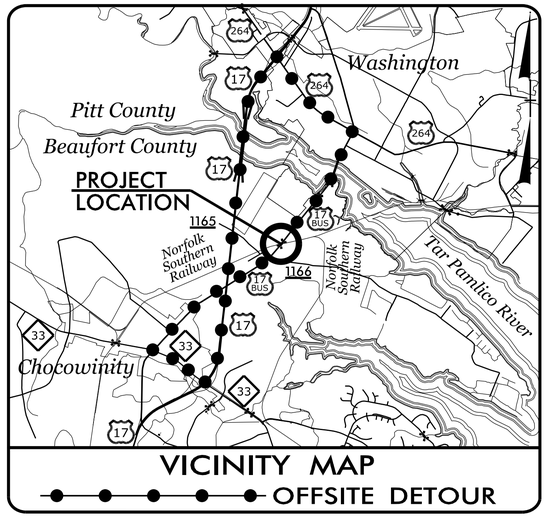
TIP PROJECT: B-5302

CONTRACT: C204594



VICINITY MAP

OFFSITE DETOUR

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BEAUFORT COUNTY

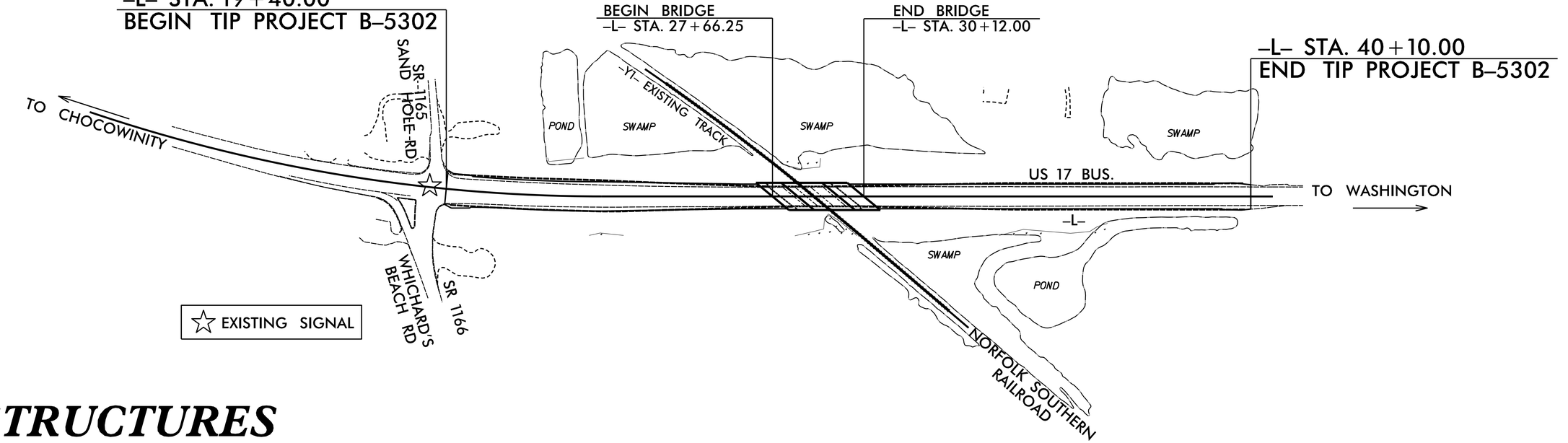
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5302	1	43

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
46016.1.1	BRNHPP-0017(127)	PE

LOCATION: REPLACE BRIDGE NO. 3 OVER NORFOLK SOUTHERN RAILROAD ON US 17 BUS.

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

NAD 83/
NA 2011



STRUCTURES

DESIGN DATA

ADT 2019 = 14,909
ADT 2039 = 20,273
K = 9 %
D = 60 %
T = 8 % *
V = 60 MPH
* TTST = 4% DUAL = 4%
FUNC CLASS =
RURAL MINOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5302 = 0.347 mile +/-
LENGTH STRUCTURES TIP PROJECT B-5302 = 0.045 mile +/-
TOTAL LENGTH TIP PROJECT B-5302 = 0.392 mile +/-
(BRIDGES MEASURED FROM PROJECTED CENTERLINE STATION)

Prepared for the Office of:

DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

LETTING DATE :
APRIL 20, 2021

Plans prepared by:

