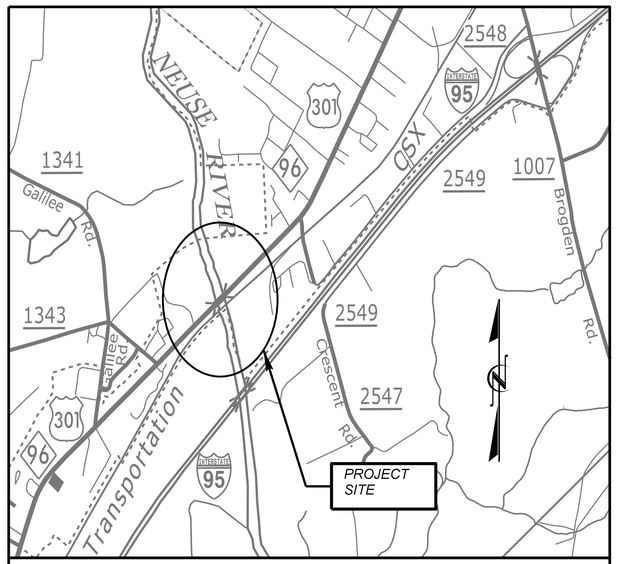
TIP PROJECT: BR-0086

CONTRACT: C204972



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

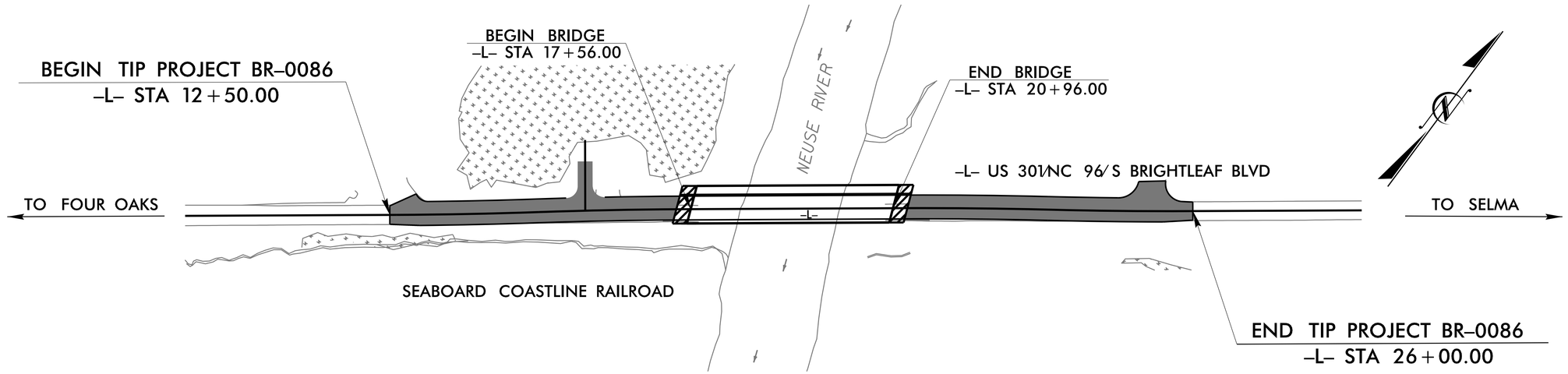
JOHNSTON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0086	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
67086.1.1	N/A	P.E.
67086.2.1	N/A	ROW & UTIL.
67086.3.1	N/A	CONST.

LOCATION: ***REPLACE BRIDGE No. 500070 ON US 301 OVER NEUSE RIVER***

TYPE OF WORK: ***GRADING, PAVING, DRAINAGE AND STRUCTURE***



STRUCTURES

DESIGN DATA

ADT 2025 = 12,808
ADT 2045 = 15,500
K = 9 %
D = 65 %
T = 4 % **
V = 50 MPH
** (TTST = 2 %, DUAL = 2 %)

FUNC CLASS = MINOR ARTERIAL

REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BR-0086 = .192 MILES
LENGTH STRUCTURE TIP PROJECT BR-0086 = .064 MILES

TOTAL LENGTH TIP PROJECT BR-0086 = .256 MILES

Prepared In the Office of:
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

2024 STANDARD SPECIFICATIONS

LETTING DATE :

JANUARY 21, 2025

KRISTY W. ALFORD, P.E., CPM
PROJECT ENGINEER

ASTER G. ABRAHA, P.E.
PROJECT DESIGN ENGINEER

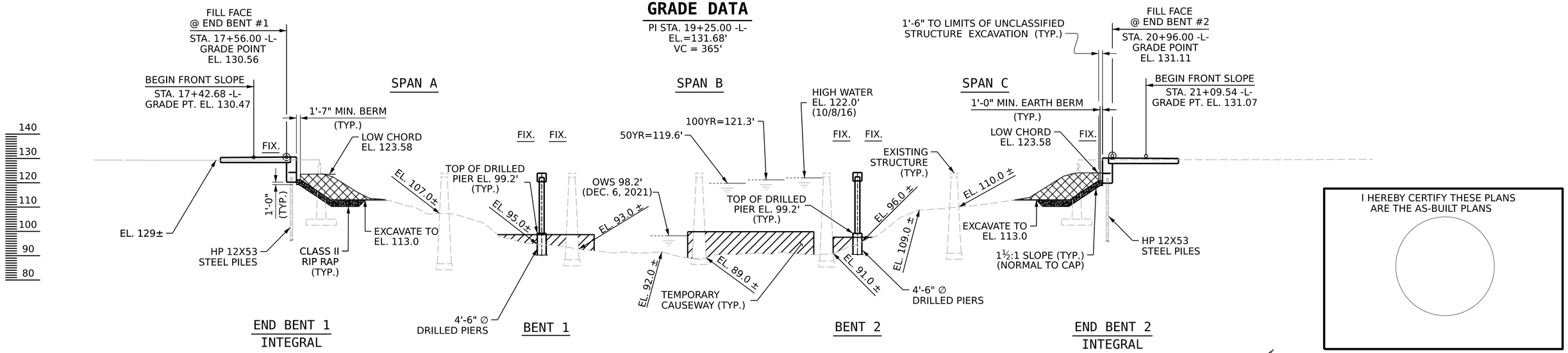
8/26/21

17+00 17+25 17+50 17+75 18+00 18+25 18+50 18+75 19+00 19+25 19+50 19+75 20+00 20+25 20+50 20+75 21+00 21+25 21+50

(+)0.6620% (-)0.3300%

GRADE DATA

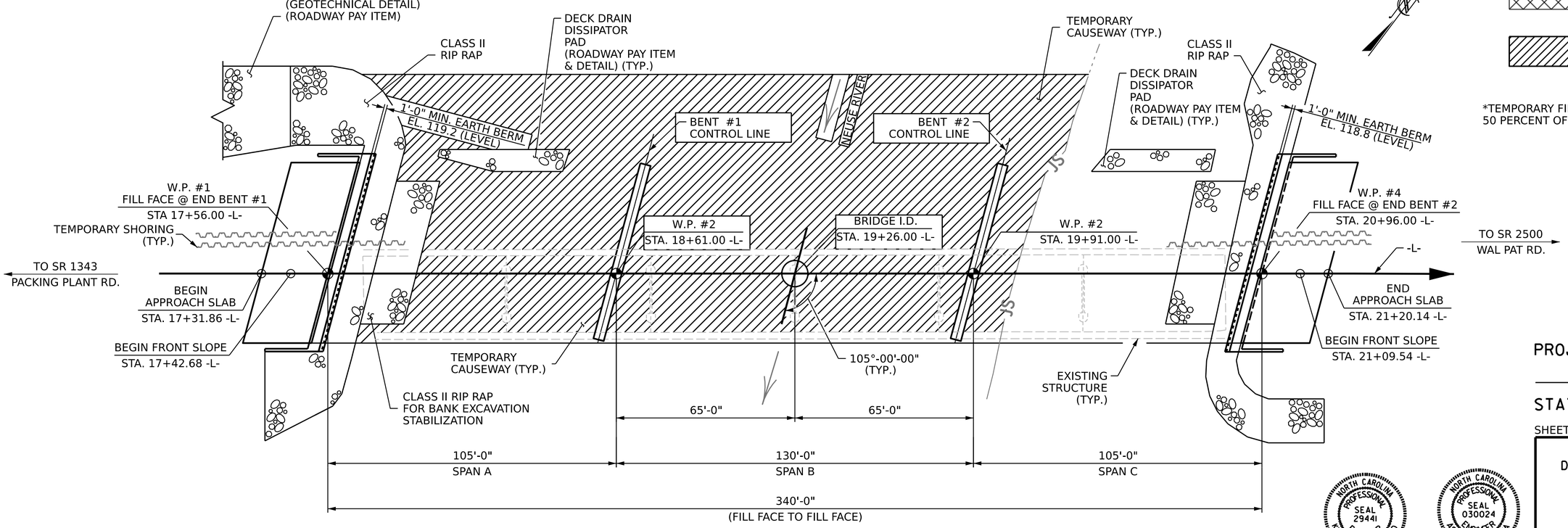
PI STA. 19+25.00 -L-
EL.=131.68'
VC = 365'



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

SECTION ALONG -L-

(SECTIONS AT END BENTS AND BENTS ARE TAKEN AT RIGHT ANGLES)



UNCLASSIFIED STRUCTURE EXCAVATION (SEE NOTES ON SHEET 3 OF 4)

TEMPORARY* ACCESS

*TEMPORARY FILL SHALL NOT BLOCK MORE THAN 50 PERCENT OF THE CHANNEL AT ANY TIME.

PLAN

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

NORTH CAROLINA PROFESSIONAL SEAL 29441 ENGINEER KRISTY W. ALFORD
11/21/2024

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
11/21/2024

PROJECT NO. BR-0086
JOHNSTON COUNTY
STATION: 19+26.00 -L-
SHEET 1 OF 4 REPLACES BRIDGE #500070

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER NEUSE RIVER
ON US 301 BETWEEN
SR 1343 & SR 2500

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : A.K. IBRAHIM DATE : 03/2024
CHECKED BY : S. LOTFI / M. AHMED DATE : 08/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 11/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

11/21/2024
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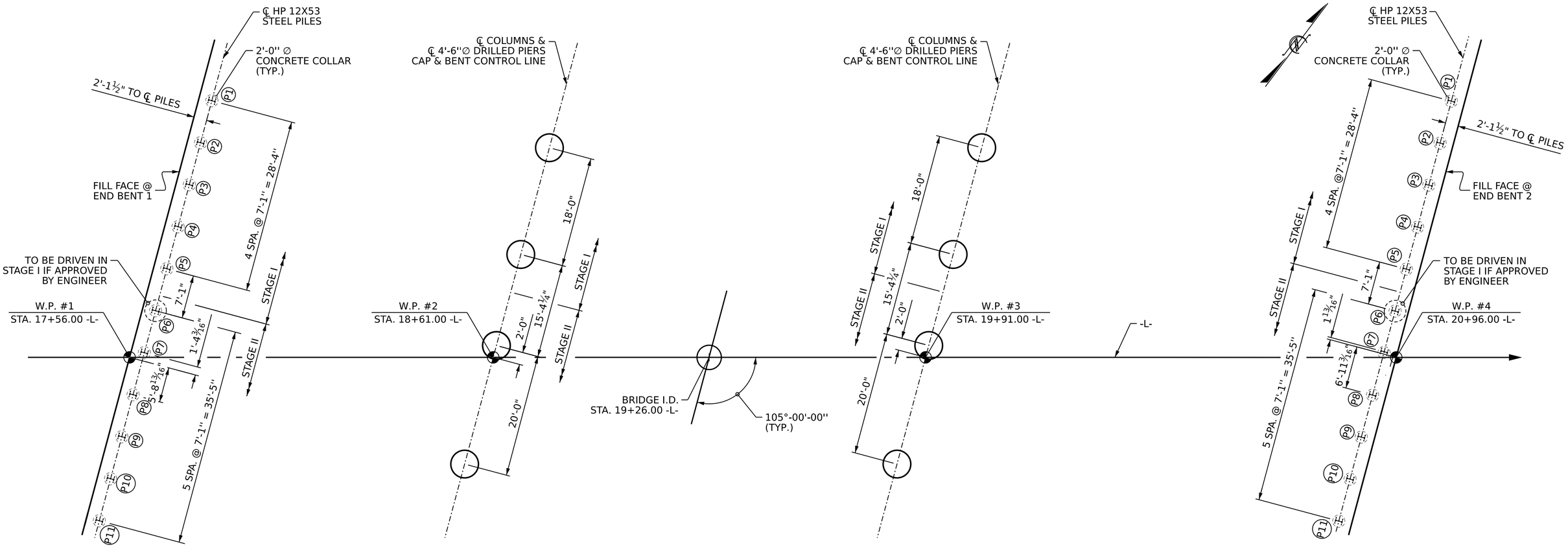
gabraha



END BENT #1
INTEGRAL

BENT #1

BENT #2

END BENT #2
INTEGRAL

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES AND DRILLED PIERS ARE SHOWN TO THE CENTERLINE OF PILES AND DRILLED PIERS.

NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

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

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 50,000 to 80,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 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-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER NEUSE RIVER
ON US 301 BETWEEN
SR 1343 & SR 2500

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha
ODA094AED5104FD...
11/21/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : A.K. IBRAHIM DATE : 02/2024
CHECKED BY : S. LOTFI / M.M. AHMED DATE : 05/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 11/2024

11/20/2024
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aabraha

8/26/21

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 1-11	145	121.40	45			245							
End Bent 2, Piles 1-11	145	121.85	35			245							
							11						

*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 1-11	143			0.60			
End Bent 2, Piles 1-11	143			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, Stage I, Pier 1	730	73.0	105	79	9.0		11.5	14.8	Yes	84.1	15
Bent 1, Stage I, Pier 2	730	73.0	105	79	9.0		10.6	15.6	Yes	84.6	15
Bent 1, Stage II, Pier 1	930	69.0	135	77	9.0		14.6	15.6	Yes	84.6	15
Bent 1, Stage II, Pier 2	930	69.0	135	77	9.0		10.9	19.3	Yes	79.9	19
Bent 2, Stage I, Pier 1	755	73.0	110	83	9.0		12.6	13.6	Yes	85.5	14
Bent 2, Stage I, Pier 2	755	73.0	110	83	9.0		13.5	12.7	Yes	85.7	14
Bent 2, Stage II, Pier 1	925	67.0	135	76	9.0		19.5	12.7	Yes	85.7	14
Bent 2, Stage II, Pier 2	925	67.0	135	76	9.0		12.7	19.5	Yes	78.7	21
TOTAL QTY:							106	124			127

*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 DPT/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing (DPT)				Pile Order Lengths	
End Bent/ Bent No	DPT Testing Required? YES or MAYBE	DPT Test Pile Length FT	Total DPT Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or DPT
End Bent 1	Maybe	50			
End Bent 2	Maybe	40			
			1		

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

SUMMARY OF 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 1-11				Yes	
End Bent 2, Piles 1-11				Yes	
TOTAL QTY:				22	

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, Stage I, Piers 1-2		Maybe	139	Maybe	
Bent 1, Sateg II, Piers 1-2		Maybe	159	Maybe	
Bent 2, Stage I, Piers 1-2		Maybe	139	Maybe	
Bent 2, Stage II, Piers 1-2		Maybe	169	Maybe	
TOTAL QTY:		2	1212	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-0086

Johnston COUNTY

STATION: 19+26.00 -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 (Yinhui Liu, PE # 034020) on 05-09-2024.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer will determine the need for DPT Testing, CSL Testing, and SID Inspections when these items may be required.

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Docusigned by: Aster Abraha DDA094AED5104FD...

11/21/2024

SIGNATURE DATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE AND DRILLED PIER FOUNDATION TABLES

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-3
1			3				TOTAL SHEETS
2			4				57

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

8/26/21

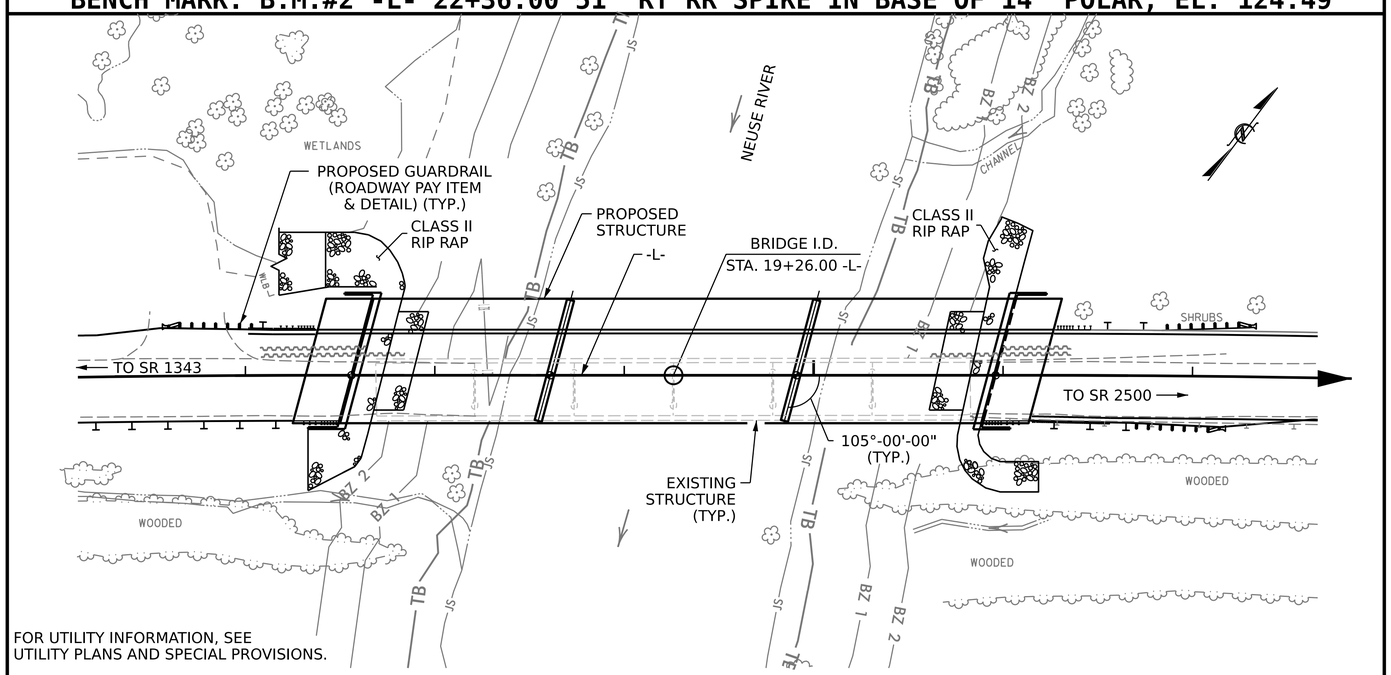
TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE STA. 19+26.00	ASBESTOS ASSESMENT	4'-6" ∅ DRILLED PIERS IN SOIL	4'-6" ∅ DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING 4'-6" ∅ DRILLED PIER	DYNAMIC PILE TESTING	SID INSPECTION	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL REINFORCING STEEL	FIB 63" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12X53 STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	TWO BAR METAL RAIL
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	EACH	EACH	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN.FT.	EACH	NO.	LIN.FT.	EACH	EACH	LIN.FT.
SUPERSTRUCTURE											22,228	23,271					24	2,690.83						660.9
END BENT 1													57.4		8,705				11	11	495	11		
BENT 1				65.3	47.6	64							95.1		29,853	5,844								
BENT 2				58.5	58.3	63							95.3		30,310	5,996								
END BENT 2													57.7		8,776				11	11	385	11		
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	123.8	105.9	127	1	2	2	LUMP SUM	22,228	23,271	305.5	LUMP SUM	77,644	11,840	24	2,690.83	22	22	880	22	11	660.9

TOTAL BILL OF MATERIAL (CONTINUED)

	1'-2" x 2'-6" CONCRETE PARAPET	1'-1½" x 3'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	LIN.FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE	676.6	387.3			LUMP SUM
END BENT 1			385	1,000	
BENT 1					
BENT 2					
END BENT 2			417	994	
TOTAL	676.6	387.3	802	1,994	LUMP SUM

BENCH MARK: B.M.#2 -L- 22+36.00 51' RT RR SPIKE IN BASE OF 14' POLAR, EL. 124.49



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE EXISTING STRUCTURE CONSISTING OF 6 SPANS @ 52'-6", WITH A CLEAR ROADWAY WIDTH OF 28'-4", WITH REINFORCED CONCRETE FLOOR ON REINFORCED CONCRETE DECK GIRDERS, END BENTS ARE RC CAP WITH TIMBER PILES AND BENTS ARE ON A REINFORCE CONCRETE POST AND WEB PIERS AND 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 DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

TEMPORARY FILL SHALL NOT BLOCK MORE THAN 50 PERCENT OF THE CHANNEL AT ANY TIME.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. THIS 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 SO AS NOT TO ALLOW DEBRIS TO FALL 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.

THE MATERIAL SHOWN IN THE CROSS HATCHED AREA ON SHEET 1 OF 4 SHALL BE EXCAVATED FOR A DISTANCE OF 45.6' LEFT AND 50.3' RIGHT OF CENTERLINE ROADWAY AT END BENT #1, 81.7 LEFT AND 59.3 RIGHT OF CENTERLINE ROADWAY AT END BENT #2, OR AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION.

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

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 STA. 19+26.00.

TEMPORARY CAUSEWAY SHALL NOT BE PERMITTED TO BLOCK THE CONFLUENCE OF ANY JURISDICTIONAL TRIBUTARY STREAM WITH THE NEUSE RIVER.

FOR ASBESTOS ASSESSMENT, SEE SPECIAL PROVISIONS.

FOR INSTALLATION AND ATTACHMENT OF 16" WATER MAIN AND 24" SEWER MAIN, SEE UTILITIES CONSTRUCTION PLANS AND UTILITIES CONSTRUCTION SPECIAL PROVISIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 23,300 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YRS.
DESIGN HIGH WATER ELEVATION	= 119.6 FT.
DRAINAGE AREA	= 1500 SQ. MI.
BASE DISCHARGE (Q100)	= 29200 CFS
BASE HIGH WATER ELEVATION	= 121.3 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 55600 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 129.8 FT.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha

11/21/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER NEUSE RIVER
ON US 301 BETWEEN
SR 1343 & SR 2500

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			57

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : A.K. IBRAHIM/ A. ABRAHA DATE : 02/2024
CHECKED BY : M.M. AHMED DATE : 10/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 10/2024

11/21/2024
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gabraha

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

LOAD TYPE		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = WXRF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					
								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		HL93(Inv)	N/A	1	1.123	--	1.75	0.856	1.222	A	ER	50.96	0.885	1.465	A	ER	40.77	0.80	0.856	1.123	B	ER	64.13
		HL93(Opr)	N/A		1.585	--	1.35	0.856	1.585	A	ER	50.96	0.885	1.899	A	ER	40.77	N/A	--	--	--	--	--
		HS20(Inv)	36.00	2	1.671	60.147	1.75	0.856	1.714	A	ER	50.96	0.885	1.842	A	ER	40.77	0.80	0.856	1.671	B	ER	64.13
		HS20(Opr)	36.00		2.222	79.983	1.35	0.856	2.222	A	ER	50.96	0.885	2.388	A	ER	40.77	N/A	--	--	--	--	--
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.50		4.001	54.010	1.4	0.856	5.101	A	ER	50.96	0.885	5.433	A	ER	40.77	0.80	0.856	4.001	A	ER	50.96
		SNGARBS2	20.00		2.891	57.813	1.4	0.856	3.685	A	ER	50.96	0.885	3.878	A	ER	40.77	0.80	0.856	2.891	A	ER	50.96
		SNAGRIS2	22.00		2.697	59.328	1.4	0.856	3.444	A	ER	50.96	0.885	3.605	A	ER	40.77	0.80	0.856	2.697	B	ER	64.13
		SNCOTTS3	27.25		1.988	54.178	1.4	0.856	2.535	A	ER	50.96	0.885	2.714	A	ER	40.77	0.80	0.856	1.988	A	ER	50.96
		SNAGGRS4	34.93		1.627	56.806	1.4	0.856	2.074	A	ER	50.96	0.885	2.263	A	ER	40.77	0.80	0.856	1.627	A	ER	50.96
		SNS5A	35.55		1.593	56.627	1.4	0.856	2.031	A	ER	50.96	0.885	2.297	A	ER	40.77	0.80	0.856	1.593	A	ER	50.96
		SNS6A	39.95		1.447	57.818	1.4	0.856	1.845	A	ER	50.96	0.885	2.100	A	ER	40.77	0.80	0.856	1.447	A	ER	50.96
		SNS7B	42.00		1.378	57.864	1.4	0.856	1.756	A	ER	50.96	0.885	2.069	A	ER	40.77	0.80	0.856	1.378	A	ER	50.96
	TRUCK TRACTOR SEMI-TRACTOR (TTST)	TNAGRIT3	33.00		1.761	58.103	1.4	0.856	2.245	A	ER	50.96	0.885	2.496	A	ER	40.77	0.80	0.856	1.761	A	ER	50.96
		TNT4A	33.08		1.765	58.365	1.4	0.856	2.250	A	ER	50.96	0.885	2.428	A	ER	40.77	0.80	0.856	1.765	A	ER	50.96
		TNT6A	41.60		1.427	59.363	1.4	0.856	1.823	A	ER	50.96	0.885	2.214	A	ER	40.77	0.80	0.856	1.427	B	ER	64.13
		TNT7A	42.00		1.424	59.807	1.4	0.856	1.823	A	ER	50.96	0.885	2.167	A	ER	40.77	0.80	0.856	1.424	B	ER	64.13
		TNT7B	42.00		1.449	60.842	1.4	0.856	1.864	A	ER	50.96	0.885	2.016	A	ER	40.77	0.80	0.856	1.449	B	ER	64.13
		TNAGRIT4	43.00		1.396	60.037	1.4	0.856	1.789	A	ER	50.96	0.885	1.950	A	ER	40.77	0.80	0.856	1.396	B	ER	64.13
		TNAGRT5A	45.00		1.325	59.630	1.4	0.856	1.695	A	ER	50.96	0.885	1.945	A	ER	40.77	0.80	0.856	1.325	B	ER	64.13
		TNAGRT5B	45.00	3	1.317	59.259	1.4	0.856	1.681	A	ER	50.96	0.885	1.854	A	ER	40.77	0.80	0.856	1.317	B	ER	64.13
EMERGENCY VEHICLE (EV)		EV2	28.75		2.033	58.442	1.3	0.856	2.791	A	ER	50.96	0.885	2.931	A	ER	40.77	0.80	0.856	2.033	A	ER	50.96
		EV3	43.00	4	1.340	57.626	1.3	0.856	1.840	A	ER	50.96	0.885	1.977	A	ER	40.77	0.80	0.856	1.340	A	ER	50.96

LOAD FACTORS:

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

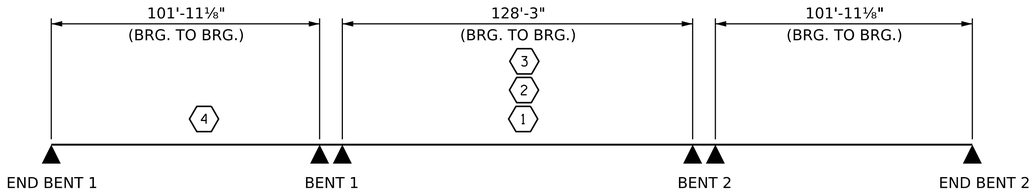
(#) CONTROLLING LOAD RATING

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-0086
JOHNSTON COUNTY
STATION: 19+26.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
11/21/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

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

ASSEMBLED BY : A.K. IBRAHIM	DATE : 09/2024
CHECKED BY : A. ABRAHA	DATE : 10/2024
DRAWN BY :	REV. 11/12/08RR
CHECKED BY :	REV. 10/1/11

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			57

11/20/2024
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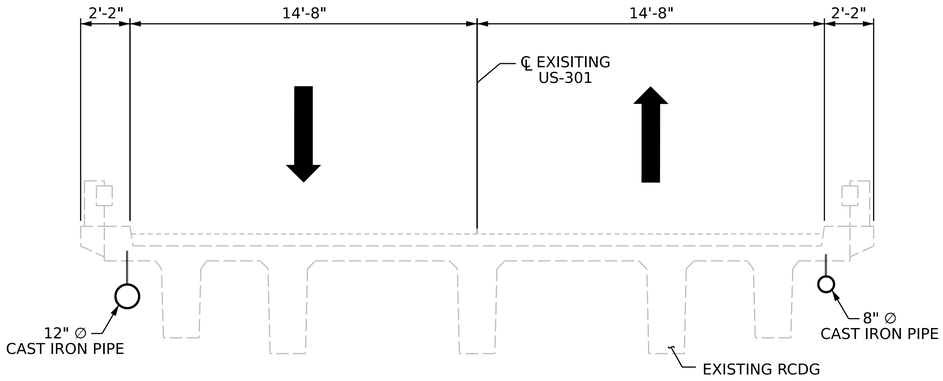
aabraha

8/26/21

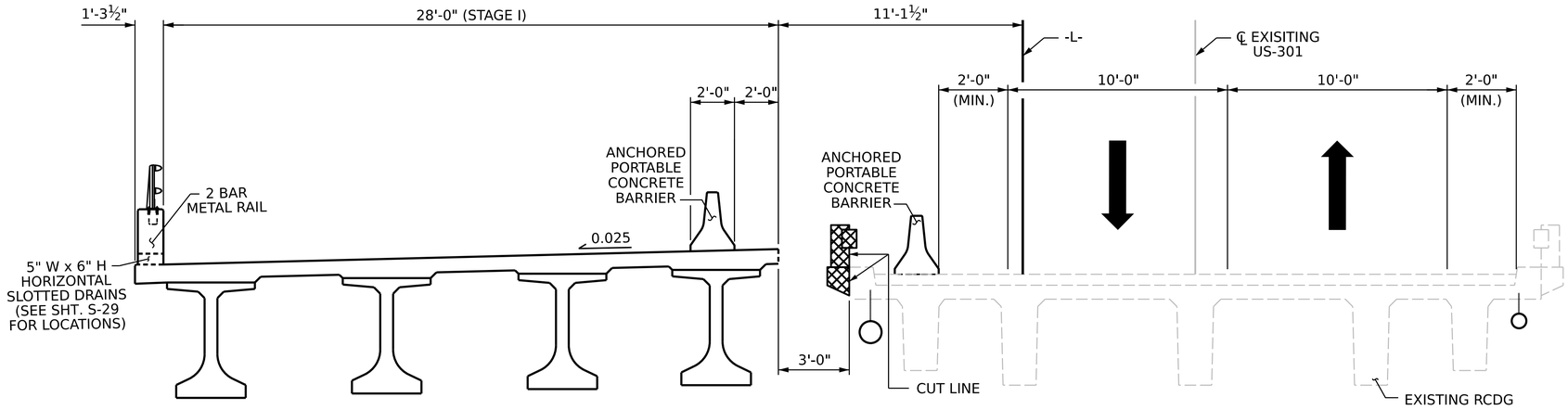
NOTES

FOR MAINTENANCE OF TRAFFIC AND LOCATIONS OF TEMPORARY SHORING AND PORTABLE CONCRETE BARRIERS, SEE TRAFFIC CONTROL PLANS.

FOR PHASING AND MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.



TYPICAL SECTION-EXISTING



TYPICAL SECTION-STAGE I CONSTRUCTION

SAW CUT 1.5' FROM OUTSIDE SOUTHBOUND DIRECTION OF EXISTING BRIDGE
PLACE ALL TRAFFIC ON NORTHBOUND DIRECTION OF EXISTING BRIDGE
BEGIN BUILDING SOUTHBOUND PORTION OF PROPOSED BRIDGE.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

CONSTRUCTION SEQUENCE

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ALSTER G. ABRAHA

Alster Abraha

DDA094AED5104FD...

11/21/2024

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : G. AYES/ M. M. AHMED DATE : 2/2024
CHECKED BY : A. ABRAHA DATE : 7/2024
DESIGN ENGINEER OF RECORD: M. M . AHMED DATE : 4/2024

11/20/2024
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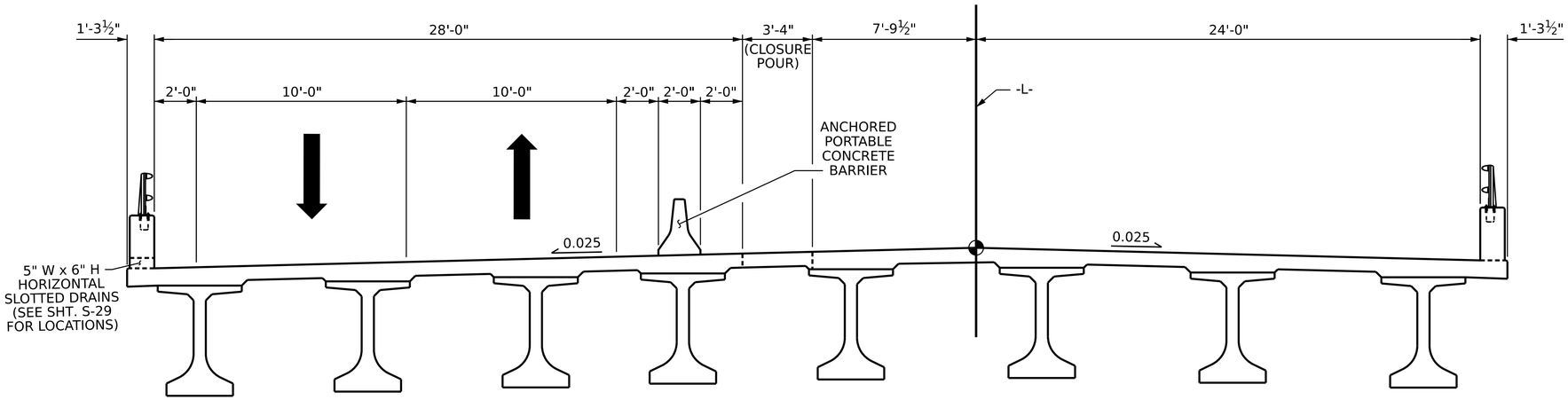
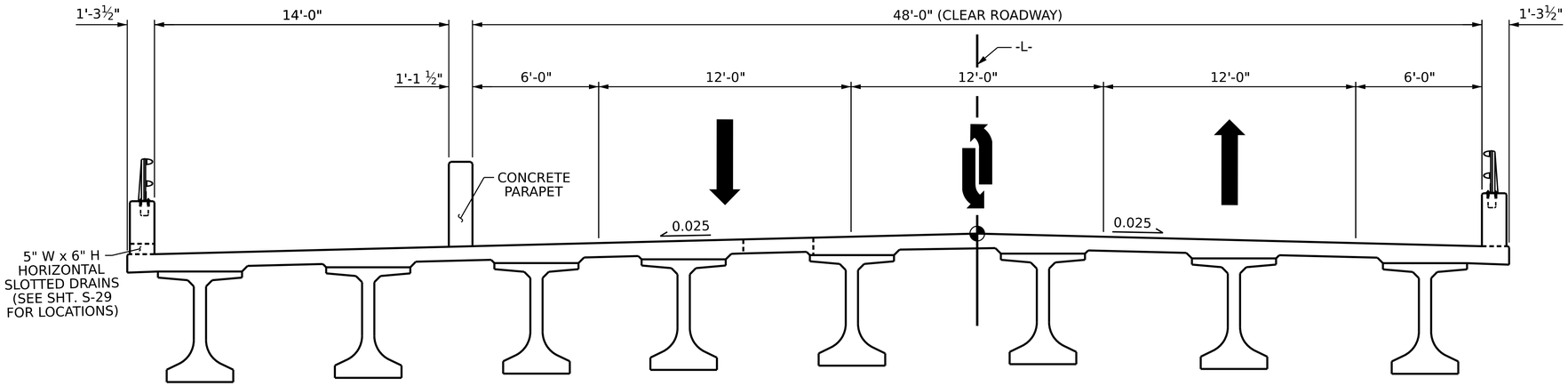


TYPICAL SECTION-STAGE II CONSTRUCTION

PLACE ALL TRAFFIC ON SOUTHBOUND DIRECTION OF NEW BRIDGE
BEGIN BUILDING NORTHBOUND PORTION OF PROPOSED BRIDGE.



TYPICAL SECTION-FINAL

PROJECT NO. BR-0086
JOHNSTON COUNTY
STATION: 19+26.00 -L-
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

CONSTRUCTION SEQUENCE

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
Aster Abraha
11/21/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
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2			4			57

DRAWN BY : G. AYES/M. M . AHMED DATE : 2/2024
CHECKED BY : A. ABRAHA DATE : 7/2024
DESIGN ENGINEER OF RECORD: M. M . AHMED DATE : 4/2024

11/20/2024
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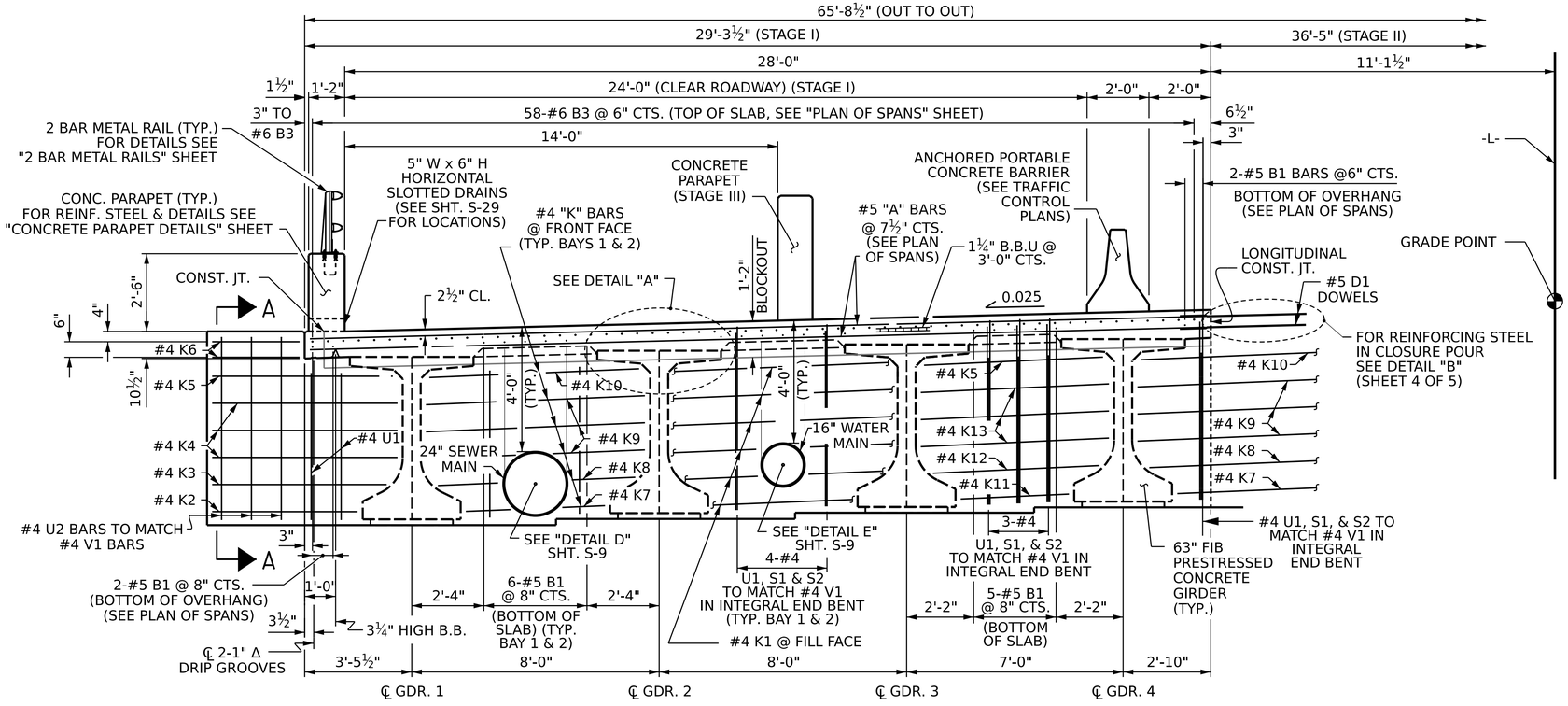
gabraha

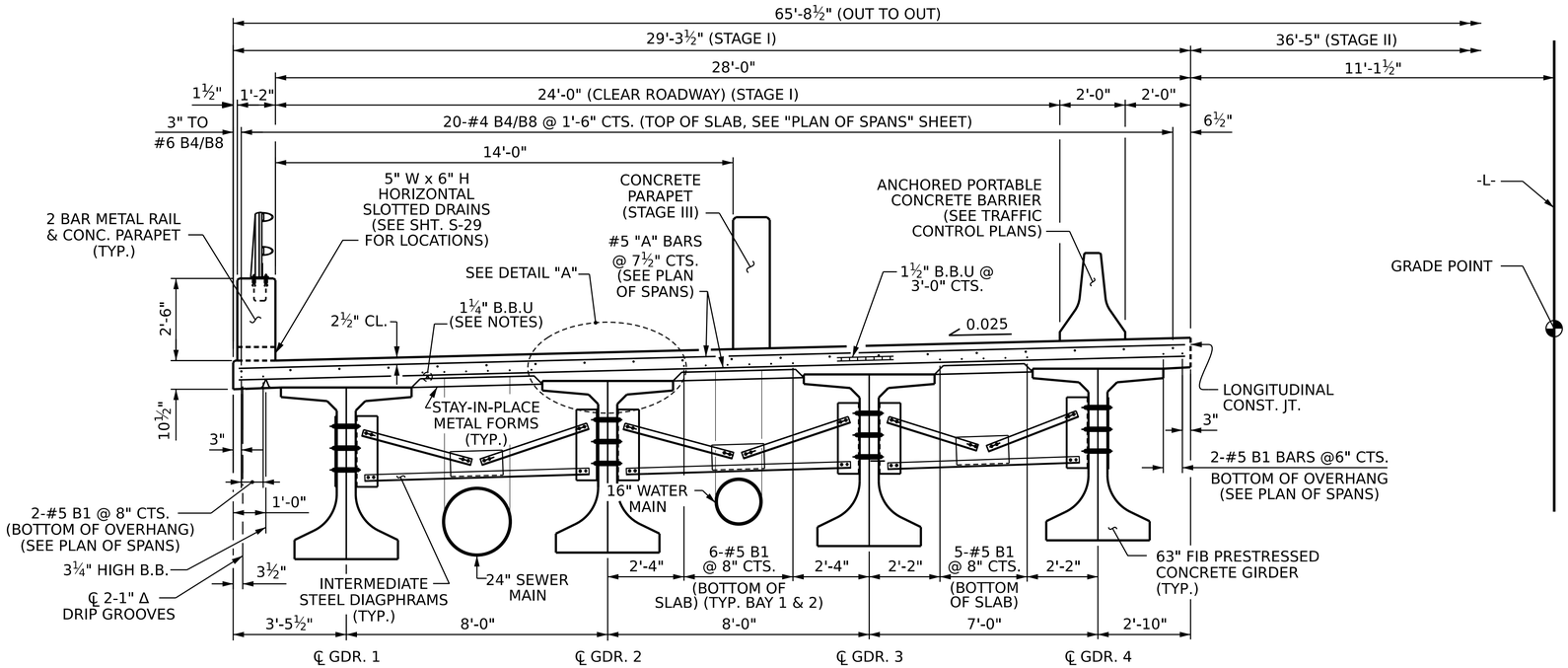
8/26/21

8/26/21



TYPICAL SECTION AT INTEGRAL END BENT

SHOWING ABUTMENT WALL AT FILL FACE OF END BENTS. WINGS NOT SHOWN FOR CLARITY.



TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM

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.

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

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

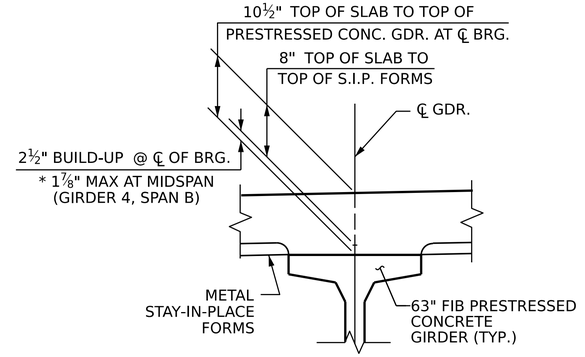
FOR INTERMEDIATE STEEL DIAPHRAGMS DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" FLORIDA I-BEAMS" SHEET.

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO THE SUPPORT ANGLES WITHIN THE LINK SLAB AREAS. SEE "PLAN OF SPANS'' SHEETS FOR LOCATION.

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

DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE ANCHORED PORTABLE CONCRETE BARRIER.



DETAIL "A"

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

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION STAGE I (LEFT SIDE)

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
Aster Abraha
DDA094AED5104FD...
11/21/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : G. AYES DATE : 7/2023
CHECKED BY : S. WANCE / M. M. AHMED DATE : 4/2024
DESIGN ENGINEER OF RECORD: M. M . AHMED DATE : 4/2024

11/21/2024
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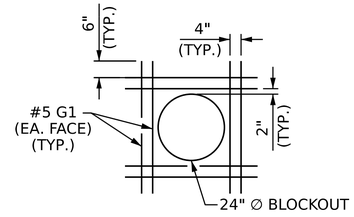
aabraha

8/26/21

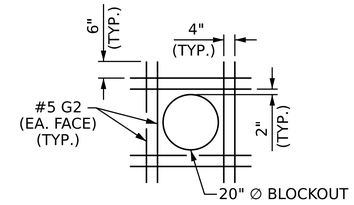
NOTES

FOR UTILITY PIPING AND SUSPENSION SYSTEM. SEE STRUCTURE UTILITY SPECIAL PROVISIONS.

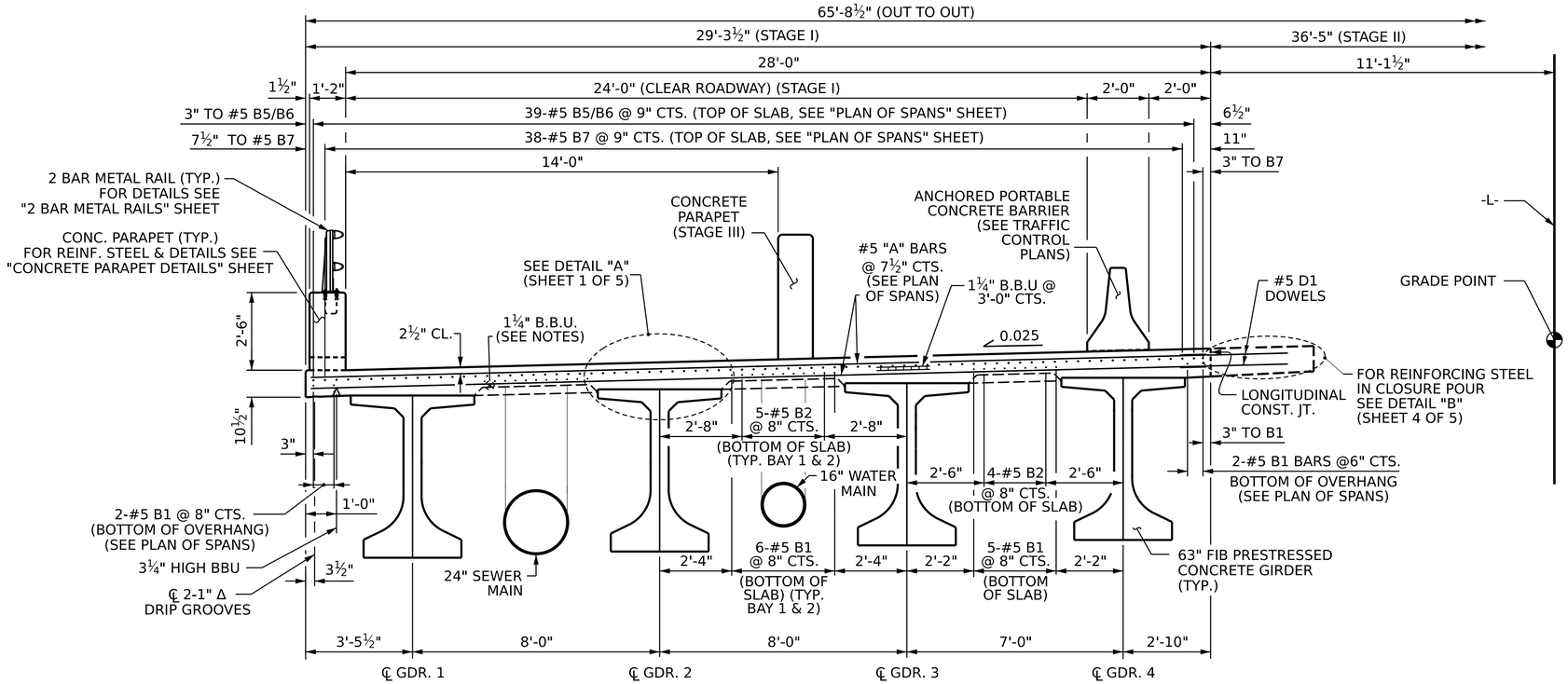
REINFORCING STEEL MAY BE FIELD BENT, SHIFTED OR CUT AS NECESSARY FOR INSTALLATION OF THE 24" ∅ AND 16" ∅ PIPES.



