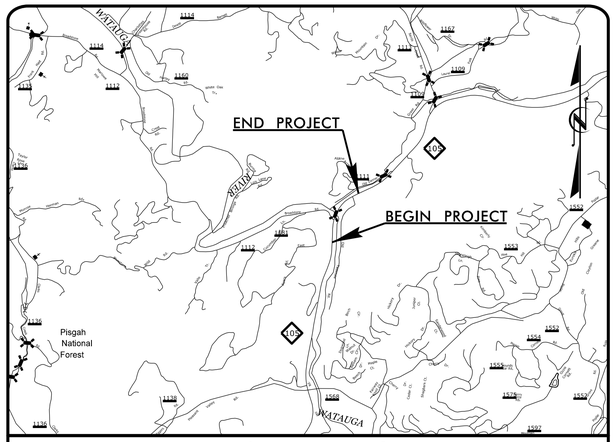

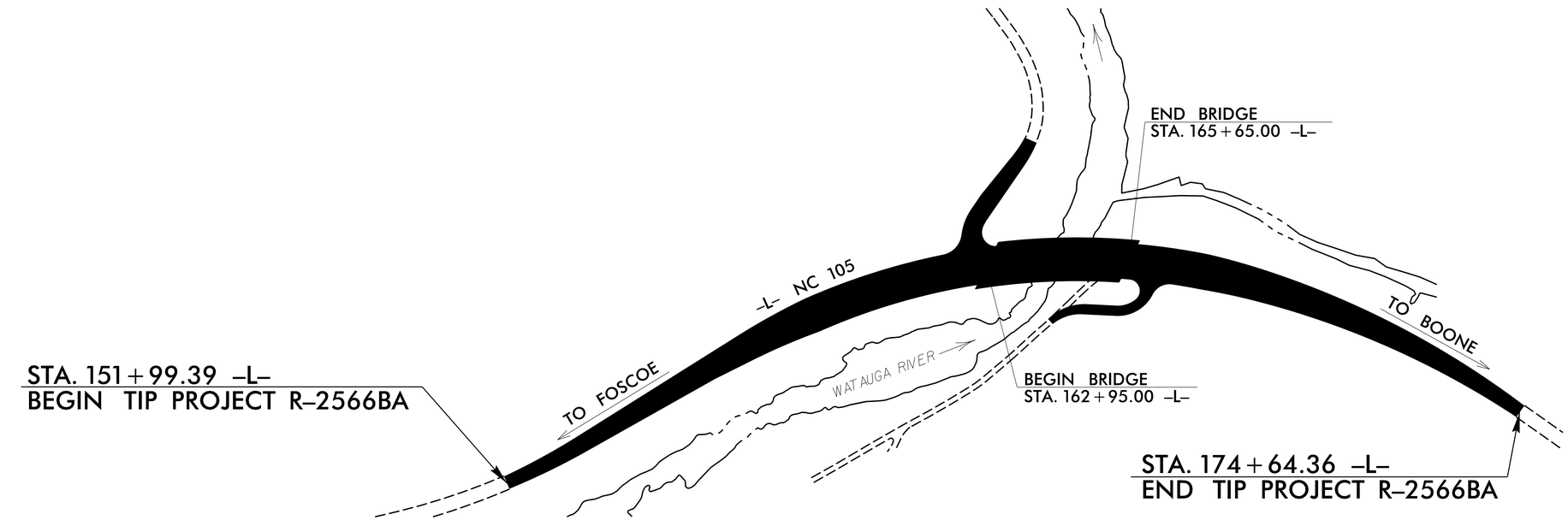

TIP PROJECT: R-2566BA

CONTRACT: C204355

STRUCTURE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WATAUGA COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2566BA		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
37512.1.4	NHP-0105(005)	PE
37512.2.3		UTL., ROW
37512.3.3		CONSTR.

VICINITY MAP

LOCATION: NC 105 – BRIDGE NO. 5 OVER WATAUGA RIVER AND LEFT–TURN LANE AT SR 1112 (BROADSTONE RD.) WITHIN THE LIMITS OF R–2566B

TYPE OF WORK: DRAINAGE, GRADING, PAVING, SIGNAL & STRUCTURE

NAD 83/
NSRS 2007

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2019 = 15,000
ADT 2040 = 21,400
K = 7 %
D = 65 %
T = 6 % *
V = 60 MPH
* TTST = 2% DUAL = 4%
FUNC CLASS = ARTERIAL

STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R–2566BA	=	*0.378 mile*
LENGTH STRUCTURES TIP PROJECT R–2566BA	=	*0.051 mile*
TOTAL LENGTH TIP PROJECT R–2566BA	=	*0.429 mile*

PLANS PREPARED BY:

TGS ENGINEERS
TGS ENGINEERS
706 HILLSBOROUGH ST
SUITE 200
RALEIGH, NC 27603

LETTING DATE:
NOVEMBER 16, 2021

2018 STANDARD SPECIFICATIONS

PLANS PREPARED FOR:

NCDOT DIVISION 11

MARC CHEEK, PE
STRUCTURES DESIGN ENGINEER

STRUCTURES DESIGN ENGINEER

SEAL 20125
MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.
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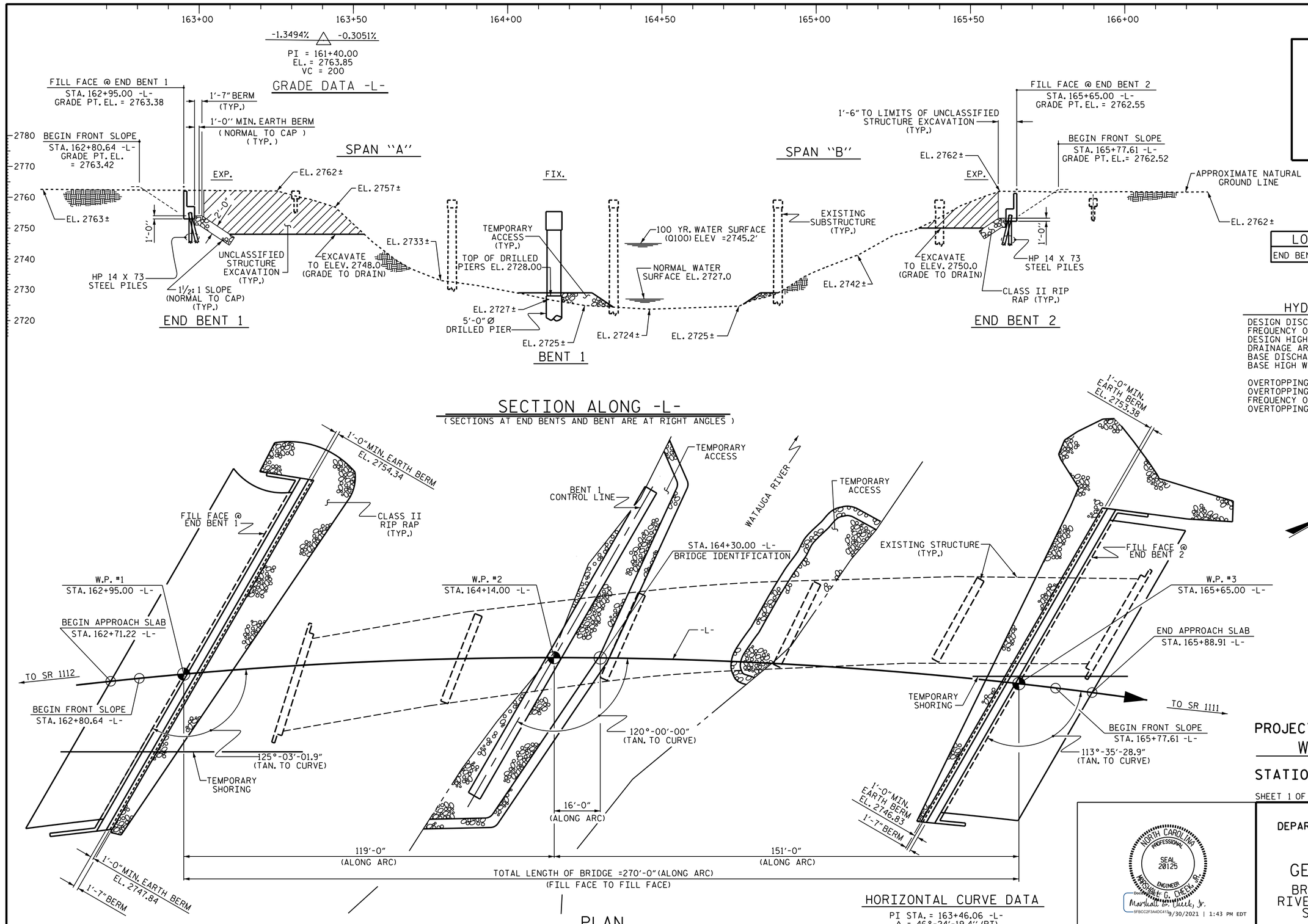
P.E.
SIGNATURE 9/30/2021 | 1:43 PM EDT



I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

LOW CHORD ELEVATIONS	
END BENT 1= 2754.38	END BENT 2= 2753.37

HYDROGRAPHIC DATA

DESIGN DISCHARGE---------- 12244 CFS
FREQUENCY OF DESIGN FLOOD------- 50 YR.
DESIGN HIGH WATER ELEVATION---- 2743.5
DRAINAGE AREA---------- 26.3 SQ.MI.
BASE DISCHARGE (Q100)--------- 15538 CFS
BASE HIGH WATER ELEVATION----- 2745.2

OVERTOPPING FLOOD DATA
OVERTOPPING DISCHARGE---------- 25567+ CFS
FREQUENCY OF OVERTOPPING FLOOD- 500+YRS
OVERTOPPING FLOOD ELEVATION---- 2765.1

SECTION ALONG -L-

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

PLAN

(PILES AND COLUMNS NOT SHOWN IN PLAN VIEW FOR CLARITY)

HORIZONTAL CURVE DATA

PI STA. = 163+46.06 -L-
Δ = 46°-24'-19.4" (RT)
D = 4°-14'-38.9"
L = 1093.40
T = 578.69
R = 1350.00

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 1 OF 4 REPLACES BRIDGE NO. 5

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Marshall G. Cheek, Jr.
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TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE OVER WATAUGA RIVER ON NC 105 BETWEEN SR 1112 AND SR 1111

REVISIONS					SHEET NO.
BY:	DATE:	NO.	BY:	DATE:	S-1
		3			TOTAL SHEETS
		4			79

DRAWN BY :	SBW	DATE :	1-19
CHECKED BY :	MGC	DATE :	4-19
DESIGN ENGINEER OF RECORD:	MGC	DATE :	8-21

9/30/2021
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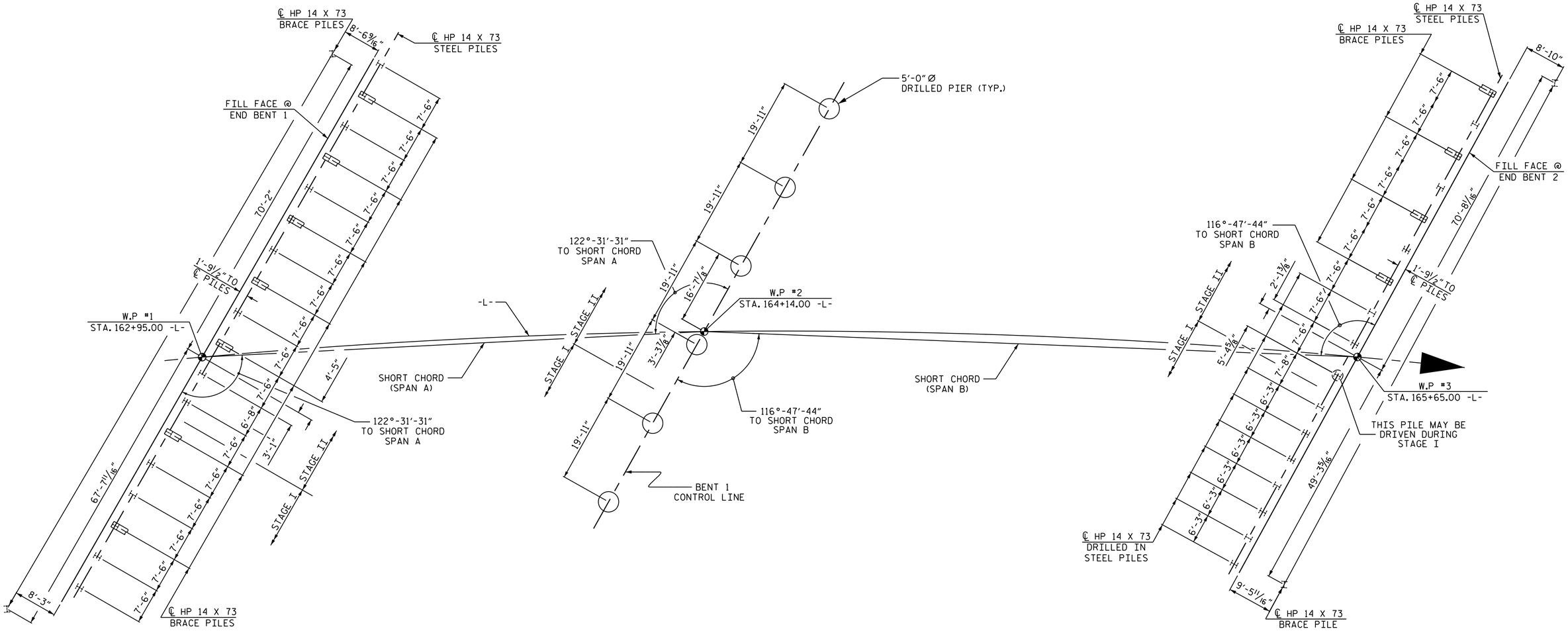
User:sbwilliams



END BENT 1 | BENT 1 | END BENT 2

FOUNDATION LAYOUT

ALL PILES ARE HP 14X73 STEEL PILES.
ALL BRACE PILES ARE BATTERED AT 3:12.
DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE.

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 192 TONS PER PILE.

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

DRILLED PIERS AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 780 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 80 TSF.

INSTALL DRILLED PIERS AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN 2705 FT (COLUMNS *1&2), 2703 FT (COLUMNS *3&4), AND 2700 FT (COLUMNS *5&6), SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 11 FT INTO ROCK AS DEFINED BY ARTICLE 411-1 OF THE STANDARD SPECIFICATIONS.

PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENT NO. 1. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 2720 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS 2718 FT (LT), 2715 (CT), AND 2712 (RT). THE SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR THE DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 135 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 225 TONS PER PILE.

DRILLED-IN PILES ARE REQUIRED FOR THE RIGHTMOST 10 PILES AT END BENT NO. 2. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 2738 FT. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

CONCRETE IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT NO. 2.

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CHEEK, JR.
Marshall C. Cheek, Jr.
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TGS ENGINEERS
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SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER WATAUGA
RIVER ON NC 105 BETWEEN
SR 1112 AND SR 1111

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	STM	DATE :	04/19
CHECKED BY :	MGC	DATE :	06/21
DESIGN ENGINEER OF RECORD:	MGC	DATE :	8/21

8/27/2021
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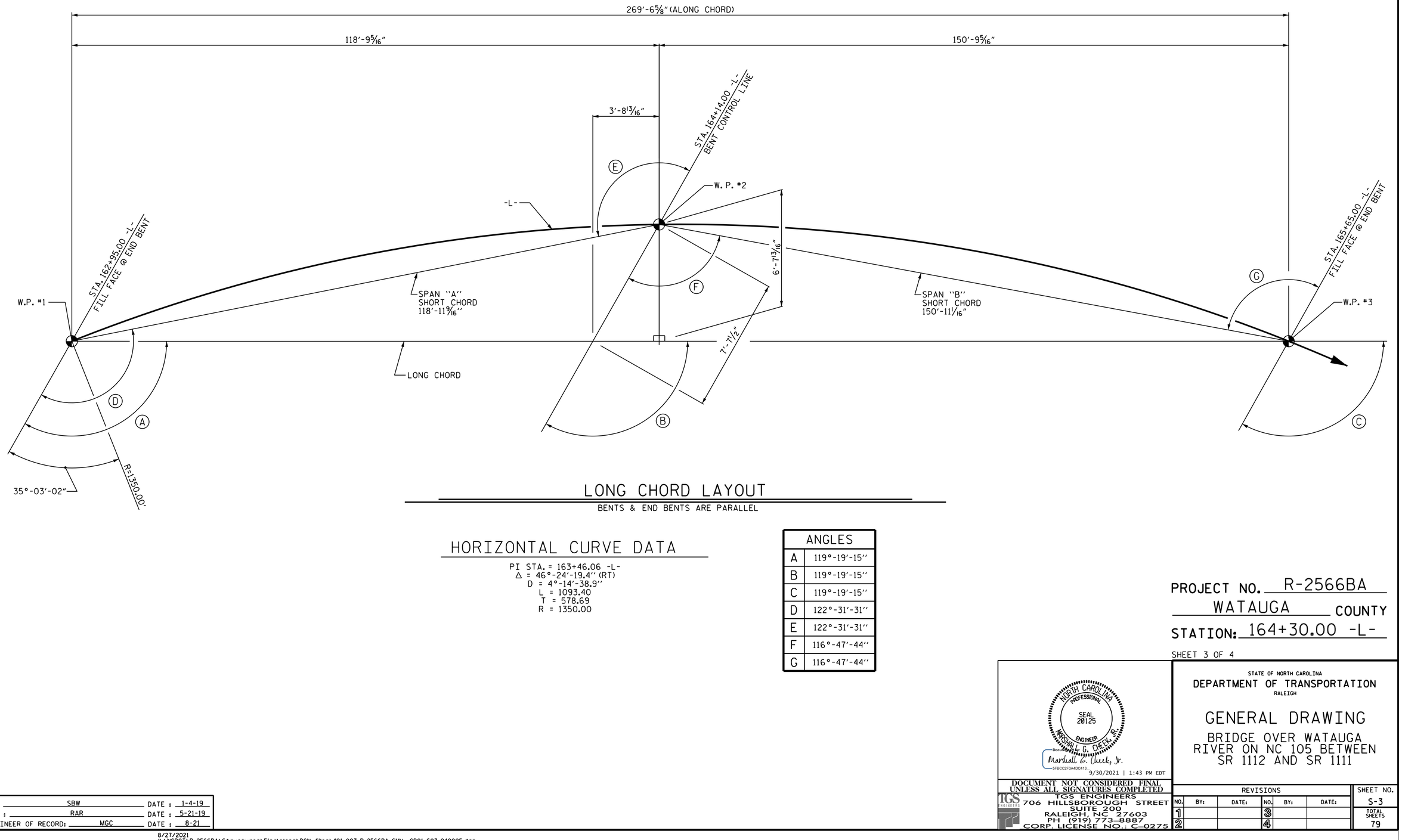
User:sbwilliams



LONG CHORD LAYOUT

BENTS & END BENTS ARE PARALLEL

HORIZONTAL CURVE DATA

PI STA. = 163+46.06 -L-
Δ = 46°-24'-19.4" (RT)
D = 4°-14'-38.9"
L = 1093.40
T = 578.69
R = 1350.00

ANGLES	
A	119°-19'-15"
B	119°-19'-15"
C	119°-19'-15"
D	122°-31'-31"
E	122°-31'-31"
F	116°-47'-44"
G	116°-47'-44"

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.
Marshall G. Creek, Jr.
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CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER WATAUGA RIVER ON NC 105 BETWEEN SR 1112 AND SR 1111

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : SBW DATE : 1-4-19
CHECKED BY : RAR DATE : 5-21-19
DESIGN ENGINEER OF RECORD: MGC DATE : 8-21

8/27/2021
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TOTAL BILL OF MATERIAL

	CONSTRUCTION MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	PILE EXCAV. IN SOIL	PILE EXCAV. NOT IN SOIL	5'-0" Ø DRILLED PIERS IN SOIL	5'-0" Ø DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINF. CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINF. STEEL	SPIRAL COLUMN REINF. STEEL	APPROXIMATE 1,437,000 LBS. STRUCTURAL STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES	HP 14 X 73 STEEL PILES		2 BAR METAL RAIL	1'-2" X 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	DISC BEARINGS	ELASTOMERIC BEARINGS	STRIP SEAL EXPANSION JOINTS	BRIDGE DECK DE-ICING SYSTEM
	LUMP SUM	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EA.	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	LUMP SUM	EACH	NO.	LIN. FT.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTR.	LUMP SUM	LUMP SUM	LUMP SUM								26,366	29,350		LUMP SUM			LUMP SUM				518.99	551.16			LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM
END BENT 1										LUMP SUM			125.7		15,867			20	20	460			415	460				
BENT 1						66.00	86.00	48.00	1				213.5		50,579	9,651												
END BENT 2				78.00	25.00					LUMP SUM			113.3		14,423			8	19	355			210	230				
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	78.00	25.00	66.00	86.00	48.00	1	LUMP SUM	26,366	29,350	452.5	LUMP SUM	80,869	9,651	LUMP SUM	28	39	815	518.99	551.16	625	690	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY ACCESS FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS, SEE SPECIAL PROVISIONS.

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.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR SYSTEM 6 OF THE STRUCTURAL STEEL SHOP COATINGS PROGRAM AND SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 45FT LEFT AND 30FT RIGHT OF -L- AT END BENT 1 AND 25FT LEFT AND 30FT RIGHT OF -L- AT END BENT 2 AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

TEMPORARY SHORING WILL BE REQUIRED IN THE AREAS INDICATED IN THE PLAN VIEW (SHEET 1 OF 4). FOR LIMITS OF TEMPORARY SHORING, SEE TRAFFIC CONTROL PLANS. FOR LIMITS OF TEMPORARY SHORING, SEE ROADWAY PLANS.

THE EXISTING 5 SPAN STRUCTURE (5 @ 52'-6") REINFORCED CONCRETE DECK ON STEEL I-BEAMS, WITH A CLEAR ROADWAY WIDTH OF 28' AND WITH A 2" ASPHALT WEARING SURFACE, WITH A SUBSTRUCTURE CONSISTING OF REINFORCED CONCRETE ABUTMENTS & REINFORCED CONCRETE POST AND BEAM BENTS SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL 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. FOR REMOVAL OF EXISTING STRUCTURE, SEE SPECIAL PROVISIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE 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 THE DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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

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

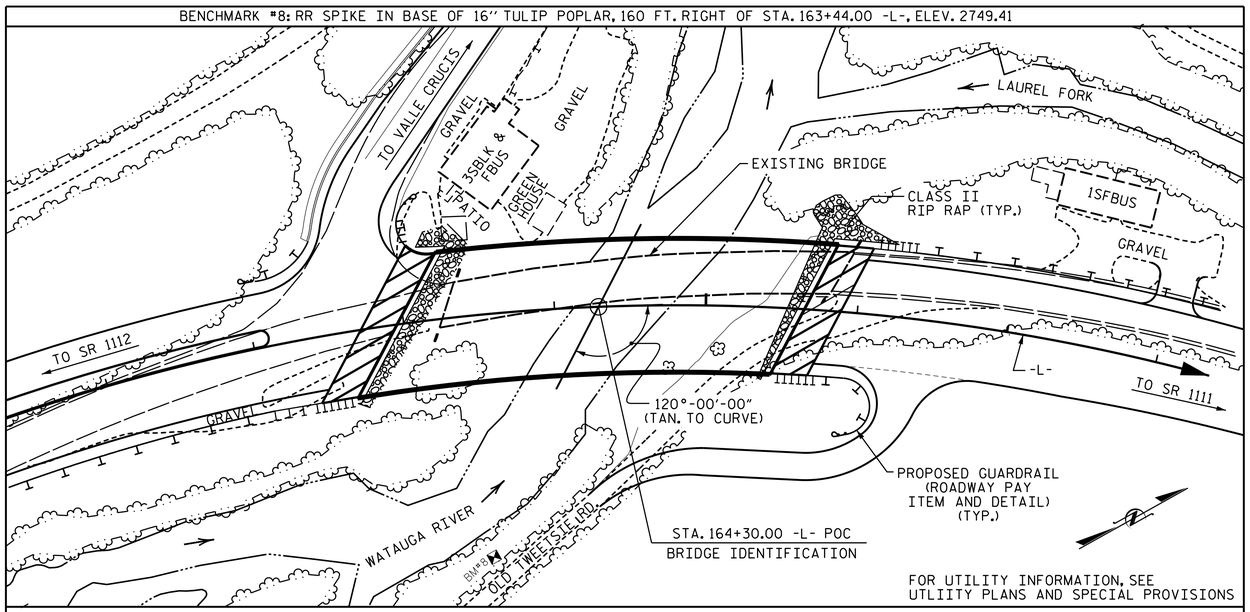
FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

FOR BRIDGE DECK DE-ICING SYSTEM, SEE SPECIAL PROVISIONS

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 164+30.00 -L-."

BENCHMARK #8: RR SPIKE IN BASE OF 16" TULIP POPLAR, 160 FT. RIGHT OF STA. 163+44.00 -L-, ELEV. 2749.41



FOR UTILITY INFORMATION, SEE UTLIITY PLANS AND SPECIAL PROVISIONS

LOCATION SKETCH

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.
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TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER WATAUGA RIVER ON NC 105 BETWEEN SR 1112 AND SR 1111

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : SBW DATE : 1-19
CHECKED BY : MGC DATE : 6-19
DESIGN ENGINEER OF RECORD: MGC DATE : 7-21

9/30/2021
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User:sbwilliams

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.43	--	1.75	0.951	1.46	B	EL	0.00	0.951	1.43	B	EL	22.00	1.30	0.951	2.26	B	EL	0.00	
		HL-93 (OPERATING)	N/A		1.86	--	1.35	0.951	1.90	B	EL	0.00	0.951	1.86	B	EL	22.00	1.00	0.951	2.93	B	EL	0.00	
		HS-20 (INVENTORY)	36.00	⟨2⟩	2.08	74.8	1.75	0.951	2.08	B	EL	0.00	0.951	2.10	B	EL	147.05	1.30	0.951	3.21	B	EL	0.00	
		HS-20 (OPERATING)	36.00		2.70	97.2	1.35	0.951	2.70	B	EL	0.00	0.951	2.72	B	EL	147.05	1.00	0.951	4.18	B	EL	0.00	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		6.39	86.2	1.40	0.951	7.54	B	EL	85.06	0.951	6.39	B	EL	147.05	1.30	0.951	8.41	A	EL	41.64	
		SNGARBS2	20.000		4.50	90.0	1.40	0.951	5.42	B	EL	85.06	0.951	4.50	B	EL	147.05	1.30	0.951	6.07	A	EL	41.64	
		SNAGRIS2	22.000		4.16	91.5	1.40	0.951	5.04	B	EL	81.15	0.951	4.16	B	EL	147.05	1.30	0.951	5.67	A	EL	41.64	
		SNCOTTS3	27.250		3.19	86.9	1.40	0.951	3.79	B	EL	88.95	0.951	3.19	B	EL	147.05	1.30	0.951	4.24	A	EL	41.64	
		SNAGGRS4	34.925		2.61	91.1	1.40	0.951	3.08	B	EL	85.06	0.951	2.61	B	EL	147.05	1.30	0.951	3.48	A	EL	41.64	
		SNS5A	35.550		2.63	93.4	1.40	0.951	3.04	B	EL	88.95	0.951	2.63	B	EL	147.05	1.30	0.951	3.43	A	EL	41.64	
		SNS6A	39.950		2.38	95.0	1.40	0.951	2.75	B	EL	85.06	0.951	2.38	B	EL	147.05	1.30	0.951	3.12	A	EL	41.64	
		SNS7B	42.000		2.28	95.7	1.40	0.951	2.61	B	EL	85.06	0.951	2.28	B	EL	22.00	1.30	0.951	2.96	A	EL	41.64	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.85	94.0	1.40	0.951	3.38	B	EL	85.06	0.951	2.85	B	EL	147.05	1.30	0.951	3.83	A	EL	41.64	
		TNT4A	33.075		2.79	92.2	1.40	0.951	3.34	B	EL	85.06	0.951	2.79	B	EL	147.05	1.30	0.951	3.75	A	EL	41.64	
		TNT6A	41.600		2.31	96.0	1.40	0.951	2.70	B	EL	81.15	0.951	2.31	B	EL	22.00	1.30	0.951	3.08	B	EL	81.15	
		TNT7A	42.000		2.30	96.6	1.40	0.951	2.70	B	EL	85.06	0.951	2.30	B	EL	22.00	1.30	0.951	3.07	A	EL	41.64	
		TNT7B	42.000		2.28	95.7	1.40	0.951	2.74	B	EL	85.06	0.951	2.28	B	EL	147.05	1.30	0.951	3.09	A	EL	41.64	
		TNAGRIT4	43.000		2.21	95.0	1.40	0.951	2.66	B	EL	85.06	0.951	2.21	B	EL	147.05	1.30	0.951	2.98	A	EL	41.64	
		TNAGT5A	45.000		2.15	96.7	1.40	0.951	2.52	B	EL	81.15	0.951	2.15	B	EL	22.00	1.30	0.951	2.87	B	EL	81.15	
		TNAGT5B	45.000	⟨3⟩	2.11	94.9	1.40	0.951	2.49	B	EL	85.06	0.951	2.11	B	EL	147.05	1.30	0.951	2.83	A	EL	41.64	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75		5.67																		

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE II	1.00	1.00

NOTES:

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

ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1. DISTRIBUTION FACTORS TAKEN FROM DESCUS
2. AVERAGE GIRDER LENGTH FOR EACH SPAN SHOWN. (℄ BEARING TO ℄ BEARING)
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93) **

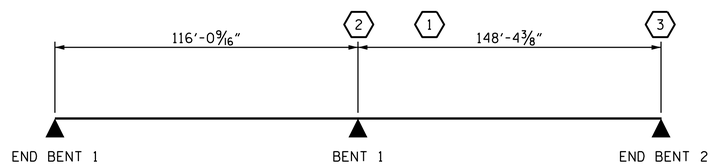
⟨2⟩ DESIGN LOAD RATING (HS-20) **

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.
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9/30/2021 | 1:43 PM EDT

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TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			79

STD. NO. LRFR3

ASSEMBLED BY : S. B. WILLIAMS	DATE : 5-19	
CHECKED BY : MGC	DATE : 5-19	
DESIGN ENGINEER OF RECORD: RDE	DATE : 9-21	
DRAWN BY : MAA 1/08	REV. 11/12/08RR	MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC

9/23/2021
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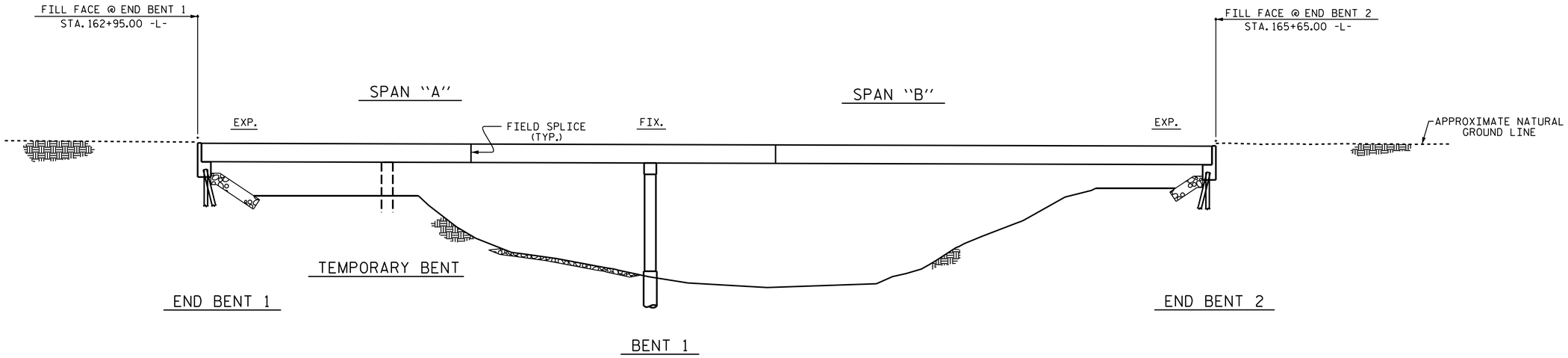
User:sbwilliams



SECTION ALONG -L-

SCHEMATIC ELEVATION VIEW

ERECTION NOTES

INITIAL SET WILL REQUIRE PLACEMENT OF TWO ADJACENT GIRDERS WITH DIAPHRAGMS.

THE STRUCTURAL STEEL SHALL BE SUPPORTED DURING ERECTION IN ITS CAMBERED POSITION. TEMPORARY BENT MAY BE USED IN SPAN ''A''.

TEMPORARY BENT SHALL SUPPORT ALL GIRDERS IN THE TYPICAL SECTION.

TEMPORARY BENT SHALL REMAIN IN PLACE UNTIL ALL CROSSFRAMES ARE IN PLACE AND HIGH STRENGTH BOLTS ARE TIGHTENED.

THE CONTRACTOR'S ERECTION PLANS SHALL INCLUDE A METHOD OF TEMPORARY BENT REMOVAL THAT WILL UNIFORMLY APPLY THE STRUCTURAL STEEL WEIGHT TO THE GIRDERS AND DIAPHRAGMS.

THE CONTRACTOR MAY SUBMIT ALTERNATE ERECTION METHODS. PLANS FOR SUCH ERECTION METHODS SHALL BE APPROVED BY THE ENGINEER.

PLANS FOR TEMPORARY BENT, ERECTION SEQUENCE, AND TEMPORARY BENT REMOVAL SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

DURING THE GIRDER ERECTION PROCEDURE, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LATERAL BRACING AND OTHER MEANS OF SUPPORTING, AS REQUIRED, TO ENSURE STABILITY OF THE GIRDERS, TO AVOID UPLIFT OF THE GIRDERS AT THE TEMPORARY BENT AND TO MAINTAIN PLUMBNESS OF THE GIRDER WEBS.

THE CONTRACTOR IS RESPONSIBLE FOR DESIGNING THE TEMPORARY BENT. THE DESIGN SHALL FOLLOW THE AASHTO GUIDE DESIGN SPECIFICATIONS FOR BRIDGE TEMPORARY WORKS, 1995 AND SHALL BE COMPLETED BY A PROFESSIONAL ENGINEER REGISTERED IN NORTH CAROLINA. THE CONTRACTOR SHALL SUBMIT SIGNED AND SEALED WORKING DRAWINGS AND CALCULATIONS FOR APPROVAL BY THE ENGINEER.

NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR PROVIDING THE TEMPORARY BENT. THE COST FOR ALL MATERIALS, EQUIPMENT, TOOLS, LABOR AND ANY INCIDENTALS NECESSARY TO PROVIDE THE TEMPORARY BENT SHALL BE CONSIDERED INCIDENTAL TO THE BID PRICE FOR STRUCTURAL STEEL.

FOR TEMPORARY BENT, SEE SPECIAL PROVISIONS.

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
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GIRDER ERECTION DETAILS

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REVISIONS					SHEET NO.
BY:	DATE:	NO.	BY:	DATE:	S-6
		3			TOTAL SHEETS
		4			79

DRAWN BY : STM DATE : 04/19
CHECKED BY : MGC DATE : 05/19
DESIGN ENGINEER OF RECORD: RDE DATE : 9/21

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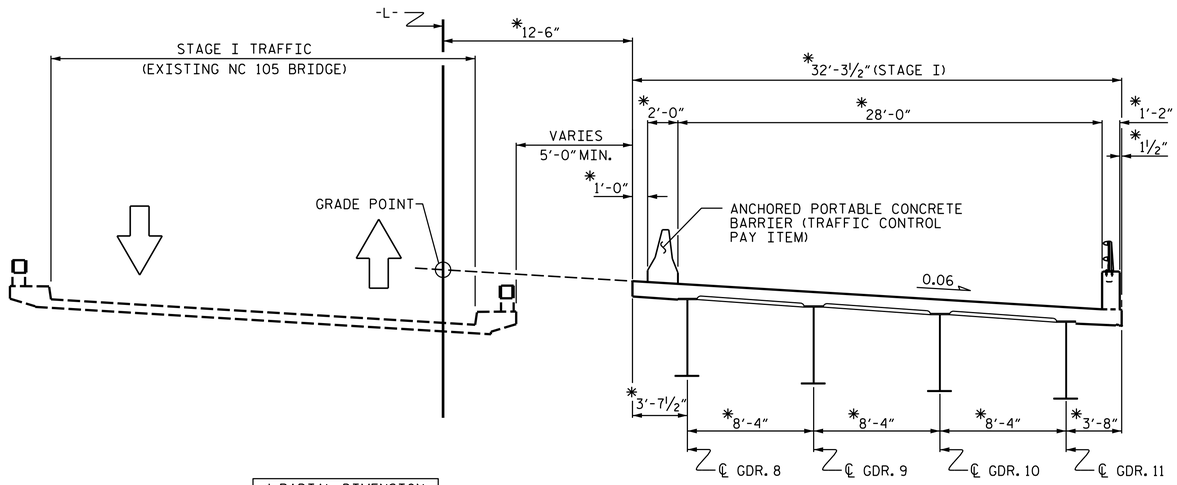
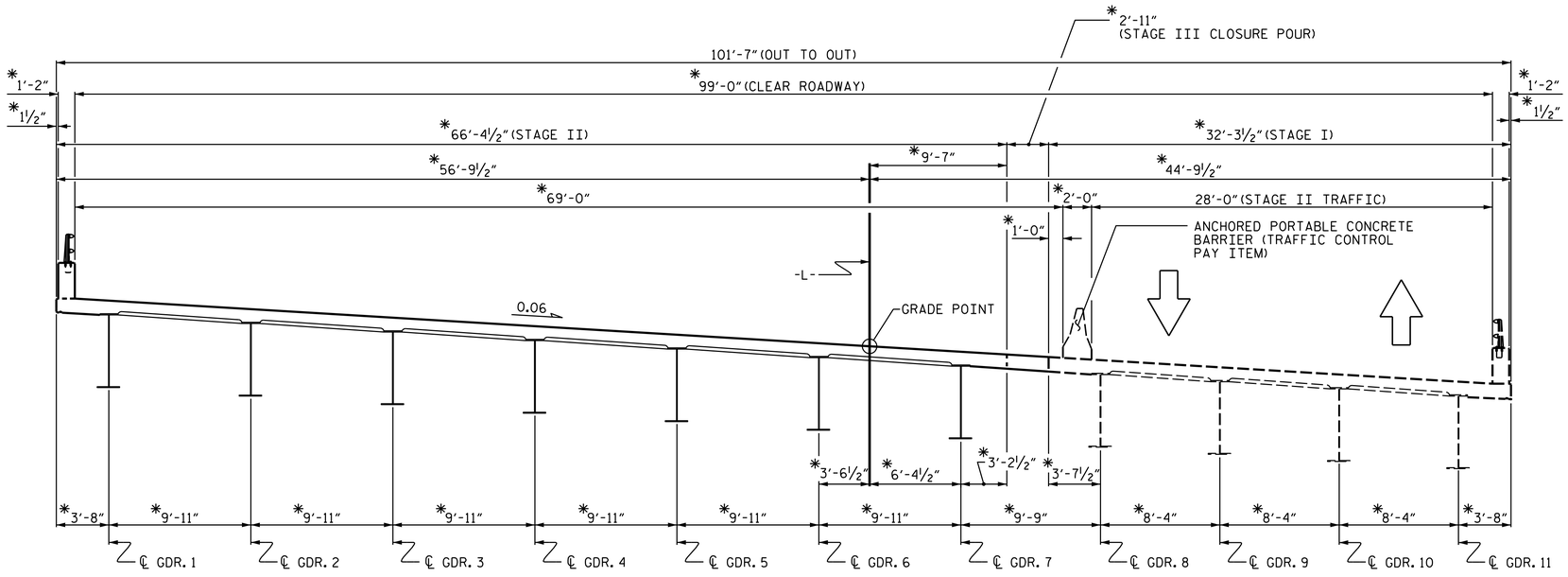
Users\bwilliams



*RADIAL DIMENSION

STAGE I



*RADIAL DIMENSION

STAGE II & STAGE III

STAGING SEQUENCE

NOTES:

FOR TRAFFIC PHASING, SEE TRAFFIC CONTROL PLANS.

THE ANCHORED PORTABLE CONCRETE BARRIER IS A TRAFFIC CONTROL PAY ITEM.

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

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.

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CONSTRUCTION STAGING SEQUENCE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : STM DATE : 03/19
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DESIGN ENGINEER OF RECORD: RDE DATE : 9/21

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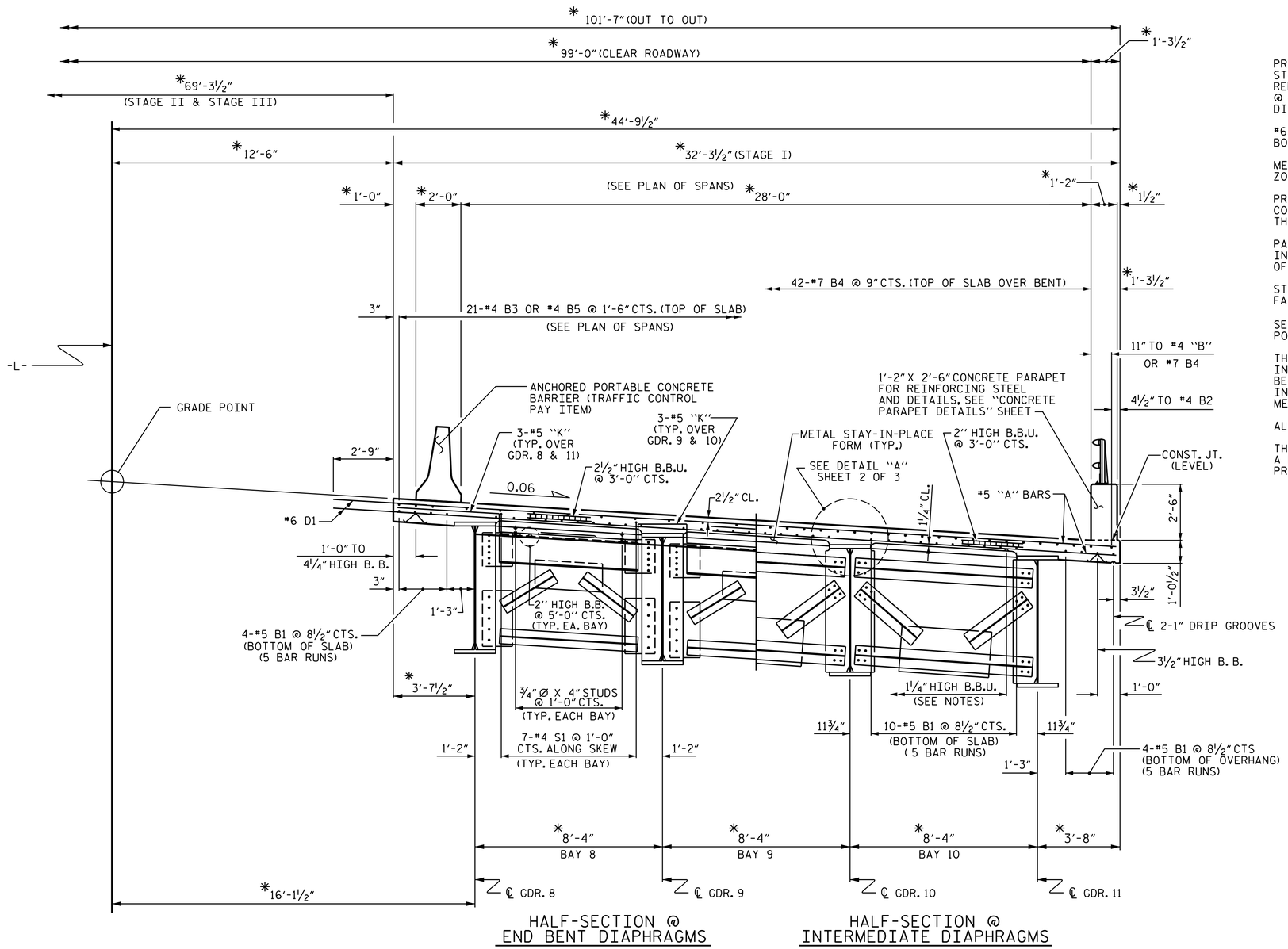

HALF-SECTION @ END BENT DIAPHRAGMS

HALF-SECTION @ INTERMEDIATE DIAPHRAGMS

*RADIAL DIMENSION

TYPICAL SECTION

(STAGE I)

NOTES

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

#6 D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP & BOTTOM SLAB REINFORCING STEEL.

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

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.

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

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

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

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND BEAM/GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

ALL REINFORCING STEEL IN PARAPETS SHALL BE EPOXY COATED.

THE CONTRACTOR SHALL ADJUST THE GIRDER BUILDUPS AS NECESSARY TO INCORPORATE A MAXIMUM PERMISSIBLE VARIATION IN DISC BEARING DEPTH OF 1/2", SEE SPECIAL PROVISION FOR DISC BEARINGS.

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER
MARSHALL G. CHEEK, JR.
Marshall G. Cheek, Jr.
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	S. B. WILLIAMS	DATE :	1-19
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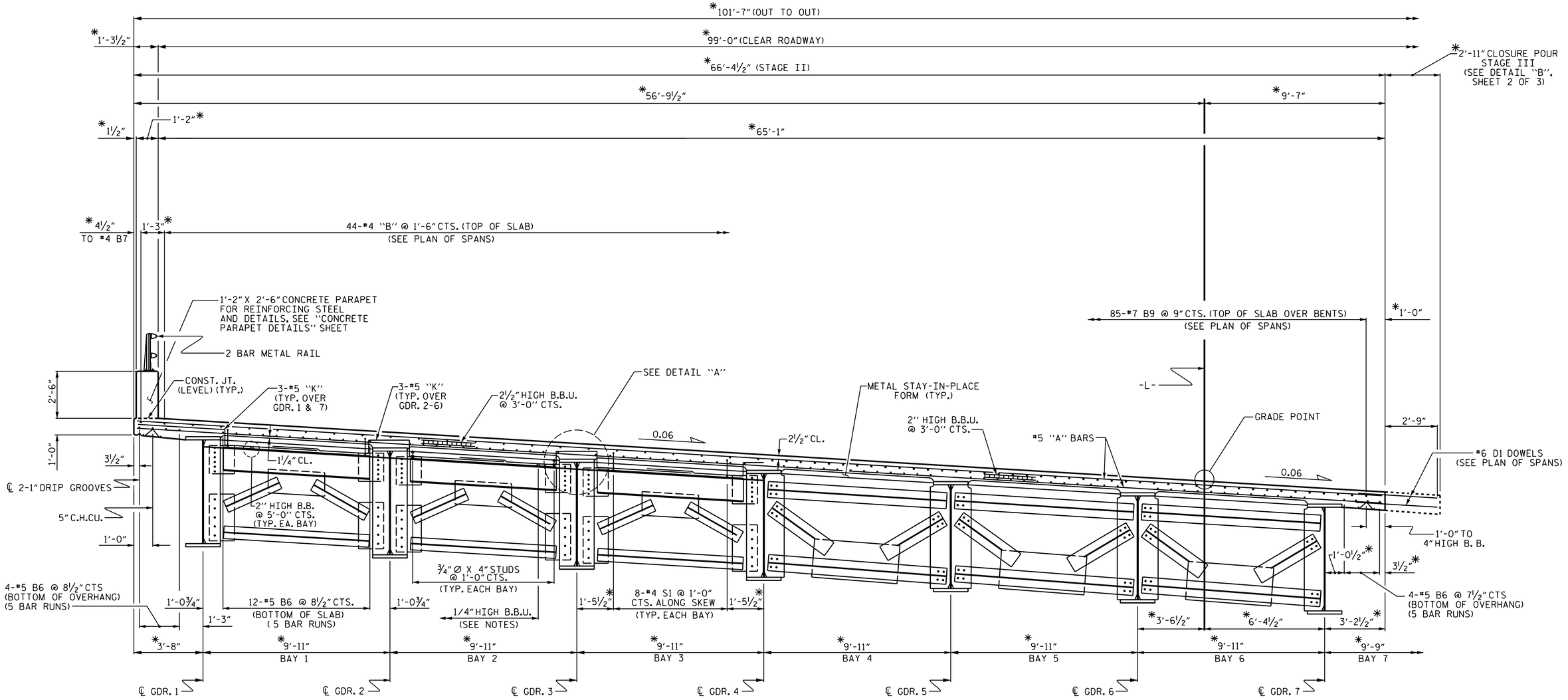
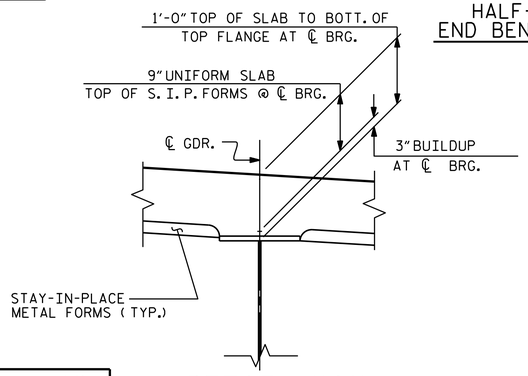


*RADIAL DIMENSION

HALF-SECTION @ END BENT DIAPHRAGMS



DETAIL "A"

HALF-SECTION @ INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

(STAGE II)

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION
STAGE II

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.
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CORP. LICENSE NO.: C-0275

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : S. B. WILLIAMS DATE : 1-19
CHECKED BY : MGC DATE : 4-19
DESIGN ENGINEER OF RECORD: RDE DATE : 9-21

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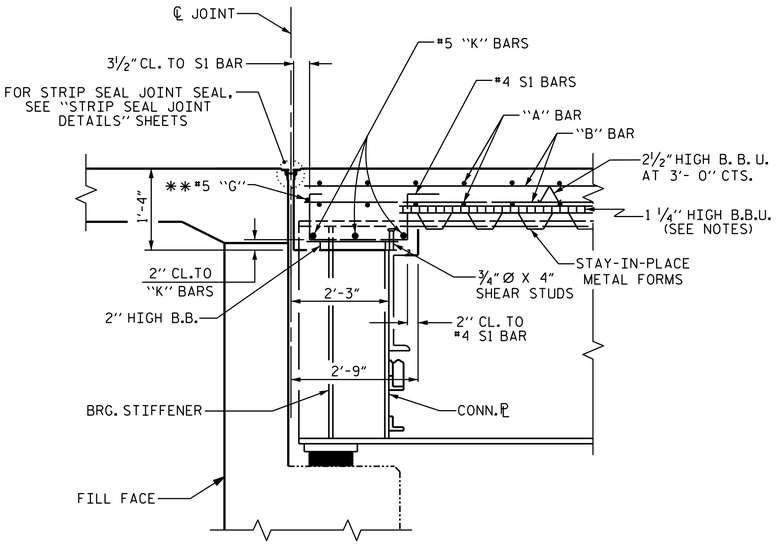
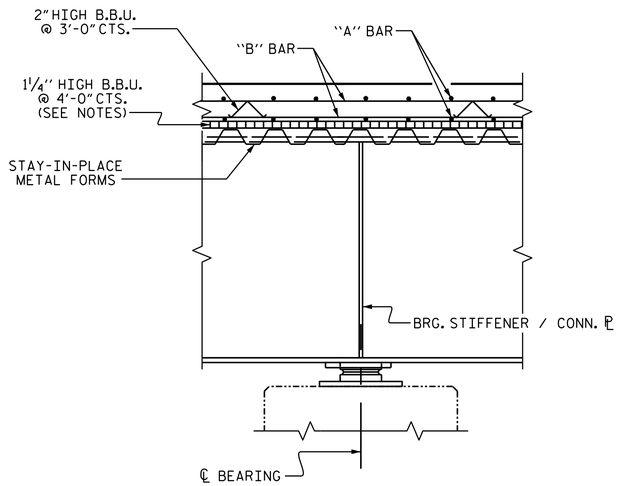
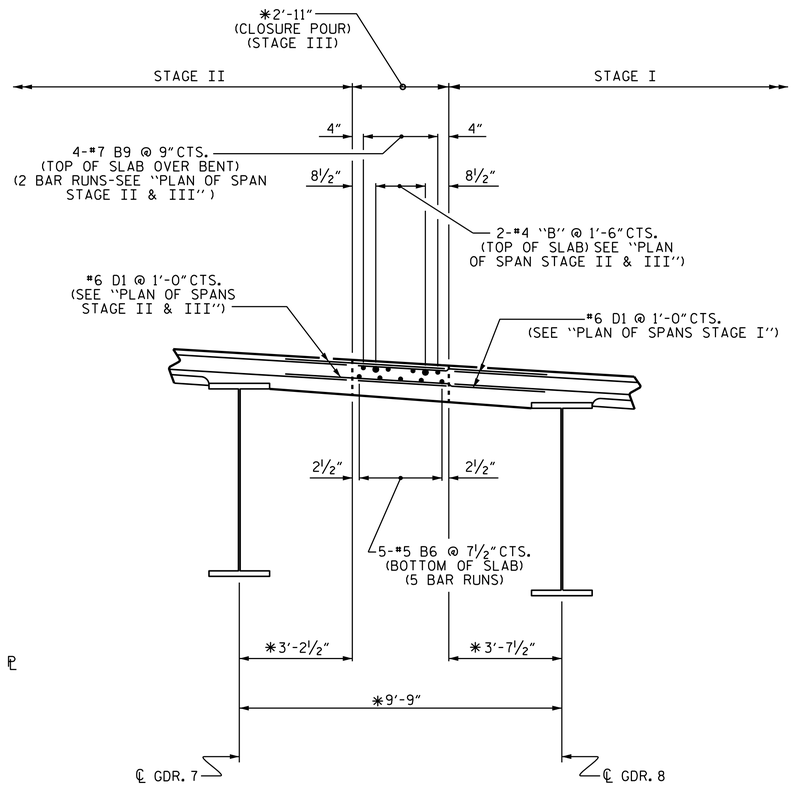


SECTION THRU END BENT DIAPHRAGM

** #5 "G" BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL & S1 BAR.



SECTION THRU BENT



DETAIL "B"

*RADIAL DIMENSION

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	S. B. WILLIAMS	DATE :	3-19
CHECKED BY :	MGC	DATE :	5-19
DESIGN ENGINEER OF RECORD:	RDE	DATE :	9-21

9/23/2021
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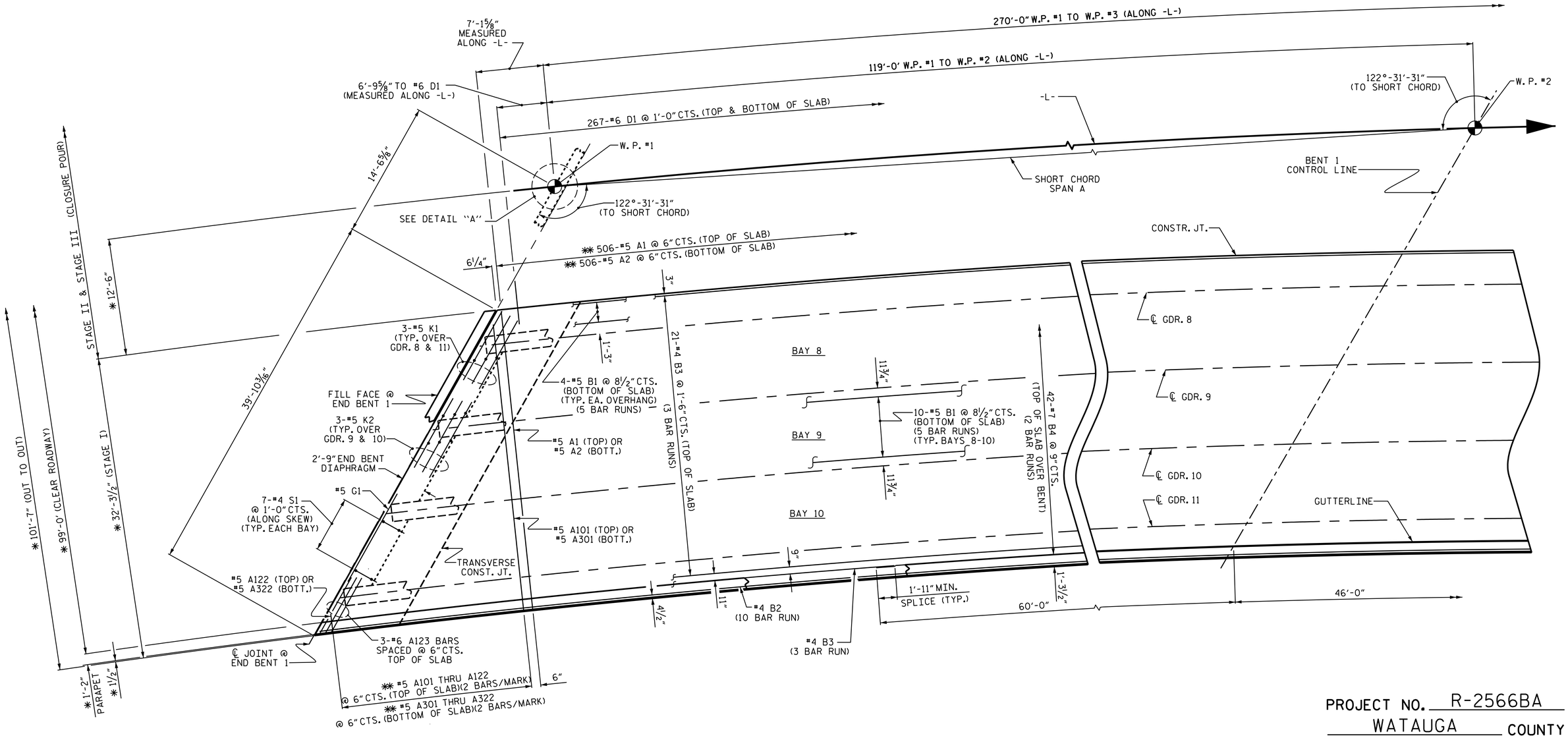

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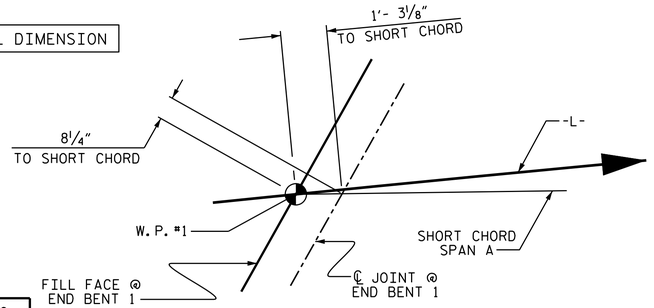

DETAIL "A"

PLAN OF SPAN A

NOTES :

** #5 "A" BARS ARE TO BE PLACED RADIALLY @ 6" CENTERS MEASURED ALONG LEFT OUTSIDE EDGE OF SUPERSTRUCTURE.

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

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 1 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER
MARSHALL G. CHEEK, JR.
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SUPERSTRUCTURE

PLAN OF SPAN A

STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : S. B. WILLIAMS DATE : 3-19
CHECKED BY : MGC DATE : 4-19
DESIGN ENGINEER OF RECORD: RDE DATE : 9-21

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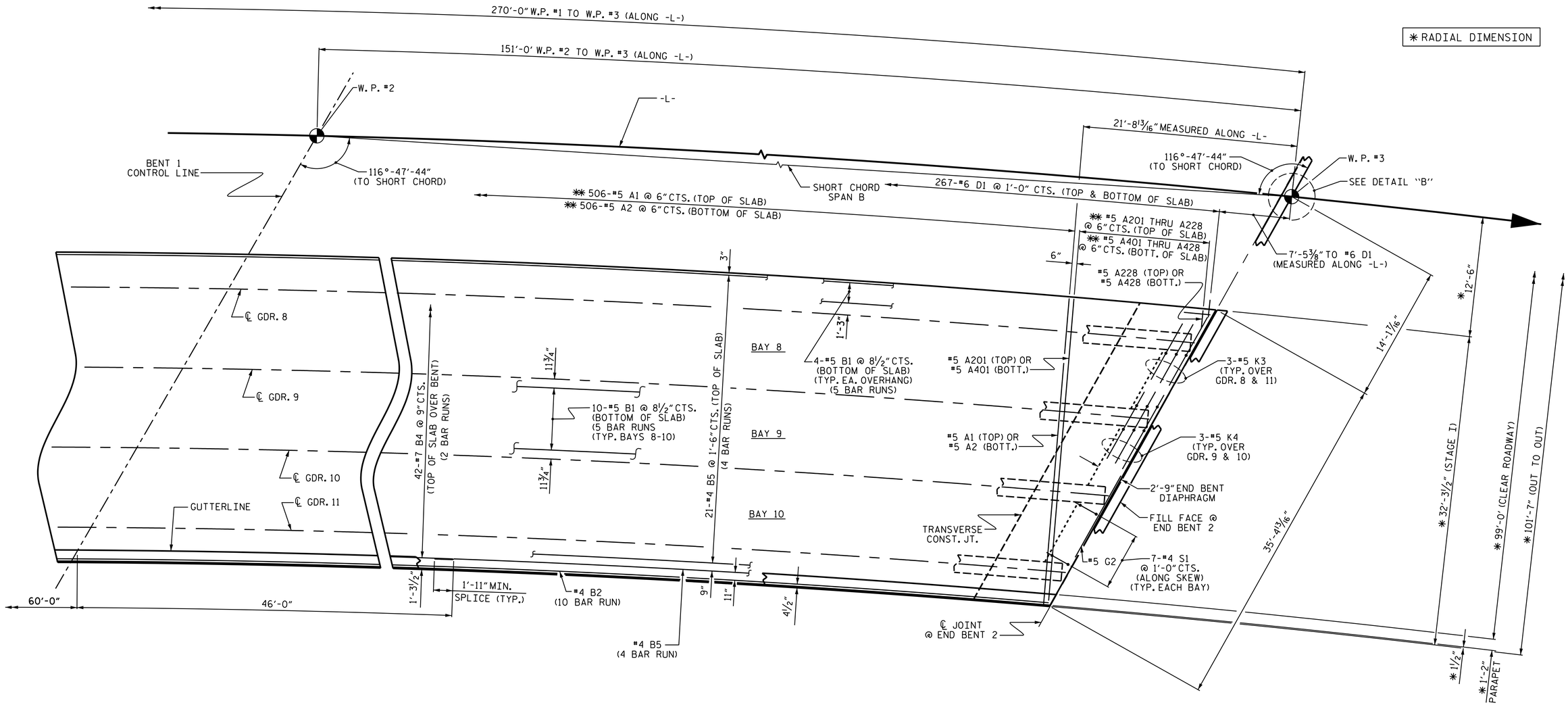
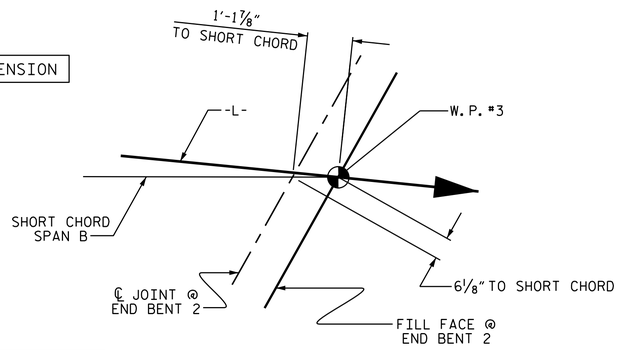


✳RADIAL DIMENSION



DETAIL "B"

PLAN OF SPAN B

NOTES :

#5 "A" BARS ARE TO BE PLACED RADIALLY @ 6" CENTERS MEASURED ALONG LEFT OUTSIDE EDGE OF SUPERSTRUCTURE.