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401

LICENSE NO. F-0165

JACOB P. SHERMAN P.E.
DESIGN ENGINEER OF RECORD

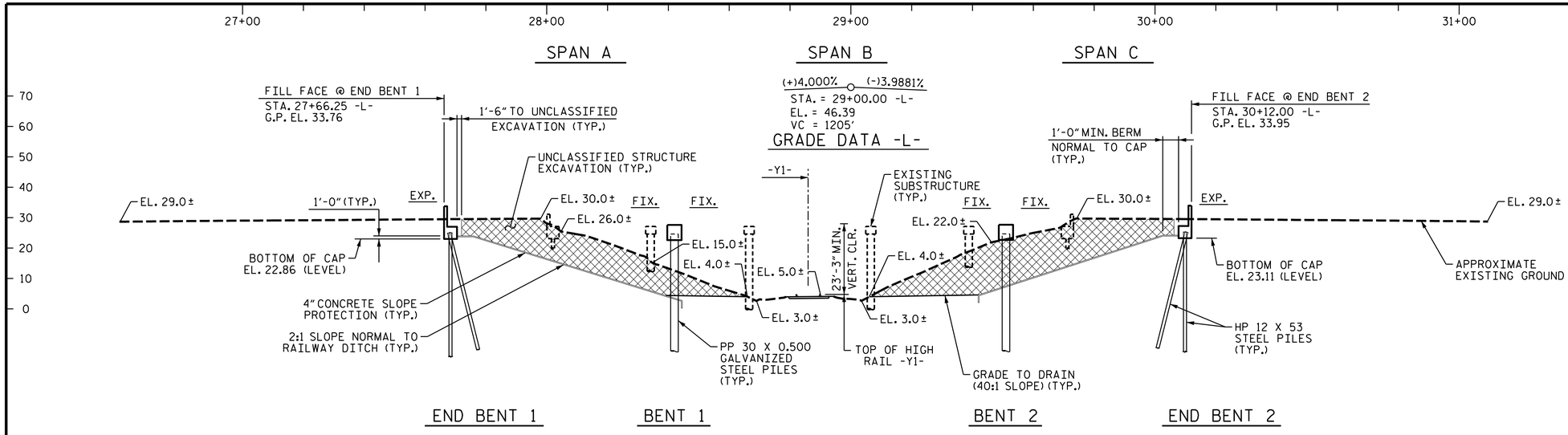
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P SHERMAN
2/8/2021

DocuSigned by:
BC5D0504B1AD4D1...

2/8/2021
p:\wsp-us-pw.bentley.com:wsp-us-pw-01\Documents\NC Structures\186615 - B-5302\STR\5.0 DGN\401_001_B5302_SMU_TSH01.dgn

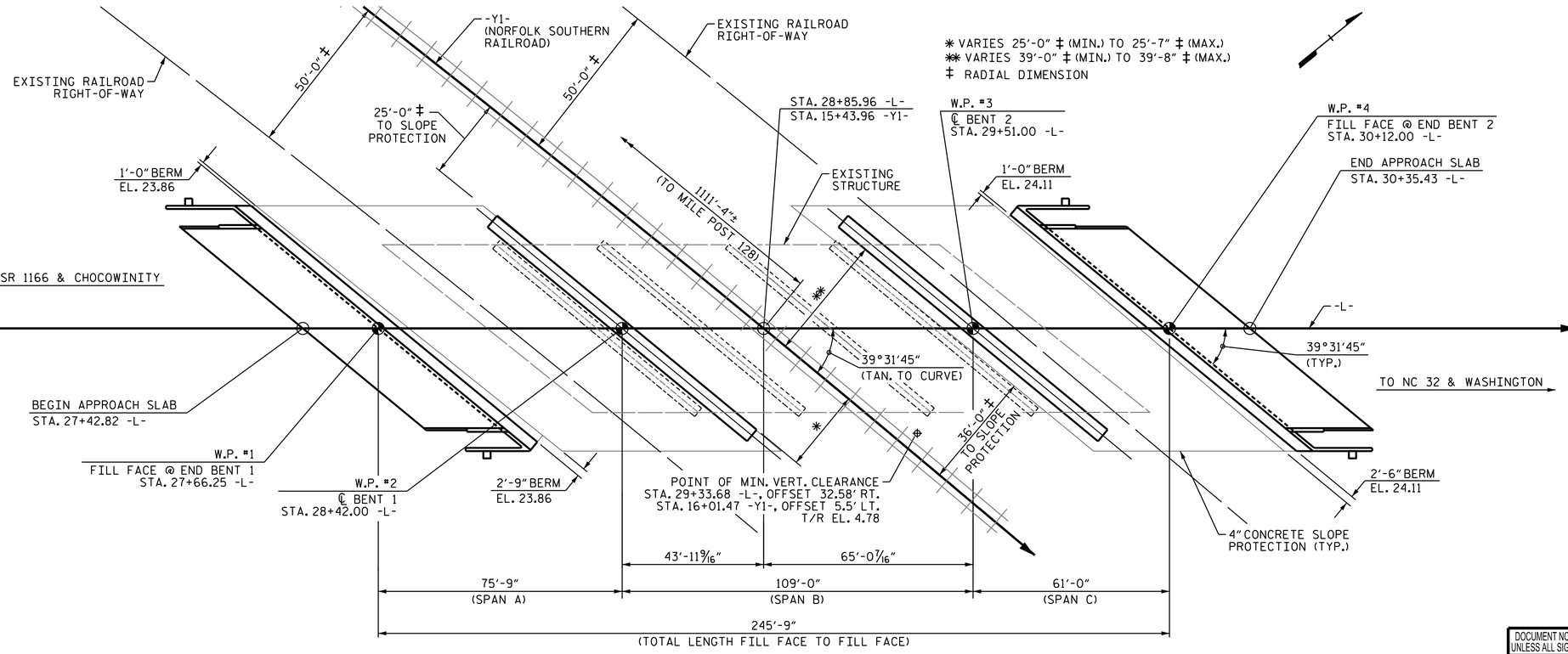
F.A. PROJECT NO. BRNHPP-0017(127)