DETAIL OF REINFORCING AROUND 24"ø SEWER MAIN



DETAIL OF REINFORCING AROUND 16"ø PIPE



TYPICAL SECTION AT LINK SLAB

CONTINUOUS FOR LIVELOAD WITH COMPOSITE DECK

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION STAGE I (LEFT SIDE)

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ALMALLA

Aster Almalla
ODA094AED5104FD...
11/21/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S-9

TOTAL SHEETS 57

DRAWN BY : G. AYES DATE : 8/2023
CHECKED BY : S. WANCE / M. M. AHMED DATE : 4/2024
DESIGN ENGINEER OF RECORD: M. M . AHMED DATE : 11/2024

11/20/2024
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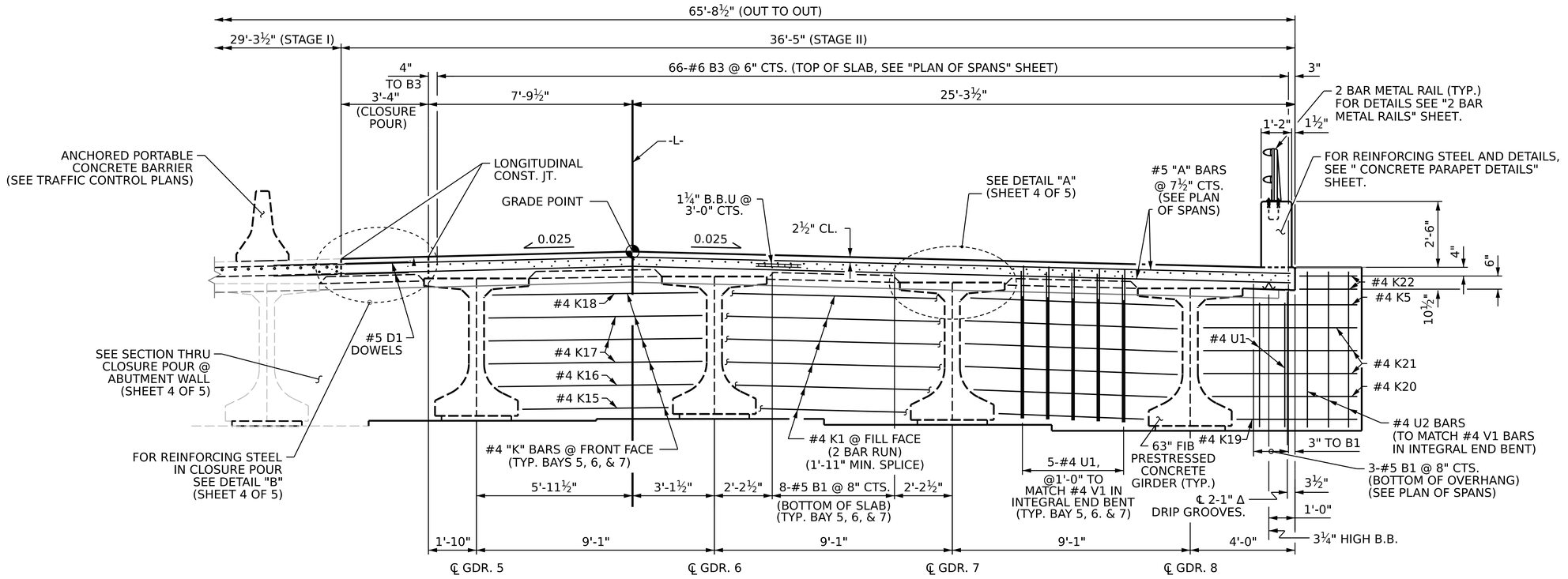
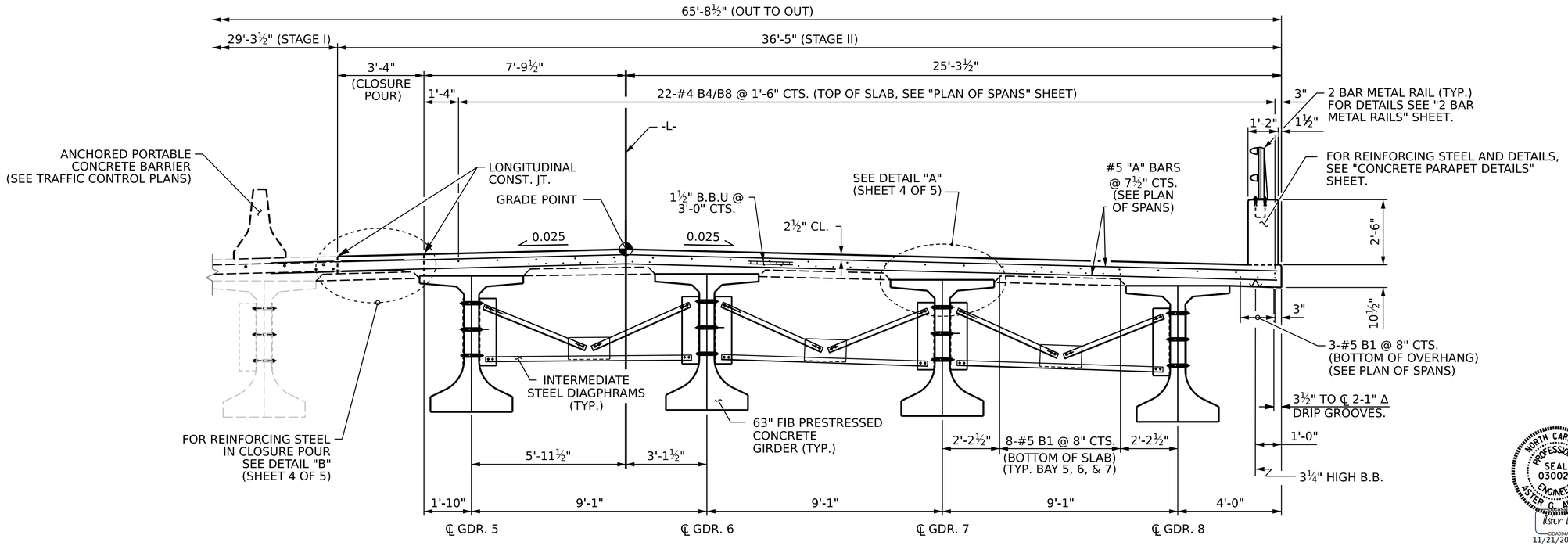
mmahmed

8/26/21



TYPICAL SECTION AT INTEGRAL END BENT

SHOWING ABUTMENT WALL AT FILL FACE OF END BENTS. WINGS NOT SHOWN FOR CLARITY.



TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM

NOTES

PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS.

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

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

FOR INTERMEDIATE STEEL DIAPHRAGMS DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" FLORIDA I-BEAMS" SHEET.

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO THE SUPPORT ANGLES WITHIN THE LINK SLAB AREAS. SEE "PLAN OF SPANS'' SHEETS FOR LOCATION.

PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL THE SLAB CONCRETE IN THE UNIT HAS REACHED A MINIMUM COMPRESSIVE STRNGTH OF 3,000 PSI.

DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP AND BOTTOM SLAB REINFORCING STEEL.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE ANCHORED PORTABLE CONCRETE BARRIER.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION STAGE II (RIGHT SIDE)

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
Aster Abraha
ODA094AED504FD...
11/21/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			57

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : G. AYES DATE : 8/2023
CHECKED BY : M. M . AHMED DATE : 4/2024
DESIGN ENGINEER OF RECORD: M. M . AHMED DATE : 9/2024

11/20/2024
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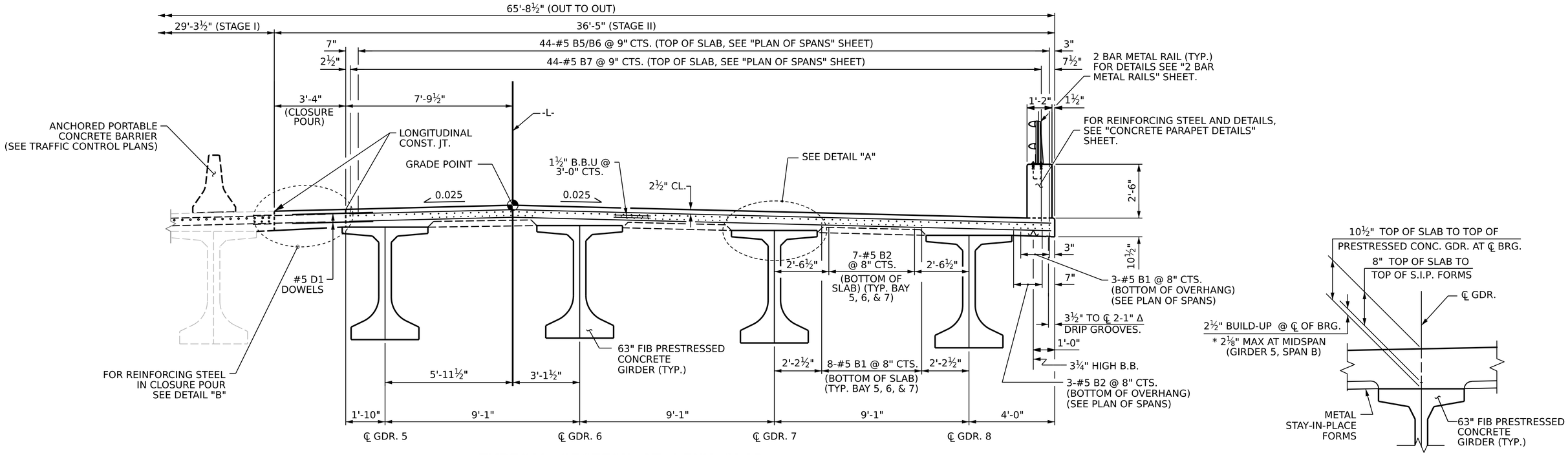
aabraha

8/26/21

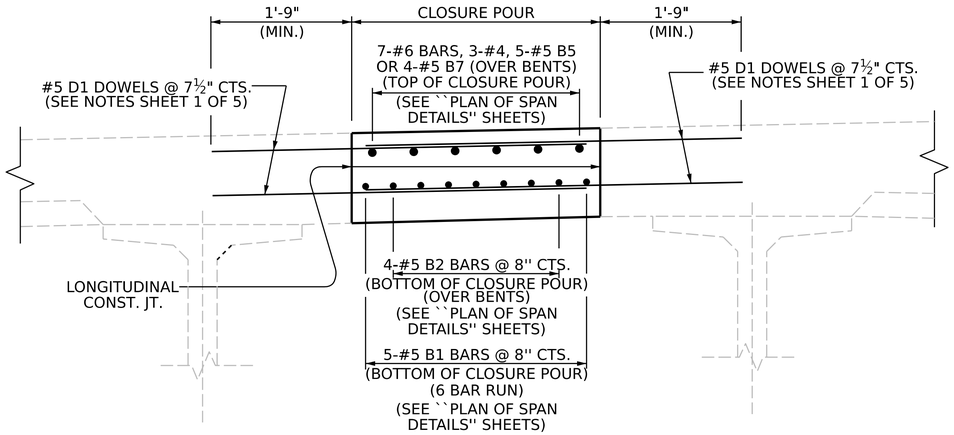


TYPICAL SECTION AT LINK SLAB

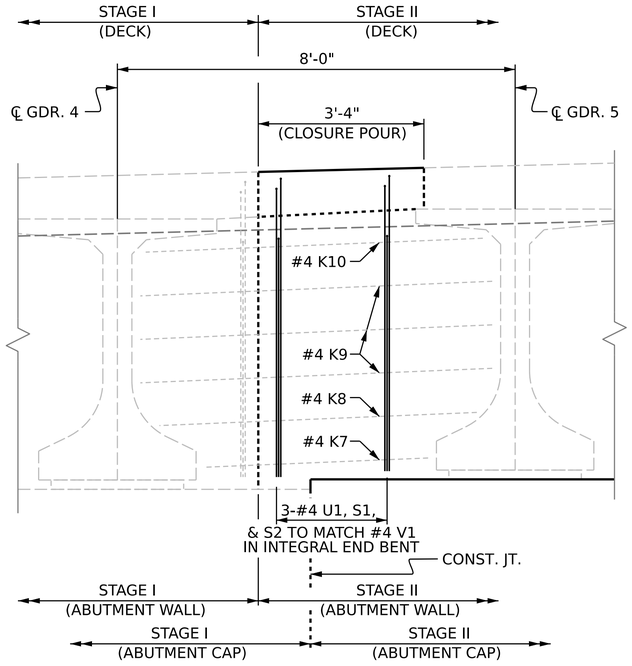
CONTINUOUS FOR LIVELOAD WITH COMPOSITE DECK

DETAIL "A"

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



DETAIL ''B''



SECTION THRU CLOSURE POUR @ ABUTMENT WALL

CAST ABUTMENT WALLS BETWEEN GIRDERS 4 & 5 WITH STAGE II CONSTRUCTION, SEE ''POUR SEQUENCE'' DETAILS.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION STAGE II (RIGHT SIDE)

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha
DDA084AED5104FD...
11/21/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
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2			4			57

DRAWN BY : G. AYES DATE : 8/2023
CHECKED BY : S. WANCE / M. M. AHMED DATE : 12/2023
DESIGN ENGINEER OF RECORD: M. M . AHMED DATE : 11/2024

11/21/2024
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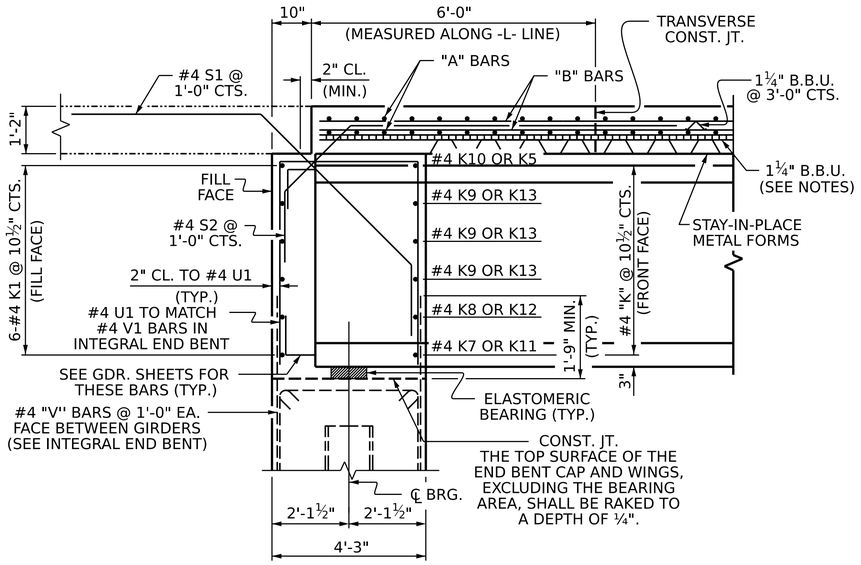
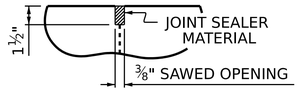
8/26/21



SECTION @ INTEGRAL END BENT

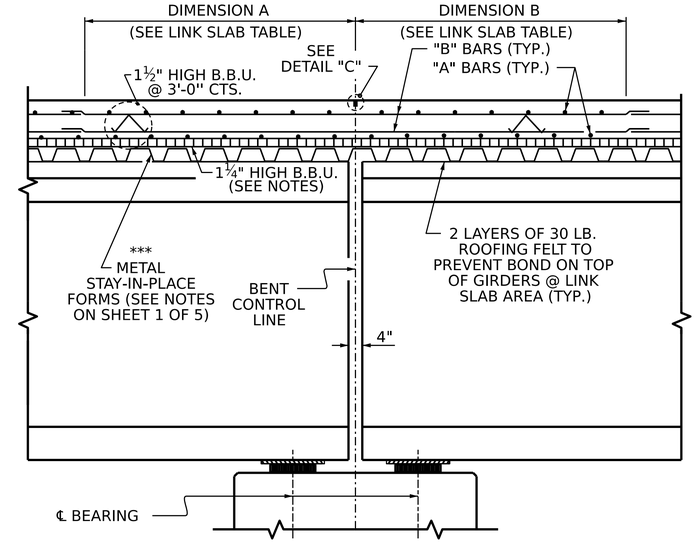


DETAIL "C"

A 1 ½" DEEP CONTRACTION JOINT AT BENT CONTROL LINE AND EDGES OF LINK SLAB AREA SHALL BE SAWN WITHIN 24 HOURS OFPOURING THE DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF TYPE B LOW MODULUS SILICONE SEALANT. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

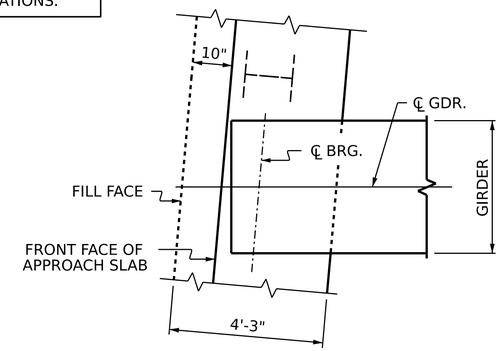
LINK SLAB TABLE		
BENT NO.	DIMENSION A	DIMENSION B
1	* 5'-6"	* 6'-9"
2	* 6'-9"	* 5'-6"

* MEASURED ALONG ℄ GIRDER

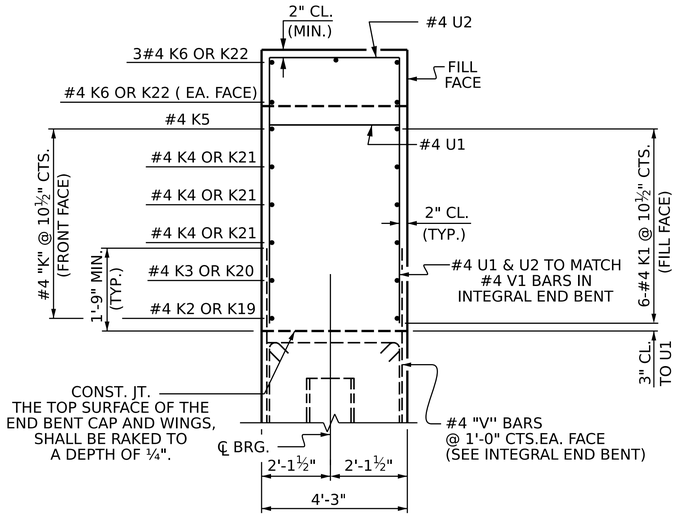


SECTION @ LINK SLAB

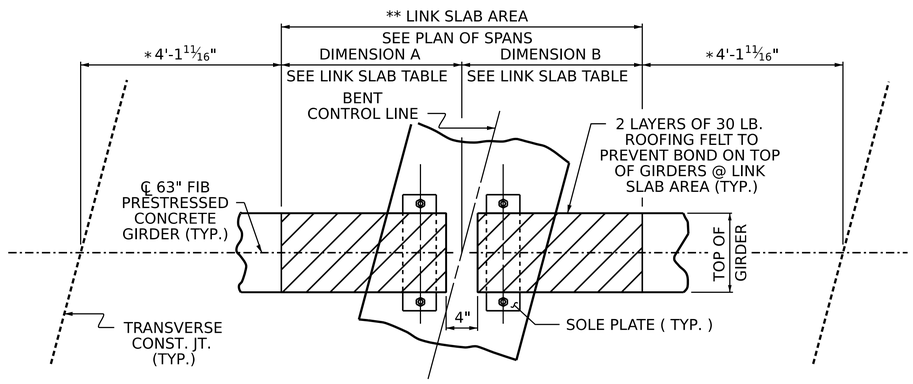
*** METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO THE GIRDER FLANGES IN THE REGION OF THE LINK SLAB.



PLAN OF GIRDER AT INTEGRAL END BENT



SECTION A-A



PLAN @ INTERIOR BENTS

** THE TOP OF THE GIRDER IN THE AREA OF THE LINK SLAB SHALL BE SMOOTH AND FREE OF STIRRUPS OR ANCHOR STUDS.
(BENT 1 SHOWN, BENT 2 SIMILAR BY ROTATION)

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ALISTER G. ABRAHA

11/21/2024

DRAWN BY : G. AYES DATE : 8/2023
CHECKED BY : M. M . AHMED DATE : 3/2024
DESIGN ENGINEER OF RECORD: M. M . AHMED DATE : 9/2024

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REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-12
1			3				TOTAL SHEETS
2			4				57

11/21/2024
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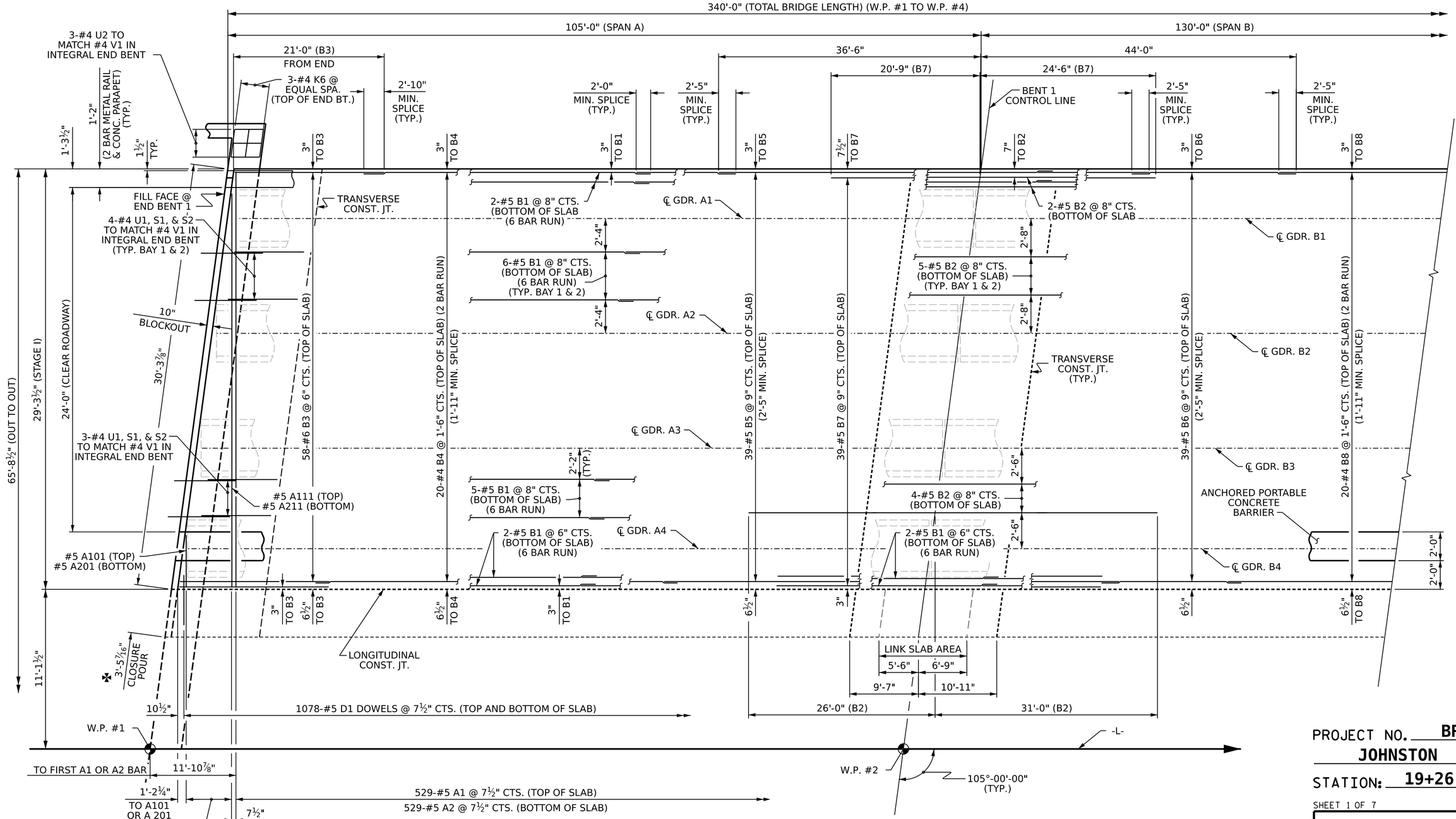
ggbraha

8/26/21



PLAN OF SPAN
STAGE I (LEFT SIDE)

NOTES: ✠ SEE "CLOSURE POUR DETAILS" ON SHEET 7 OF 7, FOR CLOSURE POUR DETAILS.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A AND PART PLAN OF SPAN B STAGE I (LEFT SIDE)

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha
DDA084AED5104FD...
11/21/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY :	G. AYES	DATE :	7/2023		
CHECKED BY :	M. M. AHMED	DATE :	3/2024		
DESIGN ENGINEER OF RECORD:	M. M. AHMED	DATE :	11/2024		

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			57

11/20/2024
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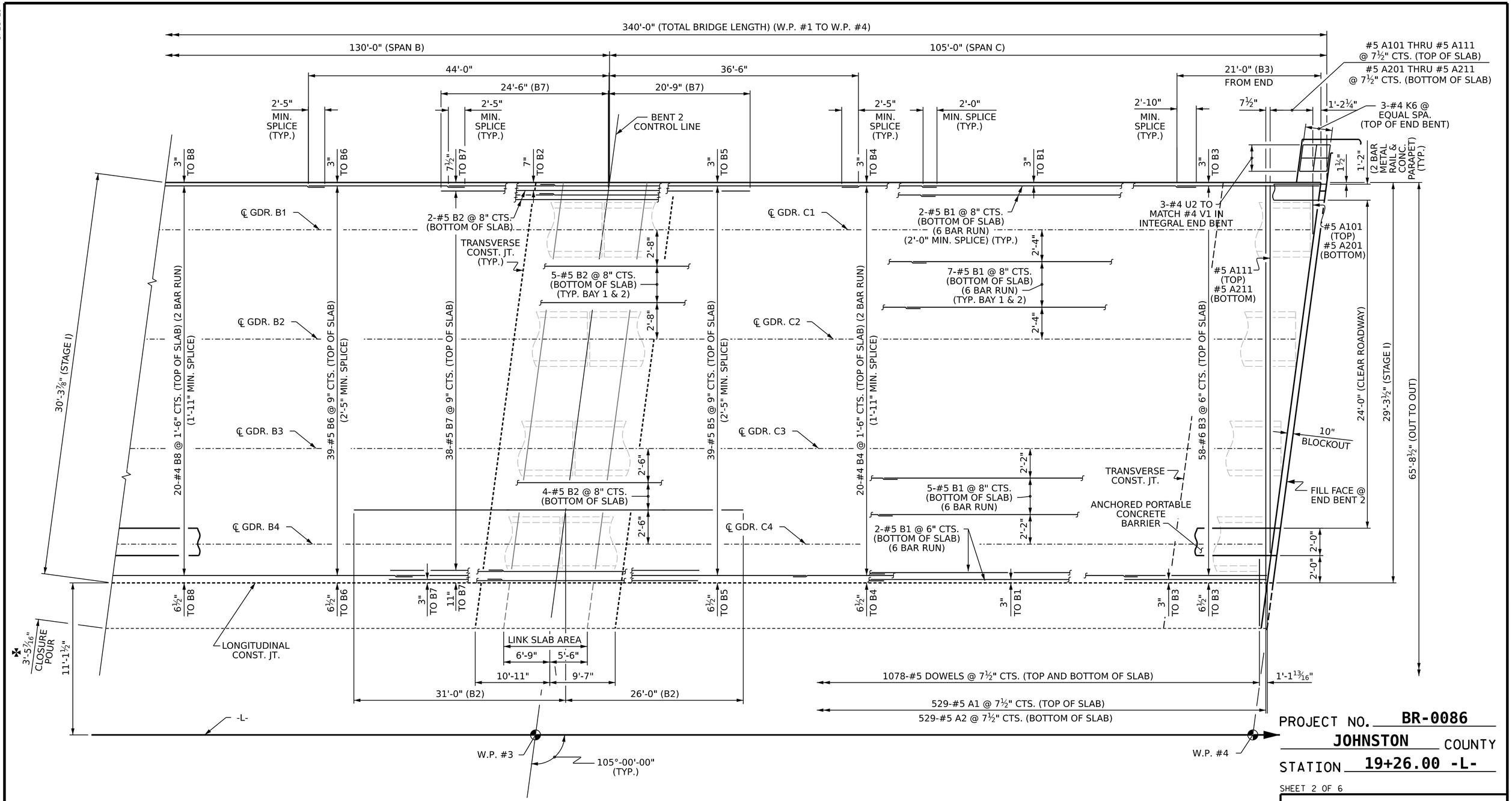
mmahmed

8/26/21



PLAN OF SPAN
STAGE I (LEFT SIDE)

NOTES: ✠ SEE "CLOSURE POUR DETAILS" ON SHEET 7 OF 7, FOR CLOSURE POUR DETAILS.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION 19+26.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PART PLAN OF SPAN B AND PLAN OF SPAN C STAGE I (LEFT SIDE)

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
Aster Abraha
11/21/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			57

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DRAWN BY : G. AYES DATE : 7/2023
CHECKED BY : M. M. AHMED DATE : 3/2024
DESIGN ENGINEER OF RECORD: M. M. AHMED DATE : 9/2024

11/21/2024
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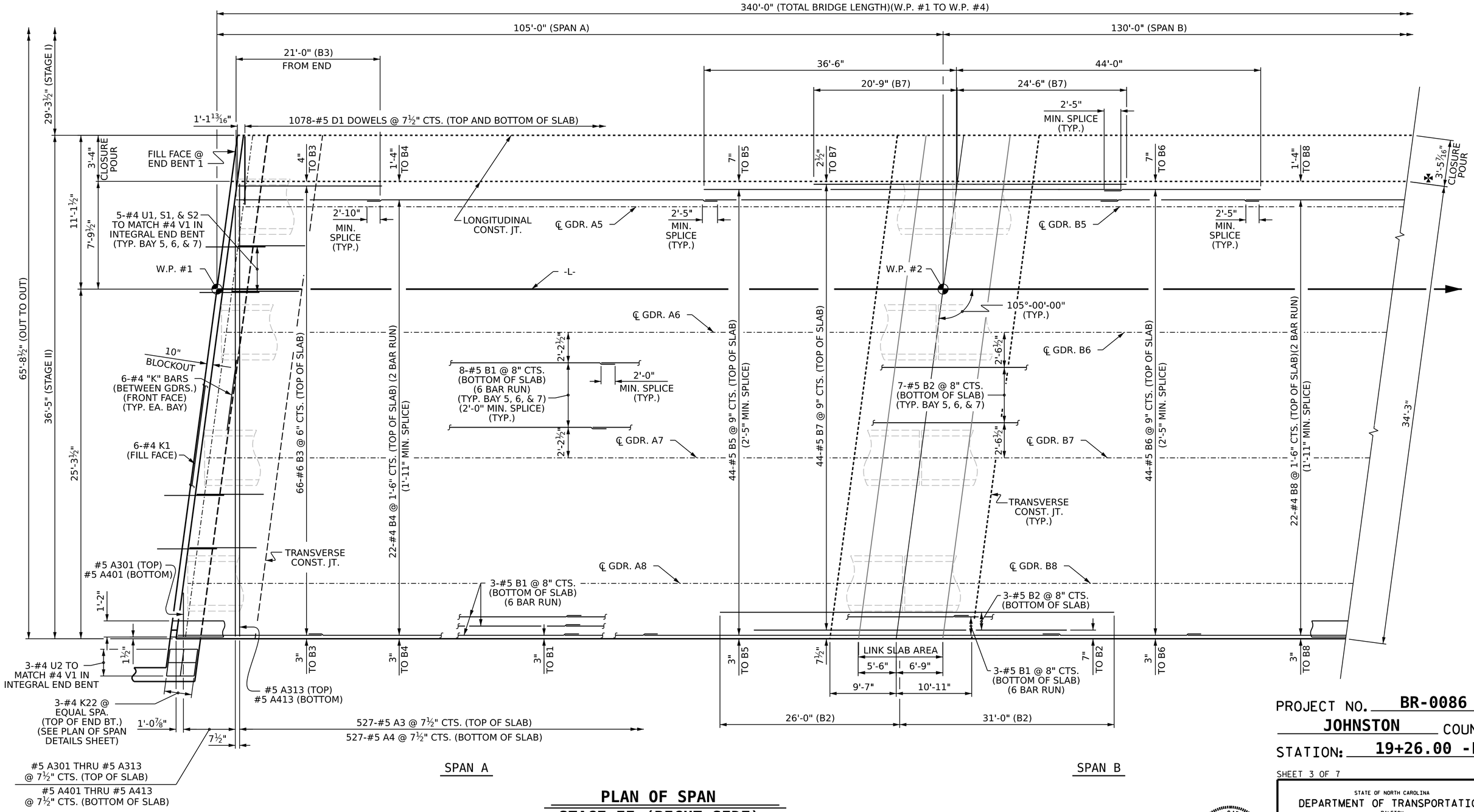
aabraha

8/26/21



PLAN OF SPAN
STAGE II (RIGHT SIDE)

NOTES: ✠ SEE "CLOSURE POUR DETAILS" ON SHEET 7 OF 7, FOR CLOSURE POUR DETAILS.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 3 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A AND PART PLAN OF SPAN B STAGE II (RIGHT SIDE)

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRUHA

Aster Abraha
DDA0984AED5104FD...
11/21/2024

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
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2			4			57

DRAWN BY :	G. AYES	DATE : 7/2023
CHECKED BY :	M.M. AHMED	DATE : 3/2024
DESIGN ENGINEER OF RECORD:	M. M. AHMED	DATE : 9/2024

11/21/2024
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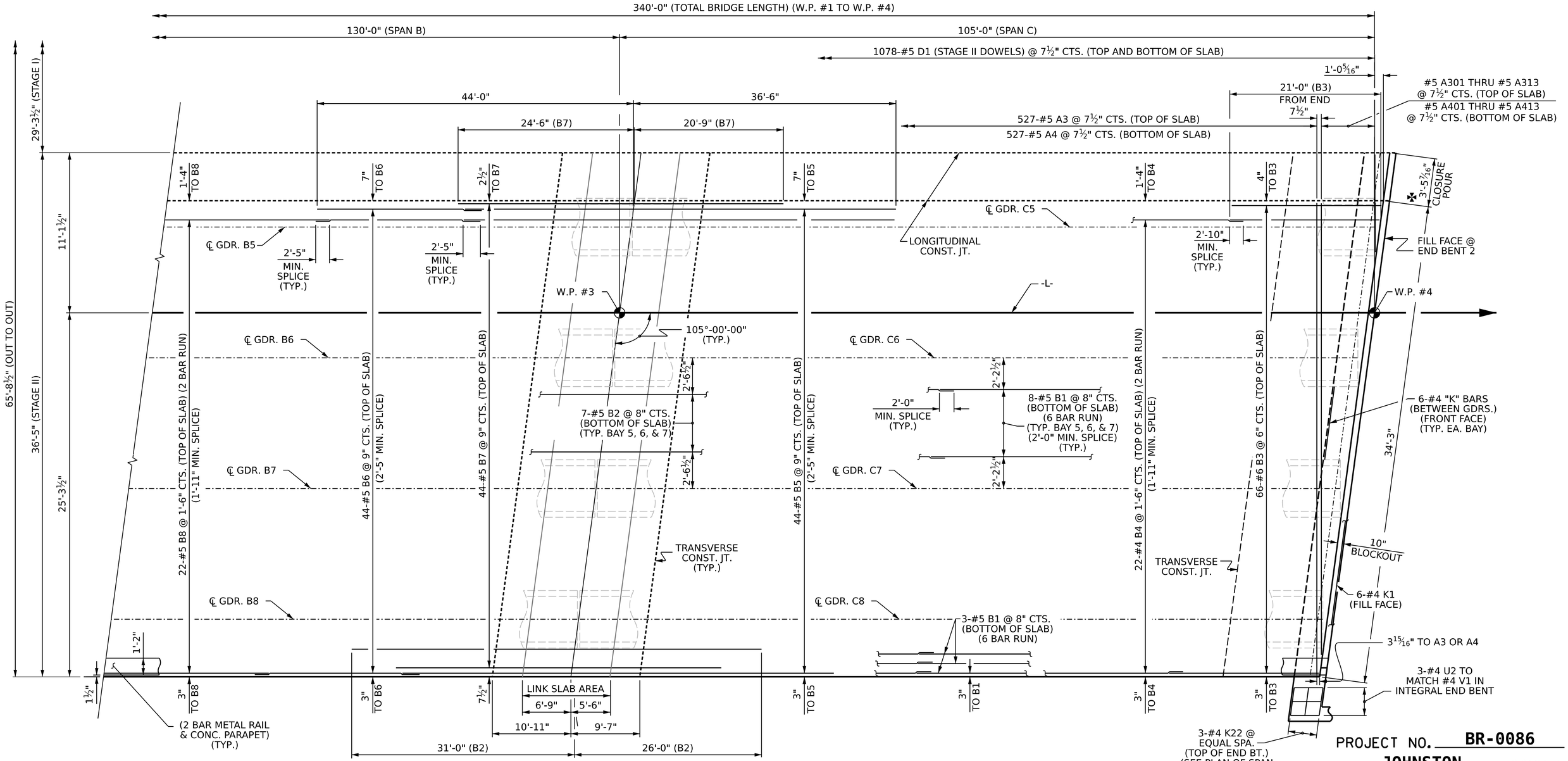
agbraha

8/26/21



SPAN B

SPAN C

PLAN OF SPAN
STAGE II (RIGHT SIDE)

NOTES: ✠ SEE "CLOSURE POUR DETAILS" ON SHEET 7 OF 7, FOR CLOSURE POUR DETAILS.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 4 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PART PLAN OF SPAN B AND PLAN OF SPAN C STAGE II (RIGHT SIDE)

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
Aster Abraha
ODA094AED5104FD...
11/21/2024

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
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2			4			57

DRAWN BY : G. AYES DATE : 7/2023
CHECKED BY : M.M. AHMED DATE : 3/2024
DESIGN ENGINEER OF RECORD: M. M. AHMED DATE : 3/2024

11/21/2024
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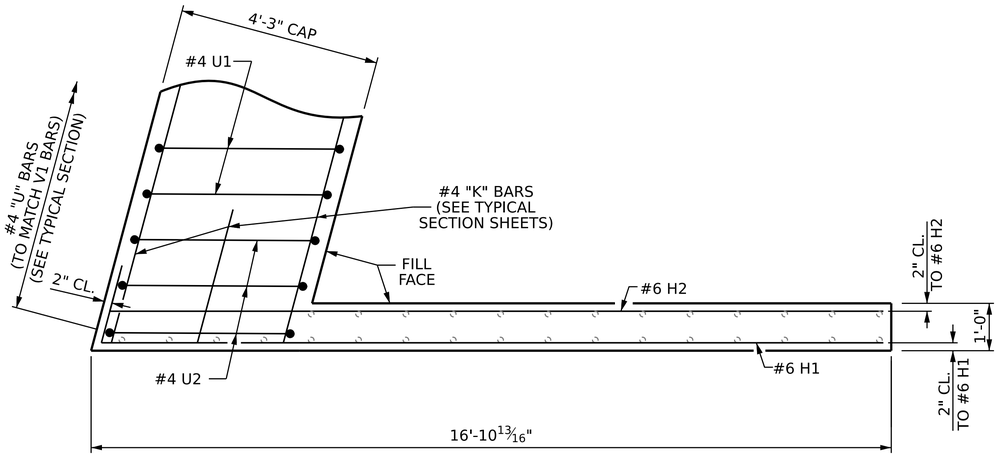
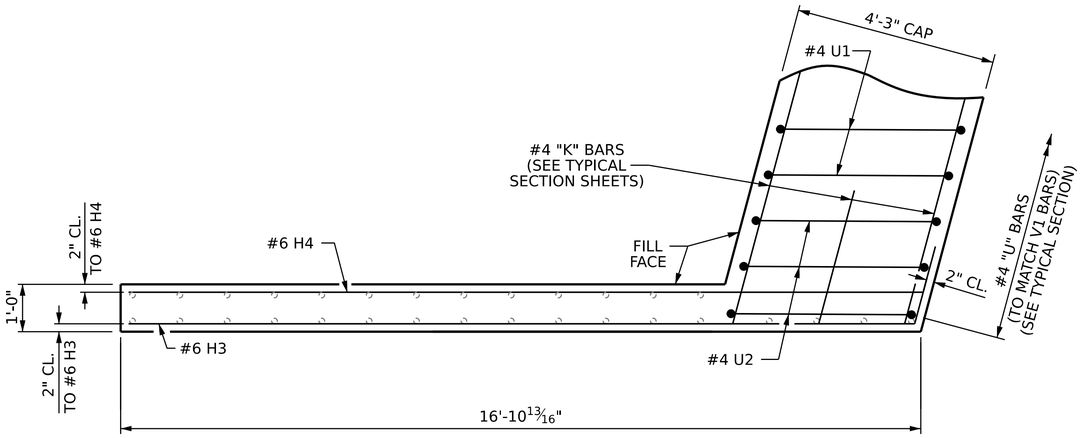
aabraha

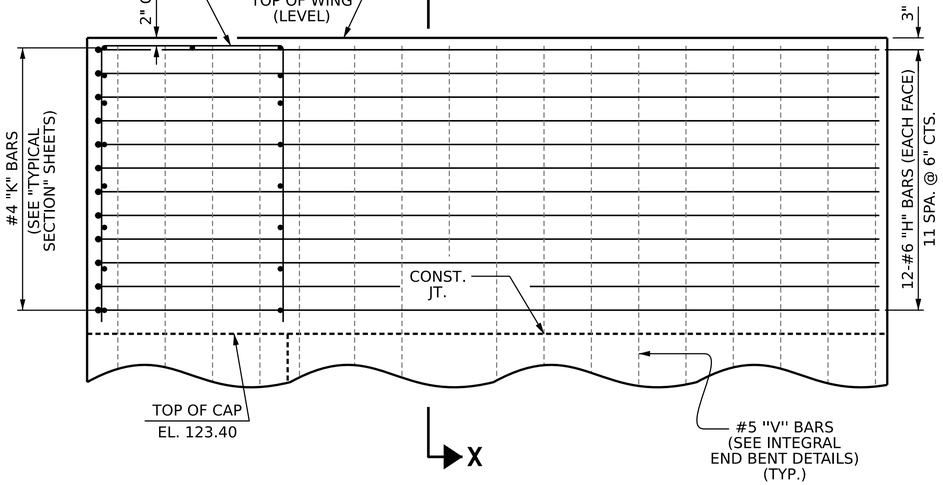
8/26/21



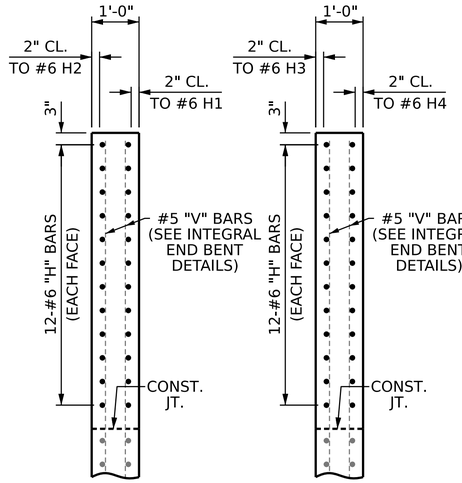
PLAN OF LEFT WING W1 - STAGE I



PLAN OF RIGHT WING W2 - STAGE II

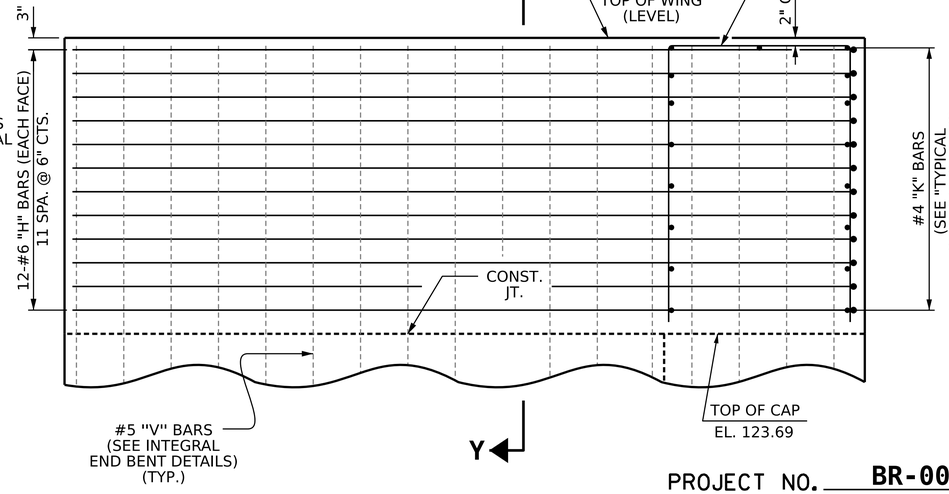


ELEVATION OF LEFT WING W1 - STAGE I



SECTION X-X

SECTION Y-Y



ELEVATION OF RIGHT WING W2 - STAGE II

UPPER PART OF WINGS AT INTEGRAL END BENT 1

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

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 5 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPANS DETAILS @ END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha

DDA084AED5104FD...

