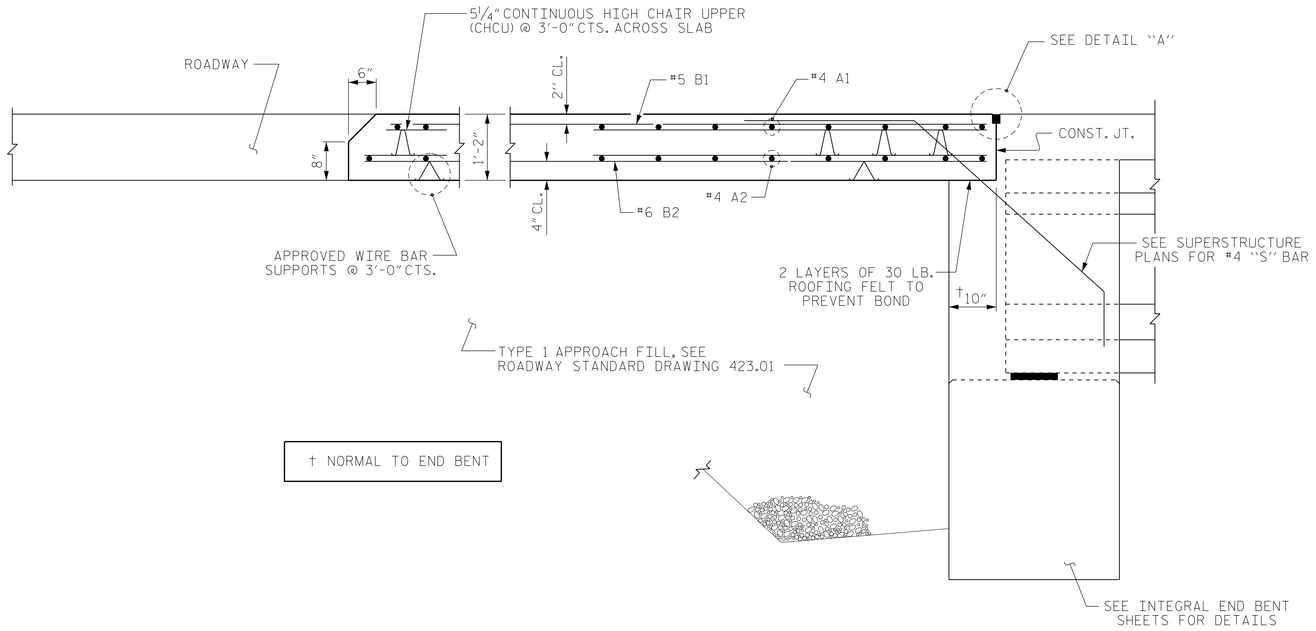
jloftus



DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB

(TYPE 1 - STANDARD APPROACH FILL)

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.

AT THE CONTRACTORS OPTION "TYPE 1A - ALTERNATE APPROACH FILL" (ROADWAY STD.423.02) MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT IN LIEU OF "TYPE 1 - APPROACH FILL".

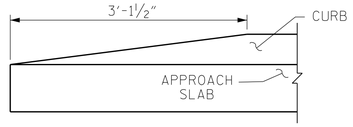
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

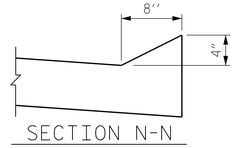
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	52	#4	STR	24'-11"	866
A2	52	#4	STR	24'-9"	860
✳ B1	90	#5	STR	24'-2"	2,269
B2	90	#6	STR	24'-8"	3,334
REINFORCING STEEL				LBS.	4,194
✳ EPOXY COATED REINFORCING STEEL				LBS.	3,135
CLASS AA CONCRETE				C.Y.	49.0

SPLICE LENGTHS

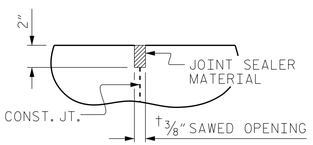
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"