SECTION ALONG -L-

SECTIONS AT END BENTS AND BENTS ARE AT RIGHT ANGLES

TOP OF RAIL ELEVATIONS (-Y1-)		
STATION (TRACK)	LEFT RAIL (HIGH)	RIGHT RAIL (LOW)
14+74.18	--	4.48
14+84.26	4.56	--
15+12.19	--	4.56
15+29.16	4.73	--
15+46.96	--	4.67
15+72.02	4.75	--
15+81.64	--	4.62
16+08.12	4.78	--
16+24.50	--	4.76
16+57.75	4.88	--



PLAN

PILES ARE NOT SHOWN FOR CLARITY
END BENTS AND BENTS ARE PARALLEL

HORIZONTAL CURVE DATA -Y1-

PI STA. 12+96.20 -Y1-
Δ = 5°24'34.5"(RT)
D= 0°54'49.8"
L= 591.97'
T = 296.20'
R = 6,269.81'

PI STA. 17+52.33 -Y1-
Δ = 0°37'28.5"(RT)
D= 0°11'41.0"
L= 320.73'
T = 160.37'
R = 29,422.30'

PROJECT NO. B-5302
BEAUFORT COUNTY
STATION: 28+85.96 -L-
15+43.96 -Y1-
REPLACES BRIDGE NO. 3
SHEET 1 OF 3
M.P. NO. 128.21

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 17
BUSINESS (-L-) OVER NSR (-Y1-)
BETWEEN SR 1166 & NC 32

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

DESIGNED BY: A. D'AIUTO DATE : AUG 2017
DRAWN BY: A. D'AIUTO DATE : AUG 2017
CHECKED BY: J. SHERMAN DATE : AUG 2017
DESIGN ENGINEER OF RECORD: J. SHERMAN DATE : FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman
AE8326DDCE16488... 02-08-2019

2/8/2019
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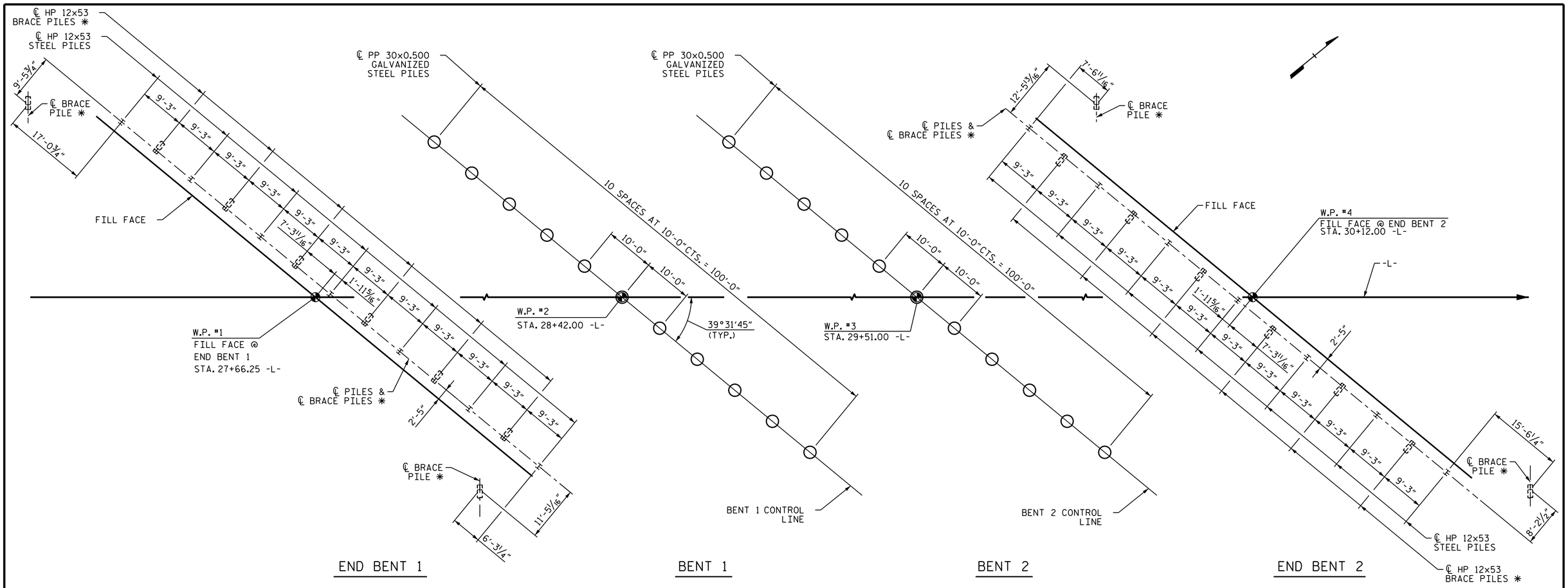