11/21/2024

DRAWN BY : G. AYES DATE : 9/2023
CHECKED BY : M.M. AHMED DATE : 3/2024
DESIGN ENGINEER OF RECORD: M. M. AHMED DATE : 6/2023

10/8/2024
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gabraha

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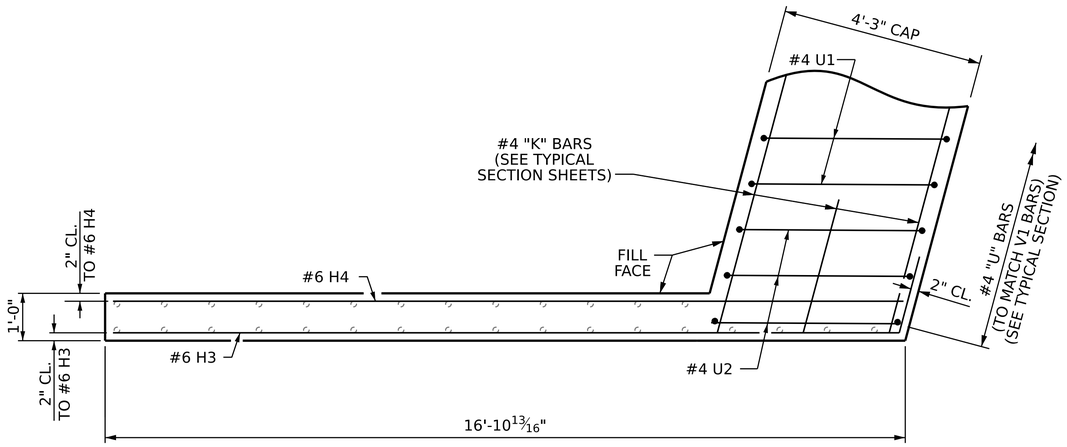
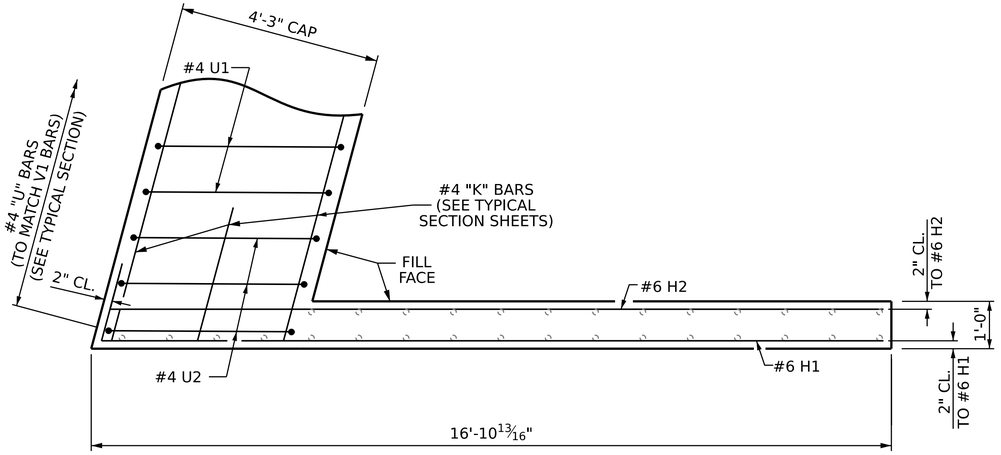
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			57

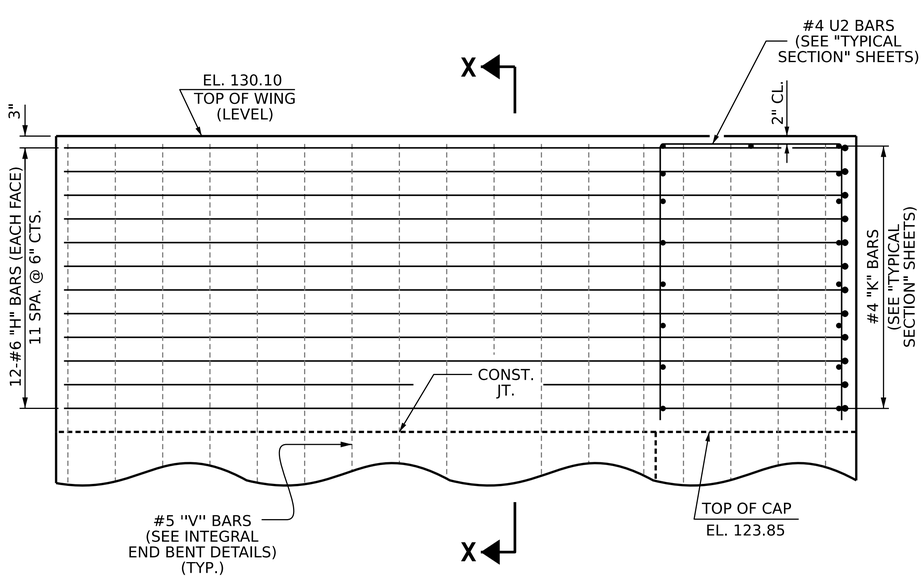
8/26/21



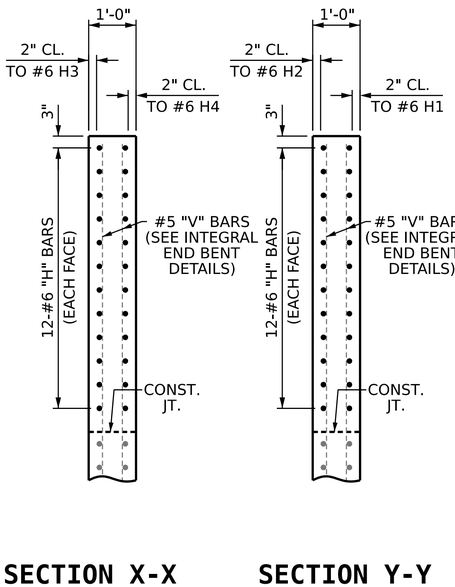
PLAN OF LEFT WING W1 - STAGE I



PLAN OF RIGHT WING W2 - STAGE II

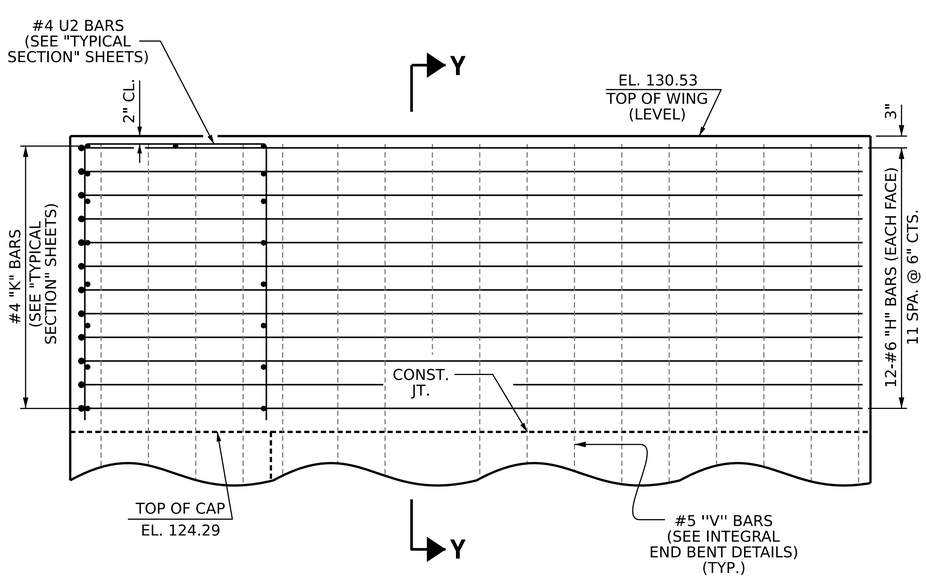


ELEVATION OF LEFT WING W1 - STAGE I



SECTION X-X

SECTION Y-Y



ELEVATION OF RIGHT WING W2 - STAGE II

UPPER PART OF WINGS AT INTEGRAL END BENT 2

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

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 6 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPANS DETAILS @ END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
11/21/2024

DRAWN BY : G. AYES DATE : 9/2023
CHECKED BY : M.M. AHMED DATE : 3/2024
DESIGN ENGINEER OF RECORD: M. M. AHMED DATE : 10/2024

10/8/2024
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aabraha

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
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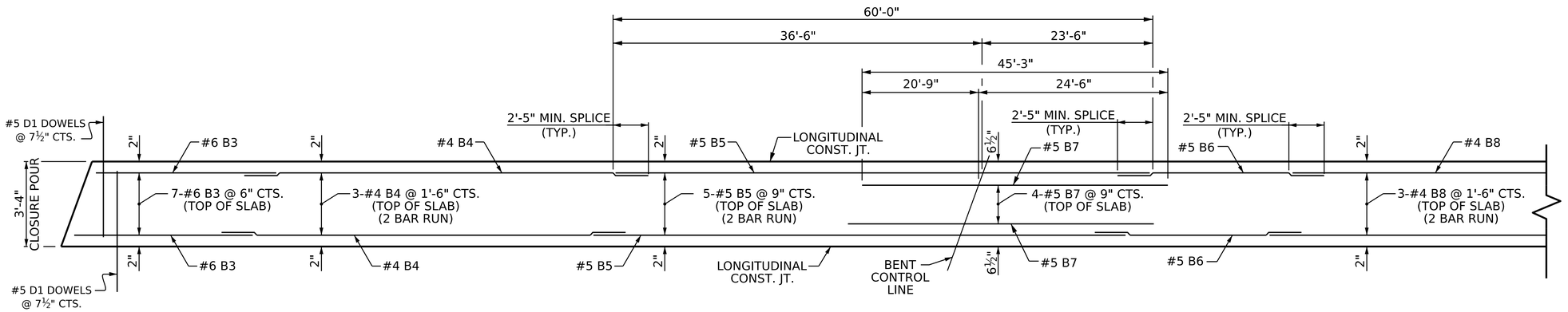
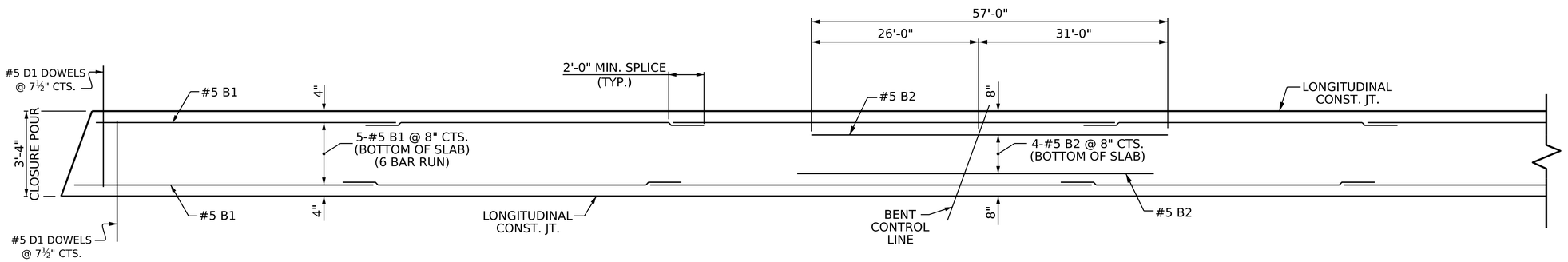


CLOSURE POUR TOP REINFORCING STEEL LAYOUT DETAIL

BENT 1 SHOWN, BENT 2 SIMILAR BY ROTATION



CLOSURE POUR BOTTOM REINFORCING STEEL LAYOUT DETAIL

BENT 1 SHOWN, BENT 2 SIMILAR BY ROTATION

PROJECT NO. **BR-0086**

JOHNSTON COUNTY

STATION: **19+26.00 -L-**

SHEET 7 OF 7

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha
11/21/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			57

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DRAWN BY : M.M. AHMED DATE : 4/2024
CHECKED BY : A. ABRAHA DATE : 9/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 4/2024

11/21/2024
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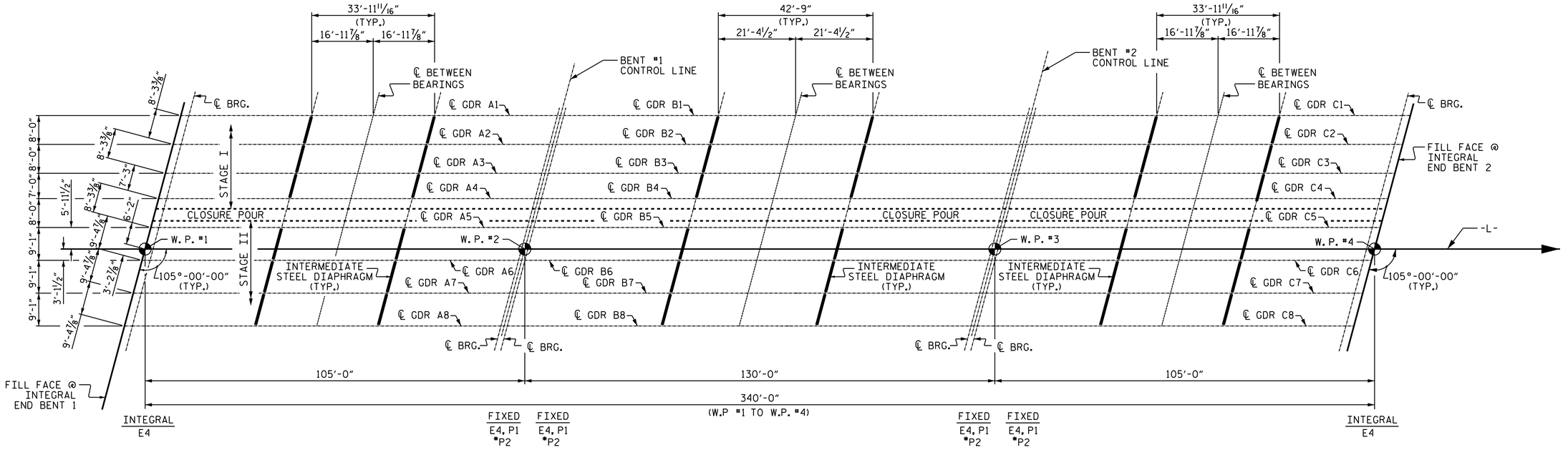

SPAN A

SPAN B

SPAN C

NOTE:

* SOLE PLATE P2 UNDER GIRDER 6 IN STAGE II ONLY

FRAMING PLAN

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abralia

DOA094AED5104FD...

11/21/2024

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : M.M. AHMED DATE : 9/5/24

CHECKED BY : A. ABRAHA P.E. DATE : 10/8/24

DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 10/8/24

11/21/2024
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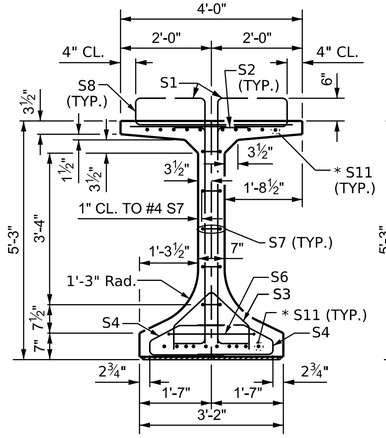
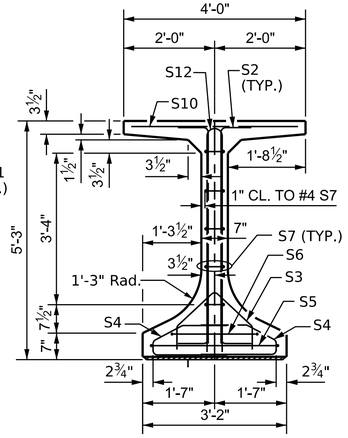
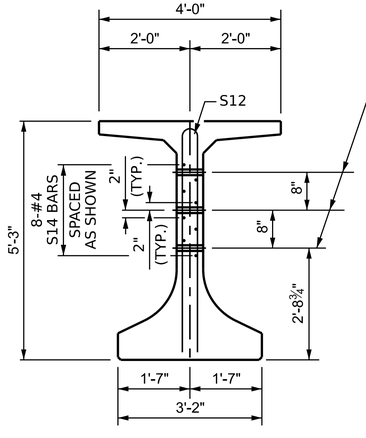


SECTION A-A



SECTION B-B



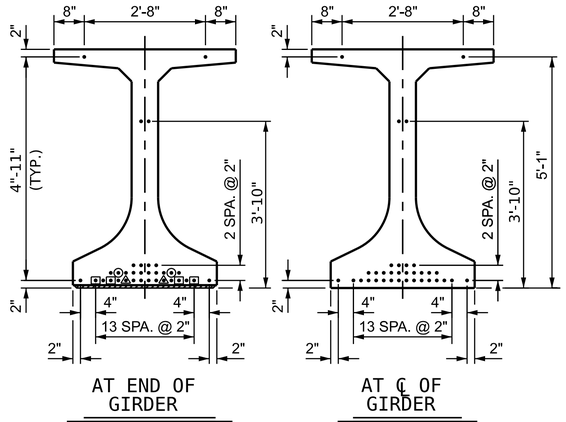
SECTION C-C

(S8, S9 AND S10 BARS NOT SHOWN)

℄ 1½" ∅ FORMED HOLE. (SEE FRAMING PLAN FOR LOCATION.) FOR DIAPHRAGM DETAILS, SEE ''INTERMEDIATE STEEL DIAPHRAGMS FOR 63" FIB '' DETAILS SHEET.

DEBONDING LEGEND

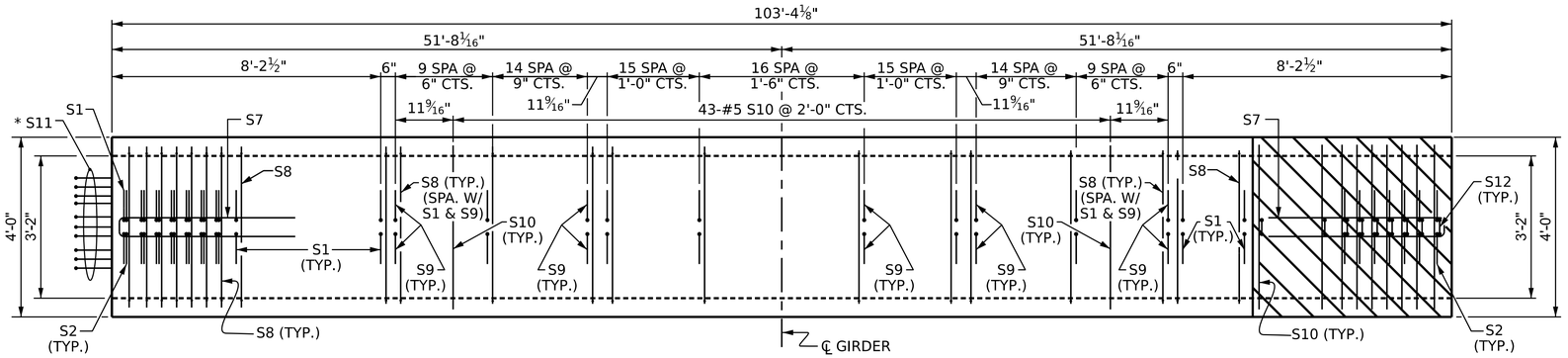
- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER



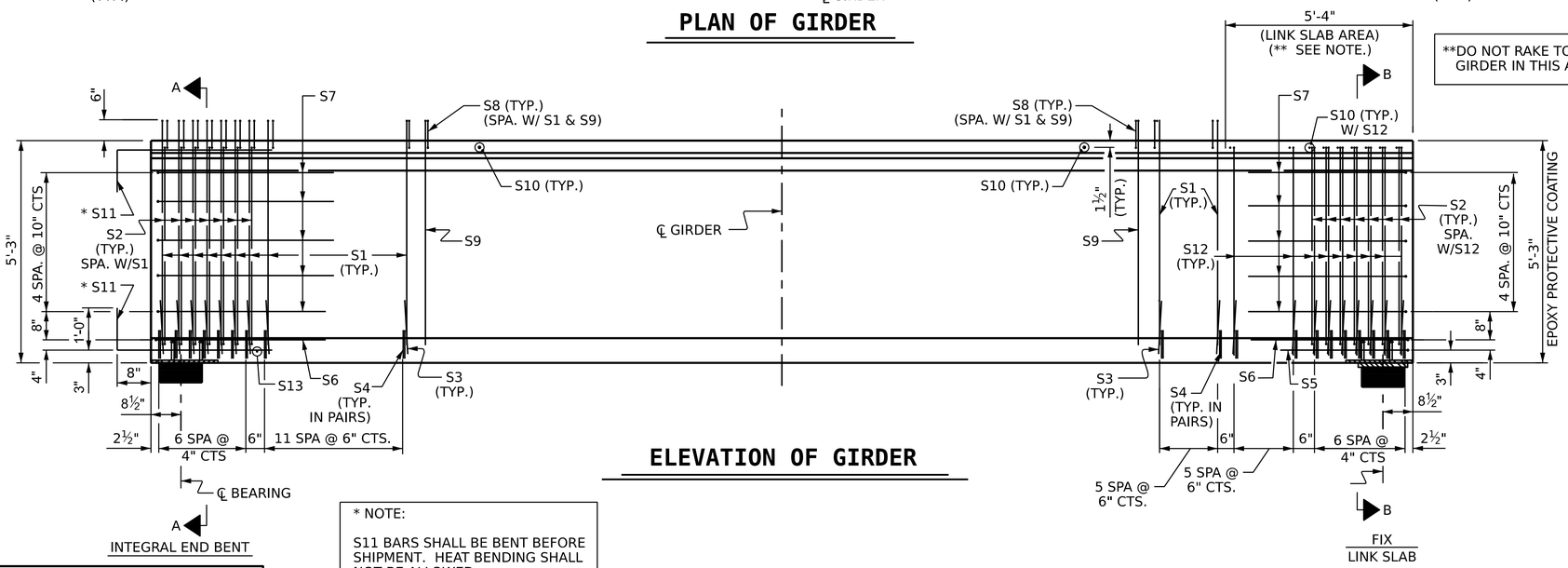
0.6" ∅ LOW RELAXATION STRAND LAYOUT

(34 STRANDS TOTAL, ALL STRAIGHT, PARTIALLY DEBONDED)

* FOR S11 BARS, SEE DETAIL "C" OF " 63" FIB PRESTRESSED CONCRETE GIRDER DETAILS" SHEET.



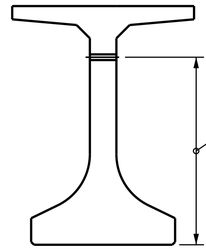
PLAN OF GIRDER



ELEVATION OF GIRDER

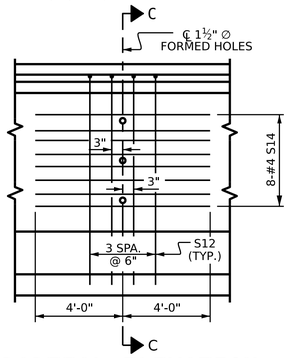
* NOTE:

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



UTILITY ATTACHMENT

(TYPICAL BEAMS 1, 2, & 3)



PARTIAL ELEVATION

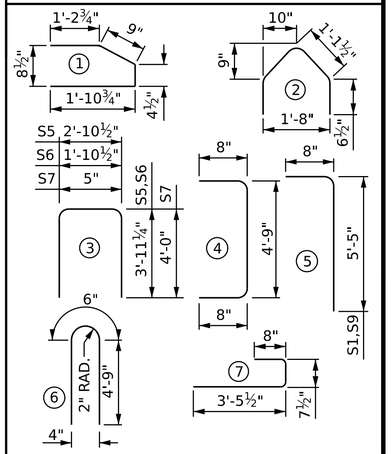
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

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 GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	50	#5	5	6'-1"	317
S2	28	#5	4	6'-1"	178
S3	38	#3	2	3'-4"	48
S4	76	#3	1	4'-3"	121
S5	1	#5	3	10'-9"	11
S6	2	#5	3	9'-9"	20
S7	10	#4	3	8'-5"	56
S8	240	#5	7	4'-9"	1189
S9	190	#4	5	6'-1"	772
S10	53	#5	STR	3'-8"	203
* S11	20	#6	STR	4'-8"	140
S12	13	#5	6	10'-0"	146
S13	1	#3	STR	2'-10"	1
S14	16	#4	STR	8'-0"	86

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

REINFORCING STEEL	7000 PSI CONCRETE	0.6" ∅ L.R. STRANDS
LB.	C.Y.	No.
3288	26.5	34

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	103'-4⅛"	826'-9"

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

63" FIB PRESTRESSED CONCRETE GIRDER W/ INTEGRAL END BENT & LINK SLAB SPAN A

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER ABRAHA
DDA094AED5104FD...
11/21/2024

ASSEMBLED BY : SWANcePE	DATE : 08/2023
CHECKED BY : H. B. AYTODA	DATE : 08/2024
DRAWN BY : BNB 01/21	
CHECKED BY : AAI 08/22	

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			57

11/21/2024
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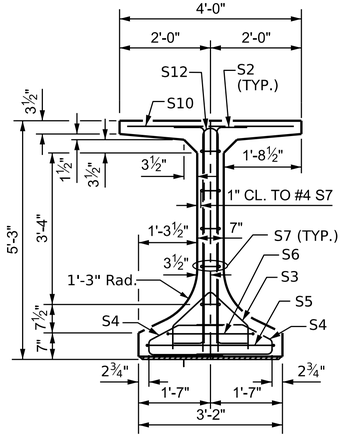
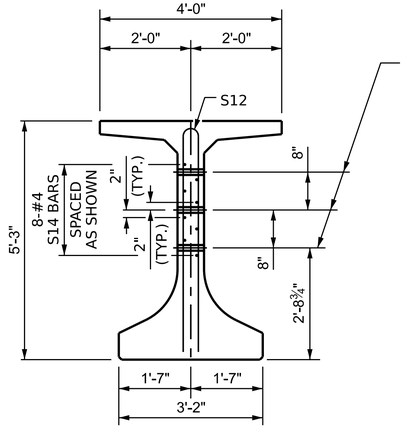
aabraha



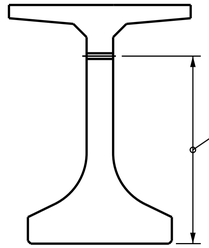
SECTION B-B



SECTION C-C

(S8, S9 AND S10 BARS NOT SHOWN)

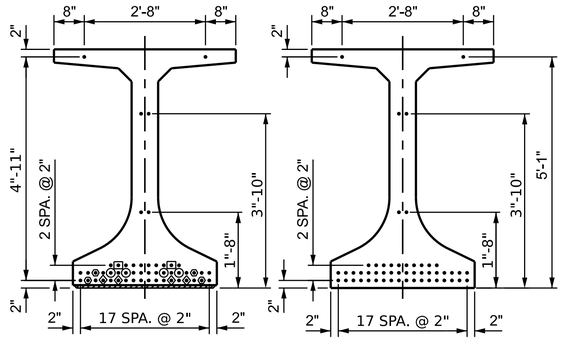
℄ 1½" ∅ FORMED HOLE.
(SEE FRAMING PLAN FOR LOCATION).
(FOR DIAPHRAGM DETAILS,
SEE ''INTERMEDIATE STEEL
DIAPHRAGMS FOR 63" FIB ''
DETAIL SHEET).



LOCATION OF 1½" ∅ FORMED HOLE. SEE UTILITIES CONSTRUCTION PLANS FOR LOCATIONS AND ATTACHMENT DETAILS.

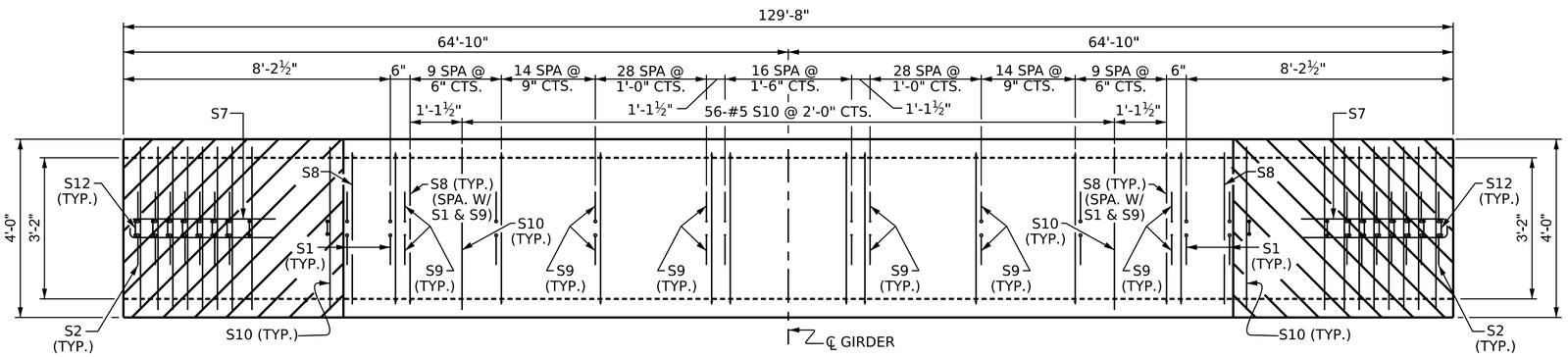
UTILITY ATTACHMENT

(TYPICAL BEAMS 1, 2, & 3)

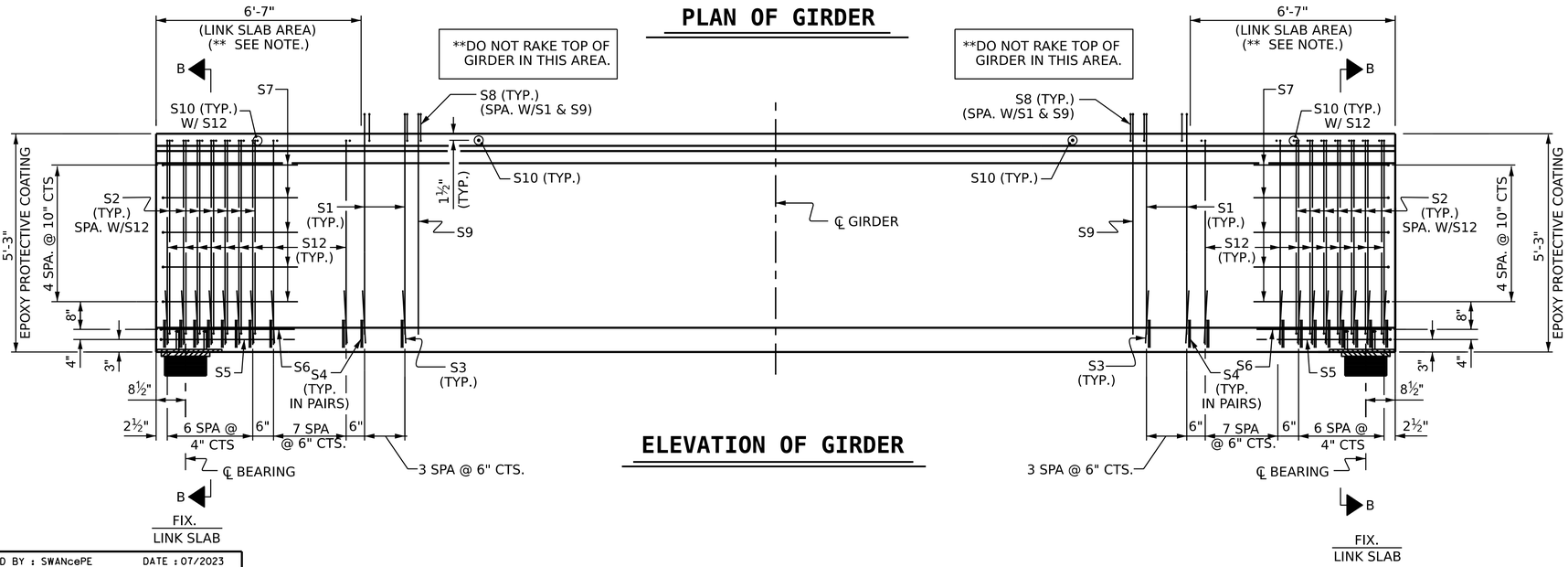


0.6" ⌀ LOW RELAXATION STRAND LAYOUT

(52 STRANDS TOTAL, ALL STRAIGHT, PARTIALLY DEBONDED)



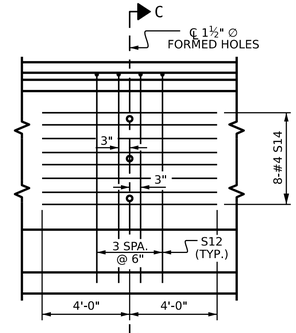
PLAN OF GIRDER



ELEVATION OF GIRDER

DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

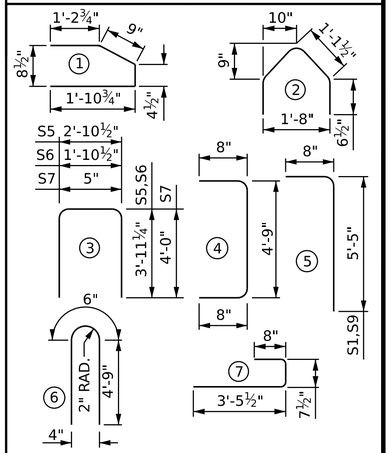
0.6"⌀ L. R. GRADE 270 STRANDS

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

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	16	#5	5	6'-1"	102
S2	28	#5	4	6'-1"	178
S3	38	#3	2	3'-4"	48
S4	76	#3	1	4'-3"	121
S5	2	#5	3	10'-9"	22
S6	2	#5	3	9'-9"	20
S7	10	#4	3	8'-5"	56
S8	258	#5	7	4'-9"	1278
S9	242	#4	5	6'-1"	983
S10	80	#5	STR	3'-8"	306
S12	30	#5	6	10'-0"	313
S14	16	#4	STR	8'-0"	86

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

REINFORCING STEEL	8500 PSI CONCRETE	0.6" ∅ L.R. STRANDS
LB.	C.Y.	No.
3513	33.2	52

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	129'-8"	1037'-4"

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

63" FIB PRESTRESSED CONCRETE GIRDER LINK SLABS SPAN B

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ISTER G. ABRAHA

11/21/2024

ASSEMBLED BY : SWANcePE	DATE : 07/2023
CHECKED BY : H. B. AYTODA	DATE : 08/2024
DRAWN BY : BNB 01/21	
CHECKED BY : AAI 08/22	

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REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			57

11/20/2024
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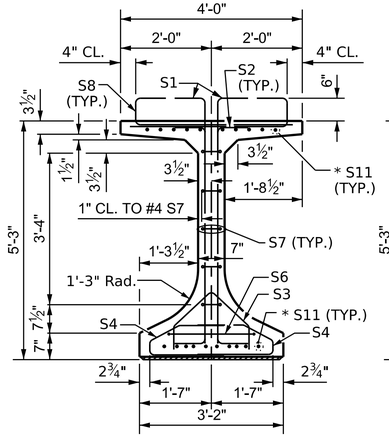
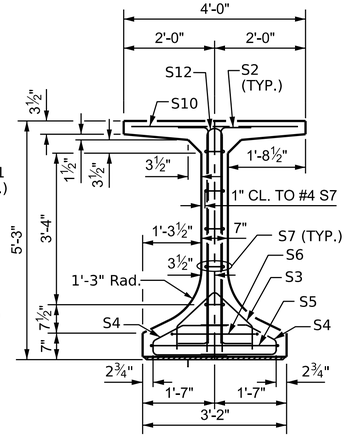
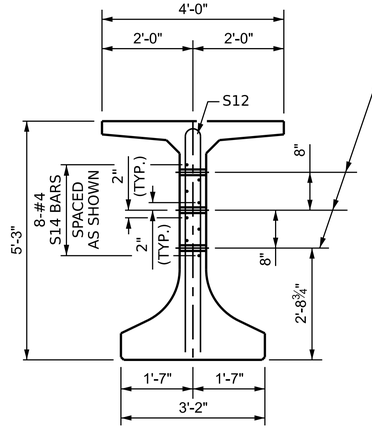


SECTION A-A



SECTION B-B



SECTION C-C

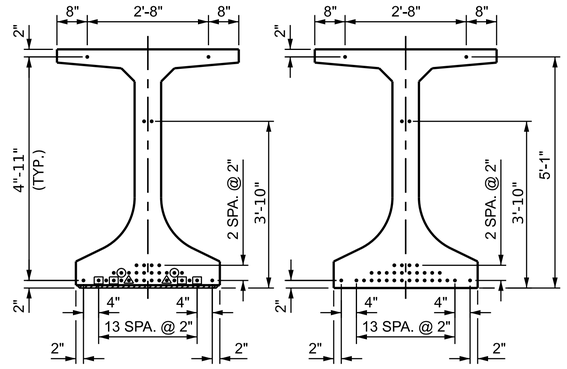
(S8, S9 AND S10 BARS NOT SHOWN)

℄ 1½" ∅ FORMED HOLE. (SEE FRAMING PLAN FOR LOCATION.) FOR DIAPHRAGM DETAILS, SEE ''INTERMEDIATE STEEL DIAPHRAGMS FOR 63" FIB '' DETAILS SHEET.

* FOR S11 BARS, SEE DETAIL "C" OF " 63" FIB PRESTRESSED CONCRETE GIRDER DETAILS" SHEET.

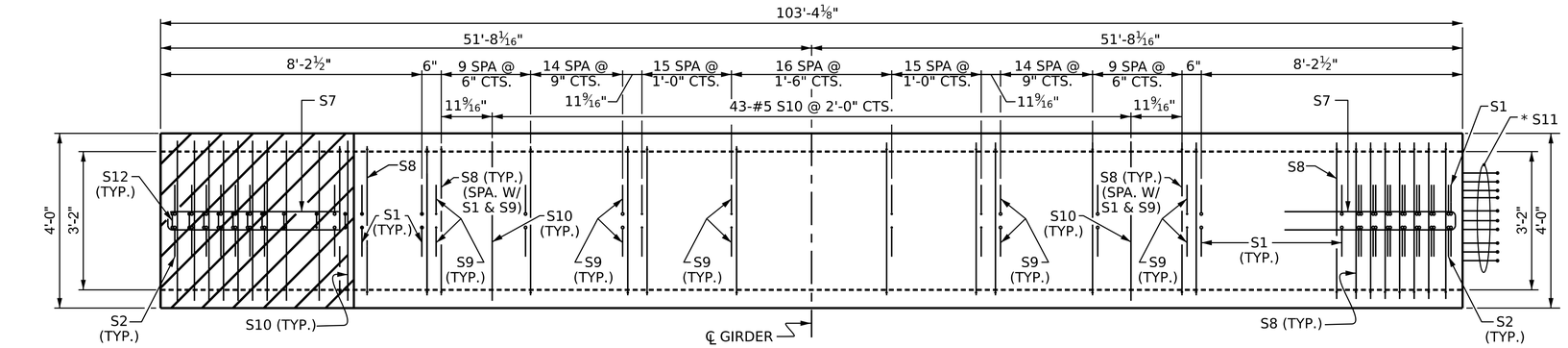
DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

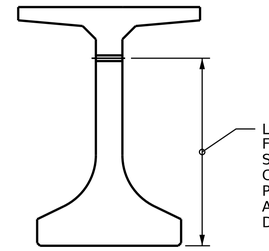


0.6" ⌀ LOW RELAXATION STRAND LAYOUT

(34 STRANDS TOTAL, ALL STRAIGHT, PARTIALLY DEBONDED)

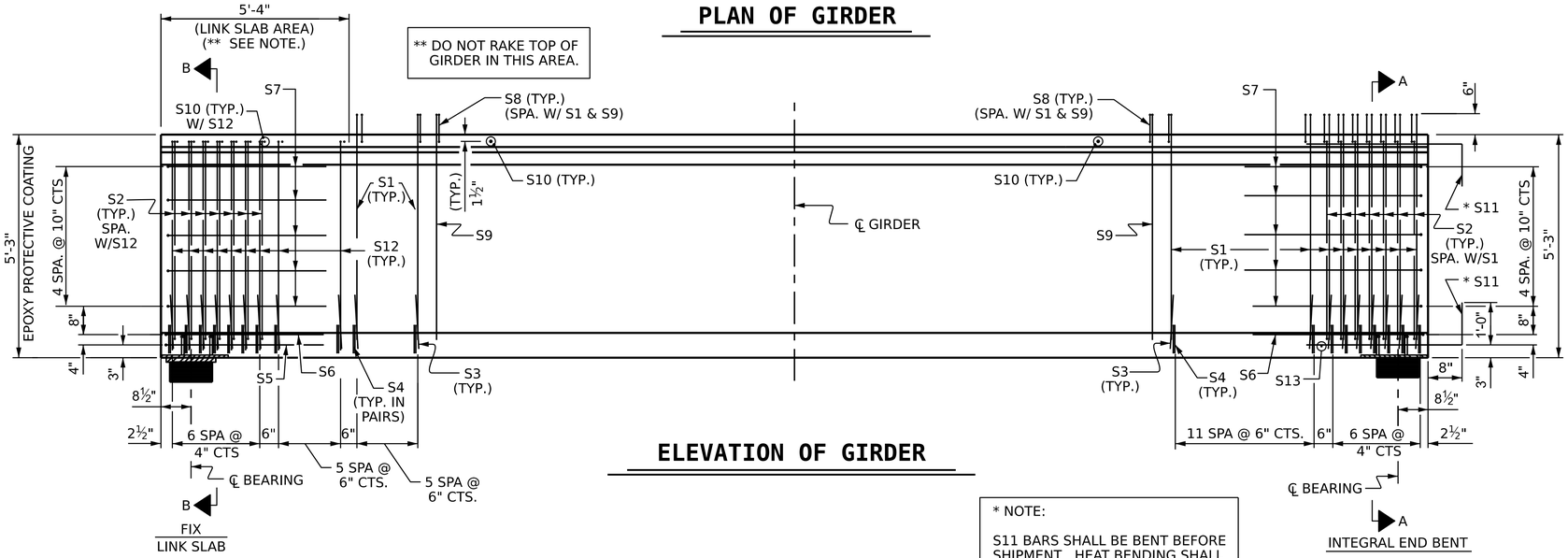


PLAN OF GIRDER



UTILITY ATTACHMENT

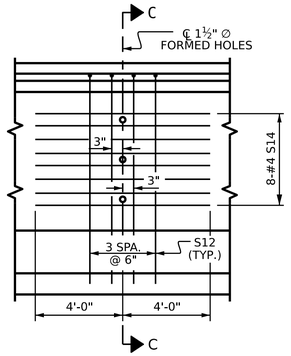
(TYPICAL BEAMS 1, 2, & 3)



ELEVATION OF GIRDER

* NOTE:

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



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

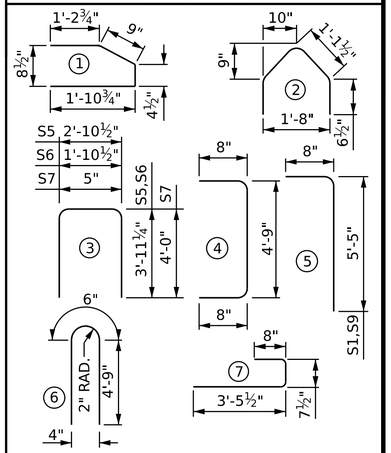
0.6"⌀ L. R. GRADE 270 STRANDS

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

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	50	#5	5	6'-1"	317
S2	28	#5	4	6'-1"	178
S3	38	#3	2	3'-4"	48
S4	76	#3	1	4'-3"	121
S5	1	#5	3	10'-9"	11
S6	2	#5	3	9'-9"	20
S7	10	#4	3	8'-5"	56
S8	240	#5	7	4'-9"	1189
S9	190	#4	5	6'-1"	772
S10	53	#5	STR	3'-8"	203
* S11	20	#6	STR	4'-8"	140
S12	13	#5	6	10'-0"	146
S13	1	#3	STR	2'-10"	1
S14	16	#4	STR	8'-0"	86

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

REINFORCING STEEL	7000 PSI CONCRETE	0.6" ∅ L.R. STRANDS
LB.	C.Y.	No.
3288	26.5	34

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	103'-4⅛"	826'-9"

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

63" FIB PRESTRESSED CONCRETE GIRDER W/ LINK SLAB & INTEGRAL END BENT SPAN C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			57

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER ABRAHA
DDA094AED5104FD...
11/21/2024

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ASSEMBLED BY : SWANcePE	DATE : 08/2023
CHECKED BY : H. B. AYTODA	DATE : 08/2024
DRAWN BY : BNB 01/21	
CHECKED BY : AAI 08/22	

11/20/2024
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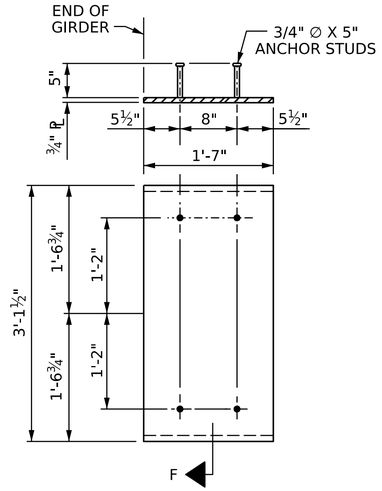
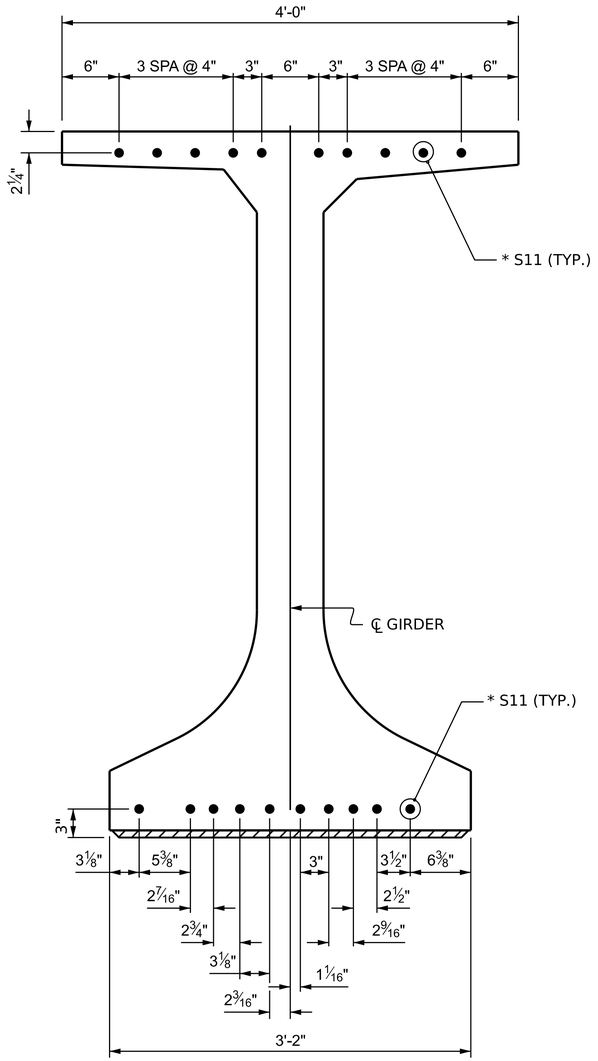


EMBEDDED PLATE "B-1" DETAILS FOR FLORIDA I BEAM

(2 REQ'D PER GIRDER)

SECTION "F"

(SEE NOTES)



DETAIL "C"

(FLORIDA I BEAM)

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 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 0R APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUB SECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5600 PSI FOR SPANS A AND C, AND NOT LESS THAN 7000 PSI FOR SPAN B.

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 LINK SLAB AREAS, SHALL BE RAKED TO A DEPTH OF ¼".

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

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

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 4 OF 6

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER AYSTER C. ABRAHA

Ayster Abraha

DDA094AED5104FD...

11/21/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

63" FIB PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			57

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ASSEMBLED BY : SWANcePE	DATE : 08/2023
CHECKED BY : H. B. AYTODA	DATE : 08/2024
DRAWN BY : BNB 05/21	
CHECKED BY : AAI 10/21	

10/8/2024
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aabraha

STD. NO. FIB SHT. 1

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" ∅ LOW RELAXATION	SPAN A & C GIRDER 1 & 3																																									
FORTIETH POINTS	0	0.025	0.050	0.075	0.1	0.125	0.150	0.175	0.2	0.225	0.250	0.275	0.3	0.325	0.350	0.375	0.4	0.425	0.450	0.475	0.5	0.525	0.550	0.575	0.6	0.625	0.650	0.675	0.7	0.725	0.750	0.775	0.8	0.825	0.850	0.875	0.9	0.925	0.950	0.975	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.010	0.019	0.029	0.038	0.047	0.055	0.064	0.072	0.079	0.085	0.092	0.099	0.103	0.107	0.111	0.115	0.117	0.118	0.120	0.121	0.120	0.118	0.117	0.115	0.111	0.107	0.103	0.099	0.092	0.085	0.079	0.072	0.064	0.055	0.047	0.038	0.029	0.019	0.010	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	-0.007	-0.013	-0.019	-0.026	-0.032	-0.038	-0.043	-0.049	-0.054	-0.058	-0.063	-0.067	-0.070	-0.073	-0.076	-0.079	-0.080	-0.081	-0.082	-0.083	-0.082	-0.081	-0.080	-0.079	-0.076	-0.073	-0.070	-0.067	-0.063	-0.058	-0.054	-0.049	-0.043	-0.038	-0.032	-0.026	-0.019	-0.013	-0.007	0.000
FINAL CAMBER ↑	0.000	1/16"	1/16"	1/8"	1/8"	3/16"	3/16"	1/4"	1/4"	5/16"	5/16"	3/8"	3/8"	3/8"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	3/8"	3/8"	3/8"	5/16"	5/16"	1/4"	1/4"	3/16"	3/16"	1/8"	1/8"	1/16"	1/16"	0.000

0.6" ∅ LOW RELAXATION	SPAN A & C GIRDER 2																																									
FORTIETH POINTS	0	0.025	0.050	0.075	0.1	0.125	0.150	0.175	0.2	0.225	0.250	0.275	0.3	0.325	0.350	0.375	0.4	0.425	0.450	0.475	0.5	0.525	0.550	0.575	0.6	0.625	0.650	0.675	0.7	0.725	0.750	0.775	0.8	0.825	0.850	0.875	0.9	0.925	0.950	0.975	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.010	0.019	0.029	0.038	0.047	0.055	0.064	0.072	0.079	0.085	0.092	0.099	0.103	0.107	0.111	0.115	0.117	0.118	0.120	0.121	0.120	0.118	0.117	0.115	0.111	0.107	0.103	0.099	0.092	0.085	0.079	0.072	0.064	0.055	0.047	0.038	0.029	0.019	0.010	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	-0.007	-0.014	-0.021	-0.028	-0.034	-0.040	-0.046	-0.053	-0.057	-0.062	-0.067	-0.072	-0.075	-0.078	-0.081	-0.084	-0.085	-0.086	-0.087	-0.088	-0.087	-0.086	-0.085	-0.084	-0.081	-0.078	-0.075	-0.072	-0.067	-0.062	-0.057	-0.053	-0.046	-0.040	-0.034	-0.028	-0.021	-0.014	-0.007	0.000
FINAL CAMBER ↑	0.000	0"	1/16"	1/16"	1/8"	1/8"	3/16"	3/16"	1/4"	1/4"	1/4"	5/16"	5/16"	5/16"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	5/16"	5/16"	5/16"	1/4"	1/4"	1/4"	3/16"	3/16"	1/8"	1/8"	1/16"	1/16"	0"	0.000

0.6" ∅ LOW RELAXATION	SPAN A & C GIRDER 4																																									
FORTIETH POINTS	0	0.025	0.050	0.075	0.1	0.125	0.150	0.175	0.2	0.225	0.250	0.275	0.3	0.325	0.350	0.375	0.4	0.425	0.450	0.475	0.5	0.525	0.550	0.575	0.6	0.625	0.650	0.675	0.7	0.725	0.750	0.775	0.8	0.825	0.850	0.875	0.9	0.925	0.950	0.975	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.010	0.019	0.029	0.038	0.047	0.055	0.064	0.072	0.079	0.085	0.092	0.099	0.103	0.107	0.111	0.115	0.117	0.118	0.120	0.121	0.120	0.118	0.117	0.115	0.111	0.107	0.103	0.099	0.092	0.085	0.079	0.072	0.064	0.055	0.047	0.038	0.029	0.019	0.010	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	-0.006	-0.011	-0.017	-0.023	-0.028	-0.033	-0.038	-0.043	-0.047	-0.051	-0.055	-0.059	-0.061	-0.064	-0.066	-0.069	-0.070	-0.071	-0.072	-0.072	-0.072	-0.071	-0.070	-0.069	-0.066	-0.064	-0.061	-0.059	-0.055	-0.051	-0.047	-0.043	-0.038	-0.033	-0.028	-0.023	-0.017	-0.011	-0.006	0.000
FINAL CAMBER ↑	0.000	1/16"	1/16"	1/8"	3/16"	1/4"	1/4"	5/16"	3/8"	3/8"	7/16"	7/16"	1/2"	1/2"	1/2"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	1/2"	1/2"	1/2"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	1/4"	3/16"	1/8"	1/16"	1/16"	0.000

0.6" ∅ LOW RELAXATION	SPAN A & C GIRDER 5																																									
FORTIETH POINTS	0	0.025	0.050	0.075	0.1	0.125	0.150	0.175	0.2	0.225	0.250	0.275	0.3	0.325	0.350	0.375	0.4	0.425	0.450	0.475	0.5	0.525	0.550	0.575	0.6	0.625	0.650	0.675	0.7	0.725	0.750	0.775	0.8	0.825	0.850	0.875	0.9	0.925	0.950	0.975	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.010	0.020	0.030	0.039	0.048	0.057	0.066	0.075	0.081	0.088	0.095	0.102	0.106	0.111	0.115	0.120	0.121	0.123	0.124	0.126	0.124	0.123	0.121	0.120	0.115	0.111	0.106	0.102	0.095	0.088	0.081	0.075	0.066	0.057	0.048	0.039	0.030	0.020	0.010	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	-0.007	-0.013	-0.020	-0.027	-0.033	-0.039	-0.045	-0.051	-0.056	-0.060	-0.065	-0.070	-0.073	-0.076	-0.079	-0.082	-0.083	-0.084	-0.085	-0.086	-0.085	-0.084	-0.083	-0.082	-0.079	-0.076	-0.073	-0.070	-0.065	-0.060	-0.056	-0.051	-0.045	-0.039	-0.033	-0.027	-0.020	-0.013	-0.007	0.000
FINAL CAMBER ↑	0.000	1/16"	1/16"	1/8"	1/8"	3/16"	3/16"	1/4"	5/16"	5/16"	5/16"	3/8"	3/8"	3/8"	7/16"	7/16"	7/16"	7/16"	7/16"	1/2"	1/2"	1/2"	7/16"	7/16"	7/16"	7/16"	7/16"	3/8"	3/8"	3/8"	5/16"	5/16"	5/16"	1/4"	3/16"	3/16"	1/8"	1/8"	1/16"	1/16"	0.000

0.6" ∅ LOW RELAXATION	SPAN A & C GIRDER 6 & 7																																									
FORTIETH POINTS	0	0.025	0.050	0.075	0.1	0.125	0.150	0.175	0.2	0.225	0.250	0.275	0.3	0.325	0.350	0.375	0.4	0.425	0.450	0.475	0.5	0.525	0.550	0.575	0.6	0.625	0.650	0.675	0.7	0.725	0.750	0.775	0.8	0.825	0.850	0.875	0.9	0.925	0.950	0.975	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.010	0.020	0.030	0.039	0.048	0.057	0.066	0.075	0.081	0.088	0.095	0.102	0.106	0.111	0.115	0.120	0.121	0.123	0.124	0.126	0.124	0.123	0.121	0.120	0.115	0.111	0.106	0.102	0.095	0.088	0.081	0.075	0.066	0.057	0.048	0.039	0.030	0.020	0.010	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	-0.007	-0.014	-0.021	-0.028	-0.035	-0.041	-0.047	-0.054	-0.059	-0.064	-0.069	-0.074	-0.077	-0.080	-0.083	-0.086	-0.087	-0.088	-0.089	-0.090	-0.089	-0.088	-0.087	-0.086	-0.083	-0.080	-0.077	-0.074	-0.069	-0.064	-0.059	-0.054	-0.047	-0.041	-0.035	-0.028	-0.021	-0.014	-0.007	0.000
FINAL CAMBER ↑	0.000	1/16"	1/16"	1/8"	1/8"	3/16"	3/16"	1/4"	1/4"	1/4"	5/16"	5/16"	5/16"	3/8"	3/8"	3/8"	3/8"	3/8"	7/16"	7/16"	7/16"	7/16"	7/16"	3/8"	3/8"	3/8"	3/8"	3/8"	5/16"	5/16"	5/16"	1/4"	1/4"	1/4"	3/16"	3/16"	1/8"	1/8"	1/16"	1/16"	0.000

0.6" ∅ LOW RELAXATION	SPAN A & C GIRDER 8																																									
FORTIETH POINTS	0	0.025	0.050	0.075	0.1	0.125	0.150	0.175	0.2	0.225	0.250	0.275	0.3	0.325	0.350	0.375	0.4	0.425	0.450	0.475	0.5	0.525	0.550	0.575	0.6	0.625	0.650	0.675	0.7	0.725	0.750	0.775	0.8	0.825	0.850	0.875	0.9	0.925	0.950	0.975	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.010	0.020	0.030	0.039	0.048	0.057	0.066	0.075	0.081	0.088	0.095	0.102	0.106	0.111	0.115	0.120	0.121	0.123	0.124	0.126	0.124	0.123	0.121	0.120	0.115	0.111	0.106	0.102	0.095	0.088	0.081	0.075	0.066	0.057	0.048	0.039	0.030	0.020	0.010	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	-0.007	-0.014	-0.021	-0.028	-0.034	-0.040	-0.046	-0.053	-0.057	-0.062	-0.067	-0.072	-0.075	-0.078	-0.081	-0.084	-0.085	-0.086	-0.087	-0.088	-0.087	-0.086	-0.085	-0.084	-0.081	-0.078	-0.075	-0.072	-0.067	-0.062	-0.057	-0.053	-0.046	-0.040	-0.034	-0.028	-0.021	-0.014	-0.007	0.000
FINAL CAMBER ↑	0.000	1/16"	1/16"	1/8"	1/8"	3/16"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	3/8"	3/8"	3/8"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	3/8"	3/8"	3/8"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	3/16"	1/8"	1/8"	1/16"	1/16"	0.000

* 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-0086

JOHNSTON COUNTY

STATION : 19+26.00 -L-

SHEET 5 OF 6

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha

DDA094AED5104FD...