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

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 2 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER Marshall G. Check, Jr.

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SUPERSTRUCTURE
PLAN OF SPAN B
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	S. B. WILLIAMS	DATE :	3-19
CHECKED BY :	MGC	DATE :	4-19
DESIGN ENGINEER OF RECORD:	RDE	DATE :	9-21

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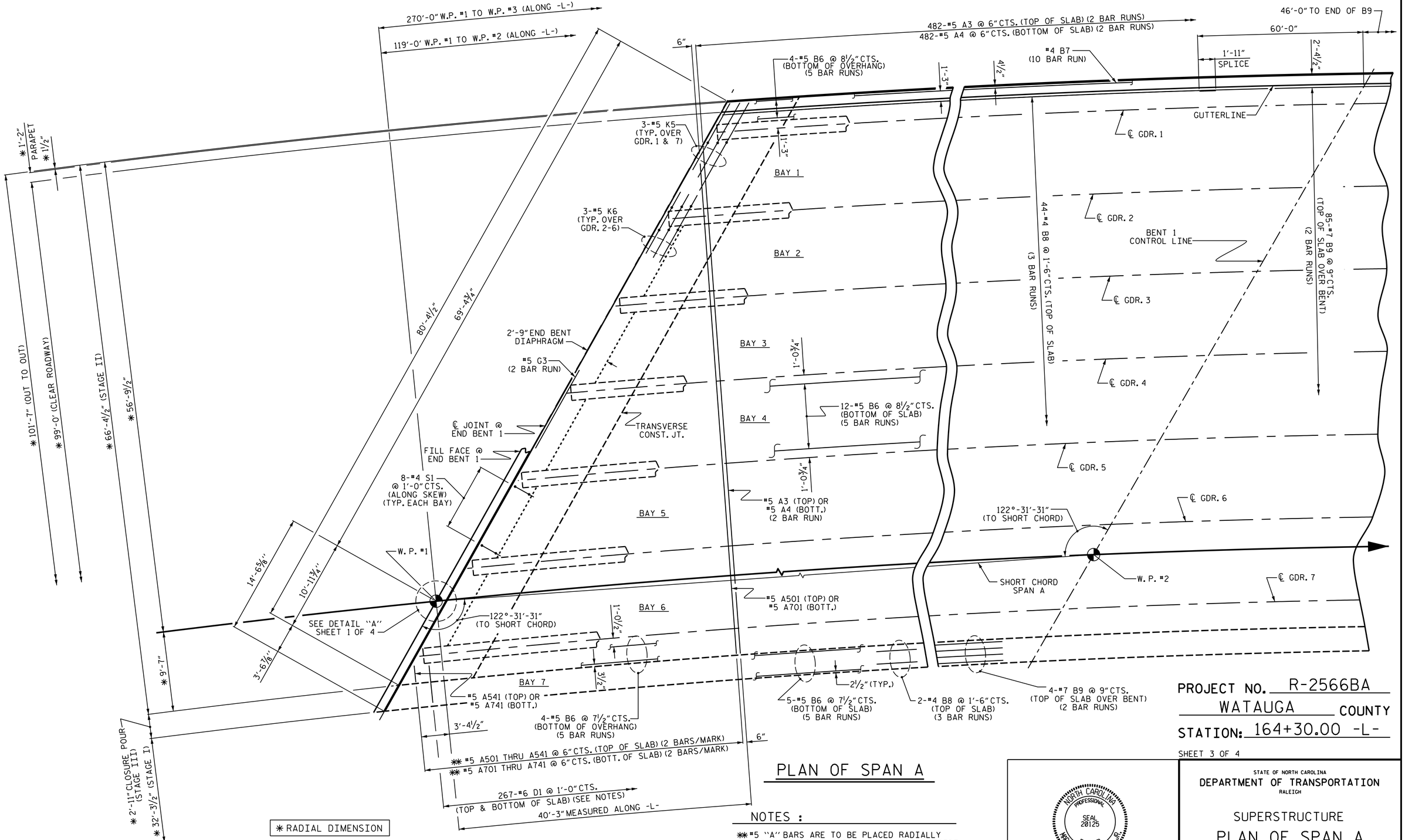

✱ RADIAL DIMENSION

PLAN OF SPAN A

NOTES :

✱✱ #5 "A" BARS ARE TO BE PLACED RADIALLY @ 6" CENTERS MEASURED ALONG LEFT OUTSIDE EDGE OF SUPERSTRUCTURE.

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

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

STAGE II & III

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : S. B. WILLIAMS DATE : 3-19
CHECKED BY : MGC DATE : 4-19
DESIGN ENGINEER OF RECORD: RDE DATE : 9-21

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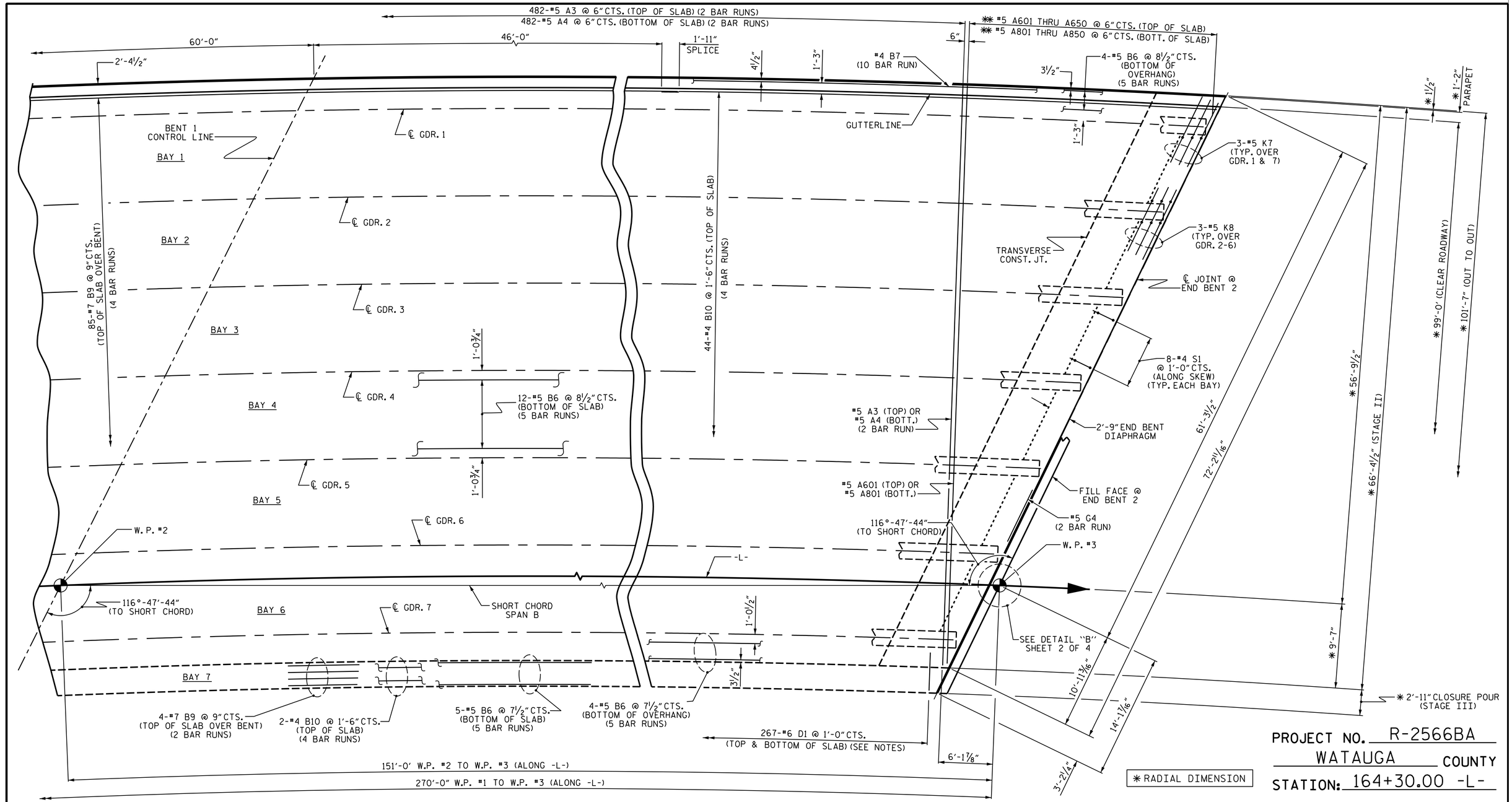

PLAN OF SPAN B

NOTES :

** #5 "A" BARS ARE TO BE PLACED RADIALLY @ 6" CENTERS MEASURED ALONG LEFT OUTSIDE EDGE OF SUPERSTRUCTURE.

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

* RADIAL DIMENSION

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 4 OF 4

DRAWN BY : S. B. WILLIAMS DATE : 3-19

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User:sbwilliams

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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SUPERSTRUCTURE

PLAN OF SPAN B

STAGE II & III

REVISIONS						SHEET NO.
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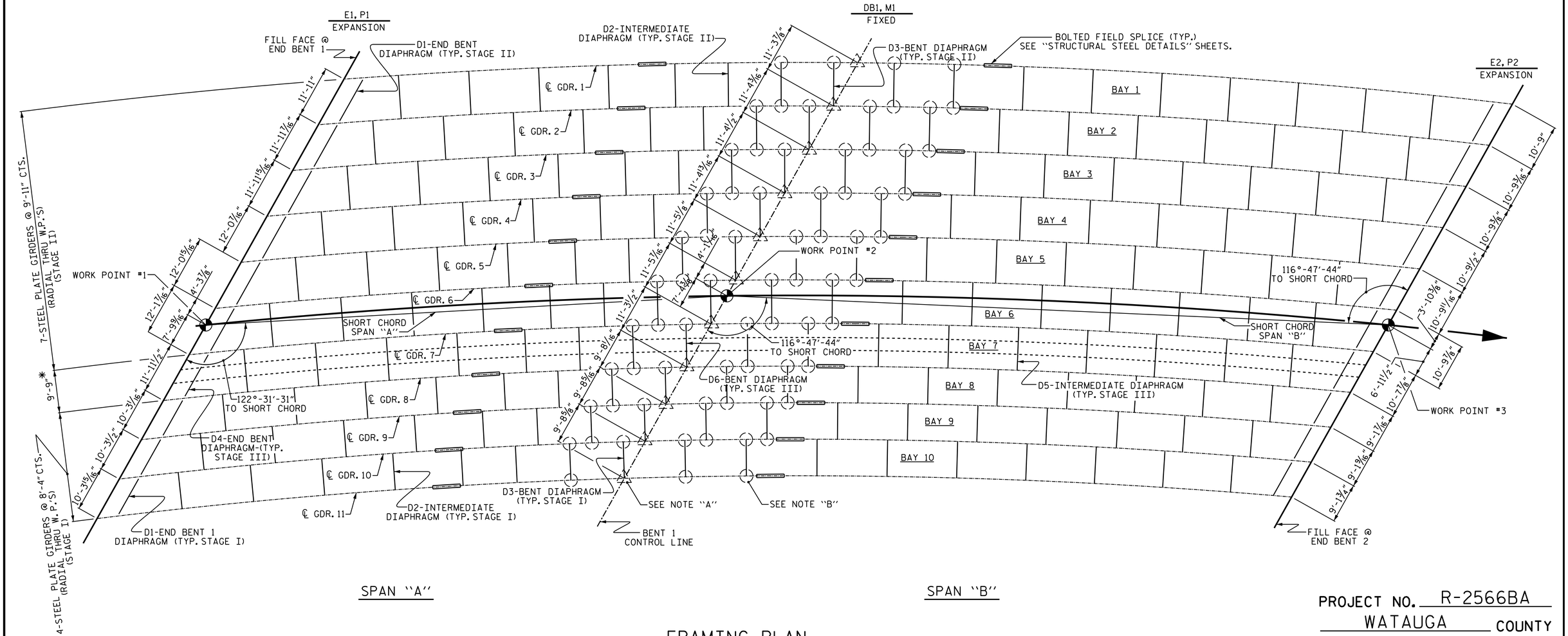
1			3			TOTAL SHEETS
2			4			79



SPAN "A"

SPAN "B"

FRAMING PLAN

FOR LOCATION OF CONNECTOR PLATES ALONG EACH GIRDER, SEE SHEET 2 OF 2.

NOTE "A":
THE BEARING STIFFENER AT THIS LOCATION SHALL BE UTILIZED AS A CONNECTOR PLATE FOR THE DIAPHRAGM.

NOTE "B":
1'-2" X 7/8" TRANSVERSE STIFFENER REQUIRED AT THIS LOCATION AND SHALL BE UTILIZED AS A CONNECTOR PLATE.

PROJECT NO. R-2566BA

WATAUGA COUNTY

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SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER
Marshall G. Cheek, Jr.
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FRAMING PLAN

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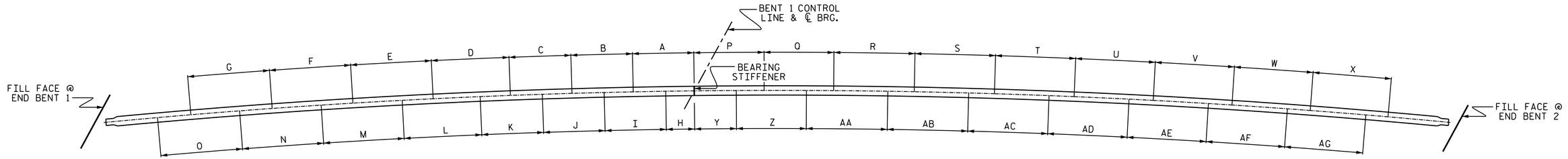

CONNECTOR PLATE SCHEMATIC

FOR CONNECTOR PLATE DIMENSIONS, SEE TABLE ''A''

TABLE ''A''

GIRDER	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	-	-	-	-	-	-	-	5'-5 13/16"	12'-0 1/4"	12'-0 15/16"	12'-1 11/16"	15'-2 7/8"	15'-10"	16'-11 5/16"	16'-0 11/16"
2	11'-11 1/4"	11'-11 15/16"	12'-0 5/8"	15'-1 9/16"	15'-8 5/8"	15'-9 15/16"	15'-11 5/16"	5'-6 7/16"	12'-0 9/16"	12'-1 5/16"	12'-2 1/16"	15'-3 5/16"	15-10 1/2"	15 11 5/16"	16'-1 5/16"
3	11'-11 9/16"	12'-0 1/4"	12'-1"	15'-2"	15'-9 1/8"	15'-10 1/2"	15'-11 5/16"	5'-7 1/16"	12'-0 15/16"	12'-1 11/16"	12'-2 7/16"	15'-3 13/16"	15'-11 1/16"	16'-0 7/16"	16'-1 7/8"
4	11'-11 7/8"	12'-0 5/8"	12'-1 3/8"	15'-2 1/2"	15'-9 11/16"	15'-11 1/16"	16'-0 1/2"	5'-7 3/4"	12'-1 1/4"	12'-2"	12'-2 13/16"	15'-4 5/16"	15'-11 9/16"	16'-1"	16'-2 1/2"
5	12'-0 1/4"	12'-1"	12'-1 3/4"	15'-3"	15'-10 3/16"	15'-11 5/8"	16'-1 1/8"	5'-8 3/8"	12'-1 5/8"	12'-2 7/16"	12'-3 3/16"	15'-4 7/8"	16'-0 3/16"	16'-1 5/8"	16'-3 1/8"
6	12'-0 9/16"	12'-1 3/8"	12'-2 1/8"	15'-3 1/2"	15'-10 3/4"	16'-0 3/16"	16'-1 3/4"	5'-9 1/16"	12'-2"	12'-2 13/16"	12'-3 5/8"	15'-5 3/8"	16'-0 3/4"	16'-2 1/4"	16'-3 13/16"
7	12'-0 15/16"	12'-1 3/4"	12'-2 1/2"	15'-4"	15'-11 5/16"	16'-0 13/16"	16'-2 3/8"	5'-8 9/16"	12'-2 3/8"	12'-3 3/16"	12'-4"	15'-5 15/16"	16'-1 5/16"	16'-2 7/8"	16'-4 7/16"
8	12'-1 5/16"	12'-2 1/8"	12'-2 15/16"	15'-4 9/16"	15'-11 15/16"	16'-1 7/16"	16'-3"	4'-11 1/8"	12'-2 9/16"	12'-3 3/8"	12'-4 3/16"	15'-6 3/16"	16'-1 5/8"	16'-3 3/16"	16'-4 13/16"
9	12'-1 5/8"	12'-2 7/16"	12'-3 5/16"	15'-5"	16'-0 7/16"	16'-2"	16'-3 5/8"	4'-11 5/8"	12'-2 7/8"	12'-3 3/4"	12'-4 9/16"	15'-6 11/16"	16'-2 5/16"	16'-3 3/4"	16'-5 7/16"
10	12'-2"	12'-2 13/16"	12'-3 5/8"	15'-5 1/2"	16'-0 15/16"	16'-2 9/16"	16'-4 3/16"	5'-0 1/8"	12'-3 1/4"	12'-4 1/16"	12'-4 15/16"	15'-7 3/16"	16'-2 3/4"	16'-4 3/8"	16'-6 1/16"
11	12'-2 5/16"	12'-3 1/8"	12'-4"	15'-6"	16'-1 1/2"	16'-3 1/8"	16'-4 13/16"	-	-	-	-	-	-	-	-

ALL GIRDER DIMENSIONS ARE MEASURED ALONG ℄ OF GIRDER.

TABLE ''A'' (CONT'D)

GIRDER	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG
1	-	-	-	-	-	-	-	-	-	8'-3 1/2"	13'-8 7/16"	15'-10 13/16"	15'-9 11/16"	15'-8 5/8"	15'-7 5/8"	15'-6 5/8"	15'-5 11/16"	15'-4 13/16"
2	13'-8 3/16"	13'-7 5/16"	15'-9 7/16"	15'-8 3/8"	15'-7 5/16"	15'-6 5/16"	15'-5 5/16"	15'-4 3/8"	15'-3 1/2"	8'-3 1/4"	13'-8 13/16"	15'-11 3/16"	15'-10 1/16"	15'-9"	15'-7 15/16"	15'-6 15/16"	15'-6"	15'-5 1/16"
3	13'-8 1/2"	13'-7 5/8"	15'-9 13/16"	15'-8 11/16"	15'-7 5/8"	15'-6 5/8"	15'-5 5/8"	15'-4 5/8"	15'-3 3/4"	8'-3"	13'-9 3/16"	15'-11 9/16"	15'-10 7/16"	15'-9 5/16"	15'-8 1/4"	15'-7 1/4"	15'-6 1/4"	15'-5 5/16"
4	13'-8 7/8"	13'-8"	15'-10 3/16"	15'-9 1/16"	15'-8"	15'-6 15/16"	15'-5 7/8"	15'-4 15/16"	15'-4"	8'-2 3/4"	13'-9 9/16"	16'-0"	15'-10 13/16"	15'-9 11/16"	15'-8 5/8"	15'-7 9/16"	15'-6 9/16"	15'-5 5/8"
5	13'-9 1/4"	13'-8 5/16"	15'-10 5/8"	15'-9 7/16"	15'-8 5/16"	15'-7 1/4"	15'-6 3/16"	15'-5 3/16"	15'-4 1/4"	8'-2 1/2"	13'-9 15/16"	16'-0 3/8"	15'-11 3/16"	15'-10 1/16"	15'-8 15/16"	15'-7 7/8"	15'-6 7/8"	15'-5 7/8"
6	13'-9 5/8"	13'-8 11/16"	15'-11"	15'-9 13/16"	15'-8 11/16"	15'-7 9/16"	15'-6 1/2"	15'-5 1/2"	15'-4 9/16"	8'-2 5/16"	13'-10 5/16"	16'-0 13/16"	15'-11 5/8"	15'-10 7/16"	15'-9 5/16"	15'-8 1/4"	16'-0 5/16"	15'-1"
7	13'-10 1/16"	13'-9 1/16"	15'-11 7/16"	15'-10 3/16"	15'-9 1/16"	15'-7 15/16"	15'-6 13/16"	15'-10 15/16"	14'-11 11/16"	8'-3 1/8"	13'-10 11/16"	16'-1 1/4"	16'-0"	15'-10 13/16"	15'-9 5/8"	15'-8 9/16"	16'-0 11/16"	15'-1 1/4"
8	13'-10 7/16"	13'-9 7/16"	15'-11 13/16"	15'-10 5/8"	15'-9 7/16"	15'-8 1/4"	15'-7 3/16"	15'-11 1/4"	14'-11 15/16"	9'-0 3/4"	13'-10 13/16"	16'-1 7/16"	16'-0 1/8"	15'-10 15/16"	15'-9 3/4"	15'-8 5/8"	15'-7 9/16"	15'-6 1/2"
9	13'-10 13/16"	13'-9 13/16"	16'-0 3/16"	15'-10 15/16"	15'-9 3/4"	15'-8 9/16"	15'-7 7/16"	15'-6 3/8"	15'-5 3/8"	9'-0 5/8"	13'-11 3/16"	16'-1 13/16"	16'-0 1/2"	15'-11 1/4"	15'-10 1/16"	16'-2 3/8"	15'-2 3/8"	15'-6 13/16"
10	13'-11 3/16"	13'-10 1/8"	16'-0 9/16"	15'-11 5/16"	15'-10 1/16"	15'-8 7/8"	16'-1 1/8"	15'-1 1/4"	15'-5 5/8"	9'-0 1/2"	13'-11 9/16"	16'-2 3/16"	16'-0 7/8"	15'-11 5/8"	15'-10 7/16"	15'-9 1/4"	15'-8 1/8"	15'-7 1/16"
11	13'-11 9/16"	13'-10 1/2"	16'-1"	15'-11 11/16"	15'-10 7/16"	15'-9 3/16"	15'-8 1/16"	16'-6 15/16"	15'-5 7/8"	-	-	-	-	-	-	-	-	-

ALL GIRDER DIMENSIONS ARE MEASURED ALONG ℄ OF GIRDER.

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL B. CHEEK, JR.

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STATE OF NORTH CAROLINA
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SUPERSTRUCTURE
FRAMING PLAN

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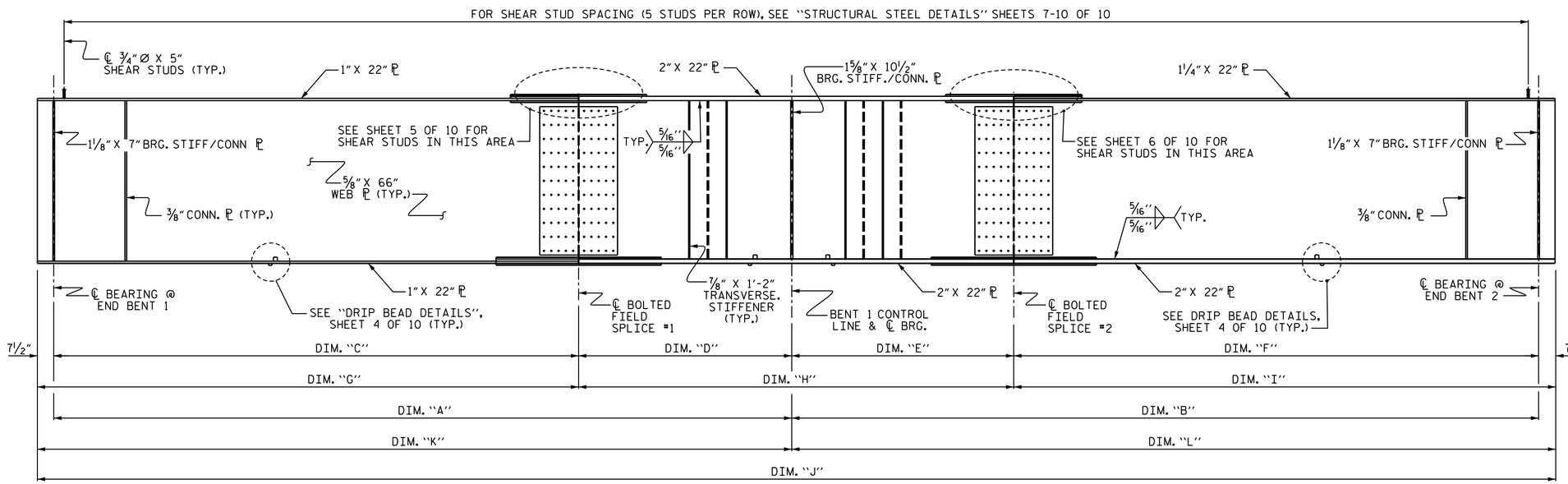
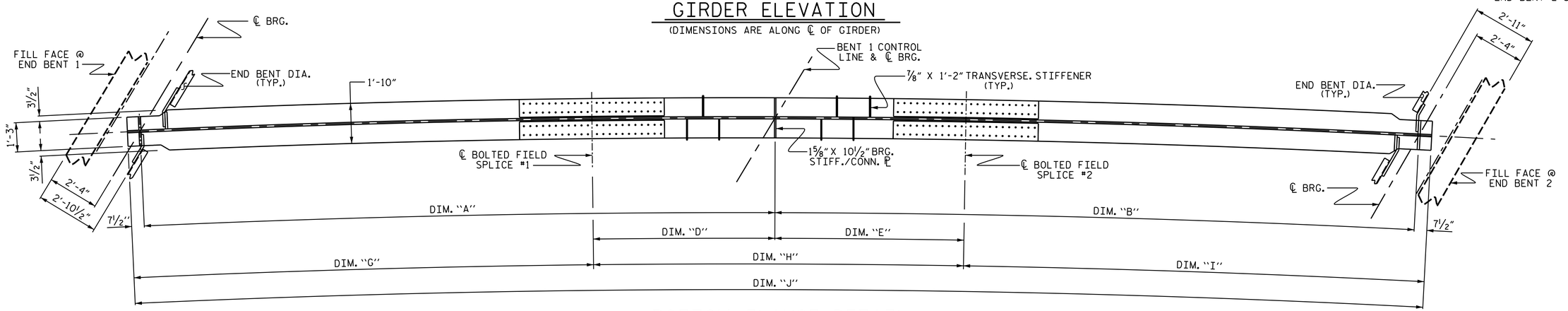


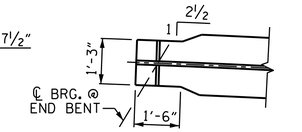
GIRDER ELEVATION

(DIMENSIONS ARE ALONG ℄ OF GIRDER)



BOTTOM FLANGE DETAIL

INTERIOR GIRDER SHOWN, EXTERIOR GIRDER SIMILAR EXCEPT NO CONNECTOR ℙ'S SHALL BE PLACED ON THE OUTSIDE OF WEB.



BOTTOM FLANGE TAPER DETAIL

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

GIRDER DIMENSIONS

GIRDER	RADIUS	A	B	C	D	E	F	G	H	I	J	K	L
1	1403'- 1½"	114'-5¼"	147'-0⁹⁄₁₆"	65'-1⅛"	49'-4⅛"	29'-11⅜"	117'- 1¾"	65'- 8⅝"	79'- 3½"	117'- 8¹¹⁄₁₆"	262'- 8¹³⁄₁₆"	115'-0¾"	147'- 8⅛"
2	1393'- 2½"	114'-8⅞"	147'-3⁹⁄₁₆"	68'- 3"	46'-5⅞"	32'-7⅜"	114'- 8⅜"	68'-10½"	79'- 1¼"	115'- 3¹¹⁄₁₆"	263'- 3⅞"	115'- 4⅜"	147'-11¹¹⁄₁₆"
3	1383'-3½"	115'-0⁹⁄₁₆"	147'-6⁹⁄₁₆"	68'-5⅛"	46'-7⅛"	32'-7¹⁵⁄₁₆"	114'-10⅝"	69'-0⅝"	79'- 3⅜"	115'- 6⅛"	263'-10⅛"	115'- 8⅛"	148'- 2⅛"
4	1373'- 4½"	115'-4⅜"	147'-9¹¹⁄₁₆"	68'-7¼"	46'-9⅛"	32'-8⁹⁄₁₆"	115'- 1⅛"	69'-2¾"	79'- 5¹¹⁄₁₆"	115'- 8⅝"	264'-5⅛"	115'-11⅞"	148'- 5⅜"
5	1363'- 5½"	115'-8⁵⁄₁₆"	148'-0¹⁵⁄₁₆"	68'-9½"	46'-10¹³⁄₁₆"	32'-9³⁄₁₆"	115'- 3¾"	69'- 5"	79'- 8"	115'-11¼"	265'- 0¼"	116'- 3¹³⁄₁₆"	148'- 8⅞"
6	1353'- 6½"	116'-0⅜"	148'-4¼"	68'-11⅞"	47'-0½"	32'-9⅞"	115'-6⅜"	69'- 7⅜"	79'- 10⅜"	116'- 1⅞"	265'- 7⅝"	116'- 7⅞"	148'-11¾"
7	1343'- 7½"	116'-4⁹⁄₁₆"	148'-7⅝"	69'-2⅞"	47'-1¹¹⁄₁₆"	32'-11¹⁄₁₆"	115'- 8⅝"	69'- 10⅜"	80'- 0¾"	116'- 4¹⁄₁₆"	266'- 3⅝"	117'- 0¹⁄₁₆"	149'- 3⅛"
8	1333'-10½"	116'-8¹³⁄₁₆"	148'-11¹⁄₁₆"	69'-10¾"	46'-10¹⁄₁₆"	33'-4⁷⁄₁₆"	115'- 6⅝"	70'- 6¼"	80'- 2½"	116'- 2⅛"	266'-10⅞"	117'- 4⅝"	149'- 6⁹⁄₁₆"
9	1325'- 6½"	117'-0½"	149'- 2¹⁄₁₆"	70'-0⅞"	46'-11⅝"	33'-5⅛"	115'- 8¹⁵⁄₁₆"	70'- 8⅜"	80'- 4¾"	116'- 4⁷⁄₁₆"	267'- 5⁹⁄₁₆"	117'- 8"	149'- 9⁹⁄₁₆"
10	1317'- 2½"	117'-4⅜"	149'- 5⅛"	70'-3⁵⁄₁₆"	47'-1⁵⁄₁₆"	33'-5¾"	115'-11⅜"	70'-10¹¹⁄₁₆"	80'- 6¹⁵⁄₁₆"	116'- 6⅞"	268'- 0½"	117-11⅞"	150'- 0⅝"
11	1308'-10½"	117'-8⁵⁄₁₆"	149'-8⁵⁄₁₆"	73'-1¹³⁄₁₆"	44'-6½"	35'-10½"	113'- 9¹³⁄₁₆"	73'- 9⁵⁄₁₆"	80'- 5"	114'- 5⁵⁄₁₆"	268'- 7⅝"	118'-3¹³⁄₁₆"	150'- 3¹³⁄₁₆"

ALL GIRDER DIMENSIONS ARE MEASURED ALONG ℄ OF GIRDER.

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WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 1 OF 10

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Marshall G. Cheek, Jr.
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SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

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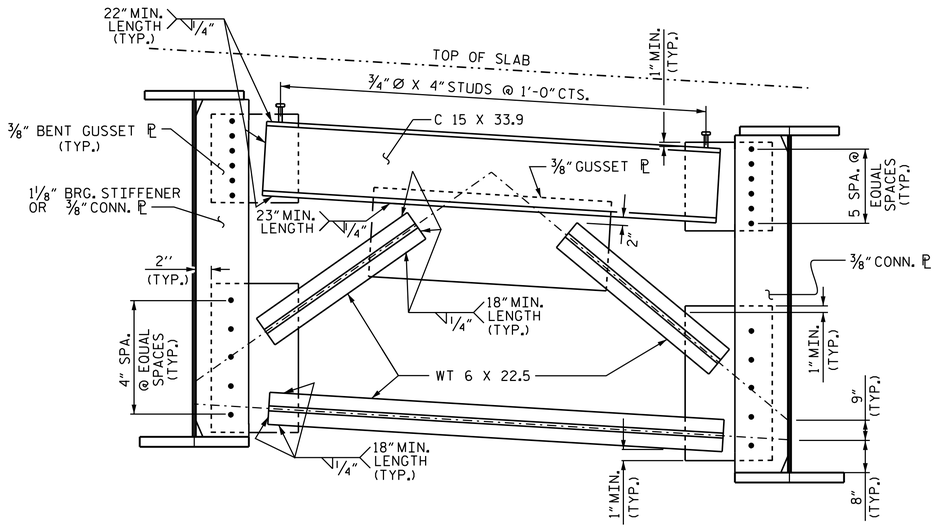
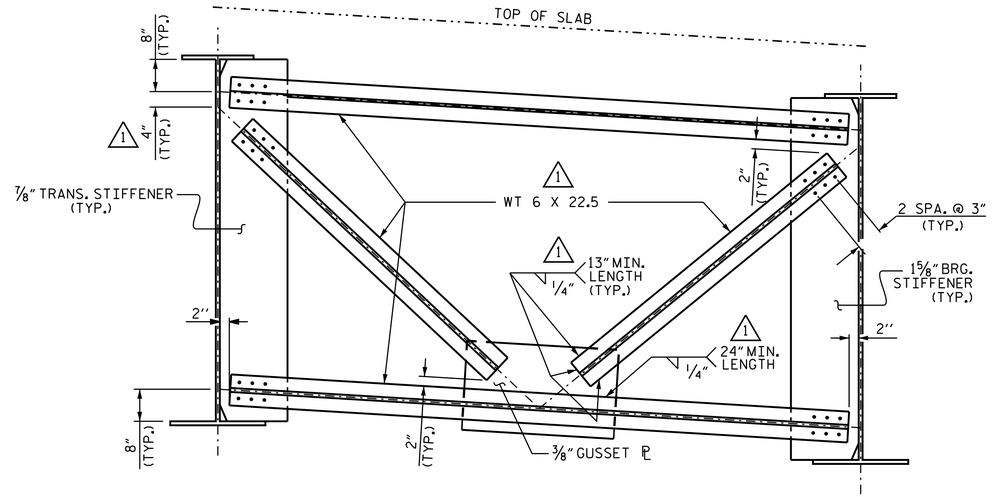
1			3			TOTAL SHEETS
2			4			79



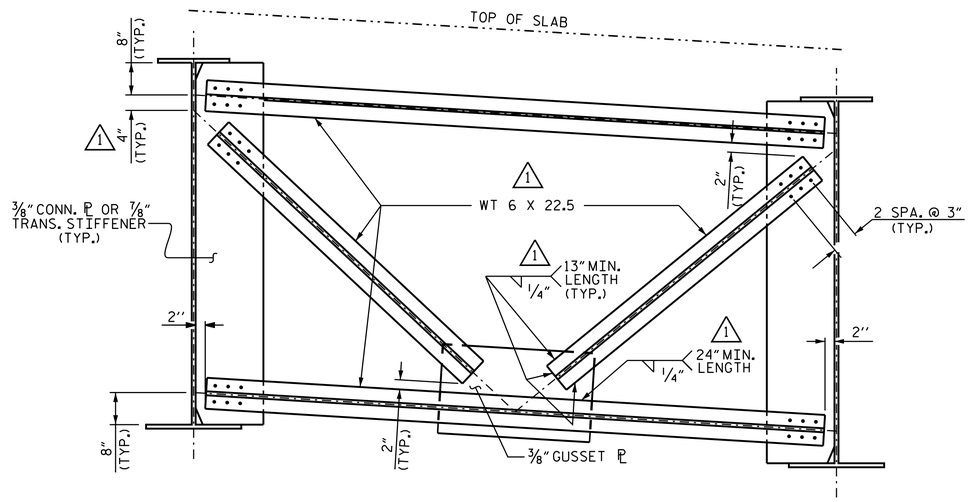
TYPICAL END BENT DIAPHRAGM D1

(18 TOTAL)



TYPICAL BENT DIAPHRAGM D3

(LOOKING UPSTATION)
(9 TOTAL)



TYPICAL INTERMEDIATE DIAPHRAGM D2

(LOOKING UPSTATION)
(144 TOTAL)

1 REVISED DIAPHRAGM WT SIZE, MIN. WELDS, AND SPACING DIMENSIONS.

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$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARGARET G. CHEEK, JR.
5FBCC2F3A4DC413 3/15/2022 | 8:13 AM EDT

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1	NMW	3/22	3			TOTAL SHEETS
2			4			79

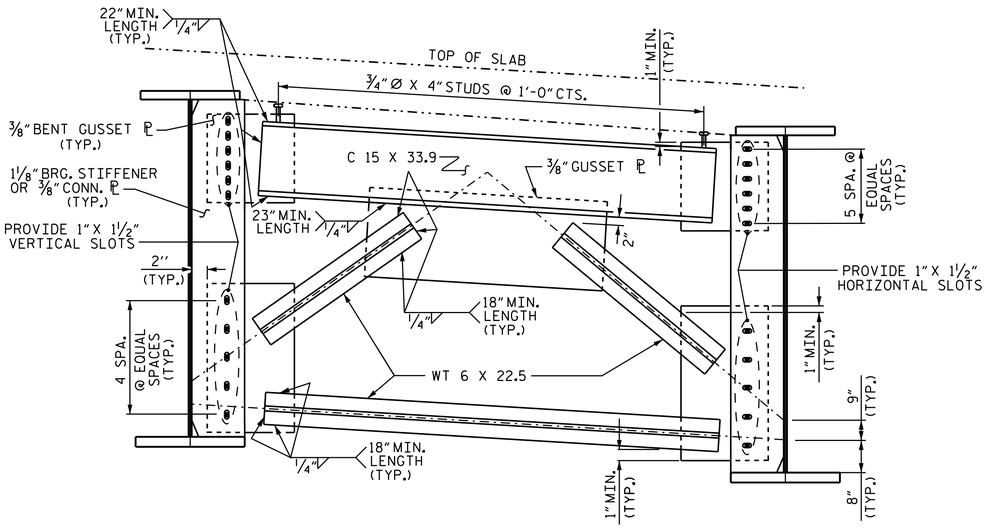
WATAUGA R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 2 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

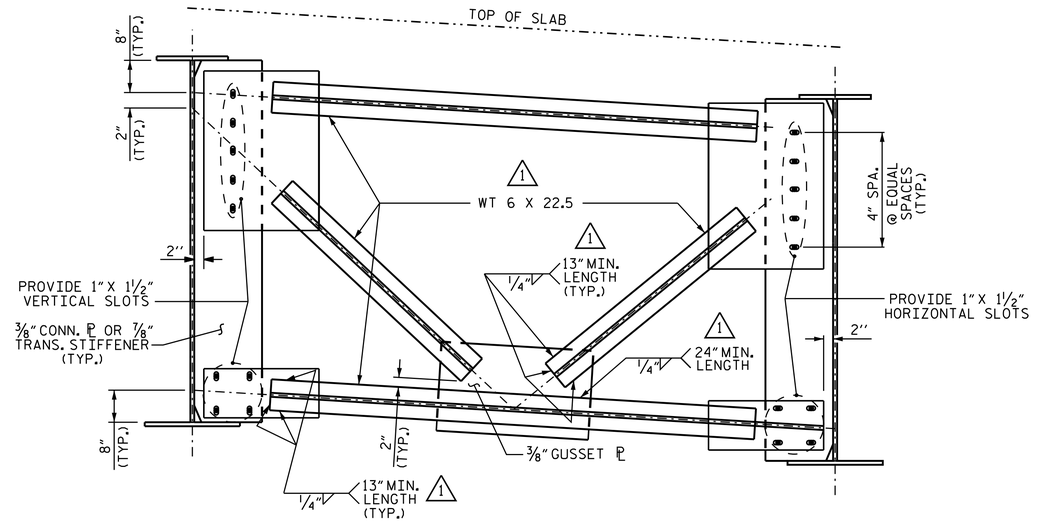
SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS



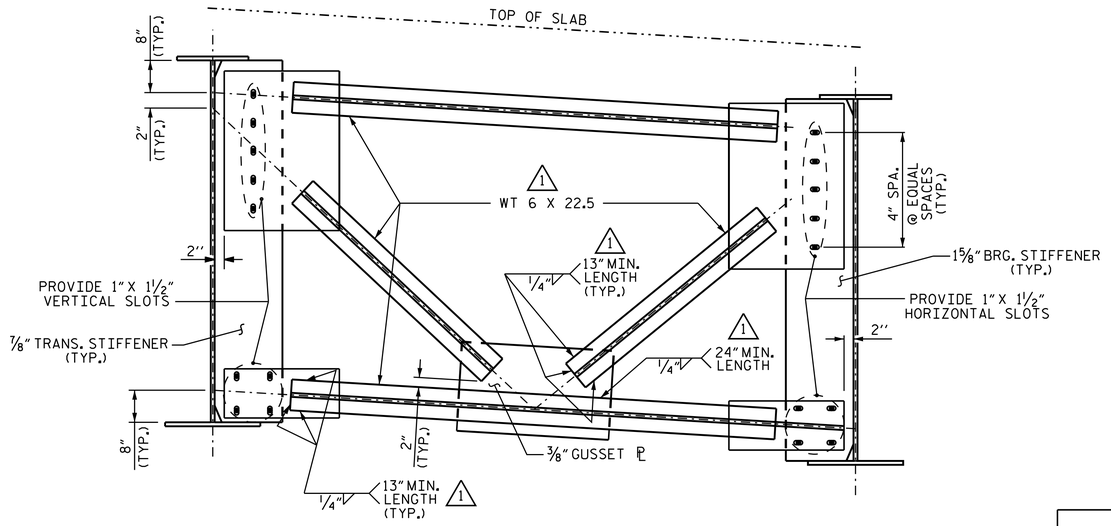
END BENT DIAPHRAGM D4-STAGE III

(2 TOTAL)



TYPICAL INTERMEDIATE DIAPHRAGM D5-STAGE III

(17 TOTAL)



TYPICAL BENT DIAPHRAGM D6-STAGE III

(1 REQ'D)

1 REVISED DIAPHRAGM WT SIZE, AND MIN. WELDS.

WATAUGA R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 3 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Document: Marshall G. Cheek, Jr.

SFBCC2F3A4DC413 3/15/2022 | 8:13 AM EDT

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SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1	NMW	3/22	3			TOTAL SHEETS
2			4			79

DRAWN BY : S. B. WILLIAMS DATE : 4-19
CHECKED BY : MGC DATE : 6-19
DESIGN ENGINEER OF RECORD: RDE DATE : 9-21

$$$$$$SYSTIME$$$$$
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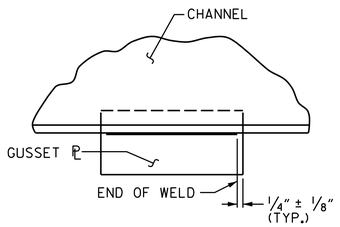
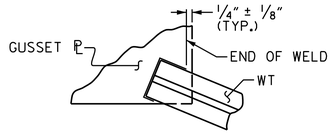
$$$$USERNAME$$$$



TYPICAL GUSSET PLATE CONNECTION



TYPICAL "TEE" TO GUSSET PLATE CONNECTION

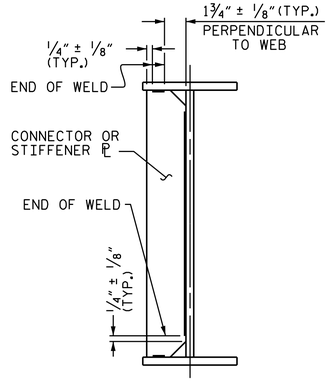
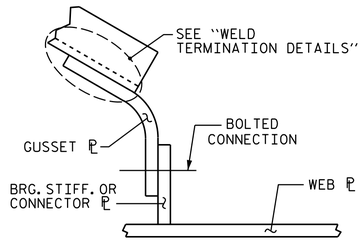


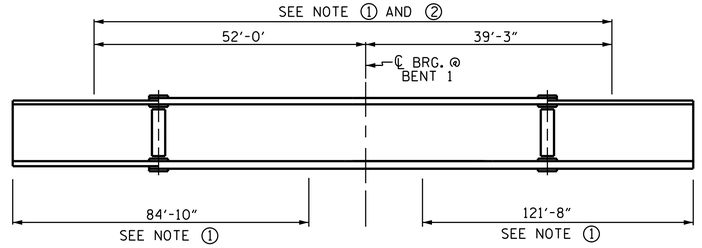
PLATE GIRDER

TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS

WELD TERMINATION DETAILS



BENT GUSSET PL

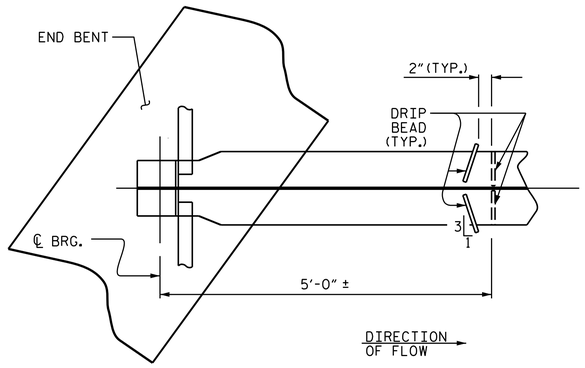


GIRDER MAKE UP

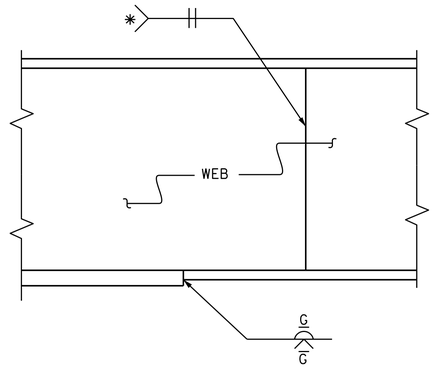
NOTE ①: CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS, ALL WEB PLATES, AND ALL SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

NOTE ②: NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION.

CHARPY V-NOTCH TESTS FOR CONTINUOUS PLATE GIRDERS

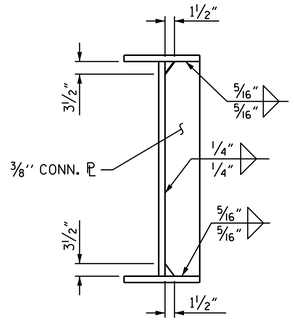


PART PLAN BOTTOM FLANGE
(END BENT SHOWN, BENT SIMILAR)

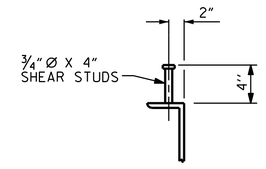


ELEVATION

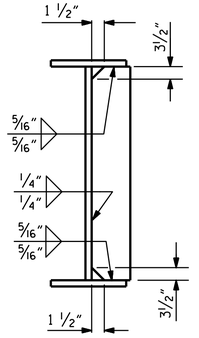
TYPICAL FLANGE AND WEB BUTT JOINT



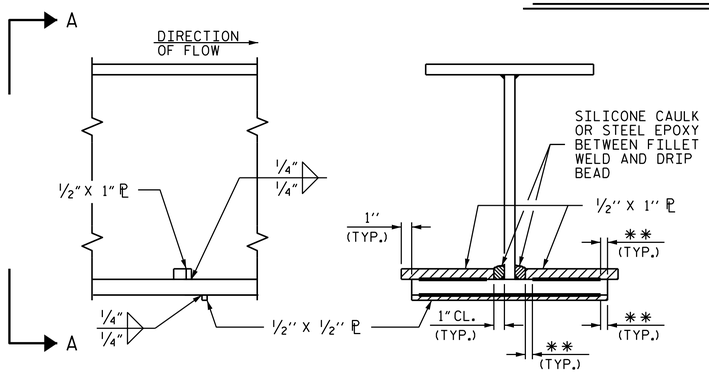
CONNECTOR PLATE



SHEAR STUD DETAILS
(TYP. EA. END BENT DIAPHRAGM)



TRANSVERSE STIFFENER

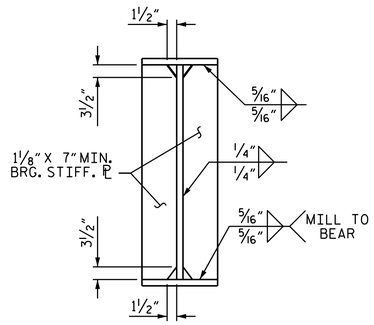


SECTION

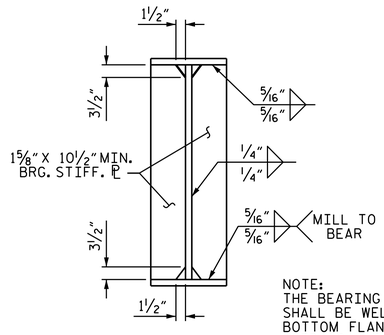
VIEW A-A

**SEE "WELD TERMINATION DETAILS"

DRIP BEAD DETAILS



BEARING STIFFENER
(AT END BENT)



BEARING STIFFENER
(AT BENT)

NOTE:
THE BEARING STIFFENER SHALL BE WELDED TO THE BOTTOM FLANGE ONLY WHEN USED AS A CONNECTOR PL.

PROJECT NO. R-2566BA
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SHEET 4 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.
Marshall G. Creek, Jr.
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SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
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DRAWN BY :	S. B. WILLIAMS	DATE :	4-19
CHECKED BY :	MGC	DATE :	5-19
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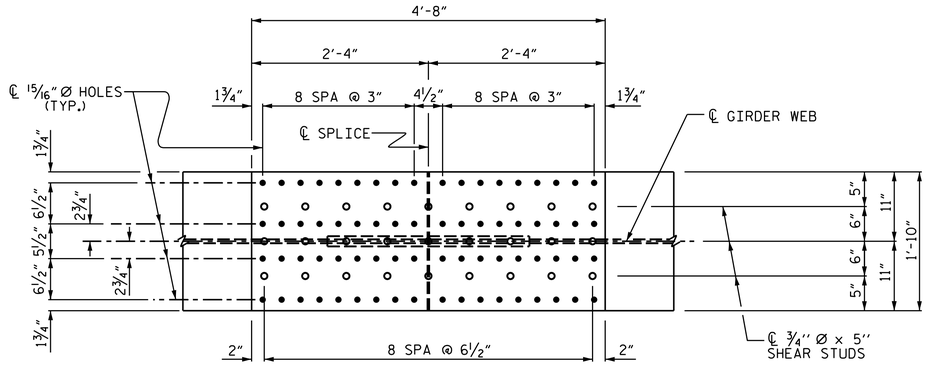
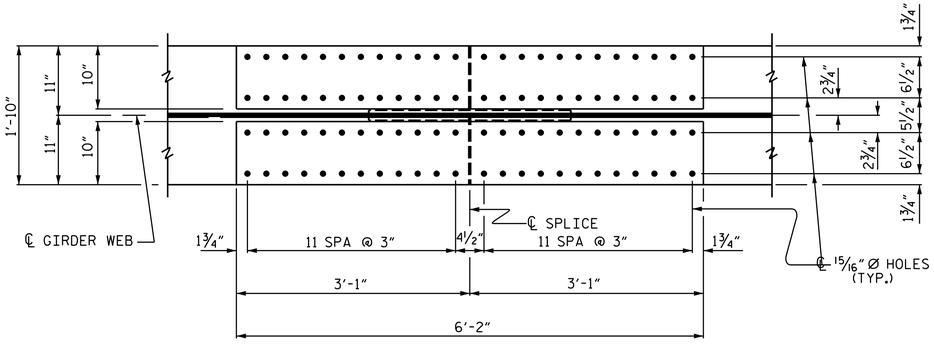
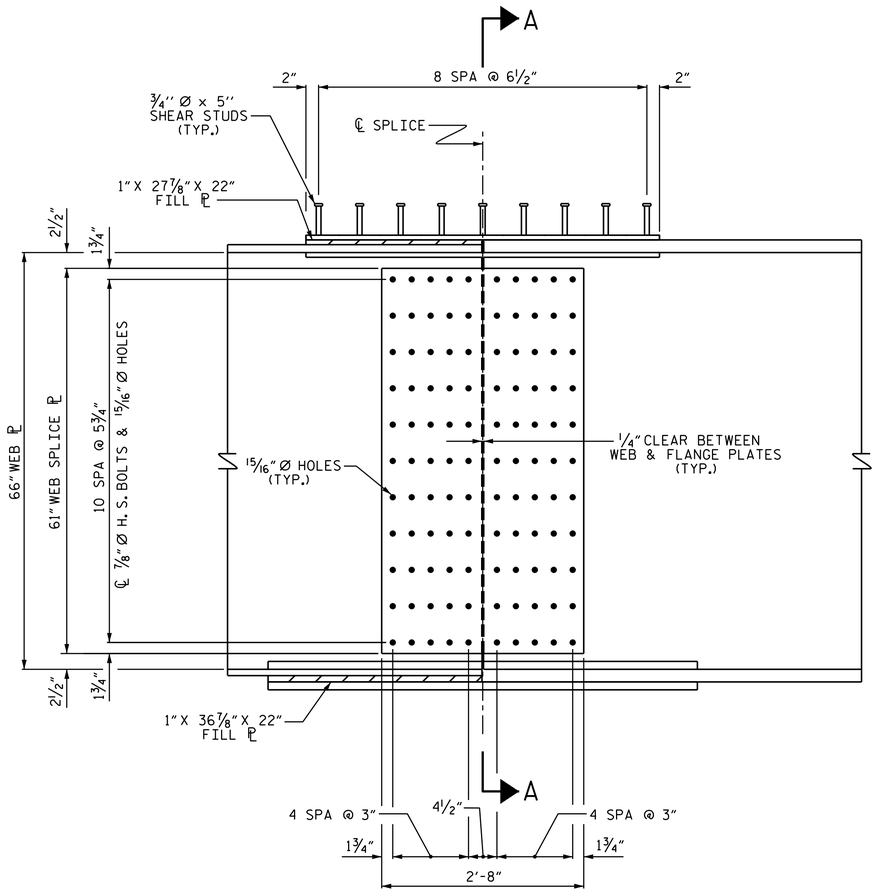
User:sbwilliams



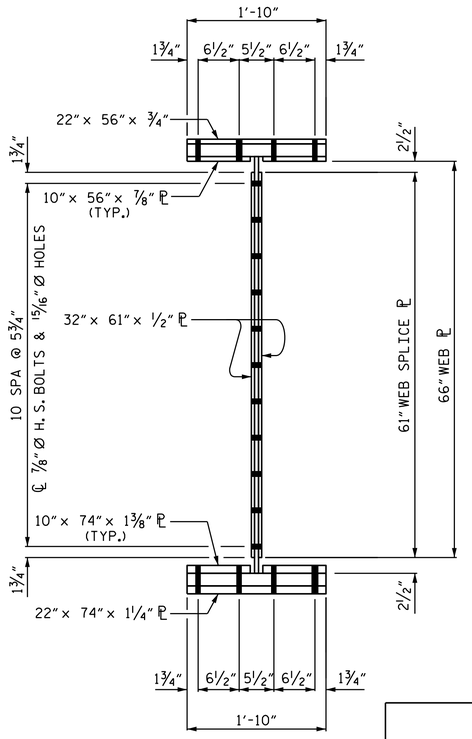
PLAN (TOP OF TOP FLANGE)



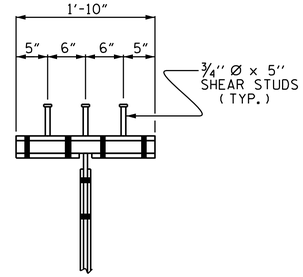
PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A



SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE

SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY.

BOLTED FIELD SPLICE NO. 1 DETAILS

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 5 OF 10

DRAWN BY : S. B. WILLIAMS DATE : 5-19

CHECKED BY : MGC DATE : 5-19

DESIGN ENGINEER OF RECORD: RDE DATE : 9-21

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.

Marshall G. Creek, Jr.

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STRUCTURAL STEEL DETAILS

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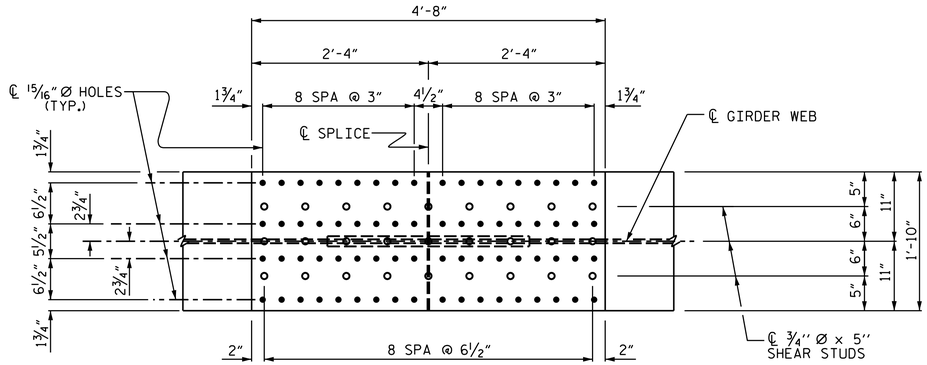
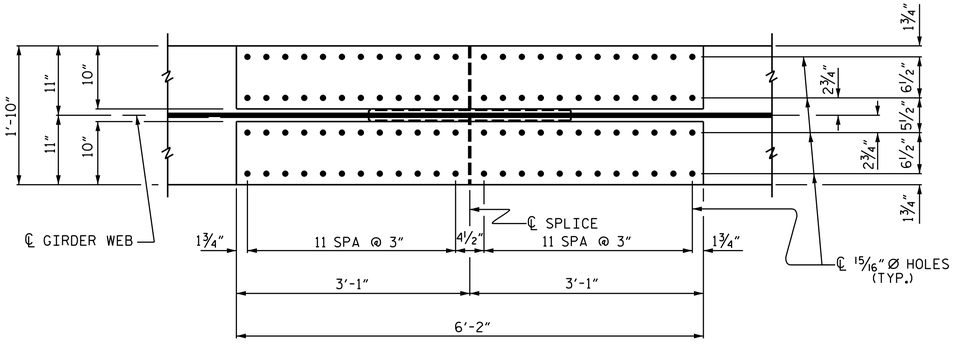
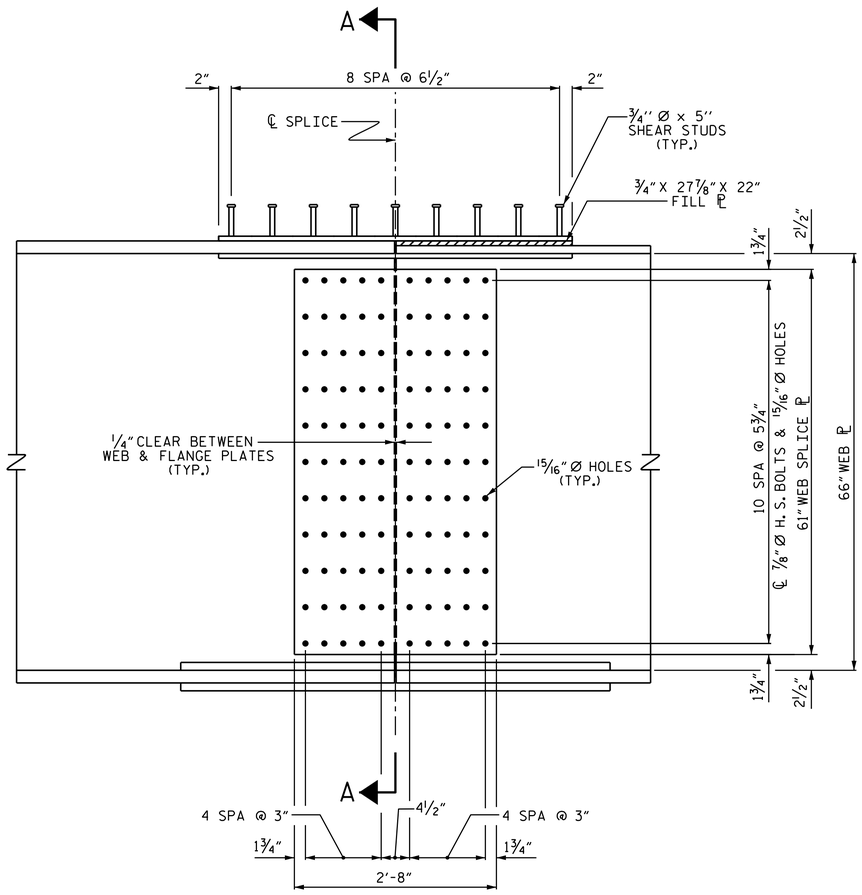


PLAN (TOP OF TOP FLANGE)



PLAN (TOP OF BOTTOM FLANGE)



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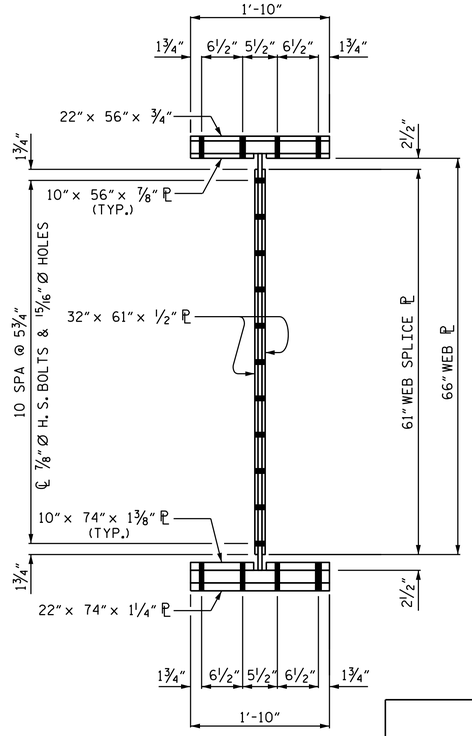
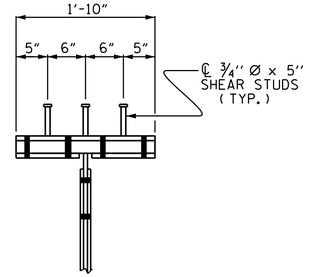


SECTION A-A



SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE

SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY.