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO CENTERLINE OF PILES, AT BOTTOM OF CAP.
ORIENT PILES AS SHOWN.
* BATTER 3:12

NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.

PILES AT BENT NO. 1 AND BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 225 TONS PER PILE.

DRIVE PILES AT BENT NO. 1 AND BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 300 TONS PER PILE.

INSTALL PILES AT BENT NO. 1 AND BENT NO. 2 TO A TIP ELEVATION NO HIGHER THAN -35 FT.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 50 TO 150 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT NO. 1 AND BENT NO. 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING THE PRODUCTION PILES WITH THE PDA DURING DRIVING, RESTRIKING, OR REDRIVING IS REQUIRED AT END BENT NO. 1 OR END BENT NO. 2 AND BENT NO. 1 OR BENT NO. 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PIPE PILE PLATES ARE REQUIRED FOR STEEL PIPE PILES AT BENT NO. 1 AND BENT NO. 2. USE PIPE PILE PLATES WITH A DIAMETER EQUAL TO THE PIPE PILE DIAMETER. FOR STEEL PIPE PILE PLATES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

WHEN THE ENGINEER REQUIRES RESTRIKES OR REDRIVES, WAIT MINIMUM 24 HOURS AFTER STOPPING DRIVING AND BETWEEN RESTRIKES AND REDRIVES.

DESIGNED BY:	A. D'AIUTO	DATE :	AUG 2017
DRAWN BY:	A. D'AIUTO	DATE :	AUG 2017
CHECKED BY:	J. SHERMAN	DATE :	AUG 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326D0CE1B488... 02-08-2019

PROJECT NO. B-5302
BEAUFORT COUNTY
STATION: 28+85.96 -L-
15+43.96 -Y1-
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 17
BUSINESS (-L-) OVER NSR (-Y1-)
BETWEEN SR 1166 & NC 32

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

2/8/2019
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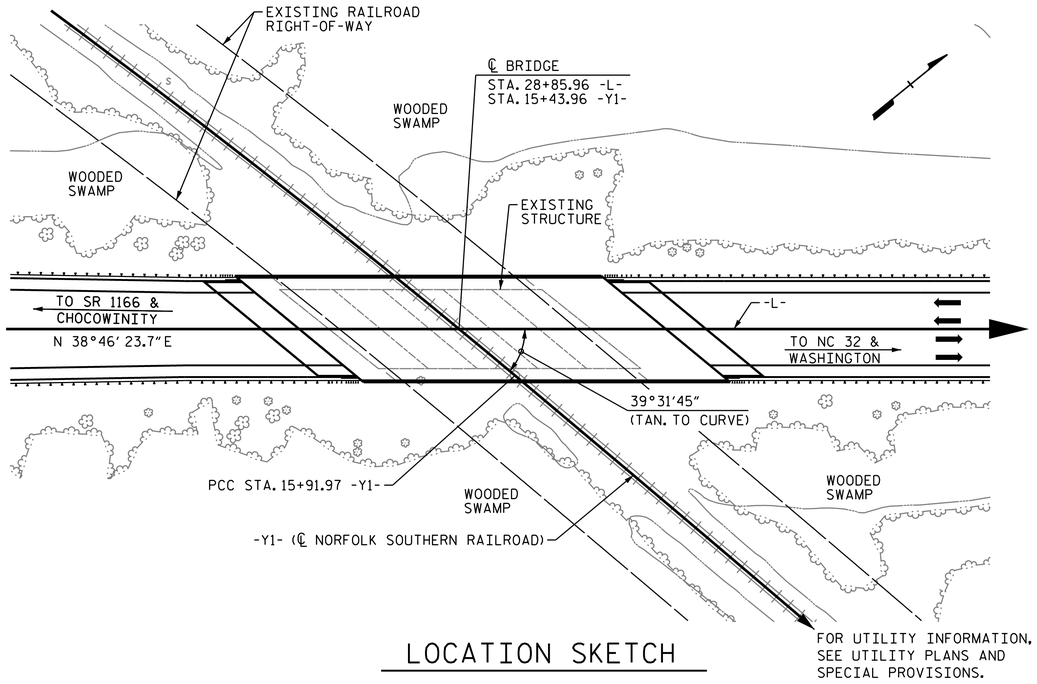
BM #1: RAILROAD SPIKE IN 16" GUM TREE, STA. 17+93.10 -L-, 220.35' RT., EL. 4.82



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-2 SHALL BE EXCAVATED FOR A DISTANCE OF 80 FT. EACH SIDE OF CENTERLINE OF ROADWAY 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.