END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION N-N



DETAIL "A"

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 037760 PAUL L. JACOB
4/2/2024

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DRAWN BY : J. WEIGER DATE : 8-2023
CHECKED BY : J. LOFTUS DATE : 8-2023
DESIGN ENGINEER OF RECORD: J. LOFTUS DATE : 3-2024

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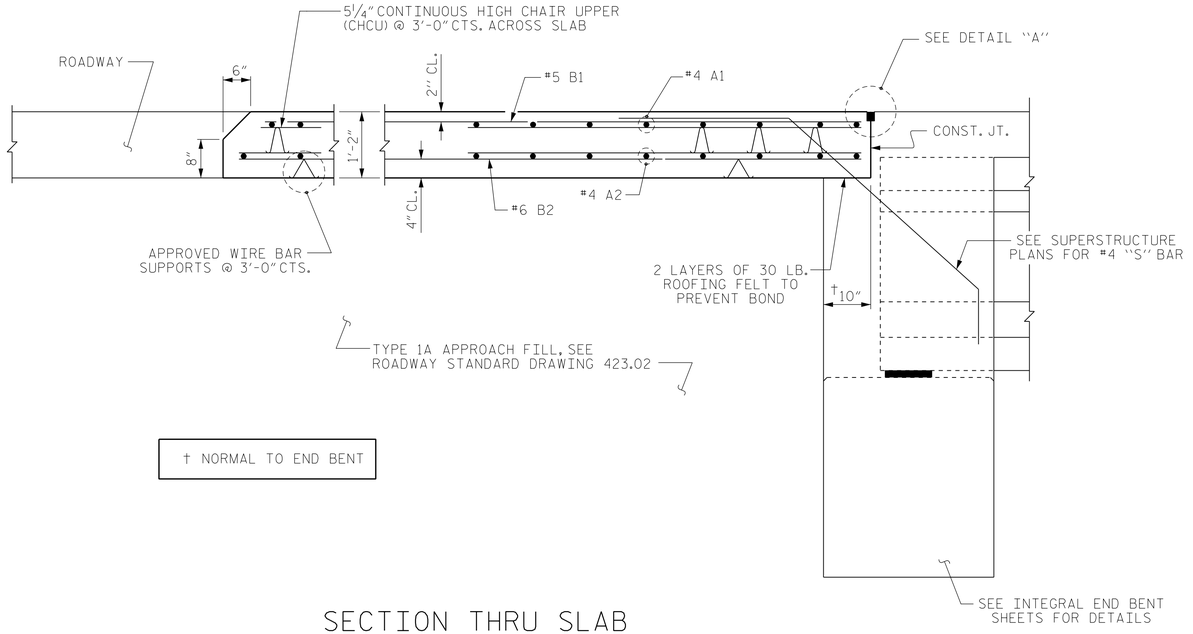
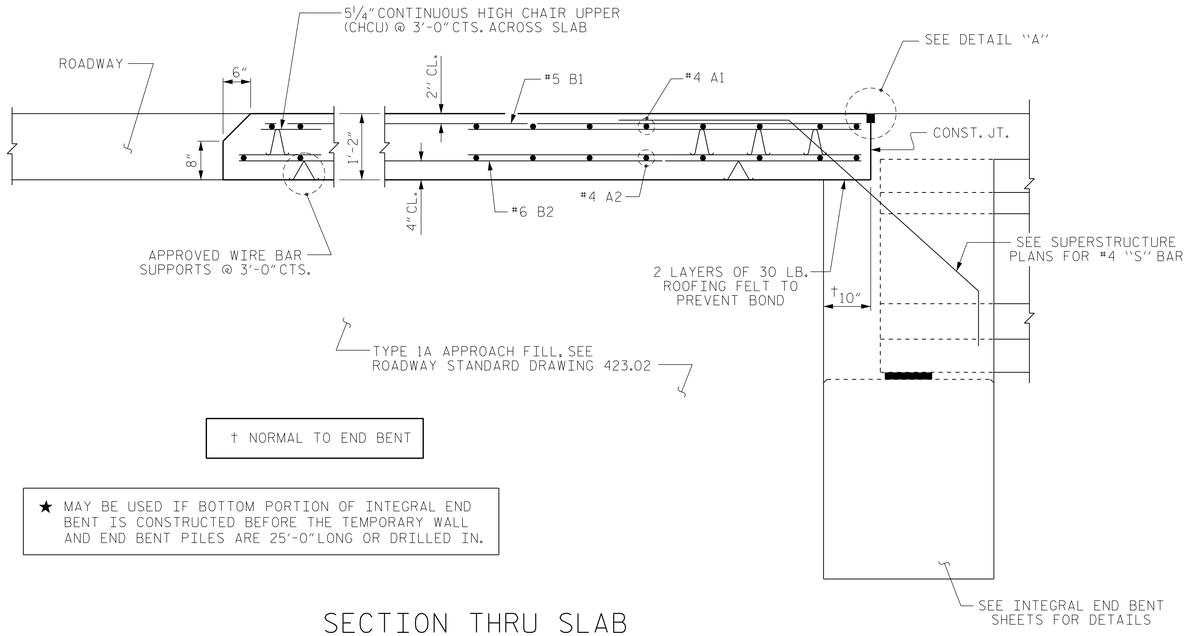
JLoftus