BOLTED FIELD SPLICE NO. 2 DETAILS

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 6 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Digitally signed by Marshall G. Cheek, Jr.
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STRUCTURAL STEEL DETAILS

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1			3			TOTAL SHEETS
2			4			79

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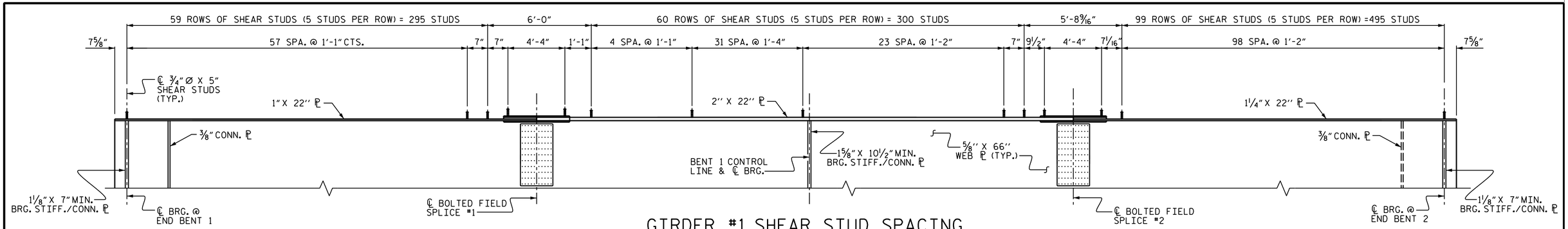
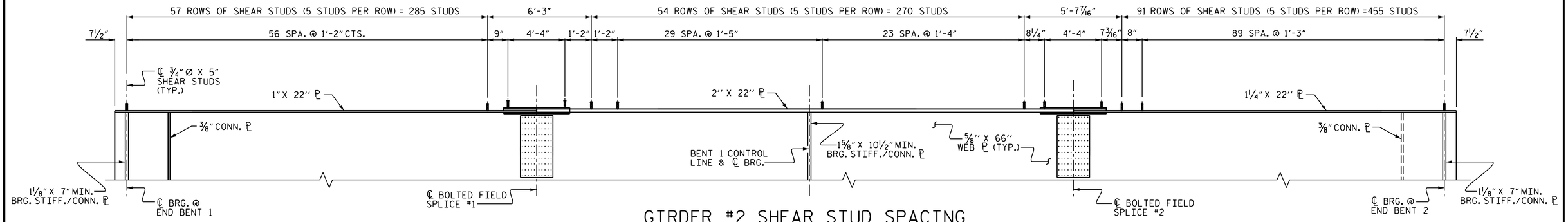


GIRDER #1 SHEAR STUD SPACING

FOR STUDS ON BOLTED FIELD SPLICE PLATE, SEE "BOLTED FIELD SPLICE DETAILS" SHEET 5 OR 6 OF 10.



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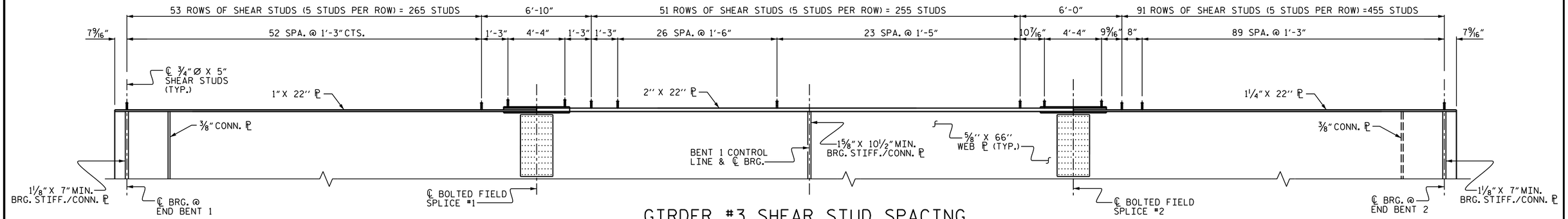
FOR STUDS ON BOLTED FIELD SPLICE PLATE, SEE "BOLTED FIELD SPLICE DETAILS" SHEET 5 OR 6 OF 10.



GIRDER #3 SHEAR STUD SPACING

FOR STUDS ON BOLTED FIELD SPLICE PLATE, SEE "BOLTED FIELD SPLICE DETAILS" SHEET 5 OR 6 OF 10.

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 7 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.

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STRUCTURAL STEEL DETAILS

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1			3			TOTAL SHEETS
2			4			79

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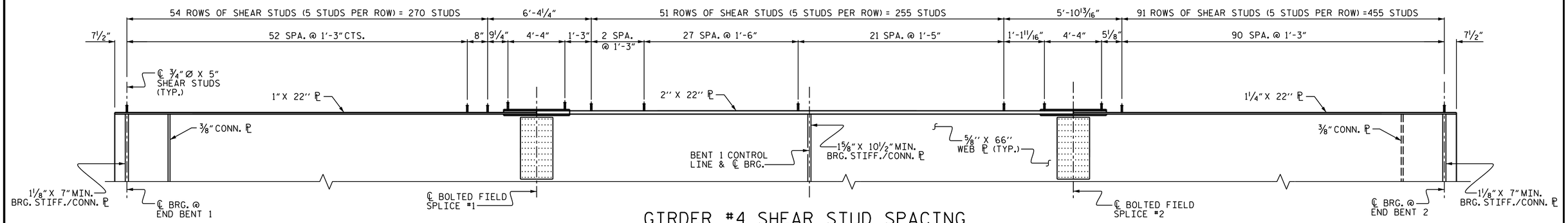

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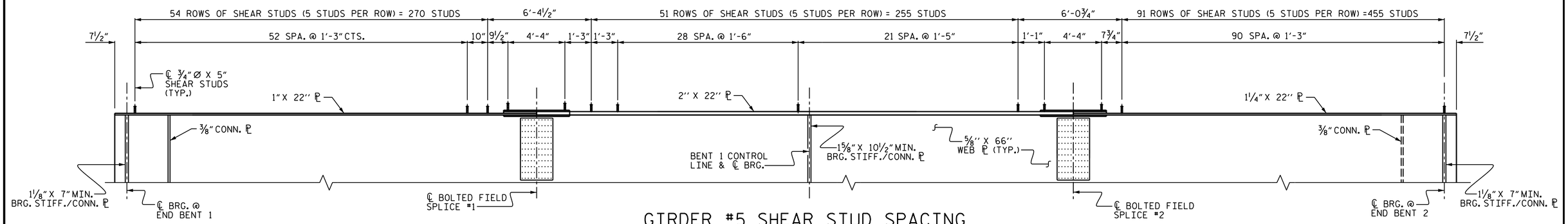

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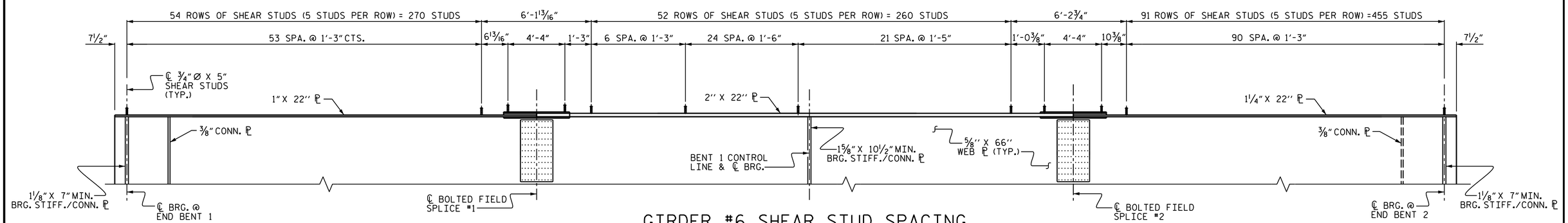

GIRDER #6 SHEAR STUD SPACING

FOR STUDS ON BOLTED FIELD SPLICE PLATE, SEE "BOLTED FIELD SPLICE DETAILS" SHEET 5 OR 6 OF 10.

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 8 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.

Marshall G. Creek, Jr.

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SUPERSTRUCTURE

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REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
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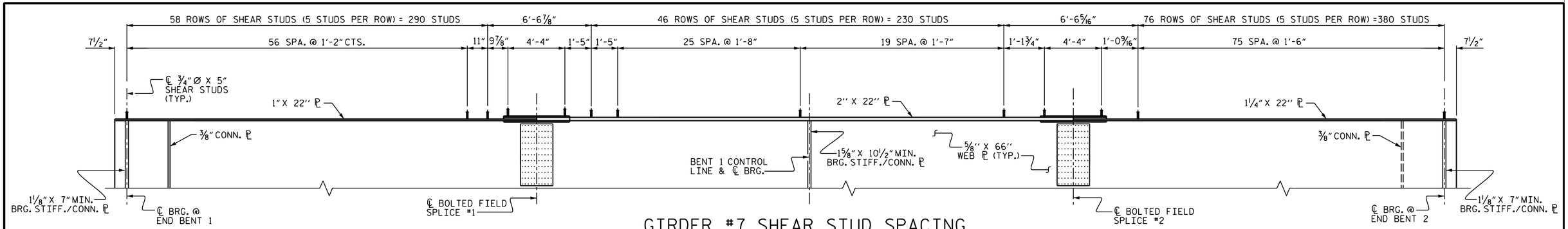

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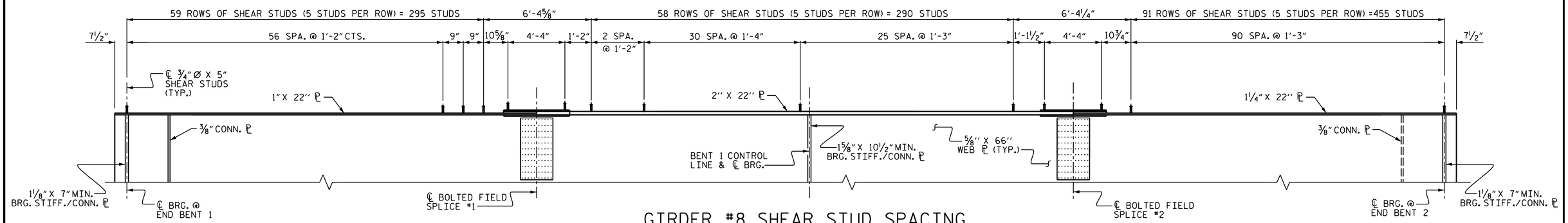
FOR STUDS ON BOLTED FIELD SPLICE PLATE, SEE "BOLTED FIELD SPLICE DETAILS" SHEET 5 OR 6 OF 10.



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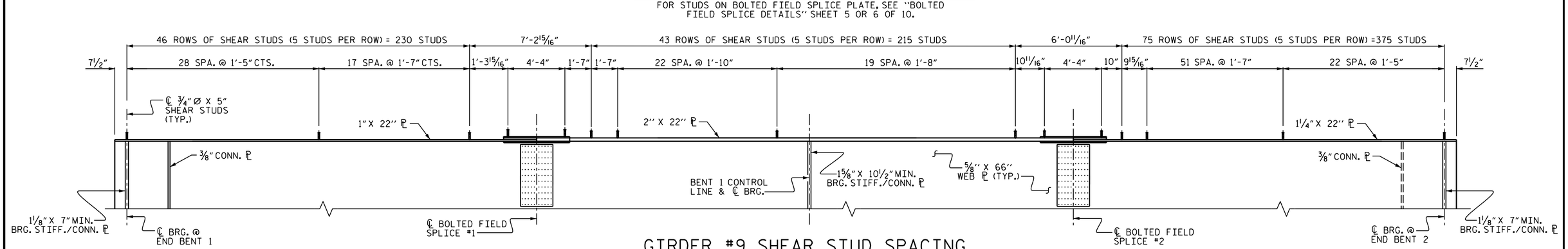
FOR STUDS ON BOLTED FIELD SPLICE PLATE, SEE "BOLTED FIELD SPLICE DETAILS" SHEET 5 OR 6 OF 10.



GIRDER #9 SHEAR STUD SPACING

FOR STUDS ON BOLTED FIELD SPLICE PLATE, SEE "BOLTED FIELD SPLICE DETAILS" SHEET 5 OR 6 OF 10.

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 9 OF 10

STATE OF NORTH CAROLINA
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RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CREEK, JR.

Marshall C. Creek, Jr.
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1			3			TOTAL SHEETS
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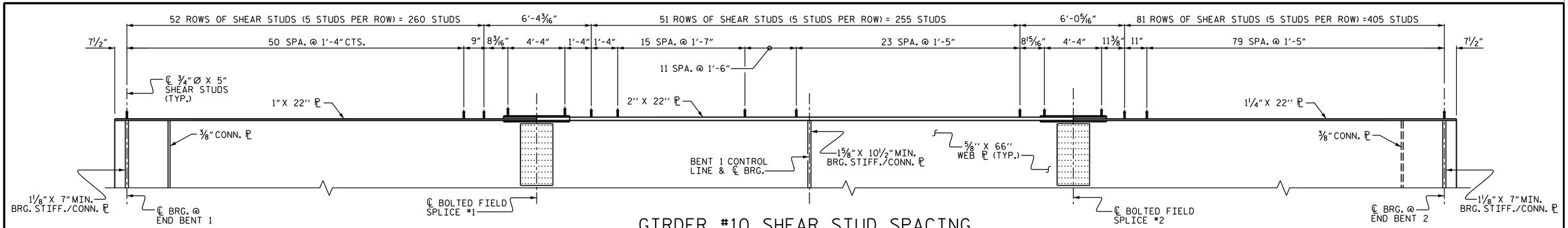
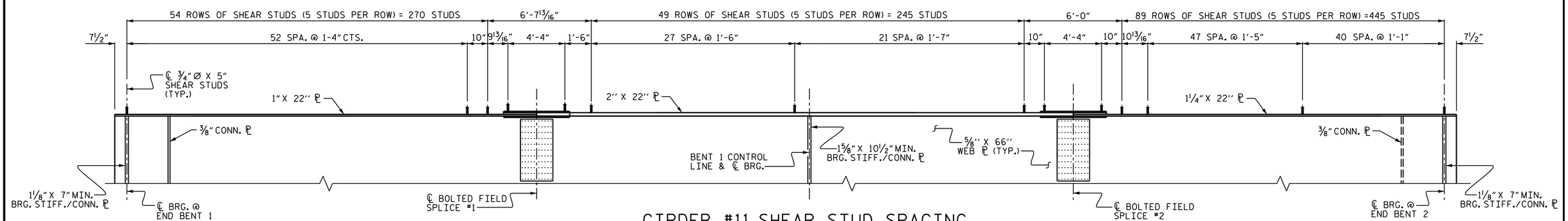
User:sbwilliams



GIRDER #10 SHEAR STUD SPACING

FOR STUDS ON BOLTED FIELD SPLICE PLATE, SEE "BOLTED FIELD SPLICE DETAILS" SHEET 5 OR 6 OF 10.



GIRDER #11 SHEAR STUD SPACING

FOR STUDS ON BOLTED FIELD SPLICE PLATE, SEE "BOLTED FIELD SPLICE DETAILS" SHEET 5 OR 6 OF 10.

NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 5 OR SYSTEM 6 OF THE STRUCTURAL STEEL SHOP COATINGS PROGRAM AND SECTION 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

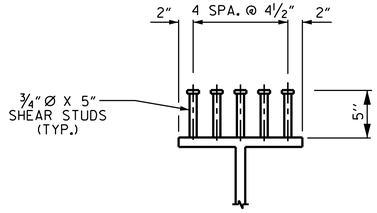
TENSION ON THE AASHTO A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS.

END OF GIRDERS SHALL BE PLUMB.

BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE TO AVOID INTERFERENCE WITH THE ANCHOR BOLT.

THE CONTRACTOR SHALL MAINTAIN STABILITY OF THE CURVED GIRDERS UNTIL ALL BOLTED FIELD SPLICES AND DIAPHRAGM CONNECTIONS HAVE BEEN COMPLETED.

NUTS ON BOLTS FOR CONNECTING DIAPHRAGM TO CONNECTOR PLATE IN BAY 7 SHALL REMAIN LOOSE FOR PURPOSE OF ADJUSTMENT UNTIL BOTH SIDES OF SLAB HAVE BEEN POURED.



SHEAR STUD DETAILS

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 10 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	S. B. WILLIAMS	DATE :	4-19
CHECKED BY :	MGC	DATE :	5-19
DESIGN ENGINEER OF RECORD:	RDE	DATE :	9-21

9/23/2021
X:\NCDOT\R-2566BA\Structures\Final plans\DGN files\401_053_R-2566BA_SMU_ SS10_S26_940005.dgn
User:sbwilliams

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER #1

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.006	0.007	0.007	0.008	0.008	0.008	0.008	0.008	0.007	0.007	0.006	0.005	0.005	0.004	0.003	0.002	0.001	0.000	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	-0.005	-0.005	-0.004	-0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.004	0.008	0.012	0.016	0.019	0.023	0.025	0.028	0.029	0.031	0.032	0.032	0.032	0.032	0.031	0.030	0.028	0.025	0.023	0.020	0.017	0.014	0.010	0.007	0.004	0.000	-0.003	-0.006	-0.008	-0.011	-0.013	-0.014	-0.015	-0.016	-0.015	-0.014	-0.012	-0.009	-0.005	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.001	0.001	0.002	0.002	0.003	0.003	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.004	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.006	0.011	0.017	0.022	0.027	0.032	0.035	0.039	0.040	0.044	0.045	0.045	0.045	0.045	0.043	0.042	0.039	0.035	0.033	0.029	0.024	0.020	0.015	0.010	0.006	0.000	-0.004	-0.008	-0.012	-0.016	-0.019	-0.020	-0.021	-0.022	-0.022	-0.020	-0.018	-0.014	-0.007	0.000
REQUIRED CAMBER ↑	0	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	7/16"	1/2"	1/2"	9/16"	9/16"	9/16"	9/16"	1/2"	1/2"	7/16"	7/16"	3/8"	5/16"	5/16"	1/4"	3/16"	1/8"	1/16"	0	-1/16"	-1/8"	-1/8"	-3/16"	-3/16"	-1/4"	-1/4"	-1/4"	-1/4"	-1/4"	-3/16"	-3/16"	-1/16"	0

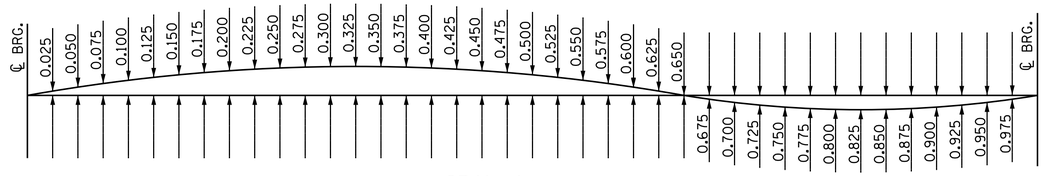
DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B

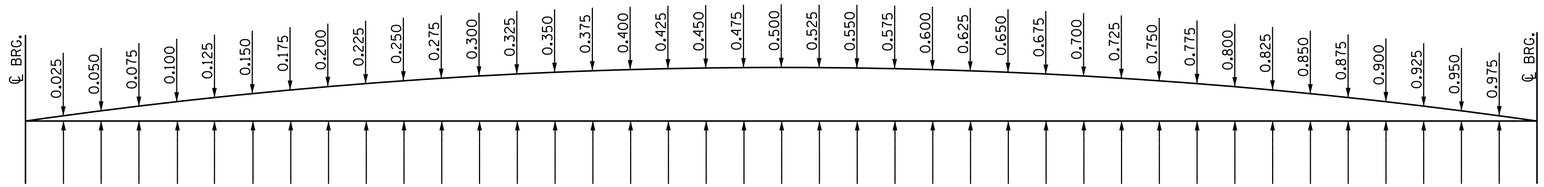
GIRDER #1

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.003	0.007	0.011	0.016	0.021	0.026	0.032	0.037	0.043	0.048	0.054	0.059	0.064	0.069	0.073	0.077	0.080	0.083	0.086	0.087	0.088	0.089	0.089	0.088	0.086	0.084	0.081	0.078	0.074	0.070	0.064	0.059	0.053	0.046	0.039	0.032	0.024	0.016	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.009	0.018	0.030	0.043	0.057	0.071	0.086	0.102	0.117	0.133	0.148	0.163	0.177	0.190	0.202	0.213	0.222	0.231	0.237	0.242	0.245	0.247	0.247	0.244	0.240	0.235	0.227	0.218	0.207	0.194	0.180	0.164	0.147	0.129	0.109	0.088	0.067	0.046	0.023	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.001	0.001	0.002	0.004	0.005	0.006	0.007	0.009	0.010	0.011	0.012	0.014	0.015	0.016	0.017	0.017	0.018	0.019	0.019	0.019	0.020	0.020	0.020	0.019	0.019	0.018	0.018	0.017	0.016	0.015	0.014	0.013	0.011	0.010	0.008	0.007	0.005	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.013	0.026	0.043	0.063	0.083	0.103	0.125	0.148	0.170	0.192	0.214	0.236	0.256	0.275	0.292	0.307	0.320	0.333	0.342	0.348	0.353	0.356	0.356	0.351	0.345	0.337	0.326	0.313	0.297	0.279	0.258	0.236	0.211	0.185	0.156	0.127	0.096	0.066	0.033	0.000
REQUIRED CAMBER ↑	0	1/8"	5/16"	1/2"	3/4"	1"	1 1/4"	1 1/2"	1 3/4"	2 1/16"	2 5/16"	2 9/16"	2 13/16"	3 1/16"	3 5/16"	3 1/2"	3 11/16"	3 7/8"	4"	4 1/8"	4 3/16"	4 1/4"	4 1/4"	4 1/4"	4 1/4"	4 1/8"	4 1/16"	3 15/16"	3 3/4"	3 3/16"	3 5/16"	3 1/8"	2 13/16"	2 1/2"	2 3/16"	1 7/8"	1 1/2"	1 3/16"	13/16"	3/8"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM). EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).



SPAN A



SPAN B

SCHEMATIC CAMBER ORDINATES

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 1 OF 11

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER Marshall G. Cheek, Jr.

Marshall G. Cheek, Jr.
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9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : ZCS DATE : 06/21
CHECKED BY : MGC DATE : 06/21
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

9/23/2021
X:\NCDOT\R-2566BA\Structures\Final plans\DGN files\401_055_R-2566BA_SMU_ DL01_S27_940005.dgn
User:sbwilliams

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER #2

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.003	0.004	0.005	0.006	0.007	0.008	0.008	0.009	0.009	0.010	0.010	0.010	0.010	0.009	0.009	0.008	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000	-0.001	-0.002	-0.003	-0.004	-0.005	-0.005	-0.005	-0.005	-0.005	-0.004	-0.003	-0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.005	0.009	0.013	0.017	0.021	0.025	0.028	0.030	0.033	0.034	0.036	0.036	0.037	0.036	0.036	0.034	0.033	0.031	0.028	0.025	0.022	0.019	0.016	0.012	0.009	0.005	0.002	-0.001	-0.004	-0.007	-0.009	-0.011	-0.012	-0.013	-0.013	-0.012	-0.011	-0.008	-0.005	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.001	0.001	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.006	0.013	0.018	0.024	0.029	0.034	0.039	0.041	0.045	0.046	0.050	0.050	0.051	0.050	0.049	0.047	0.045	0.043	0.039	0.034	0.030	0.026	0.022	0.017	0.012	0.007	0.003	-0.002	-0.006	-0.010	-0.013	-0.016	-0.017	-0.018	-0.018	-0.017	-0.015	-0.011	-0.007	0.000
REQUIRED CAMBER ↑	0	1/16"	1/8"	1/4"	5/16"	3/8"	3/8"	7/16"	1/2"	9/16"	9/16"	9/16"	5/8"	5/8"	5/8"	9/16"	9/16"	9/16"	1/2"	7/16"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0	0	-1/16"	-1/8"	-1/8"	-3/16"	-3/16"	-1/4"	-1/4"	-3/16"	-3/16"	-1/8"	-1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B

GIRDER #2

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.003	0.007	0.011	0.015	0.020	0.025	0.031	0.036	0.042	0.047	0.052	0.058	0.063	0.067	0.071	0.075	0.079	0.081	0.084	0.085	0.087	0.087	0.087	0.087	0.085	0.083	0.080	0.077	0.073	0.068	0.063	0.058	0.052	0.045	0.038	0.031	0.024	0.016	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.008	0.017	0.029	0.041	0.054	0.068	0.083	0.098	0.113	0.129	0.143	0.158	0.172	0.184	0.196	0.207	0.217	0.225	0.231	0.236	0.240	0.241	0.241	0.241	0.235	0.230	0.223	0.214	0.203	0.191	0.177	0.161	0.144	0.126	0.107	0.087	0.066	0.044	0.022	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.001	0.002	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010	0.011	0.011	0.012	0.013	0.013	0.014	0.014	0.015	0.015	0.015	0.015	0.015	0.015	0.014	0.014	0.013	0.013	0.012	0.011	0.010	0.009	0.008	0.007	0.005	0.004	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.011	0.025	0.042	0.058	0.077	0.097	0.119	0.141	0.162	0.184	0.204	0.226	0.246	0.262	0.279	0.295	0.309	0.320	0.329	0.336	0.342	0.343	0.343	0.343	0.335	0.327	0.317	0.304	0.289	0.271	0.251	0.229	0.205	0.179	0.152	0.123	0.094	0.063	0.031	0.000
REQUIRED CAMBER ↑	0	1/8"	5/16"	1/2"	11/16"	15/16"	1 3/16"	1 7/16"	1 11/16"	1 15/16"	2 3/16"	2 7/16"	2 11/16"	2 15/16"	3 3/16"	3 3/8"	3 9/16"	3 11/16"	3 13/16"	3 15/16"	4 1/16"	4 1/16"	4 1/8"	4 1/8"	4 1/8"	4"	3 15/16"	3 13/16"	3 5/8"	3 7/16"	3 1/4"	3"	2 3/4"	2 7/16"	2 1/8"	1 13/16"	1 1/2"	1 1/8"	3/4"	3/8"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM). EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 2 OF 11

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL B. CHEEK, JR.

Marshall B. Cheek, Jr.
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9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : ZCS DATE : 06/21
CHECKED BY : MGC DATE : 06/21
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

9/23/2021
X:\NCDOT\R-2566BA\Structures\Final plans\DGN files\401_057_R-2566BA_SMU_ DL02_S28_940005.dgn
User:sbwilliams

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN A																																								
	GIRDER #3																																								
FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.003	0.004	0.005	0.007	0.008	0.009	0.010	0.010	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.010	0.009	0.009	0.008	0.007	0.006	0.005	0.003	0.002	0.001	0.000	-0.001	-0.002	-0.003	-0.003	-0.004	-0.004	-0.005	-0.005	-0.004	-0.004	-0.003	-0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.005	0.010	0.015	0.019	0.023	0.027	0.031	0.033	0.036	0.038	0.040	0.041	0.041	0.041	0.040	0.039	0.038	0.036	0.033	0.031	0.027	0.024	0.021	0.017	0.013	0.010	0.006	0.003	0.000	-0.003	-0.006	-0.008	-0.010	-0.011	-0.011	-0.011	-0.010	-0.008	-0.004	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.006	0.014	0.020	0.025	0.031	0.036	0.042	0.045	0.048	0.051	0.053	0.054	0.054	0.054	0.053	0.052	0.050	0.047	0.044	0.041	0.036	0.032	0.028	0.022	0.017	0.012	0.007	0.003	-0.001	-0.005	-0.009	-0.012	-0.014	-0.016	-0.016	-0.015	-0.014	-0.011	-0.006	0.000
REQUIRED CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	5/8"	11/16"	11/16"	5/8"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	1/16"	0	-1/16"	-1/8"	-1/8"	-3/16"	-3/16"	-3/16"	-3/16"	-3/16"	-1/8"	-1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN B																																								
	GIRDER #3																																								
FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.003	0.006	0.010	0.015	0.019	0.024	0.030	0.035	0.041	0.046	0.051	0.056	0.061	0.066	0.070	0.074	0.077	0.080	0.082	0.084	0.085	0.086	0.086	0.085	0.084	0.082	0.079	0.076	0.072	0.068	0.063	0.057	0.051	0.045	0.038	0.031	0.023	0.016	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.007	0.017	0.027	0.039	0.052	0.066	0.080	0.095	0.110	0.125	0.140	0.154	0.167	0.180	0.192	0.202	0.212	0.220	0.226	0.231	0.235	0.237	0.237	0.236	0.231	0.226	0.219	0.210	0.200	0.187	0.174	0.159	0.142	0.124	0.106	0.086	0.065	0.044	0.022	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.001	0.001	0.002	0.002	0.003	0.003	0.004	0.005	0.005	0.006	0.007	0.007	0.008	0.008	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.009	0.009	0.008	0.008	0.007	0.006	0.006	0.005	0.004	0.003	0.002	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.010	0.024	0.038	0.056	0.073	0.093	0.113	0.134	0.156	0.176	0.197	0.217	0.235	0.254	0.270	0.285	0.298	0.310	0.318	0.325	0.330	0.333	0.333	0.331	0.325	0.318	0.308	0.295	0.281	0.263	0.245	0.223	0.199	0.175	0.149	0.121	0.091	0.062	0.031	0.000
REQUIRED CAMBER ↑	0	1/8"	1/4"	7/16"	11/16"	7/8"	1 1/8"	1 3/8"	1 5/8"	1 7/8"	2 1/8"	2 3/8"	2 5/8"	2 13/16"	3 1/16"	3 1/4"	3 7/8"	3 9/16"	3 11/16"	3 13/16"	3 7/8"	3 15/16"	4"	4"	4"	3 7/8"	3 13/16"	3 11/16"	3 9/16"	3 3/8"	3 3/16"	2 15/16"	2 11/16"	2 3/8"	2 1/8"	1 3/4"	1 7/16"	1 1/8"	3/4"	3/8"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM). EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 3 OF 11

SEAL
20125

DocuSigned by:
Marshall G. Cheek, Jr.
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9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD
DEFLECTIONS

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

SHEET NO.
S-29
TOTAL SHEETS
79

DRAWN BY : ZCS DATE : 06/21
CHECKED BY : MGC DATE : 06/21
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

9/23/2021
X:\NCDOT\R-2566BA\Structures\Finalplans\DGN files\401_059_R-2566BA_SMU_ DL03_S29_940005.dgn
User:sbwilliams

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER #4

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.003	0.005	0.006	0.007	0.008	0.010	0.011	0.011	0.012	0.012	0.013	0.013	0.013	0.013	0.012	0.012	0.011	0.010	0.009	0.008	0.007	0.006	0.005	0.004	0.003	0.001	0.000	-0.001	-0.002	-0.003	-0.003	-0.004	-0.004	-0.004	-0.004	-0.004	-0.003	-0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.005	0.011	0.016	0.020	0.025	0.029	0.033	0.036	0.039	0.041	0.043	0.044	0.045	0.045	0.045	0.044	0.042	0.040	0.038	0.035	0.032	0.028	0.025	0.021	0.017	0.013	0.010	0.006	0.003	0.000	-0.003	-0.006	-0.007	-0.009	-0.010	-0.010	-0.009	-0.007	-0.004	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.007	0.014	0.021	0.026	0.033	0.038	0.044	0.048	0.051	0.054	0.056	0.058	0.059	0.059	0.059	0.057	0.055	0.052	0.049	0.045	0.041	0.036	0.032	0.027	0.022	0.017	0.011	0.006	0.002	-0.002	-0.006	-0.009	-0.011	-0.013	-0.014	-0.014	-0.013	-0.010	-0.006	0.000
REQUIRED CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	5/8"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0	0	-1/16"	-1/8"	-1/8"	-3/16"	-3/16"	-3/16"	-1/8"	-1/8"	-1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B

GIRDER #4

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.003	0.006	0.010	0.014	0.019	0.024	0.029	0.034	0.039	0.045	0.050	0.055	0.060	0.064	0.068	0.072	0.075	0.078	0.081	0.082	0.084	0.084	0.084	0.084	0.082	0.080	0.078	0.075	0.071	0.066	0.062	0.056	0.050	0.044	0.037	0.030	0.023	0.016	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.007	0.016	0.026	0.038	0.050	0.064	0.078	0.092	0.107	0.121	0.136	0.150	0.163	0.175	0.187	0.198	0.207	0.215	0.221	0.226	0.230	0.232	0.232	0.232	0.227	0.222	0.215	0.206	0.196	0.184	0.171	0.156	0.140	0.122	0.104	0.084	0.064	0.043	0.022	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.005	0.005	0.005	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.010	0.022	0.037	0.053	0.070	0.090	0.109	0.128	0.149	0.169	0.190	0.209	0.227	0.244	0.260	0.275	0.287	0.299	0.308	0.314	0.320	0.322	0.322	0.322	0.315	0.308	0.299	0.287	0.272	0.255	0.238	0.216	0.194	0.169	0.144	0.116	0.089	0.060	0.031	0.000
REQUIRED CAMBER ↑	0	1/8"	1/4"	7/16"	5/8"	13/16"	1 1/16"	1 5/16"	1 9/16"	1 13/16"	2"	2 1/4"	2 1/2"	2 3/4"	2 15/16"	3 1/8"	3 5/16"	3 7/16"	3 9/16"	3 11/16"	3 3/4"	3 13/16"	3 7/8"	3 7/8"	3 7/8"	3 3/4"	3 11/16"	3 9/16"	3 7/16"	3 1/4"	3 1/16"	2 7/8"	2 5/8"	2 5/16"	2 1/16"	1 3/4"	1 3/8"	1 1/16"	11/16"	3/8"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM). EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 4 OF 11

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.
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9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : ZCS DATE : 06/21
CHECKED BY : MGC DATE : 06/21
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

9/23/2021
X:\NCDOT\R-2566BA\Structures\Final plans\DGN files\401_061_R-2566BA_SMU_ DL04_S30_940005.dgn
User:sbwilliams

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER #5

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.003	0.005	0.006	0.008	0.009	0.0010	0.011	0.012	0.013	0.013	0.014	0.014	0.014	0.014	0.013	0.013	0.012	0.011	0.011	0.010	0.008	0.007	0.006	0.005	0.004	0.002	0.001	0.000	-0.001	-0.002	-0.002	-0.003	-0.003	-0.004	-0.004	-0.003	-0.003	-0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.006	0.011	0.016	0.021	0.026	0.030	0.034	0.038	0.041	0.043	0.045	0.047	0.048	0.048	0.048	0.047	0.045	0.044	0.041	0.038	0.035	0.032	0.028	0.024	0.021	0.017	0.013	0.009	0.006	0.002	-0.001	-0.003	-0.005	-0.007	-0.008	-0.008	-0.008	-0.006	-0.004	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.008	0.014	0.021	0.027	0.034	0.039	0.044	0.049	0.053	0.056	0.058	0.061	0.062	0.062	0.062	0.060	0.058	0.056	0.052	0.049	0.045	0.040	0.035	0.030	0.026	0.021	0.015	0.010	0.006	0.001	-0.003	-0.005	-0.008	-0.010	-0.012	-0.012	-0.011	-0.009	-0.005	0.000
REQUIRED CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	7/16"	1/2"	9/16"	9/16"	5/8"	11/16"	11/16"	3/4"	3/4"	3/4"	3/4"	3/4"	11/16"	11/16"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0	0	-1/16"	-1/8"	-1/8"	-1/8"	-1/8"	-1/8"	-1/8"	-1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B

GIRDER #5

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.003	0.006	0.009	0.014	0.018	0.023	0.028	0.033	0.038	0.043	0.048	0.053	0.058	0.062	0.067	0.070	0.074	0.076	0.079	0.080	0.082	0.082	0.082	0.082	0.080	0.078	0.076	0.073	0.069	0.065	0.060	0.055	0.049	0.043	0.037	0.030	0.023	0.015	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.007	0.015	0.025	0.036	0.048	0.061	0.075	0.089	0.103	0.117	0.131	0.145	0.158	0.170	0.181	0.192	0.201	0.209	0.215	0.220	0.224	0.226	0.226	0.226	0.221	0.216	0.210	0.201	0.191	0.180	0.167	0.152	0.137	0.120	0.102	0.082	0.063	0.042	0.021	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.010	0.021	0.034	0.050	0.067	0.085	0.104	0.123	0.142	0.161	0.181	0.200	0.218	0.234	0.250	0.264	0.277	0.288	0.297	0.303	0.309	0.311	0.311	0.311	0.304	0.297	0.289	0.277	0.262	0.247	0.229	0.209	0.188	0.165	0.140	0.113	0.087	0.058	0.029	0.000
REQUIRED CAMBER ↑	0	1/8"	1/4"	7/16"	5/8"	13/16"	1"	1 1/4"	1 1/2"	1 11/16"	1 15/16"	2 3/16"	2 3/8"	2 5/8"	2 13/16"	3"	3 3/16"	3 5/16"	3 7/16"	3 9/16"	3 5/8"	3 11/16"	3 3/4"	3 3/4"	3 3/4"	3 5/8"	3 9/16"	3 7/16"	3 5/16"	3 3/16"	2 15/16"	2 3/4"	2 1/2"	2 1/4"	2"	1 11/16"	1 3/8"	1"	11/16"	3/8"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM). EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 5 OF 11

SEAL 20125
MARSHALL G. CHEEK, JR.
DocuSigned by:
Marshall G. Cheek, Jr.
5FBCC2F3A4DC413...
9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD
DEFLECTIONS

REVISIONS

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

SHEET NO. S-31
TOTAL SHEETS 79

DRAWN BY : ZCS DATE : 06/21
CHECKED BY : MGC DATE : 06/21
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER #6

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.003	0.005	0.006	0.008	0.009	0.010	0.011	0.012	0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.013	0.012	0.011
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.006	0.011	0.017	0.022	0.027	0.031	0.035	0.039	0.042	0.044	0.047	0.048	0.049	0.049	0.049	0.049	0.047	0.046	0.043	0.041
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.008	0.014	0.022	0.028	0.035	0.040	0.045	0.050	0.054	0.057	0.061	0.062	0.063	0.063	0.063	0.063	0.060	0.059	0.055	0.052
REQUIRED CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	7/16"	1/2"	9/16"	5/8"	5/8"	11/16"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	11/16"	11/16"	5/8"

FORTIETH POINTS	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.010	0.009	0.008	0.007	0.006	0.004	0.003	0.002	0.001	0.000	-0.001	-0.002	-0.002	-0.003	-0.003	-0.003	-0.003	-0.002	-0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.038	0.034	0.031	0.027	0.023	0.019	0.015	0.012	0.008	0.005	0.001	-0.001	-0.004	-0.005	-0.007	-0.007	-0.007	-0.006	-0.003	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.048	0.043	0.039	0.034	0.029	0.023	0.018	0.014	0.009	0.005	0.000	-0.003	-0.006	-0.008	-0.010	-0.010	-0.010	-0.008	-0.004	0.000
REQUIRED CAMBER ↑	9/16"	1/2"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0	-1/16"	-1/16"	-1/8"	-1/8"	-1/8"	-1/8"	-1/8"	-1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B

GIRDER #6

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.005	0.009	0.013	0.017	0.022	0.027	0.032	0.037	0.042	0.047	0.051	0.056	0.060	0.064	0.068	0.071	0.074	0.076	0.078
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.006	0.014	0.023	0.034	0.045	0.058	0.071	0.084	0.098	0.112	0.125	0.138	0.151	0.163	0.174	0.184	0.193	0.201	0.207	0.212
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.008	0.019	0.032	0.047	0.062	0.080	0.098	0.116	0.135	0.154	0.172	0.189	0.207	0.223	0.238	0.252	0.264	0.275	0.283	0.290
REQUIRED CAMBER ↑	0	1/8"	1/4"	3/8"	9/16"	3/4"	15/16"	1 3/16"	1 3/8"	1 5/8"	1 13/16"	2 1/16"	2 1/4"	2 1/2"	2 11/16"	2 7/8"	3"	3 3/16"	3 5/16"	3 3/8"	3 1/2"

FORTIETH POINTS	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.079	0.080	0.080	0.080	0.078	0.076	0.074	0.071	0.067	0.063	0.059	0.054	0.048	0.042	0.036	0.029	0.022	0.015	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.216	0.217	0.218	0.218	0.213	0.209	0.202	0.194	0.185	0.174	0.161	0.147	0.132	0.116	0.098	0.080	0.061	0.041	0.021	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.295	0.297	0.298	0.298	0.291	0.285	0.276	0.265	0.252	0.237	0.220	0.201	0.180	0.158	0.134	0.109	0.083	0.056	0.029	0.000
REQUIRED CAMBER ↑	3 9/16"	3 9/16"	3 9/16"	3 9/16"	3 1/2"	3 7/16"	3 5/16"	3 3/16"	3"	2 7/8"	2 5/8"	2 7/16"	2 3/16"	1 7/8"	1 5/8"	1 5/16"	1"	11/16"	5/16"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM). EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 6 OF 11

SEAL 20125
MARSHALL G. CHEEK, JR.

DocuSigned by:
Marshall G. Cheek, Jr.
5FBCC2F3A4DC413...

9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

REVISIONS

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

SHEET NO.
S-32
TOTAL SHEETS
79

DRAWN BY : ZCS DATE : 06/21
CHECKED BY : MGC DATE : 06/21
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

9/23/2021
X:\NCDOT\R-2566BA\Structures\Finalplans\DGN files\401_065_R-2566BA_SMU_ DL06_S32_940005.dgn
User:sbwilliams

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER #7

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.003	0.005	0.006	0.008	0.009	0.010	0.011	0.012	0.013	0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.012	0.012	0.011	0.010	0.008	0.007	0.006	0.005	0.004	0.003	0.001	0.000	-0.001	-0.001	-0.002	-0.003	-0.003	-0.003	-0.003	-0.002	-0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.006	0.011	0.016	0.022	0.026	0.031	0.035	0.039	0.042	0.045	0.047	0.048	0.049	0.050	0.050	0.049	0.048	0.047	0.045	0.042	0.039	0.036	0.032	0.028	0.025	0.021	0.017	0.013	0.009	0.006	0.003	0.000	-0.002	-0.004	-0.006	-0.006	-0.006	-0.005	-0.003	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.008	0.014	0.021	0.028	0.034	0.040	0.045	0.050	0.054	0.058	0.060	0.062	0.063	0.064	0.064	0.063	0.062	0.060	0.057	0.054	0.050	0.046	0.040	0.035	0.031	0.026	0.021	0.016	0.010	0.006	0.002	-0.001	-0.004	-0.007	-0.009	-0.009	-0.009	-0.007	-0.004	0.000
REQUIRED CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	7/16"	1/2"	9/16"	5/8"	5/8"	11/16"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	11/16"	11/16"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0	0	-1/16"	-1/16"	-1/8"	-1/8"	-1/8"	-1/16"	-1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B

GIRDER #7

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.005	0.008	0.012	0.016	0.021	0.025	0.030	0.035	0.040	0.045	0.049	0.054	0.058	0.062	0.065	0.068	0.071	0.073	0.075	0.076	0.076	0.076	0.076	0.075	0.073	0.071	0.068	0.065	0.061	0.056	0.051	0.046	0.040	0.034	0.028	0.021	0.014	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.006	0.013	0.022	0.032	0.043	0.055	0.067	0.080	0.093	0.106	0.119	0.132	0.144	0.155	0.166	0.175	0.184	0.191	0.197	0.202	0.206	0.207	0.208	0.208	0.204	0.199	0.193	0.185	0.176	0.166	0.154	0.140	0.126	0.110	0.094	0.076	0.058	0.039	0.020	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.000	0.000	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.008	0.018	0.030	0.044	0.059	0.075	0.091	0.109	0.127	0.145	0.163	0.180	0.196	0.211	0.226	0.238	0.250	0.260	0.268	0.275	0.280	0.281	0.282	0.282	0.277	0.270	0.262	0.251	0.239	0.225	0.208	0.189	0.170	0.149	0.127	0.103	0.078	0.053	0.027	0.000
REQUIRED CAMBER ↑	0	1/8"	3/16"	3/8"	1/2"	11/16"	7/8"	1 1/8"	1 5/16"	1 1/2"	1 3/4"	1 15/16"	2 1/8"	2 3/8"	2 3/16"	2 11/16"	2 7/8"	3"	3 1/8"	3 3/16"	3 5/16"	3 3/8"	3 3/8"	3 3/8"	3 3/8"	3 3/8"	3 5/16"	3 1/4"	3 1/8"	3"	2 7/8"	2 11/16"	2 1/2"	2 5/16"	2 1/16"	1 13/16"	1 1/2"	1 1/4"	1 5/16"	5/8"	5/16"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM). EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 7 OF 11

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.

9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : ZCS DATE : 06/21
CHECKED BY : MGC DATE : 06/21
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

9/23/2021
X:\NCDOT\R-2566BA\Structures\Final plans\DGN files\401_067_R-2566BA_SMU_ DL07_S33_940005.dgn
User:sbwilliams

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER #8

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.007	0.008	0.008	0.008	0.009	0.008	0.008	0.008	0.007	0.007	0.006	0.005	0.004
DEFLECTION DUE TO WEIGHT OF SLAB ✱ ↓	0.000	0.004	0.009	0.013	0.016	0.020	0.023	0.026	0.029	0.031	0.032	0.033	0.034	0.034	0.034	0.033	0.032	0.030	0.028	0.025	0.023
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.001	0.001	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.005	0.005
TOTAL DEAD LOAD DEFLECTION	0.000	0.006	0.012	0.018	0.023	0.028	0.033	0.037	0.041	0.044	0.046	0.047	0.049	0.048	0.048	0.047	0.045	0.043	0.040	0.035	0.032
REQUIRED CAMBER ↑	0	1/16"	1/8"	3/16"	5/16"	3/8"	3/8"	7/16"	1/2"	1/2"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	9/16"	1/2"	1/2"	7/16"	3/8"

FORTIETH POINTS	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.003	0.002	0.001	0.000	-0.001	-0.002	-0.003	-0.004	-0.005	-0.006	-0.006	-0.006	-0.007	-0.007	-0.006	-0.006	-0.005	-0.004	-0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ✱ ↓	0.019	0.016	0.013	0.009	0.006	0.003	0.000	-0.003	-0.006	-0.009	-0.011	-0.012	-0.013	-0.014	-0.014	-0.013	-0.011	-0.008	-0.005	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.005	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.027	0.022	0.018	0.012	0.008	0.003	-0.001	-0.006	-0.010	-0.015	-0.017	-0.019	-0.021	-0.022	-0.021	-0.020	-0.017	-0.013	-0.008	0.000
REQUIRED CAMBER ↑	5/16"	1/4"	3/16"	1/8"	1/16"	1/16"	0	-1/16"	-1/8"	-3/16"	-3/16"	-1/4"	-1/4"	-1/4"	-1/4"	-1/4"	-3/16"	-3/16"	-1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B

GIRDER #8

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.003	0.007	0.012	0.016	0.022	0.027	0.033	0.039	0.044	0.050	0.056	0.061	0.066	0.071	0.076	0.080	0.083	0.086	0.089	0.090
DEFLECTION DUE TO WEIGHT OF SLAB ✱ ↓	0.000	0.008	0.017	0.028	0.041	0.054	0.068	0.082	0.097	0.112	0.127	0.142	0.156	0.170	0.182	0.194	0.204	0.214	0.221	0.228	0.233
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.001	0.002	0.004	0.005	0.007	0.009	0.011	0.013	0.015	0.016	0.018	0.020	0.022	0.023	0.024	0.026	0.027	0.028	0.028	0.029
TOTAL DEAD LOAD DEFLECTION	0.000	0.012	0.026	0.044	0.062	0.083	0.104	0.126	0.149	0.171	0.193	0.216	0.237	0.258	0.276	0.294	0.310	0.324	0.335	0.345	0.352
REQUIRED CAMBER ↑	0	1/8"	5/16"	1/2"	3/4"	1"	1 1/4"	1 1/2"	1 13/16"	2 1/16"	2 5/16"	2 9/16"	2 7/8"	3 1/16"	3 5/16"	3 1/2"	3 11/16"	3 7/8"	4"	4 1/8"	4 1/4"

FORTIETH POINTS	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.091	0.092	0.092	0.092	0.089	0.087	0.084	0.081	0.077	0.072	0.067	0.061	0.054	0.047	0.040	0.033	0.025	0.017	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SLAB ✱ ↓	0.236	0.237	0.237	0.237	0.231	0.226	0.218	0.209	0.199	0.187	0.173	0.158	0.141	0.123	0.105	0.085	0.064	0.043	0.022	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.029	0.029	0.029	0.029	0.028	0.027	0.026	0.025	0.024	0.022	0.021	0.019	0.017	0.015	0.013	0.010	0.008	0.005	0.003	0.000
TOTAL DEAD LOAD DEFLECTION	0.356	0.358	0.358	0.358	0.348	0.340	0.328	0.315	0.300	0.281	0.261	0.238	0.212	0.185	0.158	0.128	0.097	0.065	0.033	0.000
REQUIRED CAMBER ↑	4 1/4"	4 5/16"	4 5/16"	4 5/16"	4 3/16"	4 1/16"	3 15/16"	3 13/16"	3 9/16"	3 3/8"	3 1/8"	2 7/8"	2 9/16"	2 1/4"	1 7/8"	1 1/2"	1 3/16"	13/16"	3/8"	0

✱ INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM). EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 8 OF 11

SEAL
20125
MARSHALL G. CHEEK, JR.

DocuSigned by:
Marshall G. Cheek, Jr.
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9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD
DEFLECTIONS

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

SHEET NO.
S-34
TOTAL SHEETS
79

DRAWN BY : ZCS DATE : 06/21
CHECKED BY : MGC DATE : 06/21
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

9/23/2021
X:\NCDOT\R-2566BA\Structures\Finalplans\DGN files\401_069_R-2566BA_SMU_ DL08_S34_940005.dgn
User:sbwilliams

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER #9

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.001	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010	0.010	0.010	0.011	0.011	0.010	0.010	0.010	0.009	0.009	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.000	-0.001	-0.002	-0.002	-0.003	-0.004	-0.005	-0.005	-0.005	-0.005	-0.005	-0.004	-0.003	-0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.005	0.009	0.014	0.018	0.022	0.026	0.029	0.032	0.034	0.036	0.038	0.039	0.039	0.039	0.039	0.038	0.036	0.034	0.032	0.029	0.026	0.023	0.020	0.016	0.013	0.009	0.006	0.003	0.000	-0.003	-0.005	-0.007	-0.009	-0.010	-0.010	-0.010	-0.009	-0.007	-0.004	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.001	0.001	0.002	0.003	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.007	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.005	0.005	0.004	0.004	0.004	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.001	-0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.007	0.013	0.020	0.026	0.031	0.037	0.042	0.046	0.049	0.052	0.054	0.056	0.057	0.056	0.056	0.055	0.051	0.049	0.046	0.042	0.037	0.033	0.028	0.023	0.019	0.012	0.007	0.003	-0.001	-0.005	-0.009	-0.012	-0.014	-0.016	-0.016	-0.016	-0.014	-0.011	-0.006	0.000
REQUIRED CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	11/16"	11/16"	11/16"	11/16"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/8"	1/16"	0	-1/16"	-1/8"	-1/8"	-3/16"	-3/16"	-3/16"	-3/16"	-3/16"	-1/8"	-1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B

GIRDER #9

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.003	0.006	0.010	0.015	0.019	0.024	0.030	0.035	0.040	0.046	0.051	0.056	0.061	0.065	0.069	0.073	0.077	0.079	0.082	0.083	0.085	0.085	0.085	0.085	0.083	0.081	0.079	0.075	0.072	0.067	0.062	0.057	0.051	0.045	0.038	0.031	0.023	0.016	0.008	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.007	0.015	0.025	0.036	0.048	0.061	0.074	0.088	0.101	0.115	0.129	0.142	0.155	0.166	0.177	0.187	0.196	0.204	0.210	0.214	0.218	0.219	0.220	0.219	0.215	0.210	0.203	0.195	0.186	0.174	0.162	0.148	0.132	0.116	0.098	0.080	0.061	0.041	0.021	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.001	0.002	0.003	0.005	0.006	0.008	0.010	0.011	0.013	0.015	0.016	0.018	0.020	0.021	0.022	0.023	0.024	0.025	0.026	0.026	0.027	0.027	0.027	0.027	0.026	0.025	0.025	0.024	0.022	0.021	0.019	0.018	0.016	0.014	0.012	0.010	0.007	0.005	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.011	0.023	0.038	0.056	0.073	0.093	0.114	0.134	0.154	0.176	0.196	0.216	0.236	0.252	0.268	0.283	0.297	0.308	0.318	0.323	0.330	0.331	0.332	0.332	0.324	0.316	0.307	0.294	0.280	0.262	0.243	0.223	0.199	0.175	0.148	0.121	0.091	0.062	0.031	0.000
REQUIRED CAMBER ↑	0	1/8"	1/4"	7/16"	11/16"	7/8"	1 1/8"	1 3/8"	1 5/8"	1 7/8"	2 1/8"	2 3/8"	2 9/16"	2 13/16"	3"	3 1/4"	3 3/8"	3 9/16"	3 11/16"	3 13/16"	3 7/8"	3 15/16"	4"	4"	4"	3 7/8"	3 13/16"	3 11/16"	3 9/16"	3 3/8"	3 1/8"	2 15/16"	2 11/16"	2 3/8"	2 1/16"	1 3/4"	1 7/16"	1 1/16"	3/4"	3/8"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM). EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 9 OF 11

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Documents by Marshall G. Cheek, Jr.
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9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : ZCS DATE : 06/21
CHECKED BY : MGC DATE : 06/21
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

9/30/2021
X:\NCDOT\R-2566BA\Structures\Final plans\DGN files\401_071_R-2566BA_SMU_ DL09_S35_940005.dgn
User:sbwilliams

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER #10

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.010	0.011	0.012	0.012	0.012	0.013	0.013	0.012	0.012	0.012	0.011	0.010	0.009	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000	-0.001	-0.002	-0.003	-0.003	-0.004	-0.004	-0.004	-0.003	-0.002	-0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.005	0.010	0.015	0.020	0.024	0.028	0.032	0.035	0.038	0.040	0.042	0.043	0.044	0.045	0.044	0.044	0.042	0.041	0.039	0.036	0.033	0.030	0.027	0.023	0.020	0.016	0.012	0.009	0.006	0.003	0.000	-0.003	-0.005	-0.006	-0.007	-0.007	-0.007	-0.006	-0.003	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.001	0.002	0.002	0.003	0.004	0.004	0.005	0.005	0.006	0.006	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.006	0.006	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	-0.001	-0.001	-0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.008	0.015	0.021	0.029	0.035	0.040	0.046	0.050	0.055	0.058	0.061	0.062	0.064	0.065	0.063	0.063	0.061	0.059	0.056	0.051	0.047	0.043	0.038	0.033	0.028	0.023	0.017	0.013	0.008	0.004	-0.001	-0.005	-0.008	-0.010	-0.011	-0.012	-0.011	-0.009	-0.004	0.000
REQUIRED CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	7/16"	1/2"	9/16"	5/8"	11/16"	1 11/16"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	1 11/16"	1 11/16"	5/8"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	1/16"	0	-1/16"	-1/16"	-1/8"	-1/8"	-1/8"	-1/8"	-1/8"	-1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B

GIRDER #10

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.003	0.006	0.009	0.013	0.017	0.022	0.027	0.032	0.036	0.041	0.046	0.051	0.055	0.060	0.064	0.067	0.070	0.073	0.075	0.077	0.078	0.078	0.078	0.078	0.077	0.075	0.073	0.070	0.066	0.062	0.058	0.053	0.047	0.041	0.035	0.029	0.022	0.015	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.006	0.013	0.022	0.032	0.043	0.054	0.066	0.079	0.092	0.104	0.117	0.129	0.141	0.152	0.162	0.171	0.180	0.187	0.193	0.197	0.200	0.202	0.202	0.202	0.198	0.194	0.188	0.181	0.172	0.162	0.150	0.137	0.123	0.108	0.091	0.074	0.056	0.038	0.019	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.001	0.002	0.003	0.004	0.005	0.007	0.009	0.010	0.012	0.013	0.015	0.016	0.018	0.019	0.020	0.021	0.022	0.023	0.024	0.024	0.025	0.025	0.025	0.025	0.024	0.024	0.023	0.022	0.021	0.019	0.018	0.016	0.015	0.013	0.011	0.009	0.007	0.005	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.010	0.021	0.034	0.049	0.065	0.083	0.102	0.121	0.140	0.158	0.178	0.196	0.214	0.231	0.246	0.259	0.272	0.283	0.292	0.298	0.303	0.305	0.305	0.305	0.299	0.293	0.284	0.273	0.259	0.243	0.226	0.206	0.185	0.162	0.137	0.112	0.085	0.058	0.028	0.000
REQUIRED CAMBER ↑	0	1/8"	1/4"	3/8"	9/16"	13/16"	1"	1 1/4"	1 7/16"	1 11/16"	1 15/16"	2 1/8"	2 3/8"	2 9/16"	2 3/4"	2 15/16"	3 1/8"	3 1/4"	3 3/8"	3 1/2"	3 9/16"	3 5/8"	3 11/16"	3 11/16"	3 11/16"	3 9/16"	3 1/2"	3 3/8"	3 1/4"	3 1/8"	2 15/16"	2 11/16"	2 1/2"	2 3/16"	1 15/16"	1 5/8"	1 5/16"	1"	11/16"	3/8"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM). EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 10 OF 11

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CREEK, JR.

Marshall C. Creek, Jr.
5FBCC2F3A40C419 9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : ZCS DATE : 06/21
CHECKED BY : MGC DATE : 06/21
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

9/30/2021
X:\NCDOT\R-2566BA\Structures\Final plans\DGN files\401_073_R-2566BA_SMU_ DL10_S36_940005.dgn
User:sbwilliams

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER #11

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.003	0.005	0.006	0.008	0.009	0.010	0.011	0.012	0.013	0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.012	0.012	0.011	0.010	0.009	0.008	0.006	0.005	0.004	0.003	0.002	0.001	0.000	-0.001	-0.002	-0.002	-0.002	-0.003	-0.002	-0.002	-0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.006	0.011	0.016	0.021	0.026	0.030	0.034	0.038	0.041	0.044	0.046	0.048	0.049	0.050	0.050	0.049	0.048	0.047	0.045	0.043	0.040	0.037	0.034	0.030	0.026	0.023	0.019	0.015	0.012	0.008	0.005	0.002	0.000	-0.002	-0.004	-0.005	-0.005	-0.004	-0.002	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.001	0.002	0.002	0.003	0.004	0.004	0.005	0.006	0.006	0.007	0.007	0.007	0.007	0.008	0.008	0.008	0.008	0.008	0.007	0.007	0.007	0.006	0.006	0.006	0.005	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.009	0.016	0.023	0.030	0.038	0.043	0.049	0.055	0.059	0.064	0.066	0.069	0.070	0.072	0.072	0.071	0.070	0.068	0.064	0.062	0.058	0.053	0.049	0.044	0.037	0.032	0.027	0.021	0.017	0.011	0.007	0.002	-0.001	-0.004	-0.006	-0.008	-0.007	-0.006	-0.003	0.000
REQUIRED CAMBER ↑	0	1/8"	3/16"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"	13/16"	13/16"	7/8"	7/8"	7/8"	7/8"	13/16"	13/16"	3/4"	3/4"	11/16"	5/8"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0	0	-1/16"	-1/16"	-1/16"	-1/16"	-1/16"	-1/16"	-1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B

GIRDER #11

FORTIETH POINTS	℄ BRG.	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	℄ BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER ↓	0.000	0.002	0.005	0.008	0.012	0.016	0.020	0.024	0.029	0.033	0.038	0.042	0.046	0.051	0.055	0.058	0.061	0.064	0.066	0.068	0.070	0.071	0.072	0.072	0.071	0.070	0.068	0.066	0.064	0.060	0.057	0.053	0.048	0.043	0.038	0.032	0.026	0.020	0.013	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SLAB * ↓	0.000	0.006	0.012	0.020	0.028	0.038	0.049	0.060	0.071	0.083	0.095	0.106	0.118	0.129	0.139	0.148	0.157	0.164	0.170	0.176	0.180	0.183	0.185	0.185	0.184	0.181	0.177	0.172	0.165	0.157	0.148	0.137	0.125	0.112	0.098	0.084	0.068	0.051	0.035	0.018	0.000
DEFLECTION DUE TO WEIGHT OF PARAPET ↓	0.000	0.001	0.001	0.002	0.004	0.005	0.006	0.008	0.009	0.011	0.012	0.013	0.015	0.016	0.017	0.018	0.019	0.020	0.021	0.022	0.022	0.022	0.023	0.023	0.022	0.022	0.022	0.021	0.020	0.019	0.018	0.017	0.015	0.014	0.012	0.010	0.008	0.006	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.009	0.018	0.030	0.044	0.059	0.075	0.092	0.109	0.127	0.145	0.161	0.179	0.196	0.211	0.224	0.237	0.248	0.257	0.266	0.272	0.276	0.280	0.280	0.277	0.273	0.267	0.259	0.249	0.236	0.223	0.207	0.188	0.169	0.148	0.126	0.102	0.077	0.052	0.027	0.000
REQUIRED CAMBER ↑	0	1/8"	1/4"	3/8"	1/2"	11/16"	7/8"	1 1/8"	1 5/16"	1 1/2"	1 3/4"	1 15/16"	2 1/8"	2 3/8"	2 9/16"	2 11/16"	2 7/8"	3"	3 1/8"	3 3/16"	3 1/4"	3 5/16"	3 3/8"	3 3/8"	3 5/16"	3 5/16"	3 3/16"	3 1/8"	3"	2 13/16"	2 11/16"	2 1/2"	2 1/4"	2"	1 3/4"	1 1/2"	1 1/4"	1 5/16"	5/8"	5/16"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM). EXCEPT "REQUIRED CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 11 OF 11

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Document Signed by: Marshall G. Cheek, Jr. 5FBCC2F3A4DC413...