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 DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE RAILROAD TRACK TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS AND REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR INTERIOR BENTS 1 AND 2, ONLY PARTIAL GALVANIZING OF THE PILES IS REQUIRED. SEE INTERIOR BENT SHEETS FOR REQUIRED GALVANIZING LENGTHS. PAYMENT FOR PARTIALLY GALVANIZED PILES WILL BE MADE UNDER THE CONTRACT UNIT PRICE FOR GALVANIZING STEEL PILES.

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

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.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

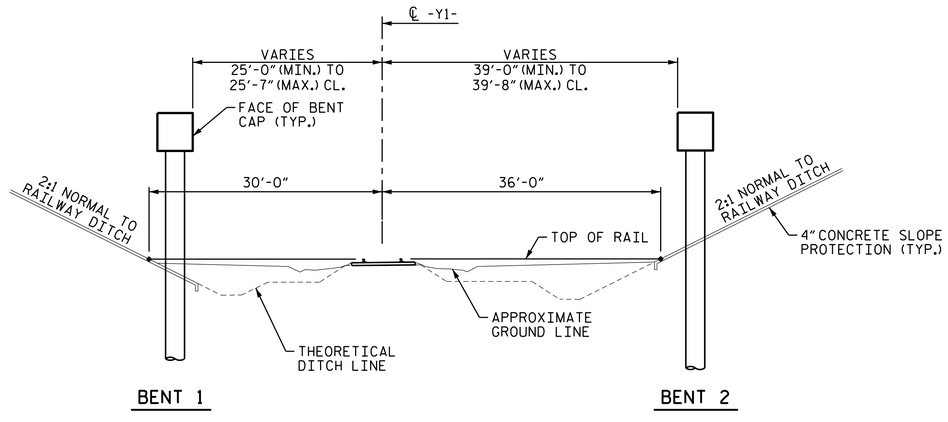
INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COST RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE "REMOVAL OF EXISTING STRUCTURE AT STATION 28+85.96 -L-. THE EXISTING STRUCTURE COLUMNS SHALL BE CUT OFF 2 FEET BELOW THE EXISTING GROUND LINE, AS DIRECTED BY THE ENGINEER.

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

THE EXISTING STRUCTURE CONSISTING OF 5 SPANS (1 @ 35.4', 1 @ 32.4', 1 @ 40.1', 1 @ 32.2', 1 @ 33.3') OF REINFORCED CONCRETE DECK AND I-BEAMS WITH A CLEAR ROADWAY WIDTH OF 52'-2" ON REINFORCED CONCRETE CAP AND CONCRETE PILES AND LOCATED AT THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXSTING STRUCTURE @ STA. 28+85.96 -L-	ASBESTOS ASSESSMENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR 12X53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR PP 30 X 0.500 GALVANIZED STEEL PILES	HP 12 X 53 STEEL PILES		PP 30 X 0.500 GALVANIZED STEEL PILES		PIPE PILE PLATES	PILE REDRIVES	VERTICAL CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS
	LUMP SUM	LUMP SUM	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	No.	LIN. FT.	EACH	EACH	No.	LIN. FT.	No.	LIN. FT.	EACH	EACH	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE		LUMP SUM			17,029	18,687		LUMP SUM		24	1,896.96									524.44		LUMP SUM	LUMP SUM
END BENT 1				LUMP SUM			124.5		16,048			15		15	1,200				15		724		
BENT 1							84.5		11,398				11			11	1,265	11	11				
BENT 2							84.3		11,342				11			11	1,265	11	11				
END BENT 2				LUMP SUM			123.2		16,012			15		15	1,200				15		616		
TOTAL	LUMP SUM	LUMP SUM	2	LUMP SUM	17,029	18,687	416.5	LUMP SUM	54,800	24	1,896.96	30	22	30	2,400	22	2,530	22	52	524.44	1,340	LUMP SUM	LUMP SUM



MINIMUM CLEARANCE - RAILROAD

(LOOKING BACK STATION ALONG RAILROAD)
SPAN LENGTH BASED ON THIS SECTION
DIMENSIONS RADIAL

SAMPLE BAR REPLACEMENT	
SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND fy = 60 ksi.