11/21/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

DEFLECTION TABLE SPANS A & C

DRAWN BY : M.M. AHMED DATE : 10/2024
CHECKED BY : A. ABRAHA P.E. DATE : 10/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 10/2024

11/5/2024
T:\Structures\Plans\401_049_BR-0086_SMU_ G5_S-25_500070.dgn
mmahmed

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			57

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" ∅ LOW RELAXATION	SPAN B																																													
	GIRDERS 1 & 3																																														
FORTIETH POINTS	0	0.025	0.050	0.075	0.1	0.125	0.150	0.175	0.2	0.225	0.250	0.275	0.3	0.325	0.350	0.375	0.4	0.425	0.450	0.475	0.5	0.525	0.550	0.575	0.6	0.625	0.650	0.675	0.7	0.725	0.750	0.775	0.8	0.825	0.850	0.875	0.9	0.925	0.950	0.975	0
CAMBER (GIRDER ALONE IN PLACE)	0.000	0.022	0.044	0.066	0.088	0.108	0.128	0.147	0.167	0.183	0.198	0.213	0.229	0.239	0.248	0.258	0.268	0.271	0.275	0.278	0.281	0.278	0.275	0.271	0.268	0.258	0.248	0.239	0.229	0.213	0.198	0.183	0.167	0.147	0.128	0.108	0.088	0.066	0.044	0.022	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	-0.016	-0.031	-0.046	-0.062	-0.076	-0.090	-0.103	-0.117	-0.128	-0.139	-0.150	-0.160	-0.167	-0.174	-0.181	-0.188	-0.190	-0.193	-0.195	-0.197	-0.195	-0.193	-0.190	-0.188	-0.181	-0.174	-0.167	-0.160	-0.150	-0.139	-0.128	-0.117	-0.103	-0.090	-0.076	-0.062	-0.046	-0.031	-0.016	0.000
FINAL CAMBER	0.000	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"	5/8"	11/16"	3/4"	13/16"	7/8"	7/8"	15/16"	15/16"	1"	1"	1"	1"	1"	1"	1"	15/16"	15/16"	7/8"	7/8"	13/16"	3/4"	11/16"	5/8"	5/8"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0.000

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" ∅ LOW RELAXATION	SPAN B																																												
	GIRDER 2																																													
FORTIETH POINTS	0	0.025	0.050	0.075	0.1	0.125	0.150	0.175	0.2	0.225	0.250	0.275	0.3	0.325	0.350	0.375	0.4	0.425	0.450	0.475	0.5	0.525	0.550	0.575	0.6	0.625	0.650	0.675	0.7	0.725	0.750	0.775	0.8	0.825	0.850	0.875	0.9	0.925	0.950	0.975	0
CAMBER (GIRDER ALONE IN PLACE)	0.000	0.022	0.044	0.066	0.088	0.108	0.128	0.147	0.167	0.183	0.198	0.213	0.229	0.239	0.248	0.258	0.268	0.271	0.275	0.278	0.281	0.278	0.275	0.271	0.268	0.258	0.248	0.239	0.229	0.213	0.198	0.183	0.167	0.147	0.128	0.108	0.088	0.066	0.044	0.022	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	-0.017	-0.033	-0.050	-0.066	-0.081	-0.096	-0.110	-0.125	-0.137	-0.148	-0.160	-0.171	-0.179	-0.186	-0.193	-0.201	-0.203	-0.206	-0.208	-0.211	-0.208	-0.206	-0.203	-0.201	-0.193	-0.186	-0.179	-0.171	-0.160	-0.148	-0.137	-0.125	-0.110	-0.096	-0.081	-0.066	-0.050	-0.033	-0.017	0.000
FINAL CAMBER	0.000	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	5/8"	11/16"	3/4"	3/4"	3/4"	13/16"	13/16"	13/16"	13/16"	7/8"	13/16"	13/16"	13/16"	13/16"	3/4"	3/4"	3/4"	11/16"	5/8"	5/8"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0.000

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" ∅ LOW RELAXATION	SPAN B																																												
	GIRDER 4																																													
FORTIETH POINTS	0	0.025	0.050	0.075	0.1	0.125	0.150	0.175	0.2	0.225	0.250	0.275	0.3	0.325	0.350	0.375	0.4	0.425	0.450	0.475	0.5	0.525	0.550	0.575	0.6	0.625	0.650	0.675	0.7	0.725	0.750	0.775	0.8	0.825	0.850	0.875	0.9	0.925	0.950	0.975	0
CAMBER (GIRDER ALONE IN PLACE)	0.000	0.022	0.044	0.066	0.088	0.108	0.128	0.147	0.167	0.183	0.198	0.213	0.229	0.239	0.248	0.258	0.268	0.271	0.275	0.278	0.281	0.278	0.275	0.271	0.268	0.258	0.248	0.239	0.229	0.213	0.198	0.183	0.167	0.147	0.128	0.108	0.088	0.066	0.044	0.022	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	-0.014	-0.027	-0.041	-0.054	-0.066	-0.079	-0.091	-0.103	-0.112	-0.122	-0.131	-0.141	-0.147	-0.153	-0.159	-0.165	-0.167	-0.169	-0.171	-0.173	-0.171	-0.169	-0.167	-0.165	-0.159	-0.153	-0.147	-0.141	-0.131	-0.122	-0.112	-0.103	-0.091	-0.079	-0.066	-0.054	-0.041	-0.027	-0.014	0.000
FINAL CAMBER	0.000	1/8"	3/16"	5/16"	7/16"	1/2"	9/16"	11/16"	3/4"	7/8"	15/16"	1"	1 1/16"	1 1/8"	1 1/8"	1 3/16"	1 1/4"	1 1/4"	1 1/4"	1 5/16"	1 5/16"	1 5/16"	1 1/4"	1 1/4"	1 1/4"	1 3/16"	1 1/8"	1 1/8"	1 1/16"	1"	15/16"	7/8"	3/4"	11/16"	9/16"	1/2"	7/16"	5/16"	3/16"	1/8"	0.000

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" ∅ LOW RELAXATION	SPAN B																																												
	GIRDER 5																																													
FORTIETH POINTS	0	0.025	0.050	0.075	0.1	0.125	0.150	0.175	0.2	0.225	0.250	0.275	0.3	0.325	0.350	0.375	0.4	0.425	0.450	0.475	0.5	0.525	0.550	0.575	0.6	0.625	0.650	0.675	0.7	0.725	0.750	0.775	0.8	0.825	0.850	0.875	0.9	0.925	0.950	0.975	0
CAMBER (GIRDER ALONE IN PLACE)	0.000	0.023	0.046	0.069	0.091	0.112	0.132	0.153	0.173	0.189	0.205	0.221	0.237	0.247	0.257	0.267	0.277	0.281	0.284	0.288	0.291	0.288	0.284	0.281	0.277	0.267	0.257	0.247	0.237	0.221	0.205	0.189	0.173	0.153	0.132	0.112	0.091	0.069	0.046	0.023	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	-0.016	-0.032	-0.048	-0.064	-0.078	-0.092	-0.107	-0.121	-0.132	-0.143	-0.154	-0.166	-0.173	-0.180	-0.187	-0.194	-0.196	-0.199	-0.201	-0.204	-0.201	-0.199	-0.196	-0.194	-0.187	-0.180	-0.173	-0.166	-0.154	-0.143	-0.132	-0.121	-0.107	-0.092	-0.078	-0.064	-0.048	-0.032	-0.016	0.000
FINAL CAMBER	0.000	1/16"	3/16"	1/4"	5/16"	3/8"	1/2"	9/16"	5/8"	11/16"	3/4"	13/16"	7/8"	7/8"	15/16"	15/16"	1"	1"	1"	1 1/16"	1 1/16"	1 1/16"	1"	1"	1"	15/16"	15/16"	7/8"	7/8"	13/16"	3/4"	11/16"	5/8"	9/16"	1/2"	3/8"	5/16"	1/4"	3/16"	1/16"	0.000

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" ∅ LOW RELAXATION	SPAN B																																												
	GIRDERS 6,7 & 8																																												
FORTIETH POINTS	0	0.025	0.050	0.075	0.1	0.125	0.150	0.175	0.2	0.225	0.250	0.275	0.3	0.325	0.350	0.375	0.4	0.425	0.450	0.475	0.5	0.525	0.550	0.575	0.6	0.625	0.650	0.675	0.7	0.725	0.750	0.775	0.8	0.825	0.850	0.875	0.9	0.925	0.950	0.975	0
CAMBER (GIRDER ALONE IN PLACE)	0.000	0.023	0.046	0.069	0.091	0.112	0.132	0.153	0.173	0.189	0.205	0.221	0.237	0.247	0.257	0.267	0.277	0.281	0.284	0.288	0.291	0.288	0.284	0.281	0.277	0.267	0.257	0.247	0.237	0.221	0.205	0.189	0.173	0.153	0.132	0.112	0.091	0.069	0.046	0.023	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0.000	-0.017	-0.033	-0.050	-0.067	-0.082	-0.097	-0.112	-0.127	-0.138	-0.150	-0.162	-0.173	-0.181	-0.188	-0.196	-0.203	-0.206	-0.208	-0.211	-0.213	-0.211	-0.208	-0.206	-0.203	-0.196	-0.188	-0.181	-0.173	-0.162	-0.150	-0.138	-0.127	-0.112	-0.097	-0.082	-0.067	-0.050	-0.033	-0.017	0.000
FINAL CAMBER	0.000	1/16"	1/8"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	11/16"	3/4"	13/16"	13/16"	7/8"	7/8"	7/8"	15/16"	15/16"	15/16"	15/16"	15/16"	7/8"	7/8"	7/8"	13/16"	13/16"	3/4"	11/16"	11/16"	5/8"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	1/8"	1/16"	0.000

* 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-0086**

JOHNSTON COUNTY

STATION : **19+26.00 -L-**

SHEET 6 OF 6

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha

-2DA094AED5104FD...

11/21/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEFLECTION TABLE
SPAN B

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-26
1			3				TOTAL SHEETS
2			4				57

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : M.M. AHMED DATE : 10/2024
CHECKED BY : A. ABRAHA P.E. DATE : 10/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 10/2024

11/21/2024
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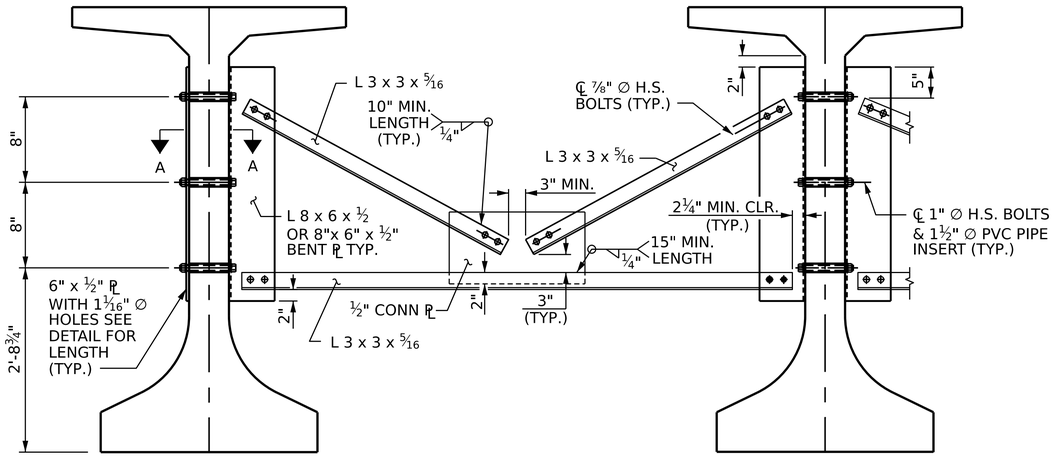
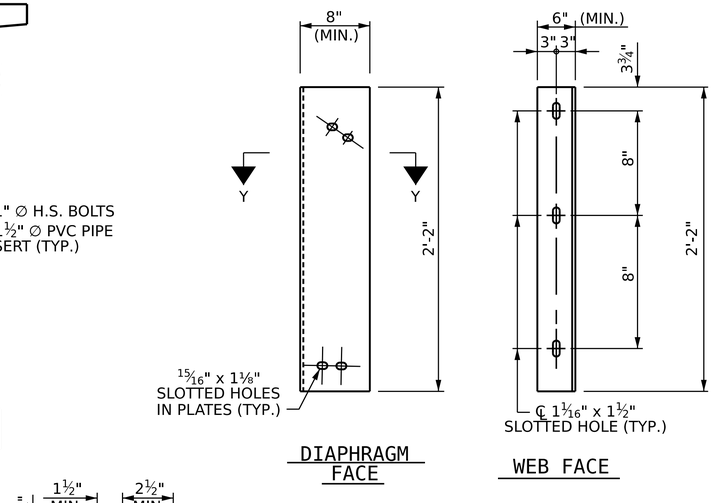
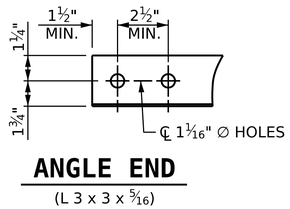
aabraha



PART SECTION AT INTERMEDIATE DIAPHRAGM



CONNECTION PLATE DETAIL



ANGLE END

(L 3 x 3 x 5/16)

STRUCTURAL STEEL NOTES

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

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

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

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

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

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

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

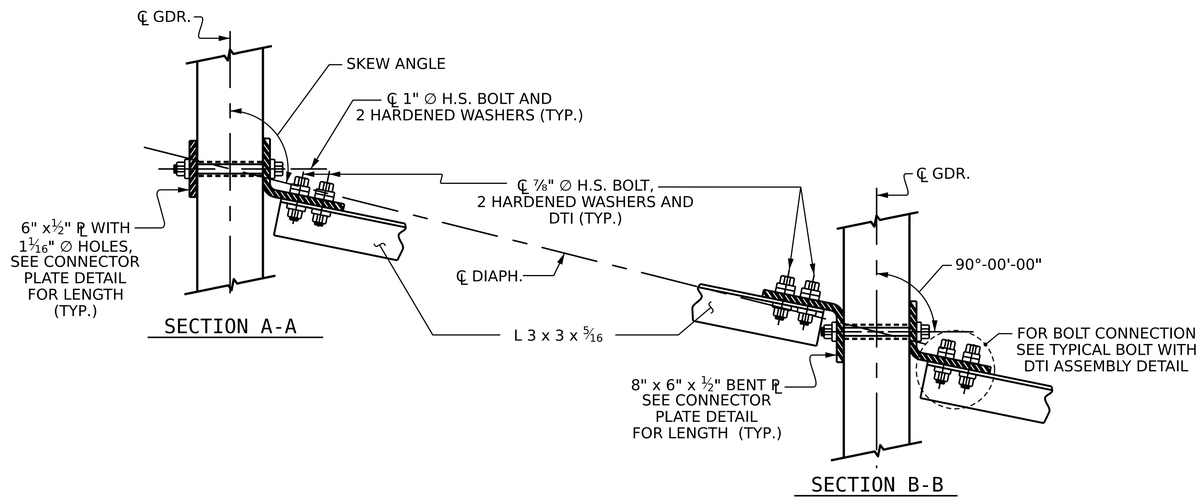
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

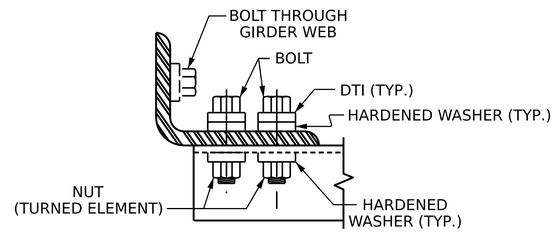
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

INTERMEDIATE STEEL DIAPHRAGMS FOR 63" FIB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G ABRAHA

Aster Abraha
DDA094AED5104FD...
11/21/2024

ASSEMBLED BY : S. WANcePE	DATE : 08/2023
CHECKED BY : M. M. AHMED	DATE : 09/2024
DRAWN BY : BNB 08/21	REV. --/--
CHECKED BY : AAI 08/21	REV. --/--

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11/21/2024
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aabraha

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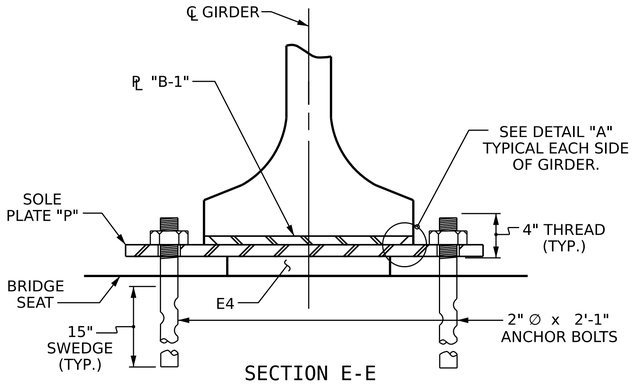
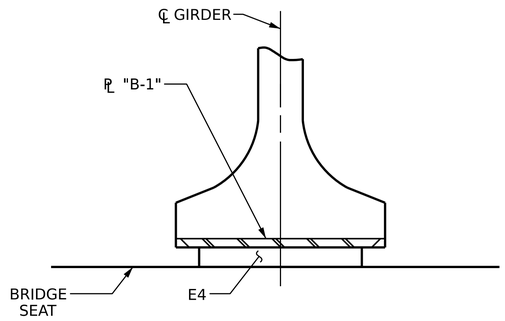
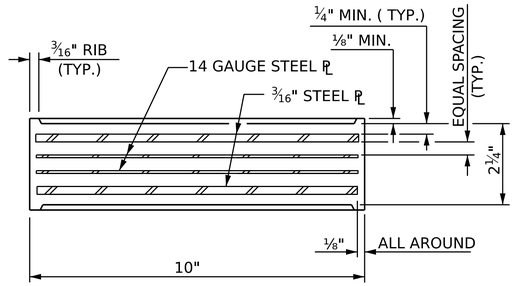


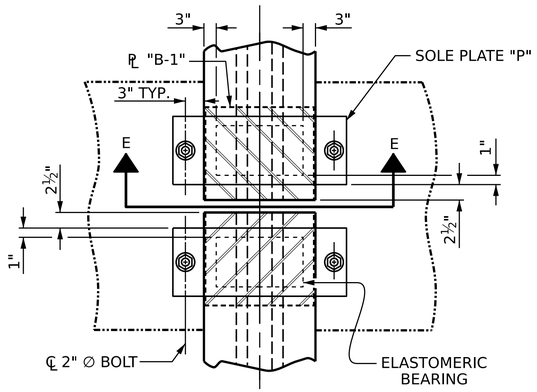
SECTION E-E



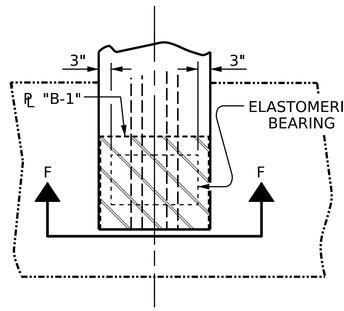
SECTION F-F



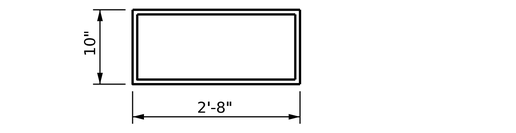
TYPICAL SECTION OF ELASTOMERIC BEARINGS



TYPICAL PLAN
(SHOWING CONTINUOUS BENT)



TYPICAL PLAN OF INTEGRAL END BENT



PLAN VIEW OF ELASTOMERIC BEARING

E4 PAD

(48 REQ'D)

NOTES

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

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

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

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

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

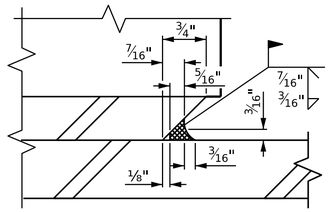
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

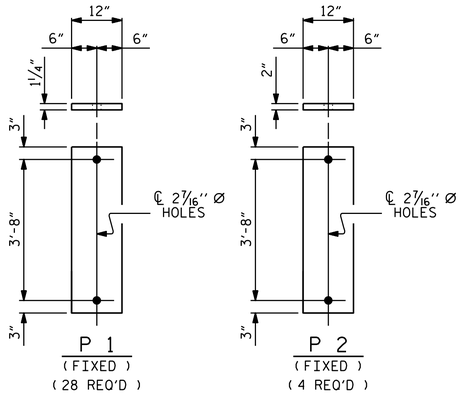
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE STANDARD SPECIFICATIONS.

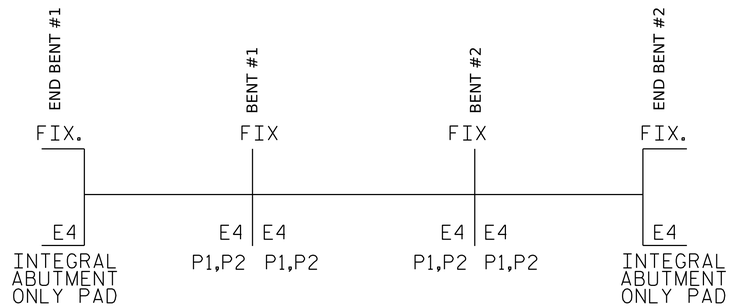
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



DETAIL "A"



SOLE PLATE DETAILS



SOLE PLATE LOCATION SKETCH

(SOLE PLATE P2 UNDER GIRDER 6 IN STAGE II ONLY)

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
E4 PAD	365 k

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

FIB PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER C. ABRAHA
Aster Abraha
DDA094AED5104FD...
11/21/2024

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ASSEMBLED BY : SWANcePE		DATE : 10/2023	
CHECKED BY : A. ABRAHA		DATE : 10/2024	
DRAWN BY : WJH	8/89	REV. 12/17	MAA/THC
CHECKED BY : CRK	8/89	REV. 10/21	BNB/AAI
		REV. 10/23	BNB/SNM

11/21/2024
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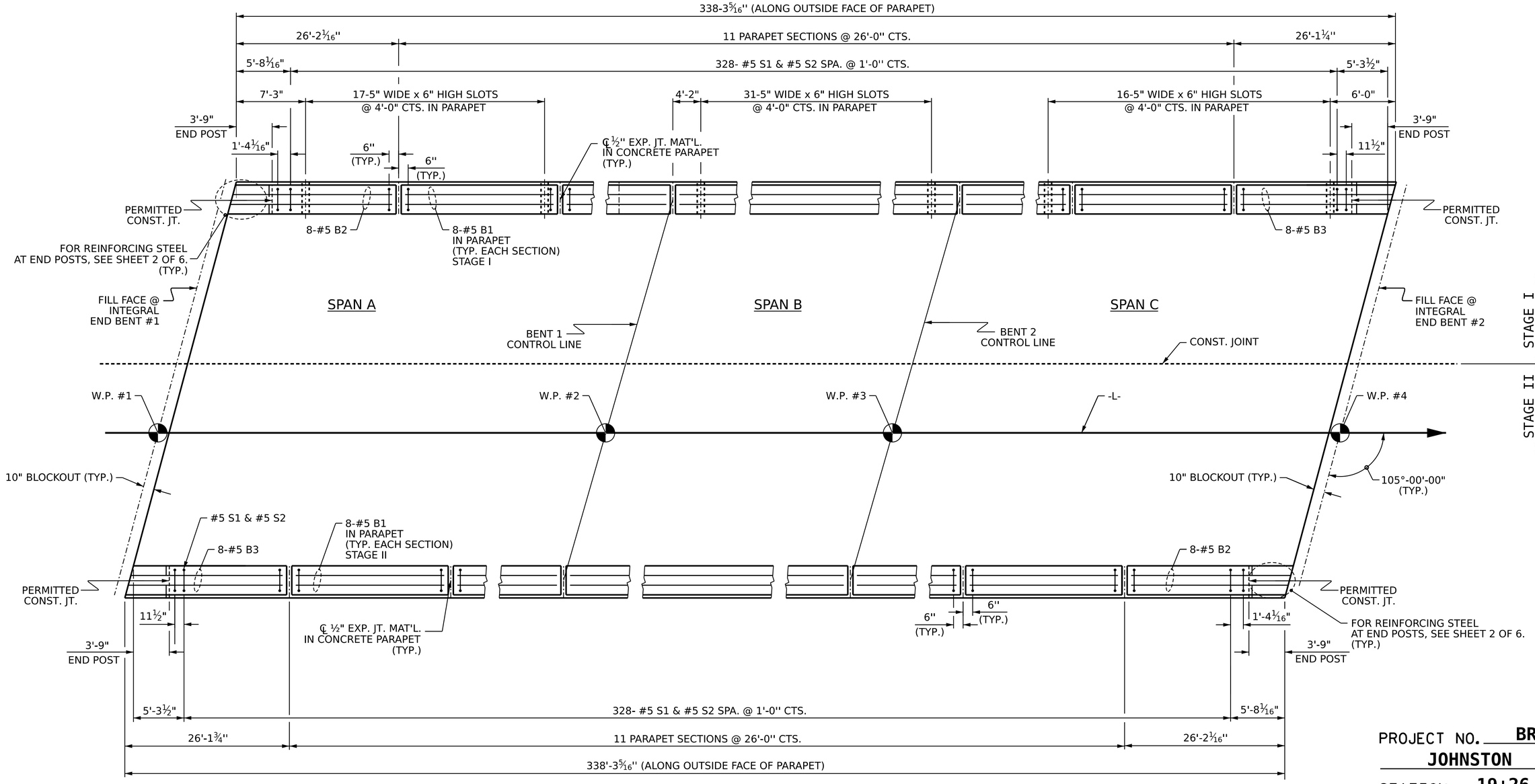
aabraha



PLAN OF CONCRETE PARAPET

ALL DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF CONCRETE PARAPET

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

1'-2" x 2'-6" CONCRETE PARAPET

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha
DDA094AED5104FD...
11/21/2024

DRAWN BY : S.LOTFI / A.IBRAHIM DATE : 3/2024
CHECKED BY : M. AHMED DATE : 8/2024
DESIGN ENGINEER OF RECORD: M. AHMED DATE : 8/2024

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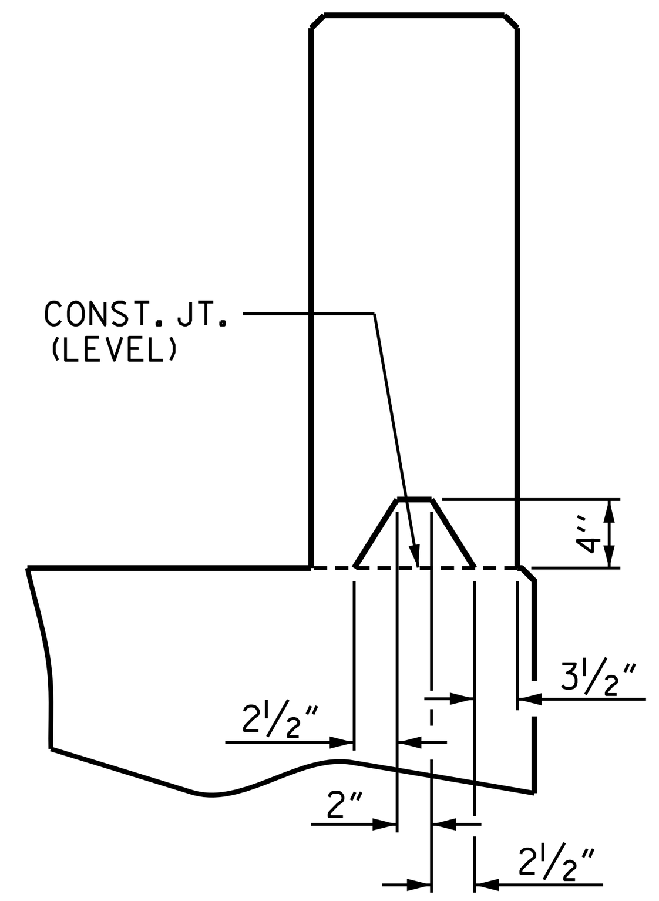
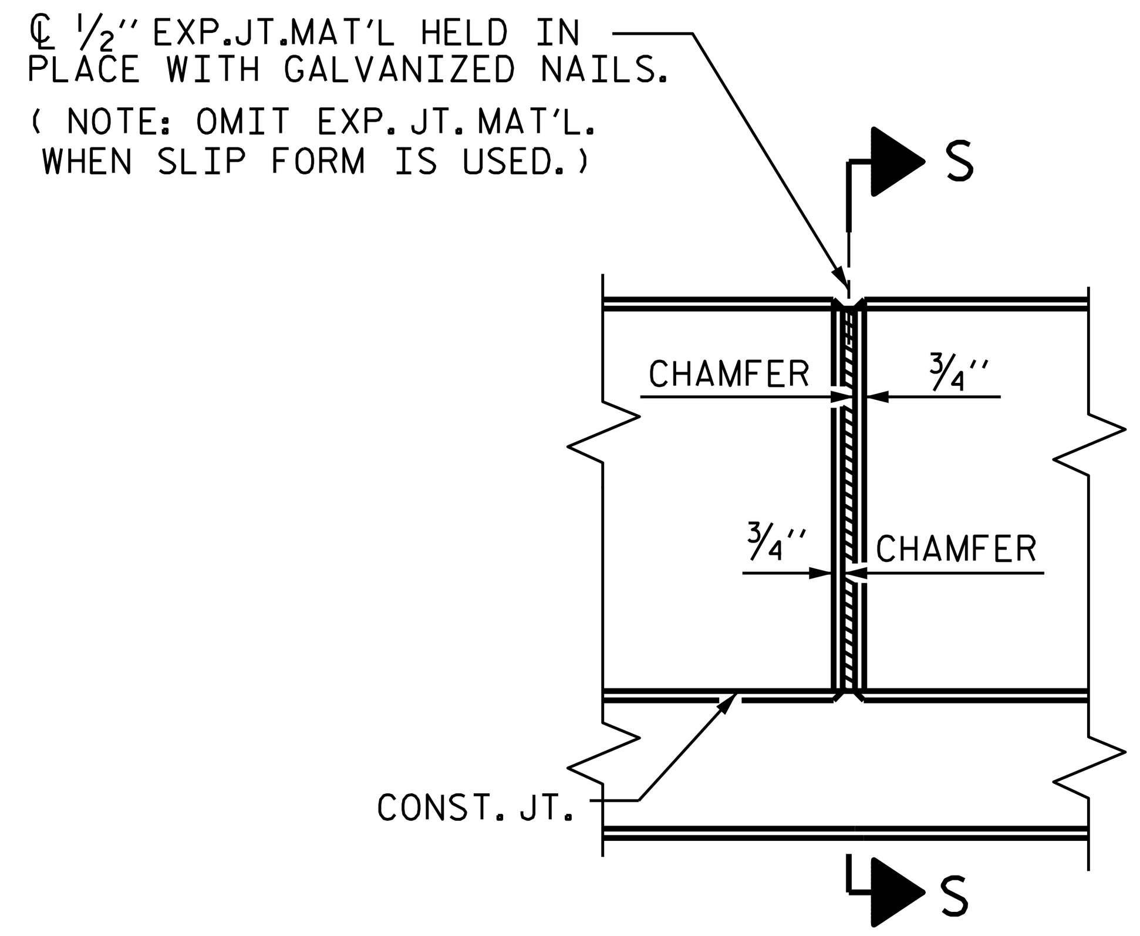


SECTION S-S

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



ELEVATION AT EXPANSION JOINTS

NOTES

THE CONCRETE PARAPET IN THE 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.

THE #5 S3 BARS SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. LEVEL TWO FIELD TESTING IS REQUIRED AND THE YIELD LOAD FOR THE #5 S3 BARS IS 18.6 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

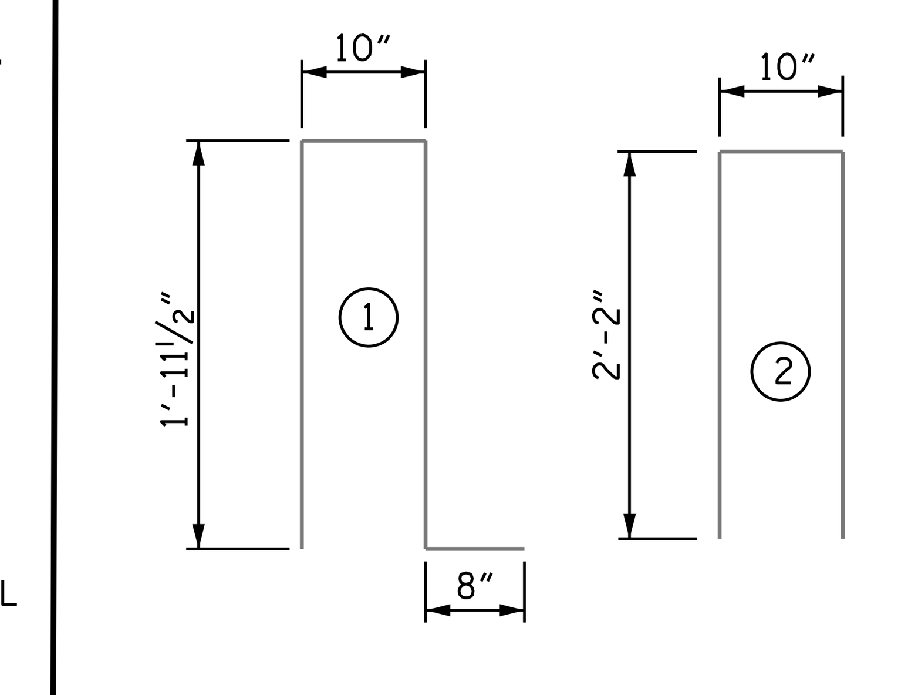
ALL REINFORCING STEEL IN CONCRETE PARAPETS SHALL BE EPOXY COATED.

SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET FOR CONCRETE INSERT DETAILS.

SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET FOR GUARDRAIL ANCHOR ASSEMBLY.

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

STAGE 1

PARAPET & TWO END POSTS

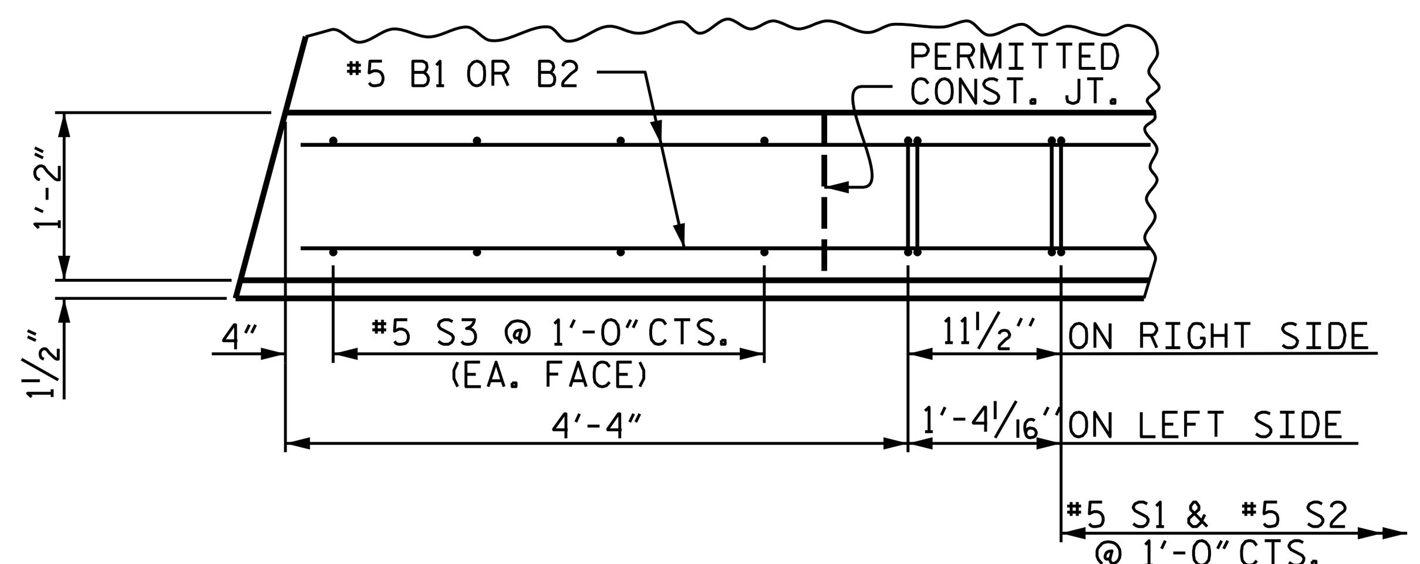
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	88	#5	STR	25'-7"	2348
* B2	8	#5	STR	25'-10"	216
* B3	8	#5	STR	25'-6"	213
* E1	4	#7	STR	2'-6"	20
* E2	4	#7	STR	3'-0"	25
* E3	4	#7	STR	3'-6"	29
* E4	4	#7	STR	4'-0"	33
* E5	4	#7	STR	4'-4"	35
* F1	4	#6	STR	1'-10"	11
* F2	4	#6	STR	3'-0"	18
* F3	4	#6	STR	3'-8"	22
* S1	328	#5	1	5'-5"	1853
* S2	328	#5	2	5'-2"	1768
* S3	16	#5	STR	3'-0"	50
* EPOXY COATED REINFORCING STEEL LBS.					6641
CLASS AA CONCRETE CU. YDS.					36.9
1'-2" x 2'-6" CONCRETE PARAPET LIN. FT.					338.28

STAGE II

PARAPET & TWO END POSTS

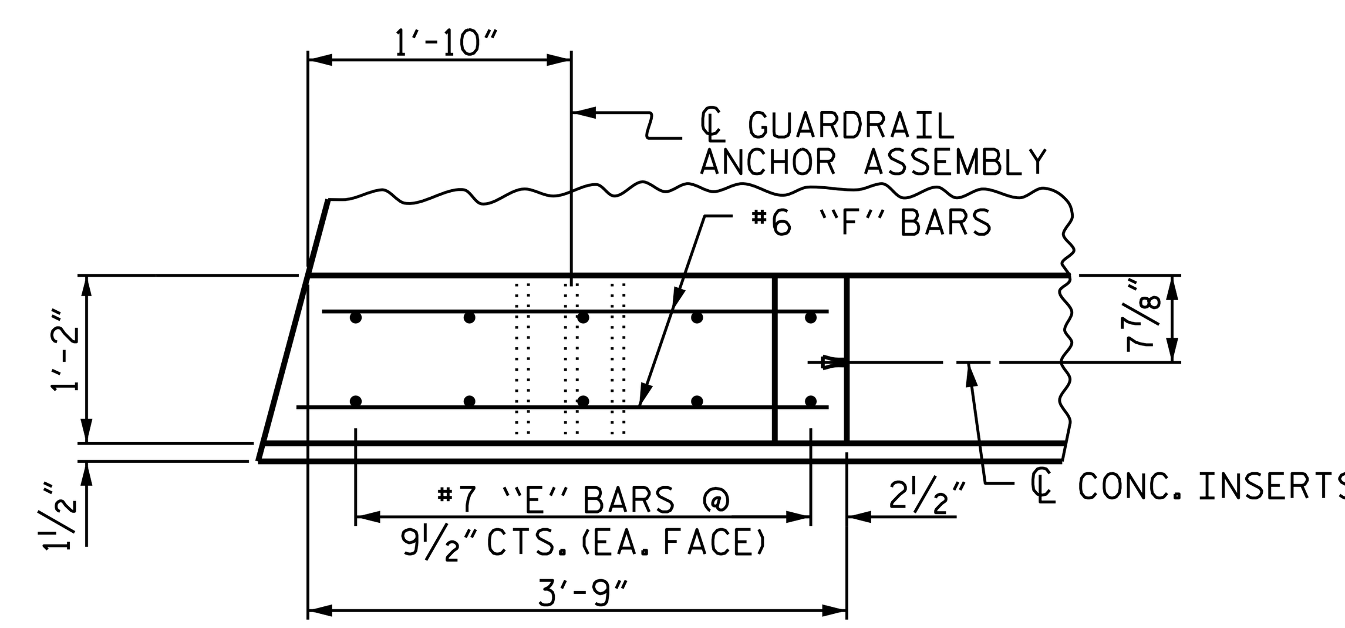
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	88	#5	STR	25'-7"	2348
* B2	8	#5	STR	25'-10"	216
* B3	8	#5	STR	25'-6"	213
* E1	4	#7	STR	2'-6"	20
* E2	4	#7	STR	3'-0"	25
* E3	4	#7	STR	3'-6"	29
* E4	4	#7	STR	4'-0"	33
* E5	4	#7	STR	4'-4"	35
* F1	4	#6	STR	1'-10"	11
* F2	4	#6	STR	3'-0"	18
* F3	4	#6	STR	3'-4"	22
* S1	328	#5	1	5'-5"	1853
* S2	328	#5	2	5'-2"	1768
* S3	16	#5	STR	3'-0"	50
* EPOXY COATED REINFORCING STEEL LBS.					6641
CLASS AA CONCRETE CU. YDS.					36.9
1'-2" x 2'-6" CONCRETE PARAPET LIN. FT.					338.28

PARAPET DETAILS

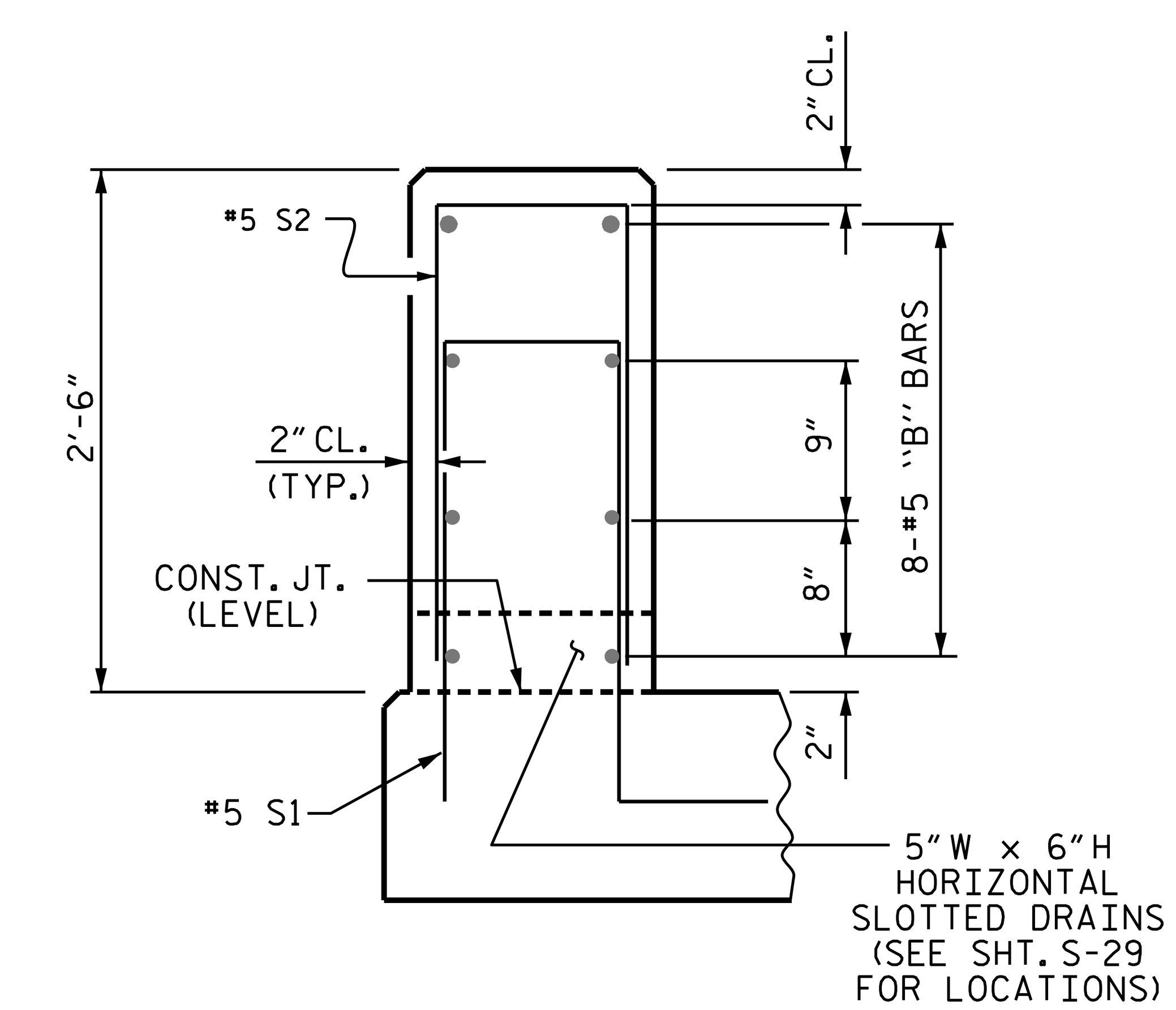


PLAN OF PARAPET

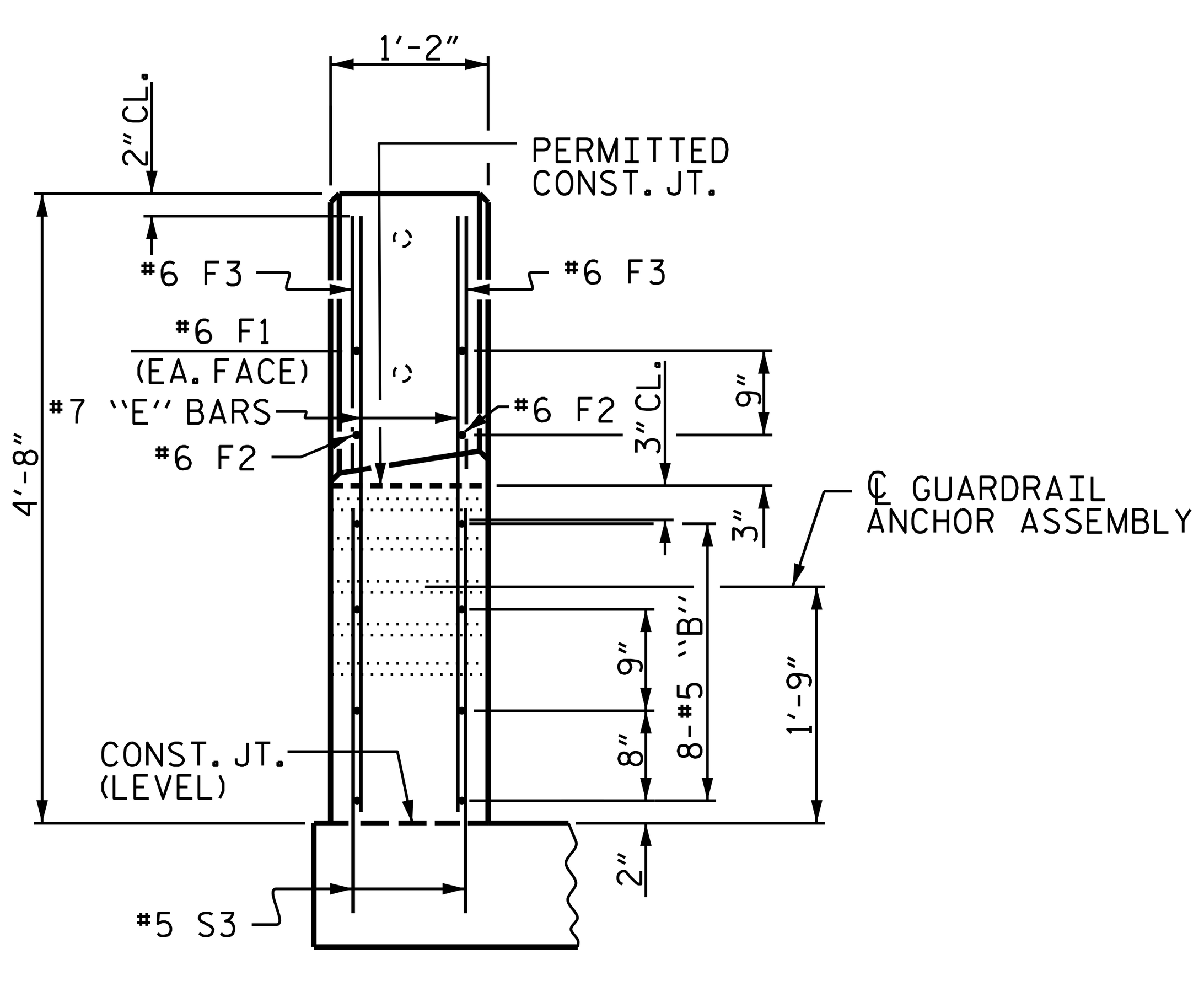
END BENT #1 SHOWN, END BENT #2 SIMILAR BY ROTATION.