9/30/2021 | 1:43 PM EDT

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TGS ENGINEERS
706 HILLSBOROUGH STREET
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CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : ZCS DATE : 06/21
CHECKED BY : MGC DATE : 06/21
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

9/30/2021
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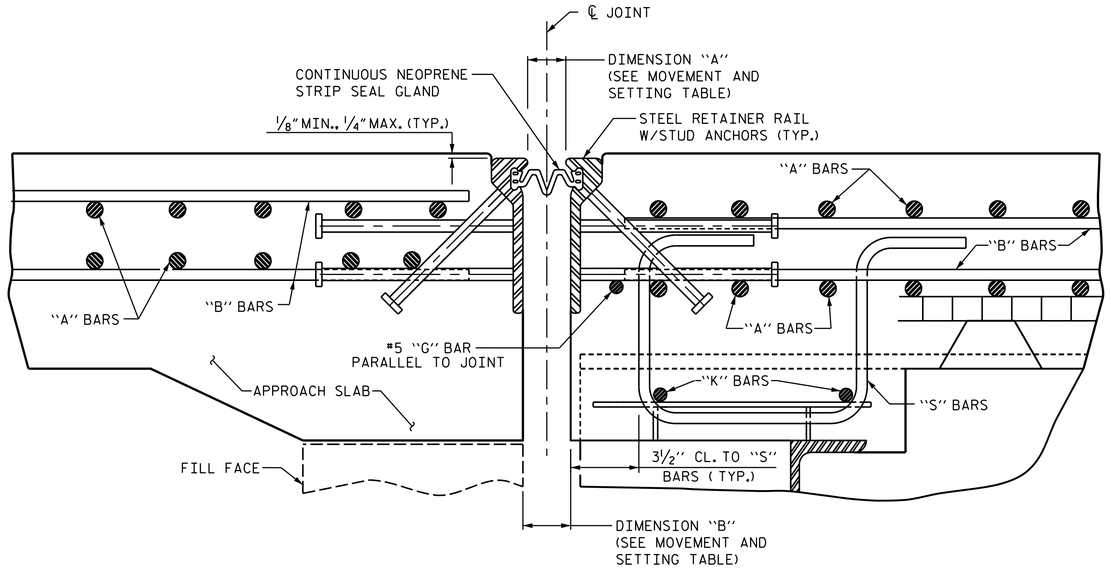
User:sbwilliams



STRIP SEAL EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- STEEL SUPERSTRUCTURE

JOINT INSTALLATION PROCEDURE:

1. INSTALL THE STRIP SEAL EXPANSION JOINT AS RECOMMENDED BY THE MANUFACTURER.
2. A MANUFACTURER'S REPRESENTATIVE SHALL BE PRESENT DURING INSTALLATION OF THE JOINT.
3. PLACE STEEL RETAINER RAILS IN JOINT OPENING. PROPERLY ALIGN THE RAILS BOTH HORIZONTALLY AND VERTICALLY. DO NOT WELD SUPPORT SYSTEM TO THE METALLIZED SURFACES OF THE STEEL RETAINER RAILS.
4. CONFLICTING REINFORCING STEEL MAY BE SHIFTED SLIGHTLY WHEN NECESSARY.
5. DECK SLAB CONCRETE PLACEMENT OPERATIONS SHALL COMMENCE PER THE POURING SEQUENCE AFTER FINAL JOINT ALIGNMENT IS SET.
6. PROTECT THE STEEL RETAINER RAILS FROM BEING FOULED BY CONCRETE SPILLOVER DURING THE DECK POUR.
7. LOOSEN THE STEEL RETAINER RAIL SUPPORT SYSTEM TO ALLOW MOVEMENT WHILE CONCRETE CURES.
8. RE-LEVEL AND RE-ALIGN STEEL RETAINER RAIL AS REQUIRED ON OPPOSITE SIDE OF JOINT.
9. PLACE APPROACH SLAB CONCRETE.
10. ONCE THE CONCRETE HAS HARDENED SUFFICIENTLY ON BOTH SIDES OF JOINT, STEEL RETAINER RAILS SHALL BE CLEANED THOROUGHLY AND SEAL CHANNELS SHALL BE INSPECTED TO ASCERTAIN THE ABSENCE OF CONCRETE AND DEBRIS.
11. COAT THE STRIP SEAL LUGS WITH LUBRICANT-ADHESIVE AND INSTALL THE NEOPRENE STRIP SEAL GLAND AS RECOMMENDED BY THE STRIP SEAL EXPANSION JOINT MANUFACTURER.

GENERAL NOTES

FOR STRIP SEAL EXPANSION JOINTS, SEE SPECIAL PROVISIONS.

STEEL RETAINER RAILS AND COVER PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR GRADE 50 STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MIN.

ONLY STEEL RETAINER RAILS OF ONE-PIECE CONSTRUCTION ARE PERMITTED. STEEL RETAINER RAILS CONSISTING OF TWO OR MORE COMPONENTS WELDED TOGETHER TO OBTAIN THEIR FINAL CROSS-SECTIONAL SHAPE ARE NOT PERMITTED.

STUD ANCHORS SHALL BE SHOP WELDED AND SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.

SURFACES COMING IN CONTACT WITH STRIP SEAL GLAND SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.

UPON COMPLETION OF SHOP FABRICATION, THE STEEL RETAINER RAILS SHALL BE METALLIZED AS SHOWN IN THE "METALLIZING DETAIL". SEE SPECIAL PROVISIONS FOR THERMAL SPRAYED COATINGS (METALLIZATION).

INSTALLED STEEL RETAINER RAILS SHALL FOLLOW THE ROADWAY SLOPE.

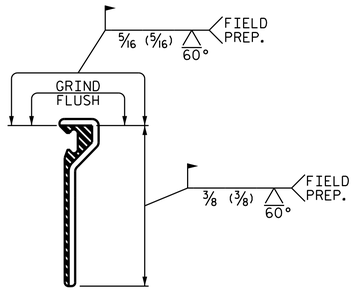
FIELD SPLICES OF THE RETAINER RAILS SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. FINISHED WELDS SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

NEOPRENE STRIP SEAL GLAND SHALL BE CONTINUOUS THROUGHOUT THE JOINT AND SHALL BE COMPATIBLE WITH THE STEEL RETAINER RAILS. FIELD SPLICING THE GLAND IS NOT PERMITTED.

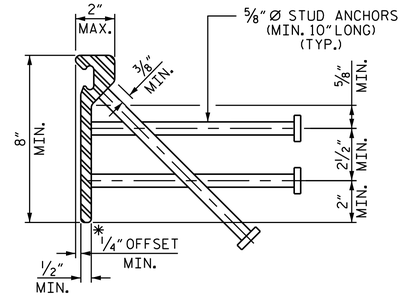
NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.

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

THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

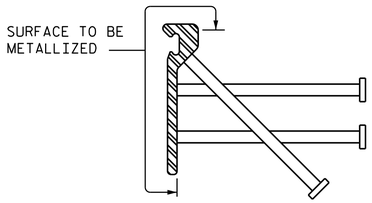


STEEL RETAINER RAIL (FIELD SPLICE DETAIL)



TYPICAL SECTION STEEL RETAINER RAIL

*DIMENSION "B" BASED ON STEEL RETAINER RAIL TOP OFFSET TO FACE OF RAIL OF 1/4" MINIMUM. IF ACTUAL OFFSET IS GREATER ADJUST DIMENSION "B" AS REQUIRED.



METALLIZING DETAIL

MOVEMENT AND SETTING AT JOINT								
LOCATION	SKEW ANGLE	TOTAL MOVEMENT (ALONG ℄ RDWY)	DIMENSION "A"			DIMENSION "B"		
			PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT 1	125°-03'-01.9"	13/16"	2 1/16"	2"	1 7/8"	2 9/16"	2 1/2"	2 3/8"
END BENT 2	113°-35'-28.9"	1"	2 1/8"	2"	1 3/4"	2 5/8"	2 1/2"	2 1/4"

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. SHEETS, JR.

Marshall G. Sheets, Jr.

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CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

STRIP SEAL EXPANSION JOINT DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			79

ASSEMBLED BY : S.B. WILLIAMS	DATE :	4-21	
CHECKED BY : MGC	DATE :	4-21	
DRAWN BY : MAA	6/20		
CHECKED BY : BNB	6/20		

8/24/2021
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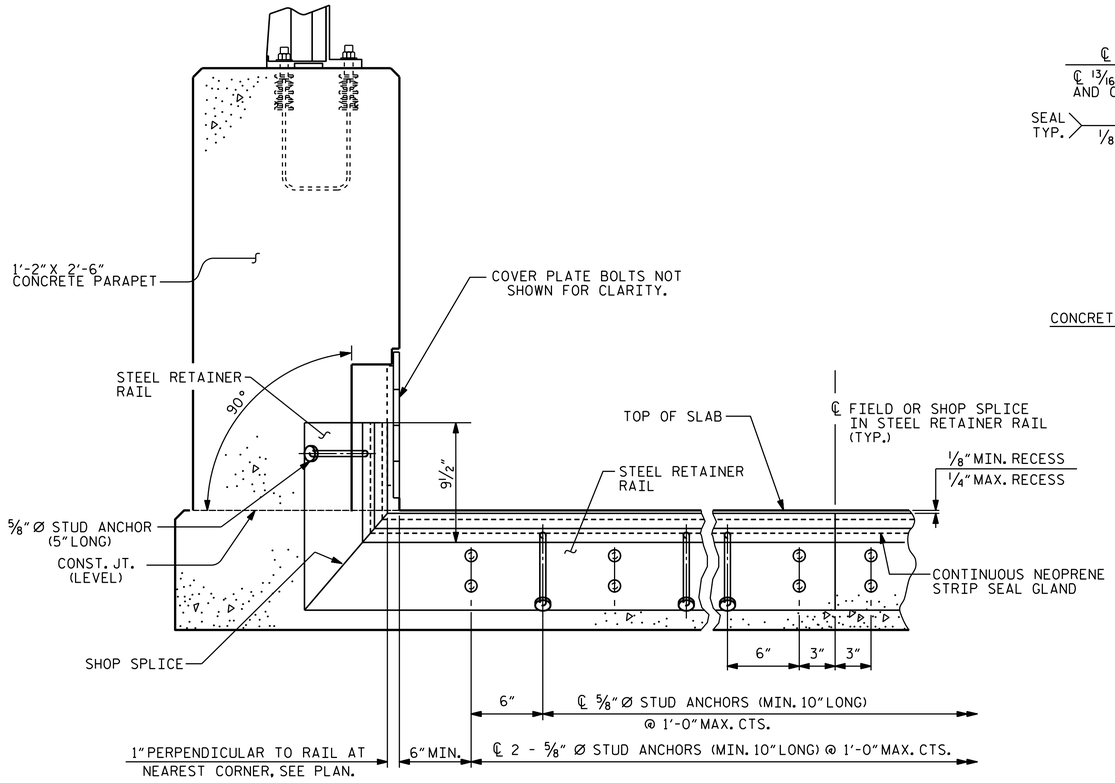
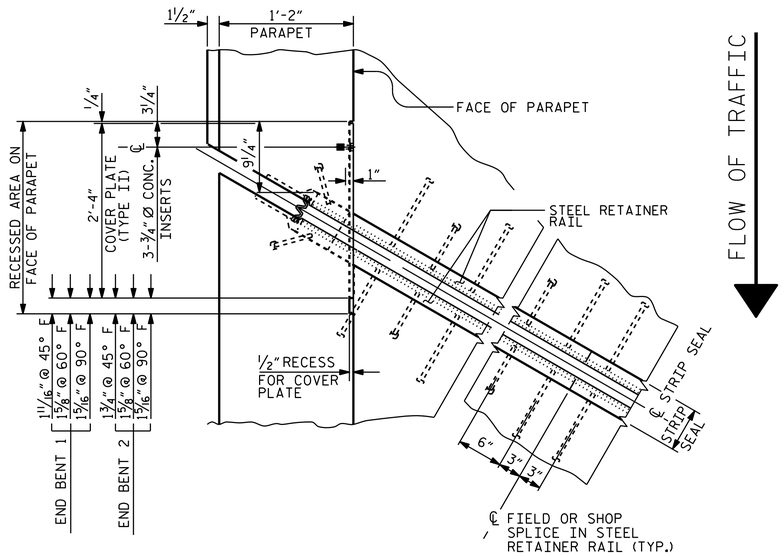
User:sbwilliams

STD. NO. SSEJ1 (SHT 2)

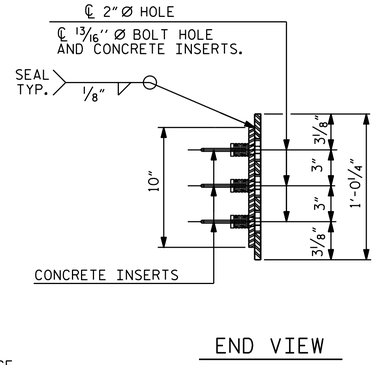


SECTION THRU RAIL NORMAL TO JOINT

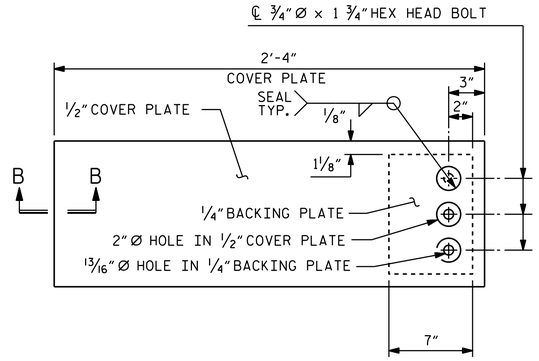


PLAN OF STRIP SEAL EXPANSION JOINT

(LEFT SIDE SHOWN, RIGHT SIDE SIMILAR)



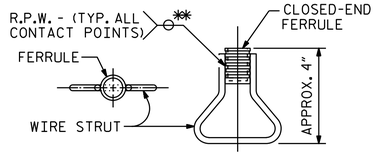
END VIEW



TYPE II - ELEVATION VIEW

SECTION B - B

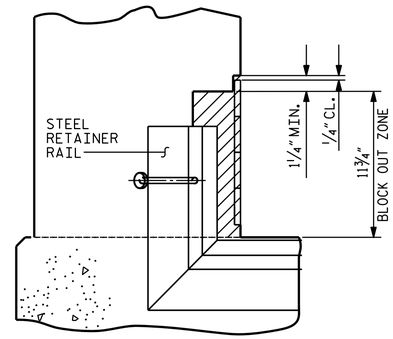
COVER PLATE DETAILS



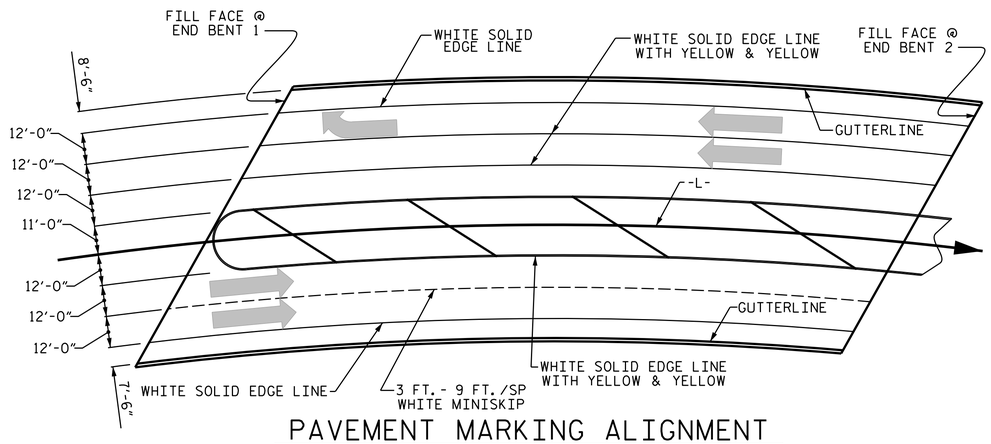
PLAN ELEVATION

CONCRETE INSERT

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



BLOCK OUT DETAIL



PAVEMENT MARKING ALIGNMENT

(FOR ADDITIONAL PAVEMENT MARKINGS, SEE ROADWAY PLANS)

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.
Marshall G. Creek, Jr.
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TGS ENGINEERS
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PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

STRIP SEAL EXPANSION JOINT DETAILS FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			79

ASSEMBLED BY : S. B. WILLIAMS	DATE :	4-21
CHECKED BY : MGC	DATE :	4-21
DRAWN BY : MAA	6/20	
CHECKED BY : BNB	6/20	

7/29/2021
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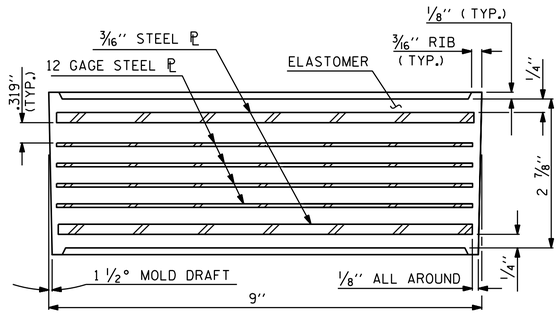
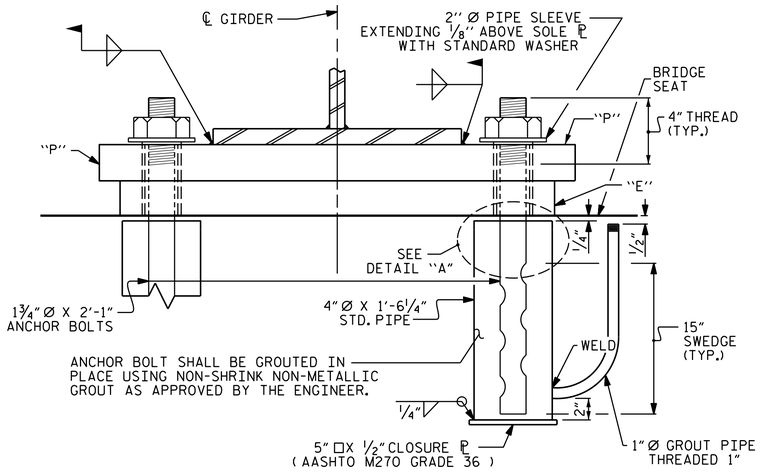
User:ZSmith

STD. NO. SSEJ2 SHT 2

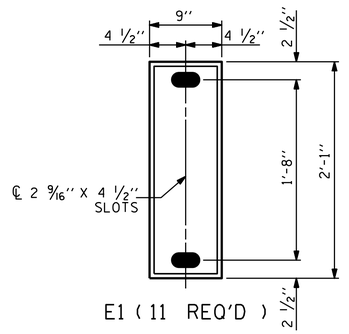


TYPICAL SECTION OF ELASTOMERIC BEARINGS



EXPANSION

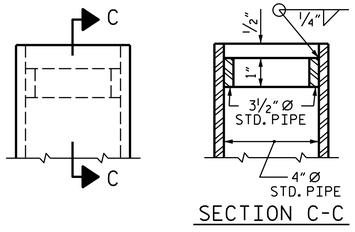
END VIEW



E1 (11 REQ'D)

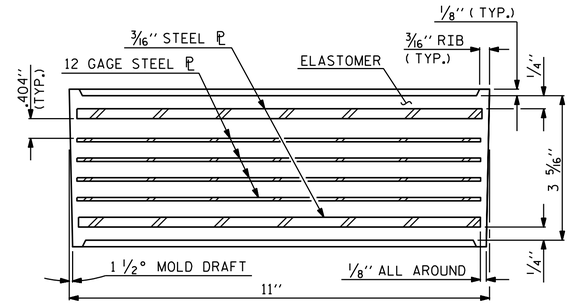
PLAN VIEW OF ELASTOMERIC BEARING

TYPE III

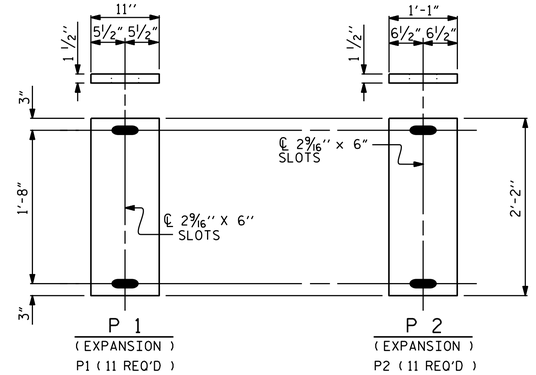


SECTION C-C

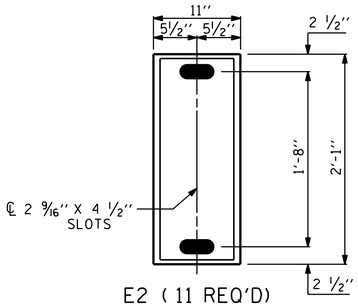
DETAIL ''A''



TYPICAL SECTION OF ELASTOMERIC BEARING



SOLE PLATE DETAILS (''P'')



E2 (11 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV

NOTES

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

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

THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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 BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

WHEN FIELD WELDING THE SOLE PLATE TO THE GIRDER FLANGE, 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.

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 SPECIAL PROVISIONS.

THE CLOSURE PLATE, GROUT PIPE AND STANDARD PIPE FOR THE EXPANSION ASSEMBLY NEED NOT BE GALVANIZED.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

1. ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED THEN THE ANCHOR BOLTS AND ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60°F.
2. AFTER CENTERING THE ELASTOMERIC BEARING SLOTS AND ANCHOR BOLTS, THE ANCHOR BOLTS SHALL BE GROUTED.

THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	255 k
TYPE IV	310 k

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

ASSEMBLED BY :	STM	DATE :	04/19
CHECKED BY :	MGC	DATE :	05/19
DRAWN BY : JMB 11/87	REV. 10/1/11		MAA/GM
CHECKED BY : ARB 11/87	REV. 6/13		AAC/MAA
	REV. 12/17		MAA/THC

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CHEEK, JR.

Marshall C. Cheek, Jr.
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CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			79

STD. NO. EB1 (SHT 3a)

7/29/2021
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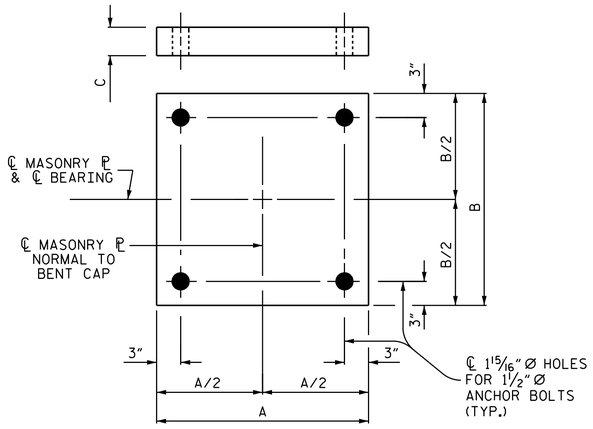
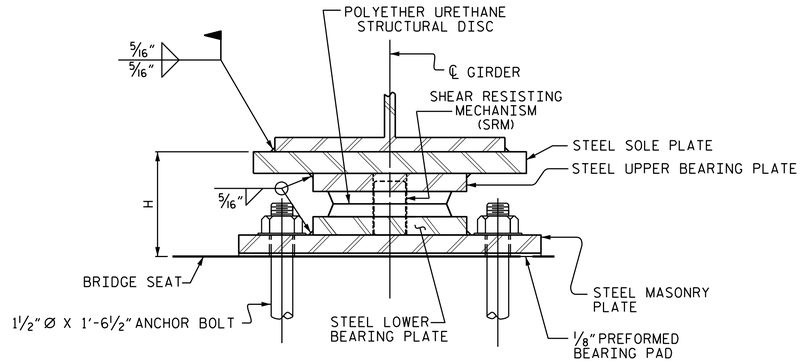


PLAN
M1, FIXED

MASONRY PLATE DETAILS



SECTION A-A
DB1, FIXED

NOTES

FOR DISC BEARINGS, SEE SPECIAL PROVISIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 50W OR GRADE 50.

AT ALL POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS SHALL BE FINGER-TIGHTENED PLUS AN ADDITIONAL 1/4 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

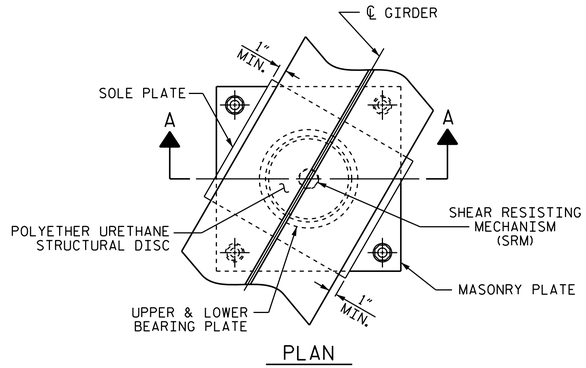
WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR URETHANE DISC.

SOLE PLATES SHOULD BE WELDED TO GIRDER FLANGES BEFORE FALSEWORK IS PLACED.

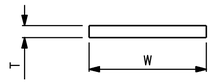
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

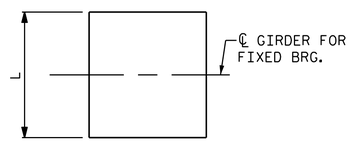
THE MINIMUM ROTATIONAL CAPACITY FOR ALL BEARINGS SHALL BE 0.02 RADIANS.



PLAN



ELEVATION



PLAN

NOTE:
DIMENSIONS "L", "W", AND "T" SHALL BE DETERMINED BY THE BEARING MANUFACTURER.

SOLE PLATE DETAILS

DESIGNATIONS		LOCATION	NUMBER OF BEARINGS	DIMENSIONS					LOADS AND MOVEMENT				
				BEARING	MASONRY PLATE			SOLE PLATE	UNFACTORED VERTICAL LOAD (KIPS)			FACTORED HORIZONTAL LOAD (KIPS)	ONE-WAY MOVEMENT (IN.)
									DEAD		LIVE		
BEARINGS	MASONRY ℙ			H (IN.)	A (IN.)	B (IN.)	C (IN.)	TOP SLOPE (%)	DC	DW	LL+IM		
DB1 (FIXED)	M1	BENT 1	11	7 5/8	32	32	1 1/4	-	365	76	252	108	0

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
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TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

DISC BEARING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			79

ASSEMBLED BY : STM DATE : 04/19
CHECKED BY : MGC DATE : 04/19
DESIGN ENGINEER OF RECORD: RDE DATE : 09/21

DRAWN BY : TMG 08/13
CHECKED BY : EKP 10/13

REV. 12/17 MAA/THC

9/23/2021
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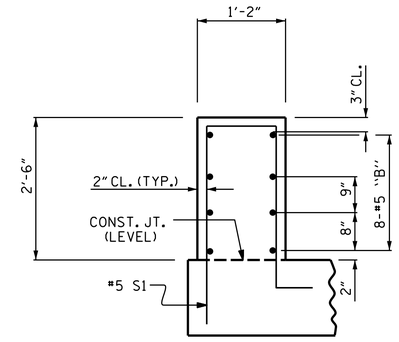
User:sbwilliams

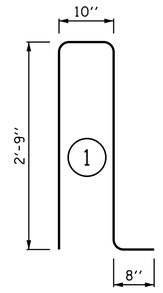
STD. NO. DB1 (SHT 2)



SECTION THRU PARAPET

TOTAL QUANTITIES	
STAGE I CONCRETE PARAPET	278.67 L.F.
STAGE II CONCRETE PARAPET	272.49 L.F.
TOTAL 1'-2" x 2'-6" CONCRETE PARAPET	551.16 L.F.

BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

STAGE I CONCRETE PARAPET

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
✱B1	32	#5	STR.	13'-2"	439
✱B2	72	#5	STR.	24'-7"	1846
✱S1	270	#5	1	7'-0"	1971
✱E1	22	#7	STR.	4'-3"	191
✱F1	3	#6	STR.	4'-1"	18
✱F2	6	#6	STR.	3'-5"	31
✱F3	3	#6	STR.	3'-10"	17

✱EPOXY COATED REINFORCING STEEL 4,513 LBS.

CLASS AA CONCRETE 30.1 C.Y.

1'-2" X 2'-6" CONCRETE PARAPET 278.67 L.F.

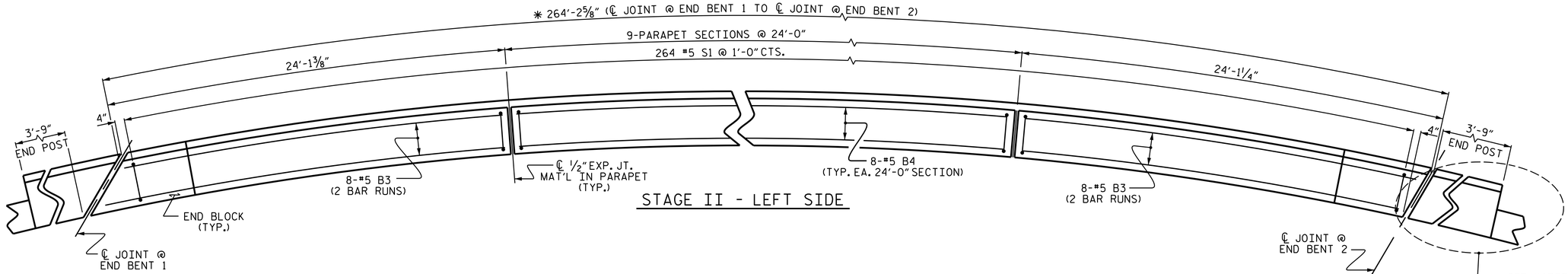
STAGE II CONCRETE PARAPET

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
✱B3	32	#5	STR.	13'-11"	464
✱B4	72	#5	STR.	23'-7"	1771
✱S1	264	#5	1	7'-0"	1927
✱E1	22	#7	STR.	4'-3"	191
✱F1	3	#6	STR.	4'-1"	18
✱F2	6	#6	STR.	3'-5"	31
✱F3	3	#6	STR.	3'-10"	17

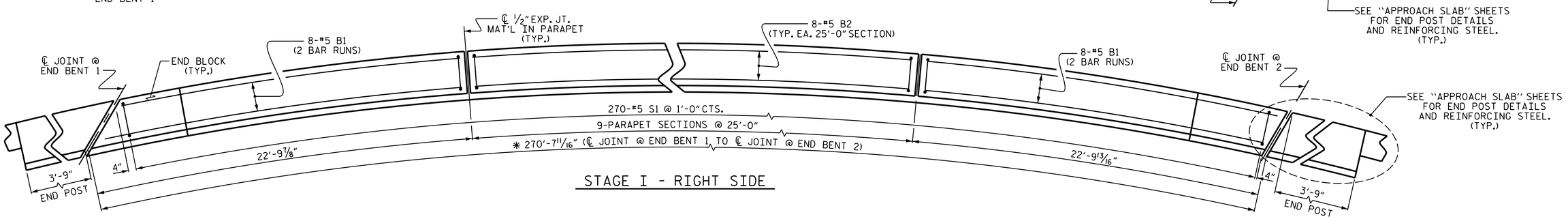
✱EPOXY COATED REINFORCING STEEL 4,419 LBS.

CLASS AA CONCRETE 29.4 C.Y.

1'-2" X 2'-6" CONCRETE PARAPET 272.49 L.F.



STAGE II - LEFT SIDE



STAGE I - RIGHT SIDE

PLAN OF PARAPET

✱DIMENSIONS ARE TAKEN ALONG THE OUTSIDE FACE OF THE PARAPET

NOTES

THE 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.

ALL REINFORCING STEEL IN PARAPET SHALL BE EPOXY COATED.

THE #5 S1 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE ½" EXPANSION JOINT MATERIAL IN PARAPET.

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

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

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

PAYMENT FOR THE END POST ON THE APPROACH SLABS SHALL BE PAID FOR UNDER PRICE BID FOR LINEAR FEET OF CONCRETE PARAPET. REINFORCING STEEL AND CONCRETE QUANTITIES ARE INCLUDED WITH THE APPROACH SLAB BILL OF MATERIAL.

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek Jr.

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CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
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RALEIGH

SUPERSTRUCTURE

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-42
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	S. B. WILLIAMS	DATE :	01/19
CHECKED BY :	MGC	DATE :	06/19
DESIGN ENGINEER OF RECORD:	MGC	DATE :	7-21

8/27/2021
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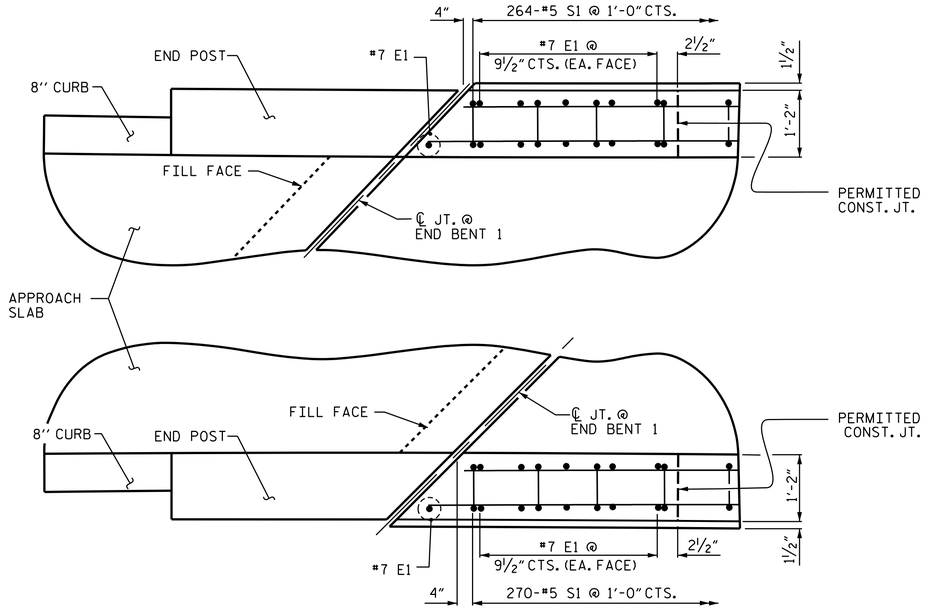
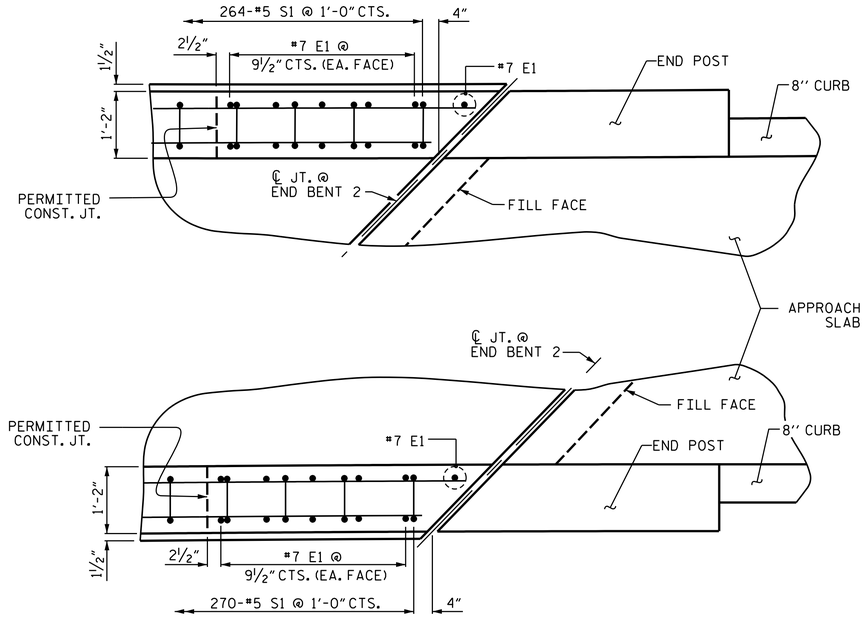
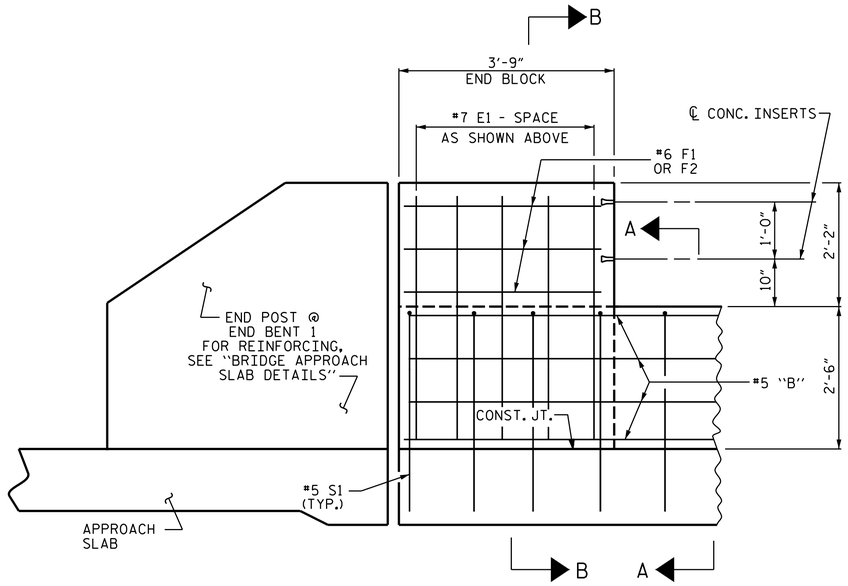
User:sbwilliams



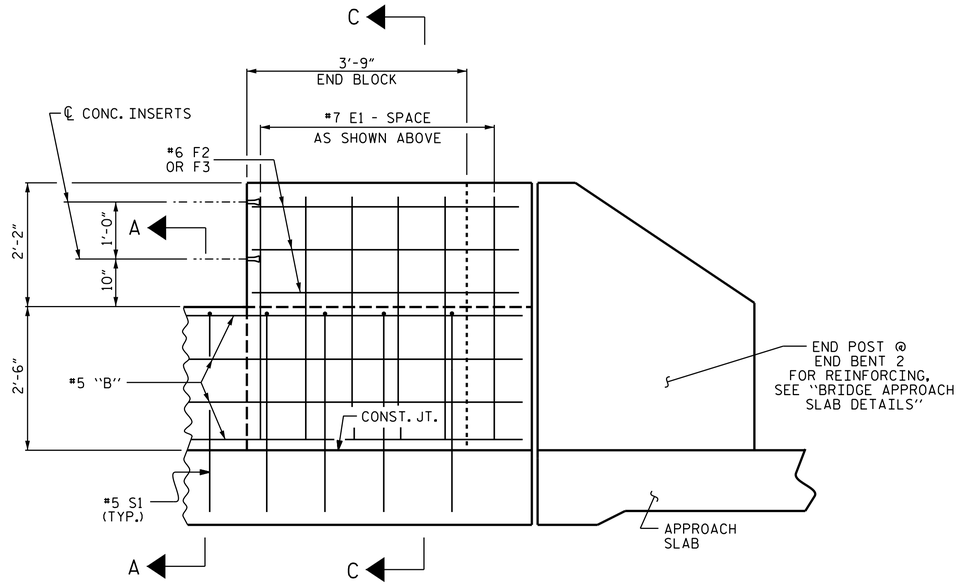


PLAN OF PARAPET & END BLOCK



ELEVATION

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



ELEVATION

FOR SECTION A-A & C-C, SEE SHEET 3 OF 3.

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Marshall G. Cheek, Jr.
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RALEIGH, NC 27603
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CORP. LICENSE NO.: C-0275

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
1'-2" X 2'-6" CONCRETE PARAPET DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-43
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : STM DATE : 04/19
CHECKED BY : MGC DATE : 05/19
DESIGN ENGINEER OF RECORD : MGC DATE : 7-21

8/27/2021
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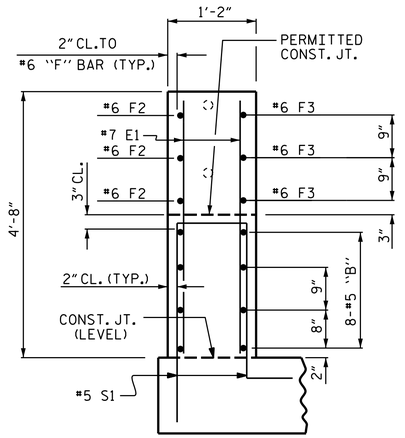
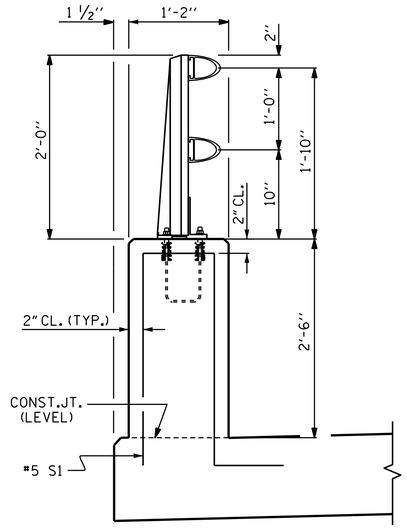
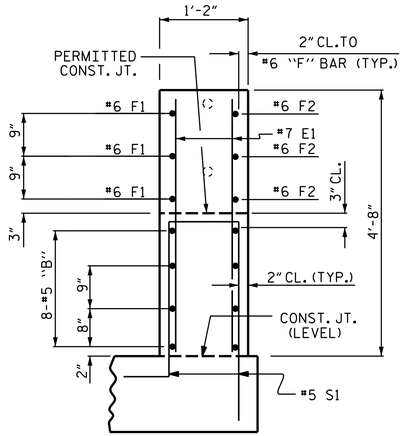
User:sbwilliams



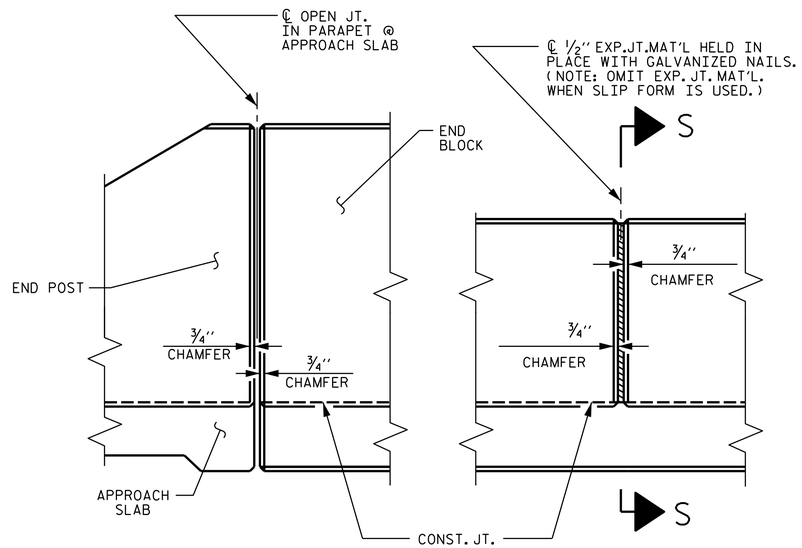
SECTION C-C



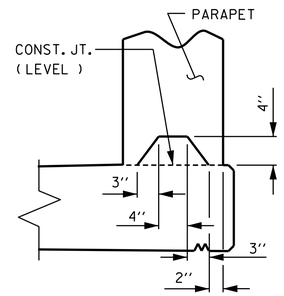
SECTION A-A



SECTION B-B



ELEVATION AT EXPANSION JOINTS



SECTION S-S

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

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
1'-2" X 2'-6"
CONCRETE PARAPET
DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CREEK, JR.
Marshall C. Creek, Jr.
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706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
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CORP. LICENSE NO.: C-0275

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-44
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : STM DATE : 04/19
CHECKED BY : MGC DATE : 05/19
DESIGN ENGINEER OF RECORD : MGC DATE : 7-21

8/27/2021
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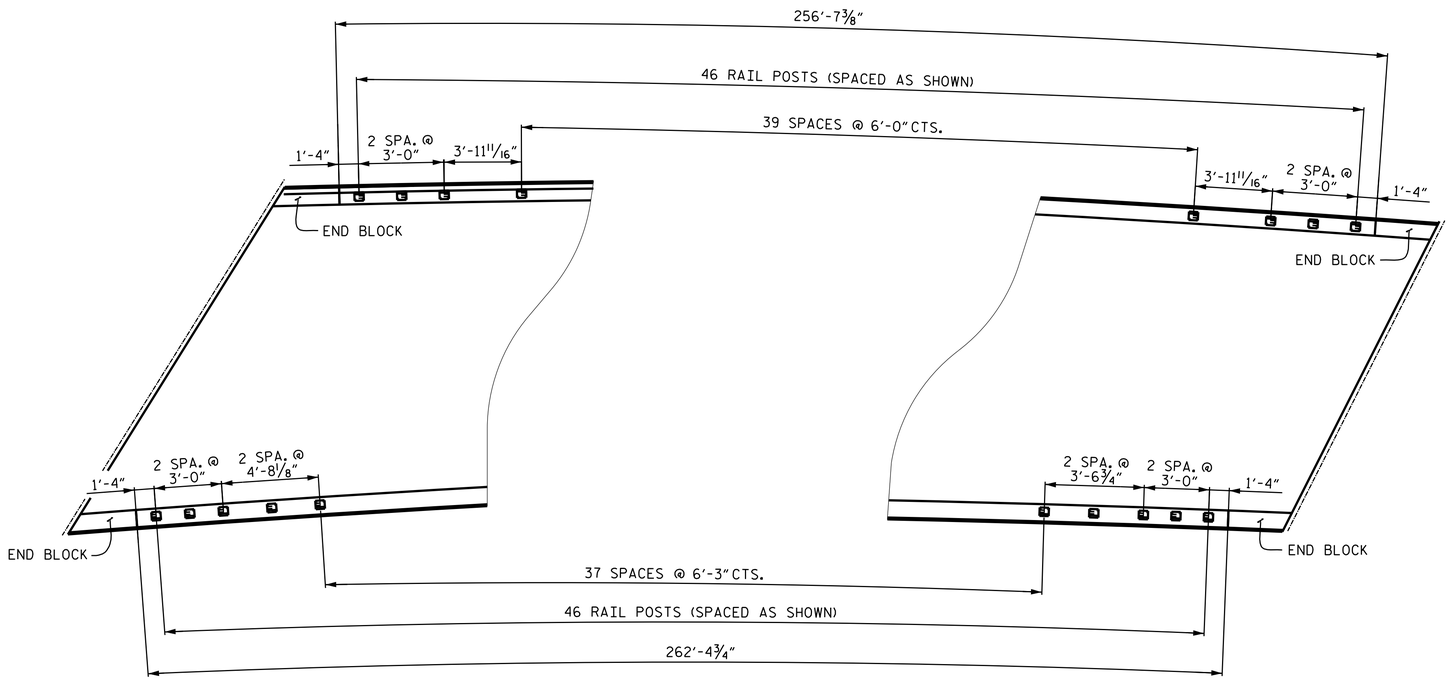
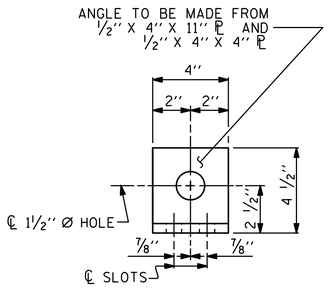
User:sbwilliams

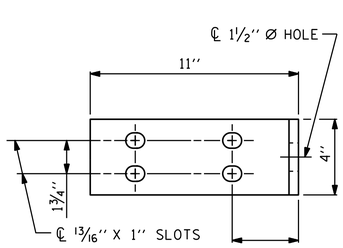


PLAN OF RAIL POST SPACINGS

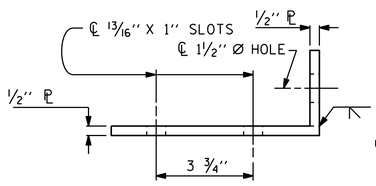
DIMENSIONS MEASURED FROM ℄ OF PARAPET



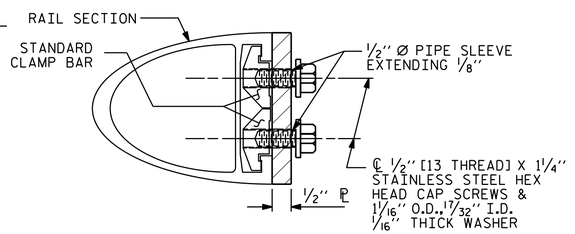
END VIEW (FIX AND EXP.)



ELEVATION



TOP VIEW



SECTION H-H (EXP.)

EXPANSION

DETAILS FOR ATTACHING METAL RAIL TO END BLOCK

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 BLOCK CONNECTION

THE METAL RAIL TO END BLOCK 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).

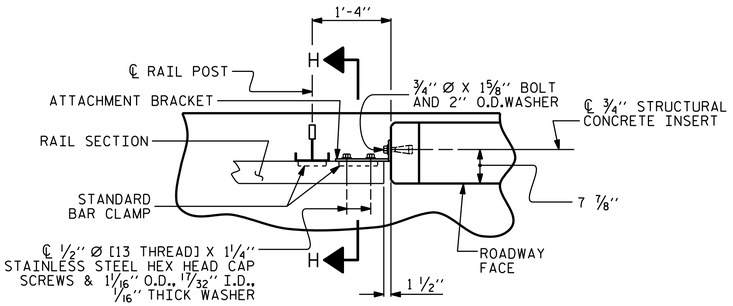
E. ½'' Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

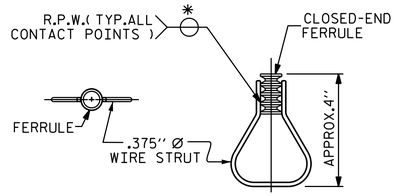
THE ¾'' STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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 BLOCK. 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.



PLAN - RAIL AND END BLOCK



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 1 OF 3

ASSEMBLED BY :	STM	DATE :	03/19
CHECKED BY :	MGC	DATE :	06/19
DESIGN ENGINEER OF RECORD :	MGC	DATE :	07/21
DRAWN BY : FCJ 1/88	REV. 5/1/06		TLA/GM
CHECKED BY : CRK 3/89	REV. 10/1/11		MAA/GM
	REV. 5/18		MAA/THC

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.

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SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS

FOR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-45
1			3			TOTAL SHEETS
2			4			79

STD. NO. BMR2

7/29/2021
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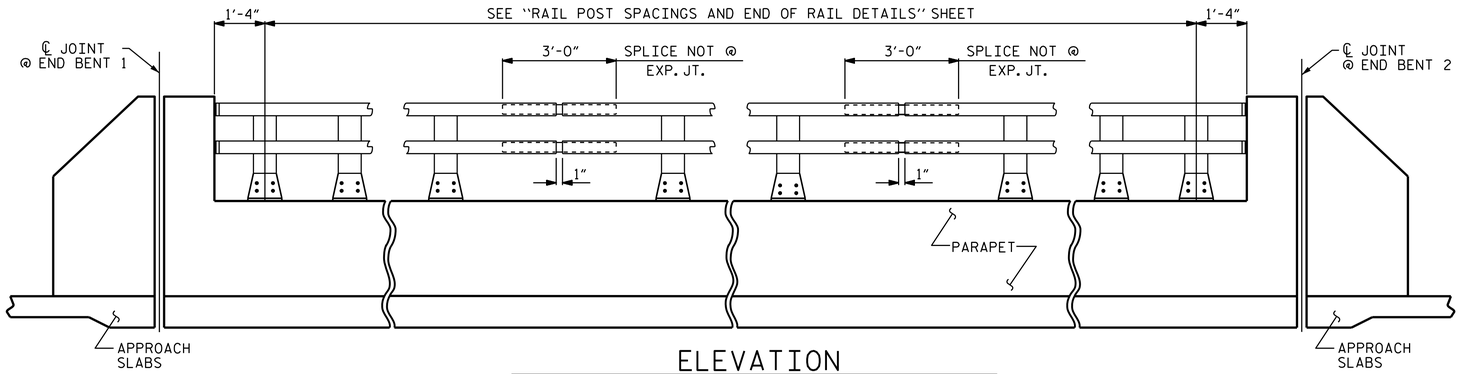
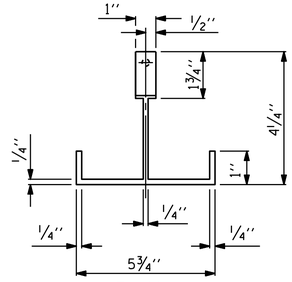
User:ZSmith

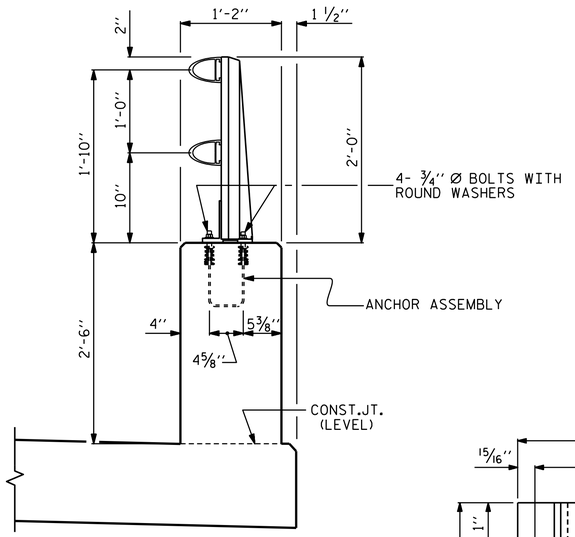


ELEVATION

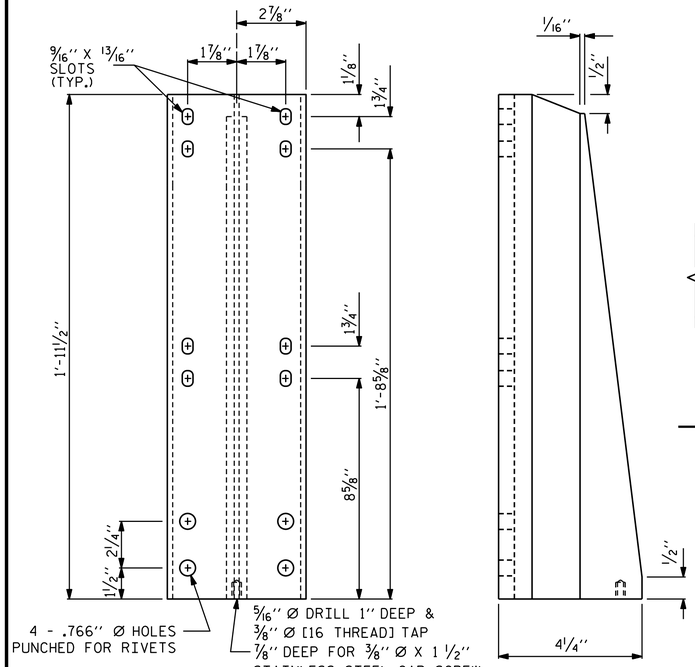
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET 1 OF 3.



PLAN



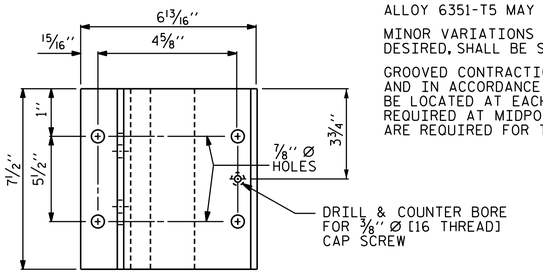
SECTION THRU PARAPET AND RAIL



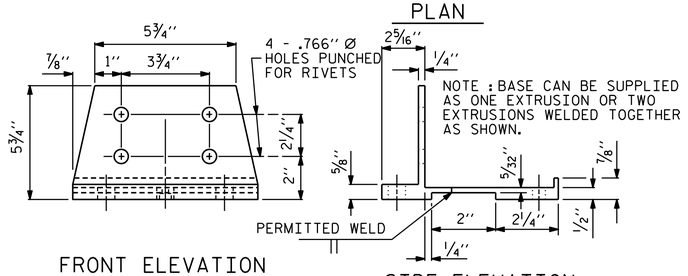
FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST



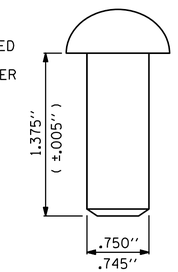
PLAN



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 BLOCK TO END BLOCK 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 BLOCK 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 = 518.99 LIN. FT.

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 2 OF 3

ASSEMBLED BY : S. B. WILLIAMS	DATE : 01/19
CHECKED BY : M. G. CHEEK	DATE : 06/19
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

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER Marshall G. Cheek, Jr.

9/30/2021 | 1:43 PM EDT

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TGS ENGINEERS
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SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-46
1			3			TOTAL SHEETS
2			4			79

7/29/2021
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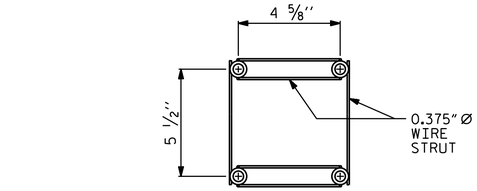
User:ZSmith

STD. NO. BMR3 (SHT 2)



4-BOLT METAL RAIL ANCHOR ASSEMBLY

(92 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.

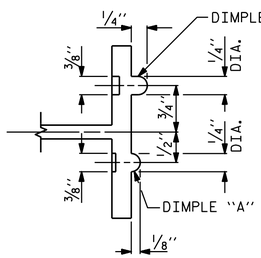
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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.

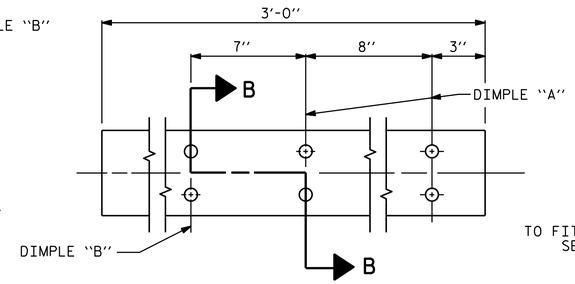
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

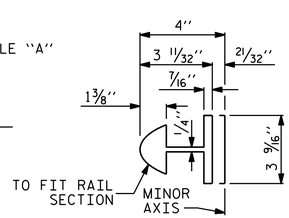
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4'' Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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.