PROJECT NO. B-5302
BEAUFORT COUNTY
STATION: 28+85.96 -L-
15+43.96 -Y1-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 17
BUSINESS (-L-) OVER NSR (-Y1-)
BETWEEN SR 1166 & NC 32

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

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

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DESIGNED BY:	A. D'AIUTO	DATE :	AUG 2017
DRAWN BY:	A. D'AIUTO	DATE :	AUG 2017
CHECKED BY:	J. SHERMAN	DATE :	AUG 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

2/8/2019
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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	# CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM 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	1.16	--	1.75	0.81	1.56	B	EL/ER	53.38	0.98	1.24	B	EL/ER	X	0.80	0.81	1.16	B	EL/ER	53.38	1,2,3
		HL-93 (OPERATING)	N/A		1.66	--	1.35	0.81	2.03	B	EL/ER	53.38	1.01	1.66	B	I	X	N/A	--	--	--	--	--	1,2,3
		HS-20 (INVENTORY)	36.000	2	1.64	59.0	1.75	0.81	2.22	B	EL/ER	53.38	1.01	1.69	B	I	X	0.80	0.81	1.64	B	EL/ER	53.38	1,2,3
		HS-20 (OPERATING)	36.000		2.25	81.0	1.35	0.81	2.87	B	EL/ER	53.38	1.01	2.25	B	I	X	N/A	--	--	--	--	--	1,2,3
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.93	53.1	1.40	0.79	5.83	A	EL/ER	35.22	1.01	5.56	B	I	X	0.80	0.81	3.93	B	EL/ER	53.38	1,2,3
		SNGARBS2	20.000		2.83	56.6	1.40	0.79	4.36	A	EL/ER	35.22	1.01	3.85	B	I	X	0.80	0.81	2.83	B	EL/ER	53.38	1,2,3
		SNAGRIS2	22.000		2.64	58.1	1.40	0.79	4.13	A	EL/ER	35.22	1.01	3.54	B	I	X	0.80	0.81	2.64	B	EL/ER	53.38	1,2,3
		SNCOTTS3	27.250		1.95	53.1	1.40	0.79	2.90	A	EL/ER	35.22	1.01	2.68	B	I	X	0.80	0.81	1.95	B	EL/ER	53.38	1,2,3
		SNAGGRS4	34.925		1.59	55.5	1.40	0.79	2.43	A	EL/ER	35.22	1.01	2.15	B	I	X	0.80	0.81	1.59	B	EL/ER	53.38	1,2,3
		SNS5A	35.550		1.56	55.5	1.40	0.79	2.38	A	EL/ER	35.22	1.01	2.17	B	I	X	0.80	0.81	1.56	B	EL/ER	53.38	1,2,3
		SNS6A	39.950		1.42	56.7	1.40	0.79	2.18	A	EL/ER	35.22	1.01	1.95	B	I	X	0.80	0.81	1.42	B	EL/ER	53.38	1,2,3
		SNS7B	42.000		1.35	56.7	1.40	0.79	2.08	A	EL/ER	35.22	1.01	1.89	B	I	X	0.80	0.81	1.35	B	EL/ER	53.38	1,2,3
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.72	56.8	1.40	0.79	2.66	A	EL/ER	35.22	1.01	2.36	B	I	X	0.80	0.81	1.72	B	EL/ER	53.38	1,2,3
		TNT4A	33.075		1.73	57.2	1.40	0.79	2.67	A	EL/ER	35.22	1.01	2.31	B	I	X	0.80	0.81	1.73	B	EL/ER	53.38	1,2,3
		TNT6A	41.600		1.40	58.2	1.40	0.79	2.19	A	EL/ER	35.22	1.01	1.99	B	I	X	0.80	0.81	1.40	B	EL/ER	53.38	1,2,3
		TNT7A	42.000		1.40	58.8	1.40	0.79	2.20	A	EL/ER	35.22	1.01	1.96	B	I	X	0.80	0.81	1.40	B	EL/ER	53.38	1,2,3
		TNT7B	42.000		1.43	60.1	1.40	0.79	2.28	A	EL/ER	35.22	1.01	1.86	B	I	X	0.80	0.81	1.43	B	EL/ER	53.38	1,2,3
		TNAGRIT4	43.000		1.37	58.9	1.40	0.79	2.17	A	EL/ER	35.22	1.01	1.80	B	I	X	0.80	0.81	1.37	B	EL/ER	53.38	1,2,3
		TNAGT5A	45.000		1.30	58.5	1.40	0.79	2.04	A	EL/ER	35.22	1.01	1.76	B	I	X	0.80	0.81	1.30	B	EL/ER	53.38	1,2,3
		TNAGT5B	45.000	3	1.29	58.1	1.40	0.79	2.02	A	EL/ER	35.22	1.01	1.70	B	I	X	0.80	0.81	1.29	B	EL/ER	53.38	1,2,3