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE 1A - ALTERNATE APPROACH FILL)

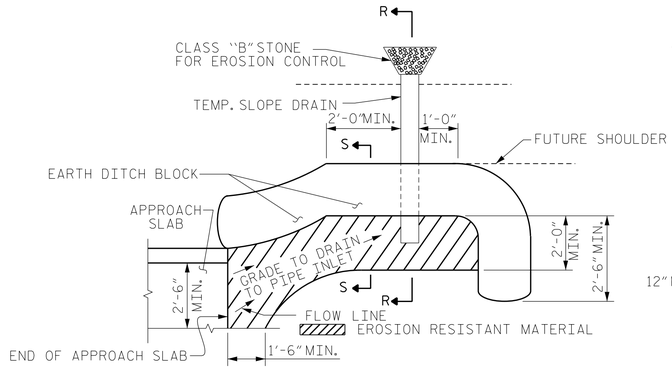


† NORMAL TO END BENT

★ MAY BE USED IF BOTTOM PORTION OF INTEGRAL END BENT IS CONSTRUCTED BEFORE THE TEMPORARY WALL AND END BENT PILES ARE 25'-0" LONG OR DRILLED IN.

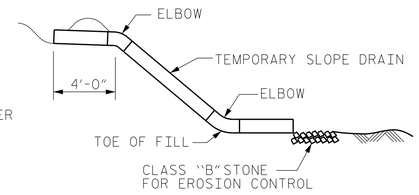
SECTION THRU SLAB

(TYPE 1A - ALTERNATE APPROACH FILL - ALTERNATE INSET A)

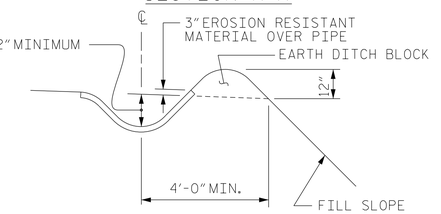


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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.

PLAN VIEW



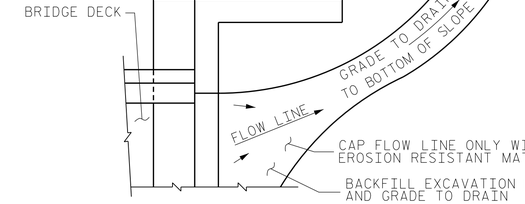
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

PROJECT NO. BR-0069

CASWELL COUNTY

STATION: 20+18.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 037760 ENGINEER PAUL L. JACOB
4/2/2024

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jloftus

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2024 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.