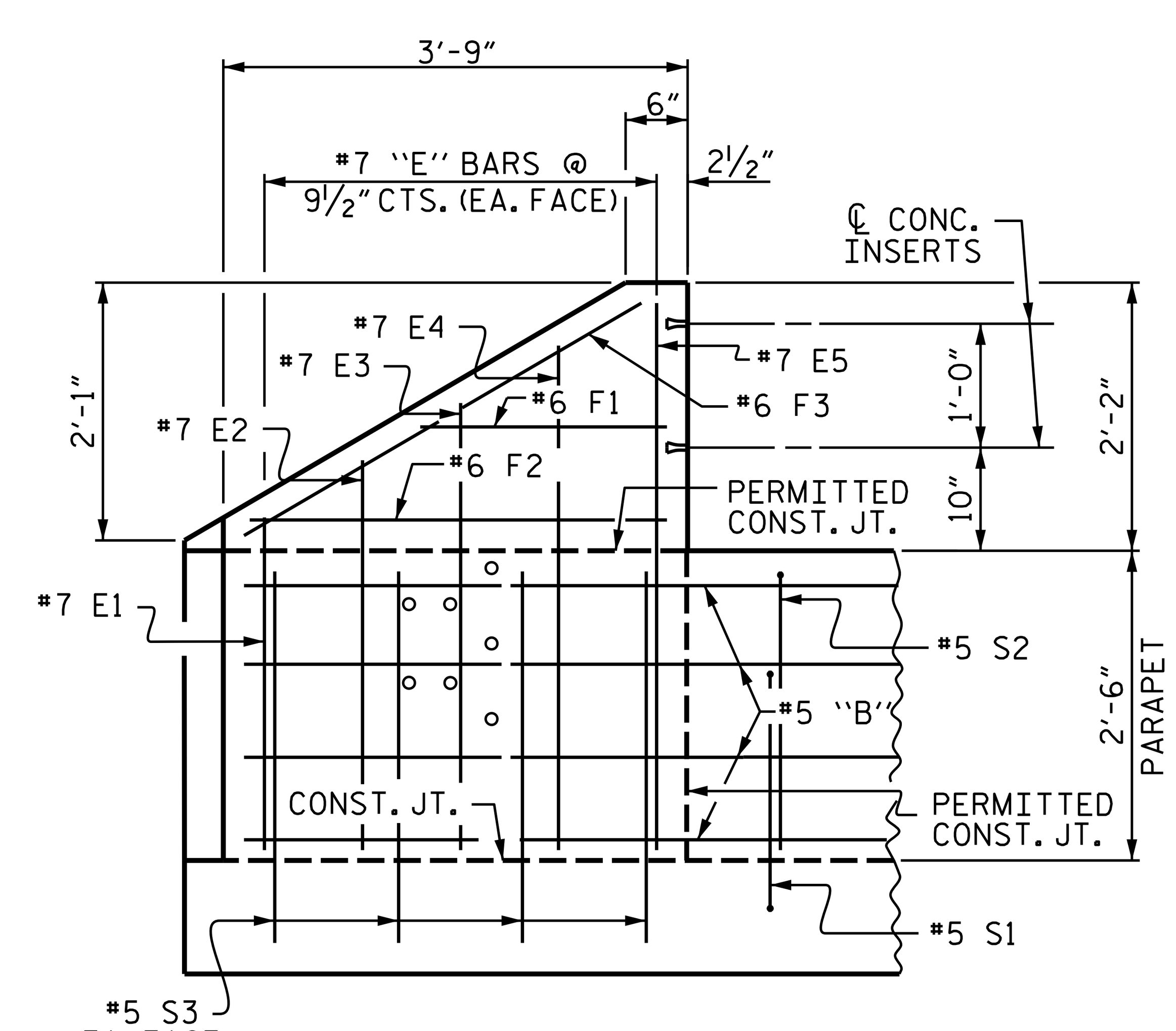
PLAN OF END POST



SECTION THRU PARAPET



END VIEW



ELEVATION

PARAPET AND END POST FOR TWO BAR METAL RAIL

PROJECT NO. BR-0086

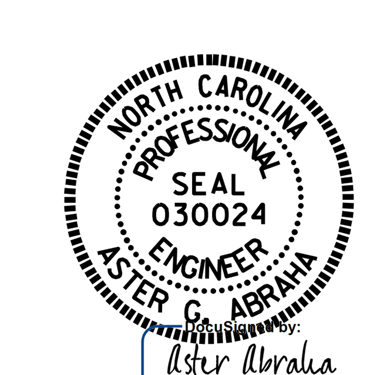
JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

1'-2" x 2'-6" CONCRETE PARAPET DETAILS



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DRAWN BY : SHAHNAZ LOTFI / A.IBRAHIM DATE : 3/2024
CHECKED BY : M. AHMAD DATE : 8/2024
DESIGN ENGINEER OF RECORD: M. AHMAD DATE : 8/2024

11/12/2024
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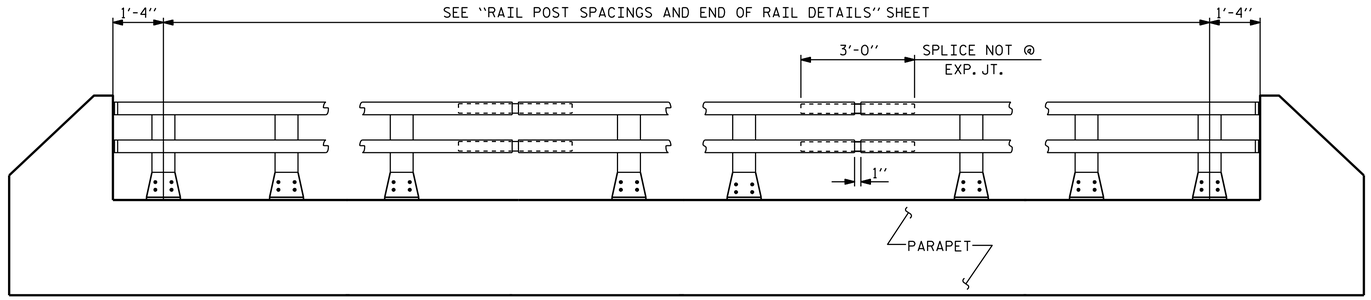
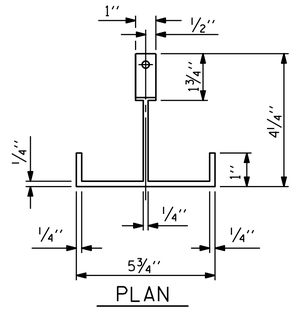
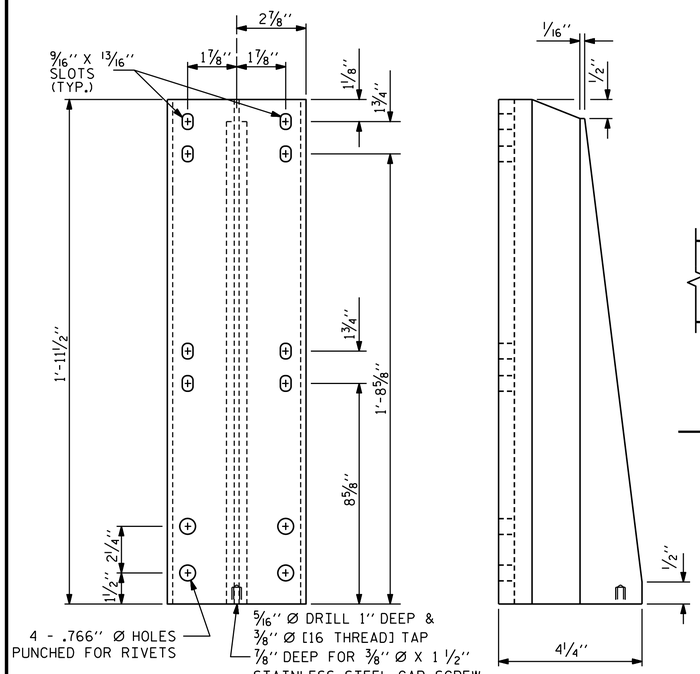


ELEVATION

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

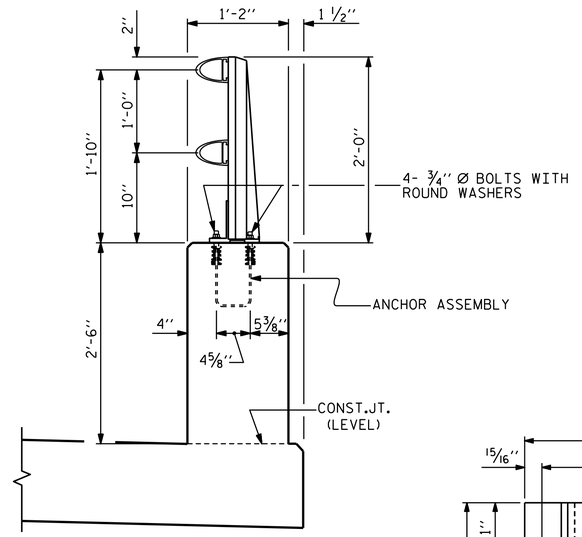


PLAN

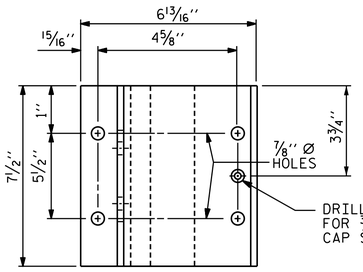


FRONT ELEVATION SIDE ELEVATION

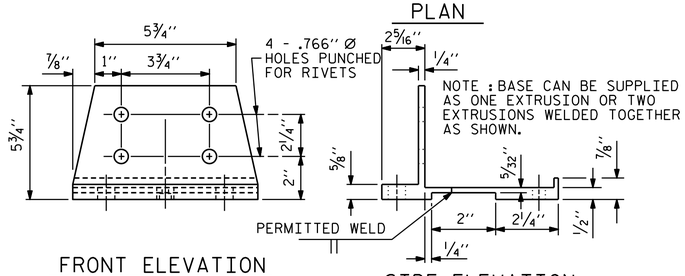
DETAILS OF POST



SECTION THRU PARAPET AND RAIL

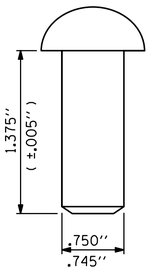


PLAN



FRONT ELEVATION SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

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

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

ALUMINUM RAILS

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

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

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

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

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

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

PAY LENGTH =	330.46	LIN. FT.	(STAGE I)
	330.46	LIN. FT.	(STAGE II)
TOTAL =	660.92	LIN. FT.	

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ISTER G. ABRALIA
Ister Abralia
DDA094AED5104FD...
11/21/2024

ASSEMBLED BY :	S. LOTFI	DATE :	3/2024
CHECKED BY :	M.M. AHMED	DATE :	11/2024
DRAWN BY : EEM	6/94	REV.	10/1/11 MAA/GM
CHECKED BY : RGW	6/94	REV.	6/13 MAA/GM
		REV.	12/17 MAA/THC

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			57

11/12/2024
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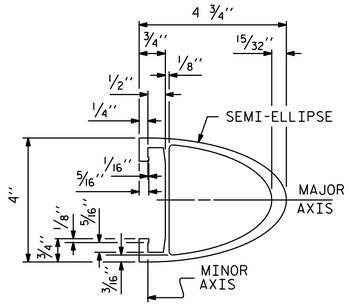
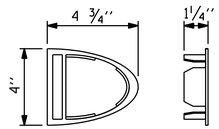
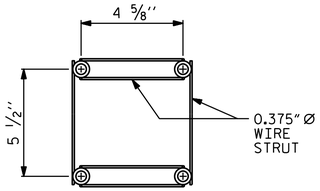
STD. NO. BMR3



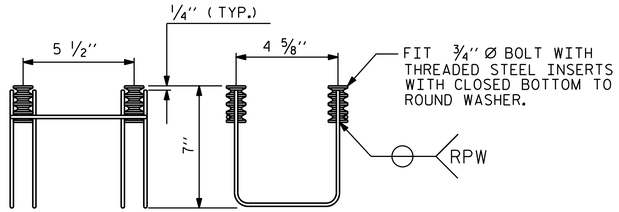
RAIL SECTION



RAIL CAP



PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(108 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2'' FOR 3/4'' FERRULES.

B. 4 - 3/4'' Ø X 2 1/2'' BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4'' Ø X 2 1/2'' GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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

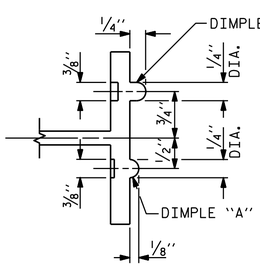
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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

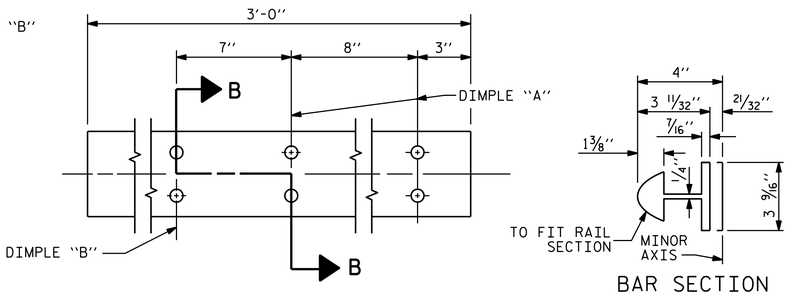
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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

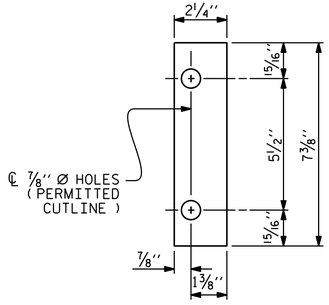


SECTION B - B

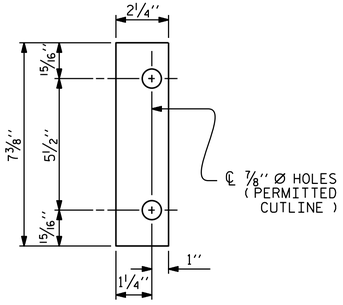


BAR SECTION

EXPANSION BAR DETAILS



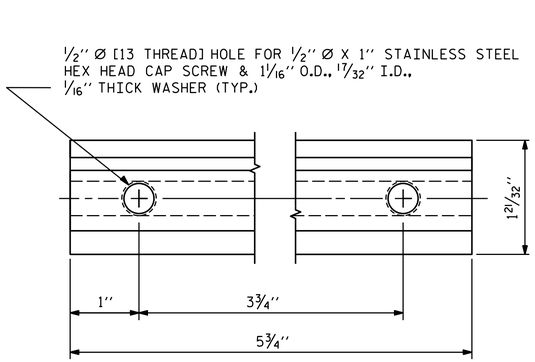
FRONT PLATE

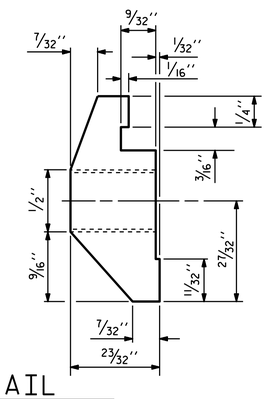


REAR PLATE

SHIM DETAILS

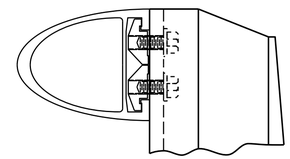
NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.





CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ALSTER G. ABRAHA

Alster Abraha

DDA094AED5104FD...

11/21/2024

ASSEMBLED BY : S. LOTFI	DATE : 3/2024
CHECKED BY : A. ABRAHA	DATE : 10/2024

DRAWN BY : EEM 6/94	REV. 5/1/06R KMM/GM
CHECKED BY : RGW 6/94	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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2			4			57

STD. NO. BMR4

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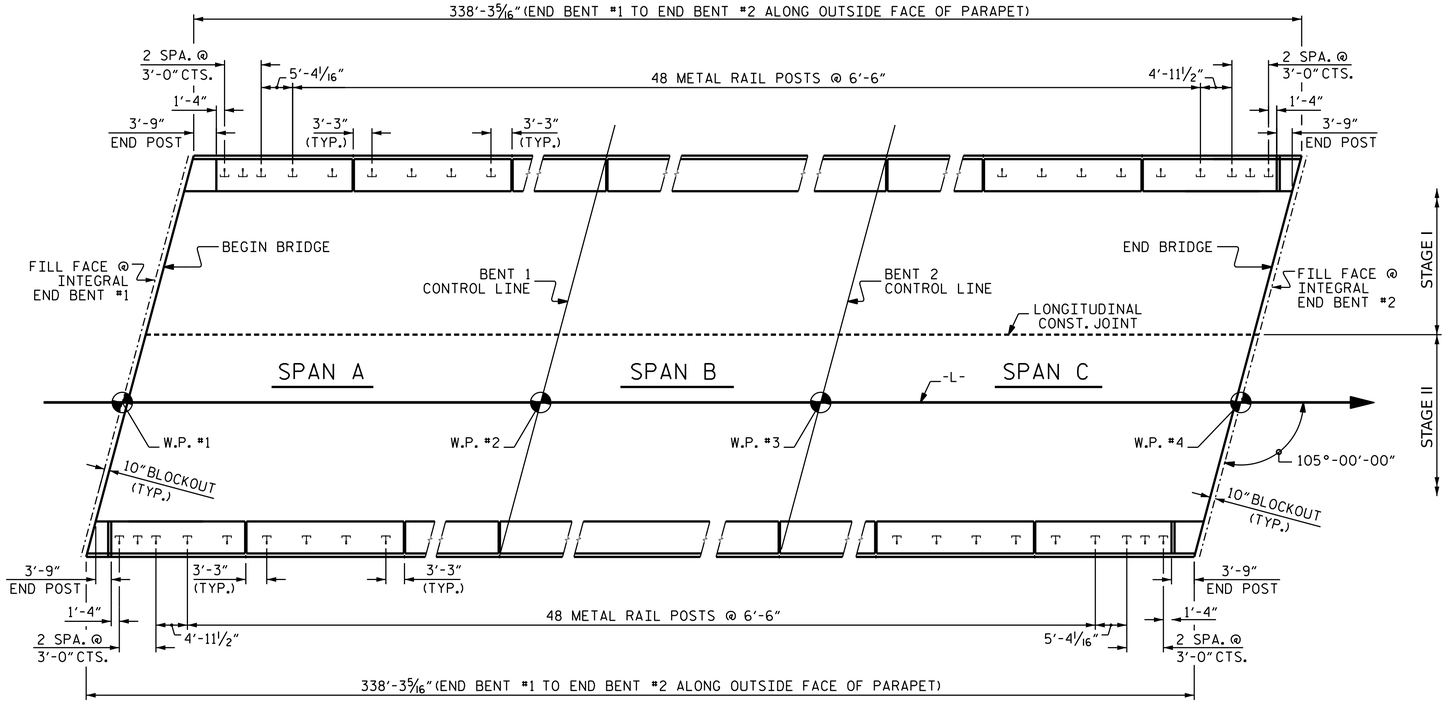
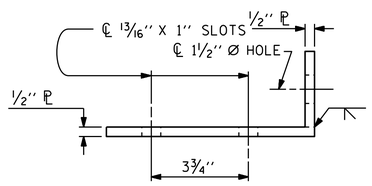


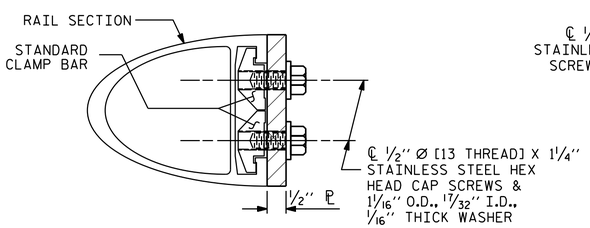
PLAN OF RAIL POST SPACING

ELEVATION

END VIEW (FIX AND EXP.)

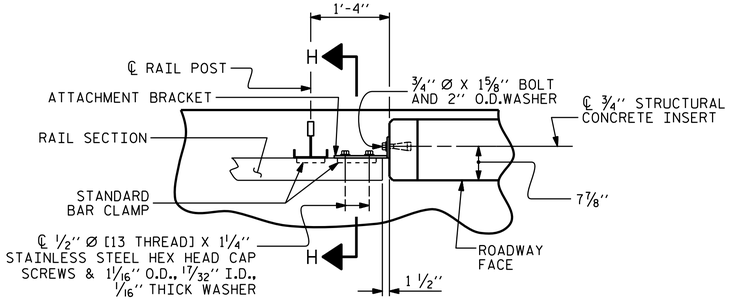


TOP VIEW

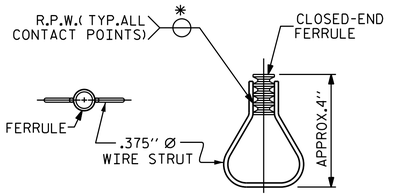


SECTION H-H (FIX)

FIXED



PLAN - RAIL AND END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

NOTES

STRUCTURAL CONCRETE INSERT

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

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

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

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

NOTES

METAL RAIL TO END POST CONNECTION

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

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

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

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

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

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

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

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

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

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

RAIL POST SPACINGS AND END OF RAIL DETAILS

FOR TWO BAR METAL RAILS

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha
DDA094AED5104FD...
11/21/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			57

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ASSEMBLED BY : S. LOTFI	DATE : 3/2024	REV. 5/1/06	TLA/GM
CHECKED BY : M. AHMED	DATE : 8/2024	REV. 10/1/11	MAA/GM
DRAWN BY : FCJ 1/88		REV. 12/17	MAA/THC
CHECKED BY : CRK 3/89			

DETAILS FOR ATTACHING METAL RAIL TO END POST

10/15/2024
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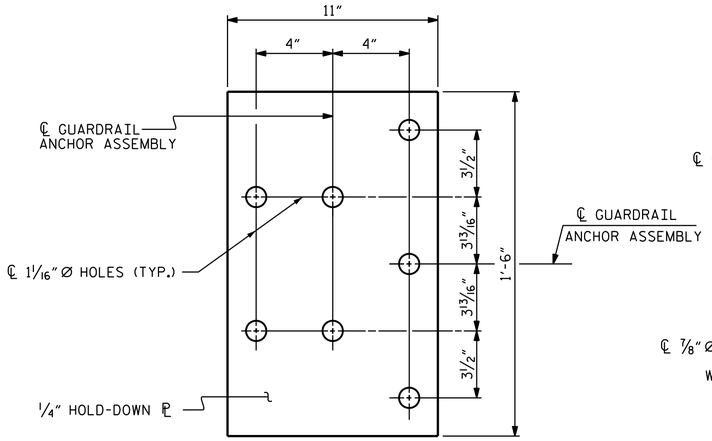
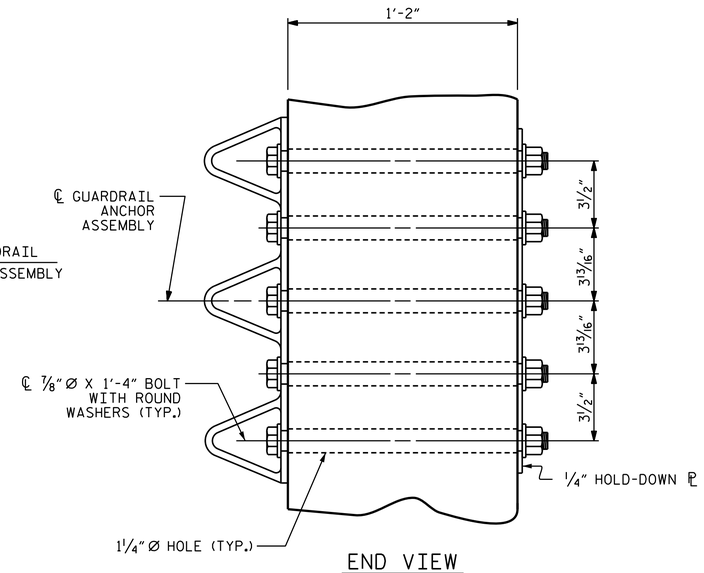
STD. NO. BMR2



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4'' HOLD DOWN PLATE AND 7 - 7/8'' Ø BOLTS WITH NUTS AND WASHERS.

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.

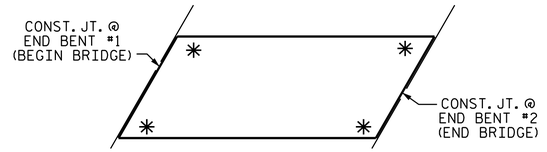
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

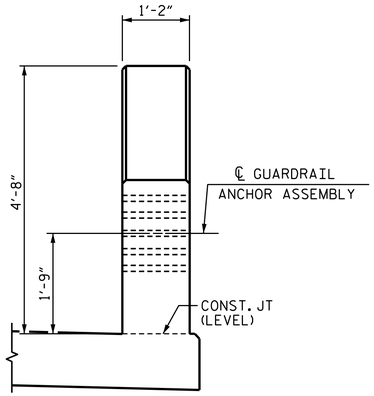
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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.

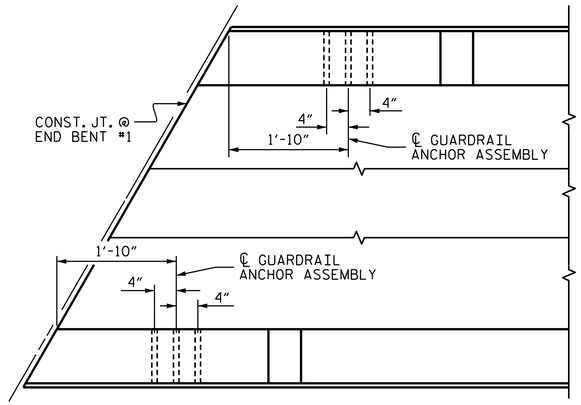


SKETCH SHOWING POINTS OF ATTACHMENT

✱ DENOTES GUARDRAIL ANCHOR ASSEMBLY



END VIEW
(TWO BAR METAL RAIL)



LOCATION OF GUARDRAIL ANCHOR AT END POST

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

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 6 OF 6

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ISTER C. ABRAHA

Ister Abraha

DDA094AED5104FD...

11/21/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

ASSEMBLED BY : S. LOTFI	DATE : 12/2023
CHECKED BY : A. ABRAHA P.E.	DATE : 10/2024

DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC
	REV. 5/18	MAA/THC

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REVISIONS						SHEET NO.
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2			4			57

11/12/2024
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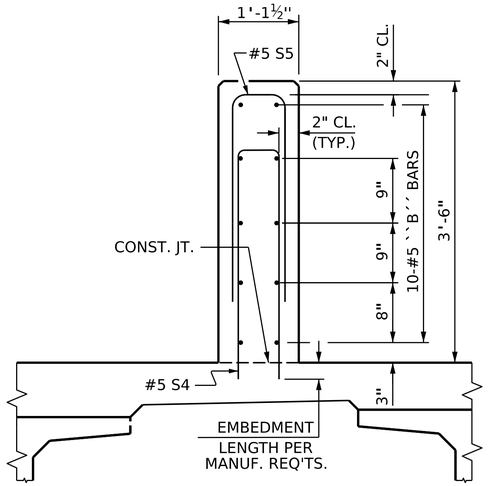
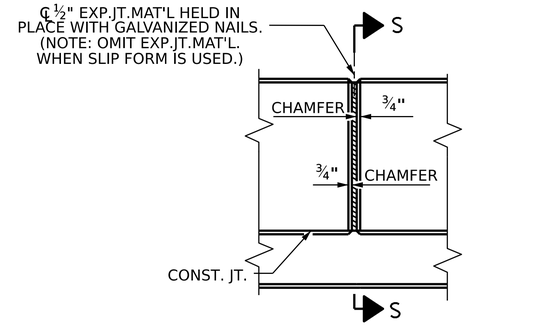
mmahmed

(SHT 2a) STD. NO. GRA3

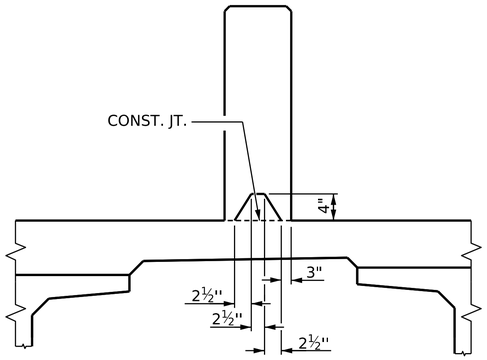


SECTION THRU RAIL

THE #5 S4 BARS SHALL BE ADHESIVELY ANCHORED. THE YIELD LOAD FOR THE #5 S4 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS REQUIRED.



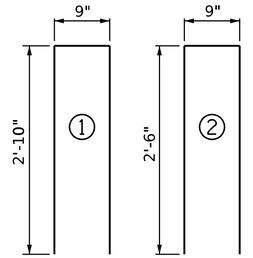
ELEVATION AT EXPANSION JOINTS



SECTION S-S

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

BAR TYPES



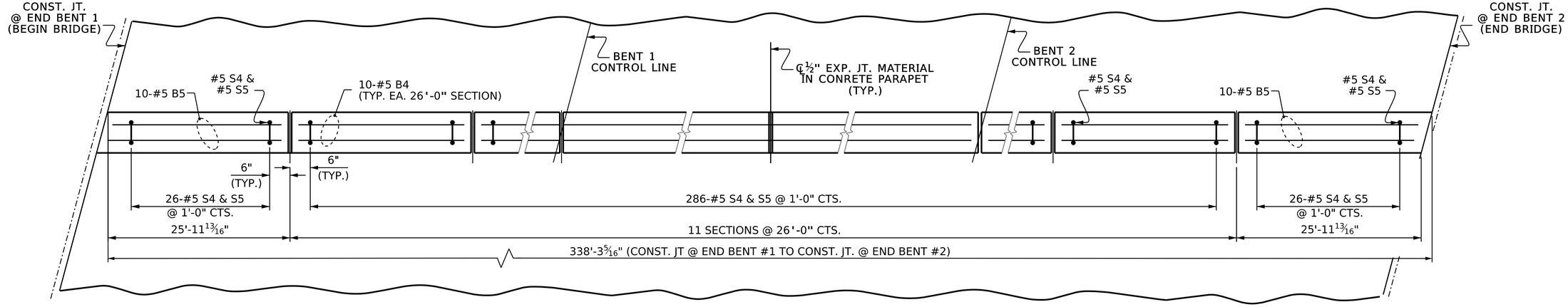
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL-STAGE III

1'-1½" x 3'-6" CONCRETE PARAPET

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B4	110	#5	STR	25'-7"	2935
* B5	20	#5	STR	25'-8"	535
* S4	338	#5	1	6'-5"	2262
* S5	338	#5	2	5'-9"	2027
* EPOXY COATED REINF. STEEL					7759 LBS.
CLASS AA CONCRETE					49.3 C.Y.

1'-1½" X 3'-6" CONCRETE PARAPET 338.28 L.F.



PLAN OF CONCRETE PARAPET-(STAGE III)

DIMENSIONS ARE GIVEN ALONG THE OUTSIDE EDGE

NOTES

ALL REINFORCING STEEL IN PARAPET SHALL BE EPOXY COATED.

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

FOR CONCRETE PARAPET ON APPROACH SLABS, SEE APPROACH SLAB SHEETS.

THE #5 S4 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S4 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS REQUIRED. FOR ADHESIVELY ANCHOR BOLTS AND DOWELS, SEE SPECIAL PROVISIONS

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
DDA094AED5104FD...
11/21/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

1'-1½" x 3'-6" CONCRETE PARAPET

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : S. LOTFI / A. K. IBRAHIM DATE : 3/2024
CHECKED BY : M.M. AHMED DATE : 7/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 11/2024

11/21/2024
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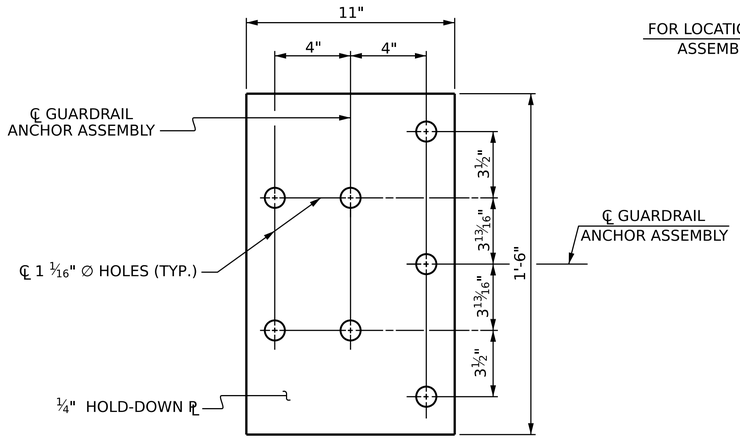
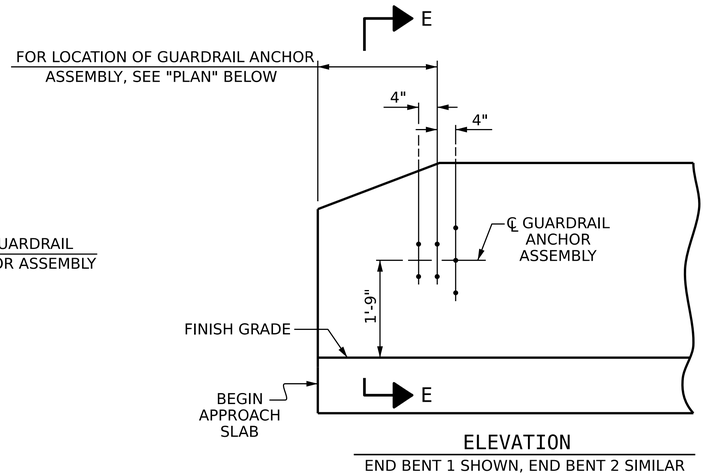
mmahmed



PLAN



ELEVATION

END BENT 1 SHOWN, END BENT 2 SIMILAR

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼'' HOLD DOWN PLATE AND 7 - ⅞'' ∅ BOLTS WITH NUTS AND WASHERS.

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ⅞'' ∅ 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.)

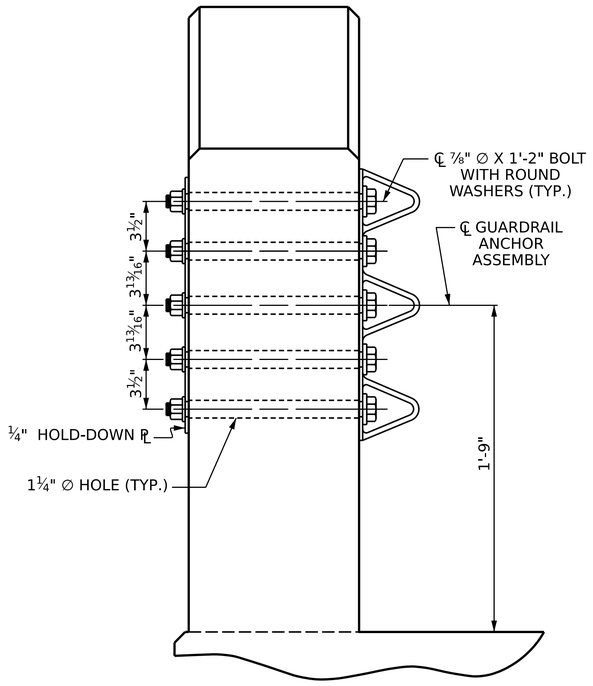
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF CONCRETE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

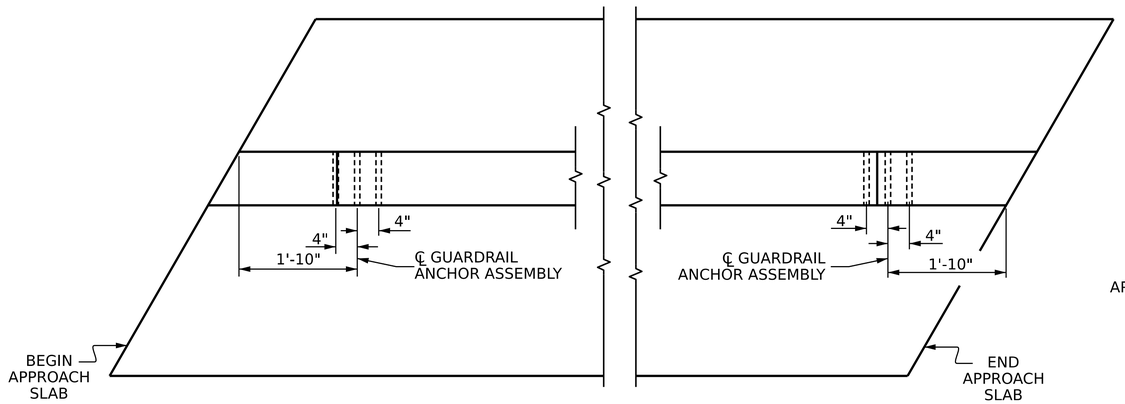
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR "1'-1½' x 3'-6" CONCRETE PARAPET".

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE CONCRETE PARAPET TO CLEAR ASSEMBLY BOLTS.

THE 1 ¼'' ∅ 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.



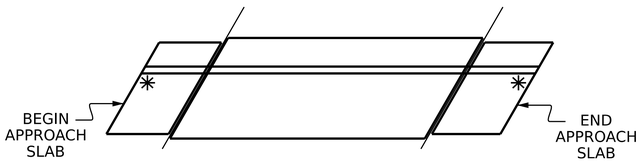
SECTION E-E



PLAN

GUARDRAIL ANCHOR ASSEMBLY DETAILS

LOCATION OF ANCHORS FOR GUARDRAIL



SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR 1'-1½" x 3'-6" CONCRETE PARAPET

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

11/21/2024

ASSEMBLED BY : M. AHMED	DATE : 10/2024
CHECKED BY : A. ABRAHA P.E.	DATE : 10/2024
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			57

11/15/2024
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aabraha

Sht.1a

8/26/21

REINFORCING BAR SCHEDULE

STAGE I

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT	BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
* A1	529	#5	STR.	28'-11"	15,955	*D1	1078	#5	STR.	4'-11"	5528
A2	529	#5	STR.	28'-11"	15,955						
						G1	16	#5	STR.	4'-0"	67
*A101	2	#5	STR.	3'-7"	7	G2	16	#5	STR.	3'-8"	61
*A102	2	#5	STR.	5'-11"	12						
*A103	2	#5	STR.	8'-3"	17	H1	12	#6	3	17'-6"	315
*A104	2	#5	STR.	10'-7"	22	H2	12	#6	3	17'-4"	312
*A105	2	#5	STR.	13'-4"	28	H3	12	#6	4	17'-7"	317
*A106	2	#5	STR.	15'-3"	32	H4	12	#6	4	17'-9"	320
*A107	2	#5	STR.	17'-7"	37						
*A108	2	#5	STR.	19'-11"	42	K1	6	#4	STR.	37'-9"	151
*A109	2	#5	STR.	22'-3"	46	K2	2	#4	STR.	4'-10"	6
*A110	2	#5	STR.	24'-7"	51	K3	2	#4	STR.	5'-10"	8
*A111	2	#5	STR.	26'-11"	56	K4	6	#4	STR.	6'-2"	25
						K5	2	#4	STR.	6'-0"	12
A201	2	#5	STR.	3'-7"	7	K6	10	#4	STR.	3'-1"	21
A202	2	#5	STR.	5'-11"	12	K7	4	#4	STR.	4'-8"	12
A203	2	#5	STR.	8'-3"	17	K8	4	#4	STR.	6'-7"	18
A204	2	#5	STR.	10'-7"	22	K9	12	#4	STR.	7'-4"	59
A205	2	#5	STR.	13'-4"	28	K10	4	#4	STR.	7'-0"	19
A206	2	#5	STR.	15'-3"	32	K11	2	#4	STR.	3'-7"	5
A207	2	#5	STR.	17'-7"	37	K12	2	#4	STR.	5'-7"	7
A208	2	#5	STR.	19'-11"	42	K13	6	#4	STR.	6'-3"	25
A209	2	#5	STR.	22'-3"	46						
A210	2	#5	STR.	24'-7"	51	*S1	26	#4	1	10'-11"	190
A211	2	#5	STR.	26'-11"	56	*S2	26	#4	1	11'-11"	207
B1	126	#5	STR.	58'-0"	7622	U1	26	#4	2	13'-6"	234
B2	32	#5	STR.	57'-0"	1902	U2	6	#4	2	15'-8"	63
*B3	118	#6	STR.	20'-10"	3692						
*B4	80	#4	STR.	27'-0"	1443	REINFORCING STEEL				27,886 LBS.	
*B5	78	#5	STR.	60'-0"	4881	*EPOXY COATED REINFORCING STEEL				38,443 LBS.	
*B6	78	#5	STR.	22'-11"	1864						
*B7	78	#5	STR.	45'-3"	3681						
*B8	40	#4	STR.	24'-5"	652						

SUPERSTRUCTURE BILL OF MATERIAL

	STAGE I-LEFT SIDE (LBS.)	TOTAL STAGE I ** (LBS.)
REINFORCING STEEL	27,886	27,886
* EPOXY COATED REINFORCING STEEL	38,443	38,443

CONCRETE QUANTITIES

	STAGE I-LEFT SIDE (CU. YDS.)
POUR 1	264
POUR 2	37.8
POUR 3	57.8
TOTAL **	327.6

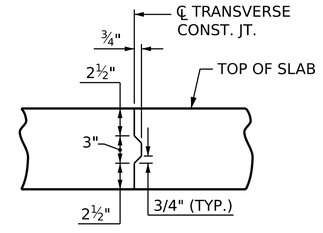
** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,298	SQ.FT.
BRIDGE DECK	8,964	SQ.FT.
TOTAL	10,262	SQ.FT.

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

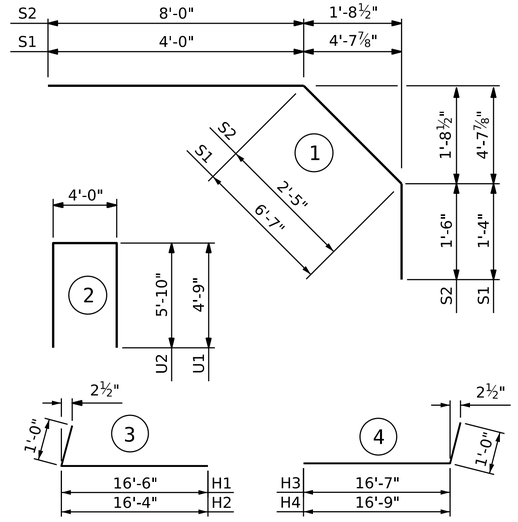
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			



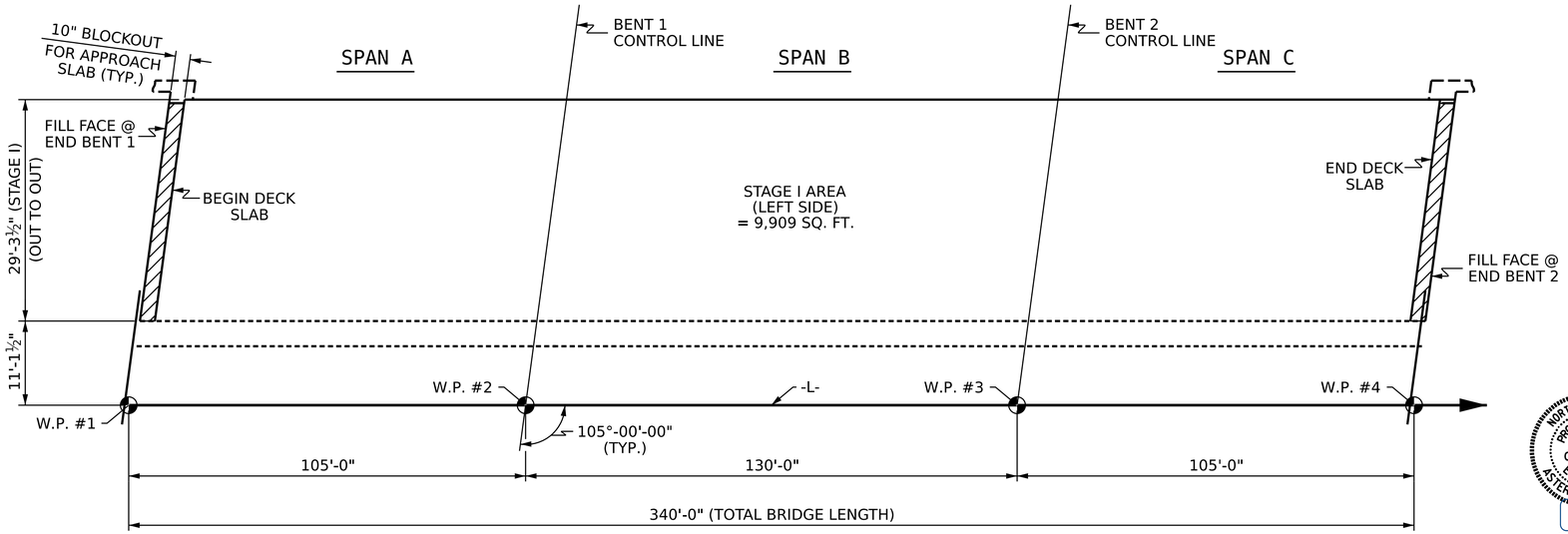
TRANSVERSE CONSTRUCTION JOINT DETAIL

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 9,909)

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL STAGE I (LEFT SIDE)

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha
DDA09A6AED5104FD...
11/21/2024

DRAWN BY : G. AYES DATE : 8/2023
CHECKED BY : M. M. AHMED DATE : 4/2024
DESIGN ENGINEER OF RECORD: M. M. AHMED DATE : 11/2024

11/21/2024
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mmahmed

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			57

8/26/21

REINFORCING BAR SCHEDULE

STAGE II

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT	BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
*A3	527	#5	STR.	32'-9"	18,001	*D1	1078	#5	STR.	4'-11"	5528
A4	527	#5	STR.	32'-9"	18,001						
						H1	12	#6	3	17'-5"	315
*A301	2	#5	STR.	3'-2"	7	H2	12	#6	3	17'-4"	312
*A302	2	#5	STR.	5'-6"	11	H3	12	#6	4	17'-7"	317
*A303	2	#5	STR.	7'-10"	16	H4	12	#6	4	17'-9"	320
*A304	2	#5	STR.	10'-2"	21						
*A305	2	#5	STR.	12'-6"	26	K1A	12	#4	STR	22'-7"	181
*A306	2	#5	STR.	14'-10"	31	K5	2	#4	STR	6'-0"	8
*A307	2	#5	STR.	17'-2"	36	K15	6	#4	STR	5'-9"	23
*A308	2	#5	STR.	19'-6"	41	K16	6	#4	STR	7'-8"	31
*A309	2	#5	STR.	21'-10"	46	K17	18	#4	STR	8'-5"	101
*A310	2	#5	STR.	24'-2"	50	K18	6	#4	STR	8'-1"	32
*A311	2	#5	STR.	26'-6"	55	K19	2	#4	STR	4'-9"	6
*A312	2	#5	STR.	28'-10"	60	K20	2	#4	STR	5'-8"	8
*A313	2	#5	STR.	31'-2"	65	K21	6	#4	STR	6'-6"	26
						K22	10	#4	STR	2'-10"	19
A401	2	#5	STR.	3'-2"	7						
A402	2	#5	STR.	5'-6"	11	*S1	34	#4	1	10'-11"	248
A403	2	#5	STR.	7'-10"	16	*S2	34	#4	1	271	207
A404	2	#5	STR.	10'-2"	21						
A405	2	#5	STR.	12'-6"	26	U1	38	#4	2	13'-6"	343
A406	2	#5	STR.	14'-10"	31	U2	6	#4	2	15'-8"	63
A407	2	#5	STR.	17'-2"	36						
A408	2	#5	STR.	19'-6"	41	REINFORCING STEEL					33,225 LBS.
A409	2	#5	STR.	21'-10"	46	*EPOXY COATED REINFORCING STEEL					42,645 LBS.
A410	2	#5	STR.	24'-2"	50						
A411	2	#5	STR.	26'-6"	55						
A412	2	#5	STR.	28'-10"	60						
A413	2	#5	STR.	31'-2"	65						
B1	162	#5	STR.	58'-0"	9800						
B2	48	#5	STR.	57'-0"	2854						
*B3	132	#6	STR.	20'-10"	4130						
*B4	88	#4	STR.	27'-0"	1587						
*B5	88	#5	STR.	60'-0"	5507						
*B6	88	#5	STR.	22'-11"	2103						
*B7	88	#5	STR.	45'-3"	4153						
*B8	40	#4	STR.	24'-5"	652						

CLOSURE POURS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	30	#5	STR	58'-0"	1815
B2	8	#5	STR	57'-0"	476
* B3	14	#6	STR	20'-10"	438
* B4	12	#4	STR	27'-0"	216
* B5	10	#5	STR	60'-0"	626
* B6	10	#5	STR	22'-11"	239
* B7	8	#5	STR	45'-3"	378
* B8	6	#4	STR	24'-5"	98
K7	2	#4	STR	4'-8"	6
K8	2	#4	STR	6'-7"	9
K9	6	#4	STR	7'-4"	29
K10	2	#4	STR	7'-0"	9
REINFORCING STEEL				LBS.	2,338
* EPOXY COATED REINFORCING STEEL				LBS.	2,001

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	1,646	SQ.FT.
BRIDGE DECK	11,363	SQ.FT.
TOTAL	13,009	SQ.FT.