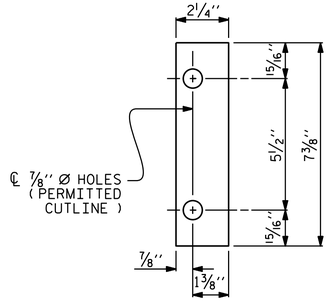
SECTION B - B



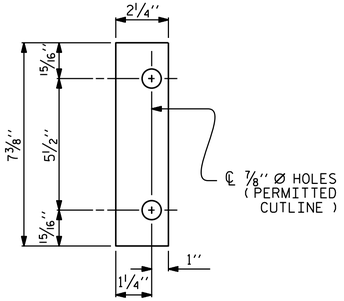


BAR SECTION

EXPANSION BAR DETAILS



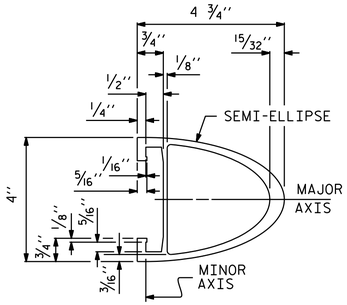
FRONT PLATE



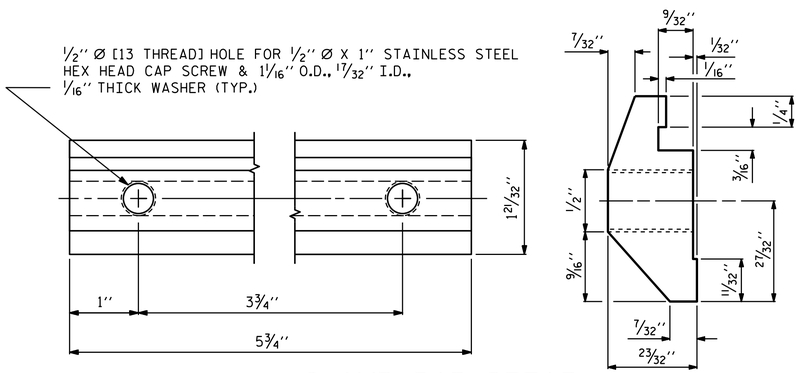
REAR PLATE

SHIM DETAILS

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

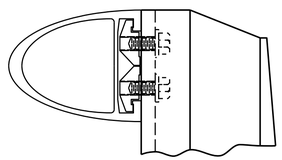


RAIL SECTION

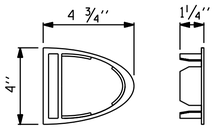


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Marshall G. Cheek, Jr.
9/30/2021 | 1:43 PM EDT

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PH. (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

ASSEMBLED BY : S. B. WILLIAMS	DATE : 01/19
CHECKED BY : M. G. CHEEK	DATE : 06/19
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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-47
1			3			TOTAL SHEETS
2			4			79

STD. NO. BMR4

7/29/2021
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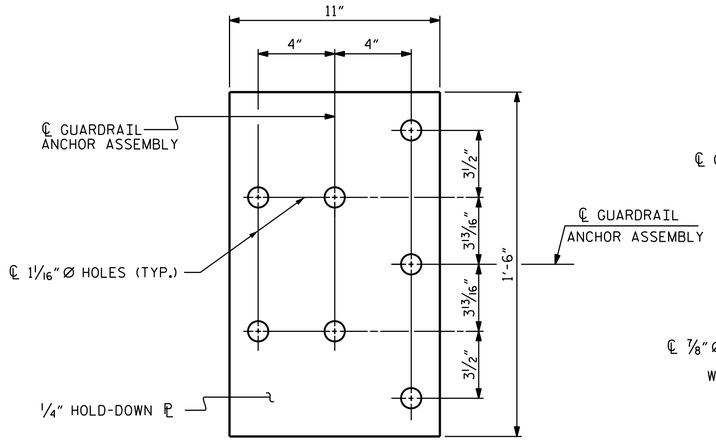
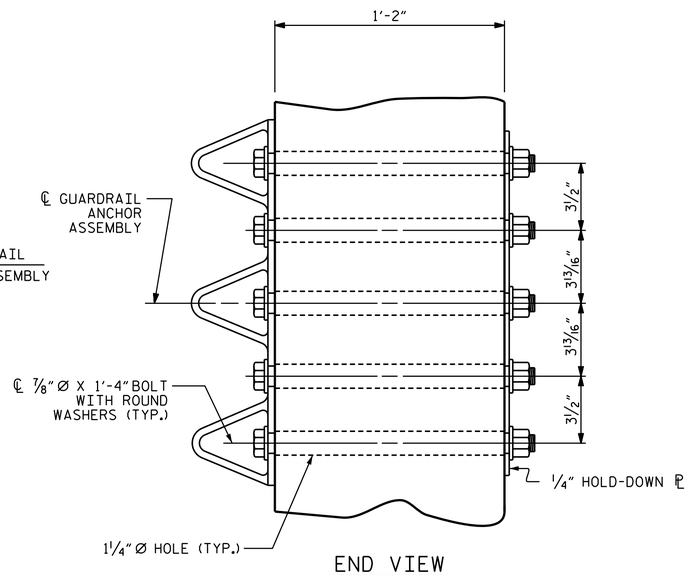
User:ZSmith



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.

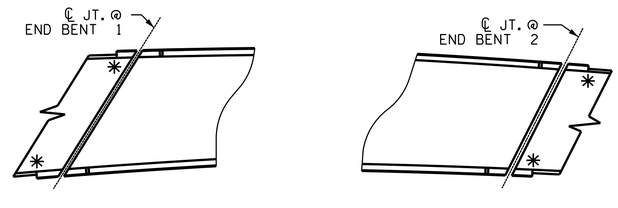
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

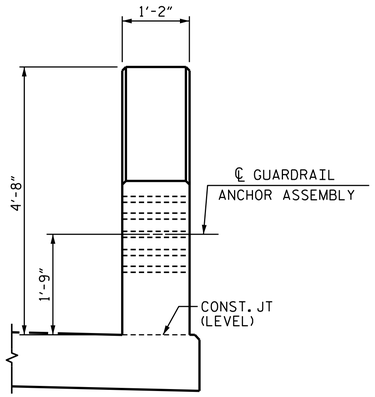
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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.

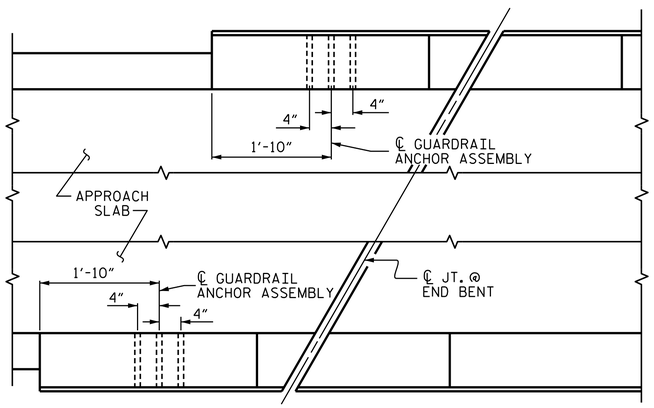


SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

END BENT 1 SHOWN, END BENT 2 SIMILAR.

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CREEK, JR.

Document signed by: Marshall G. Creek, Jr. 5FBCC2F3A4DC413...
9/30/2021 | 1:43 PM EDT

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CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-48
1			3			TOTAL SHEETS
2			4			79

STD. NO. GRA3

ASSEMBLED BY :	STM	DATE :	03/19
CHECKED BY :	MGC	DATE :	04/19
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

7/29/2021
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User:ZSmith

REINFORCING BAR SCHEDULE SPANS A & B- STAGE I

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	506	#5	STR.	31'-11"	16844
A2	506	#5	STR.	31'-11"	16844
✱A101	2	#5	STR.	30'- 8"	64
✱A102	2	#5	STR.	29'- 3"	61
✱A103	2	#5	STR.	27'-10"	58
✱A104	2	#5	STR.	26'- 5"	55
✱A105	2	#5	STR.	25'- 0"	52
✱A106	2	#5	STR.	23'- 8"	49
✱A107	2	#5	STR.	22'- 3"	46
✱A108	2	#5	STR.	20'-11"	44
✱A109	2	#5	STR.	19'- 6"	41
✱A110	2	#5	STR.	18'- 2"	38
✱A111	2	#5	STR.	16'- 9"	35
✱A112	2	#5	STR.	15'- 5"	32
✱A113	2	#5	STR.	14'- 0"	29
✱A114	2	#5	STR.	12'- 8"	26
✱A115	2	#5	STR.	11'- 4"	24
✱A116	2	#5	STR.	10'- 0"	21
✱A117	2	#5	STR.	8'- 7"	18
✱A118	2	#5	STR.	7'- 3"	15
✱A119	2	#5	STR.	5'- 11"	12
✱A120	2	#5	STR.	4'- 7"	10
✱A121	2	#5	STR.	3'- 3"	7
✱A122	2	#5	STR.	1'- 11"	4
✱A123	3	#6	STR.	8'- 0"	36
A301	2	#5	STR.	30'- 8"	64
A302	2	#5	STR.	29'- 3"	61
A303	2	#5	STR.	27'-10"	58
A304	2	#5	STR.	26'- 5"	55
A305	2	#5	STR.	25'- 0"	52
A306	2	#5	STR.	23'- 8"	49
A307	2	#5	STR.	22'- 3"	46
A308	2	#5	STR.	20'-11"	44
A309	2	#5	STR.	19'- 6"	41
A310	2	#5	STR.	18'- 2"	38
A311	2	#5	STR.	16'- 9"	35
A312	2	#5	STR.	15'- 5"	32
A313	2	#5	STR.	14'- 0"	29
A314	2	#5	STR.	12'- 8"	26
A315	2	#5	STR.	11'- 4"	24
A316	2	#5	STR.	10'- 0"	21
A317	2	#5	STR.	8'- 7"	18
A318	2	#5	STR.	7'- 3"	15
A319	2	#5	STR.	5'- 11"	12
A320	2	#5	STR.	4'- 7"	10
A321	2	#5	STR.	3'- 3"	7
A322	2	#5	STR.	1'- 11"	4
✱A201	1	#5	STR.	31'- 6"	33
✱A202	1	#5	STR.	30'- 5"	32
✱A203	1	#5	STR.	29'- 4"	31
✱A204	1	#5	STR.	28'- 3"	29
✱A205	1	#5	STR.	27'- 3"	28
✱A206	1	#5	STR.	26'- 2"	27
✱A207	1	#5	STR.	25'- 1"	26
✱A208	1	#5	STR.	24'- 0"	25
✱A209	1	#5	STR.	22'-11"	24
✱A210	1	#5	STR.	21'-10"	23
✱A211	1	#5	STR.	20'- 9"	22
✱A212	1	#5	STR.	19'- 8"	21
✱A213	1	#5	STR.	18'- 6"	19
✱A214	1	#5	STR.	17'- 5"	18
✱A215	1	#5	STR.	16'- 4"	17
✱A216	1	#5	STR.	15'- 3"	16
✱A217	1	#5	STR.	14'- 2"	15
✱A218	1	#5	STR.	13'- 0"	14
✱A219	1	#5	STR.	11'- 11"	12
✱A220	1	#5	STR.	10'-10"	11
✱A221	1	#5	STR.	9'- 9"	10
✱A222	1	#5	STR.	8'- 7"	9
✱A223	1	#5	STR.	7'- 6"	8
✱A224	1	#5	STR.	6'- 4"	7
✱A225	1	#5	STR.	5'- 3"	5
✱A226	1	#5	STR.	4'- 2"	4
✱A227	1	#5	STR.	3'- 0"	3
✱A228	1	#5	STR.	1'-11"	2

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
A401	1	#5	STR.	31'- 6"	33
A402	1	#5	STR.	30'- 5"	32
A403	1	#5	STR.	29'- 4"	31
A404	1	#5	STR.	28'- 3"	29
A405	1	#5	STR.	27'- 3"	28
A406	1	#5	STR.	26'- 2"	27
A407	1	#5	STR.	25'- 1"	26
A408	1	#5	STR.	24'- 0"	25
A409	1	#5	STR.	22'-11"	24
A410	1	#5	STR.	21'-10"	23
A411	1	#5	STR.	20'- 9"	22
A412	1	#5	STR.	19'- 8"	21
A413	1	#5	STR.	18'- 6"	19
A414	1	#5	STR.	17'- 5"	18
A415	1	#5	STR.	16'- 4"	17
A416	1	#5	STR.	15'- 3"	16
A417	1	#5	STR.	14'- 2"	15
A418	1	#5	STR.	13'- 0"	14
A419	1	#5	STR.	11'- 11"	12
A420	1	#5	STR.	10'-10"	11
A421	1	#5	STR.	9'- 9"	10
A422	1	#5	STR.	8'- 7"	9
A423	1	#5	STR.	7'- 6"	8
A424	1	#5	STR.	6'- 4"	7
A425	1	#5	STR.	5'- 3"	5
A426	1	#5	STR.	4'- 2"	4
A427	1	#5	STR.	3'- 0"	3
A428	1	#5	STR.	1'-11"	2
B1	190	#5	STR.	55'-10"	11064
✱B2	10	#4	STR.	28'-11"	193
✱B3	66	#4	STR.	21'-11"	966
✱B4	84	#7	STR.	55'-8"	9558
✱B5	88	#4	STR.	27'-9"	1631
✱D1	534	#6	STR.	5'- 3"	4211
✱G1	1	#5	STR.	39'- 5"	41
✱G2	1	#5	STR.	34'-11"	36
✱K1	6	#5	1	11'-10"	74
✱K2	6	#5	2	15'- 3"	95
✱K3	6	#5	1	10'- 7"	66
✱K4	6	#5	2	13'- 7"	85
✱S1	42	#4	3	4'-11"	138

REINFORCING STEEL 29,140 LBS.

✱EPOXY COATED REINFORCING STEEL 35,206 LBS.

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"			

DRAWN BY : S.B. WILLIAMS DATE : 3-19
CHECKED BY : MGC DATE : 4-19
DESIGN ENGINEER OF RECORD: MGC DATE : 8-21

8/27/2021
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User:sbwilliams

REINFORCING BAR SCHEDULE SPANS A & B - STAGE II

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
✱A3	964	#5	STR.	34'- 4"	34520
A4	964	#5	STR.	34'- 2"	34353
✱A501	2	#5	STR.	58'-11"	123
✱A502	2	#5	STR.	57'- 6"	120
✱A503	2	#5	STR.	56'- 0"	117
✱A504	2	#5	STR.	54'- 6"	114
✱A505	2	#5	STR.	53'- 0"	111
✱A506	2	#5	STR.	51'- 6"	107
✱A507	2	#5	STR.	50'- 1"	104
✱A508	2	#5	STR.	48'-7"	101
✱A509	2	#5	STR.	47'- 1"	98
✱A510	2	#5	STR.	45'- 8"	95
✱A511	2	#5	STR.	44'- 2"	92
✱A512	2	#5	STR.	42'- 9"	89
✱A513	2	#5	STR.	41'- 3"	86
✱A514	2	#5	STR.	39'-10"	83
✱A515	2	#5	STR.	38'- 4"	80
✱A516	2	#5	STR.	36'- 11"	77
✱A517	2	#5	STR.	35'- 6"	74
✱A518	2	#5	STR.	34'- 1"	71
✱A519	2	#5	STR.	32'- 8"	68
✱A520	2	#5	STR.	31'- 2"	65
✱A521	2	#5	STR.	29'- 9"	62
✱A522	2	#5	STR.	28'- 4"	59
✱A523	2	#5	STR.	26'-11"	56
✱A524	2	#5	STR.	25'- 6"	53
✱A525	2	#5	STR.	24'- 1"	50
✱A526	2	#5	STR.	22'- 8"	47
✱A527	2	#5	STR.	21'- 4"	45
✱A528	2	#5	STR.	19'-11"	42
✱A529	2	#5	STR.	18'-6"	39
✱A530	2	#5	STR.	17'- 1"	36
✱A531	2	#5	STR.	15'- 8"	33
✱A532	2	#5	STR.	14'- 4"	30
✱A533	2	#5	STR.	12'-11"	27
✱A534	2	#5	STR.	11'- 7"	24
✱A535	2	#5	STR.	10'- 2"	21
✱A536	2	#5	STR.	8'- 9"	18
✱A537	2	#5	STR.	7'- 5"	15
✱A538	2	#5	STR.	6'- 1"	13
✱A539	2	#5	STR.	4'- 9"	10
✱A540	2	#5	STR.	3'- 4"	7
✱A541	2	#5	STR.	1'- 11"	4
A701	2	#5	STR.	58'-11"	123
A702	2	#5	STR.	57'- 6"	120
A703	2	#5	STR.	56'- 0"	117
A704	2	#5	STR.	54'- 6"	114
A705	2	#5	STR.	53'- 0"	111
A706	2	#5	STR.	51'- 6"	107
A707	2	#5	STR.	50'- 1"	104
A708	2	#5	STR.	48'-7"	101
A709	2	#5	STR.	47'- 1"	98
A710	2	#5	STR.	45'- 8"	95
A711	2	#5	STR.	44'- 2"	92
A712	2	#5	STR.	42'- 9"	89
A713	2	#5	STR.	41'- 3"	86
A714	2	#5	STR.	39'-10"	83
A715	2	#5	STR.	38'- 4"	80
A716	2	#5	STR.	36'- 11"	77
A717	2	#5	STR.	35'- 6"	74
A718	2	#5	STR.	34'- 1"	71
A719	2	#5	STR.	32'- 8"	68
A720	2	#5	STR.	31'- 2"	65
A721	2	#5	STR.	29'- 9"	62
A722	2	#5	STR.	28'- 4"	59
A723	2	#5	STR.	26'-11"	56
A724	2	#5	STR.	25'- 6"	53
A725	2	#5	STR.	24'- 1"	50
A726	2	#5	STR.	22'- 8"	47
A727	2	#5	STR.	21'- 4"	45
A728	2	#5	STR.	19'-11"	42
A729	2	#5	STR.	18'-6"	39
A730	2	#5	STR.	17'- 1"	36
A731	2	#5	STR.	15'- 8"	33
A732	2	#5	STR.	14'- 4"	30
A733	2	#5	STR.	12'-11"	27
A734	2	#5	STR.	11'- 7"	24
A735	2	#5	STR.	10'- 2"	21
A736	2	#5	STR.	8'- 9"	18
A737	2	#5	STR.	7'- 5"	15
A738	2	#5	STR.	6'- 1"	13
A739	2	#5	STR.	4'- 9"	10
A740	2	#5	STR.	3'- 4"	7
A741	2	#5	STR.	1'- 11"	4

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
✱A601	1	#5	STR.	59'- 3"	62
✱A602	1	#5	STR.	58'- 2"	61
✱A603	1	#5	STR.	57'- 1"	60
✱A604	1	#5	STR.	56'- 0"	58
✱A605	1	#5	STR.	54'- 11"	57
✱A606	1	#5	STR.	53'- 9"	56
✱A607	1	#5	STR.	52'- 8"	55
✱A608	1	#5	STR.	51'- 7"	54
✱A609	1	#5	STR.	50'-6"	53
✱A610	1	#5	STR.	49'- 4"	51
✱A611	1	#5	STR.	48'- 3"	50
✱A612	1	#5	STR.	47'- 2"	49
✱A613	1	#5	STR.	46'- 0"	48
✱A614	1	#5	STR.	44'-11"	47
✱A615	1	#5	STR.	43'- 9"	46
✱A616	1	#5	STR.	42'- 8"	45
✱A617	1	#5	STR.	41'- 7"	43
✱A618	1	#5	STR.	40'- 5"	42
✱A619	1	#5	STR.	39'- 4"	41
✱A620	1	#5	STR.	38'- 2"	40
✱A621	1	#5	STR.	37'- 1"	39
✱A622	1	#5	STR.	35'-11"	37
✱A623	1	#5	STR.	34'-10"	36
✱A624	1	#5	STR.	33'- 8"	35
✱A625	1	#5	STR.	32'- 6"	34
✱A626	1	#5	STR.	31'- 4"	33
✱A627	1	#5	STR.	30'- 3"	32
✱A628	1	#5	STR.	29'- 1"	30
✱A629	1	#5	STR.	28'- 0"	29
✱A630	1	#5	STR.	26'-10"	28
✱A631	1	#5	STR.	25'- 8"	27
✱A632	1	#5	STR.	23'- 4"	24
✱A633	1	#5	STR.	22'- 2"	23
✱A634	1	#5	STR.	21'- 0"	22
✱A635	1	#5	STR.	19'-10"	21
✱A636	1	#5	STR.	18'- 9"	20
✱A637	1	#5	STR.	17'- 7"	18
✱A638	1	#5	STR.	16'- 5"	17
✱A639	1	#5	STR.	15'- 3"	16
✱A640	1	#5	STR.	14'- 1"	15
✱A641	1	#5	STR.	12'-11"	13
✱A642	1	#5	STR.	11'- 8"	12
✱A643	1	#5	STR.	10'- 7"	11
✱A644	1	#5	STR.	9'- 4"	10
✱A645	1	#5	STR.	8'- 2"	9
✱A646	1	#5	STR.	7'- 0"	7
✱A647	1	#5	STR.	5'-10"	6
✱A648	1	#5	STR.	4'- 7"	5
✱A649	1	#5	STR.	3'- 5"	4
✱A650	1	#5	STR.	2'- 3"	2
A801	1	#5	STR.	59'- 3"	62
A802	1	#5	STR.	58'- 2"	61
A803	1	#5	STR.	57'- 1"	60
A804	1	#5	STR.	56'- 0"	58
A805	1	#5	STR.	54'- 11"	57
A806	1	#5	STR.	53'- 9"	56
A807	1	#5	STR.	52'- 8"	55
A808	1	#5	STR.	51'- 7"	54
A809	1	#5	STR.	50'- 6"	53
A810	1	#5	STR.	49'- 4"	51
A811	1	#5	STR.	48'- 3"	50
A812	1	#5	STR.	47'- 2"	49
A813	1	#5	STR.	46'- 0"	48
A814	1	#5	STR.	44'-11"	47
A815	1	#5	STR.	43'- 9"	46
A816	1	#5	STR.	42'- 8"	45
A817	1	#5	STR.	41'- 7"	43
A818	1	#5	STR.	40'- 5"	42
A819	1	#5	STR.	39'- 4"	41
A820	1	#5	STR.	38'- 2"	40
A821	1	#5	STR.	37'- 1"	39
A822	1	#5	STR.	35'-11"	37
A823	1	#5	STR.	34'-10"	36
A824	1	#5	STR.	33'- 8"	35
A825	1	#5	STR.	32'- 6"	34
A826	1	#5	STR.	31'- 4"	33
A827	1	#5	STR.	30'- 3"	32
A828	1	#5	STR.	29'- 1"	30
A829	1	#5	STR.	28'- 0"	29
A830	1	#5	STR.	26'-10"	28
A831	1	#5	STR.	25'- 8"	27
A832	1	#5	STR.	23'- 4"	24
A833	1	#5	STR.	22'- 2"	23
A834	1	#5	STR.	21'- 0"	22
A835	1	#5	STR.	19'-10"	21
A836	1	#5	STR.	18'- 9"	20
A837	1	#5	STR.	17'-7"	18
A838	1	#5	STR.	16'- 5"	17
A839	1	#5	STR.	15'- 3"	16
A840	1	#5	STR.	14'- 1"	15
A841	1	#5	STR.	12'-11"	13
A842	1	#5	STR.	11'- 8"	12
A843	1	#5	STR.	10'- 7"	11
A844	1	#5	STR.	9'- 4"	10
A845	1	#5	STR.	8'- 2"	9
A846	1	#5	STR.	7'- 0"	7
A847	1	#5	STR.	5'-10"	6
A848	1	#5	STR.	4'- 7"	5
A849	1	#5	STR.	3'- 5"	4
A850	1	#5	STR.	2'- 3"	2

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B6	400	#5	STR.	55'-10"	23294
✱B7	10	#4	STR.	28'- 3"	189
✱B8	132	#4	STR.	21'- 7"	1903
✱B9	170	#7	STR.	55'- 8"	19343
✱B10	176	#4	STR.	27'- 8"	3253
✱D1	534	#6	STR.	5'- 3"	4211
✱G3	2	#5	STR.	41'- 3"	86
✱G4	2	#5	STR.	37'- 3"	78
✱K5	6	#5	1	12'- 4"	77
✱K6	15	#5	2	17'- 1"	267
✱K7	6	#5	1	11'- 1"	69
✱K8	15	#5	2	15'- 5"	241
✱S1	96	#4	3	4'-11"	315

REINFORCING STEEL 61,846 LBS.

✱EPOXY COATED REINFORCING STEEL 68,751 LBS.

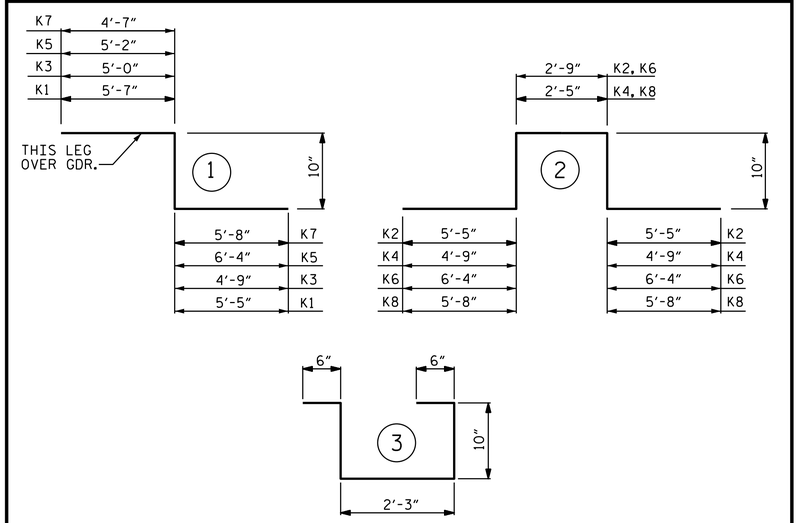
REINFORCING BAR SCHEDULE SPANS A & B - STAGE III

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B6	25	#5	STR.	55'-10"	1456
✱B8	6	#4	STR.	21'- 7"	87
✱B9	8	#7	STR.	55'- 8"	910
✱B10	8	#4	STR.	27'- 8"	148

REINFORCING STEEL 1,456 LBS.

✱EPOXY COATED REINFORCING STEEL 1,145 LBS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

WATAUGA R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Digitally signed by G. CHEEK, JR.
Marshall G. Cheek, Jr.
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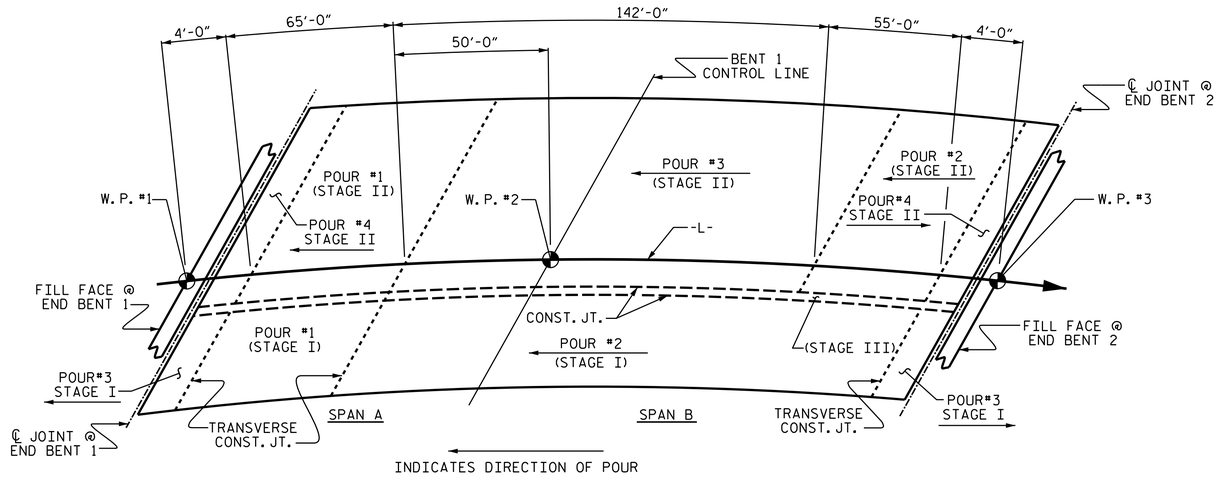
TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 209
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

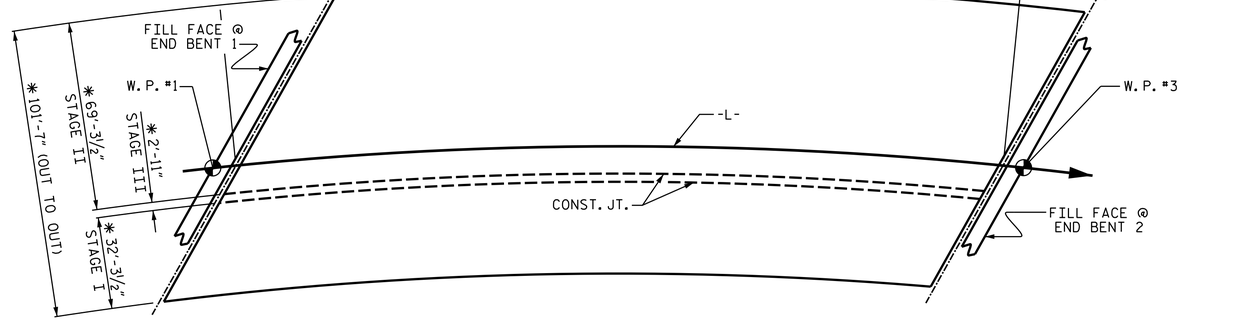
SUPERSTRUCTURE BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-49
1			3			TOTAL SHEETS
2			4			79



DECK POUR DETAIL

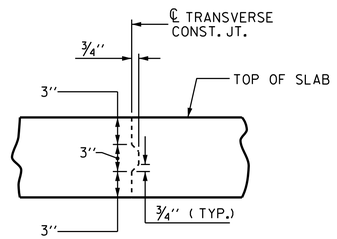
ALL DIMENSIONS SHOWN ARE ALONG -L-



*RADIAL DIMENSION

(STAGE I = 8,702 SQ. FT.)
(STAGE II & III =17,664 SQ. FT.)

LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. = 26,366)



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

POUR SEQUENCE BREAKDOWN

	CLASS AA CONCRETE		
	STAGE I	STAGE II	STAGE III
	(CU.YDS.)	(CU.YDS.)	(CU.YDS.)
POUR *1	68.7	137.1	28.9
POUR *2	208.3	116.0	-
POUR *3	9.9	299.6	-
POUR *4	—	19.9	-
TOTALS**	286.9	572.6	28.9

** QUANTITIES FOR CONCRETE PARAPET ARE NOT INCLUDED

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU.YDS.)	(LBS.)	(LBS.)
STAGE I	286.9	29,140	35,206
STAGE II	572.6	61,846	68,751
STAGE III	28.9	1,456	1,145
TOTALS**	888.4	92,442	105,102

** QUANTITIES FOR CONCRETE PARAPET ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

APPROACH SLABS STAGE I	2,329 SQ. FT.
APPROACH SLABS STAGE II	2,311 SQ. FT.
TOTAL	4,640 SQ. FT.
BRIDGE DECK STAGE I	7,878 SQ. FT.
BRIDGE DECK STAGE II & III	16,832 SQ. FT.
TOTAL	24,710 SQ. FT.

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER
Digitally signed by Marshall G. Cheek, Jr.
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TGS ENGINEERS
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SUITE 200
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PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-50
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	S. B. WILLIAMS	DATE :	3-19
CHECKED BY :	MGC	DATE :	5-19
DESIGN ENGINEER OF RECORD:	MGC	DATE :	8-21

8/27/2021
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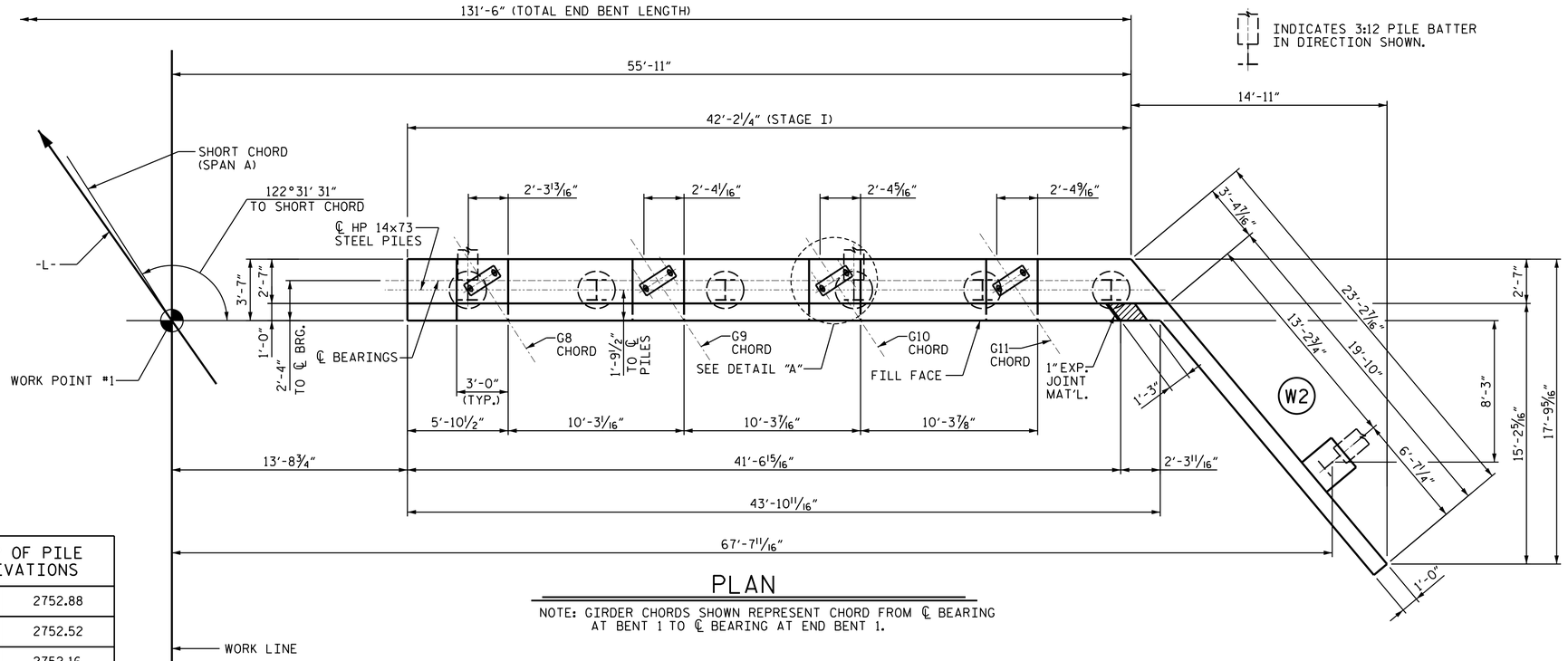
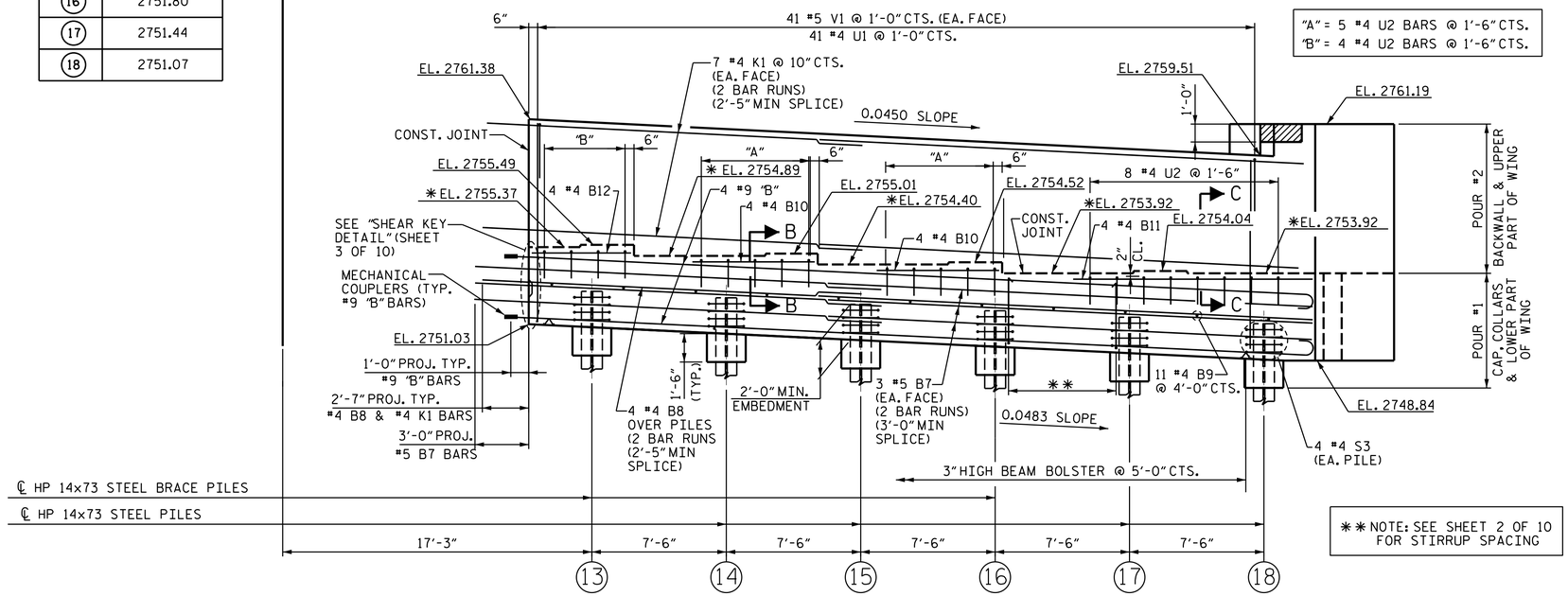
User:sbwilliams



PLAN

NOTE: GIRDER CHORDS SHOWN REPRESENT CHORD FROM ℄ BEARING AT BENT 1 TO ℄ BEARING AT END BENT 1.

TOP OF PILE ELEVATIONS	
(13)	2752.88
(14)	2752.52
(15)	2752.16
(16)	2751.80
(17)	2751.44
(18)	2751.07



ELEVATION

(WING NOT SHOWN FOR CLARITY)
FOR SECTION B-B AND C-C SEE SHEET 3 OF 10
✱FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILD-UPS, SEE TYPICAL SECTION

✱✱NOTE: SEE SHEET 2 OF 10 FOR STIRRUP SPACING

NOTES :

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

FOR PILE SPLICE DETAILS, SEE SHEET 5 OF 10.

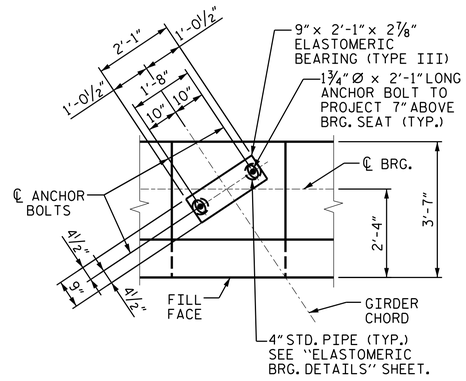
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPET IS POURED IF SLIP FORMING IS USED.

FOR PIPE INSERT DETAILS, SEE BEARINGS SHEET.



DETAIL "A"

(TYP. EA. GIRDER)

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 1 OF 10

DRAWN BY :	NMW	DATE :	3/19
CHECKED BY :	RAR	DATE :	6/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL N. CHEEK, JR.
DocuSigned by: Marshall N. Cheek, Jr.
5FBCC2F3A4DC413...
9/30/2021 | 1:43 PM EDT

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SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

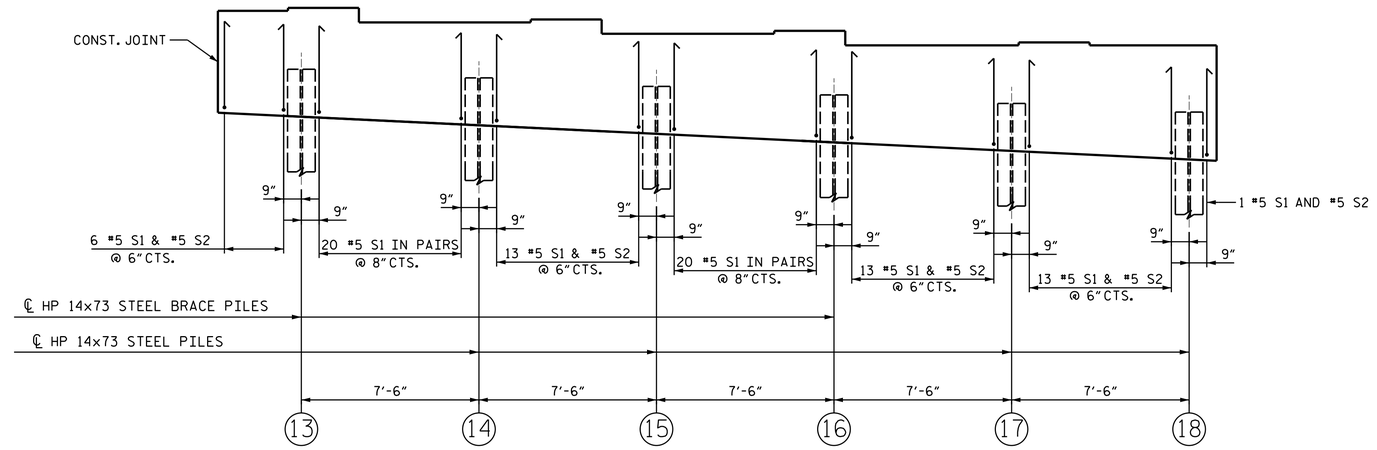
END BENT 1
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-51
1			3			TOTAL SHEETS
2			4			79

NOTES :

FOR S1 STIRRUPS SHOWN AS PAIRS INVERT OPPOSITE STIRRUP.

FOR S1 AND S2 SPACING PLACE THE S2 OVER THE TOP OF THE S1 STIRRUP.



STIRRUP SPACING - END BENT 1 STAGE I

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 2 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL R. CHEEK, JR.

Marshall R. Cheek, Jr.
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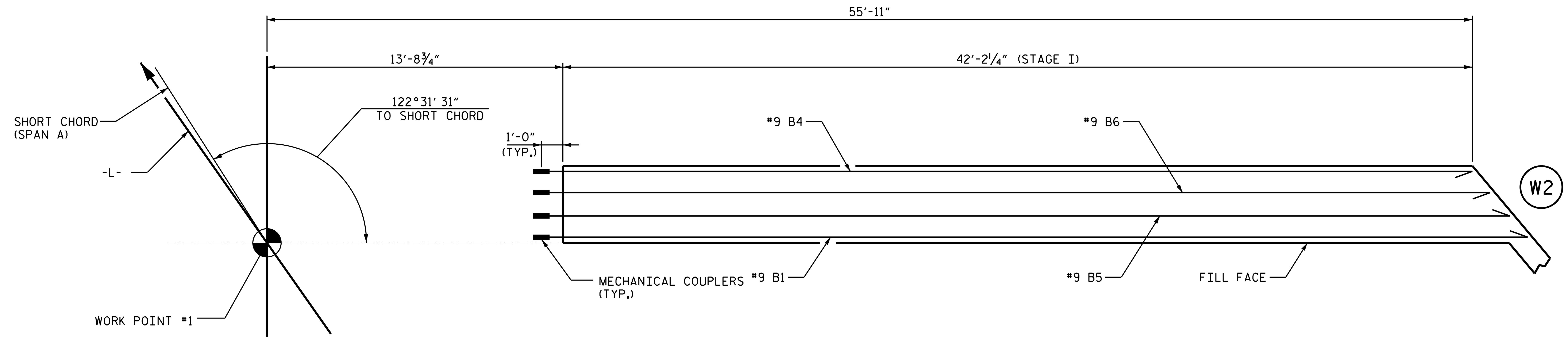
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

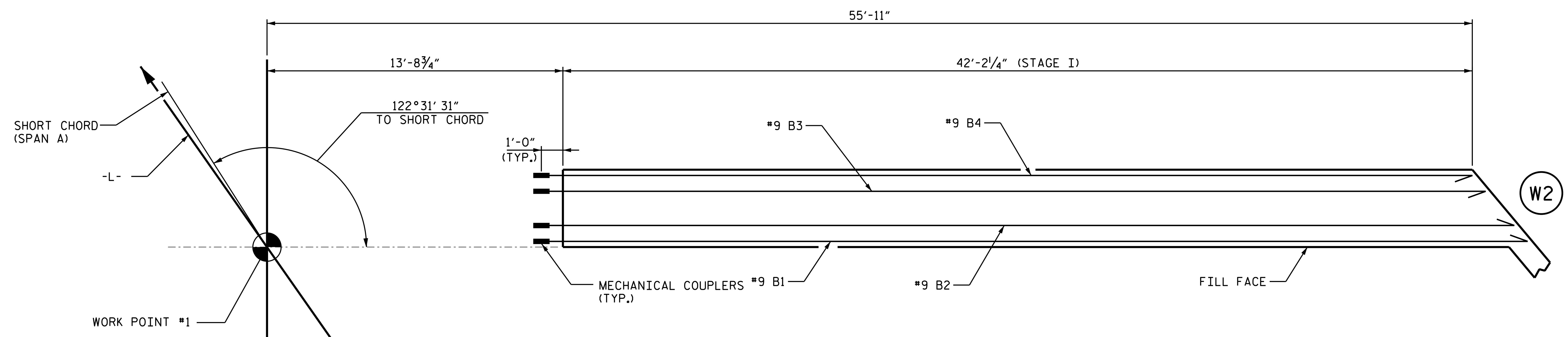
END BENT 1
STIRRUP SPACING
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-52
1			3			TOTAL SHEETS
2			4			79

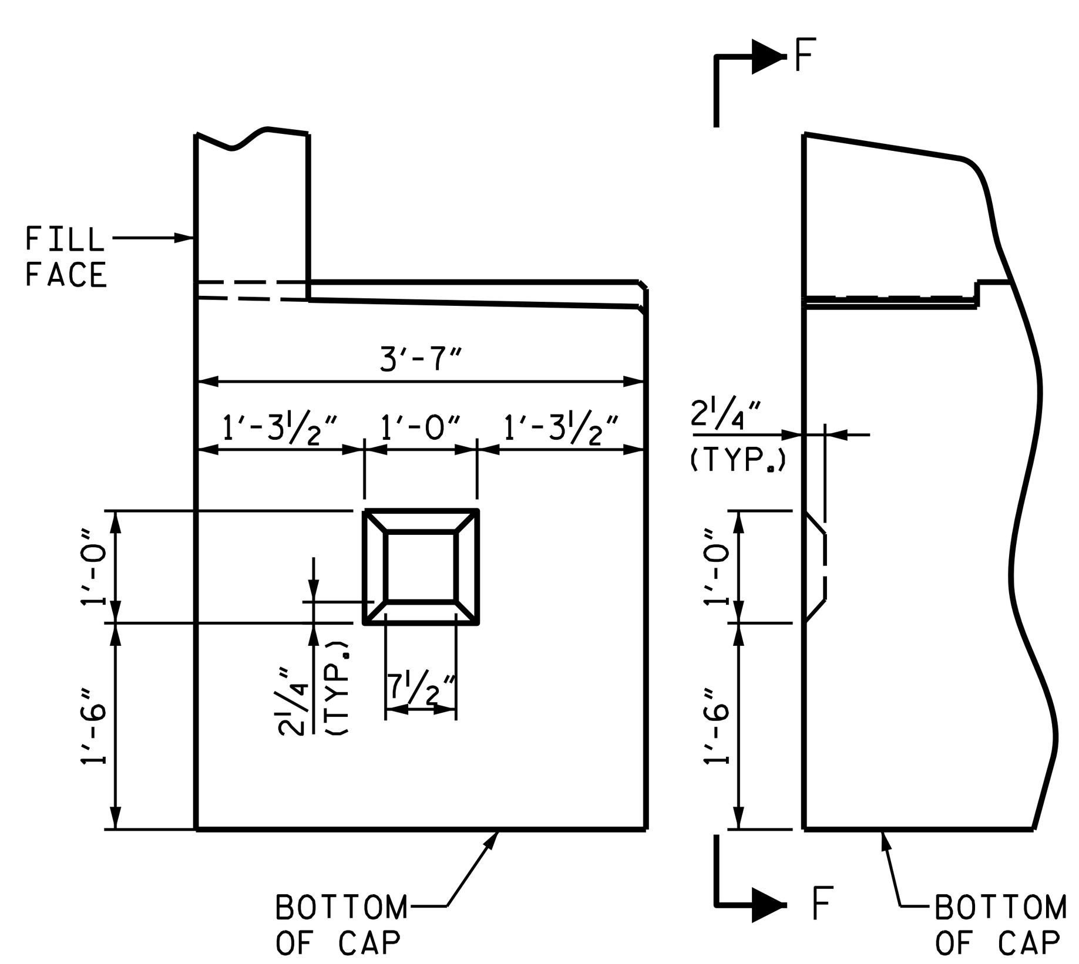
DRAWN BY :	NMW	DATE :	5/19
CHECKED BY :	RAR	DATE :	6/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19



#9 "B" BARS - TOP OF CAP - STAGE I

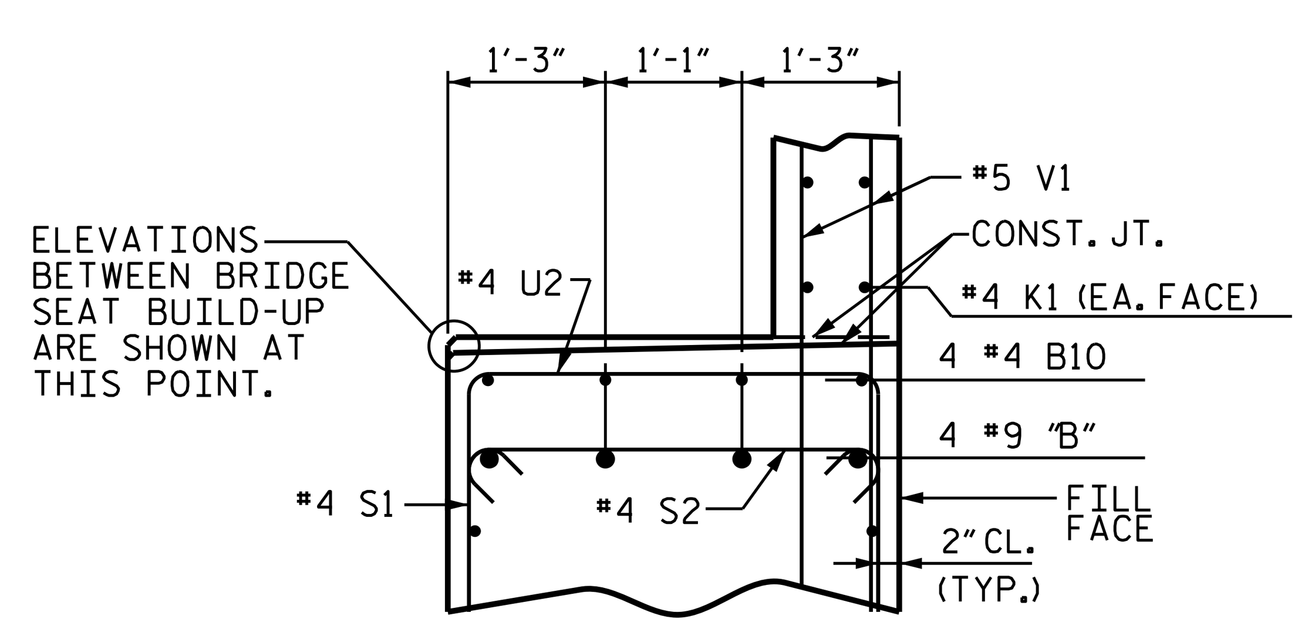


#9 "B" BARS - BOTTOM OF CAP - STAGE I

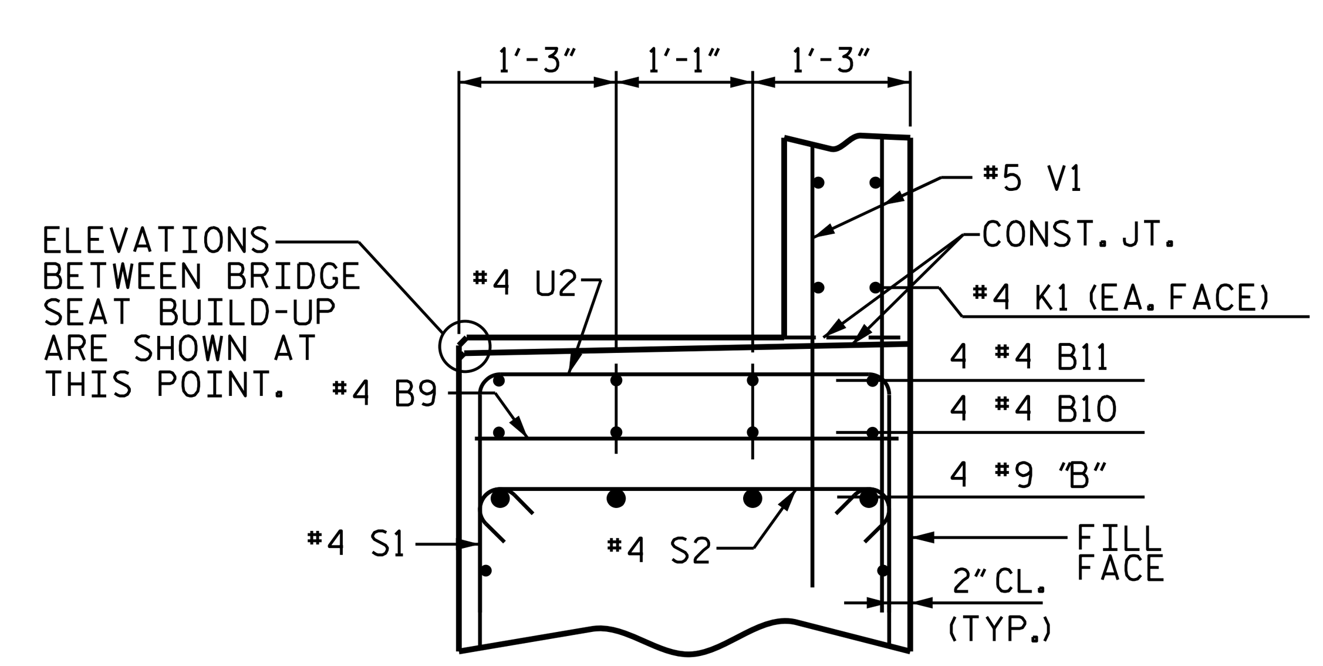


SECTION F-F

SHEAR KEY DETAIL



SECTION B-B



SECTION C-C

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 3 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
STAGE I DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.
9/30/2021 | 1:43 PM EDT

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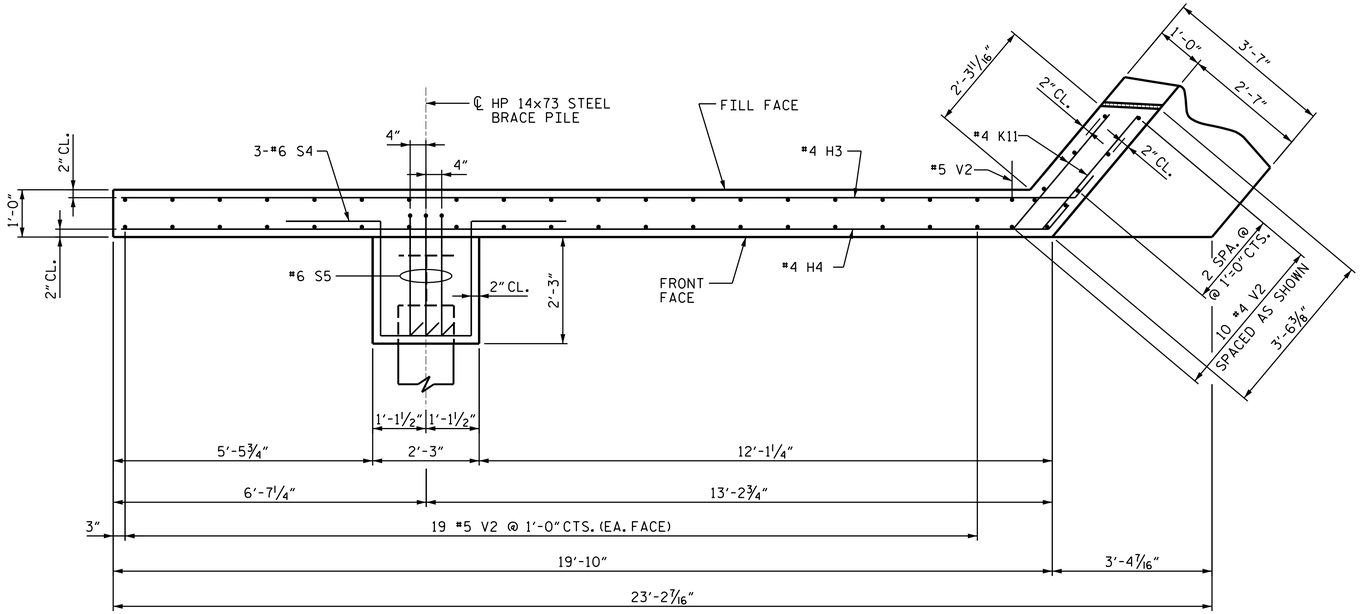
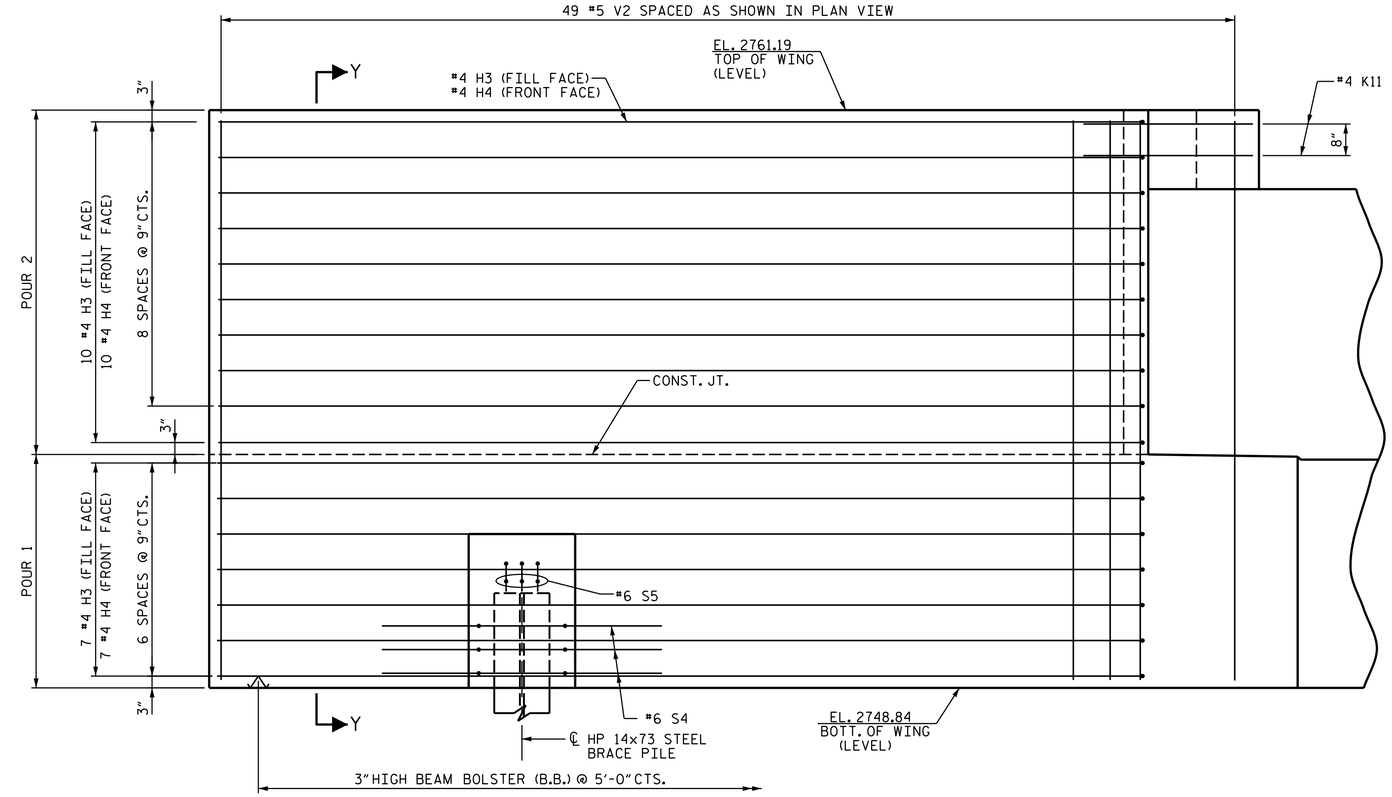
CORP. LICENSE NO.: C-0275

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-53
1			3			TOTAL SHEETS
2			4			79

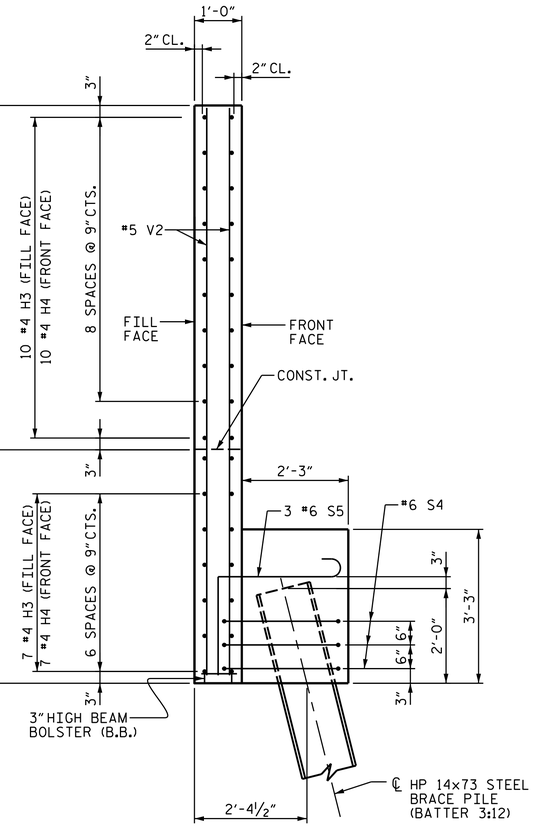
DRAWN BY :	NMW	DATE :	3/19
CHECKED BY :	RAR	DATE :	6/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19



PLAN OF WING (W2)



ELEVATION OF WING (W2)



SECTION Y-Y

DRAWN BY :	NMW	DATE :	3/19
CHECKED BY :	RAR	DATE :	6/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 4 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER

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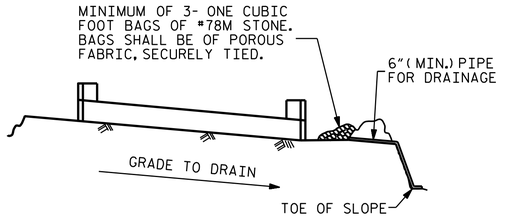
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
STAGE I WING

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-54
1			3			TOTAL SHEETS
2			4			79

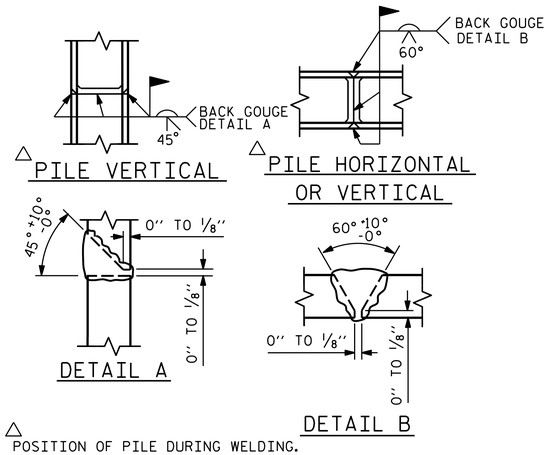


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

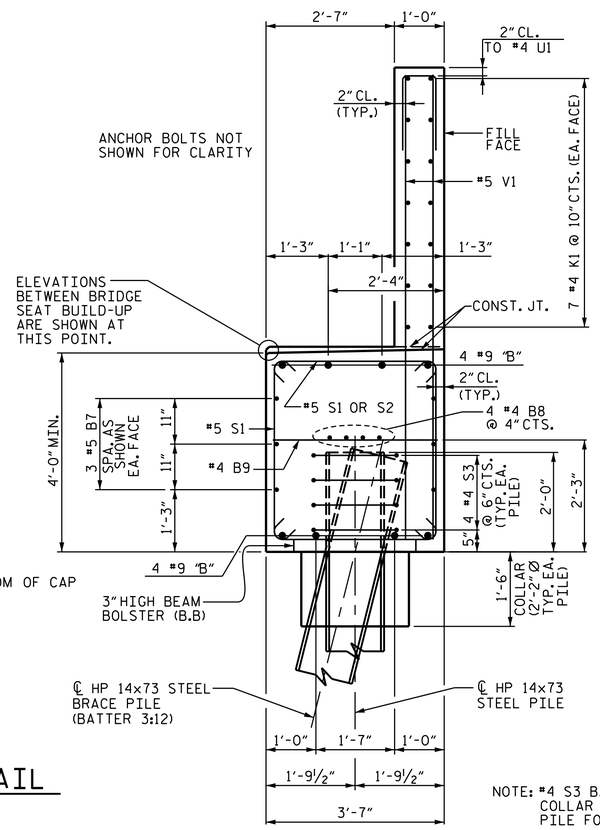
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



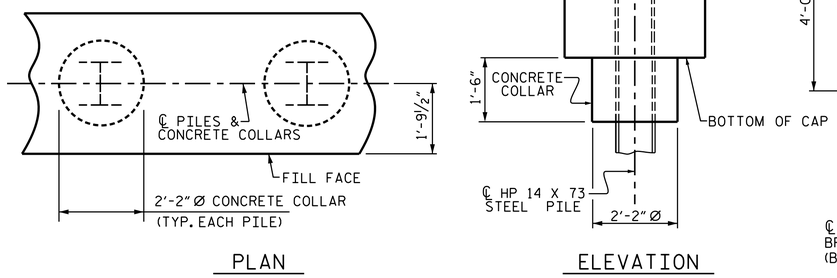
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



NOTE: #4 S3 BARS AND CONCRETE COLLAR NOT SHOWN ON BRACE PILE FOR CLARITY.