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1. GIRDERS DESIGNED AS SIMPLE SPANS FOR FLEXURE, GIRDERS DESIGNED AS SIMPLE-MADE-CONTINOUS (FOR LIVE LOAD AND SUPERIMPOSED DEAD LOAD) FOR SHEAR.
2. 3" AVERAGE HAUNCH ASSUMED FOR ALL SPANS, HAUNCH CONCRETE IS NOT INCLUDED IN SECTION PROPERTIES.
3. Ec, GIRDER SPAN A & C = 5,423 KSI (FINAL)
   Ec, GIRDER SPAN B = 5,909 KSI (FINAL)
   Ec, DECK = 3,834 KSI
   Eps = 28,500 KSI

 # 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

TABLE OF SECTION RESISTANCES (SPAN A)

		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
INTERIOR GIRDER (I)	ΦVn (KIPS)	580	548	293	290	291	292	292	295	302	367	811
	ΦMn (KIP-FT)	--	4788	5695	5695	5695	5695	5695	5695	5695	4788	--
EXTERIOR GIRDER (EL, ER)	ΦVn (KIPS)	577	545	291	283	290	290	290	294	301	385	807
	ΦMn (KIP-FT)	--	4783	5668	5668	5668	5668	5668	5668	5668	4783	--

TABLE OF SECTION RESISTANCES (SPAN B)

		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
INTERIOR GIRDER (I)	ΦVn (KIPS)	649	371	297	290	280	287	280	290	297	371	649
	ΦMn (KIP-FT)	--	9346	11121	11584	11314	11314	11314	11584	11121	9346	--
EXTERIOR GIRDER (EL, ER)	ΦVn (KIPS)	648	367	291	264	219	227	219	264	291	367	648
	ΦMn (KIP-FT)	--	9325	11025	11470	11207	11207	11207	11470	11025	9325	--

TABLE OF SECTION RESISTANCES (SPAN C)

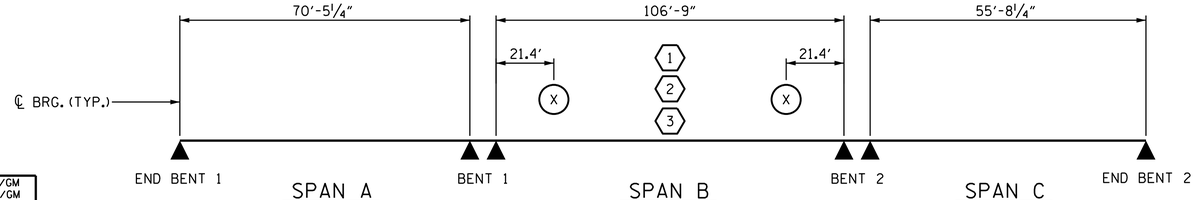
		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
INTERIOR GIRDER (I)	ΦVn (KIPS)	833	400	365	304	301	302	300	300	360	551	596
	ΦMn (KIP-FT)	--	4437	5636	5695	5695	5695	5695	5695	5636	4437	--
EXTERIOR GIRDER (EL, ER)	ΦVn (KIPS)	832	413	364	303	301	301	299	299	360	550	595
	ΦMn (KIP-FT)	--	4433	5621	5668	5668	5668	5668	5668	5621	4433	--

SECTION DATA (SPAN A & C):

INTERIOR COMPOSITE Ixx = 654,973 IN^4
INTERIOR COMPOSITE y_b = 39.56 IN.
EXTERIOR COMPOSITE Ixx = 632,554 IN^4
EXTERIOR COMPOSITE y_b = 38.72 IN.
COMPOSITE SECTION PROPERTIES ARE TRANSFORMED TO EQUIVALENT GIRDER CONCRETE USING Ec = 5,423 KSI
STRAND AREA NOT INCLUDED IN SECTION PROPERTIES.
y_b MEASURED FROM BOTTOM OF GIRDER

SECTION DATA (SPAN B):

INTERIOR COMPOSITE Ixx = 636,115 IN^4
INTERIOR COMPOSITE y_b = 38.85 IN.
EXTERIOR COMPOSITE Ixx = 614,023 IN^4
EXTERIOR COMPOSITE y_b = 38.03 IN.
COMPOSITE SECTION PROPERTIES ARE TRANSFORMED TO EQUIVALENT GIRDER CONCRETE USING Ec = 5,909 KSI
STRAND AREA NOT INCLUDED IN SECTION PROPERTIES.
y_b MEASURED FROM BOTTOM OF GIRDER