SUPERSTRUCTURE BILL OF MATERIAL

	STAGE II-RIGHT SIDE (LBS.)	CLOSURE POURS (LBS.)	TOTAL STAGE II ** (LBS.)
REINFORCING STEEL	32,862	2,338	35,200
* EPOXY COATED REINFORCING STEEL	42,645	2,001	44,646

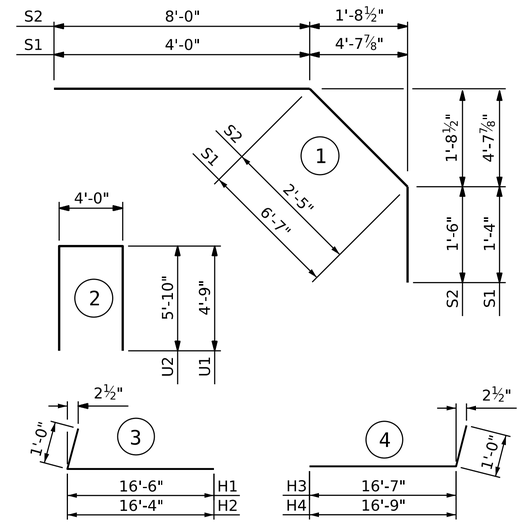
** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

CONCRETE QUANTITIES

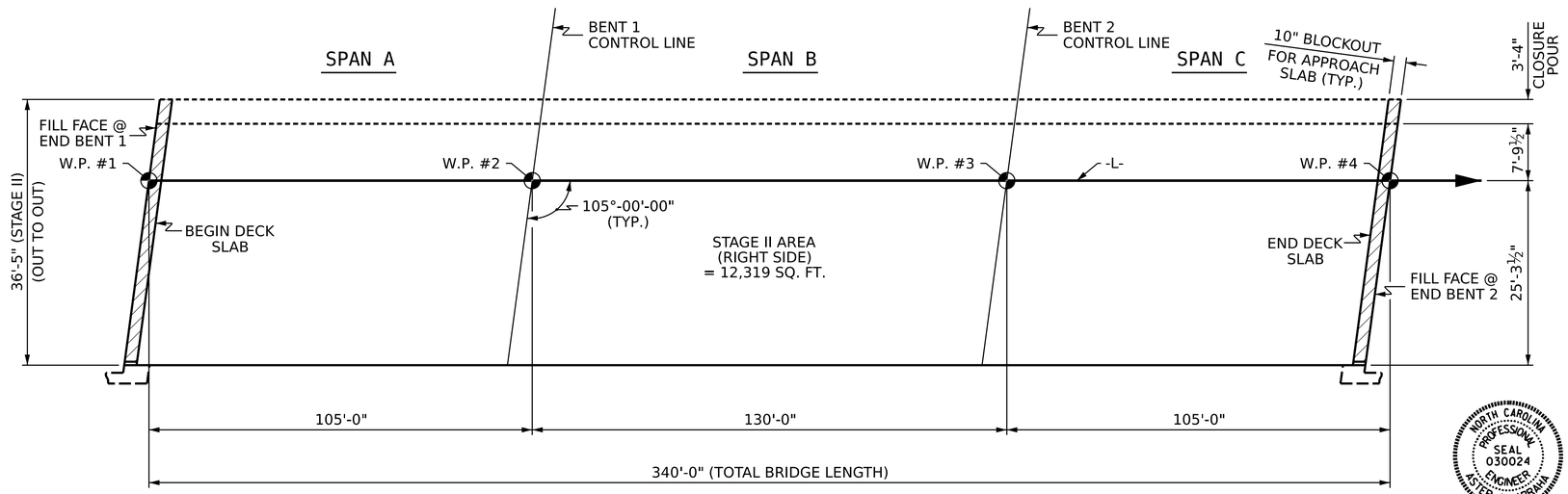
	STAGE II-RIGHT SIDE (CU. YDS.)
POUR 4	318
POUR 5	45.5
POUR 6	72.6
CLOSURE POURS	51.1
TOTAL **	487.2

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 12,319)

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
Aster Abraha
-DDA084AED5104FD...
11/21/2024

PROJECT NO. BR-0086
JOHNSTON COUNTY
STATION: 19+26.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL STAGE II (RIGHT SIDE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			57

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DRAWN BY : G. AYES DATE : 8/2023
CHECKED BY : M. M. AHMED DATE : 4/2024
DESIGN ENGINEER OF RECORD: M. M. AHMED DATE : 9/2024

10/15/2024
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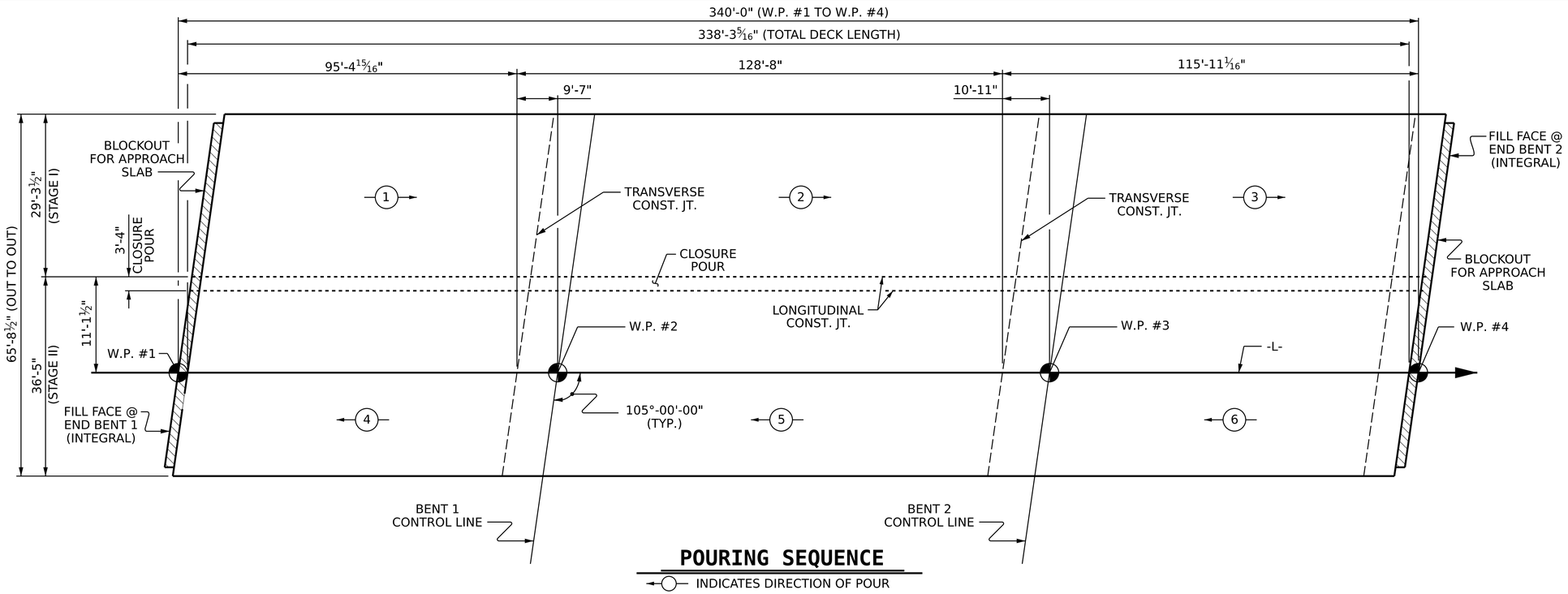
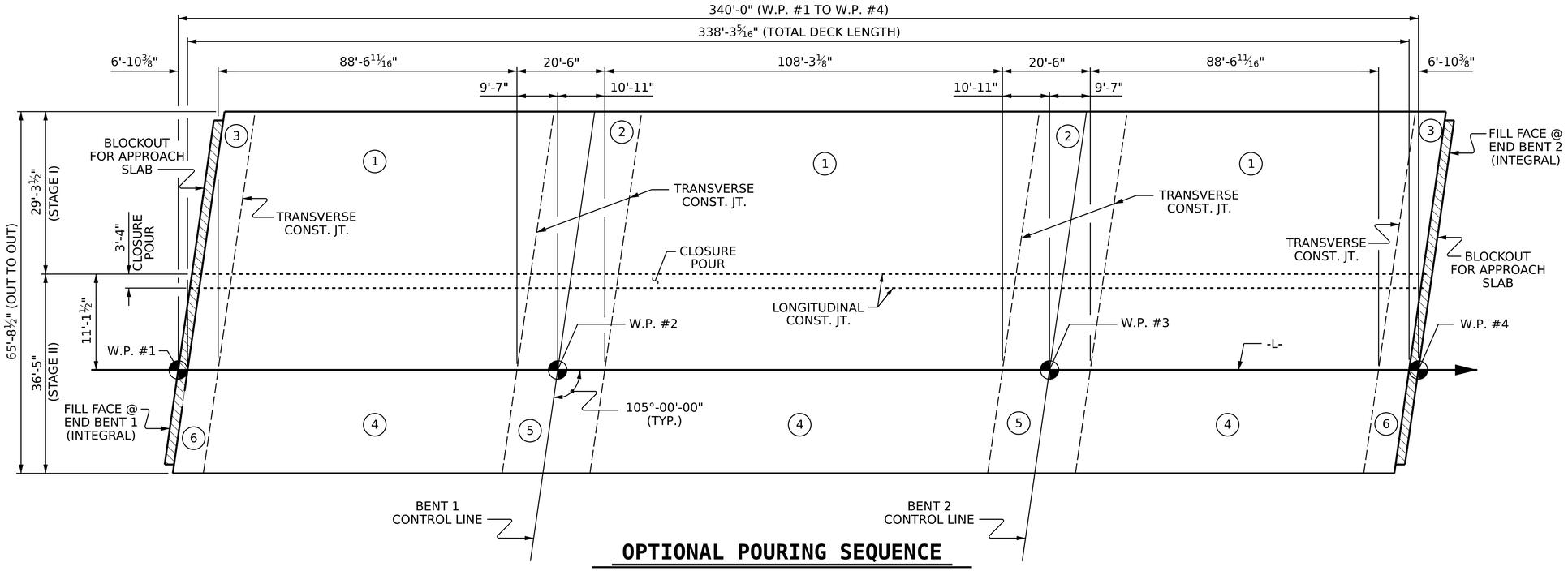


POURING SEQUENCE

INDICATES DIRECTION OF POUR



OPTIONAL POURING SEQUENCE

POUR #2 OF STAGE I CANNOT BE STARTED UNTIL ADJACENT POURS REACH A MINIMUM OF 3000 PSI.

POUR #5 OF STAGE II CANNOT BE STARTED UNTIL ADJACENT POURS REACH A MINIMUM OF 3000 PSI.

SUPERSTRUCTURE BILL OF MATERIAL

	REINFORCING STEEL (LBS)	EPOXY COATED REINFORCING STEEL (LBS)
STAGE I	27,886	38,443
STAGE II	35,200	44,646
TOTALS	63,086	83,089

CONCRETE QUANTITIES (CU. YDS.)

	POUR 1	POUR 2	POUR 3	TOTAL
STAGE I	110.8	119	129.7	359.5
	POUR 4	POUR 5	POUR 6	
STAGE II	134.7	143.3	157.4	435.4
CLOSURE POURS				51.1
TOTALS **				846.0

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

STAGE I

APPROACH SLABS	1,298	SQ.FT.
BRIDGE DECK	8,964	SQ.FT.
TOTAL	10,262	SQ.FT.

STAGE II

APPROACH SLABS	1,646	SQ.FT.
BRIDGE DECK	11,363	SQ.FT.
TOTAL	13,009	SQ.FT.

TOTAL

APPROACH SLABS	2,944	SQ.FT.
BRIDGE DECK	20,327	SQ.FT.
TOTAL	23,271	SQ.FT.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

11/21/2024

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : M. M. AHMED DATE : 4/2024
CHECKED BY : A. ABRAHA P.E. DATE : 11/2024
DESIGN ENGINEER OF RECORD: M. M. AHMED DATE : 11/2024

11/21/2024
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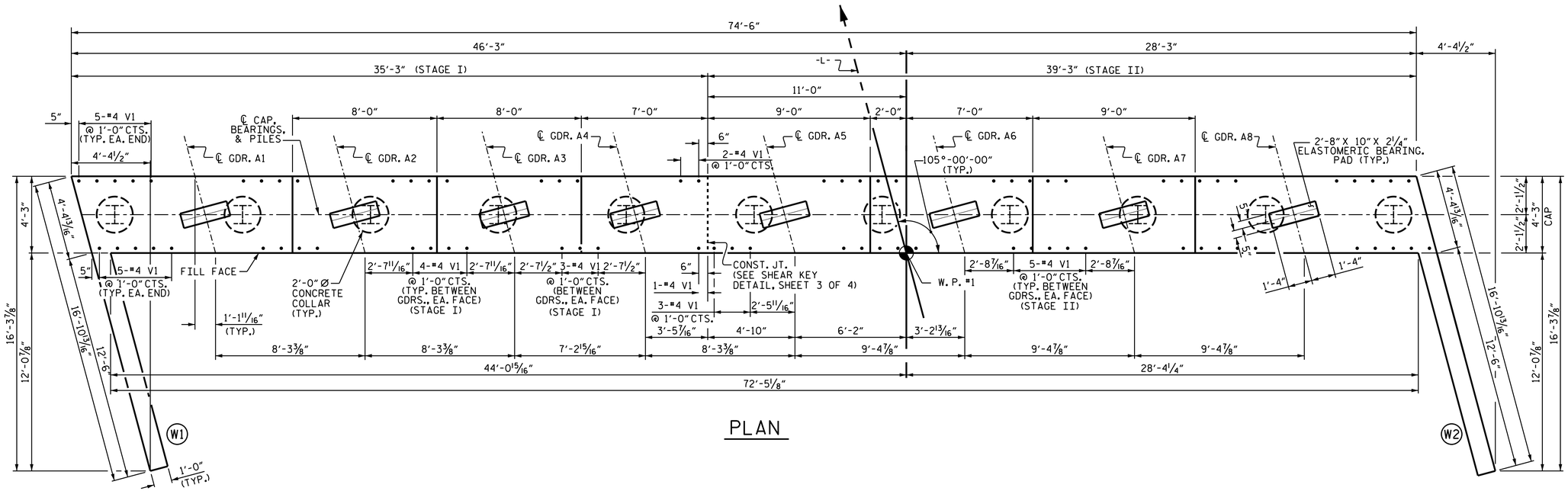
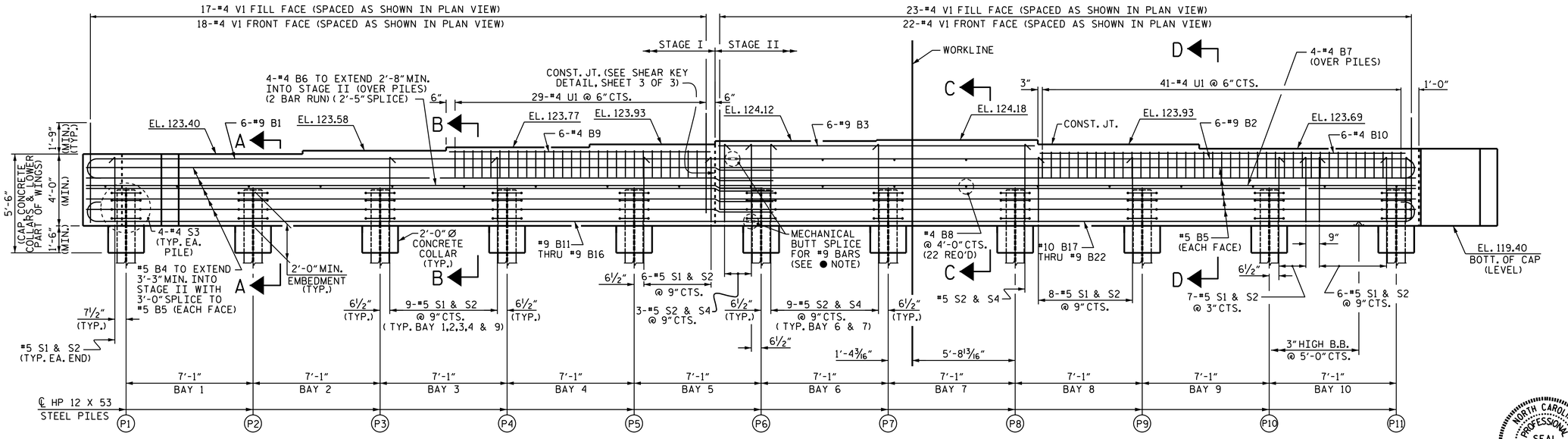


PLAN



ELEVATION

NOTES:

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

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

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

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

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENTS 1 & 2. SEE SECTION 450 OF THE STANDARD SPECIFICATION.

PILE NO. 6 TO BE DRIVEN IN STAGE I IF APPROVED BY THE ENGINEER.

THE CONTRACTOR'S ATTENTION IS CALLED FOR THE FACT THAT THE LENGTHS OF THE #10 "B" BARS AT THE STAGED CONSTRUCTION JOINT MAY NEED TO BE ADJUSTED DUE TO THE MECHANICAL BUTT SPLICE CHOSEN BY THE CONTRACTOR. NO ADDITIONAL PAYMENT WILL BE MADE FOR ANY ADJUSTMENTS.

● MECHANICAL COUPLERS SHALL BE USED TO JOIN THE #9 "B" BARS IN STAGE I WITH THE #9 "B" BARS IN STAGE II. SEE SHEET 3 OF 3 FOR DETAILS.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

11/21/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			57

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DRAWN BY : MOHAMMED AHMED DATE : 07/2023
CHECKED BY : S. LOTFI/A. ABRAHA DATE : 05/2024
DESIGN ENGINEER OF RECORD: MOHAMMED AHMED DATE : 05/2024

11/12/2024
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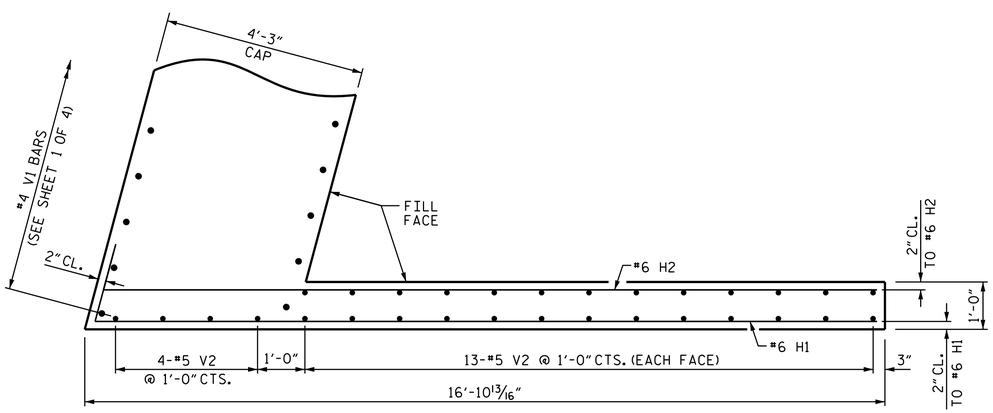
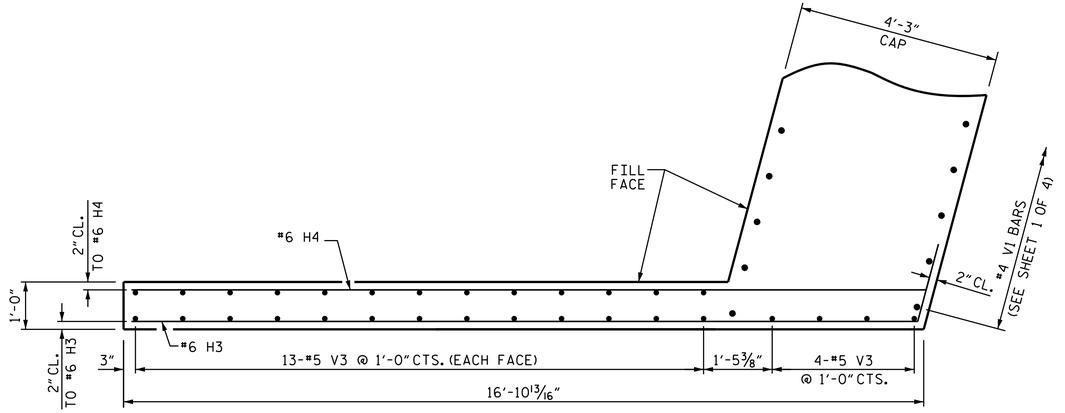
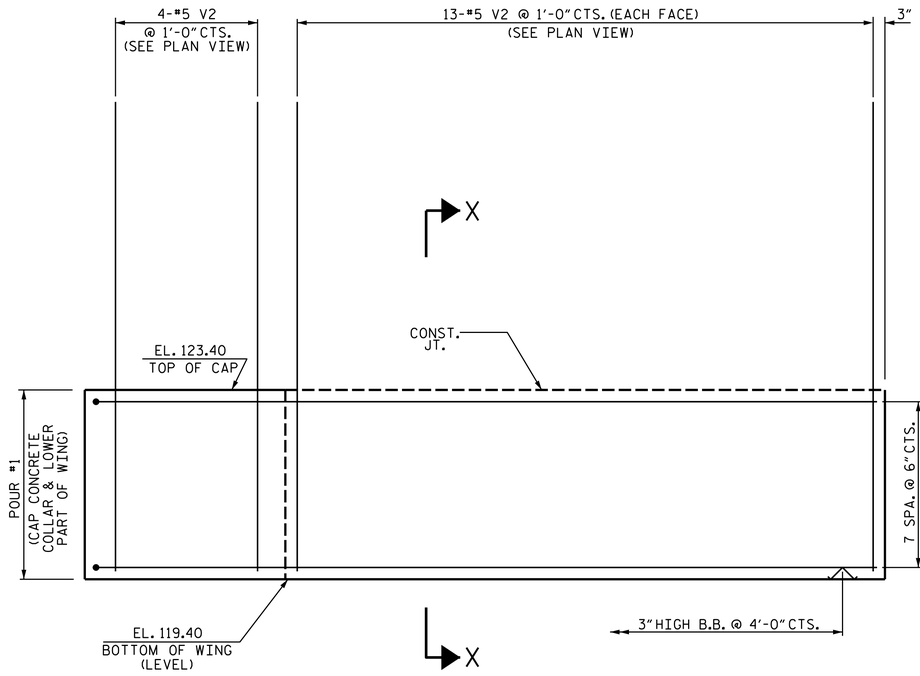


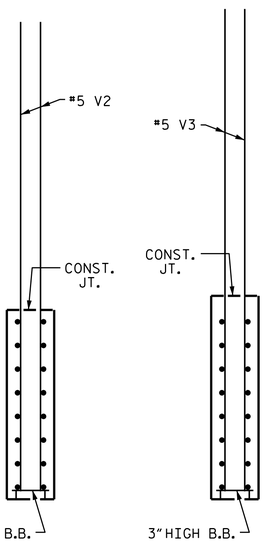
PLAN OF LEFT WING W1 - STAGE I



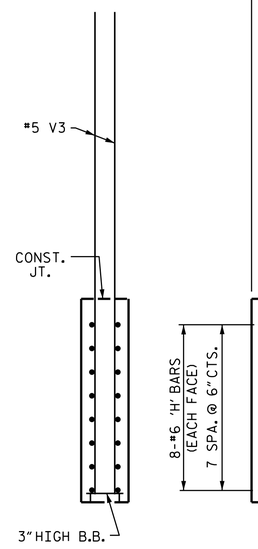
PLAN OF RIGHT WING W2 - STAGE II



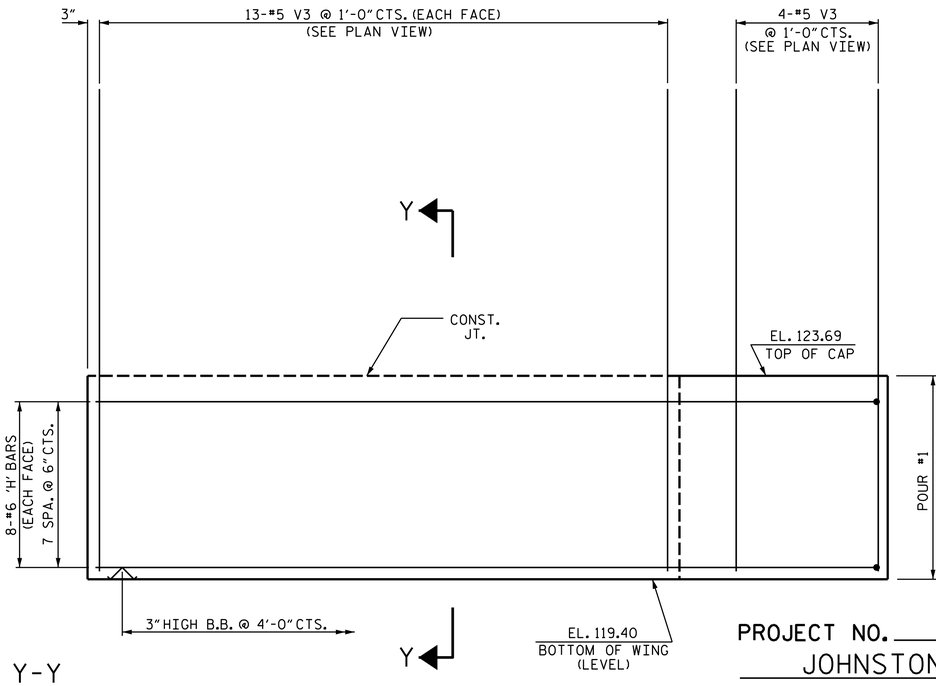
ELEVATION OF LEFT WING W1 - STAGE I



SECTION X-X



SECTION Y-Y



ELEVATION OF RIGHT WING W2 - STAGE II

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

DDA094AED5104FD...

11/21/2024

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : M.M. AHMED DATE : 07/23
CHECKED BY : S. LOTFI/A. ABRAHA DATE : 05/24
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 09/24

10/15/2024
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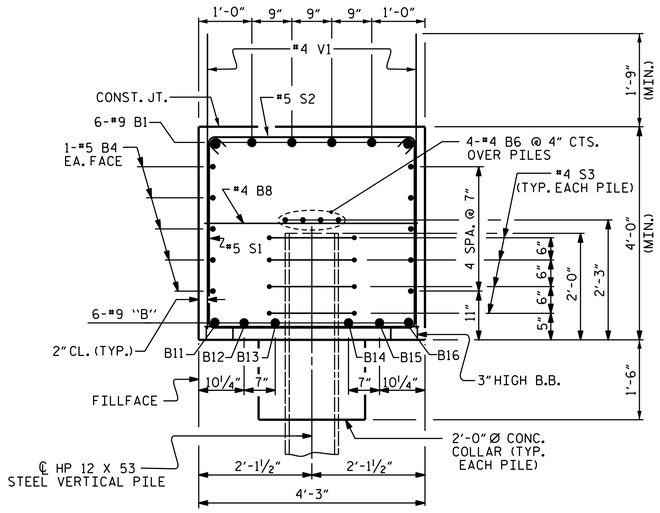
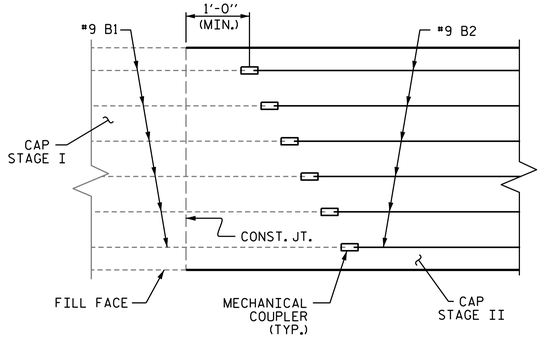
aabraha

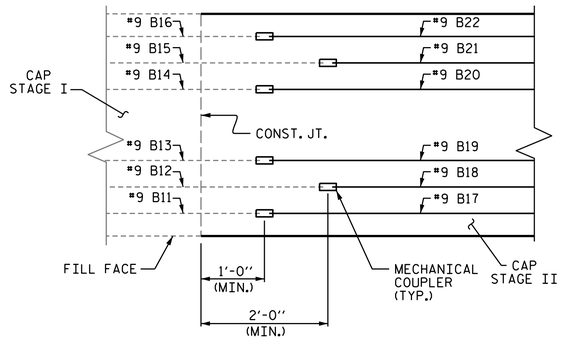


SECTION A-A



MECHANICAL COUPLER DETAIL

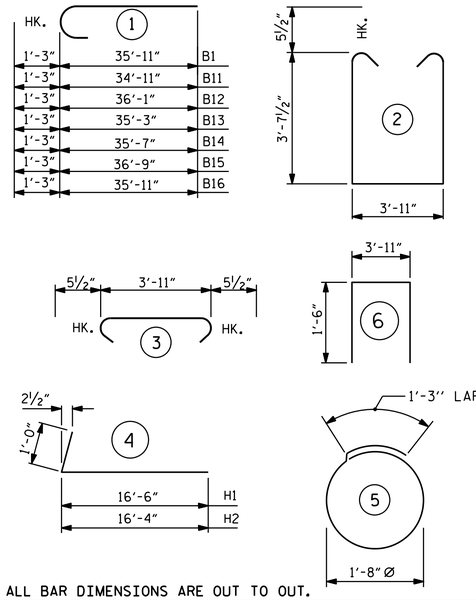
PLAN VIEW OF TOP MAIN STEEL



MECHANICAL COUPLER STAGGER DETAIL

PLAN VIEW OF BOTTOM MAIN STEEL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

STAGE I

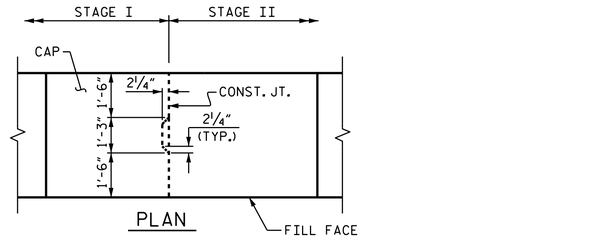
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	1	37'-2"	758
B4	10	#5	STR	38'-4"	400
B6	4	#4	STR	37'-4"	100
B8	9	#4	STR	3'-11"	24
B9	6	#4	STR	14'-7"	58
B11	1	#9	1	36'-2"	123
B12	1	#9	1	37'-4"	127
B13	1	#9	1	36'-6"	124
B14	1	#9	1	36'-10"	125
B15	1	#9	1	38'-0"	129
B16	1	#9	1	37'-2"	126
H1	8	#6	4	17'-6"	210
H2	8	#6	4	17'-4"	208
S1	43	#5	2	12'-1"	546
S2	43	#5	3	4'-10"	217
S3	20	#4	5	6'-6"	87
U1	29	#4	6	6'-11"	134
V1	35	#4	STR	5'-7"	131
V2	30	#5	STR	9'-11"	310

REINFORCING STEEL 3937 LBS.

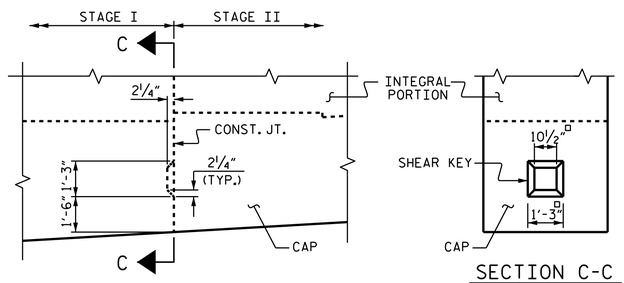
CLASS A CONCRETE

POUR #1 CAP, LOWER PART OF WINGS & CONCRETE COLLARS 26.2 CU. YDS.

TOTAL CLASS A CONCRETE 26.2 CU. YDS.



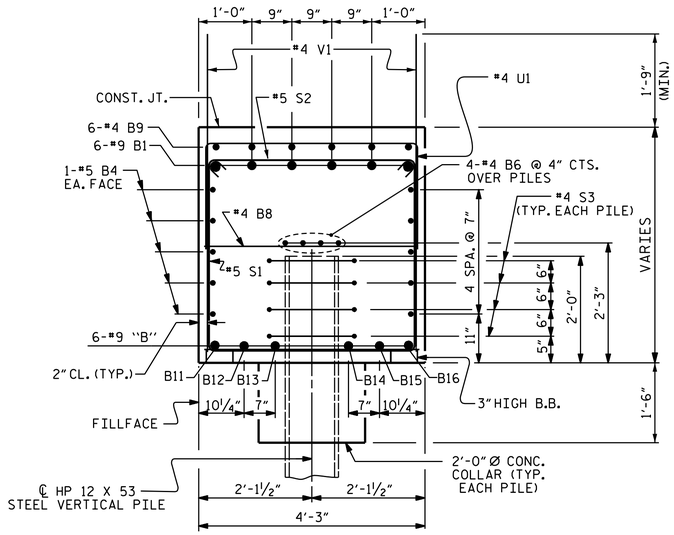
PLAN



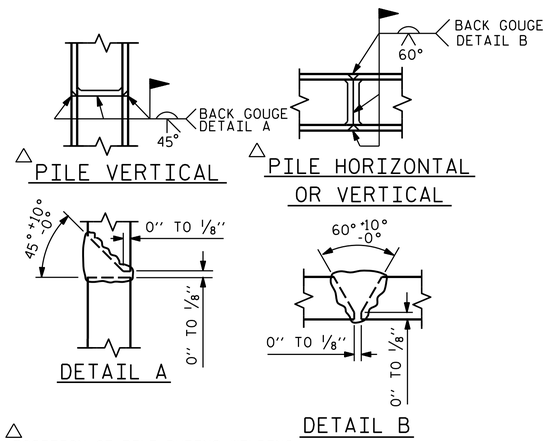
ELEVATION SECTION C-C

SHEAR KEY DETAIL

REINFORCING STEEL NOT SHOWN



SECTION B-B



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-42
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : MOHAMMED AHMED DATE : 08, 2023
CHECKED BY : S. LOTFI/A. ABRAHA DATE : 05, 2024
DESIGN ENGINEER OF RECORD: MOHAMMED AHMED DATE : 10, 2024

10/15/2024
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NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER GEBRAHA
11/21/2024

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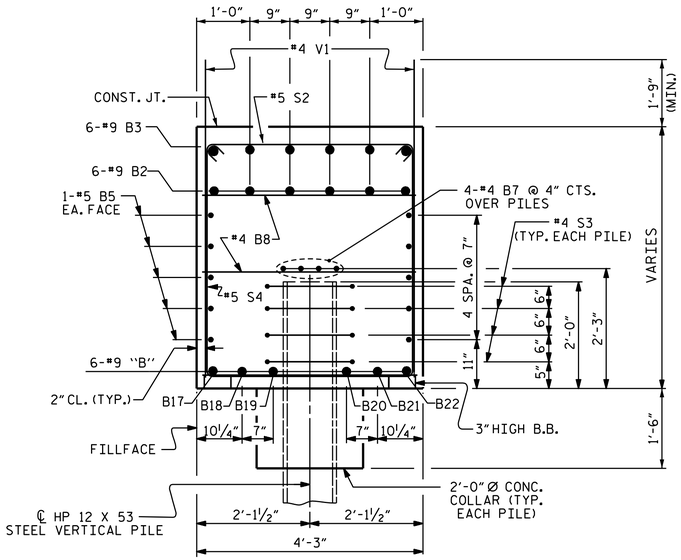
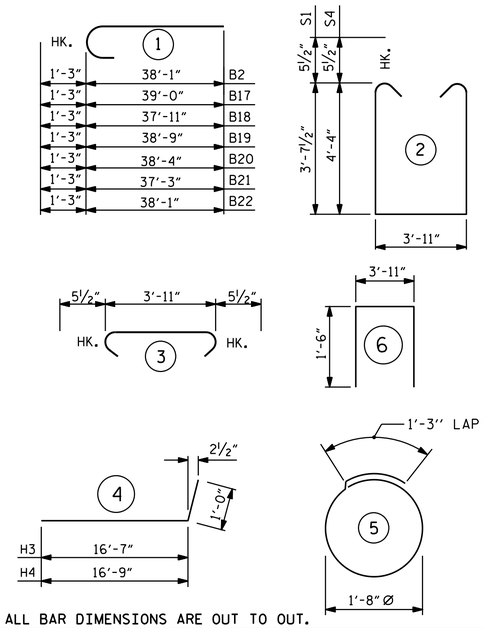


SECTION C-C

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

STAGE II

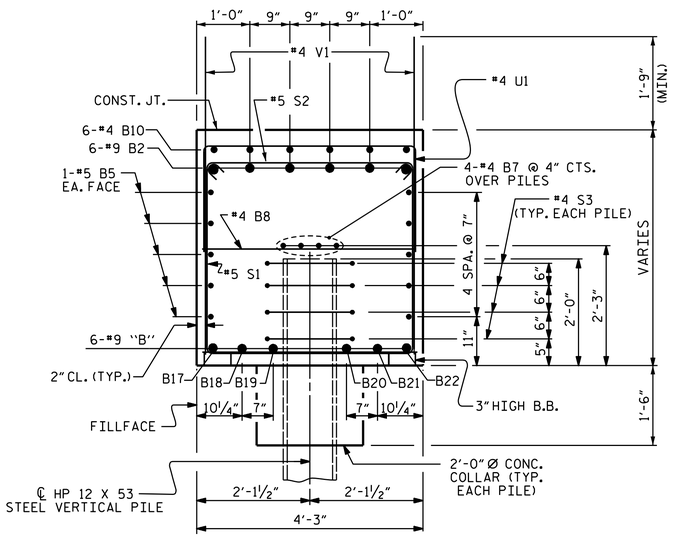
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B2	6	#9	1	39'-4"	802
B3	6	#9	STR	17'-8"	360
B5	10	#5	STR	38'-11"	406
B7	4	#4	STR	39'-4"	105
B8	13	#4	STR	3'-11"	34
B10	6	#4	STR	21'-0"	84
B17	1	#9	1	40'-3"	137
B18	1	#9	1	39'-2"	133
B19	1	#9	1	40'-0"	136
B20	1	#9	1	39'-7"	135
B21	1	#9	1	38'-6"	131
B22	1	#9	1	39'-4"	134
H3	8	#6	4	17'-7"	211
H4	8	#6	4	17'-9"	213
S1	31	#5	2	12'-1"	391
S2	53	#5	3	4'-10"	267
S3	24	#4	5	6'-6"	104
S4	22	#5	2	13'-6"	310
U1	41	#4	6	6'-11"	189
V1	45	#4	STR	5'-7"	168
V3	30	#5	STR	10'-2"	318

REINFORCING STEEL 4768 LBS.

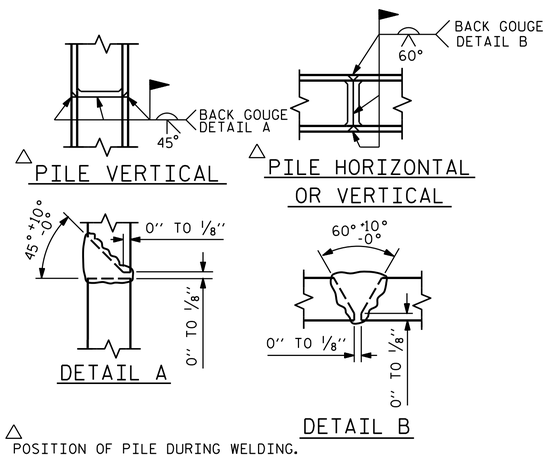
CLASS A CONCRETE

POUR #1 CAP, LOWER PART OF WINGS & CONCRETE COLLARS 31.2 CU. YDS.

TOTAL CLASS A CONCRETE 31.2 CU. YDS.

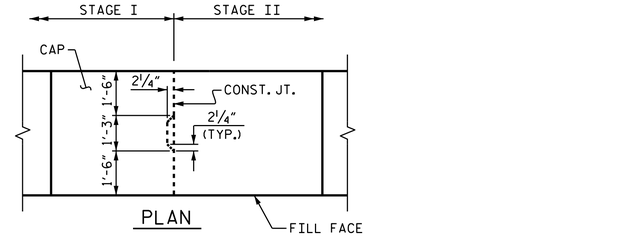


SECTION D-D

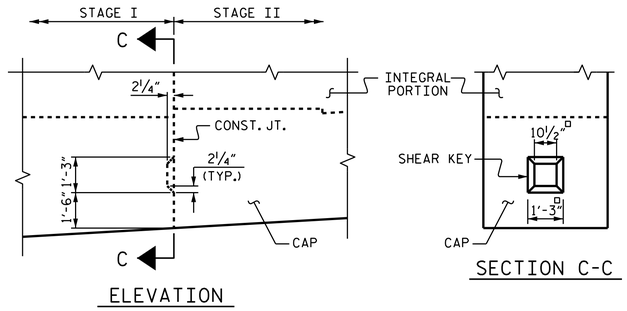


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



PLAN



ELEVATION

SECTION C-C

SHEAR KEY DETAIL

REINFORCING STEEL NOT SHOWN

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-43
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : MOHAMMED AHMED DATE : 08, 2023
CHECKED BY : S. LOTFI/A. ABRAHA DATE : 05,2024
DESIGN ENGINEER OF RECORD: MOHAMMED AHMED DATE : 10,2024

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NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
11/21/2024

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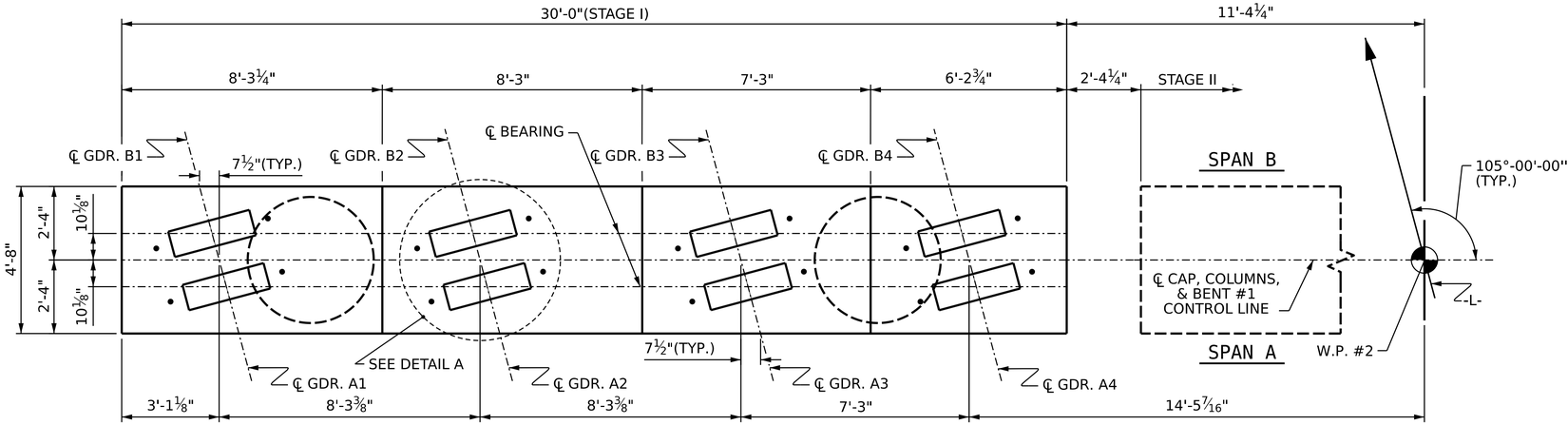
8/26/21



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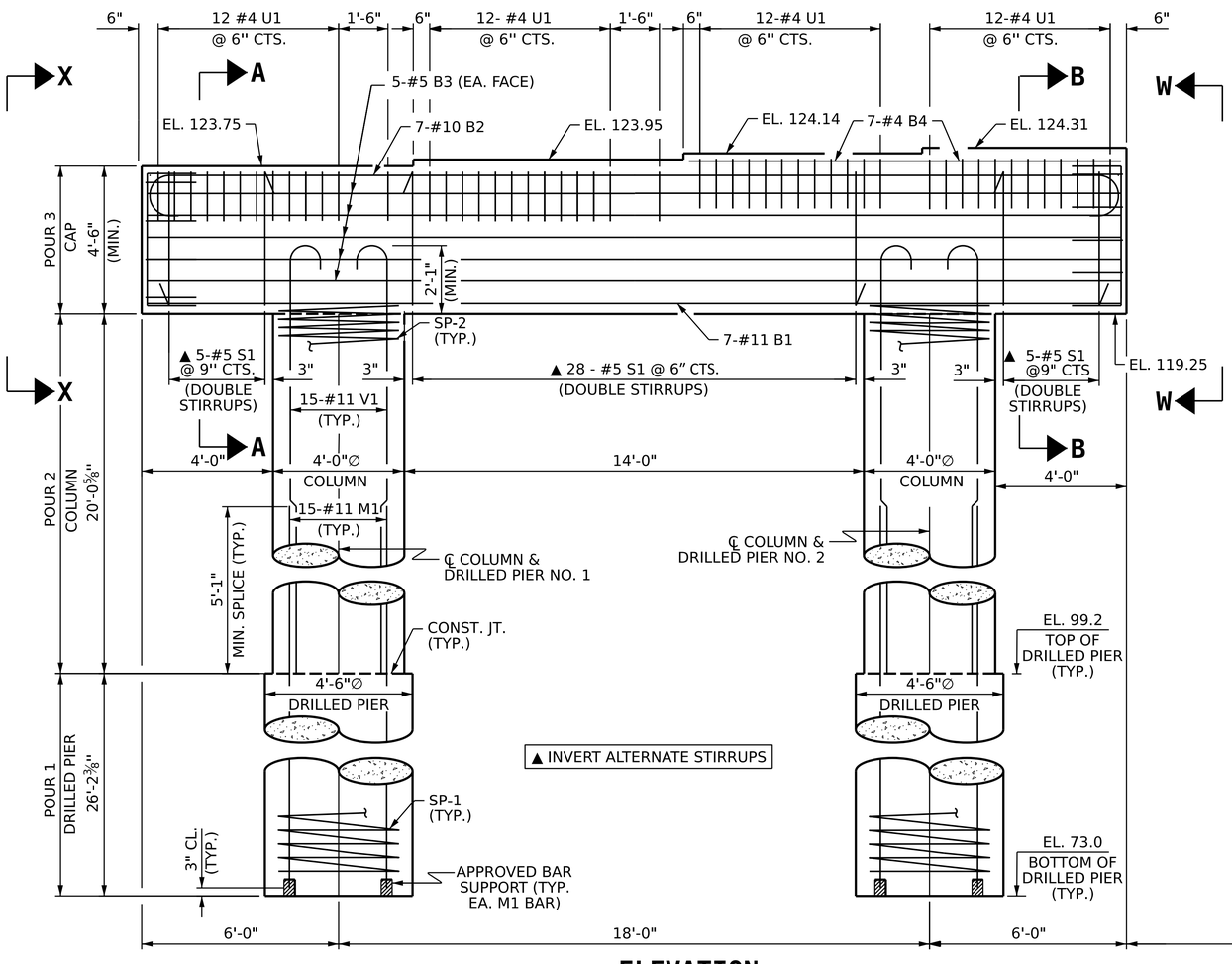
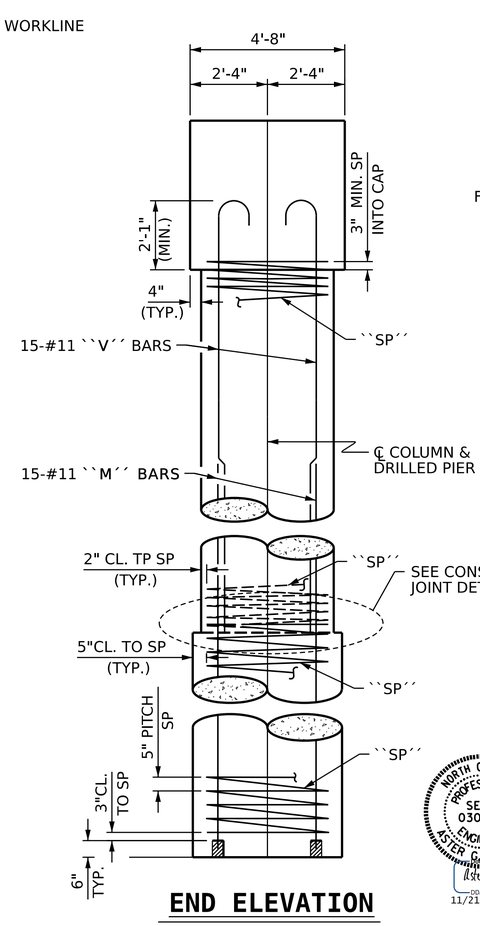


ELEVATION

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



END ELEVATION

NOTES

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

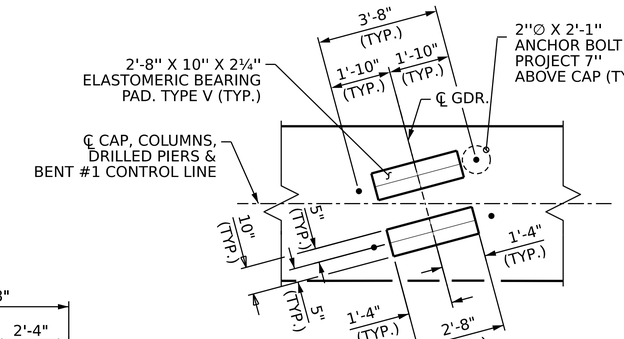
HOOKS ON ``V´´ BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

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

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

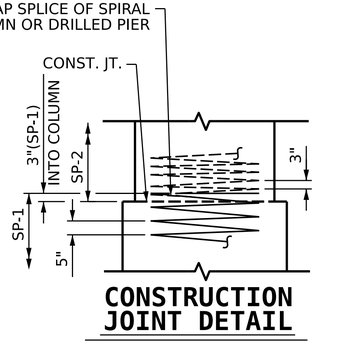
NO SEPARATE PAYMENT WILL BE MADE FOR CSL TUBES. CSL TUBES WILL BE INCLUDED IN THE UNIT BID PRICE FOR DRILLED PIERS.

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.



DETAIL ``A´´

(TYP. EA. GDR.)