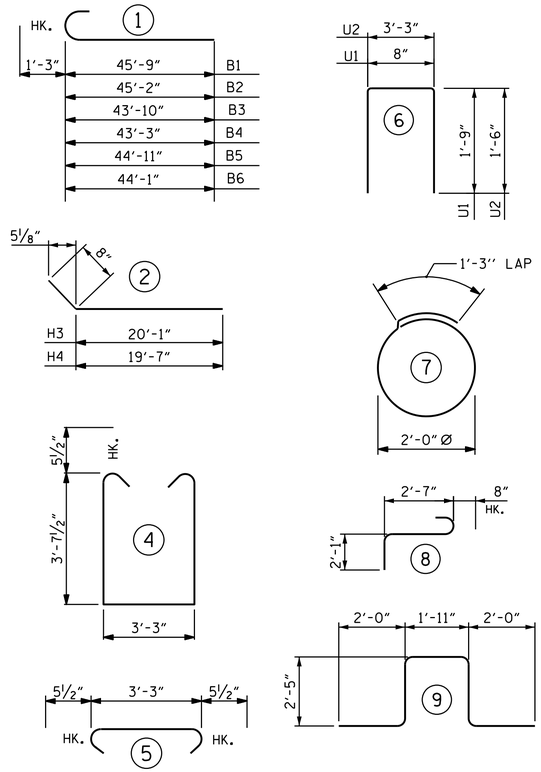
SECTION THRU CAP



CORROSION PROTECTION FOR STEEL PILES DETAIL

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

END BENT 1 STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	2	#9	1	47'-0"	320
B2	1	#9	1	46'-5"	158
B3	1	#9	1	45'-1"	153
B4	2	#9	1	44'-6"	303
B5	1	#9	1	46'-2"	157
B6	1	#9	1	45'-4"	154
B7	12	#5	STR.	25'-6"	319
B8	8	#4	STR.	24'-6"	131
B9	11	#4	STR.	3'-3"	24
B10	8	#4	STR.	6'-10"	37
B11	4	#4	STR.	13'-5"	36
B12	4	#4	STR.	5'-6"	15
H3	17	#4	2	20'-9"	236
H4	17	#4	2	20'-3"	230
K1	28	#4	STR.	24'-9"	463
K11	4	#4	STR.	3'-1"	8
S1	86	#5	4	11'-5"	1024
S2	46	#5	5	4'-2"	200
S3	24	#4	7	7'-7"	122
S4	3	#6	9	10'-9"	48
S5	3	#6	8	5'-4"	24
U1	41	#4	6	4'-2"	114
U2	22	#4	6	6'-3"	92
V1	82	#5	STR.	9'-11"	848
V2	49	#5	STR.	11'-11"	609

REINFORCING STEEL 5,825 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 CAP, LOWER PART OF WING & COLLARS 31.3 C.Y.

POUR #2 BACKWALL AND UPPER PART OF WING 15.1 C.Y.

TOTAL CLASS A CONCRETE 46.4 C.Y.

HP 14 X 73 STEEL PILES
NO: 7 LIN. FT.= 175

PILE DRIVING EQUIPMENT SETUP FOR HP 14 x 73 STEEL PILES
EACH = 7

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00-L-

SHEET 5 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER
Marshall A. Cheek, Jr.
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STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE

END BENT 1
STAGE I DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-55
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	NMW	DATE :	3/19
CHECKED BY :	RAR	DATE :	6/19
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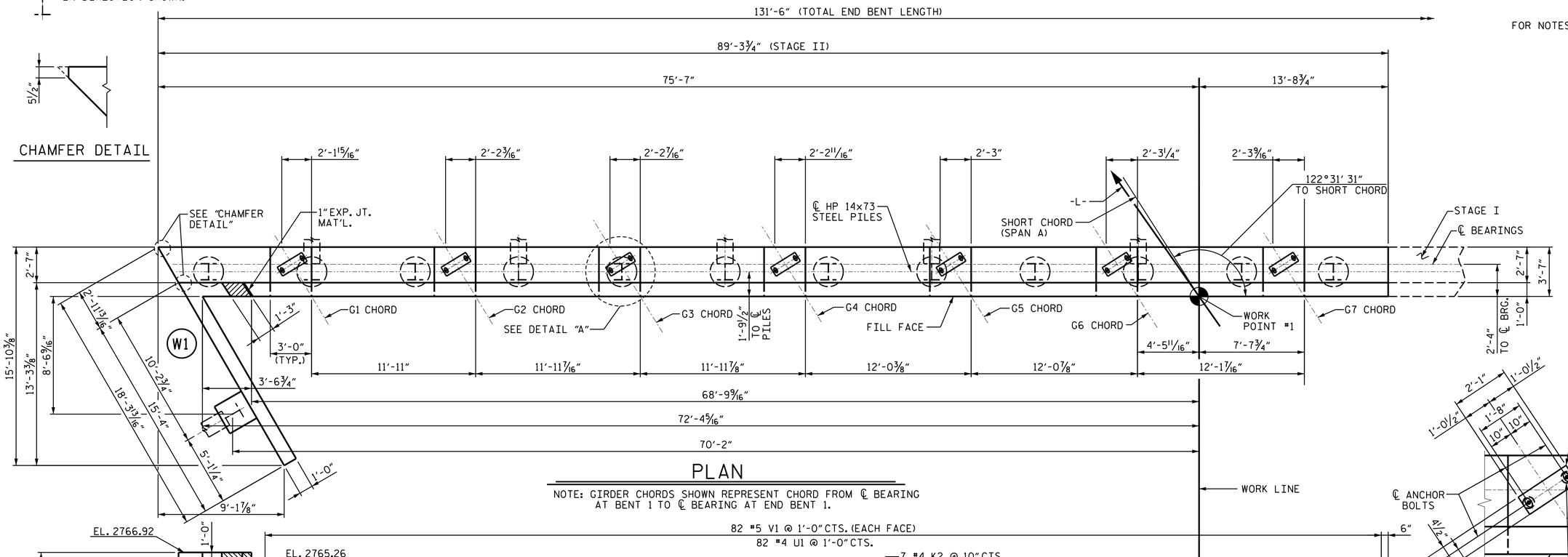
INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.

FOR NOTES, SEE SHEET 1 OF 10.

CHAMFER DETAIL

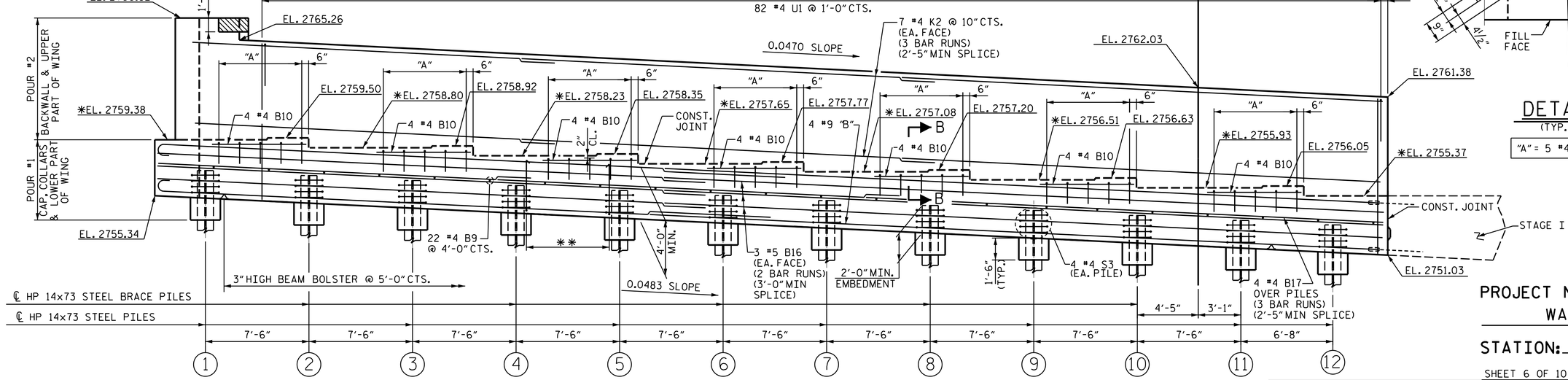
PLAN

NOTE: GIRDER CHORDS SHOWN REPRESENT CHORD FROM ℄ BEARING AT BENT 1 TO ℄ BEARING AT END BENT 1.



ELEVATION

(WING NOT SHOWN FOR CLARITY)
FOR SECTION B-B SEE SHEET 8 OF 10
✱ FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILD-UPS, SEE TYPICAL SECTION



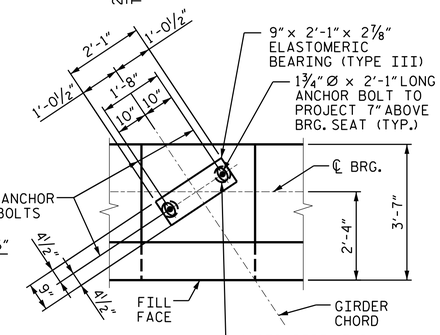
✱✱ NOTE: SEE SHEET 7 OF 10 FOR STIRRUP SPACING

TOP OF PILE ELEVATIONS			
1	2757.19	7	2755.02
2	2756.83	8	2754.66
3	2756.47	9	2754.29
4	2756.10	10	2753.93
5	2755.74	11	2753.57
6	2755.38	12	2753.25

DETAIL "A"

(TYP. EA. GIRDER)

"A" = 5 #4 U2 BARS @ 1'-6" CTS.



PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 6 OF 10

DRAWN BY : NMW DATE : 3/19
CHECKED BY : RAR DATE : 6/19
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NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Marshall G. Cheek, Jr.
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SUBSTRUCTURE

END BENT 1

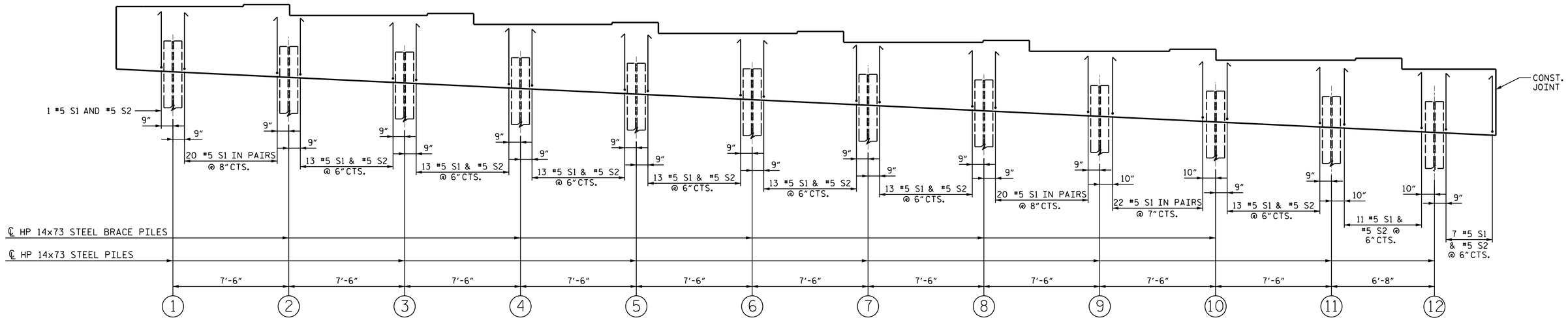
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-56
1			3			TOTAL SHEETS
2			4			79

NOTES :

FOR S1 STIRRUPS SHOWN AS PAIRS INVERT OPPOSITE STIRRUP.

FOR S1 AND S2 SPACING PLACE THE S2 OVER THE TOP OF THE S1 STIRRUP.



STIRRUP SPACING - END BENT 1 STAGE II

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 7 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER
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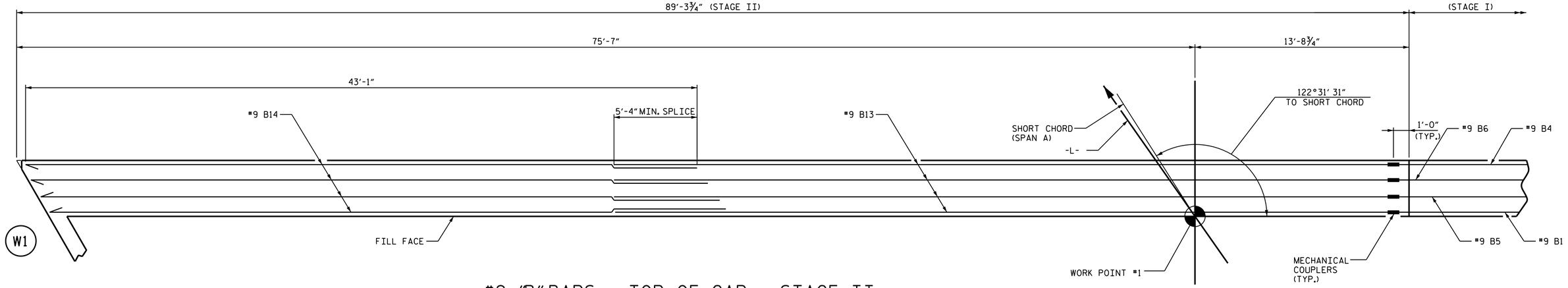
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

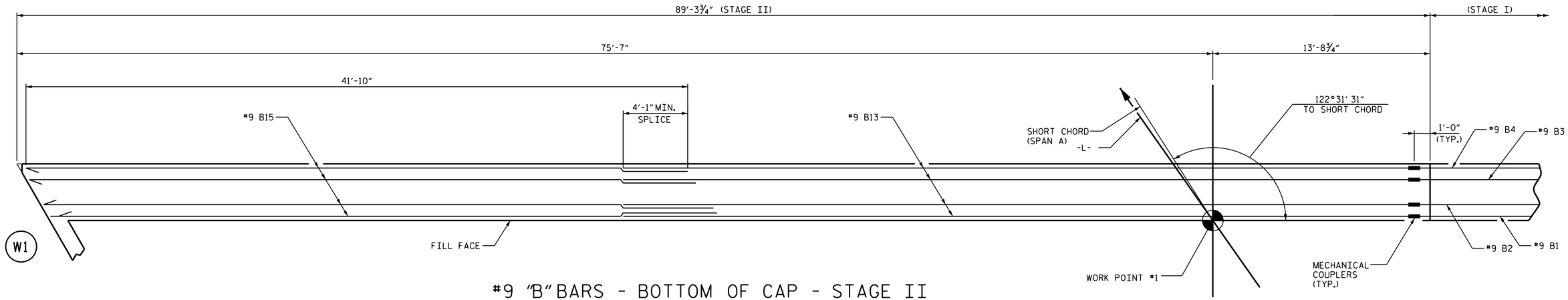
END BENT 1
STIRRUP SPACING
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-57
1			3			TOTAL SHEETS
2			4			79

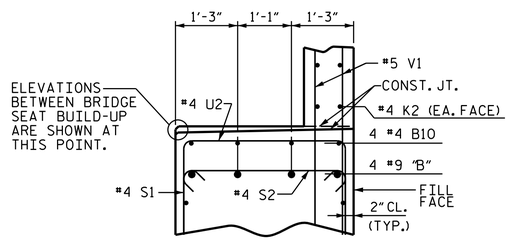
DRAWN BY :	NMW	DATE : 5/19
CHECKED BY :	RAR	DATE : 6/19
DESIGN ENGINEER OF RECORD :	TBE	DATE : 6/19



#9 "B" BARS - TOP OF CAP - STAGE II



#9 "B" BARS - BOTTOM OF CAP - STAGE II



SECTION B-B

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 8 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CHEEK, JR.

Marshall C. Cheek, Jr.

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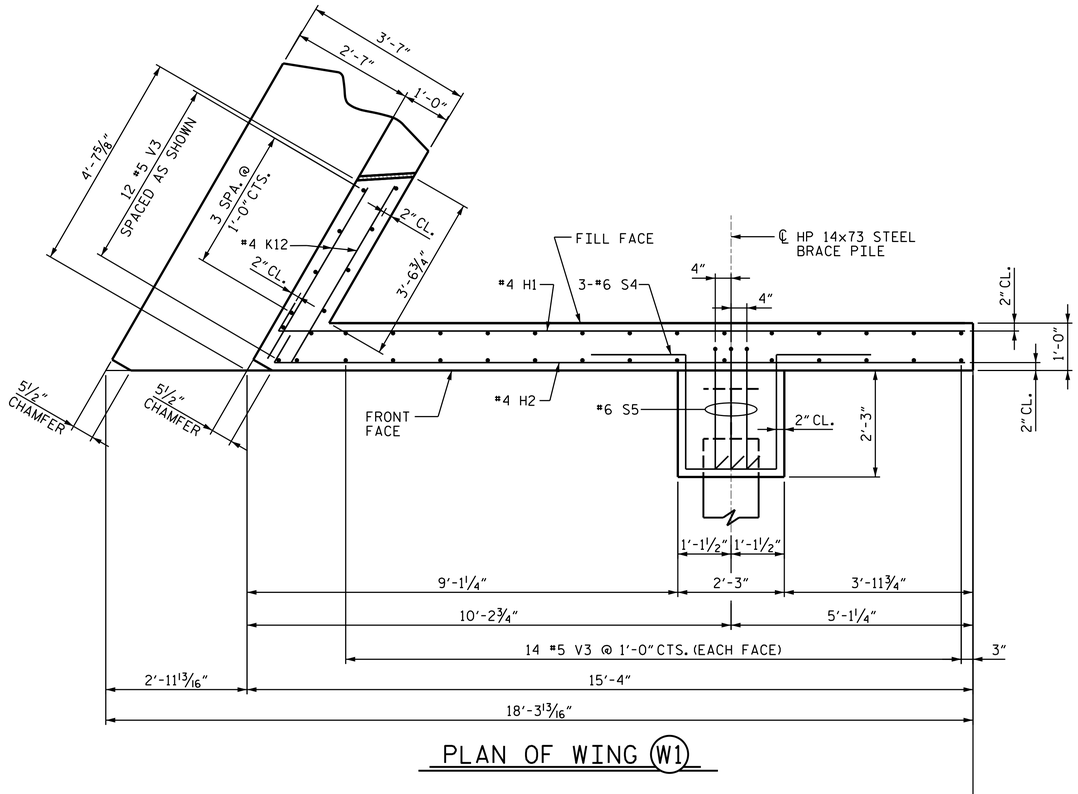
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

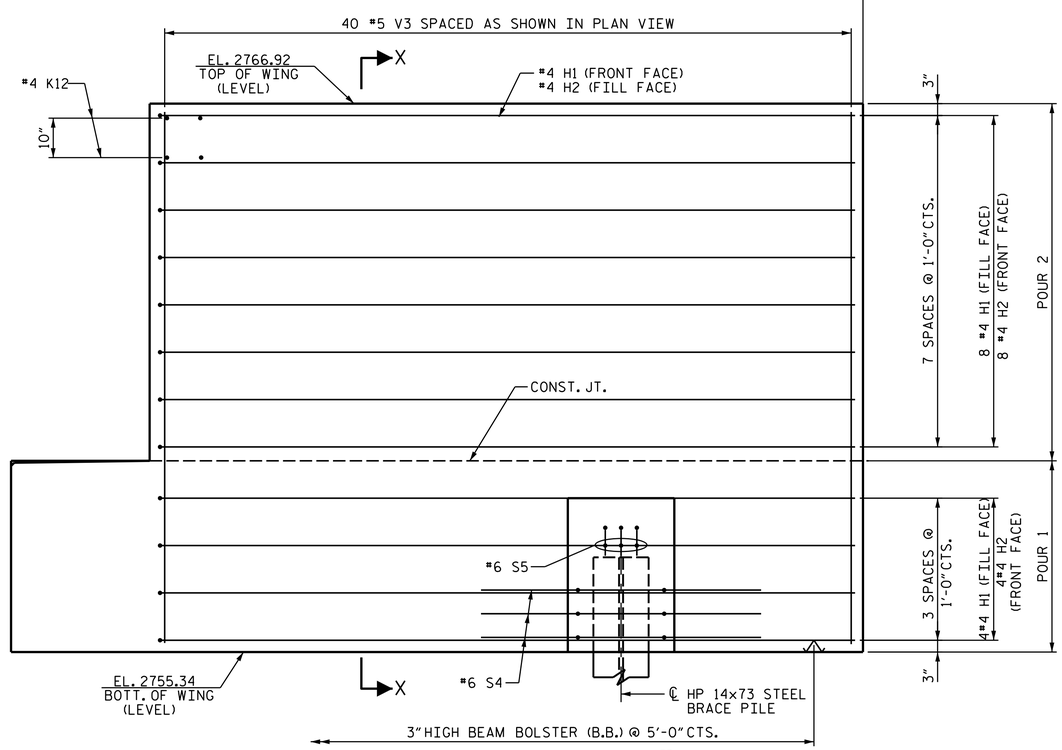
END BENT 1
STAGE II DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-58
1			3			TOTAL SHEETS
2			4			79

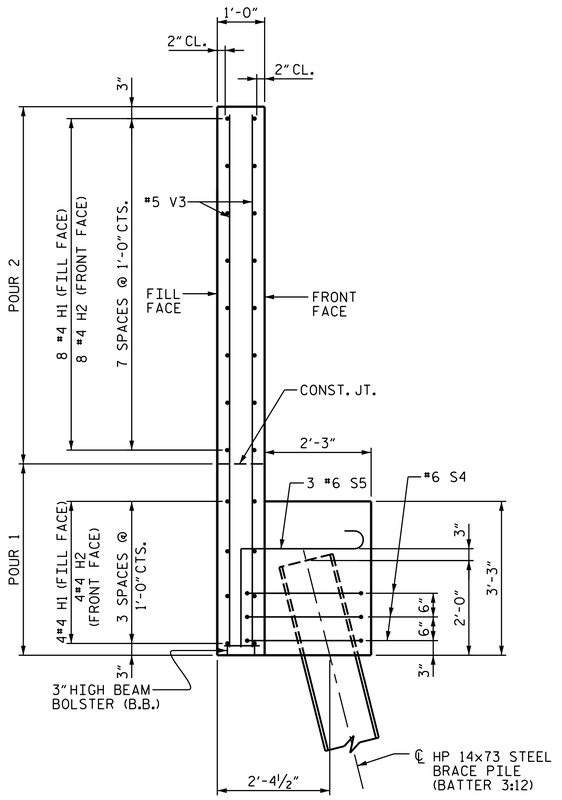
DRAWN BY :	NMW	DATE : 3/19
CHECKED BY :	RAR	DATE : 6/19
DESIGN ENGINEER OF RECORD : TBE		DATE : 6/19



PLAN OF WING (W1)



ELEVATION OF WING (W1)



SECTION Y-Y

DRAWN BY :	NMW	DATE :	3/19
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PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 9 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL R. CREECH, JR.
Marshall R. Creech, Jr.
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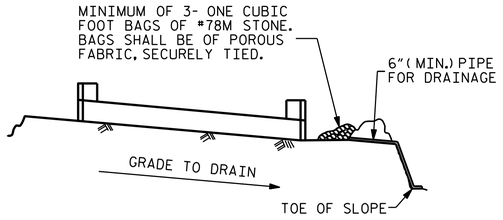
RALEIGH

SUBSTRUCTURE

END BENT 1 STAGE II WING

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-59
1			3			TOTAL SHEETS
2			4			79



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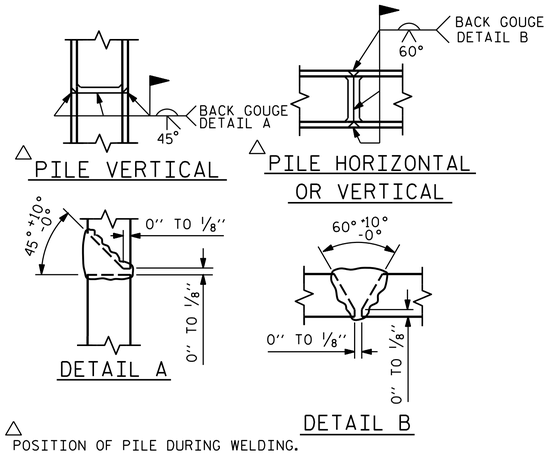
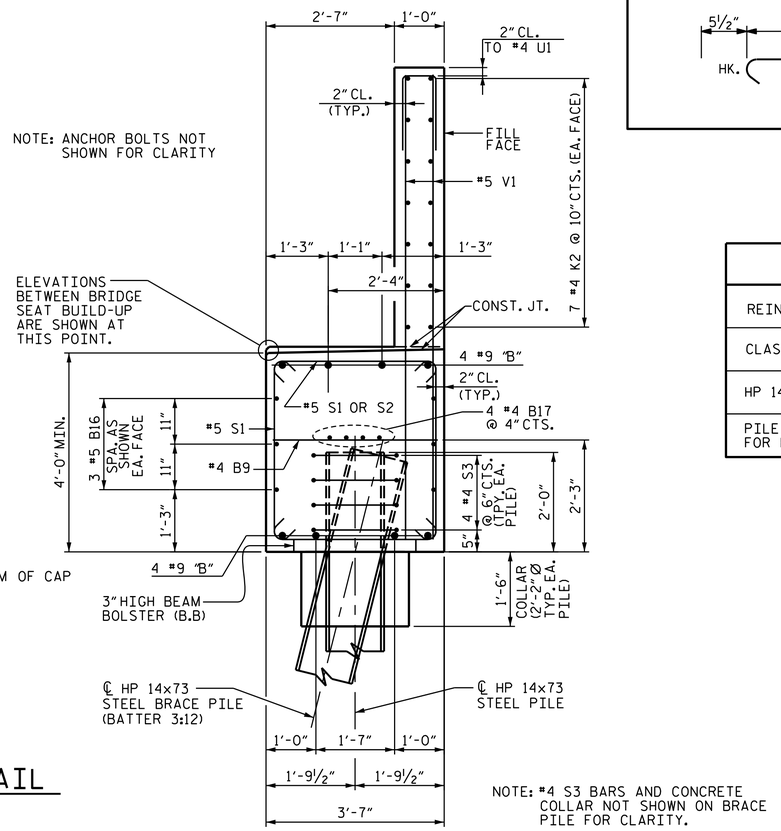


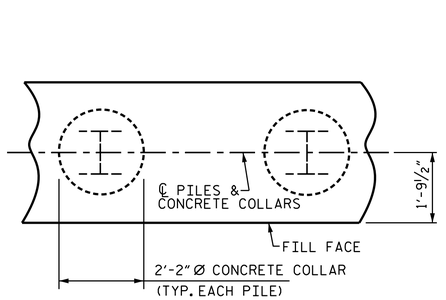
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

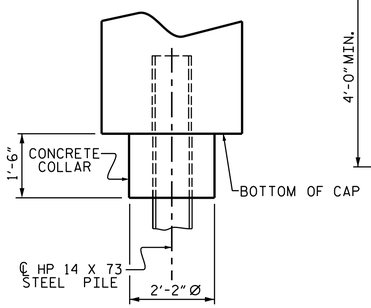


NOTE: #4 S3 BARS AND CONCRETE COLLAR NOT SHOWN ON BRACE PILE FOR CLARITY.

SECTION THRU CAP



PLAN

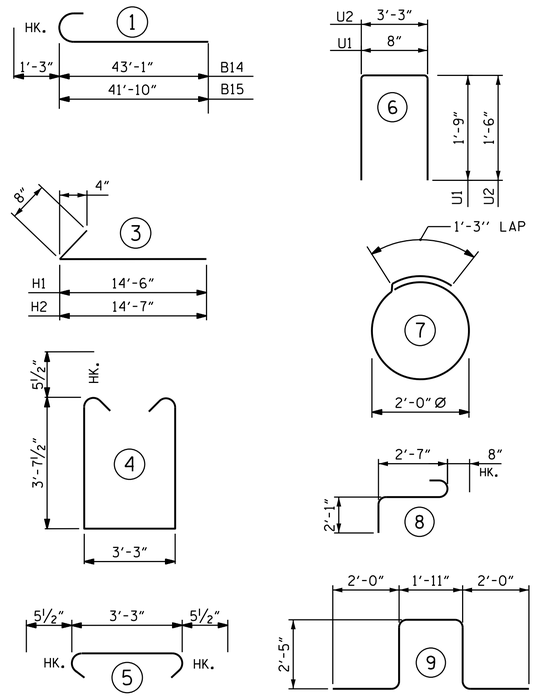


ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

END BENT 1 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B9	22	#4	STR.	3'-3"	48
B10	28	#4	STR.	6'-10"	128
B13	8	#9	STR.	50'-0"	1360
B14	4	#9	1	44'-4"	603
B15	4	#9	1	43'-1"	586
B16	12	#5	STR.	46'-1"	577
B17	12	#4	STR.	31'-2"	250
H1	12	#4	2	15'-2"	122
H2	12	#4	2	15'-3"	122
K2	42	#4	STR.	30'-7"	858
K12	4	#4	STR.	4'-2"	11
S1	172	#5	4	11'-5"	2048
S2	110	#5	5	4'-2"	478
S3	48	#4	7	7'-7"	243
S4	3	#6	9	10'-9"	48
S5	3	#6	8	5'-4"	24
U1	82	#4	6	4'-2"	228
U2	35	#4	6	6'-3"	146
V1	164	#5	STR.	9'-11"	1696
V3	40	#5	STR.	11'-2"	466

REINFORCING STEEL 10,042 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 CAP, LOWER PART OF WING & COLLARS 55.6 C.Y.

POUR #2 BACKWALL AND UPPER PART OF WING 23.7 C.Y.

TOTAL CLASS A CONCRETE 79.3 C.Y.

HP 14 X 73 STEEL PILES
NO: 13 LIN. FT.= 285

PILE DRIVING EQUIPMENT SETUP FOR HP 14 x 73 STEEL PILES EACH = 13

TOTAL END BENT 1 QUANTITIES

REINFORCING STEEL	15,867 LBS.
CLASS A CONCRETE	125.7 C.Y.
HP 14 X 73 STEEL PILES	460 LIN FT.
PILE DRIVING EQUIPMENT SETUP FOR HP 14 x 73 STEEL PILES	20 EA.

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 10 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER
Marshall R. Creek, Jr.
5FBCC2F3A4DC413...
9/30/2021 | 1:43 PM EDT

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TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

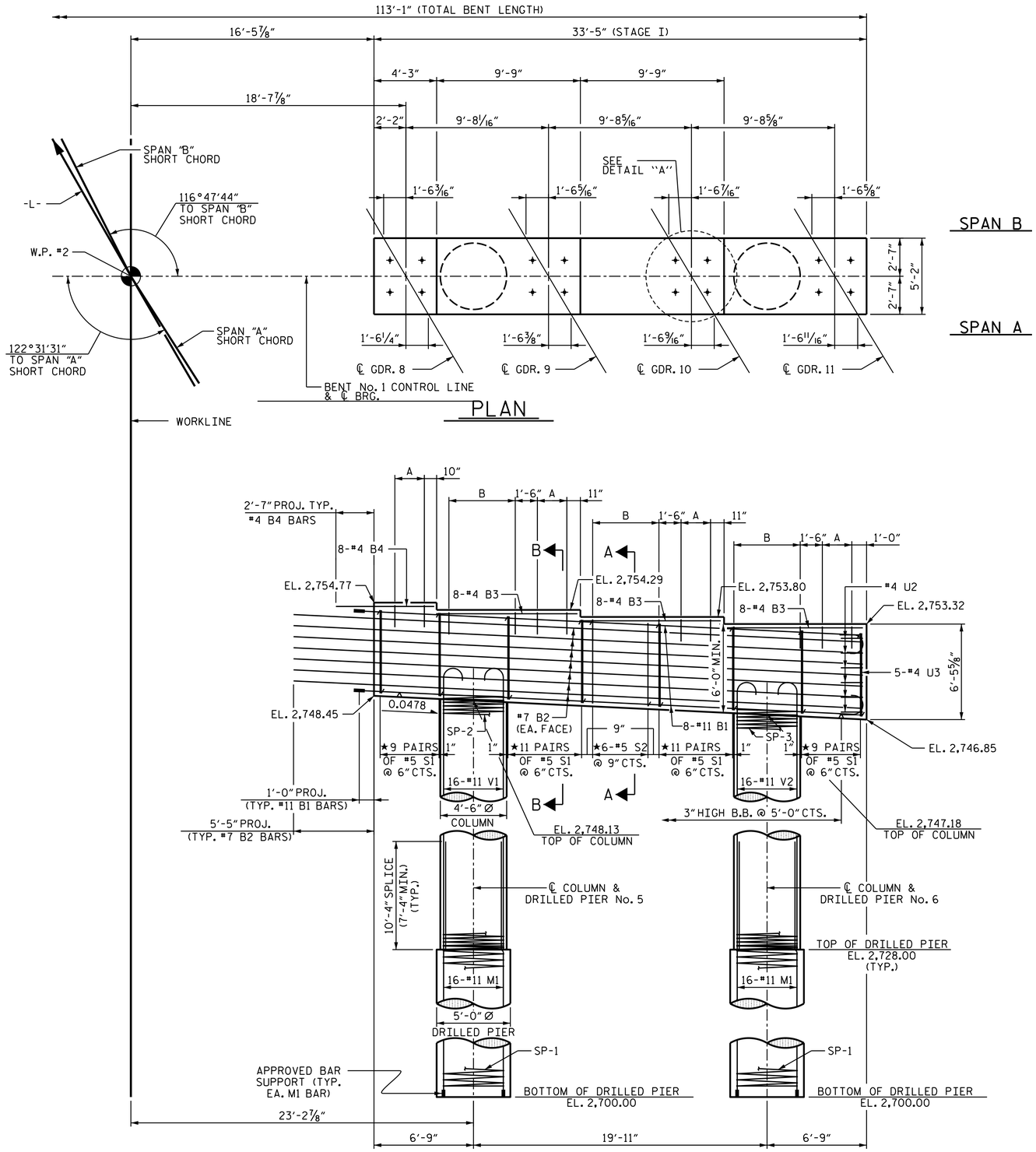
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
STAGE II DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-60
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	NMW	DATE :	3/19
CHECKED BY :	RAR	DATE :	6/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19



ELEVATION

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER EXCEPT AS NOTED

NOTES

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

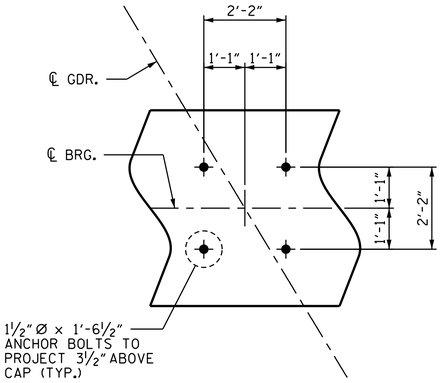
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

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

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

★ INVERT ALTERNATE STIRRUPS.

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



DETAIL "A"

(TYP. EA. BRG.)

A = 5-#4 U1 @ 6"CTS.

B = 4-#4 U1 @ 1'-6"CTS.

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARCUS A. WHEELER, JR.

DocuSigned by: Marcus A. Wheeler, Jr. 5FBCC2F3A4DC413...

9/30/2021 | 1:43 PM EDT

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SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

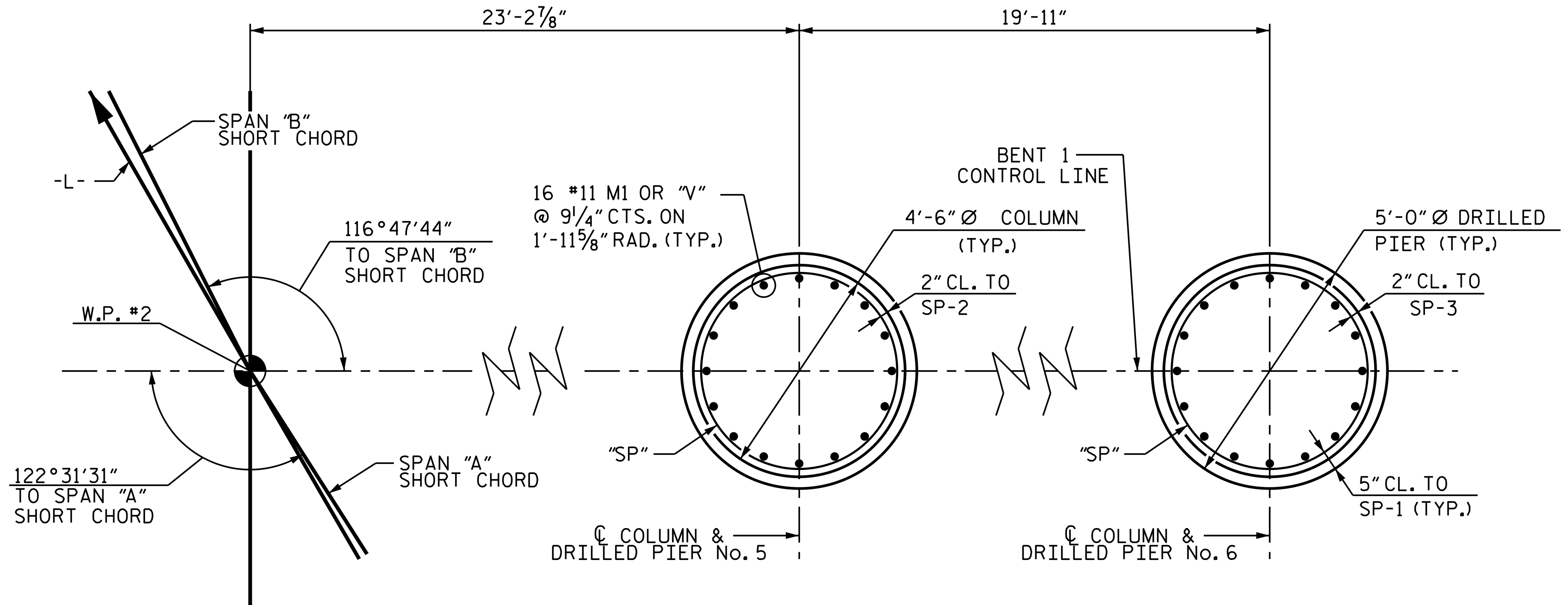
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1
STAGE I

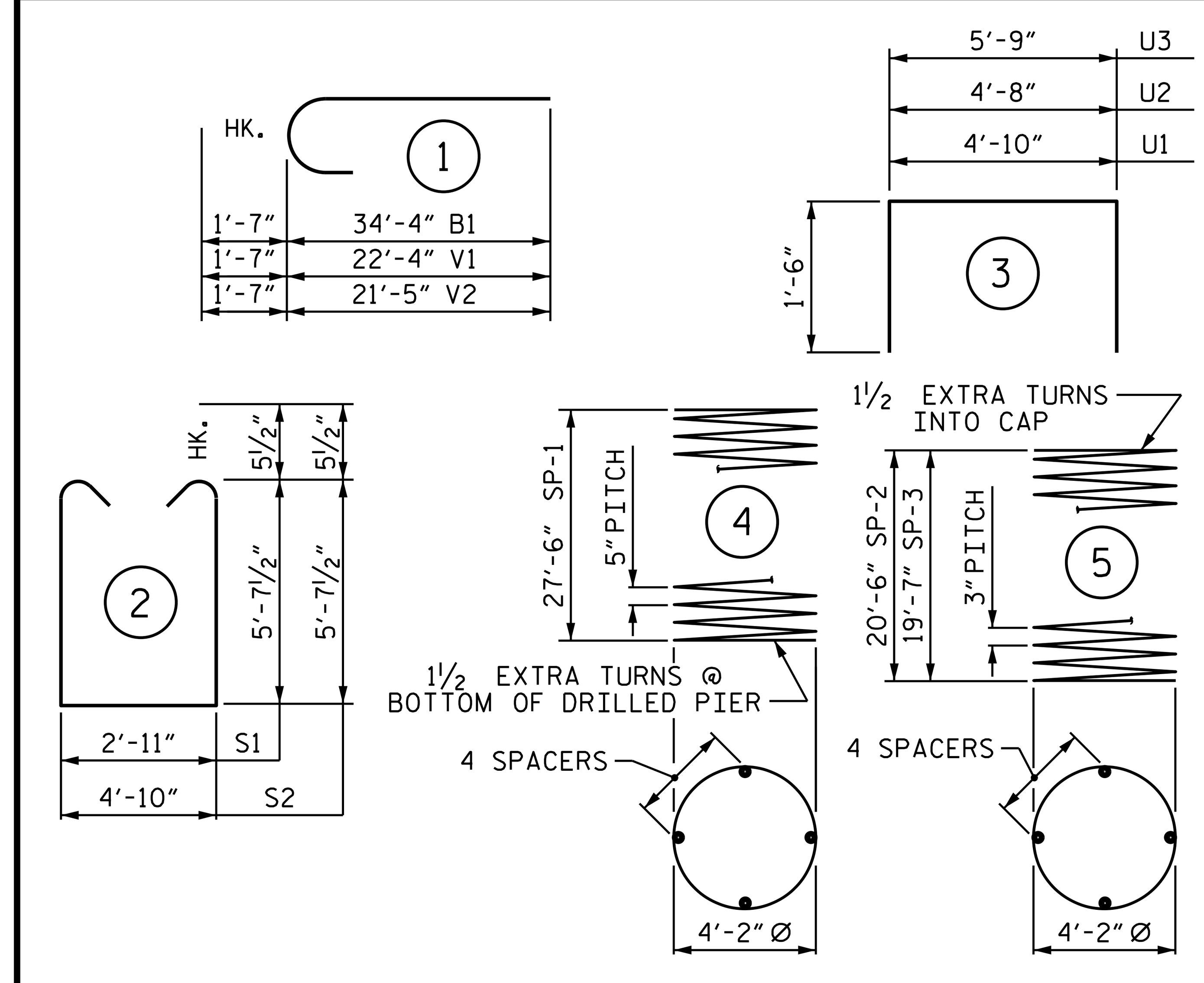
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-61
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	RAR	DATE :	5/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19



PLAN OF DRILLED PIERS & COLUMNS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 1 STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#11	1	35'-11"	3,053
B2	14	#7	STR	38'-8"	1,106
B3	24	#4	STR	9'-6"	152
B4	8	#4	STR	6'-8"	36
M1	32	#11	STR	37'-10"	6,432
S1	80	#5	2	15'-1"	1,259
S2	6	#5	2	17'-0"	106
U1	32	#4	3	7'-10"	167
U2	6	#4	3	7'-8"	31
U3	5	#4	3	8'-9"	29
V1	16	#11	1	23'-11"	2,033
V2	16	#11	1	23'-0"	1,955
REINFORCING STEEL					16,359 LBS.
SP-1	2	*	4	879'-6"	1,835
SP-2	1	**	5	1,088'-10"	727
SP-3	1	**	5	1,036'-11"	693
SPIRAL COLUMN REINFORCING STEEL					3,255 LBS.

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

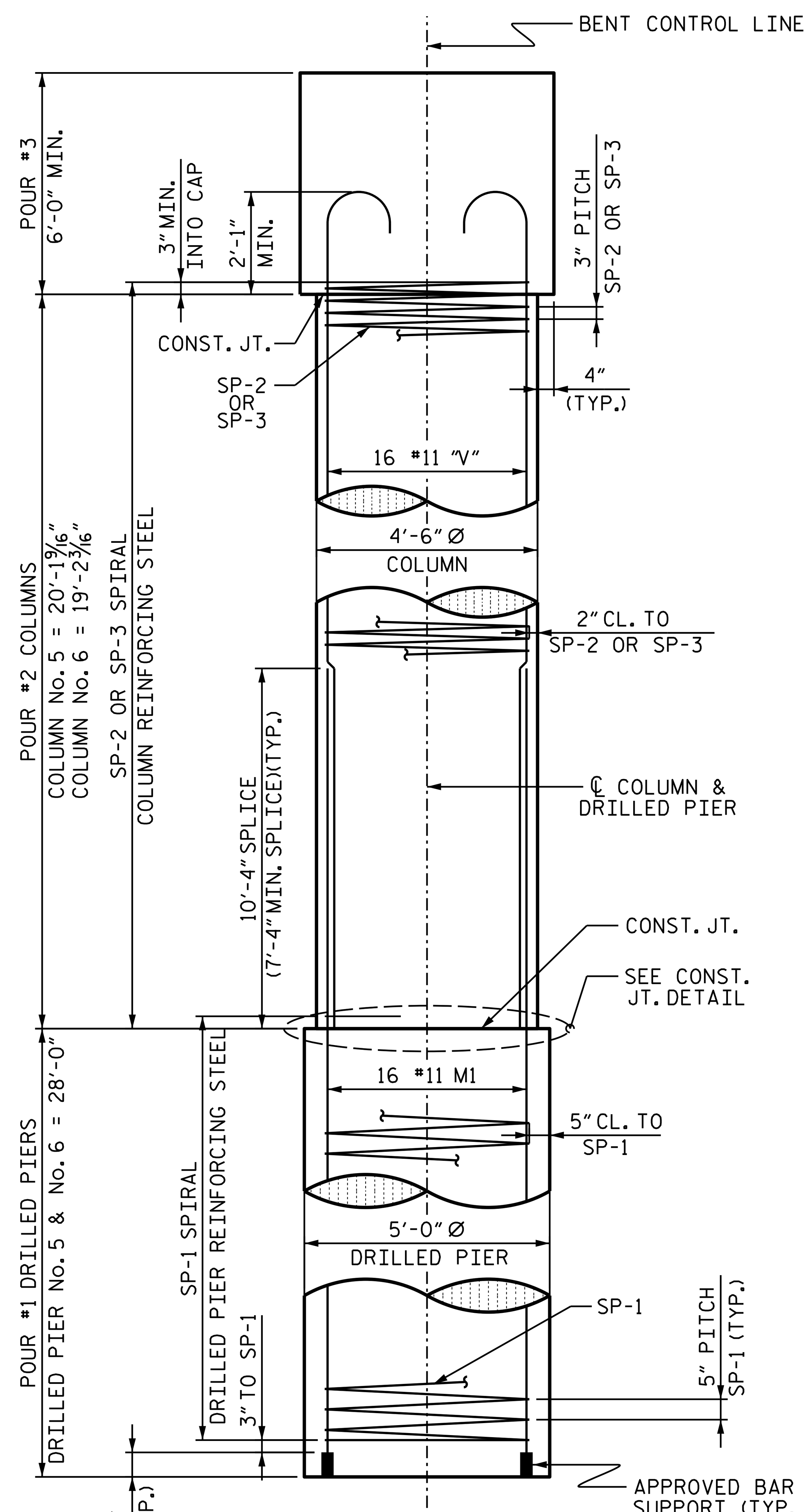
** THE SP-2 OR SP-3 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR

CLASS A CONCRETE BREAKDOWN

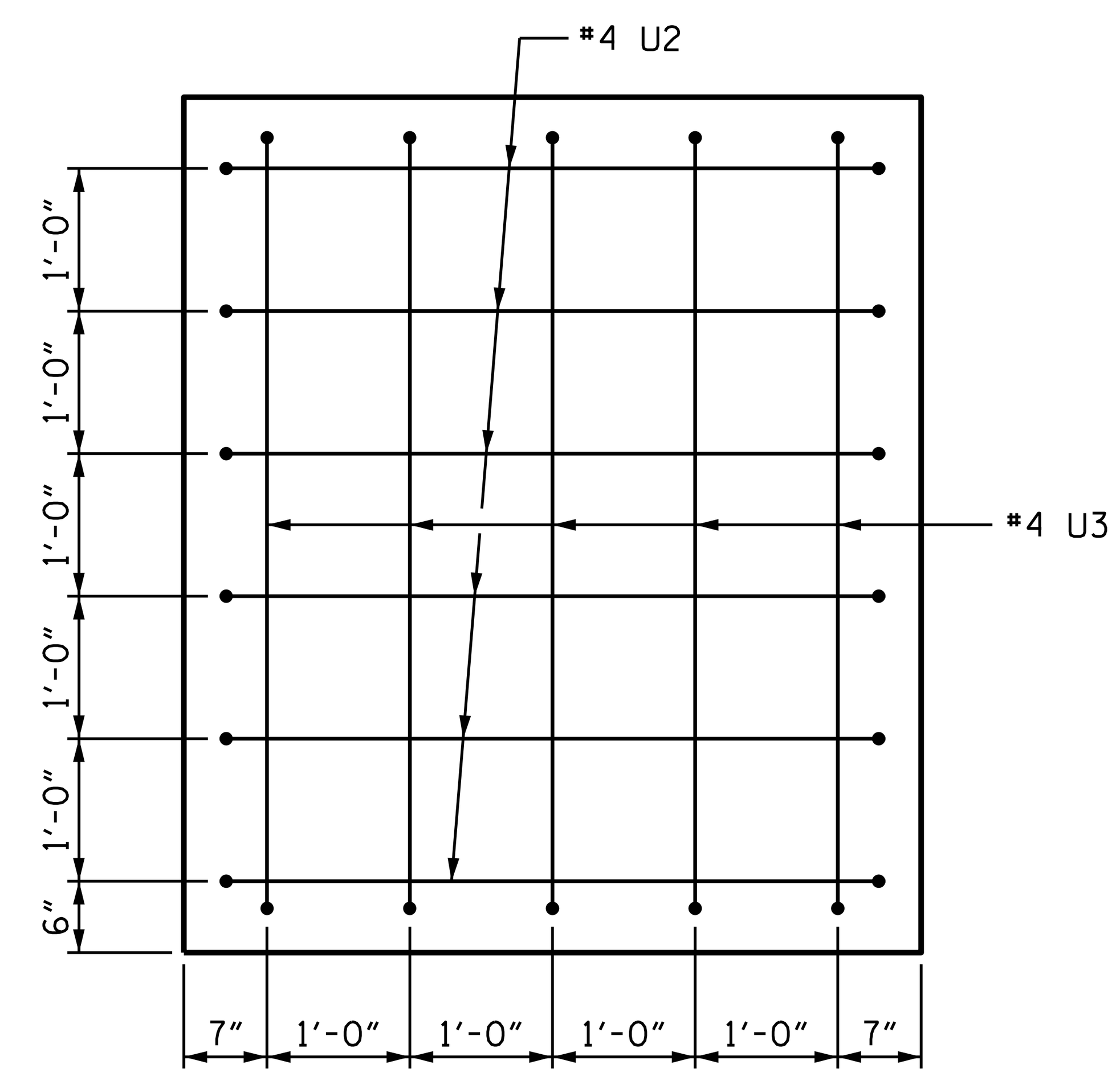
POUR #2 (COLUMNS)	23.2 C.Y.
POUR #3 (CAP)	40.2 C.Y.
TOTAL CLASS A CONCRETE	63.4 C.Y.

DRILLED PIERS:

DRILLED PIER CONCRETE POUR #1	40.7 C.Y.
5'-0" Ø DRILLED PIERS NOT IN SOIL	29.00 LIN. FT.
5'-0" Ø DRILLED PIERS IN SOIL	27.00 LIN. FT.
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	16.00 LIN. FT.
CSL TUBES	295.00 LIN. FT.

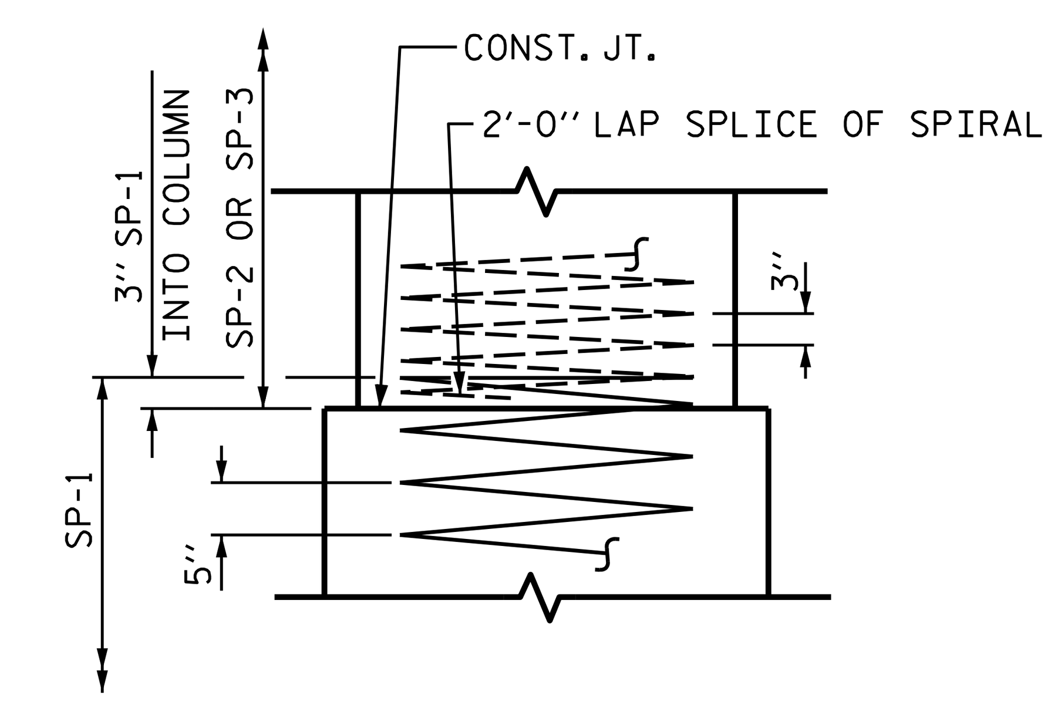


END ELEVATION

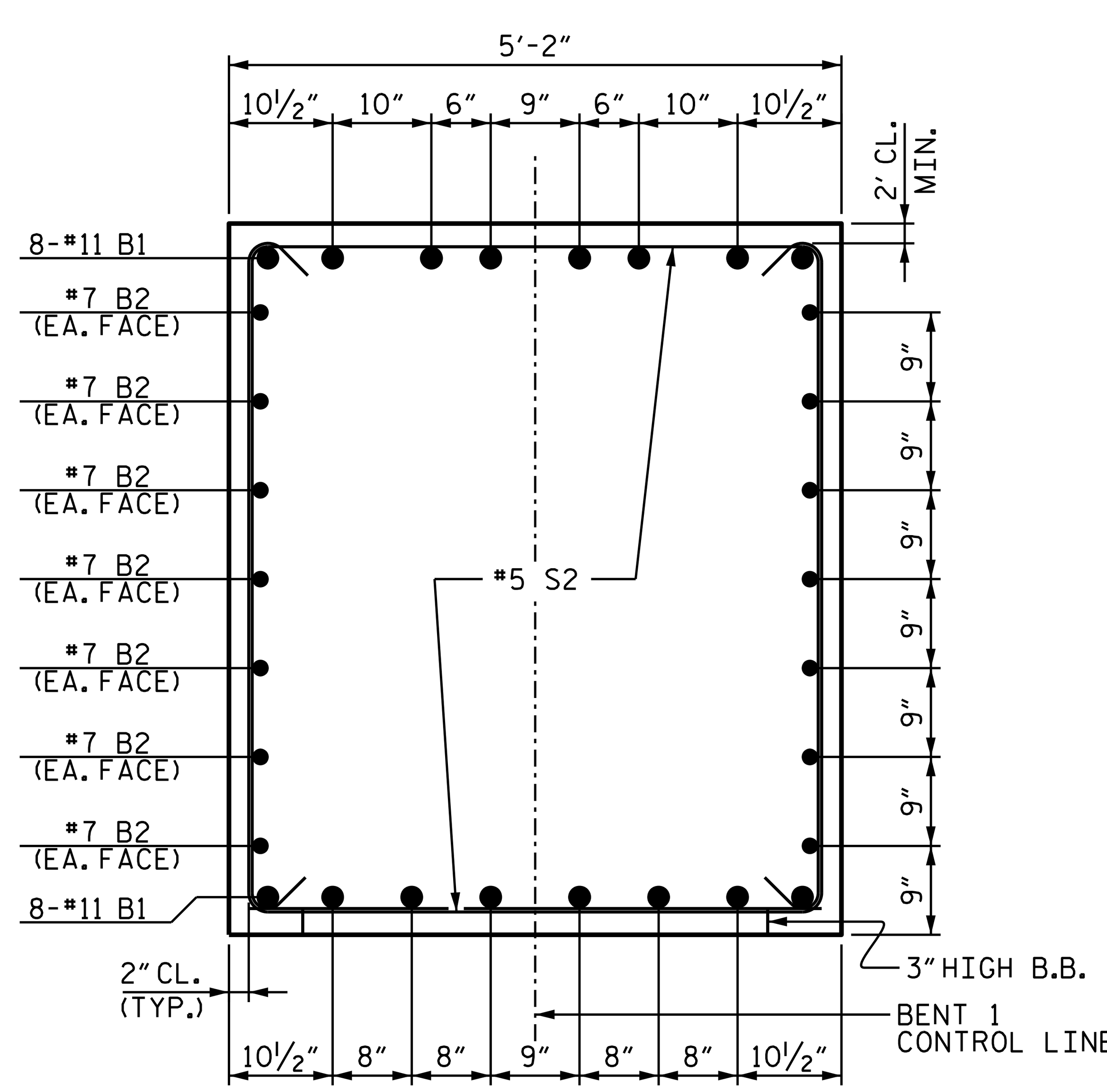


END OF CAP VIEW

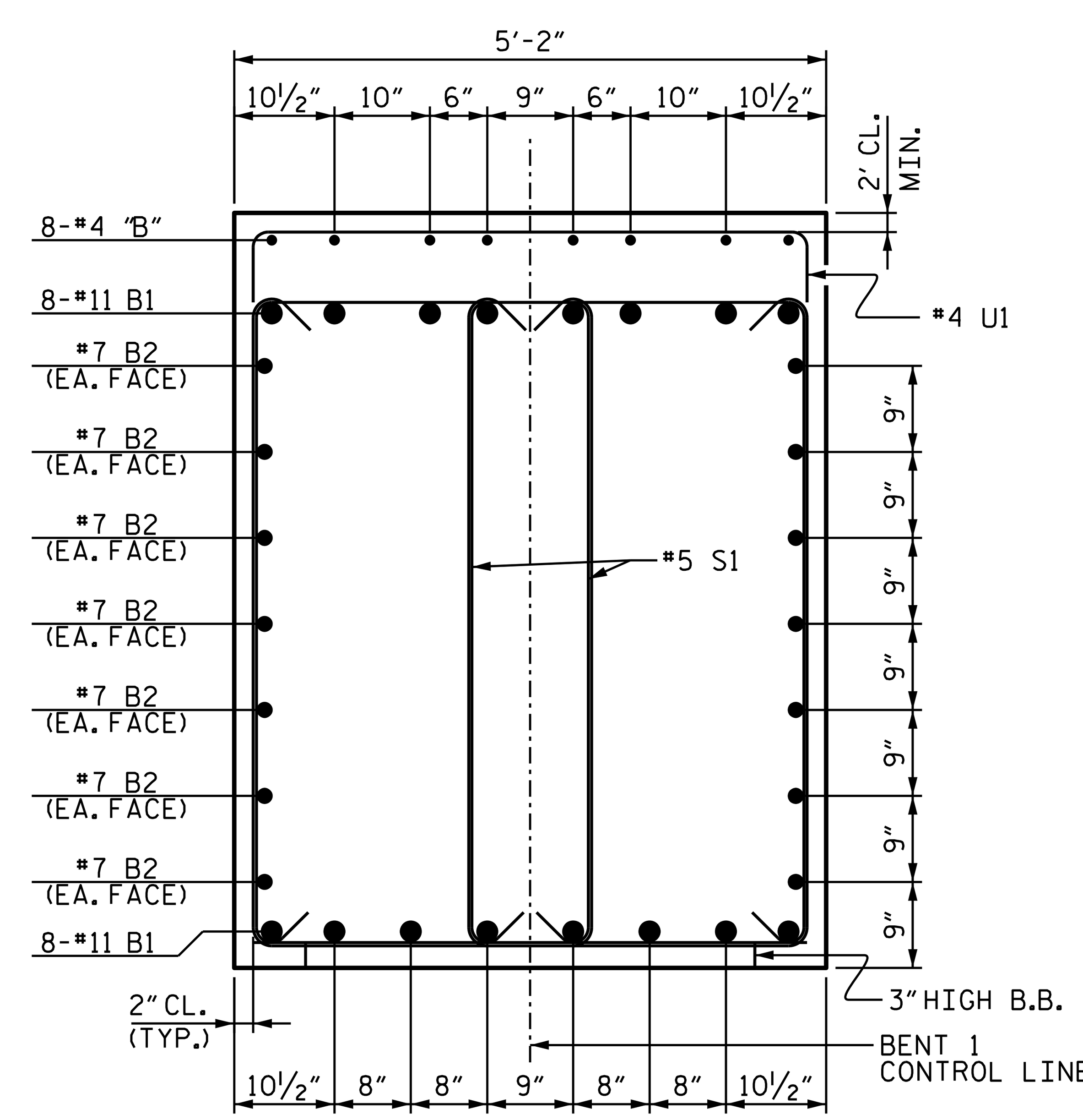
(RIGHT SIDE ONLY)



CONSTRUCTION JOINT DETAIL



SECTION A-A



SECTION B-B

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHECK, JR.