CONSTRUCTION JOINT DETAIL

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

STAGE I

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRALIA

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11/21/2024

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-44
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : A.K. IBRAHIM DATE : 1/2024
CHECKED BY : H.B. AYTODA / M. AHMED DATE : 7/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE :

11/12/2024
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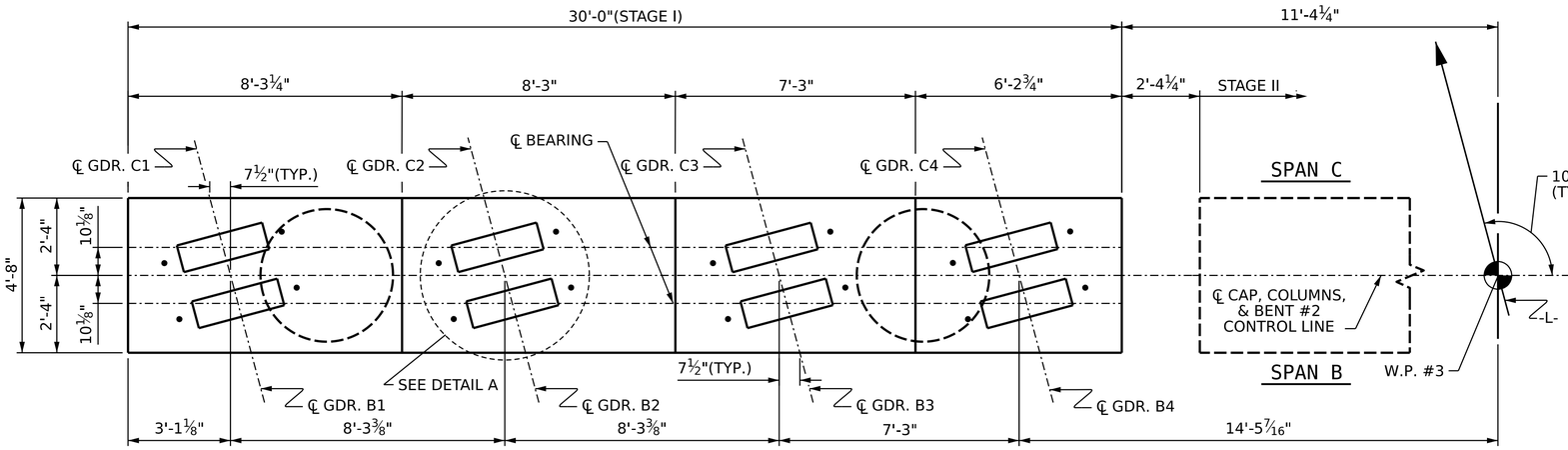
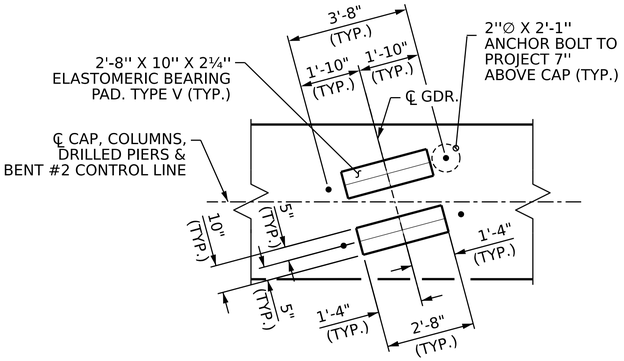
mmahmed

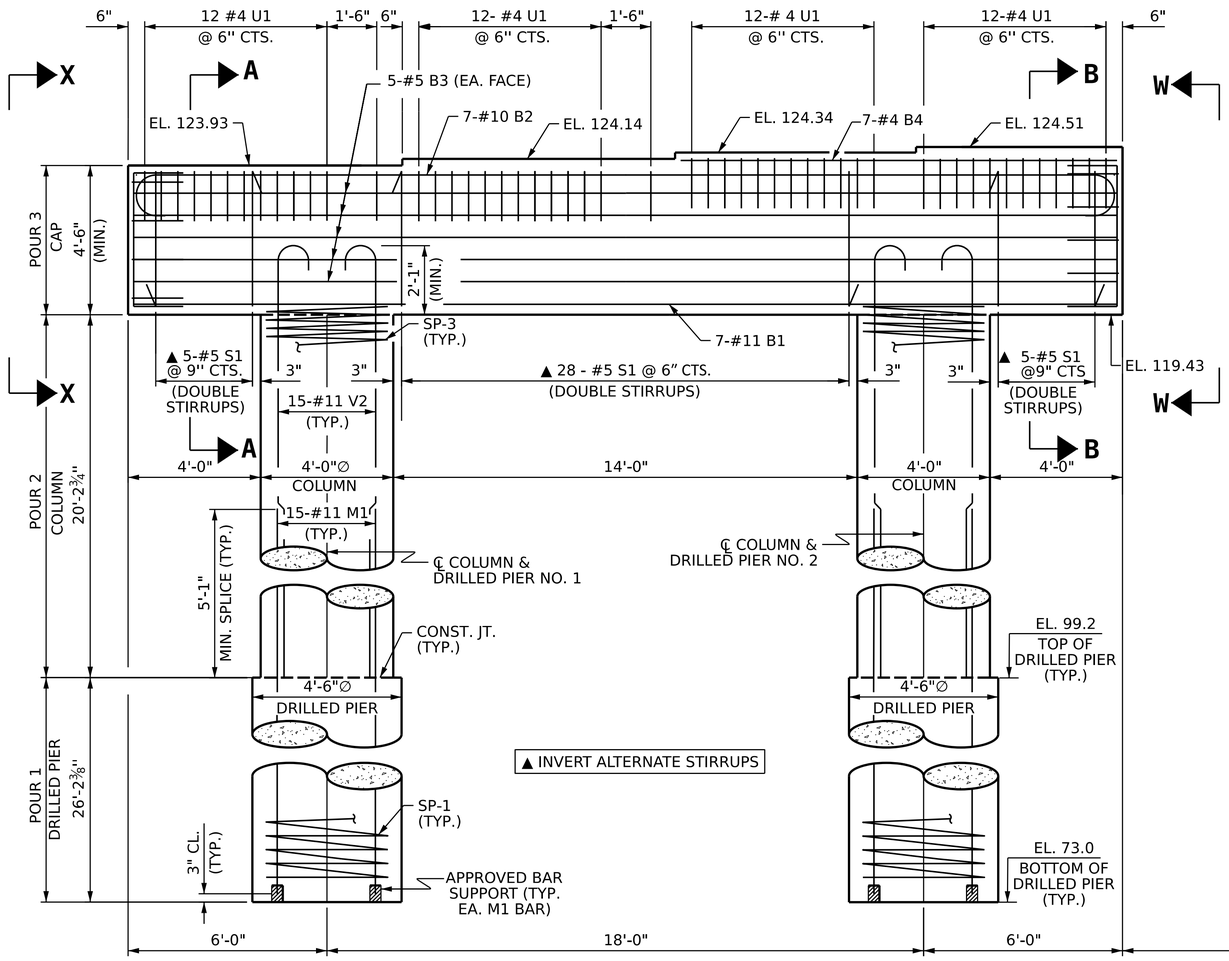
8/26/21



PLAN

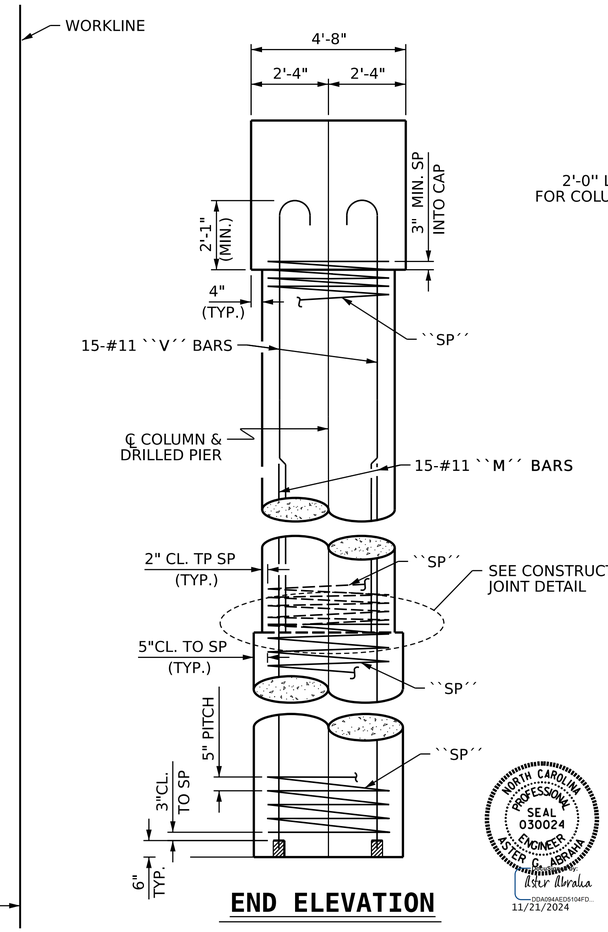


DETAIL ``A´´
(TYP. EA. GDR.)

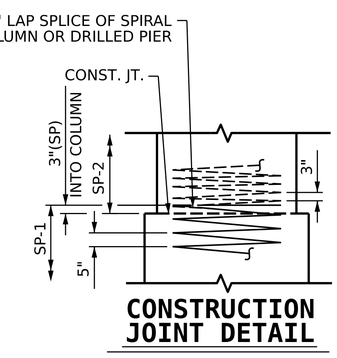


ELEVATION

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



END ELEVATION



CONSTRUCTION JOINT DETAIL

PROJECT NO. BR-0086
JOHNSTON COUNTY
STATION: 19+26.00 -L-
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2
STAGE I

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
Aster Abraha
DocuSigned by: DDA094AED6104FD...
11/21/2024

DRAWN BY : A.K. IBRAHIM DATE : 01/2024
CHECKED BY : H.B. AYTODA / M. AHMED DATE : 07/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 10/2024

11/12/2024
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mmahmed

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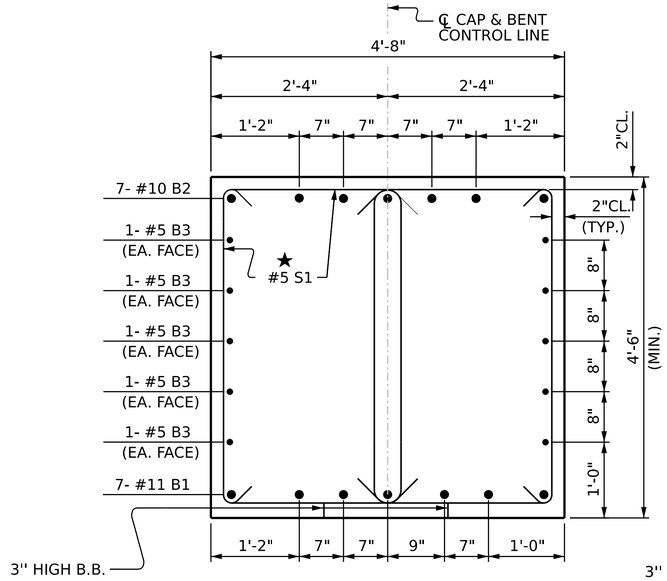
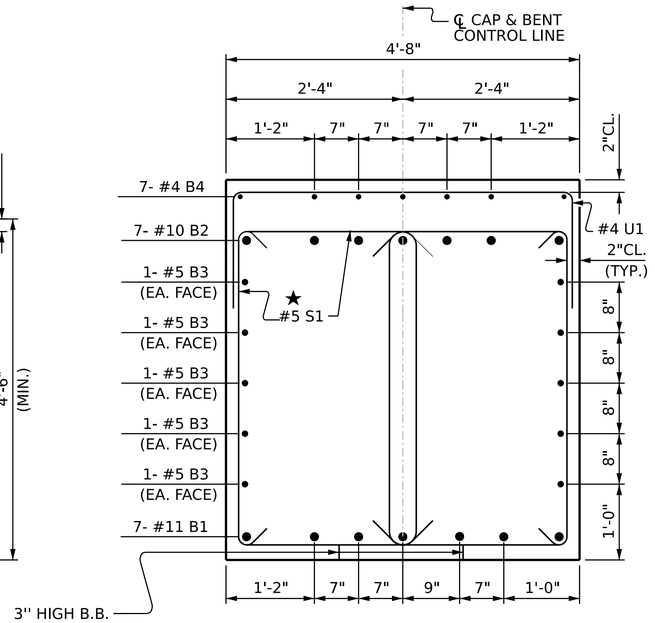
8/26/21



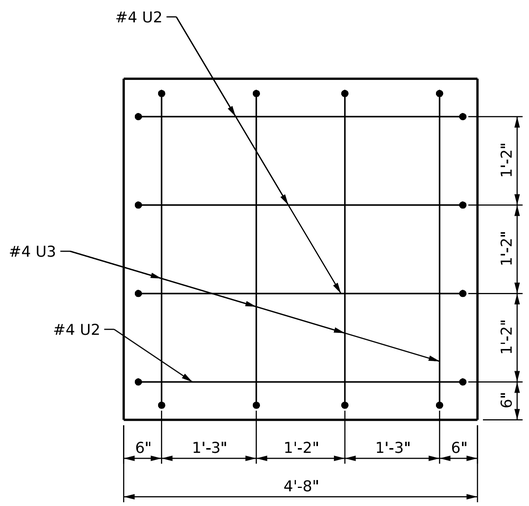
SECTION A-A

★INVERT ALTERNATE STIRRUPS

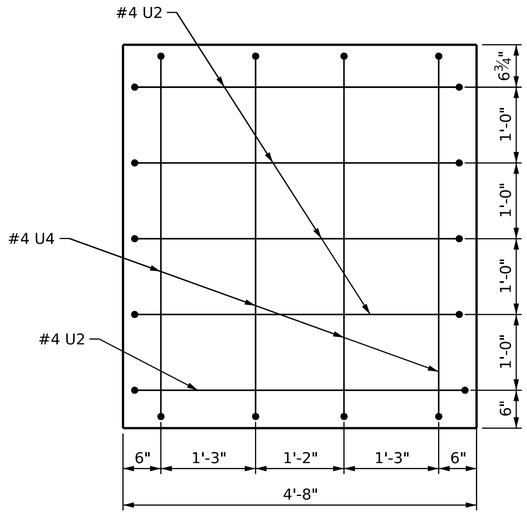


SECTION B-B

★INVERT ALTERNATE STIRRUPS

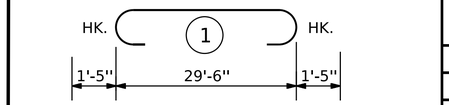


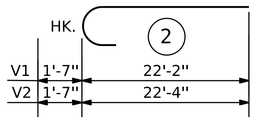
VIEW X-X

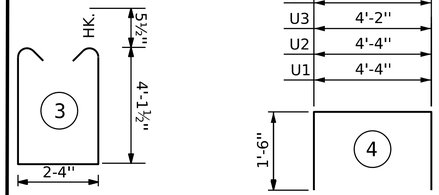


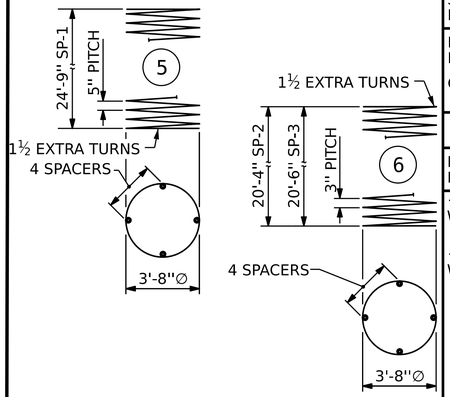
VIEW W-W

BAR TYPES









ALL BAR DIMENSIONS ARE OUT TO OUT.

TOTAL BILL OF MATERIAL

BENT 1 (STAGE I)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#11	STR	29'-8''	1103
B2	7	#10	1	32'-4''	974
B3	10	#5	STR	29'-8''	309
B4	7	#4	STR	13'-2''	62
M1	30	#11	STR	34'-1''	5433
S1	76	#5	3	11'-6''	912
U1	50	#4	4	7'-4''	245
U2	9	#4	4	7'-4''	44
U3	4	#4	4	7'-2''	19
U4	4	#4	4	7'-8''	20
V1	30	#11	2	23'-9''	3786

REINFORCING STEEL FOR BENT NO. 1 — 12,907 LBS.

SP-1	2	***	5	738'	1540
SP-2	2	**	6	946'	1264

SPIRAL COLUMN REINFORCING STEEL — 2,804 LBS.

POUR #2 (COLUMNS) — 18.7 CU.YDS.
POUR #3 (CAP) — 24.7 CU.YDS.

CLASS A CONCRETE BREAKDOWN — 43.4 CU.YDS.

4'-6" ø DRILLED PIERS

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS): 30.9 CU.YDS.

BENT 2 (STAGE I)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	7	#11	STR	29'-8''	1103
B2	7	#10	1	32'-4''	974
B3	10	#5	STR	29'-8''	309
B4	7	#4	STR	13'-2''	62
M1	30	#11	STR	34'-1''	5433
S1	76	#5	3	11'-6''	912
U1	50	#4	4	7'-4''	245
U2	9	#4	4	7'-4''	44
U3	4	#4	4	7'-2''	19
U4	4	#4	4	7'-8''	20
V2	30	#11	2	23'-11''	3812

REINFORCING STEEL FOR BENT NO. 2 — 12,933 LBS.

SP-1	2	***	5	738'	1540
SP-3	2	**	6	957'	1280

SPIRAL COLUMN REINFORCING STEEL — 2,820 LBS.

POUR #2 (COLUMNS) — 18.8 CU.YDS.
POUR #3 (CAP) — 24.7 CU.YDS.

CLASS A CONCRETE BREAKDOWN — 43.5 CU.YDS.

4'-6" ø DRILLED PIERS

DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS): 30.9 CU.YDS.

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

** THE SP-2 & SP-3 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE BENT 1 & BENT 2 (STAGE I)

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

11/21/2024

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-46
1			3			TOTAL SHEETS
2			4			57

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DRAWN BY : A.K. IBRAHIM DATE : 1/2024
CHECKED BY : H.B. AYTODA / M. AHMED DATE : 7/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 10/2024

11/21/2024
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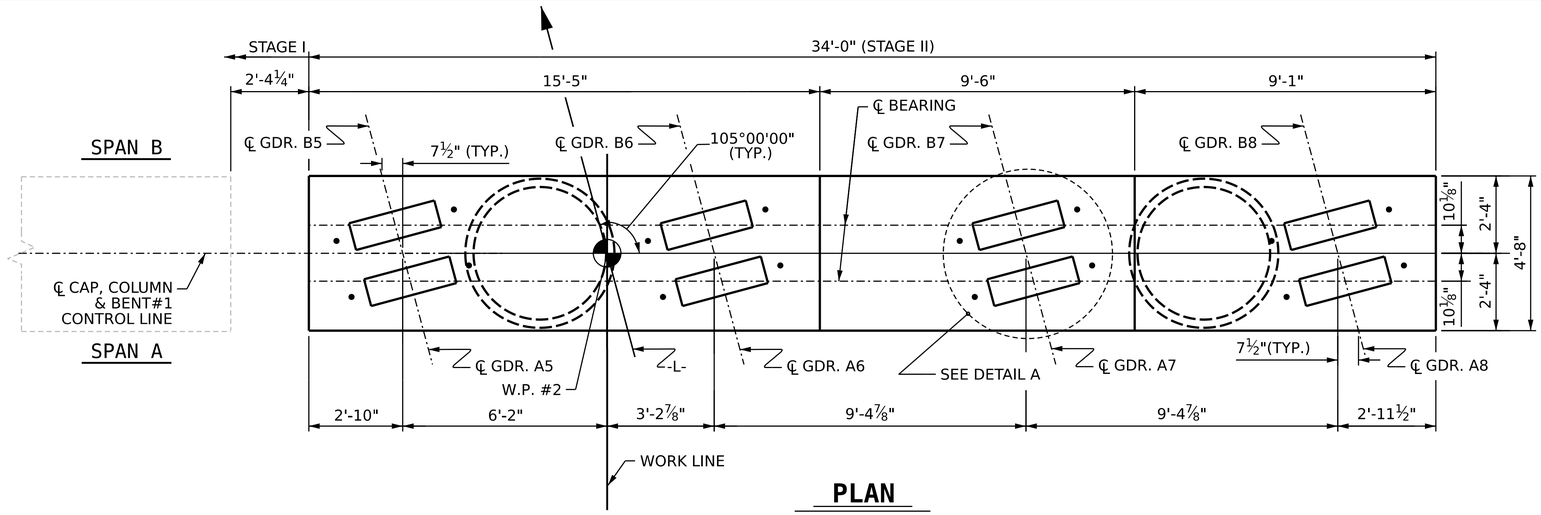
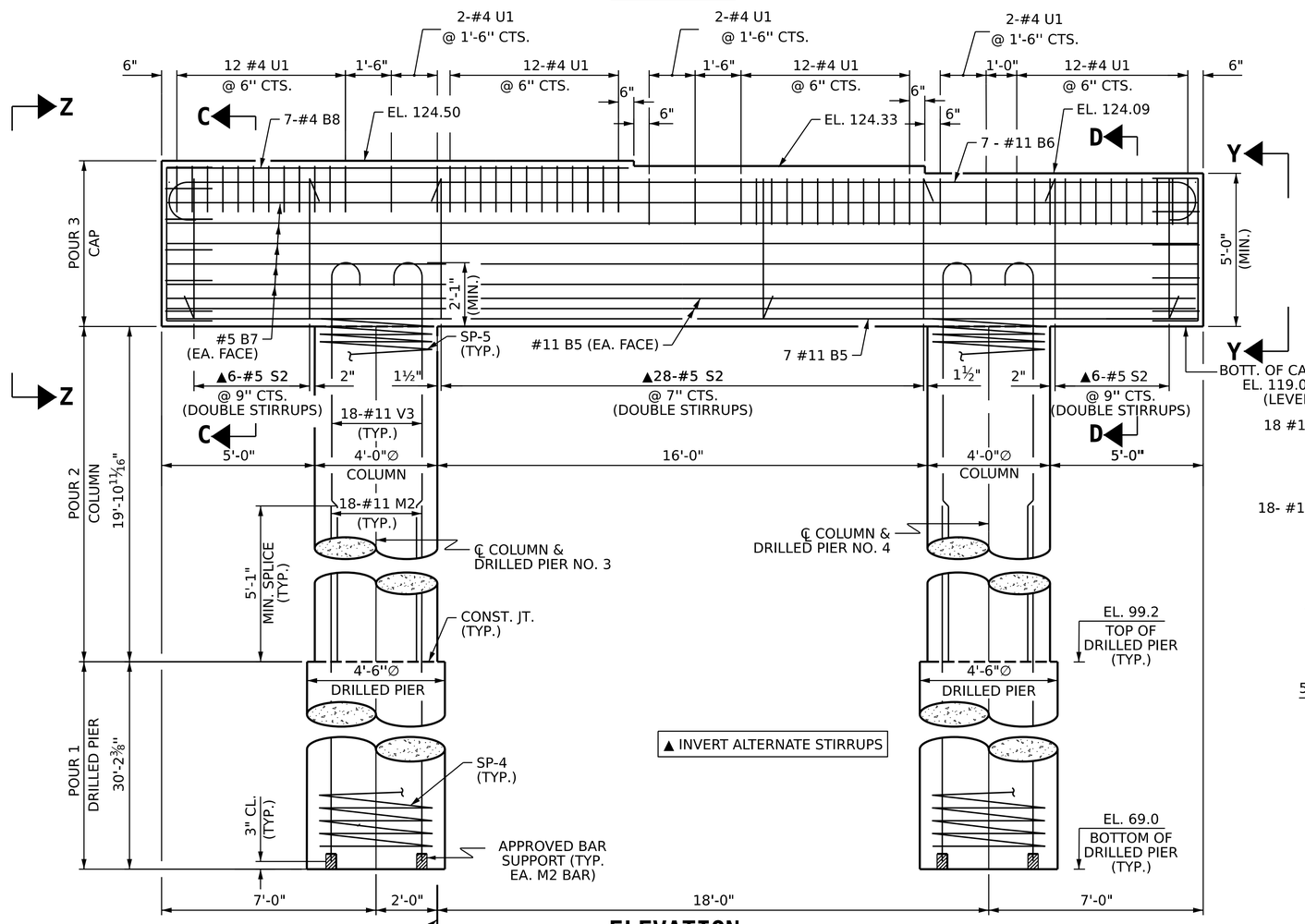
gabraha

8/26/21

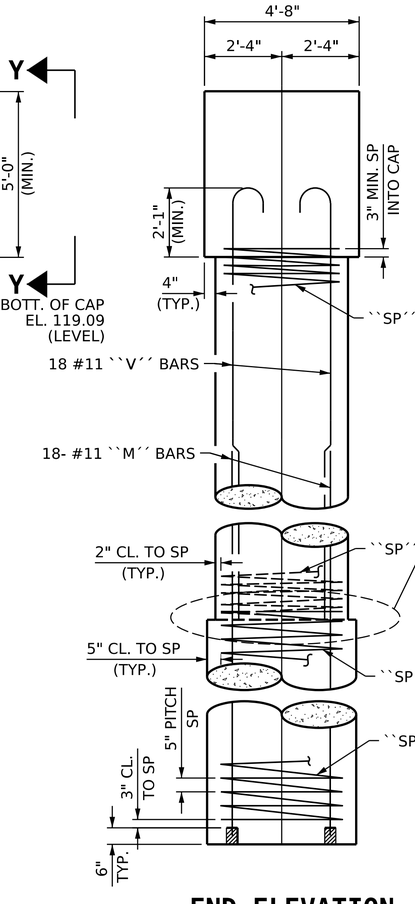


PLAN



ELEVATION

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



END ELEVATION

NOTES

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

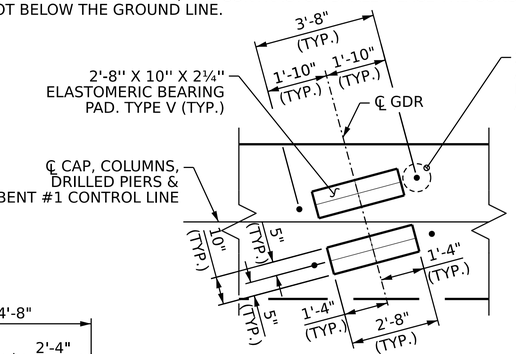
HOOKS ON ``V´´ BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

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

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

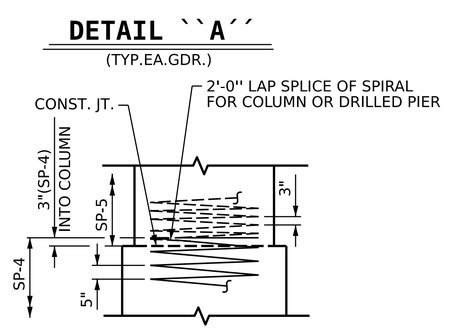
NO SEPARATE PAYMENT WILL BE MADE FOR CSL TUBES. CSL TUBES WILL BE INCLUDED IN THE UNIT BID PRICE FOR DRILLED PIERS.

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.



DETAIL ``A´´

(TYP.EA.GDR.)



CONSTRUCTION JOINT DETAIL

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1
STAGE II

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

11/21/2024

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DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 11/2024

11/18/2024
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aabraha

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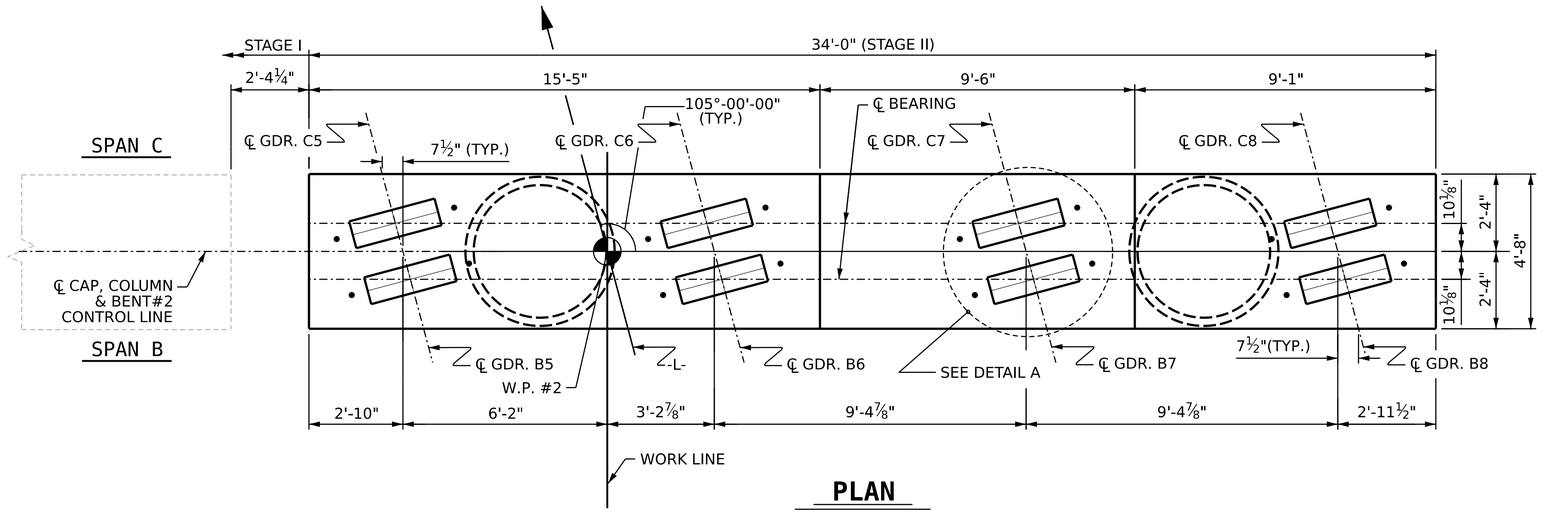
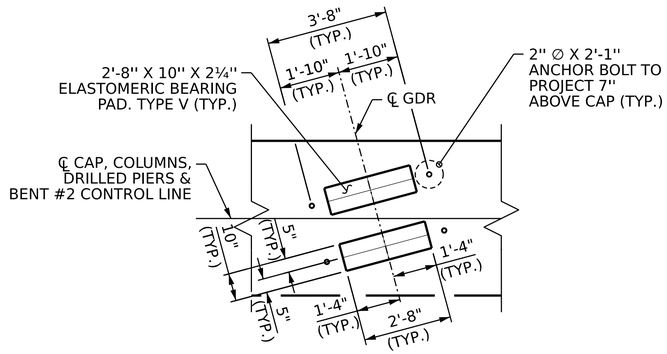
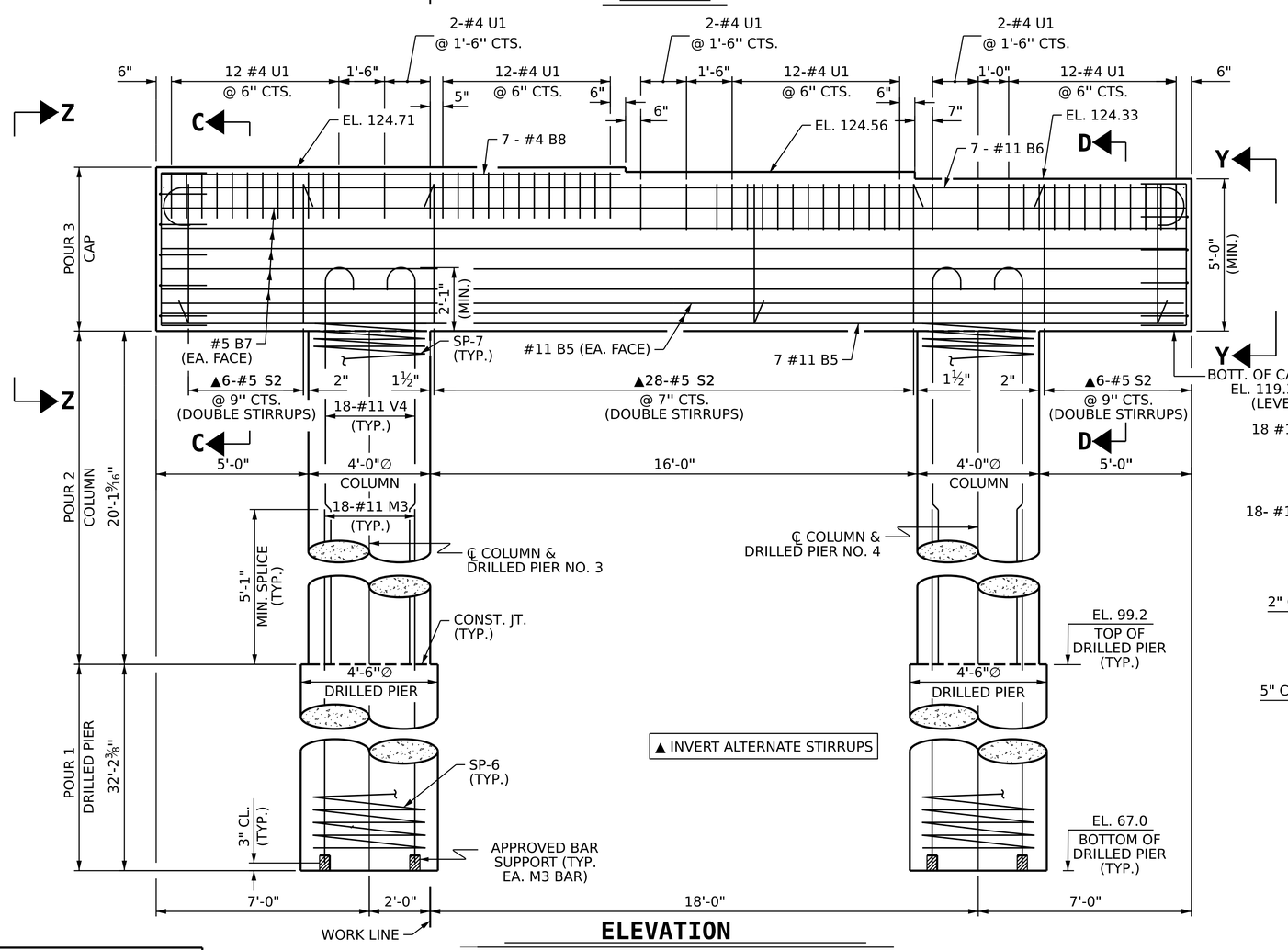




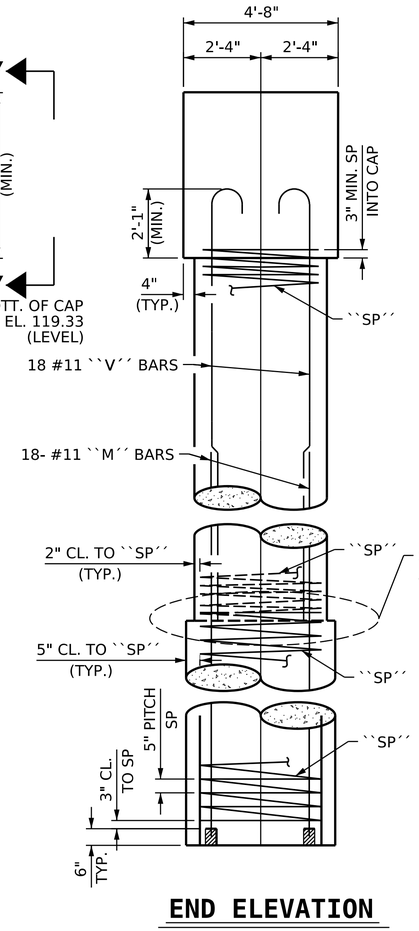
DETAIL ``A´´
(TYP.EA.GDR.)

PLAN

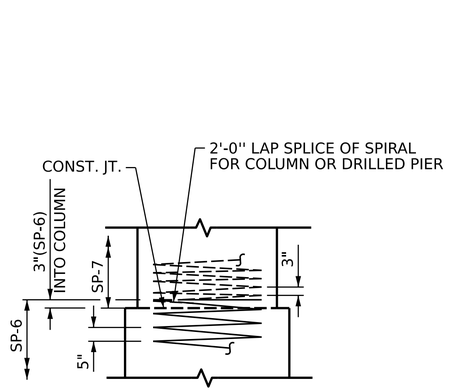


ELEVATION

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



END ELEVATION



CONSTRUCTION JOINT DETAIL

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
Aster Abraha
DDA094AED5104FD...
11/21/2024

PROJECT NO. BR-0086
JOHNSTON COUNTY
STATION: 19+26.00 -L-
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-48
1			3			TOTAL SHEETS
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DRAWN BY : A.K. IBARHIM DATE : 1/2024
CHECKED BY : H.B. AYTODA / M.M.AHMED DATE : 7/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 11/2024

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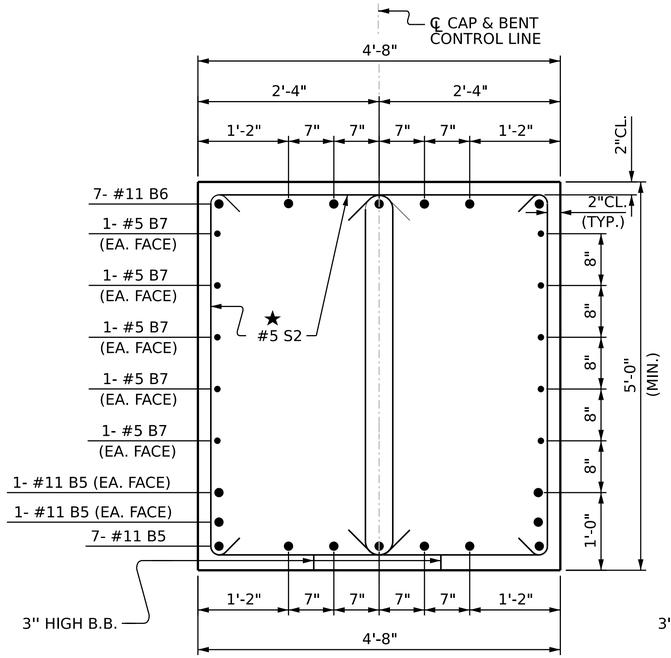
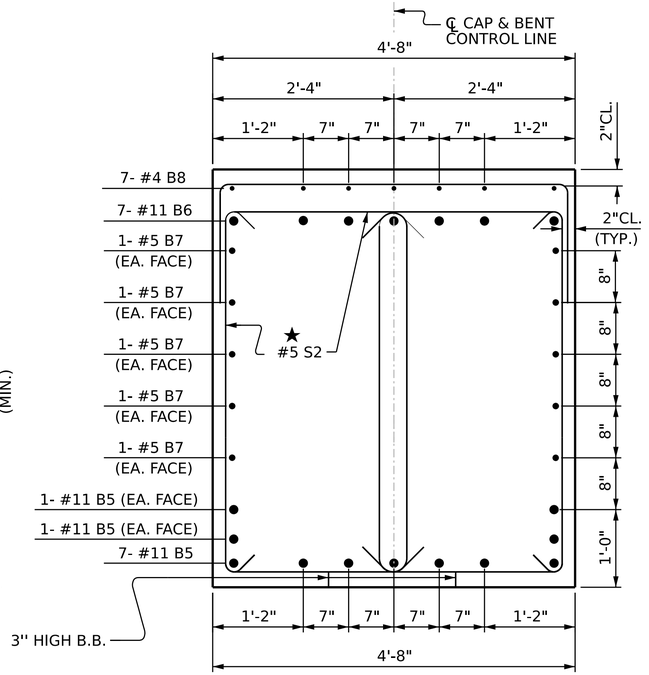


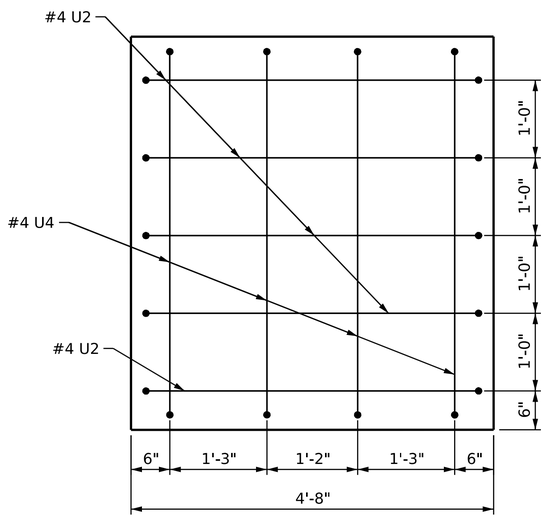
SECTION D-D

★INVERT ALTERNATE STIRRUPS

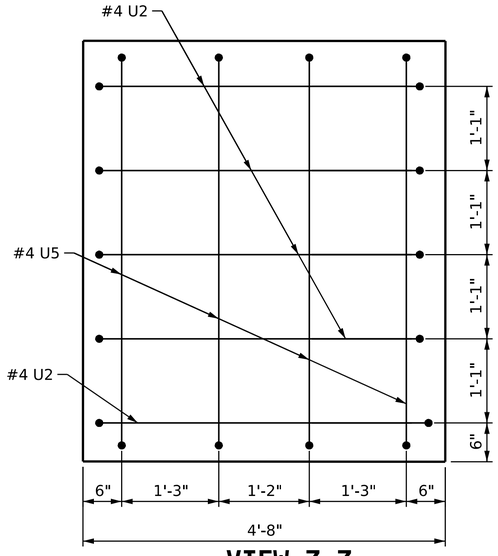


SECTION C-C

★INVERT ALTERNATE STIRRUPS

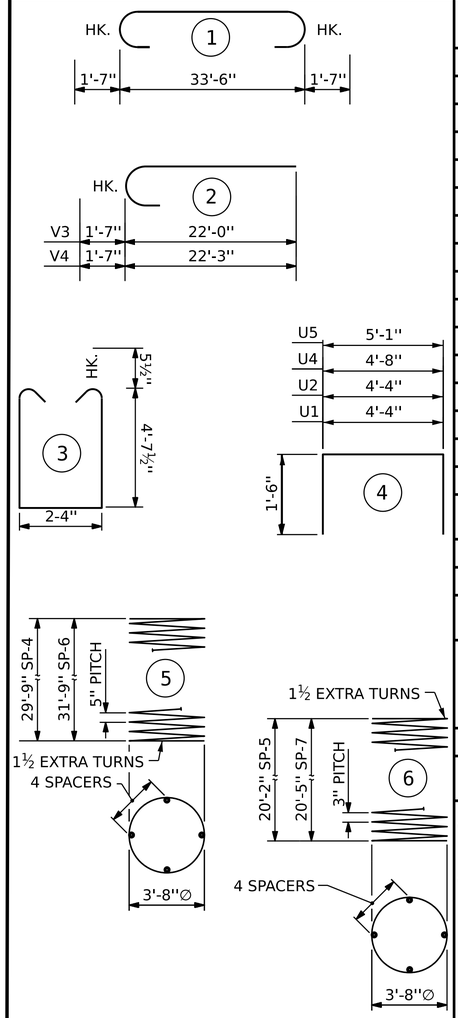


VIEW Y-Y



VIEW Z-Z

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

TOTAL BILL OF MATERIAL

BENT 1 (STAGE II)						BENT 2 (STAGE II)					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B5	11	#11	STR	33'-8"	1968	B5	11	#11	STR	33'-8"	1968
B6	7	#11	1	36'-8"	1364	B6	7	#11	1	36'-8"	1364
B7	10	#5	STR	33'-8"	351	B7	10	#5	STR	33'-8"	351
B8	7	#4	STR	15'-1"	71	B8	7	#4	STR	15'-1"	71
M2	36	#11	STR	38'-1"	7284	M3	36	#11	STR	40'-1"	7667
S2	80	#5	3	12'-6"	1043	S2	80	#5	3	12'-6"	1043
U1	54	#4	4	7'-4"	265	U1	54	#4	4	7'-4"	265
U2	10	#4	4	7'-4"	49	U2	10	#4	4	7'-4"	49
U4	4	#4	4	7'-8"	20	U4	4	#4	4	7'-8"	20
U5	4	#4	4	8'-1"	22	U5	4	#4	4	8'-1"	22
V3	36	#11	2	23'-7"	4511	V4	36	#11	2	23'-10"	4559
REINFORCING STEEL FOR BENT NO. 1					16,946 LBS.	REINFORCING STEEL FOR BENT NO. 2					17,377 LBS.
SP-4	2	***	5	851'-0"	1776	SP-6	2	***	5	908'-0"	1896
SP-5	2	**	6	946'-0"	1264	SP-7	2	**	6	957'-0"	1280
SPIRAL COLUMN REINFORCING STEEL					3,040 LBS.	SPIRAL COLUMN REINFORCING STEEL					3,176 LBS.
POUR #2 (COLUMNS)					18.6 CU.YDS.	POUR #2 (COLUMNS)					18.7 CU.YDS.
POUR #3 (CAP)					33.1 CU.YDS.	POUR #3 (CAP)					33.1 CU.YDS.
CLASS A CONCRETE BREAKDOWN					51.7 CU.YDS.	CLASS A CONCRETE BREAKDOWN					51.8 CU.YDS.
4'-6" ⌀ DRILLED PIERS						**4'-6" ⌀ DRILLED PIERS**					
DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS):					35.6 CU.YDS.	DRILLED PIER CONCRETE POUR #1 (DRILLED PIERS):					37.9 CU.YDS.

*** THE SP-4 & SP-6 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

** THE SP-5 & SP-7 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

11/21/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 & BENT 2 (STAGE II)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-49
1			3			TOTAL SHEETS
2			4			57

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DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 10/2024

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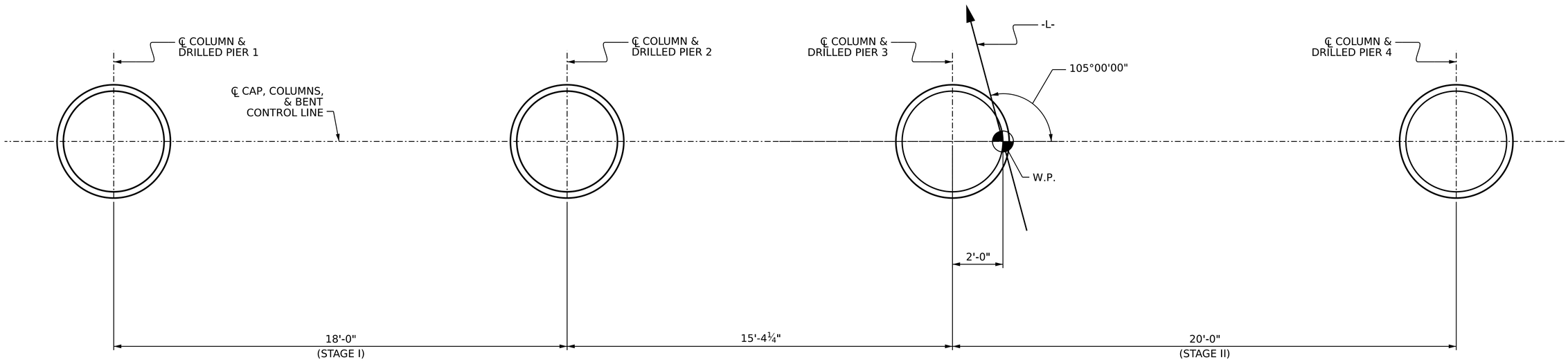
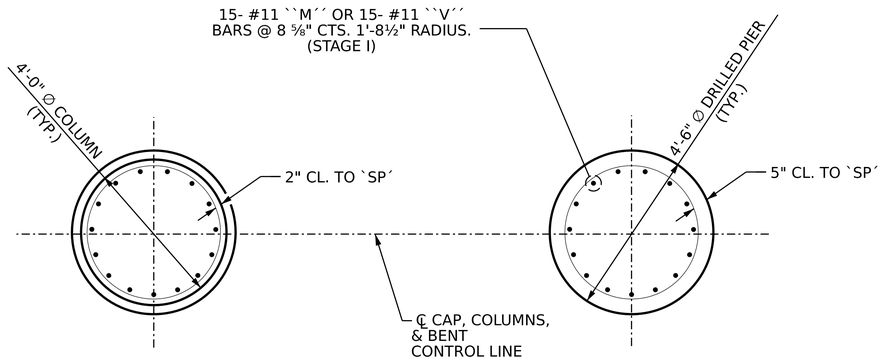
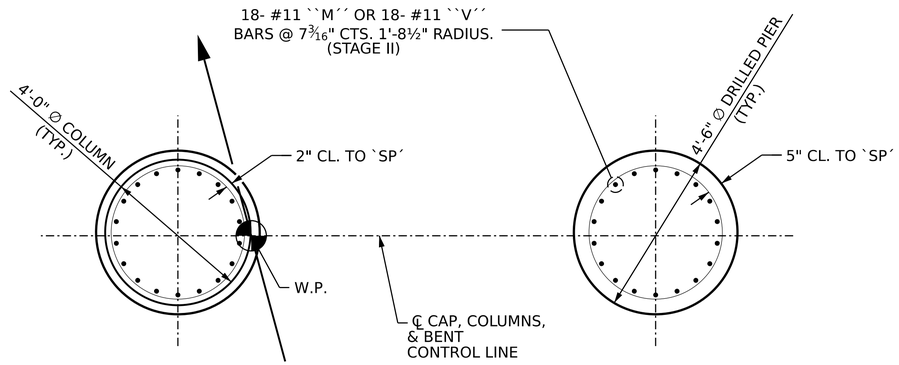


COLUMNS AND DRILLED PIERS LAYOUT (STAGE I AND STAGE II)



DETAILS OF COLUMNS AND DRILLED PIERS (STAGE I)

(DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN, AND DRILLED PIER.)



DETAILS OF COLUMNS AND DRILLED PIERS (STAGE II)

(DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN, AND DRILLED PIER.)

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

Aster Abraha DDA094AED5104FD...

11/21/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 & BENT 2

STAGE I & II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-50
1			3			TOTAL SHEETS
2			4			58

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : A.K. IBRAHIM DATE : 1/2024
CHECKED BY : H.B. AYTODA / M. AHMED DATE : 7/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE : 11/2024

11/12/2024
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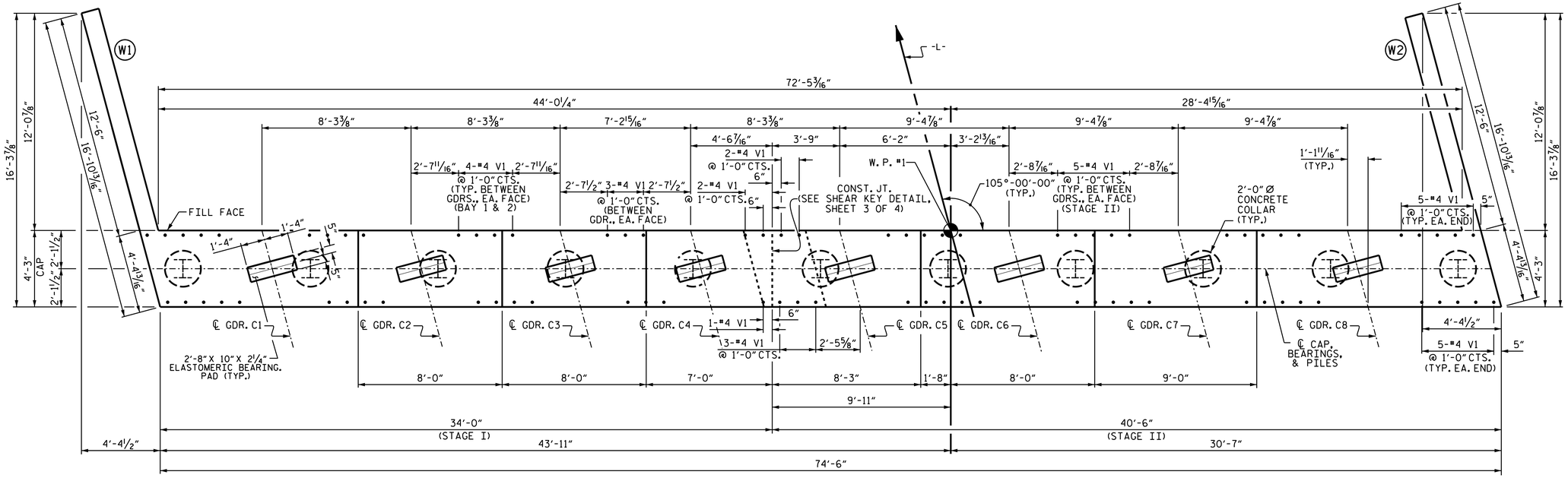
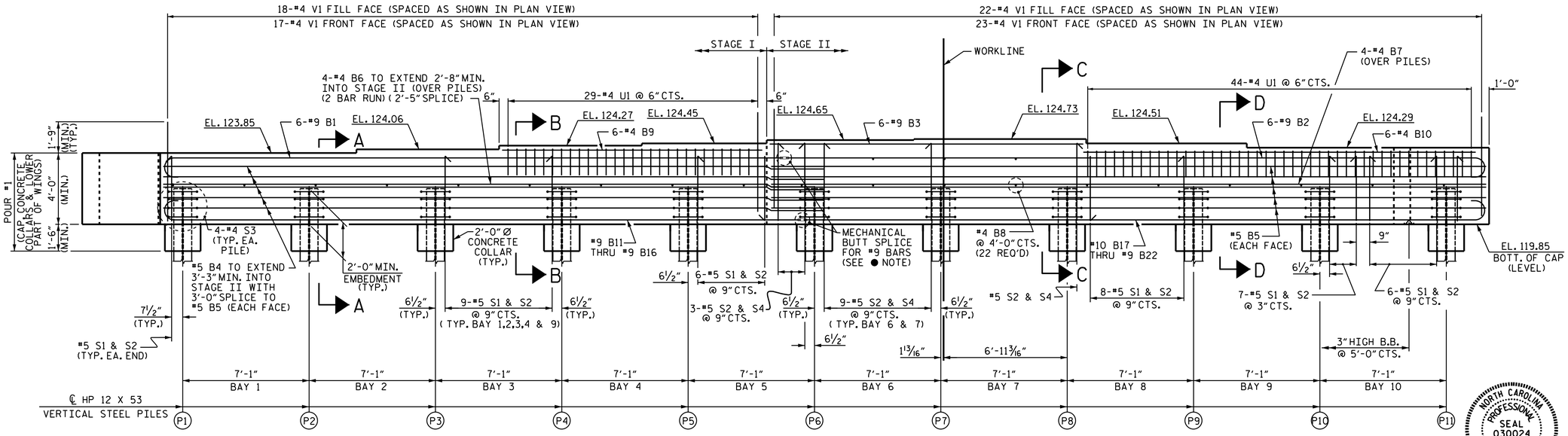
mmahmed



PLAN



ELEVATION

NOTES:

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

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

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

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

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENTS 1 & 2. SEE SECTION 450 OF THE STANDARD SPECIFICATION.

PILE NO. 6 TO BE DRIVEN IN STAGE I IF APPROVED BY THE ENGINEER.

THE CONTRACTOR'S ATTENTION IS CALLED FOR THE FACT THAT THE LENGTHS OF THE #10 "B" BARS AT THE STAGED CONSTRUCTION JOINT MAY NEED TO BE ADJUSTED DUE TO THE MECHANICAL BUTT SPLICE CHOSEN BY THE CONTRACTOR. NO ADDITIONAL PAYMENT WILL BE MADE FOR ANY ADJUSTMENTS.

● MECHANICAL COUPLERS SHALL BE USED TO JOIN THE #9 "B" BARS IN STAGE I WITH THE #9 "B" BARS IN STAGE II. SEE SHEET 3 OF 3 FOR DETAILS.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
11/21/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-51
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : MOHAMMED AHMED DATE : 08.2023
CHECKED BY : STEVE WANCE/S. LOTFI DATE : 05.2024
DESIGN ENGINEER OF RECORD: MOHAMMED AHMED DATE : 09.2024

10/10/2024
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mmahmed

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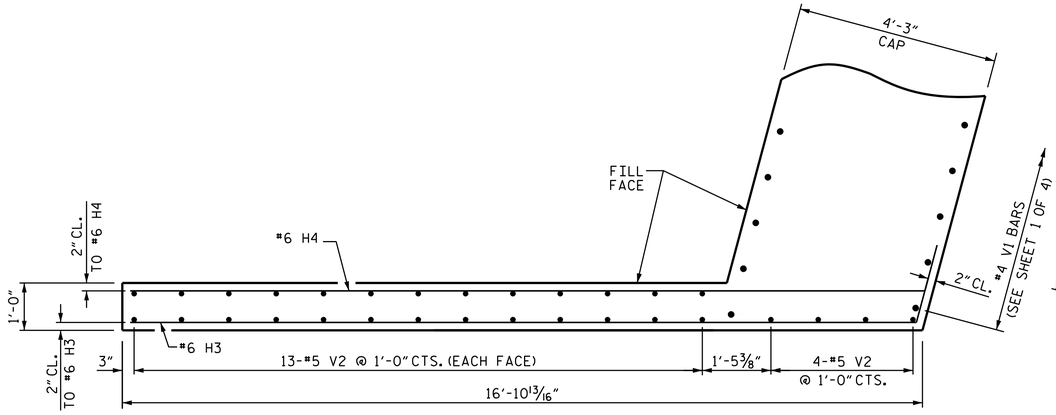
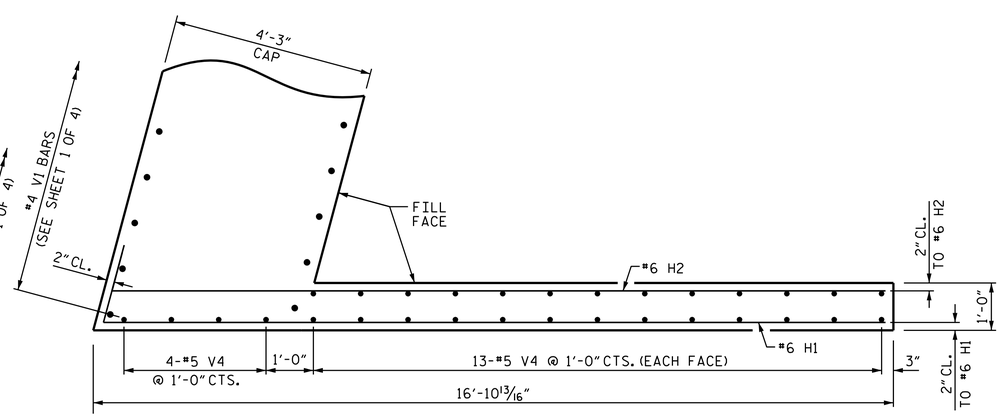
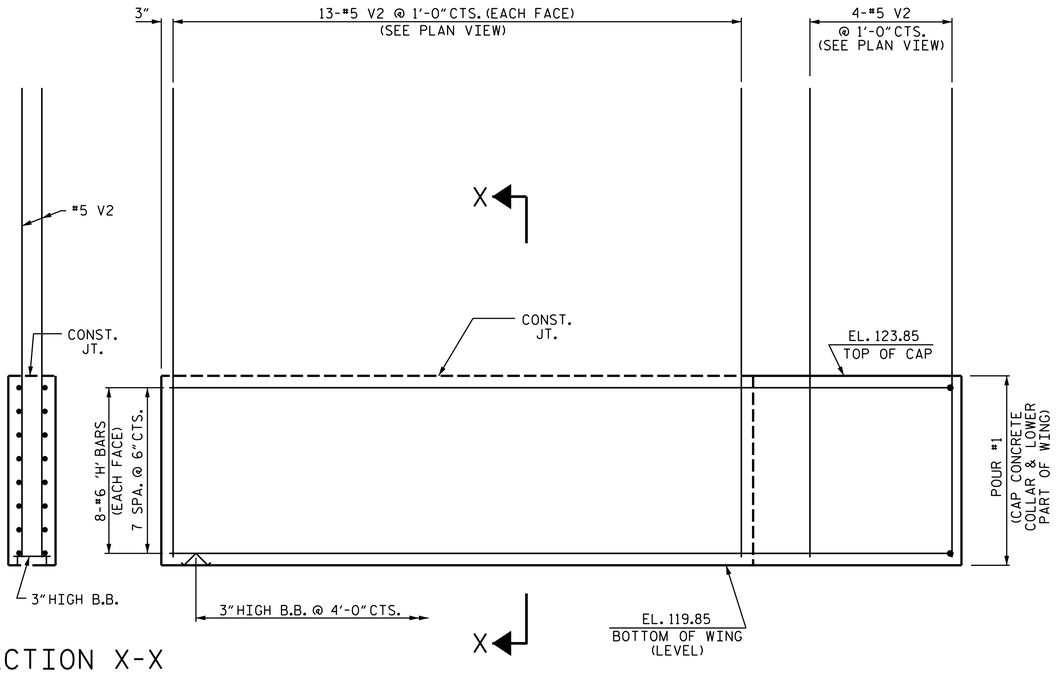


PLAN OF LEFT WING W1 - STAGE I

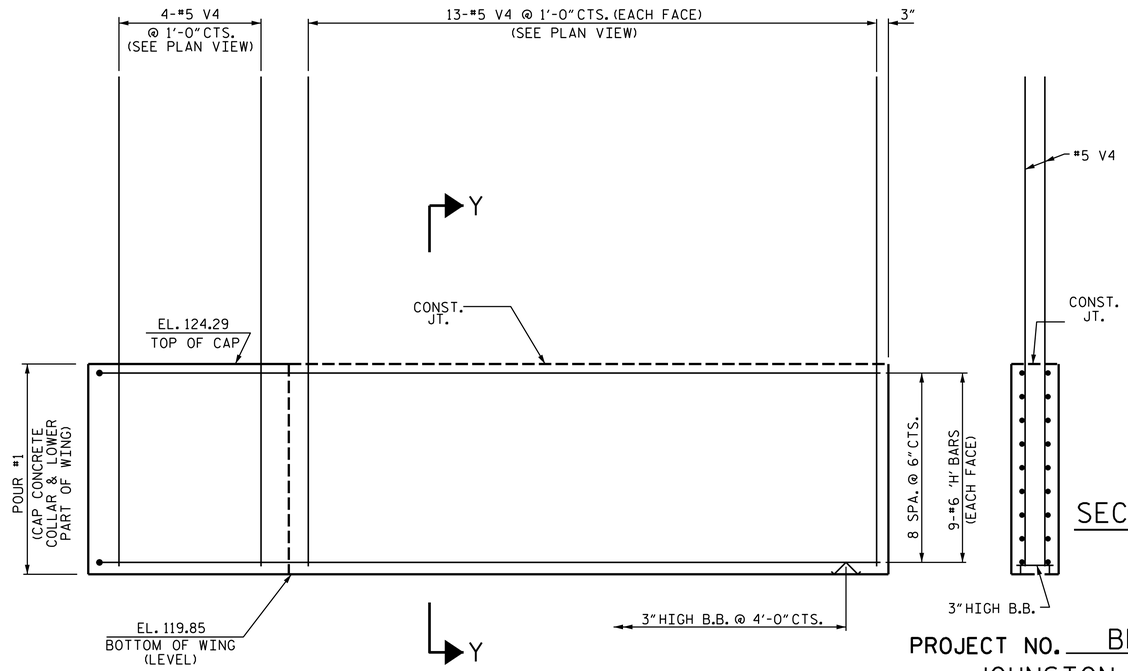


PLAN OF RIGHT WING W2 - STAGE II



SECTION X-X

ELEVATION OF LEFT WING W1 - STAGE I



SECTION Y-Y

ELEVATION OF RIGHT WING W2 - STAGE II

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

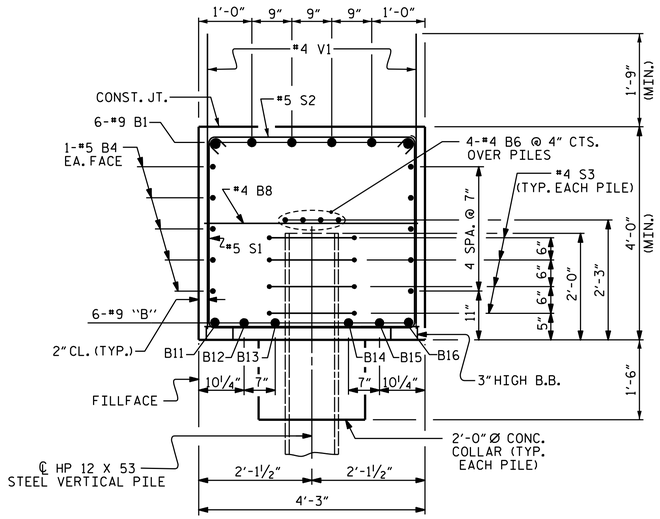
NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G ABRAHA
ASTER Abraha
DDA094AED5104FD...
11/21/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

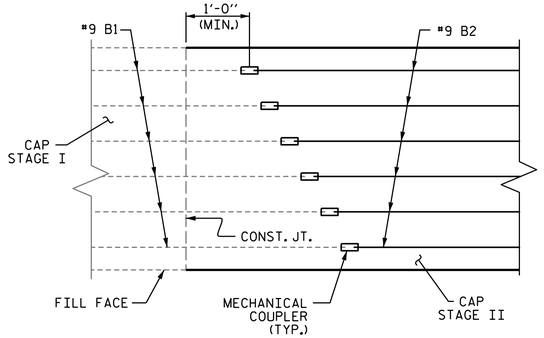
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-52
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : MOHAMMED AHMED DATE : 08/23
CHECKED BY : STEVE WANCE/S.LOTFI DATE : 05/24
DESIGN ENGINEER OF RECORD: MOHAMMED AHMED DATE : 09/24

10/10/2024
I:\Structures\Plans\401_103_BR-0086_SMU_Eb2_S-52_500070.dgn
mmahmed

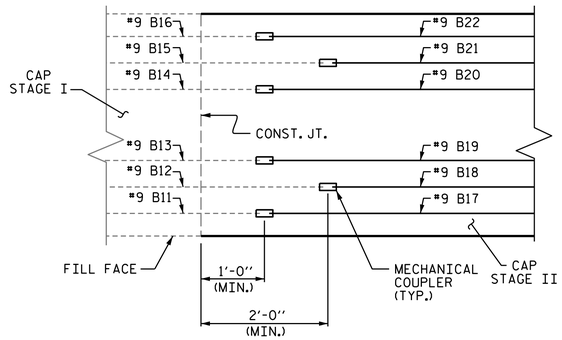


SECTION A-A



MECHANICAL COUPLER DETAIL

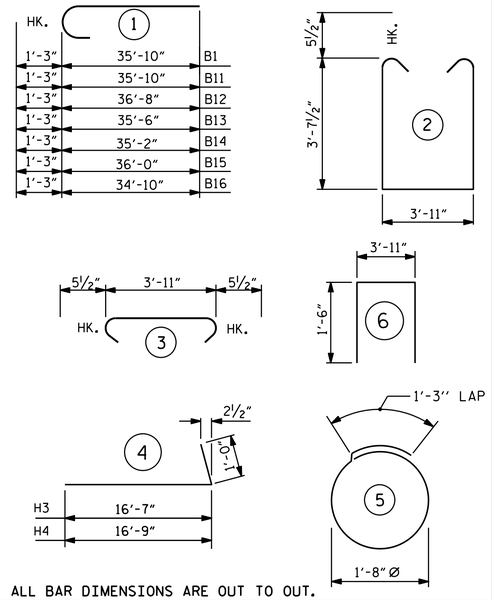
PLAN VIEW OF TOP MAIN STEEL



MECHANICAL COUPLER STAGGER DETAIL

PLAN VIEW OF BOTTOM MAIN STEEL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

STAGE I

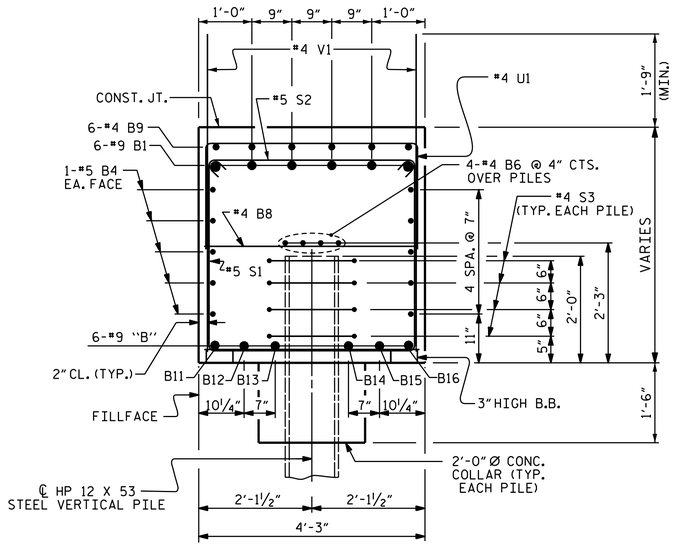
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	1	37'-1"	756
B4	10	#5	STR	38'-2"	398
B6	4	#4	STR	37'-3"	100
B8	9	#4	STR	3'-11"	24
B9	6	#4	STR	14'-7"	58
B11	1	#9	1	37'-1"	126
B12	1	#9	1	37'-11"	129
B13	1	#9	1	36'-9"	125
B14	1	#9	1	36'-5"	124
B15	1	#9	1	37'-3"	127
B16	1	#9	1	36'-1"	123
H3	8	#6	4	17'-7"	211
H4	8	#6	4	17'-9"	213
S1	43	#5	2	12'-1"	542
S2	43	#5	3	4'-10"	217
S3	20	#4	5	6'-6"	87
U1	29	#4	6	6'-11"	134
V1	35	#4	STR	5'-7"	131
V2	30	#5	STR	9'-11"	310

REINFORCING STEEL 3935 LBS.

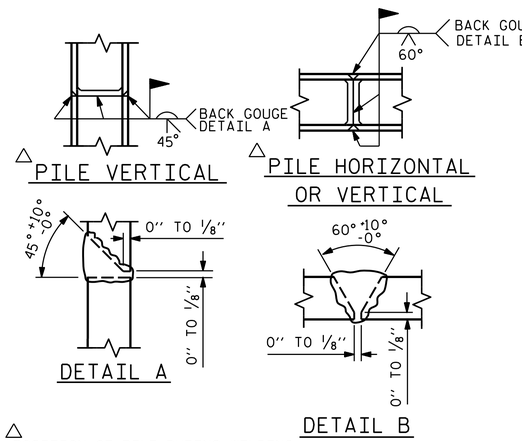
CLASS A CONCRETE

POUR #1 CAP, LOWER PART OF WINGS & CONCRETE COLLARS 25.5 CU. YDS.

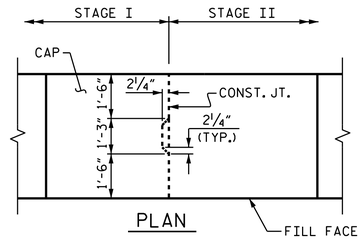
TOTAL CLASS A CONCRETE 25.5 CU. YDS.

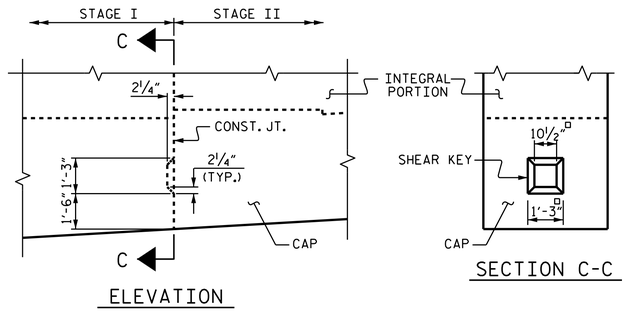


SECTION B-B



PILE SPLICE DETAILS





SHEAR KEY DETAIL

REINFORCING STEEL NOT SHOWN

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-53
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : MOHAMMED AHMED DATE : 08/23
CHECKED BY : STEVE WANCE/S.LOTFI DATE : 05/24
DESIGN ENGINEER OF RECORD: MOHAMMED AHMED DATE : 09/24

10/15/2024
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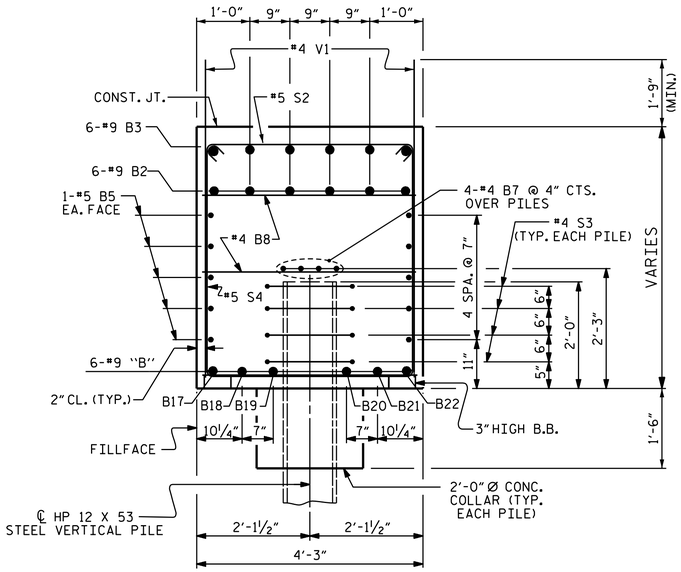
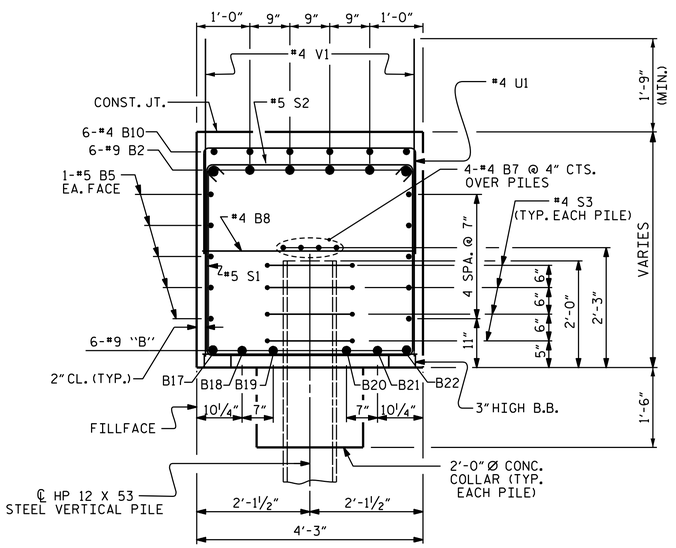
aabraha

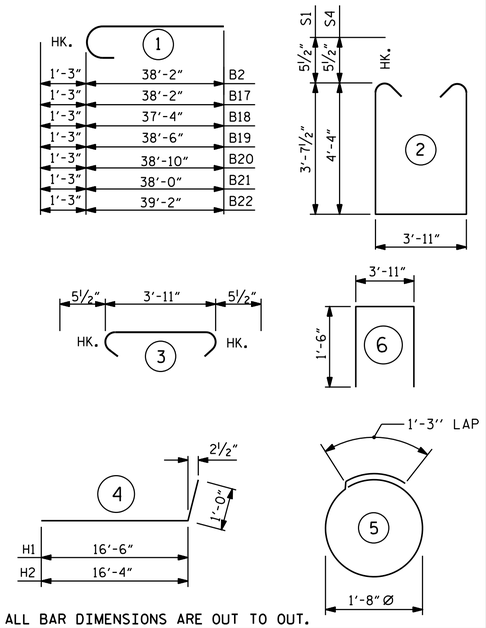


SECTION C-C



SECTION D-D

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

STAGE II

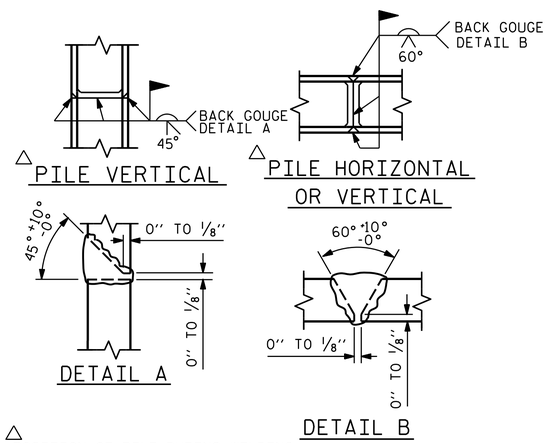
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B2	6	#9	1	39'-5"	804
B3	6	#9	STR	17'-8"	360
B5	10	#5	STR	39'-0"	407
B7	4	#4	STR	39'-4"	105
B8	10	#4	STR	3'-11"	34
B10	6	#4	STR	22'-0"	88
B17	1	#9	1	39'-5"	134
B18	1	#9	1	38'-7"	131
B19	1	#9	1	39'-9"	135
B20	1	#9	1	40'-1"	136
B21	1	#9	1	39'-3"	133
B22	1	#9	1	40'-5"	137
H1	9	#6	4	17'-6"	237
H2	9	#6	4	17'-4"	234
S1	31	#5	2	12'-1"	391
S2	53	#5	3	4'-10"	267
S3	24	#4	5	6'-6"	104
S4	22	#5	2	13'-6"	310
U1	44	#4	6	6'-11"	203
V1	45	#4	STR	5'-7"	168
V4	30	#5	STR	10'-4"	323

REINFORCING STEEL 4841 LBS.

CLASS A CONCRETE

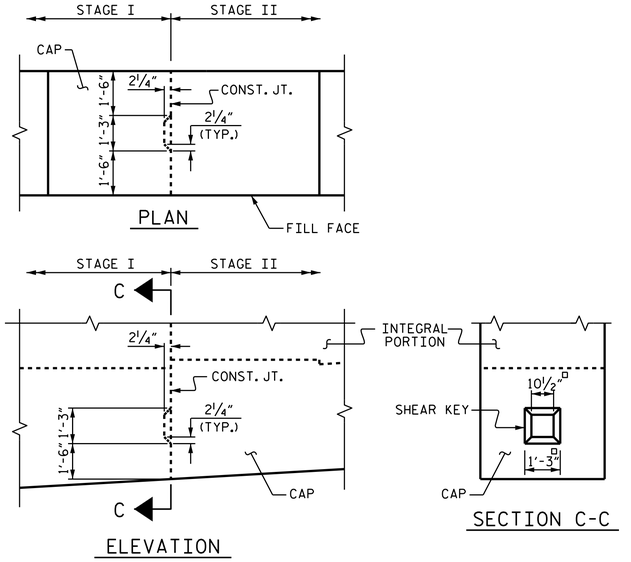
POUR #1 CAP, LOWER PART OF WINGS & CONCRETE COLLARS 32.2 CU. YDS.

TOTAL CLASS A CONCRETE 32.2 CU. YDS.



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



SHEAR KEY DETAIL

REINFORCING STEEL NOT SHOWN

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-54
1			3			TOTAL SHEETS
2			4			57

DRAWN BY : M.M AHMED DATE : 08/23
CHECKED BY : STEVE WANCE/S. LOTFI DATE : 05/24
DESIGN ENGINEER OF RECORD: M.M AHMED DATE : 09/24

10/10/2024
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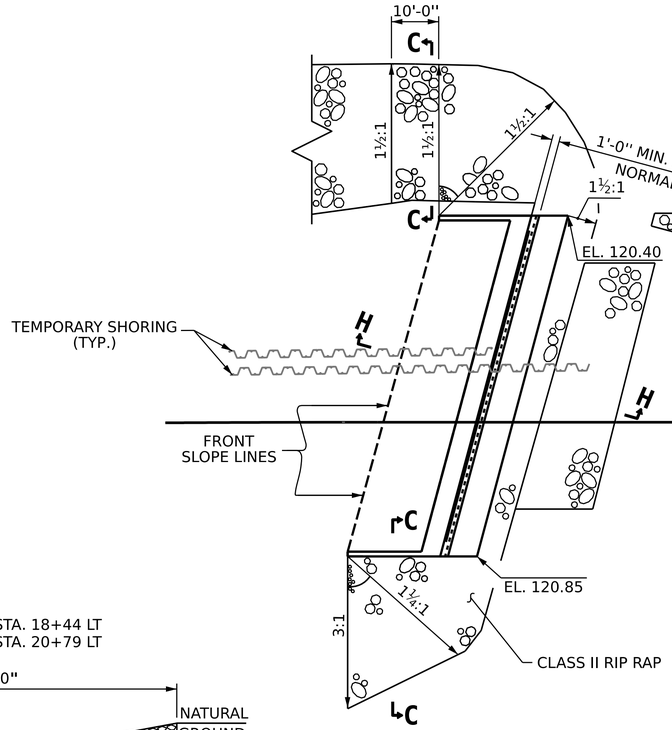
mmahmed

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

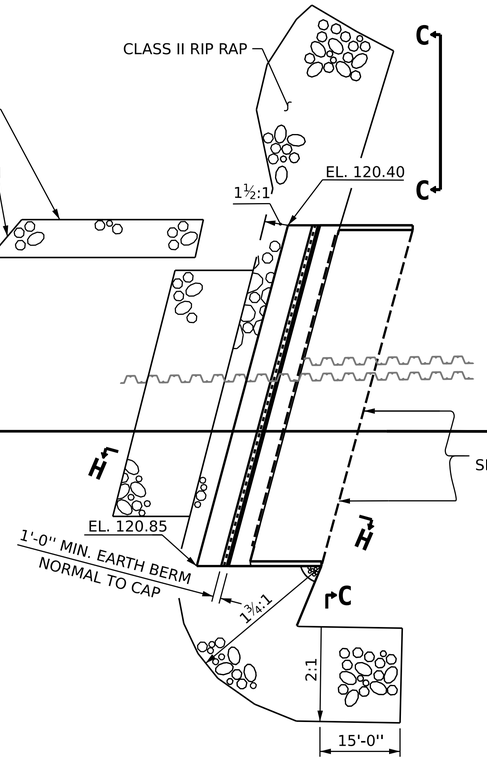
DOA094AED5104FD...
11/21/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

8/26/21



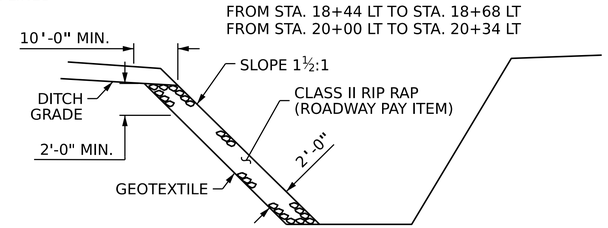
END BENT 1
INTEGRAL



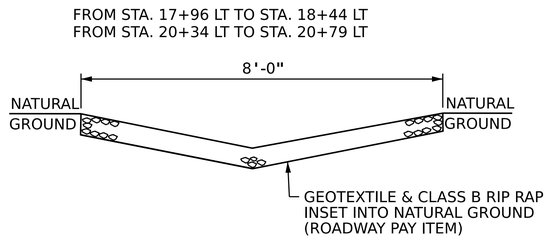
END BENT 2
INTEGRAL

NOTES
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

	BRIDGE @ STA. 19+26.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
		ESTIMATED QUANTITIES	
		TONS	SQUARE YARDS
STAGE I	END BENT 1	210	300
	END BENT 2	150	200
STAGE II	END BENT 1	175	200
	END BENT 2	267	297
TOTAL	END BENT 1	385	500
	END BENT 2	417	497

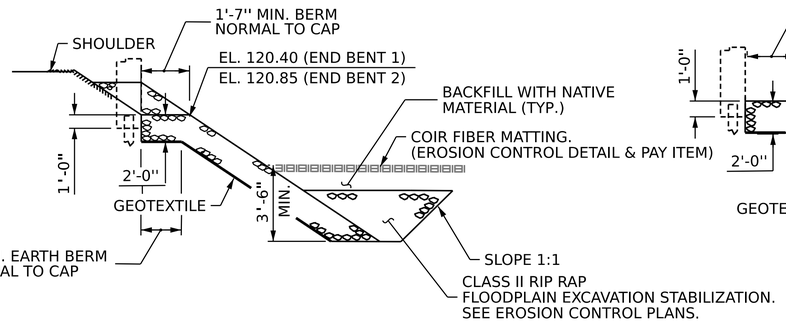


DETAIL C
RIP RAP AT EMBANKMENT

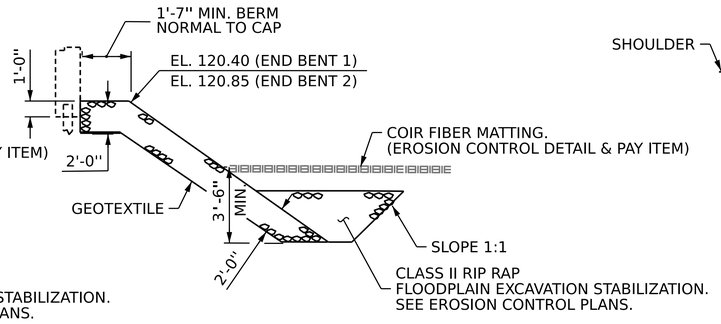


DETAIL B
DECK DRAIN DISSIPATOR PAD

SHOULDER RIP RAP IS HIGHER THAN BERM RIP RAP



SECTION H-H



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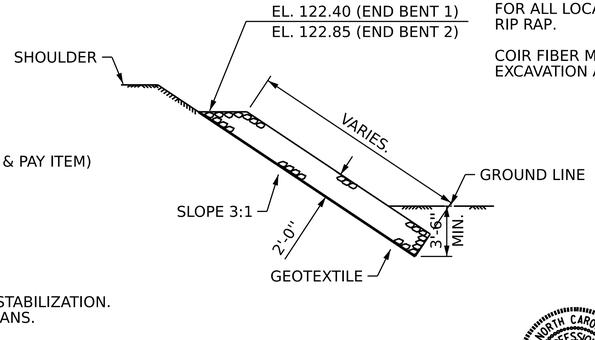

SECTION C-C

DETAIL NOTES

FOR USE WHERE EXISTING ABUTMENTS AND BULKHEADS ARE TO BE COMPLETELY REMOVED.

EXCAVATE TO FLOODPLAIN ELEVATION AS SPECIFIED ON PRELIMINARY GENERAL DRAWINGS.

FLOODPLAIN STABILIZATION TO BEGIN WITH A 5' MINIMUM SETBACK FROM PROPOSED TOB.

FOR ALL LOCATIONS OF CLASS II RIP RAP, FILL VOIDS WITH CLASS B RIP RAP.

COIR FIBER MATTING TO BE INSTALLED OVER LIMITS OF FLOODPLAIN EXCAVATION AND AREAS BACKFILLED WITH NATIVE MATERIAL.

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA
Aster Abraha
11/21/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

DRAWN BY : A.K. IBRAHIM DATE : 02/2024
CHECKED BY : M.M. AHMED DATE : 08/2024
DESIGN ENGINEER OF RECORD: M.M. AHMED DATE :

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-55
1			3			TOTAL SHEETS
2			4			57

10/29/2024
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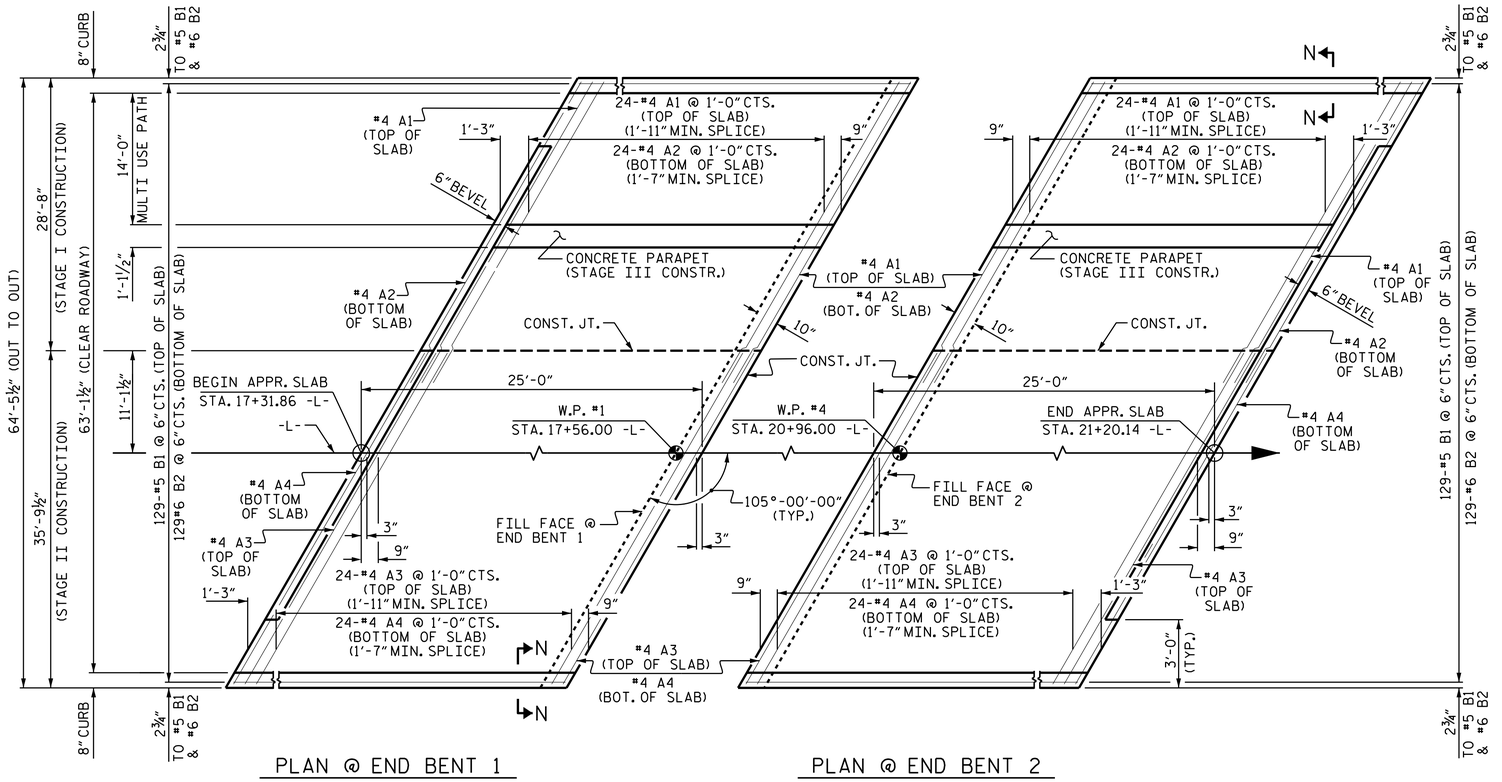
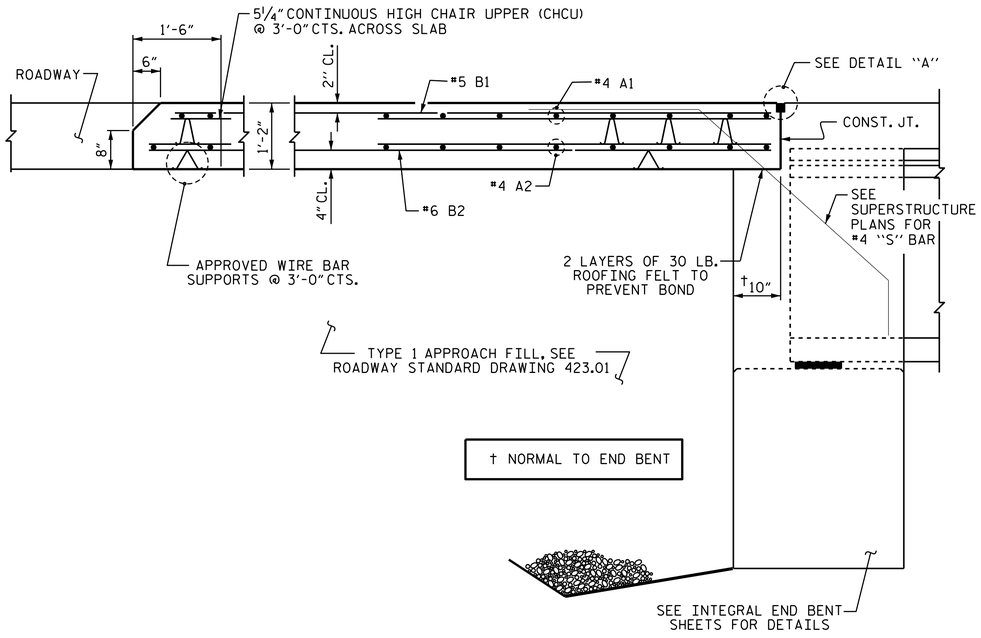
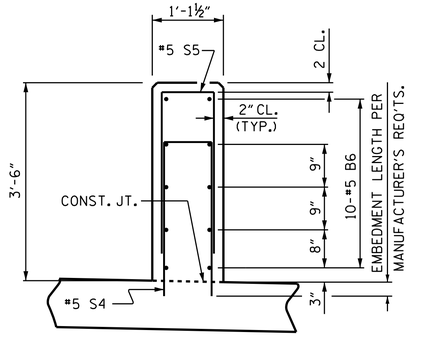


PLAN @ END BENT 1 PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB



SECTION THRU CONCRETE PARAPET

THE #5 S4 BARS SHALL BE ADHESIVELY ANCHORED. THE YIELD LOAD FOR THE #5 S4 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

NOTES

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

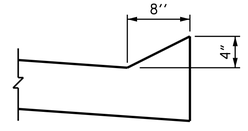
FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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.

LONGITUDINAL REINFORCING STEEL MAY BE SHIFTED SLIGHTLY TO CLEAR STAGING CONSTRUCTION JOINT.

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."



SECTION N-N

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

DDA094AED5104FD...

11/21/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-56
1			3			TOTAL SHEETS
2			4			57

ASSEMBLED BY: SWANcePE/S. LOTFI	DATE : 12/05/2023	
CHECKED BY : A. ABRAHA P.E.	DATE : 10/2024	
DRAWN BY : TLA/S.L 10/05	REV. 6/13	MAA/GM
CHECKED BY : GM 5/06	REV. 12/17	MAA/THC
	REV. 06/19	BNB/THC

11/12/2024
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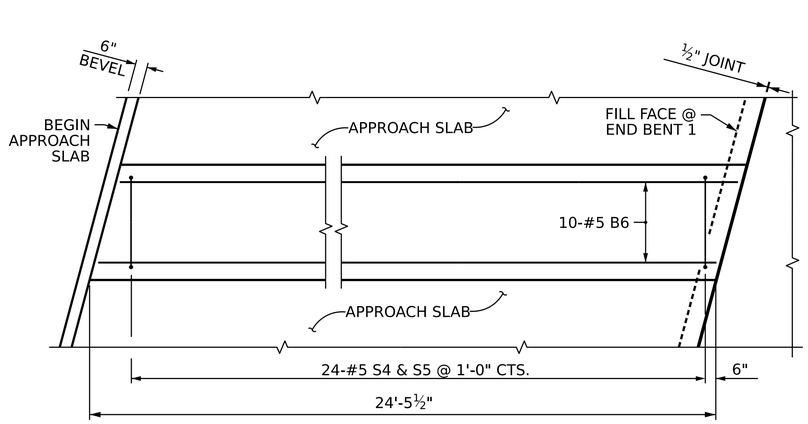
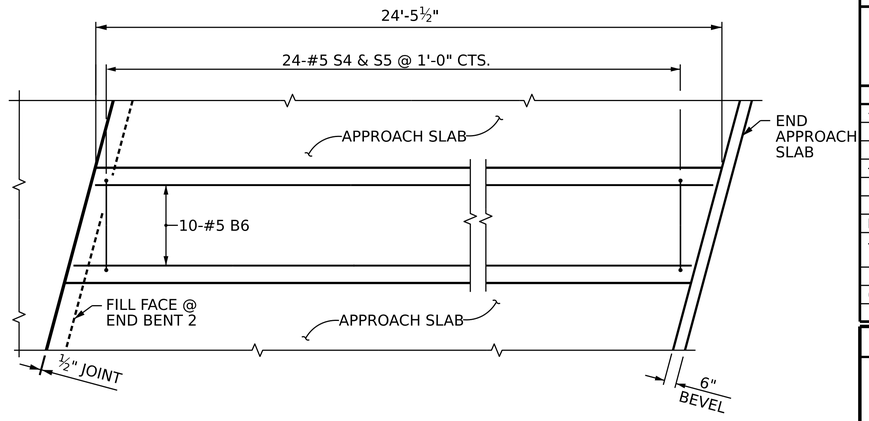


END BENT 1



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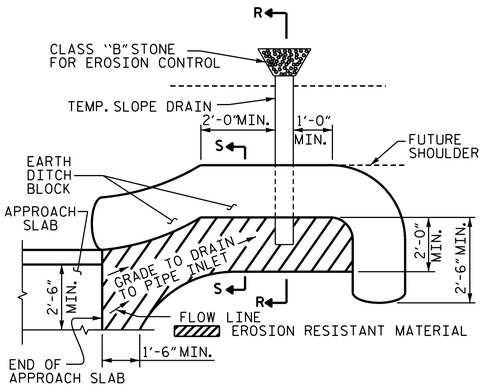
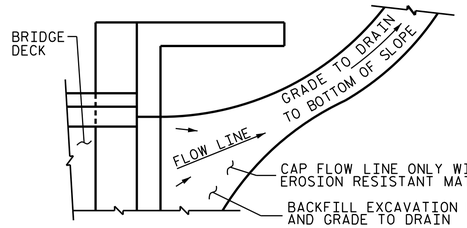
PLAN OF CONCRETE PARAPET



PLAN VIEW

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.

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

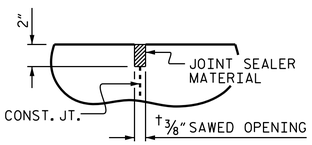


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

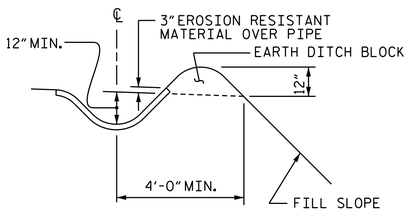
TEMPORARY DRAINAGE DETAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

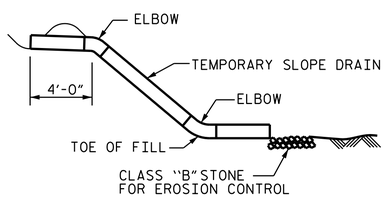
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



DETAIL "A"



SECTION S-S



SECTION R-R

BILL OF MATERIAL

STAGE I FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	31'-8"	550
A2	26	#4	STR	31'-4"	544
✱ B1	57	#5	STR	24'-2"	1437
B2	57	#6	STR	24'-8"	2112

REINFORCING STEEL 2,656 LBS.

✱ EPOXY COATED REINFORCING STEEL 1,987 LBS.

CLASS AA CONCRETE 31.0 C.Y.

STAGE II FOR ONE APPROACH SLAB (2 REQ'D)

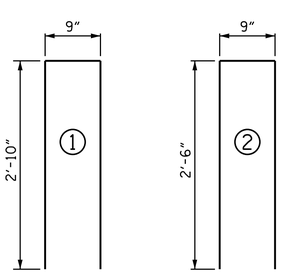
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A3	26	#4	STR	36'-8"	637
A4	26	#4	STR	36'-8"	637
✱ B1	72	#5	STR	24'-2"	1815
B2	72	#6	STR	24'-8"	2668

REINFORCING STEEL 3,305 LBS.

✱ EPOXY COATED REINFORCING STEEL 2,452 LBS.

CLASS AA CONCRETE 38.6 C.Y.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL-STAGE III

FOR ONE CONCRETE PARAPET (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B6	10	#5	STR	24'-1"	251
✱ S4	24	#5	1	6'-5"	161
✱ S5	24	#5	2	5'-9"	144

✱ EPOXY COATED REINF. STEEL 556 LBS.

CLASS AA CONCRETE 3.6 C.Y.

1'-1½" X 3'-6" CONCRETE PARAPET 24.5 L.F.

NOTES

THE COST OF THE CONCRETE PARAPET ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT BID PRICE FOR "1'-1½" x 3'-6" CONCRETE PARAPET".

ALL REINFORCING STEEL IN CONCRETE SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE CONCRETE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN ENDS OF CONCRETE PARAPET SEGMENTS ON THE APPROACH SLABS.

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

PROJECT NO. BR-0086

JOHNSTON COUNTY

STATION: 19+26.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 030024 ENGINEER ASTER G. ABRAHA

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11/21/2024

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-57
1			3			TOTAL SHEETS
2			4			57

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY: S. LOTFI/A. ABRAHA DATE : 09/2024
CHECKED BY : A. ABRAHA P.E. DATE : 10/2024

CHECKED BY : GM 5/06

REV. 6/13	MAA/GM
REV. 12/17	MAA/THC
REV. 06/19	BNB/THC

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STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE AASHTO
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 AASHTO
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" ∅ SHEAR STUDS FOR THE ¾" ∅ STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" ∅ STUDS FOR 4 - ¾" ∅ STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" ∅ STUDS ALONG THE BEAM AS SHOWN FOR ¾" ∅ STUDS BASED ON THE RATIO OF 3 - ⅞"∅ STUDS FOR 4 - ¾" ∅ 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" 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.