Marshall G. Check, Jr. 9/30/2021 | 1:43 PM EDT

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CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1
STAGE I

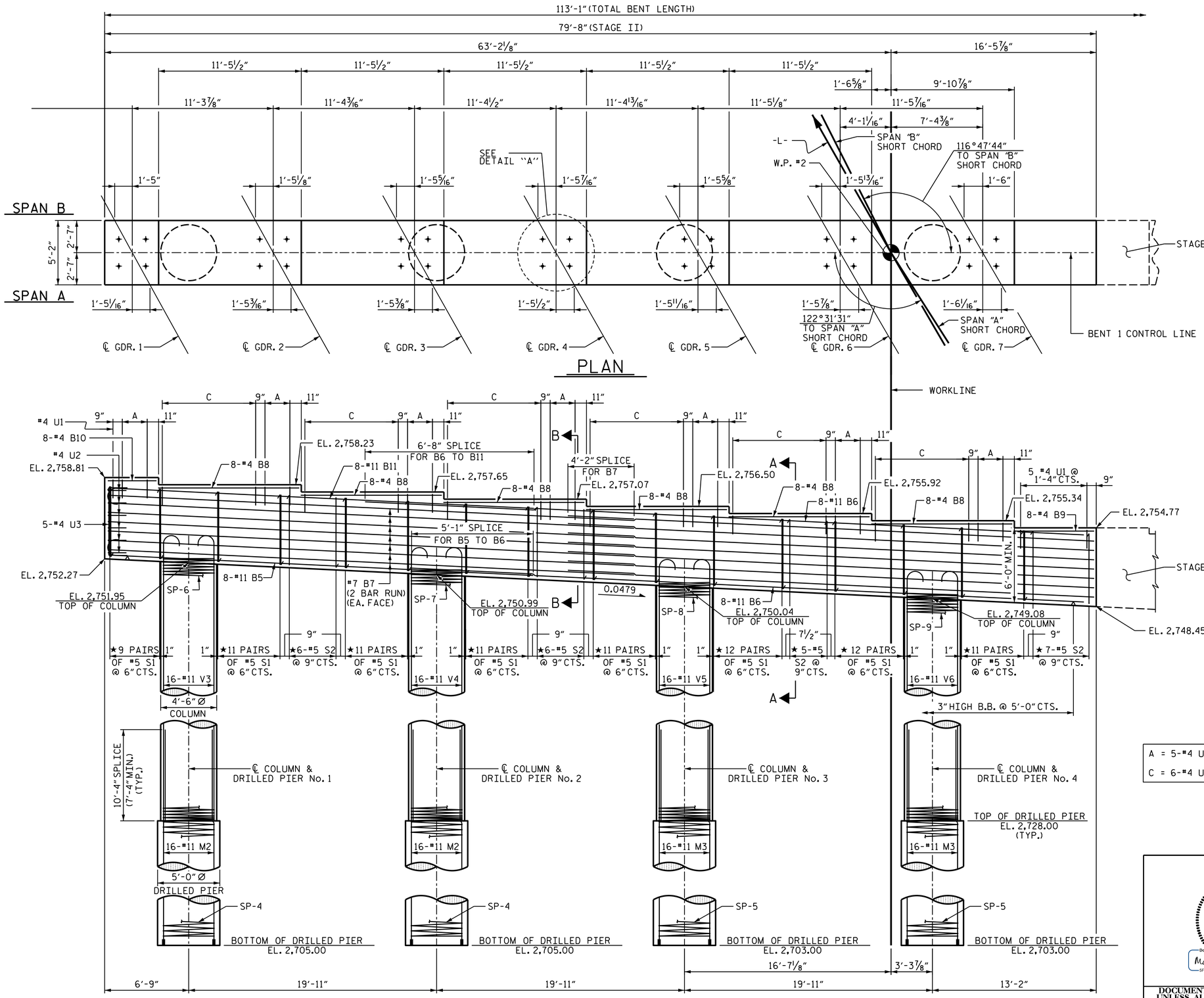
DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	RAR	DATE :	5/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19

REVISIONS

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

SHEET NO. S-62

TOTAL SHEETS 79



NOTES

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

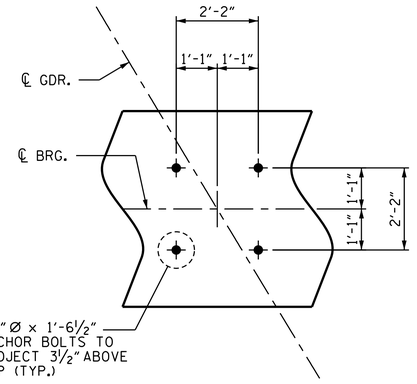
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

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

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

★ INVERT ALTERNATE STIRRUPS.

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



DETAIL "A"
(TYP. EA. BRG.)

A = 5-#4 U1 @ 6" CTS.
C = 6-#4 U1 @ 1'-6" CTS.

ELEVATION
DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER EXCEPT AS NOTED

DRAWN BY :	JLA	DATE :	4/19
CHECKED BY :	RAR	DATE :	5/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00-L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CREECH, JR.
Marshall C. Creech, Jr. 9/30/2021 | 1:43 PM EDT
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TGS ENGINEERS
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SHELBY, NC 28150
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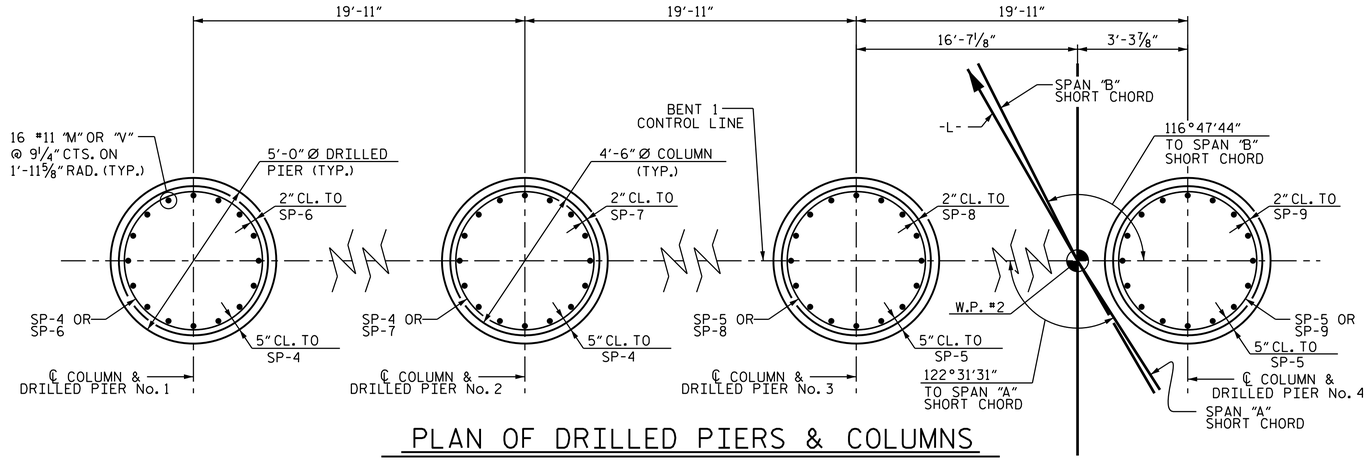
CORP. LICENSE NO.: C-0275

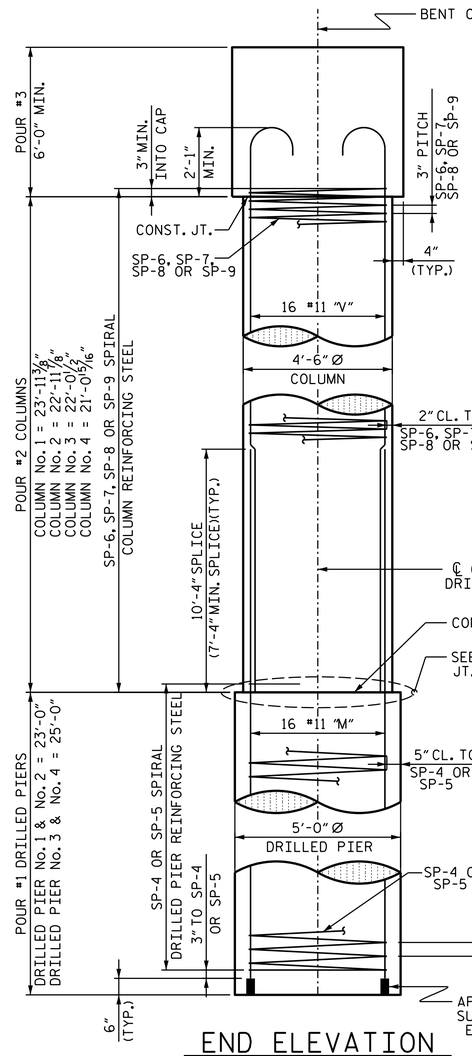
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BENT 1
STAGE II

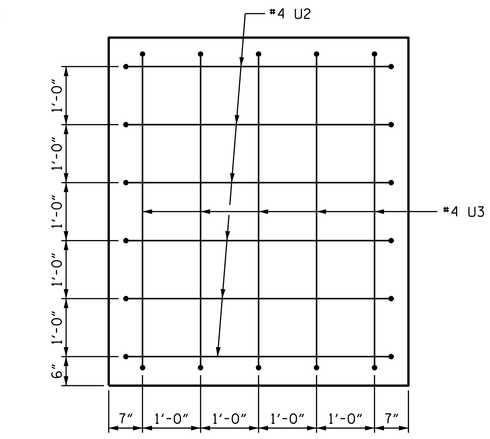
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-63
1			3			TOTAL SHEETS
2			4			79



PLAN OF DRILLED PIERS & COLUMNS

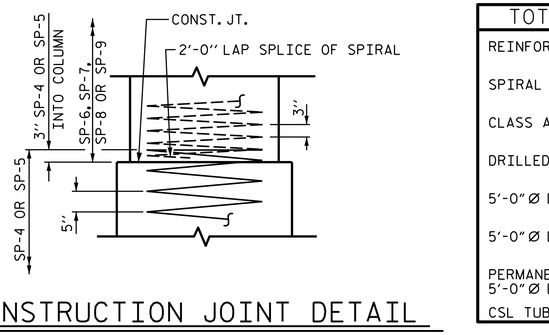


END ELEVATION

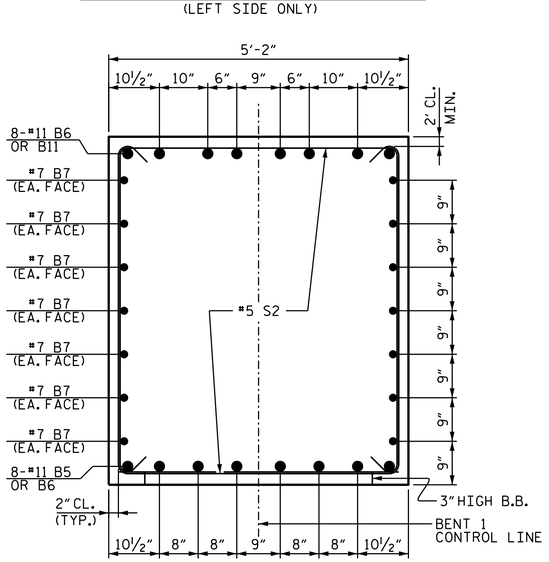


END OF CAP VIEW

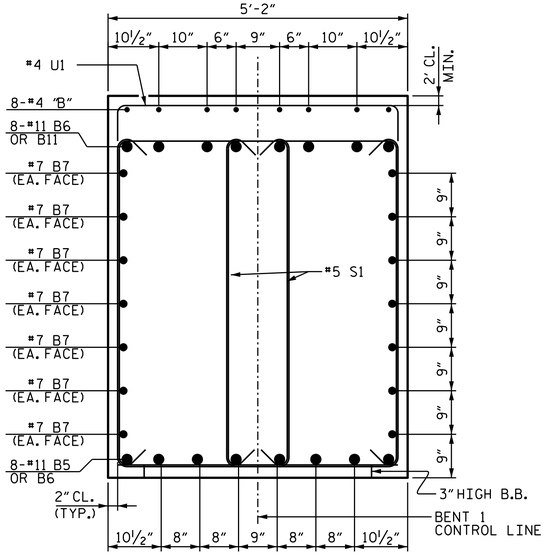
(LEFT SIDE ONLY)



CONSTRUCTION JOINT DETAIL

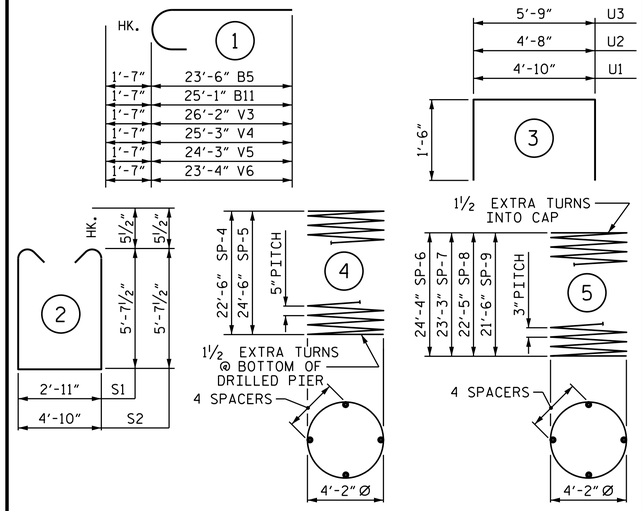


SECTION A-A



SECTION B-B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 1 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B5	8	#11	1	25'-1"	1,066
B6	16	#11	STR	60'-0"	5,100
B7	28	#7	STR	41'-9"	2,389
B8	48	#4	STR	11'-3"	361
B9	8	#4	STR	6'-5"	34
B10	8	#4	STR	3'-11"	21
B11	8	#11	1	26'-8"	1,133
M2	32	#11	STR	32'-10"	5,582
M3	32	#11	STR	34'-10"	5,922
S1	176	#5	2	15'-1"	2,769
S2	24	#5	2	17'-0"	426
U1	77	#4	3	7'-10"	403
U2	6	#4	3	7'-8"	31
U3	5	#4	3	8'-9"	29
V3	16	#11	1	27'-9"	2,359
V4	16	#11	1	26'-10"	2,281
V5	16	#11	1	25'-10"	2,196
V6	16	#11	1	24'-11"	2,118
REINFORCING STEEL					34,220 LBS.
SP-4	2	✳	4	724'-4"	1,511
SP-5	2	✳	4	788'-11"	1,646
SP-6	1	✳✳	5	1,283'-3"	857
SP-7	1	✳✳	5	1,231'-5"	823
SP-8	1	✳✳	5	1,192'-6"	797
SP-9	1	✳✳	5	1,140-8"	762
SPIRAL COLUMN REINFORCING STEEL					6,396 LBS.

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

✳✳ THE SP-6, SP-7, SP-8 OR SP-9 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR

TOTAL BENT 1 QUANTITIES

REINFORCING STEEL	50,579 LBS.
SPIRAL COLUMN REINFORCING STEEL	9,651 LBS.
CLASS A CONCRETE	213.5 C.Y.
DRILLED PIER CONCRETE	110.5 C.Y.
5'-0" Ø DRILLED PIERS NOT IN SOIL	86.00 LIN. FT.
5'-0" Ø DRILLED PIERS IN SOIL	66.00 LIN. FT.
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	48.00 LIN. FT.
CSL TUBES	805.00 LIN. FT.

CLASS A CONCRETE BREAKDOWN

POUR #2 (COLUMNS)	53.0 C.Y.
POUR #3 (CAP)	97.1 C.Y.
TOTAL CLASS A CONCRETE	150.1 C.Y.

DRILLED PIERS:

DRILLED PIER CONCRETE POUR #1	69.8 C.Y.
5'-0" Ø DRILLED PIERS NOT IN SOIL	57.00 LIN. FT.
5'-0" Ø DRILLED PIERS IN SOIL	39.00 LIN. FT.
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	32.00 LIN. FT.
CSL TUBES	510.00 LIN. FT.

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 2 OF 2

DRAWN BY :	JLA	DATE : 4/19
CHECKED BY :	RAR	DATE : 5/19
DESIGN ENGINEER OF RECORD :	TBE	DATE : 6/19

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Signed by: Marshall G. Cheek, Jr.

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9/30/2021 | 1:43 PM EDT

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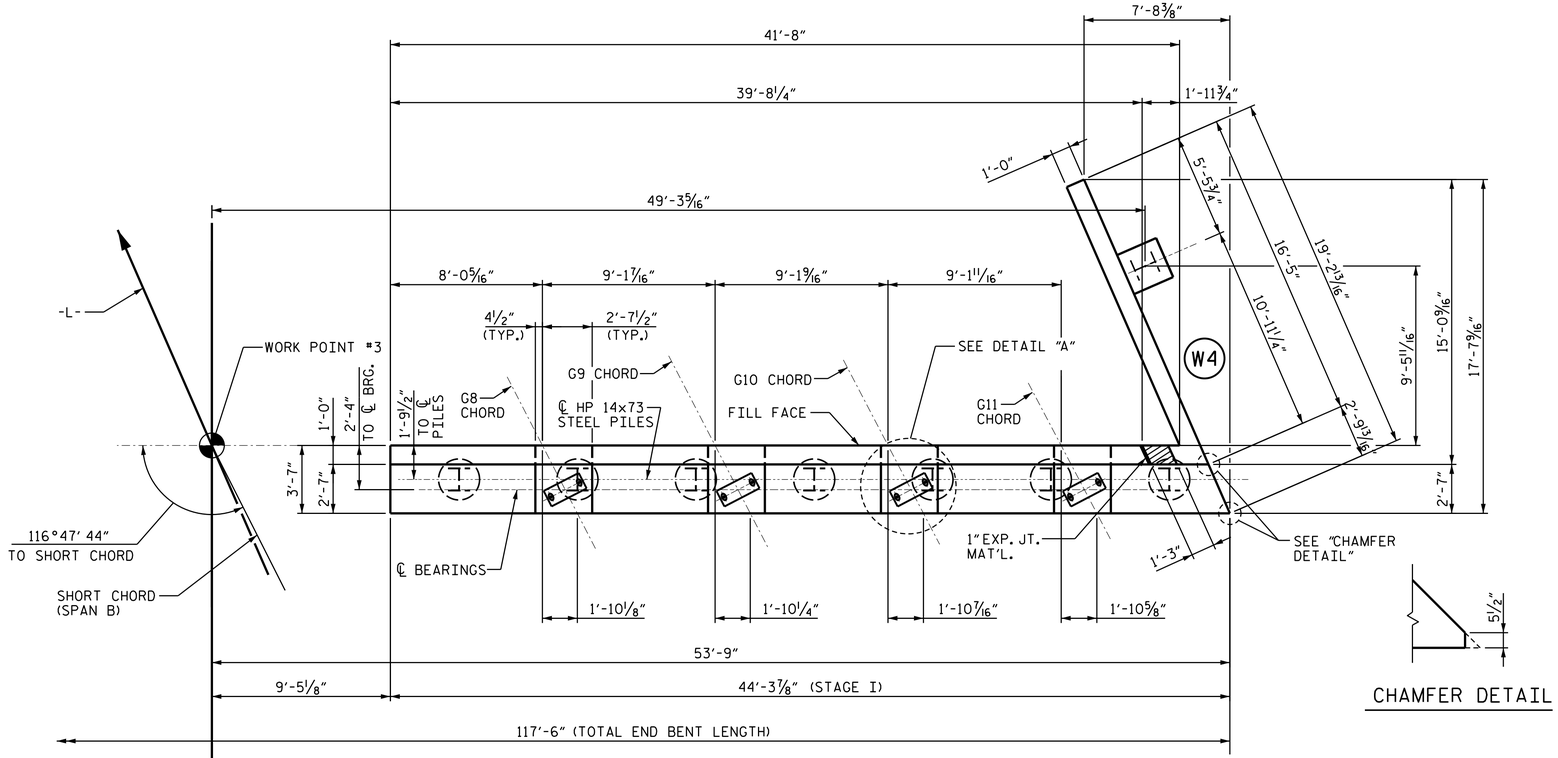
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-64
1			3			TOTAL SHEETS
2			4			79



PLAN

NOTE: GIRDER CHORDS SHOWN REPRESENT CHORD FROM ℄ BEARING AT BENT 1 TO ℄ BEARING AT END BENT 2.

CHAMFER DETAIL

NOTES :

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

FOR PILE SPLICE DETAILS, SEE SHEET 5 OF 10.

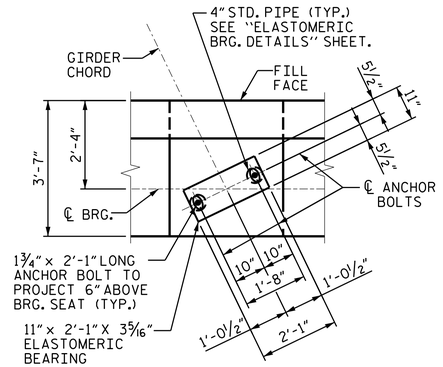
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THAT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE PARAPET IS POURED IF SLIP FORMING IS USED.

FOR PIPE INSERT DETAILS, SEE BEARINGS SHEET.

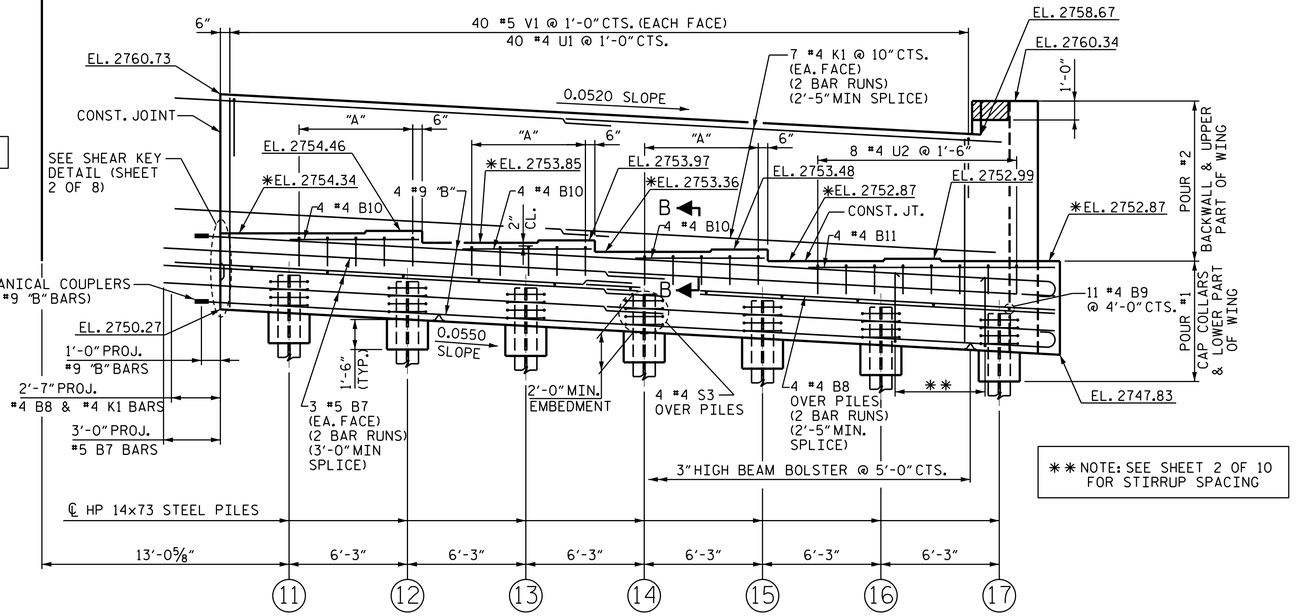


DETAIL "A"

(TYP. EA. GIRDER)

"A" = 5 #4 U2 BARS @ 1'-6" CTS.

TOP OF PILE ELEVATIONS	
(11)	2752.13
(12)	2751.79
(13)	2751.46
(14)	2751.12
(15)	2750.78
(16)	2750.44
(17)	27450.11



ELEVATION

(WING NOT SHOWN FOR CLARITY)
FOR SECTION B-B AND C-C SEE SHEET 3 OF 10
* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILD-UPS, SEE TYPICAL SECTION

** NOTE: SEE SHEET 2 OF 10 FOR STIRRUP SPACING

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00-L-

SHEET 1 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Marshall G. Cheek, Jr.
5FBCC2F3A4DC413... 9/30/2021 | 1:43 PM EDT

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TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-65
1			3			TOTAL SHEETS
2			4			79

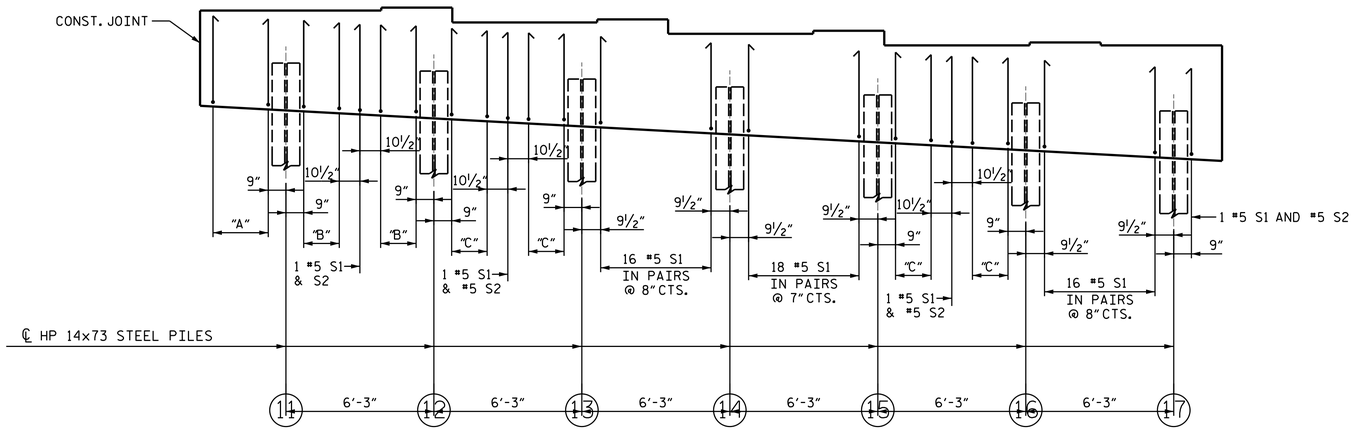
DRAWN BY :	NMW	DATE :	3/19
CHECKED BY :	RAR	DATE :	6/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19

NOTES :

FOR S1 STIRRUPS SHOWN AS PAIRS INVERT OPPOSITE STIRRUP.

FOR S1 AND S2 SPACING PLACE THE S2 OVER THE TOP OF THE S1 STIRRUP.

"A" = 10 #5 S1 IN PAIRS @ 7"CTS.
"B" = 8 #5 S1 IN PAIRS @ 6"CTS.
"C" = 4 #5 S1 & #5 S2 @ 6"CTS.



STIRRUP SPACING - END BENT 2 STAGE I

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00-L-

SHEET 2 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL R. CHEEK, JR.
Marshall R. Cheek, Jr.
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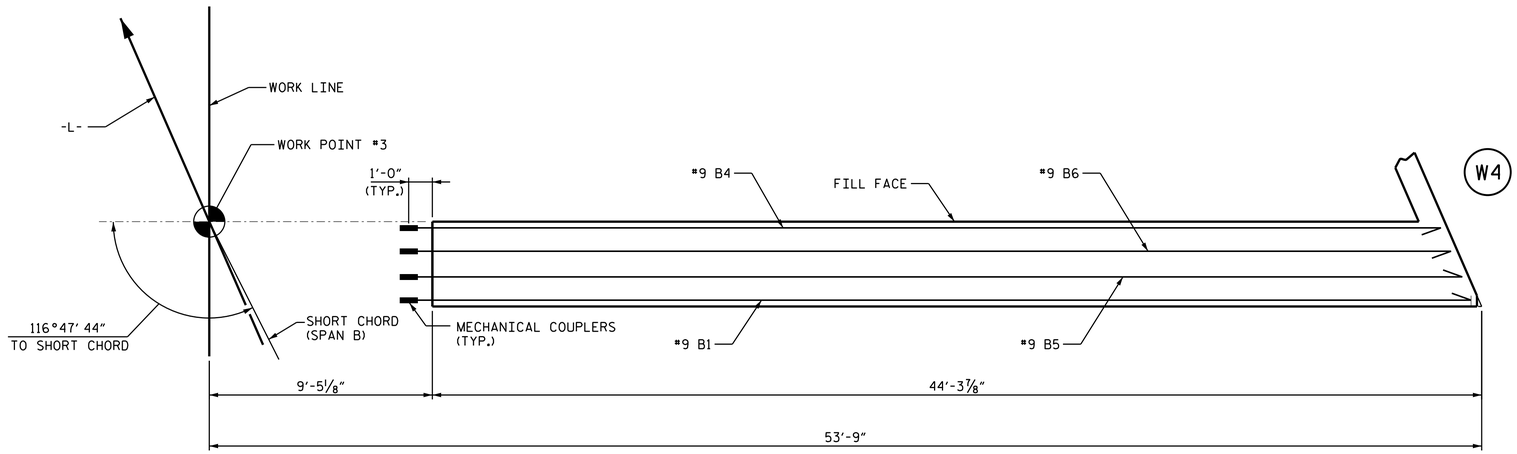
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

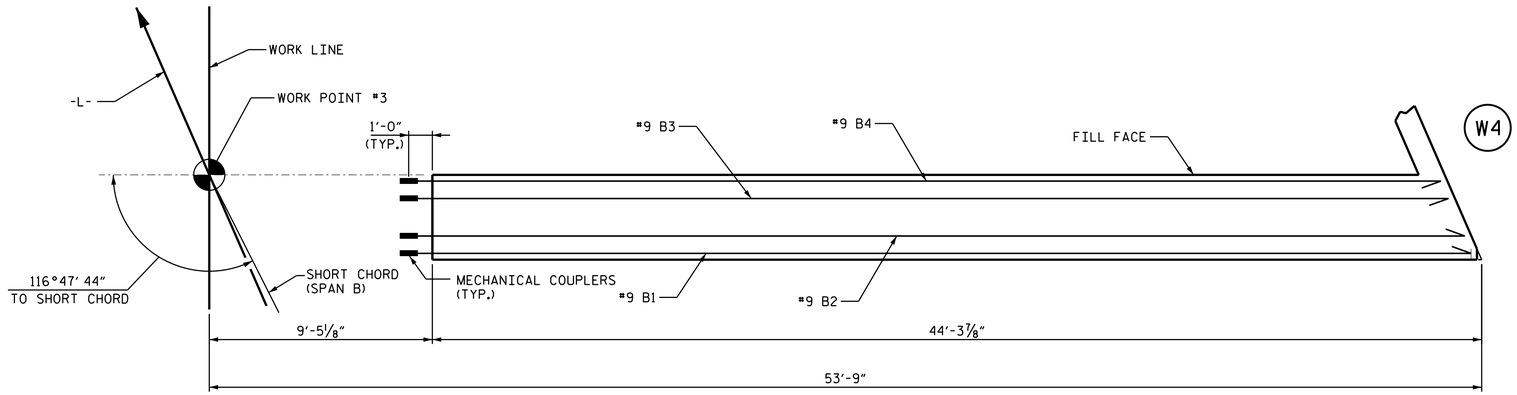
END BENT 2
STIRRUP SPACING
STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-66
1			3			TOTAL SHEETS
2			4			79

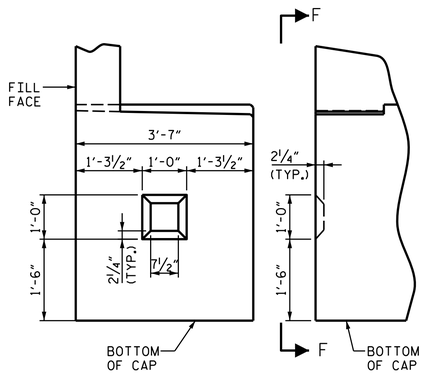
DRAWN BY :	NMW	DATE : 5/19
CHECKED BY :	RAR	DATE : 6/19
DESIGN ENGINEER OF RECORD : TBE		DATE : 6/19



#9 "B" BARS - TOP OF CAP - STAGE I

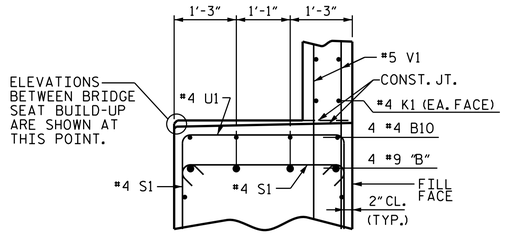


#9 "B" BARS - BOTTOM OF CAP - STAGE I



SECTION F-F

SHEAR KEY DETAIL



SECTION B-B

DRAWN BY :	NMW	DATE :	3/19
CHECKED BY :	RAR	DATE :	6/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 3 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER Marshall G. Creek, Jr.

Marshall G. Creek, Jr.
5FBCC2F3A4DC413...

9/30/2021 | 1:43 PM EDT

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SHELBY, NC 28150
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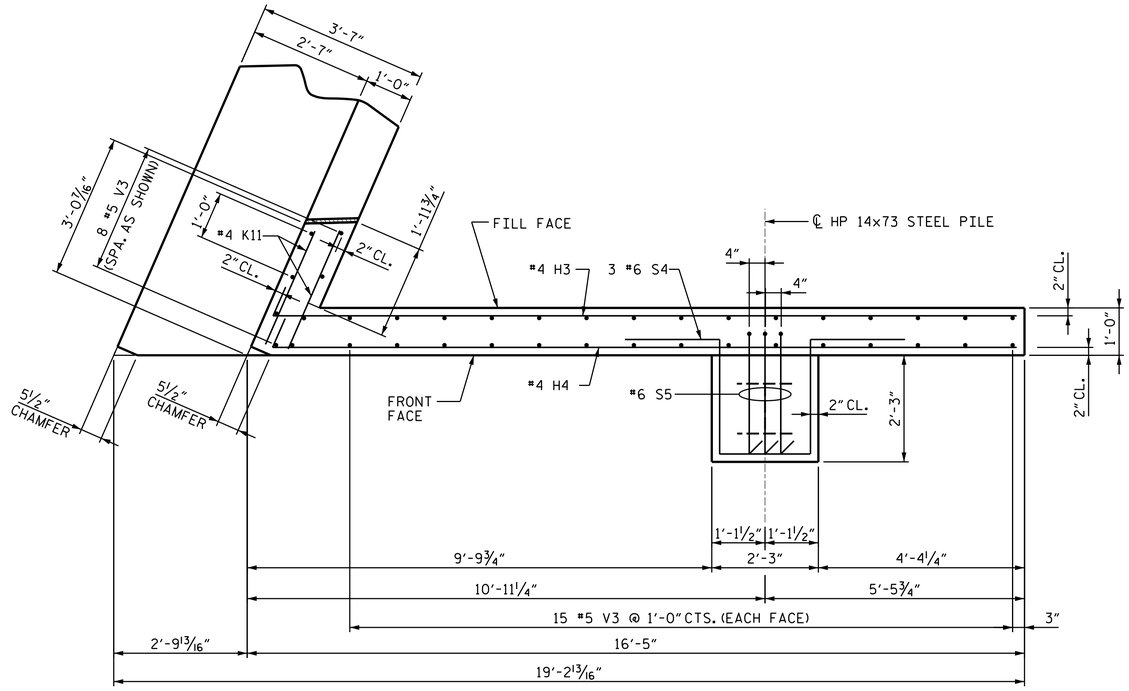
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

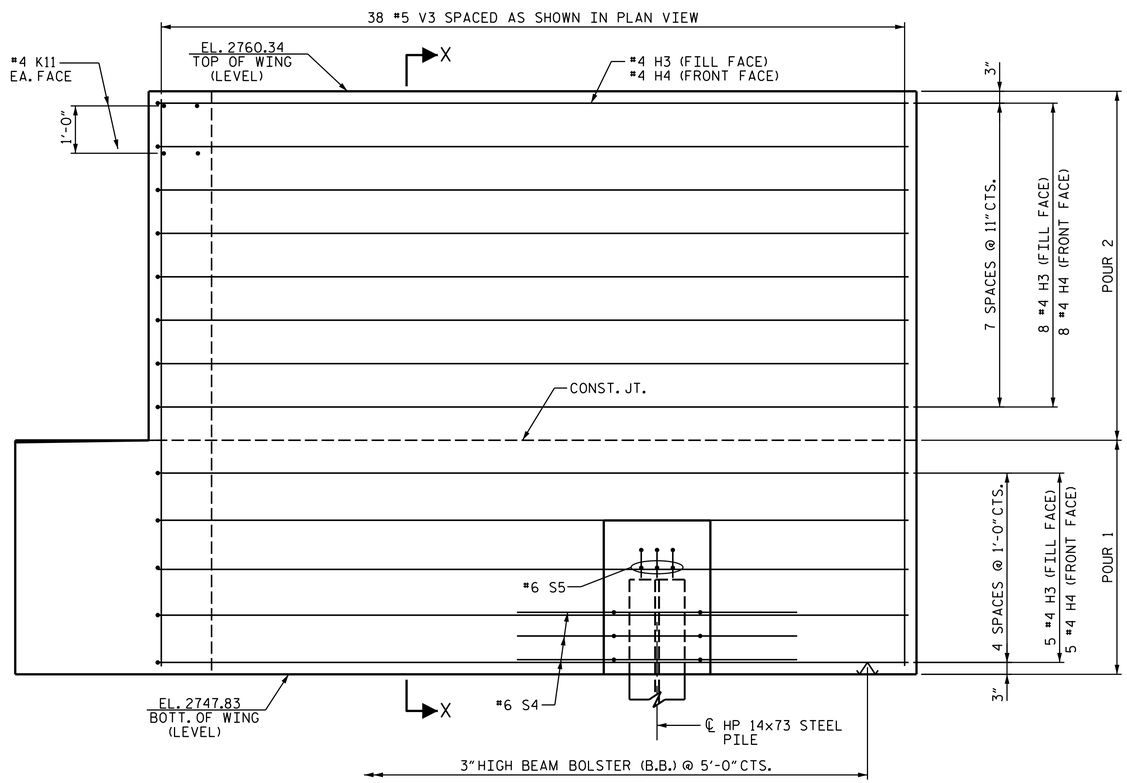
SUBSTRUCTURE

END BENT 2 STAGE I DETAILS

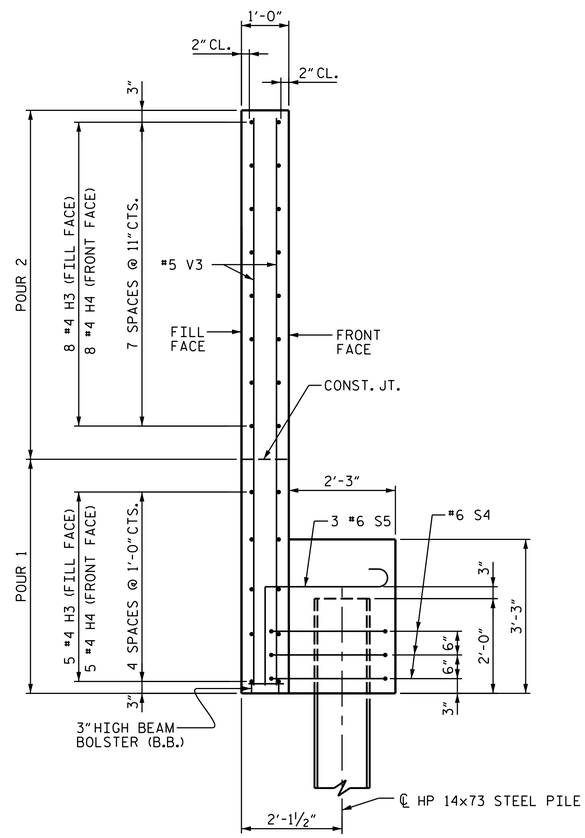
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-67
1			3			TOTAL SHEETS
2			4			79



PLAN OF WING (W4)



ELEVATION OF WING (W4)



SECTION X-X

DRAWN BY :	NMW	DATE :	3/19
CHECKED BY :	RAR	DATE :	6/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 4 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER
Marshall A. Rhyne, Jr.
5FBCC2F3A4DC413...
9/30/2021 | 1:43 PM EDT

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

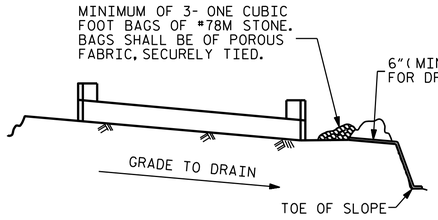
SUBSTRUCTURE

END BENT 2
STAGE I WINGS

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

SHEET NO. S-68

TOTAL SHEETS 79

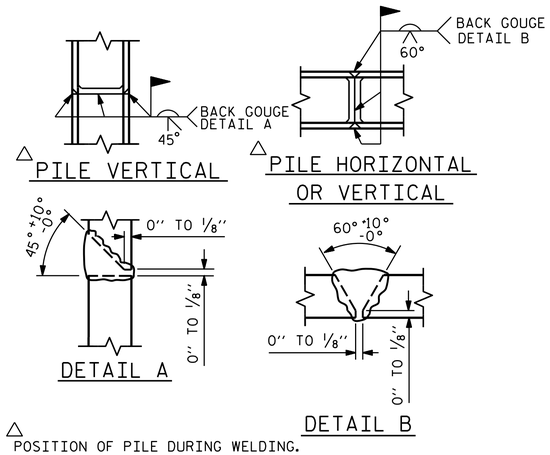


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

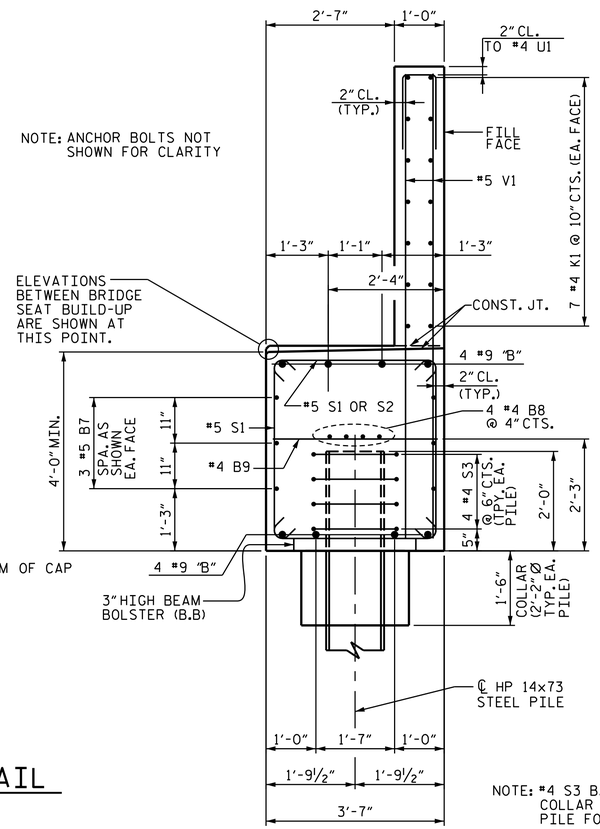
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



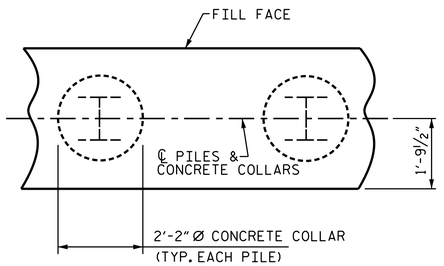
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

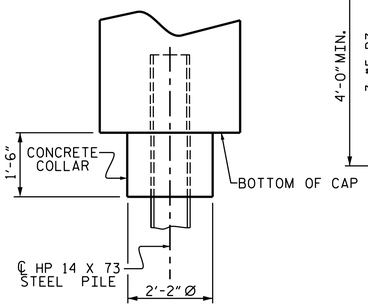


NOTE: #4 S3 BARS AND CONCRETE COLLAR NOT SHOWN ON BRACE PILE FOR CLARITY.

SECTION THRU CAP



PLAN

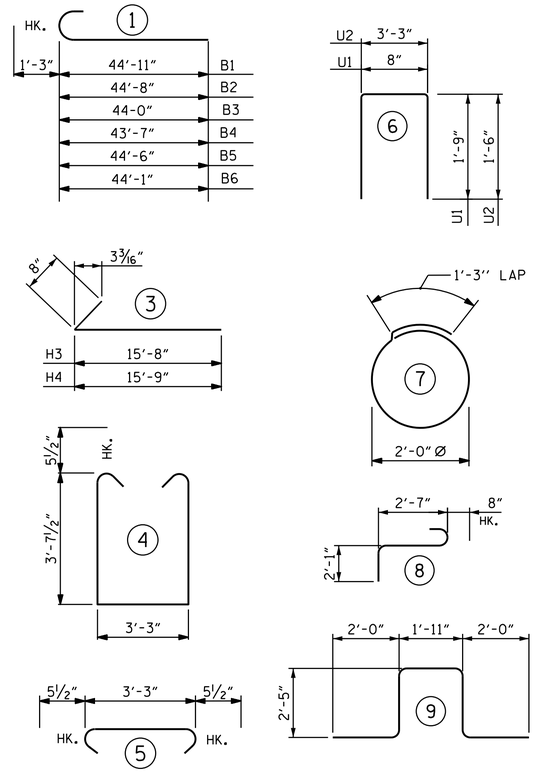


ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

END BENT 2 STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	2	#9	1	46'-2"	314
B2	1	#9	1	45'-11"	156
B3	1	#9	1	45'-3"	154
B4	2	#9	1	44'-10"	305
B5	1	#9	1	45'-9"	156
B6	1	#9	1	45'-4"	154
B7	12	#5	STR.	25'-0"	313
B8	8	#4	STR.	24'-4"	130
B9	11	#4	STR.	3'-3"	24
B10	12	#4	STR.	6'-10"	55
B11	4	#4	STR.	13'-0"	35
H3	13	#4	3	16'-4"	142
H4	13	#4	3	16'-5"	143
K1	28	#4	STR.	23'-9"	444
K11	4	#4	STR.	2'-8"	7
S1	96	#5	4	11'-5"	1143
S2	20	#5	5	4'-2"	87
S3	28	#4	7	7'-7"	142
S4	3	#6	9	10'-9"	48
S5	3	#6	8	5'-4"	24
U1	40	#4	6	4'-2"	111
U2	23	#4	6	6'-3"	96
V1	80	#5	STR.	10'-0"	834
V3	38	#5	STR.	12'-0"	476

REINFORCING STEEL 5,493 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 CAP, LOWER PART OF WING & COLLARS 30.7 C.Y.

POUR #2 BACKWALL AND UPPER PART OF WING 14.0 C.Y.

TOTAL CLASS A CONCRETE 44.7 C.Y.

HP 14 X 73 STEEL PILES
NO: 8 LIN. FT.= 120

PILE EXCAVATION IN SOIL 56.73 L.F.
PILE EXCAVATION NOT IN SOIL 18.18 L.F.

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00-L-

SHEET 5 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.
Marshall G. Cheek, Jr.
5FBCC2F3A4DC413...
9/30/2021 | 1:43 PM EDT

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TGS ENGINEERS
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SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

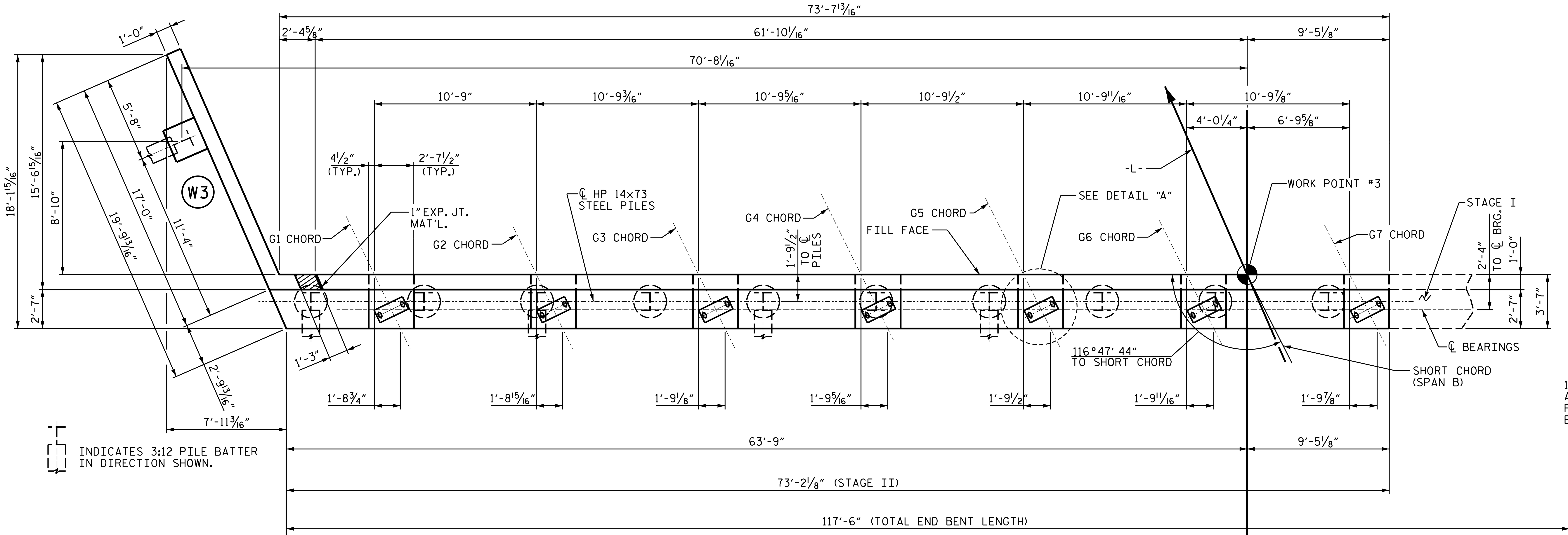
SUBSTRUCTURE

END BENT 2
STAGE I DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-69
1			3			TOTAL SHEETS
2			4			79

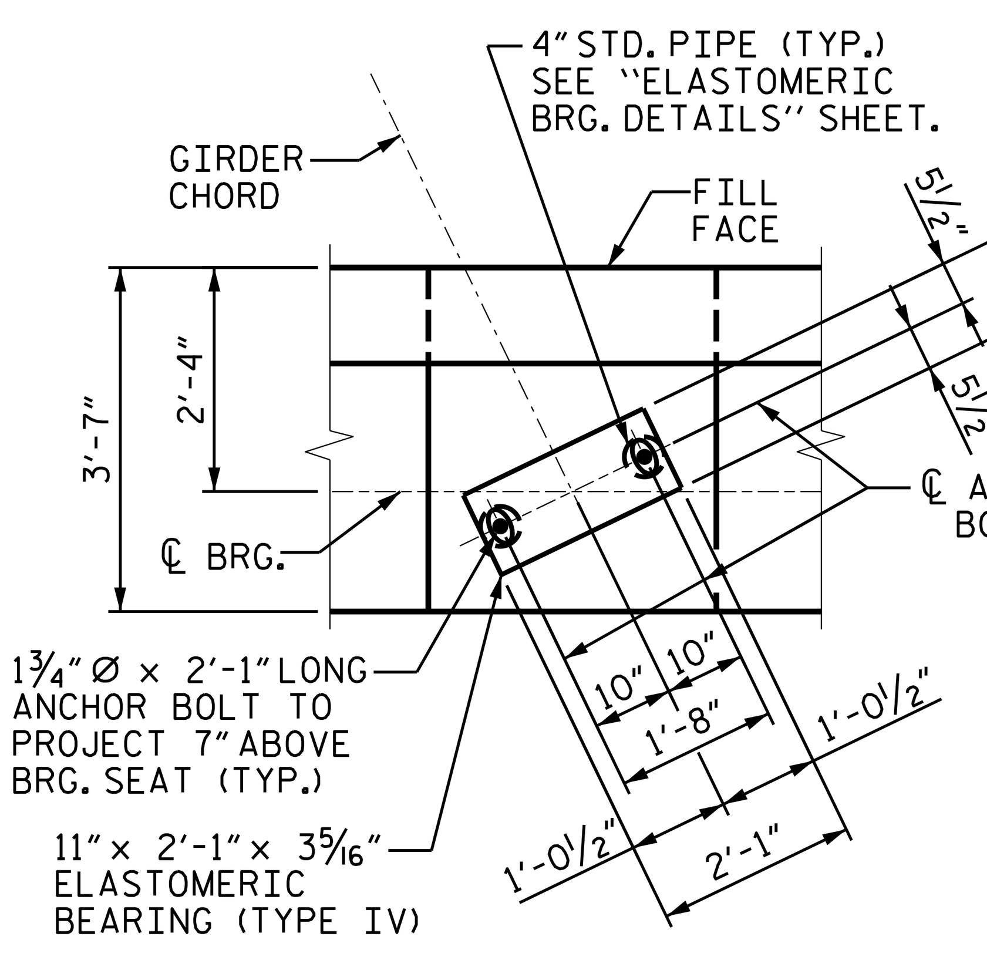
DRAWN BY :	NMW	DATE :	3/19
CHECKED BY :	RAR	DATE :	6/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19

FOR NOTES, SEE SHEET 1 OF 10.



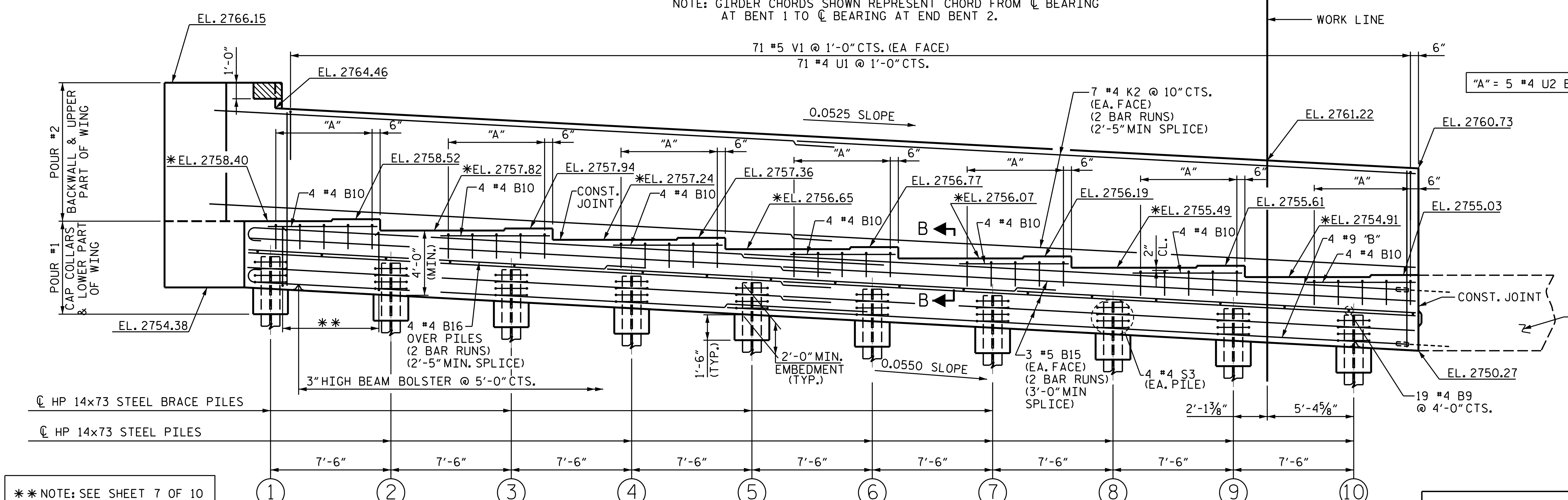
PLAN

NOTE: GIRDER CHORDS SHOWN REPRESENT CHORD FROM ℄ BEARING AT BENT 1 TO ℄ BEARING AT END BENT 2.



DETAIL "A"

(TYP. EA. GIRDER)



** NOTE: SEE SHEET 7 OF 10 FOR STIRRUP SPACING

TOP OF PILE ELEVATIONS			
1	2756.24	6	2754.17
2	2755.82	7	2753.76
3	2755.41	8	2753.35
4	2754.99	9	2752.94
5	2754.59	10	2752.52

ELEVATION

(WING NOT SHOWN FOR CLARITY)
FOR SECTION B-B SEE SHEET 8 OF 10
*FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEAT BUILD-UPS, SEE TYPICAL SECTION

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00-L-

SHEET 6 OF 10

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125
9/30/2021 | 1:43 PM EDT

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-70
1			3			TOTAL SHEETS
2			4			79

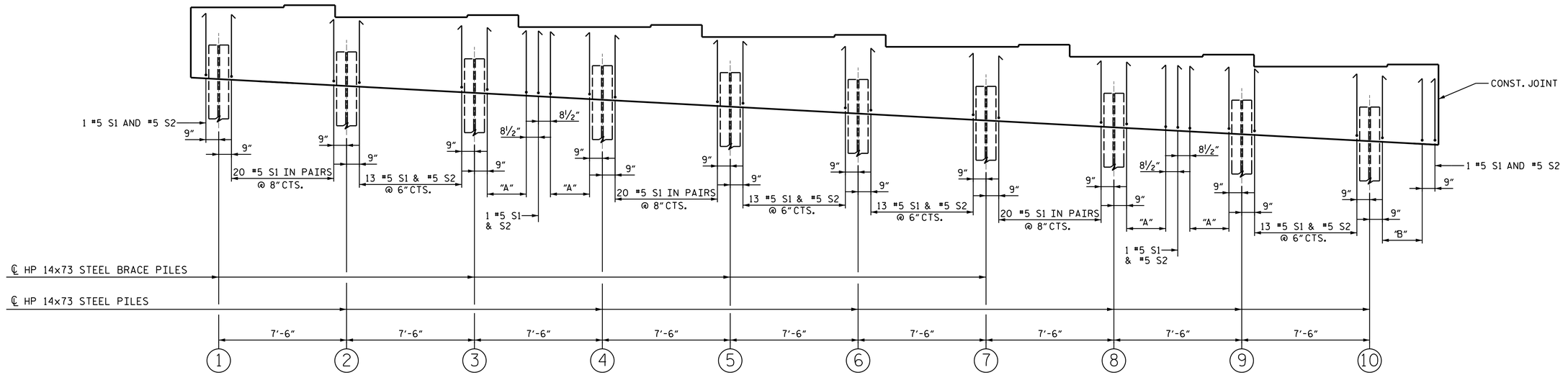
DRAWN BY :	NMW	DATE :	3/19
CHECKED BY :	RAR	DATE :	6/19
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19

NOTES :

FOR S1 STIRRUPS SHOWN AS PAIRS INVERT OPPOSITE STIRRUP.

FOR S1 AND S2 SPACING PLACE THE S2 OVER THE TOP OF THE S1 STIRRUP.

"A" = 12 #5 S1 IN PAIRS @ 5½" CTS.
"B" = 10 #5 S1 IN PAIRS @ 7" CTS.



STIRRUP SPACING - END BENT 2 STAGE II

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 7 OF 10

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL R. CREEK, JR.

Marshall R. Creek, Jr.

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
STIRRUP SPACING
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-71
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	NMW	DATE :	5/19
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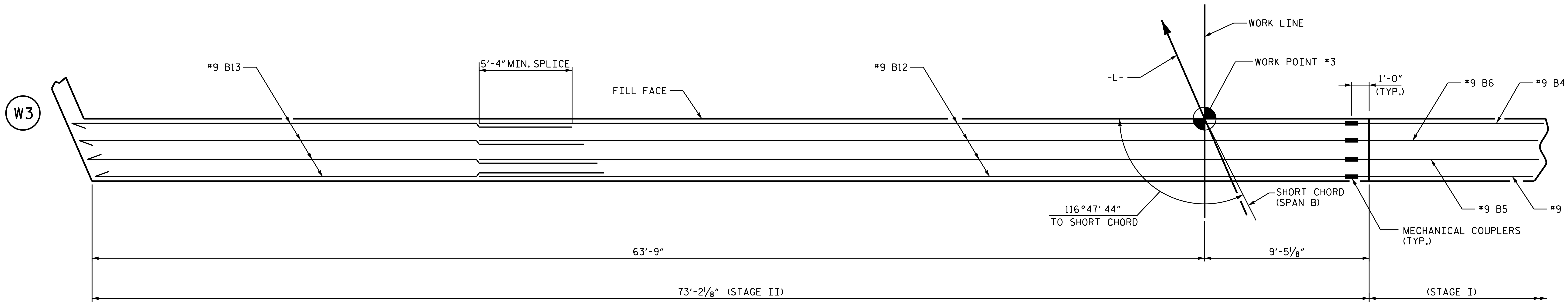
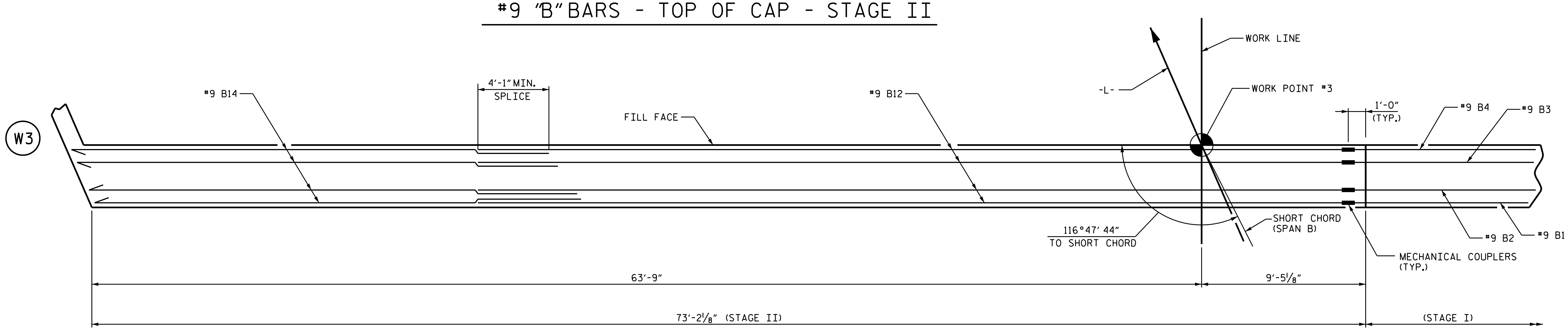
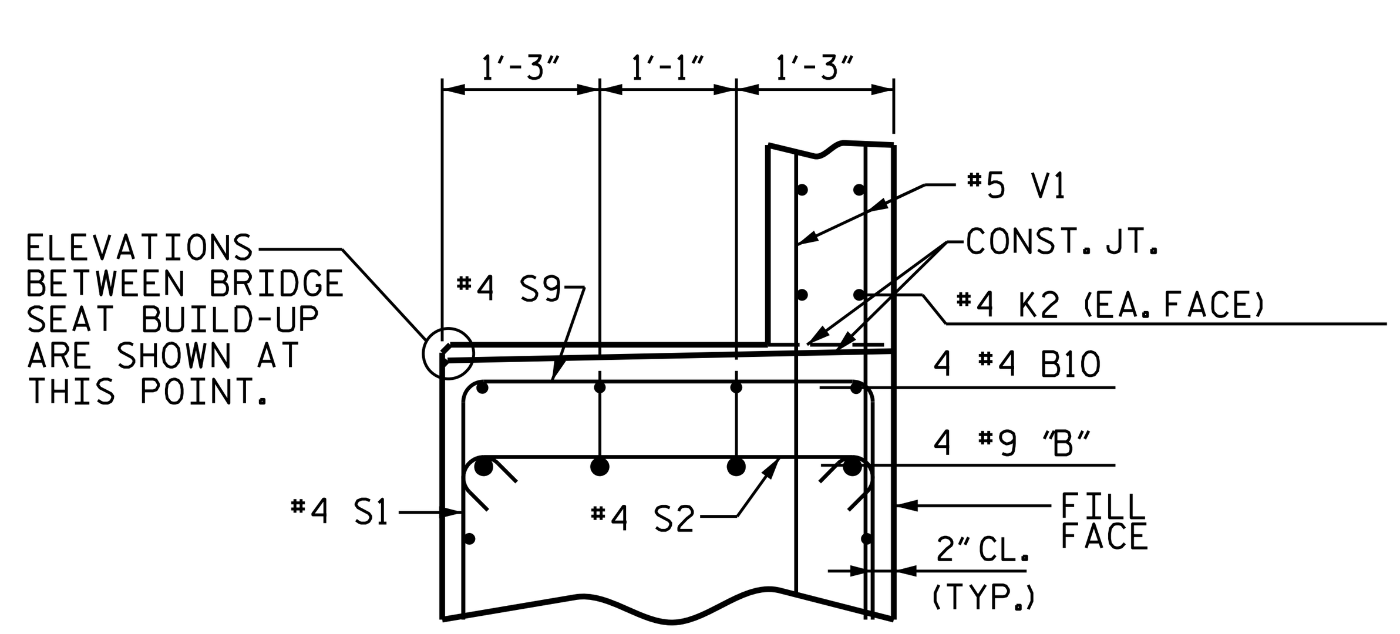
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19



#9 "B" BARS - TOP OF CAP - STAGE II



#9 "B" BARS - BOTTOM OF CAP - STAGE II



SECTION B-B

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 8 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
STAGE II DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER

9/30/2021 | 1:43 PM EDT

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SHELBY, NC 28150
PH (704) 476-0003
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-72
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	NMW	DATE :	3/19
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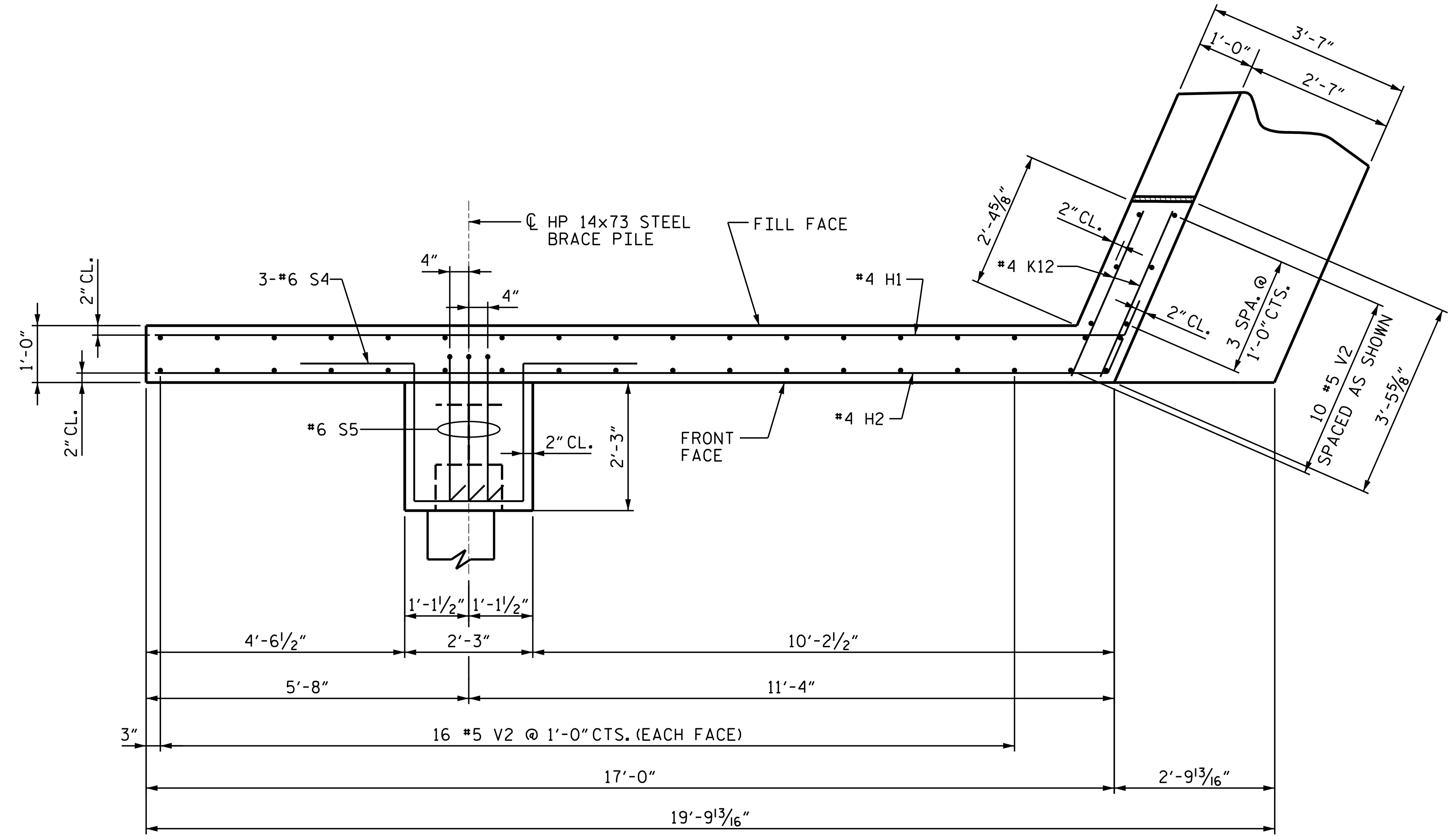
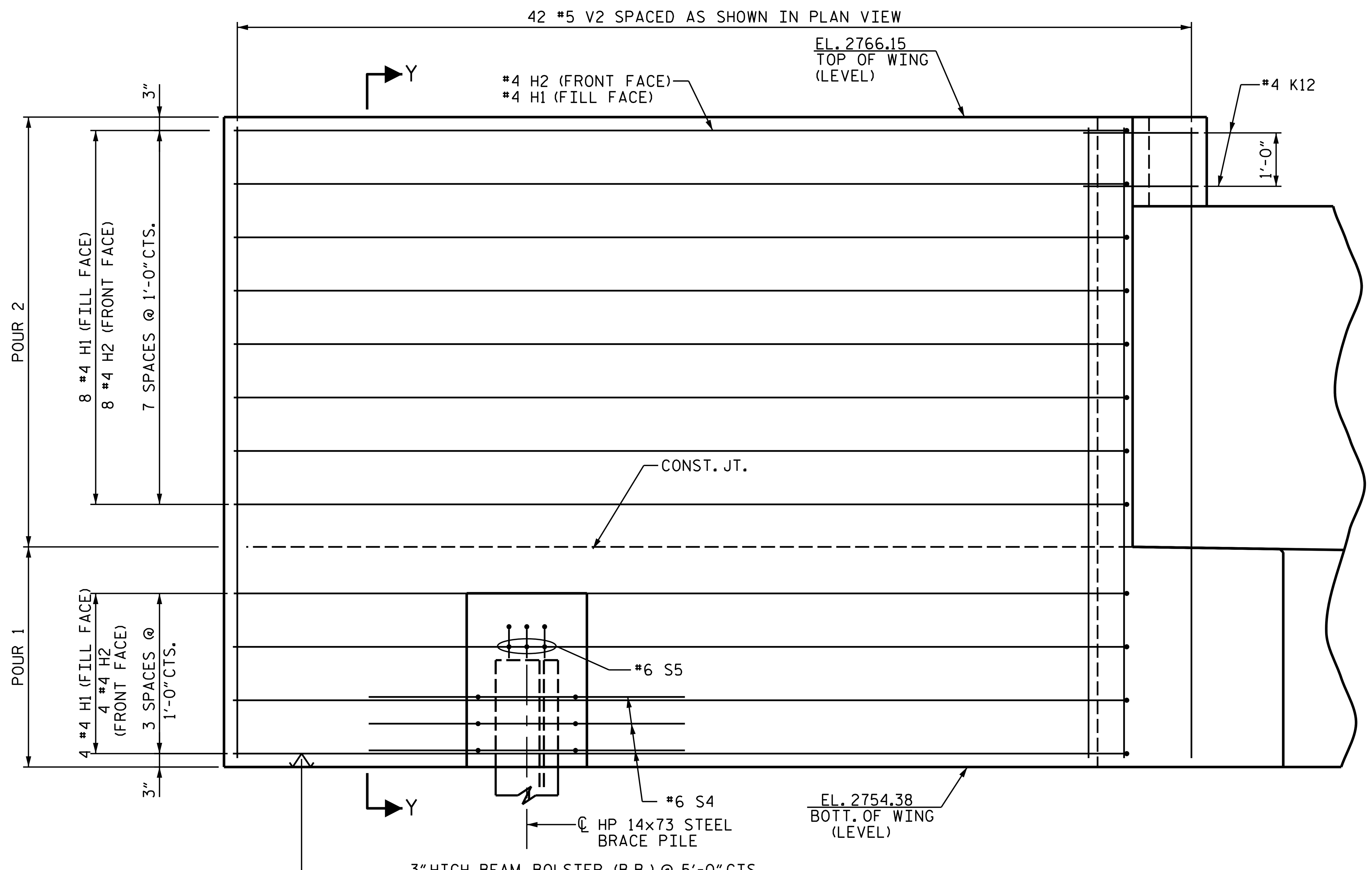
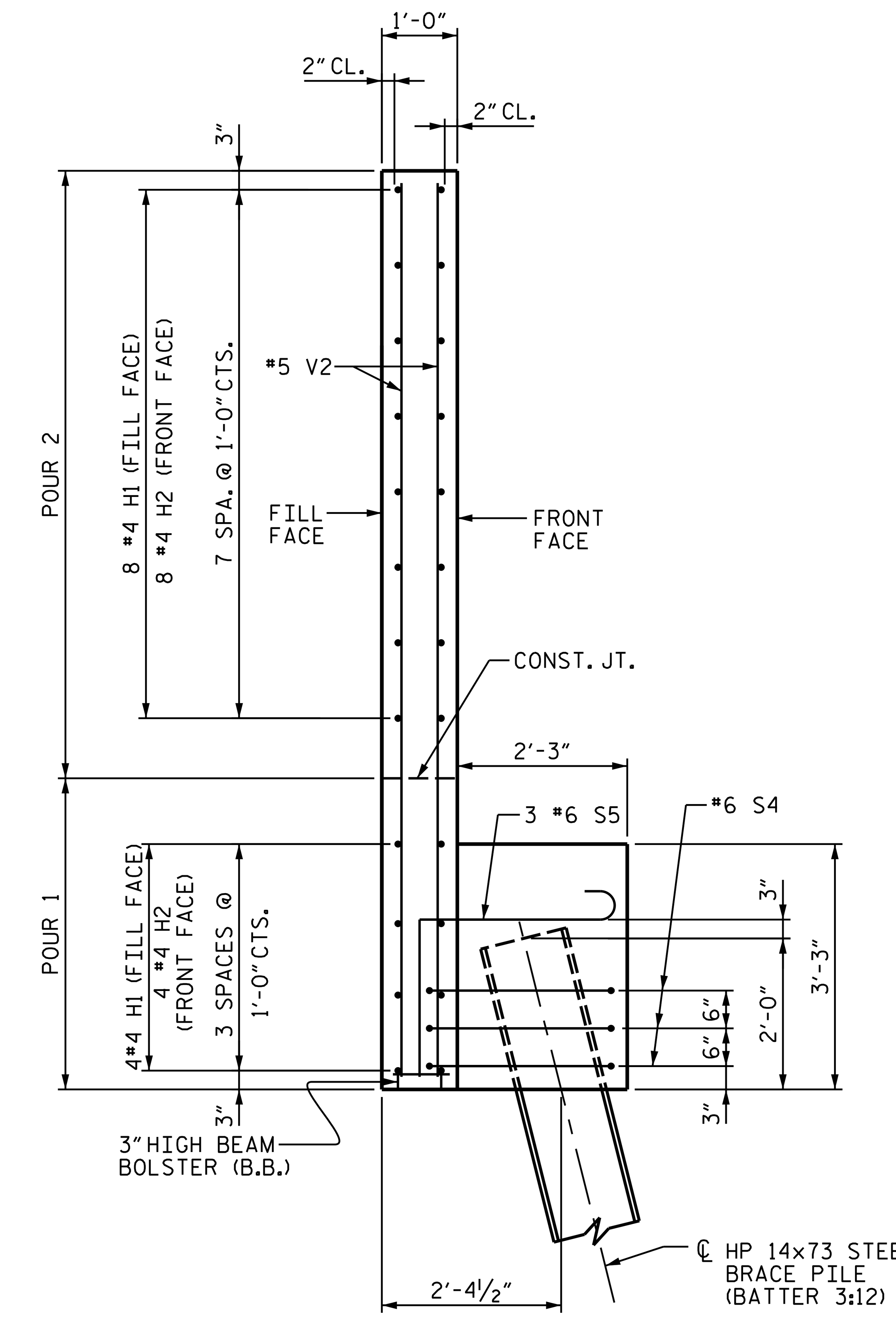
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19



PLAN OF WING (W3)



ELEVATION OF WING (W3)



SECTION Y-Y

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 9 OF 10

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20125 MARSHALL ... JR.

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RALEIGH

SUBSTRUCTURE

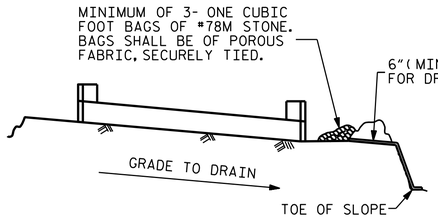
END BENT 2
STAGE II WINGS

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

SHEET NO. S-73

TOTAL SHEETS 79

DRAWN BY : NMW DATE : 3/19
CHECKED BY : RAR DATE : 6/19
DESIGN ENGINEER OF RECORD : TBE DATE : 6/19



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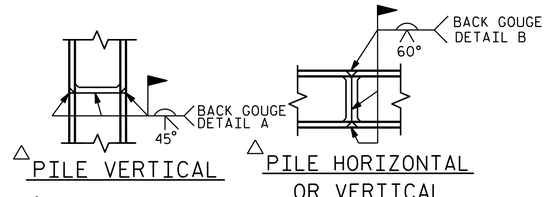
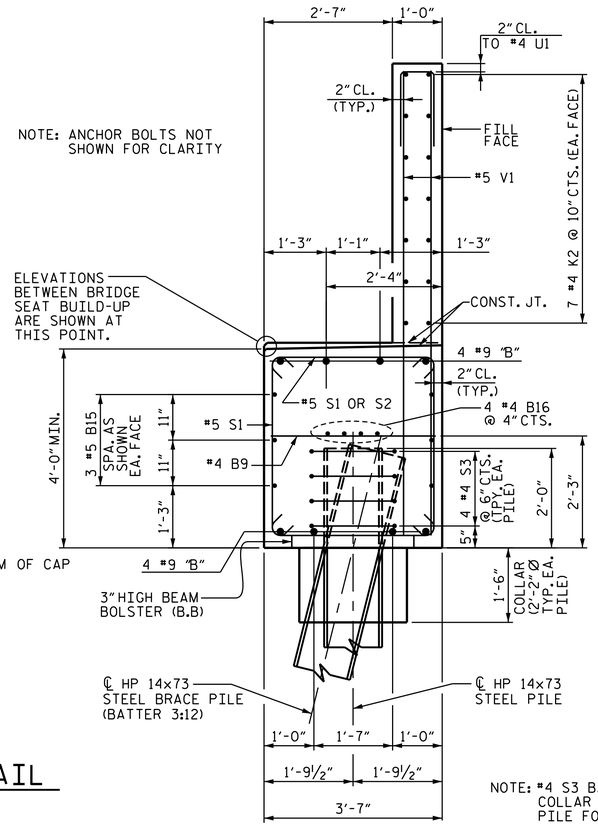
TEMPORARY DRAINAGE AT END BENT



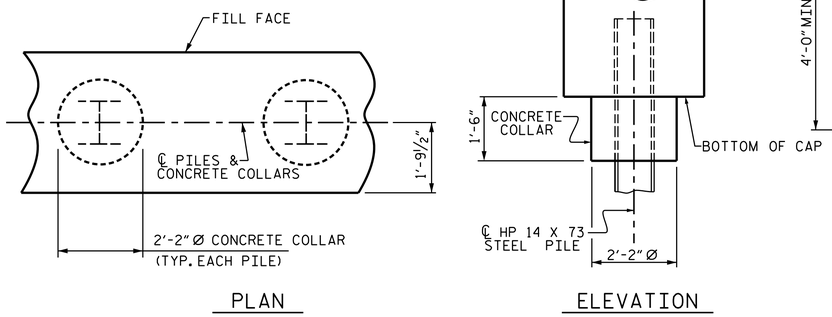
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



NOTE: #4 S3 BARS AND CONCRETE COLLAR NOT SHOWN ON BRACE PILE FOR CLARITY.

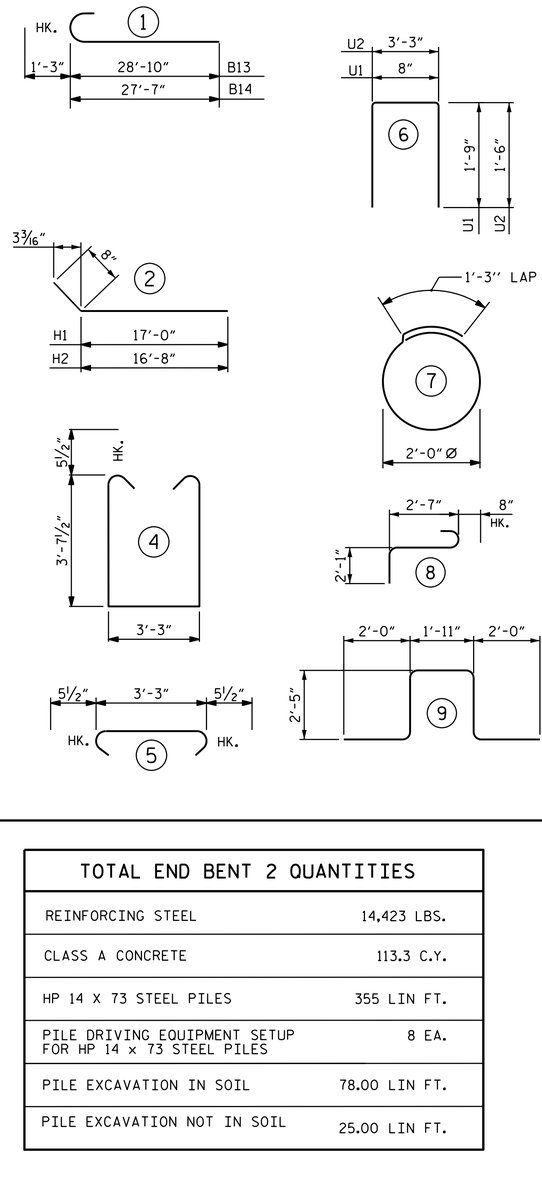
SECTION THRU CAP



CORROSION PROTECTION FOR STEEL PILES DETAIL

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

END BENT 2 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B9	19	#4	STR.	3'-3"	41
B10	28	#4	STR.	6'-10"	128
B12	8	#9	STR.	50'-0"	1360
B13	4	#9	1	30'-1"	409
B14	4	#9	1	28'-10"	392
B15	12	#5	STR.	38'-9"	485
B16	8	#4	STR.	38'-2"	204
H1	12	#4	2	17'-8"	142
H2	12	#4	2	17'-4"	139
K2	28	#4	STR.	38'-2"	714
K12	4	#4	STR.	3'-1"	8
S1	174	#5	4	11'-5"	2072
S2	56	#5	5	4'-2"	243
S3	40	#4	7	7'-7"	203
S4	3	#6	9	10'-9"	48
S5	3	#6	8	5'-4"	24
U1	71	#4	6	4'-2"	198
U2	35	#4	6	6'-3"	146
V1	142	#5	STR.	10'-0"	1481
V2	42	#5	STR.	11'-3"	493

REINFORCING STEEL 8,930 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 CAP, LOWER PART OF WING & COLLARS 47.7 C.Y.

POUR #2 BACKWALL AND UPPER PART OF WING 20.9 C.Y.

TOTAL CLASS A CONCRETE 68.6 C.Y.

HP 14 X 73 STEEL PILES
NO: 11 LIN. FT.= 235

PILE DRIVING EQUIPMENT SETUP FOR HP 14 x 73 STEEL PILES EACH = 8

PILE EXCAVATION IN SOIL 21.27 L.F.

PILE EXCAVATION NOT IN SOIL 6.82 L.F.

TOTAL END BENT 2 QUANTITIES

REINFORCING STEEL	14,423 LBS.
CLASS A CONCRETE	113.3 C.Y.
HP 14 X 73 STEEL PILES	355 LIN FT.
PILE DRIVING EQUIPMENT SETUP FOR HP 14 x 73 STEEL PILES	8 EA.
PILE EXCAVATION IN SOIL	78.00 LIN FT.
PILE EXCAVATION NOT IN SOIL	25.00 LIN FT.

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00-L-

SHEET 10 OF 10

DRAWN BY :	NMW	DATE :	3/19		
CHECKED BY :	RAR	DATE :	6/19		
DESIGN ENGINEER OF RECORD :	TBE	DATE :	6/19		

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER
Marshall R. Sheek, Jr.
5FBCC2F3A4DC413...
9/30/2021 | 1:43 PM EDT

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TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

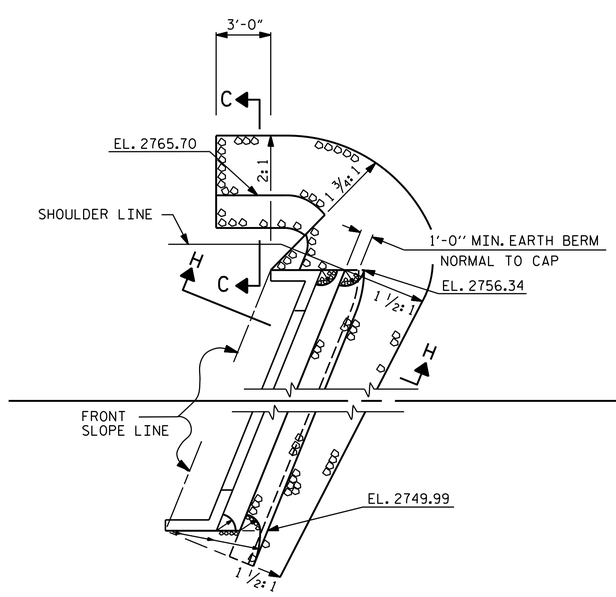
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

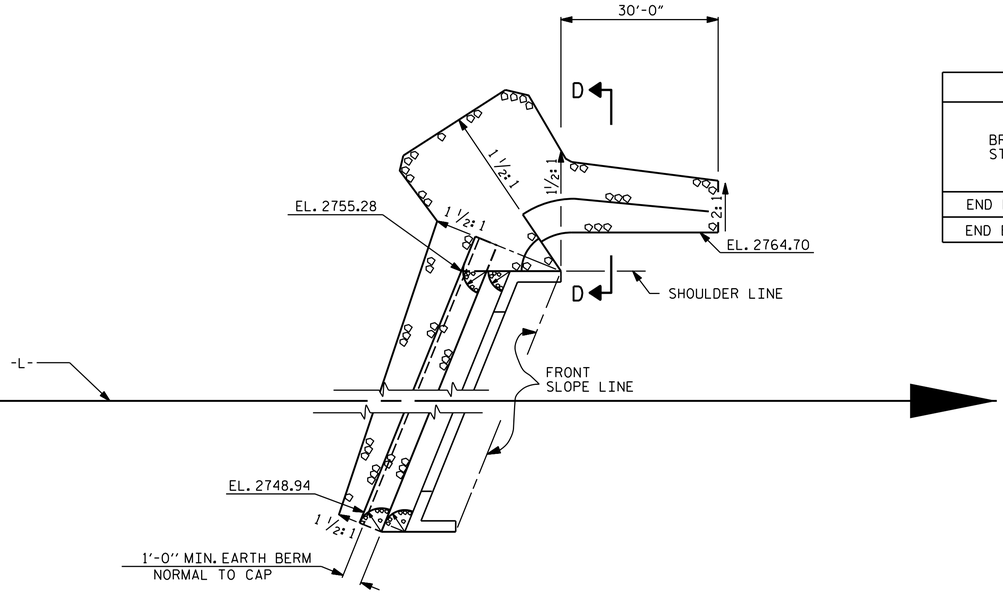
END BENT 2
STAGE II DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-74
1			3			TOTAL SHEETS
2			4			79

ESTIMATED QUANTITIES		
BRIDGE @ STA. 164+30.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	415	460
END BENT 2	210	230

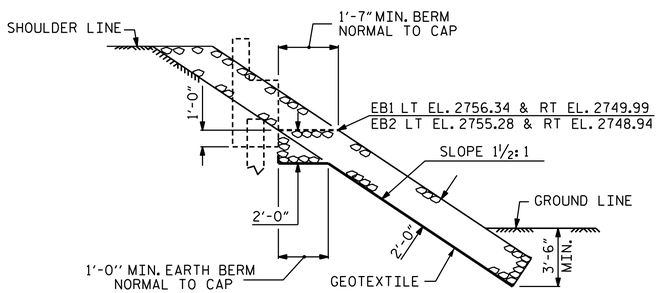


END BENT 1

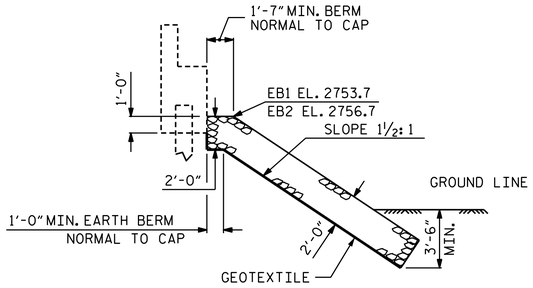


END BENT 2

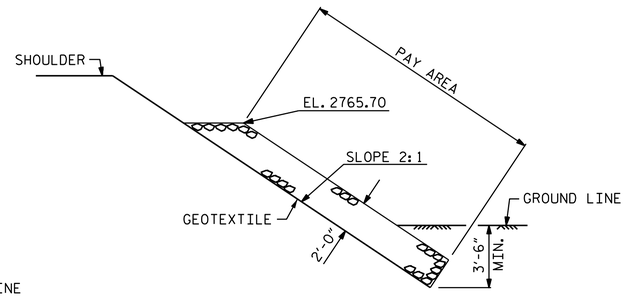
PLAN



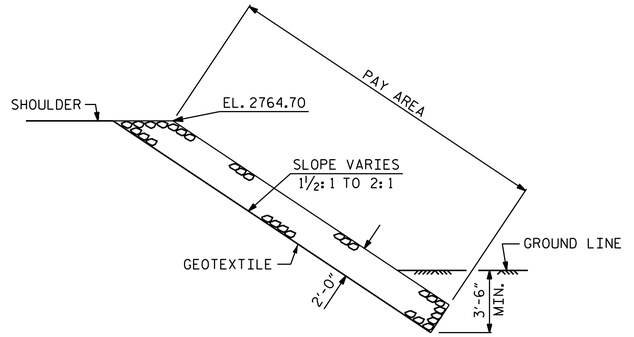
SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C



SECTION D-D

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CHEEK, JR.
Marshall C. Cheek, Jr.
9/30/2021 | 1:43 PM EDT

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TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-75
1			3			TOTAL SHEETS
2			4			79

ASSEMBLED BY : STM	DATE : 03/19		
CHECKED BY : MGC	DATE : 04/19		
DRAWN BY : REK 1/84	REV. 10/1/11	MAA/GM	
CHECKED BY : RDU 1/84	REV. 12/21/11	MAA/GM	
	REV. 12/17	MAA/THC	

7/29/2021
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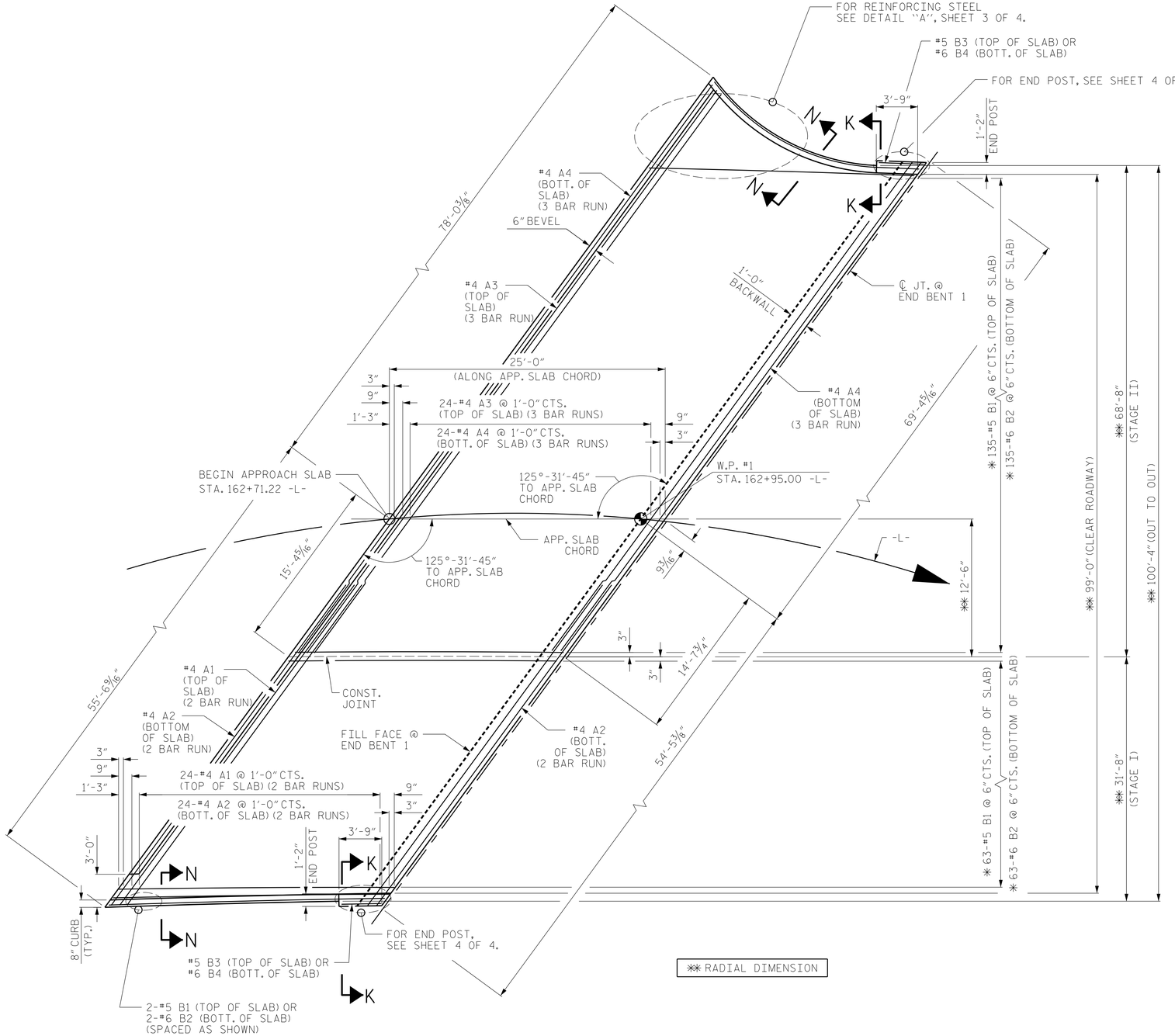
User:ZSmith

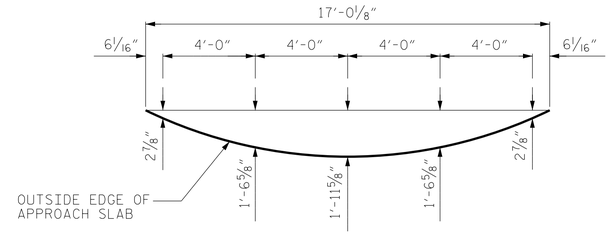
STD. NO. RR1 (Sht 3)



** RADIAL DIMENSION

PLAN OF APPROACH SLAB @ END BENT 1

* "B" BARS SHALL BE PLACED ON THE APPROACH SLAB CHORD



ARC OFFSETS
LEFT SIDE

ARC OFFSETS
RIGHT SIDE

PROJECT NO. R-2566BA
WATAUGA COUNTY
STATION: 164+30.00 -L-

SHEET 1 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER
MARSHALL C. CREEK, JR.
Documents signed by: C. CREEK, JR.
Marshall C. Creek, Jr.
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9/30/2021 | 1:43 PM EDT

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RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

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RALEIGH

BRIDGE APPROACH SLAB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-76
1			3			TOTAL SHEETS
2			4			79

DRAWN BY :	STM	DATE : 05/21
CHECKED BY :	S.B. WILLIAMS	DATE : 06/21
DESIGN ENGINEER OF RECORD:	MGC	DATE : 07/21

7/29/2021
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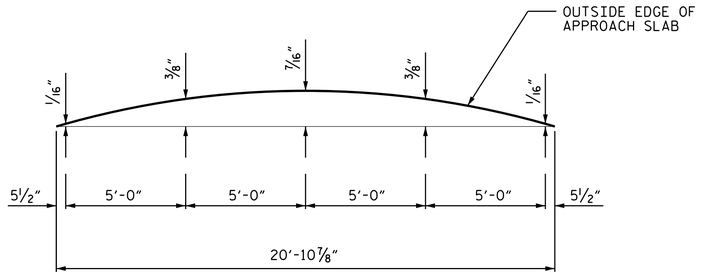
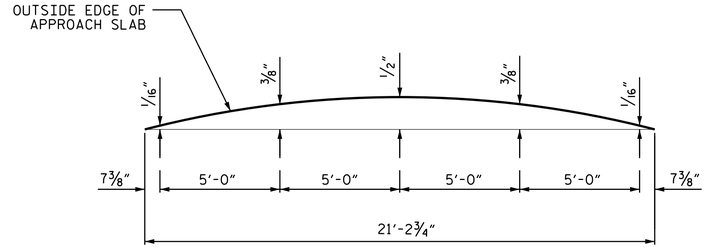
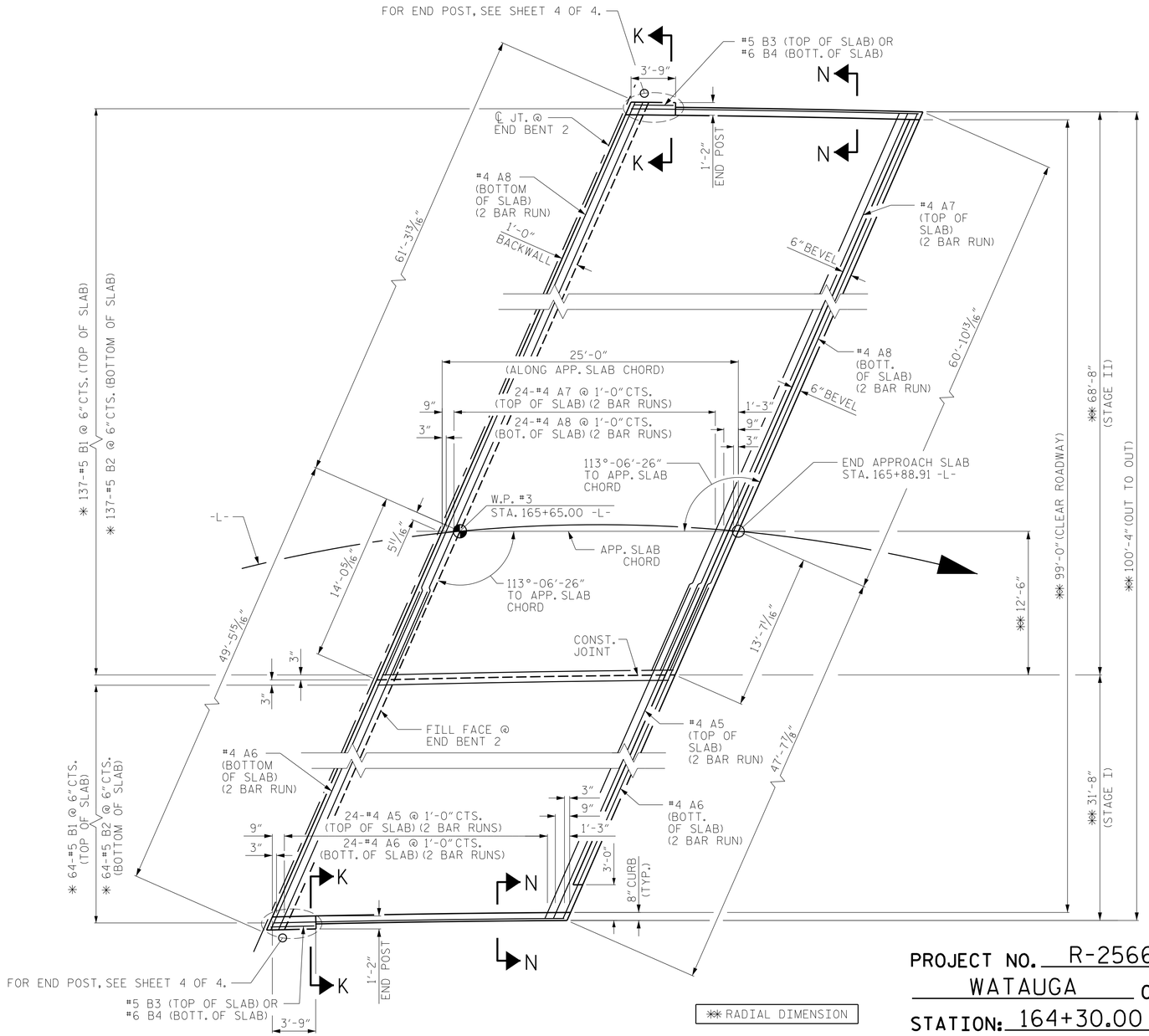
User:ZSmith



ARC OFFSETS
LEFT SIDE



ARC OFFSETS
RIGHT SIDE



PLAN OF APPROACH SLAB @ END BENT 2

✳ "B" BARS SHALL BE PLACED ON THE APPROACH SLAB CHORD

✳✳ RADIAL DIMENSION

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 2 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.
5FBCC2F3A4DC413...
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CORP. LICENSE NO.: C-0275

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RALEIGH

BRIDGE APPROACH SLAB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-77
1			3			TOTAL SHEETS
2			4			79

DRAWN BY : STM DATE : 05/21
CHECKED BY : S.B. WILLIAMS DATE : 06/21
DESIGN ENGINEER OF RECORD: MGC DATE : 07/21

7/29/2021
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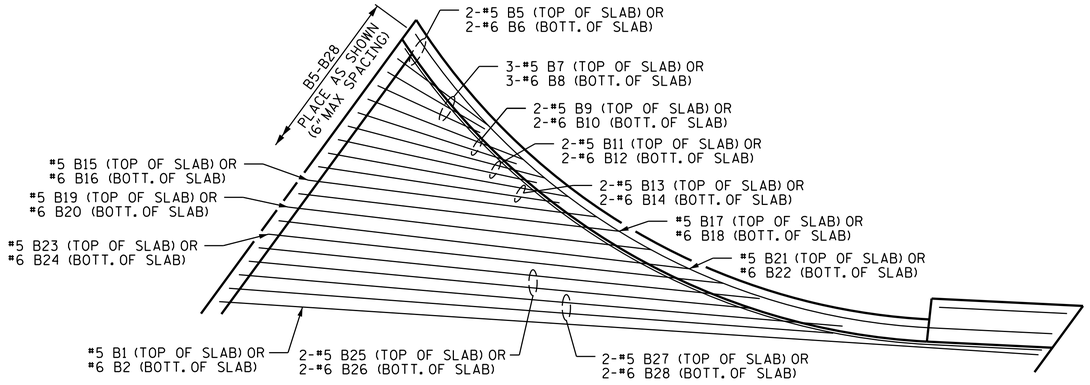
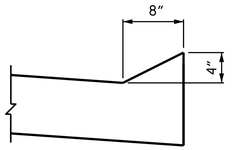
User:ZSmith

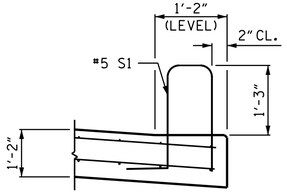


DETAIL A

✳ #5 B5 & #6 B6 TO BE FIELD BENT

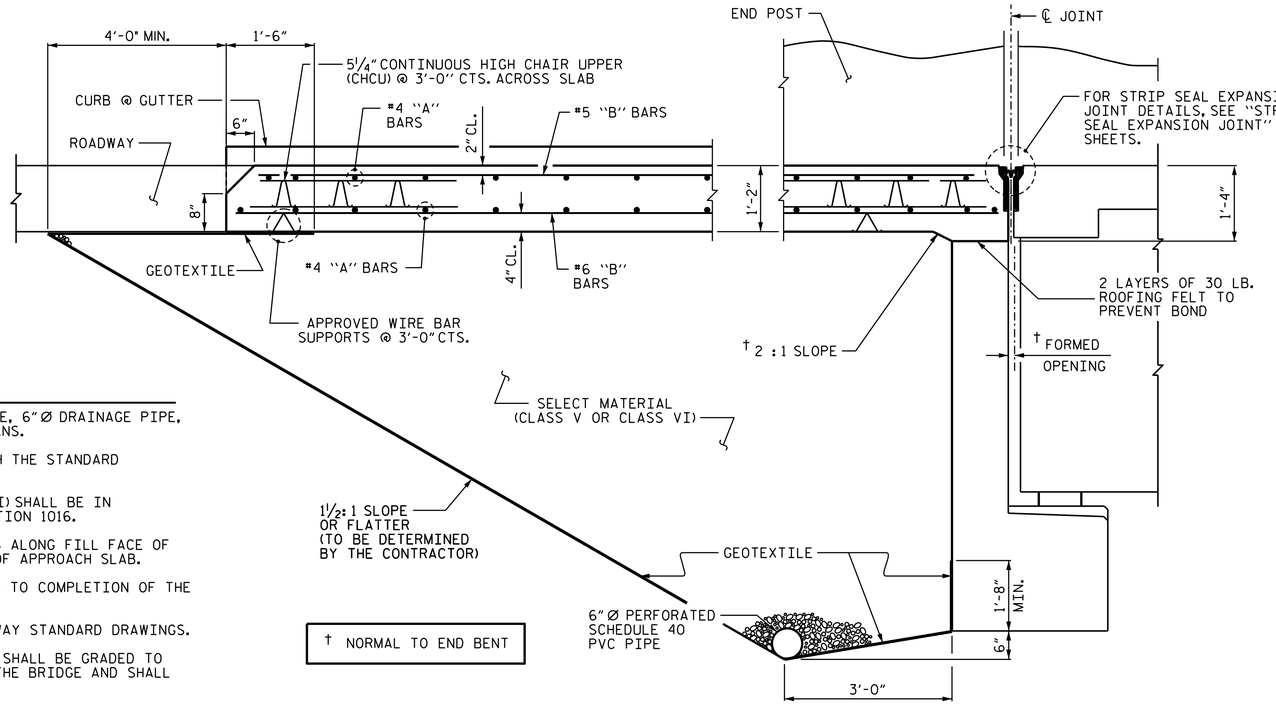


SECTION N-N



SECTION K-K

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



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

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

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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.

FOR STRIP SEAL EXPANSION JOINT, SEE SPECIAL PROVISIONS.

APPROACH SLAB BILL OF MATERIAL

AP. SLAB @ EB1 STAGE 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	50	#4	STR	21'-11"	732
A2	52	#4	STR	21'-7"	750
✳ B1	65	#5	STR	24'-0"	1627
B2	65	#6	STR	24'-7"	2400
✳ B3	1	#5	STR	3'-4"	3
B4	1	#6	STR	3'-4"	5
REINFORCING STEEL					3155 LBS.
✳ EPOXY COATED REINFORCING STEEL					2362 LBS.
CLASS AA CONCRETE					35.0 C.Y.

AP. SLAB @ EB2 STAGE 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A5	50	#4	STR	19'-7"	654
A6	52	#4	STR	19'-3"	669
✳ B1	64	#5	STR	24'-0"	1602
B2	64	#6	STR	24'-7"	2363
✳ B3	1	#5	STR	3'-4"	3
B4	1	#6	STR	3'-4"	5
REINFORCING STEEL					3037 LBS.
✳ EPOXY COATED REINFORCING STEEL					2259 LBS.
CLASS AA CONCRETE					34.4 C.Y.

AP. SLAB @ EB1 STAGE 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A3	75	#4	STR	32'-4"	1620
A4	78	#4	STR	32'-1"	1672
✳ B1	135	#5	STR	24'-0"	3379
B2	135	#6	STR	24'-7"	4985
✳ B3	1	#5	STR	3'-4"	3
B4	1	#6	STR	3'-4"	5
✳ B5	2	#5	STR	21'-3"	44
B6	2	#6	STR	21'-3"	64
✳ B7	3	#5	STR	2'-10"	9
B8	3	#6	STR	3'-4"	15
✳ B9	2	#5	STR	4'-1"	9
B10	2	#6	STR	4'-7"	14
✳ B11	2	#5	STR	5'-0"	10
B12	2	#6	STR	5'-6"	17
✳ B13	2	#5	STR	6'-1"	13
B14	2	#6	STR	6'-7"	20
✳ B15	1	#5	STR	7'-7"	8
B16	1	#6	STR	8'-1"	12
✳ B17	1	#5	STR	8'-4"	9
B18	1	#6	STR	8'-10"	13
✳ B19	1	#5	STR	9'-3"	10
B20	1	#6	STR	9'-9"	15
✳ B21	1	#5	STR	10'-4"	11
B22	1	#6	STR	10'-10"	16
✳ B23	1	#5	STR	11'-4"	12
B24	1	#6	STR	11'-10"	18
✳ B25	2	#5	STR	12'-10"	27
B26	2	#6	STR	13'-4"	40
✳ B27	2	#5	STR	16'-5"	34
B28	2	#6	STR	16'-11"	51
REINFORCING STEEL					6957 LBS.
✳ EPOXY COATED REINFORCING STEEL					5198 LBS.
CLASS AA CONCRETE					76.3 C.Y.

AP. SLAB @ EB2 STAGE 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A7	50	#4	STR	38'-6"	1286
A8	52	#4	STR	38'-4"	1332
✳ B1	137	#5	STR	24'-0"	3429
B2	137	#6	STR	24'-7"	5059
✳ B3	1	#5	STR	3'-4"	3
B4	1	#6	STR	3'-4"	5
REINFORCING STEEL					6396 LBS.
✳ EPOXY COATED REINFORCING STEEL					4718 LBS.
CLASS AA CONCRETE					75.9 C.Y.

✳✳ QUANTITIES FOR END POST ARE NOT INCLUDED. SEE SHEET 4 OF 4.

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL G. CHEEK, JR.

Marshall G. Cheek, Jr.

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TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-78
1			3			TOTAL SHEETS
2			4			79

ASSEMBLED BY : STM	DATE : 02/19		
CHECKED BY : S.B. WILLIAMS	DATE : 06/21		
DRAWN BY : RH 5/99	REV. 6/13	MAA/GM	
CHECKED BY : RDR 5/99	REV. 12/17	MAA/THC	
	REV. 06/19	BNB/THC	

7/29/2021
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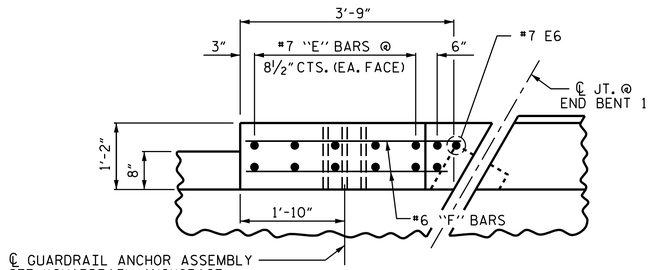
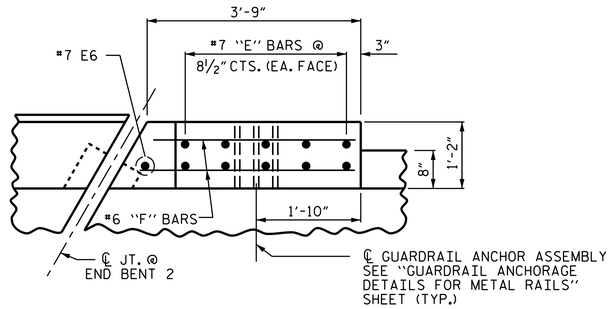
User:ZSmith

STD. NO. BAS2 (SHT 2a)



PLAN OF END POST

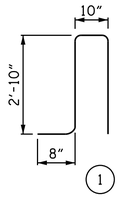
END BENT 1 STAGE II SHOWN, END BENT 1 STAGE I SIMILAR



PLAN OF END POST

END BENT 2 STAGE II SHOWN, END BENT 2 STAGE I SIMILAR

BAR TYPE



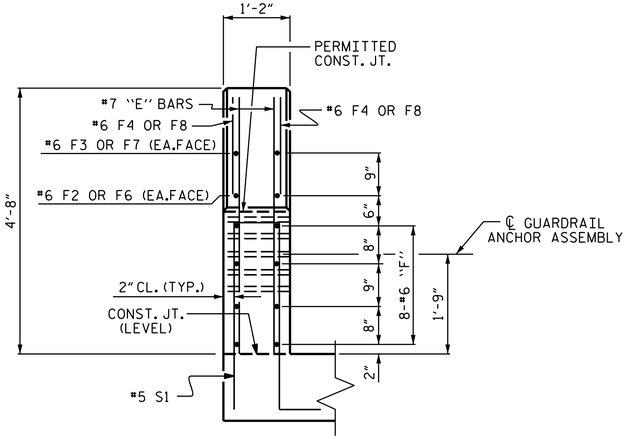
ALL BAR DIMENSIONS ARE OUT TO OUT

NOTES

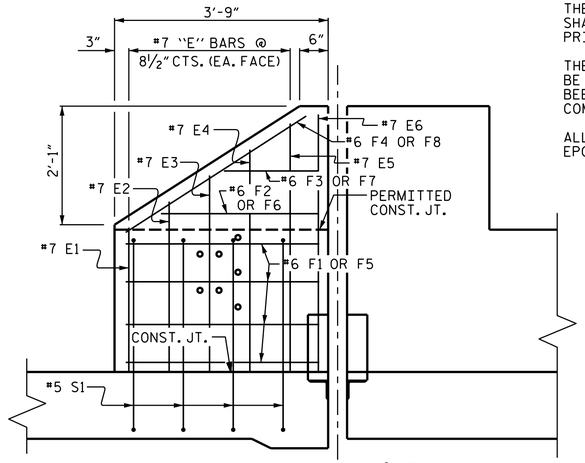
THE COST OF THE END POST ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "1'-2" X 2'-6" CONCRETE PARAPET".

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

ALL REINFORCING STEEL IN END POSTS SHALL BE EPOXY COATED.

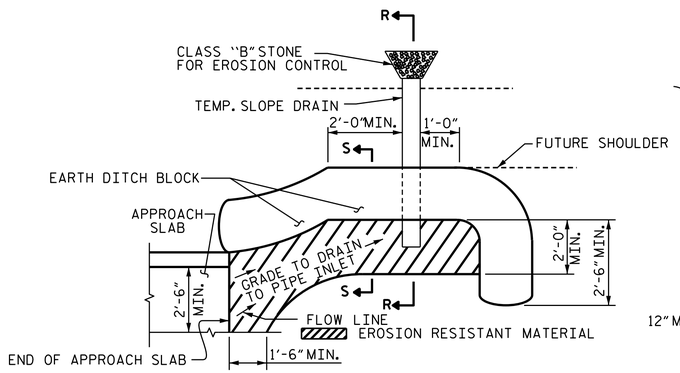


END VIEW



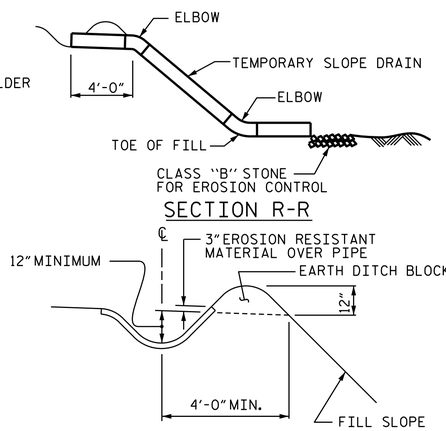
ELEVATION

END POST FOR TWO BAR RAIL

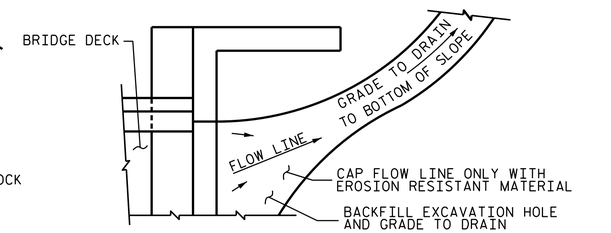


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



SECTION S-S



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

APPROACH SLAB @ EB 1 (STAGE I)

BILL OF MATERIAL FOR 1 END POST

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳E1	2	#7	STR	2'-6"	10
✳E2	2	#7	STR	2'-11"	12
✳E3	2	#7	STR	3'-3"	13
✳E4	2	#7	STR	3'-10"	16
✳E5	2	#7	STR	4'-2"	17
✳E6	3	#7	STR	4'-5"	27
✳F1	4	#6	STR	3'-5"	21
✳F2	1	#6	STR	2'-11"	4
✳F3	1	#6	STR	1'-6"	2
✳F4	1	#6	STR	3'-9"	6
✳F5	4	#6	STR	3'-11"	24
✳F6	1	#6	STR	3'-5"	5
✳F7	1	#6	STR	2'-0"	3
✳F8	1	#6	STR	4'-5"	7
✳S1	4	#5	1	7'-2"	30

✳EPOXY COATED REINFORCING STEEL	LBS.	197
CLASS AA CONCRETE	CU.YDS.	0.7

APPROACH SLAB @ EB 1 (STAGE II)

BILL OF MATERIAL FOR 1 END POST

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳E1	2	#7	STR	2'-6"	10
✳E2	2	#7	STR	2'-11"	12
✳E3	2	#7	STR	3'-3"	13
✳E4	2	#7	STR	3'-10"	16
✳E5	2	#7	STR	4'-2"	17
✳E6	3	#7	STR	4'-5"	27
✳F1	4	#6	STR	3'-5"	21
✳F2	1	#6	STR	2'-11"	4
✳F3	1	#6	STR	1'-6"	2
✳F4	1	#6	STR	3'-9"	6
✳F5	4	#6	STR	3'-11"	24
✳F6	1	#6	STR	3'-5"	5
✳F7	1	#6	STR	2'-0"	3
✳F8	1	#6	STR	4'-5"	7
✳S1	4	#5	1	7'-2"	30

✳EPOXY COATED REINFORCING STEEL	LBS.	197
CLASS AA CONCRETE	CU.YDS.	0.7

APPROACH SLAB @ EB 2 (STAGE I)

BILL OF MATERIAL FOR 1 END POST

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳E1	2	#7	STR	2'-6"	10
✳E2	2	#7	STR	2'-11"	12
✳E3	2	#7	STR	3'-3"	13
✳E4	2	#7	STR	3'-10"	16
✳E5	2	#7	STR	4'-2"	17
✳E6	1	#7	STR	4'-5"	9
✳F1	4	#6	STR	3'-5"	21
✳F2	1	#6	STR	2'-11"	4
✳F3	1	#6	STR	1'-6"	2
✳F4	1	#6	STR	3'-5"	5
✳F5	4	#6	STR	3'-8"	22
✳F6	1	#6	STR	3'-3"	5
✳F7	1	#6	STR	1'-10"	3
✳F8	1	#6	STR	4'-1"	6
✳S1	4	#5	1	7'-2"	30

✳EPOXY COATED REINFORCING STEEL	LBS.	175
CLASS AA CONCRETE	CU.YDS.	0.7

APPROACH SLAB @ EB 2 (STAGE II)

BILL OF MATERIAL FOR 1 END POST

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳E1	2	#7	STR	2'-6"	10
✳E2	2	#7	STR	2'-11"	12
✳E3	2	#7	STR	3'-3"	13
✳E4	2	#7	STR	3'-10"	16
✳E5	2	#7	STR	4'-2"	17
✳E6	1	#7	STR	4'-5"	9
✳F1	4	#6	STR	3'-5"	21
✳F2	1	#6	STR	2'-11"	4
✳F3	1	#6	STR	1'-6"	2
✳F4	1	#6	STR	3'-5"	5
✳F5	4	#6	STR	3'-8"	22
✳F6	1	#6	STR	3'-3"	5
✳F7	1	#6	STR	1'-10"	3
✳F8	1	#6	STR	4'-1"	6
✳S1	4	#5	1	7'-2"	30

✳EPOXY COATED REINFORCING STEEL	LBS.	175
CLASS AA CONCRETE	CU.YDS.	0.7

PROJECT NO. R-2566BA

WATAUGA COUNTY

STATION: 164+30.00 -L-

SHEET 4 OF 4

ASSEMBLED BY :	STM	DATE :	06/21
CHECKED BY :	S.B. WILLIAMS	DATE :	06/21
DRAWN BY :	FCJ	11/88	
CHECKED BY :	ARB	11/88	

REV. 6/13	MAA/GM
REV. 12/17	MAA/THC
REV. 5/18	MAA/THC

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

NORTH CAROLINA PROFESSIONAL SEAL 20125 ENGINEER MARSHALL C. CHEEK, JR.
Marshall C. Cheek, Jr.
SFBCC2F3A4DC413...
9/30/2021 | 1:43 PM EDT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-79
1			3			TOTAL SHEETS
2			4			79

7/29/2021
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User:ZSmith

STD. NO. BAS4(SHT 6b)

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

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SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM (/) RGW
REV. 8-16-99 RWW (/) LES
REV. 5-7-03 RWW (/) JTE
REV. 5-1-06 TLA (/) GM
REV. 10-1-11 MAA (/) GM
REV. 12-17 MAA (/) THC

6/18/2021
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