LRFR SUMMARY

PROJECT NO. B-5302
BEAUFORT COUNTY
STATION: 28+85.96 -L-

DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08

REV.		
11/12/08RR	MAA/GM	
10/1/11	MAA/GM	
12/17	MAA/THC	

DESIGNED BY:	A. D'AIUTO	DATE : AUG 2017
DRAWN BY:	M.J. OSTRISHKO	DATE : AUG 2017
CHECKED BY:	J. SHERMAN	DATE : SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE : FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN
DocuSigned by: Jacob P. Sherman
AE8326DDCE18488...
02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			43

STD. NO. LRFR1

2/8/2019
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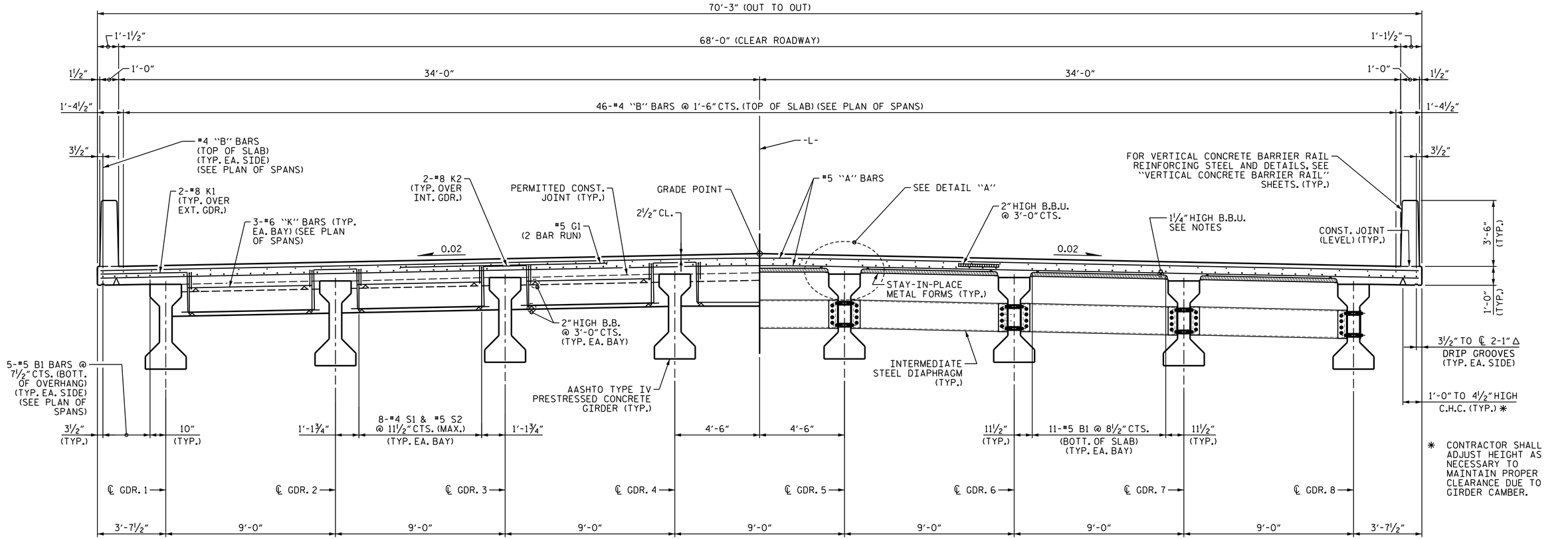


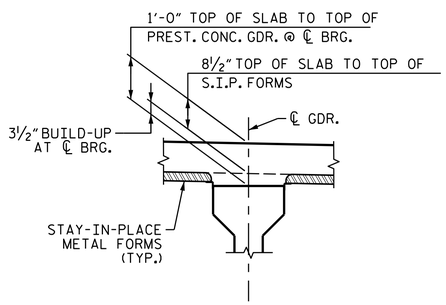
* CONTRACTOR SHALL ADJUST HEIGHT AS NECESSARY TO MAINTAIN PROPER CLEARANCE DUE TO GIRDER CAMBER.

HALF SECTION AT END BENT

HALF SECTION AT INTERMEDIATE DIAPHRAGM

TYPICAL SECTION

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



DETAIL "A"

(TYPICAL EACH GIRDER)
(SPANS A, B AND C)

NOTES

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 3'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

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

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

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

PROJECT NO. B-5302
BEAUFORT COUNTY
STATION: 28+85.96 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			43

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DocuSigned by: Jacob P. Sherman AE8326DDCE18488...
02-08-2019

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1001 MOREHEAD SQUARE DRIVE
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TEL: 1.704.342.5401
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DESIGNED BY:	A. D'AIUTO	DATE :	JUL 2017
DRAWN BY:	M.J. OSTRISHKO	DATE :	JUL 2017
CHECKED BY:	J. SHERMAN	DATE :	AUG 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

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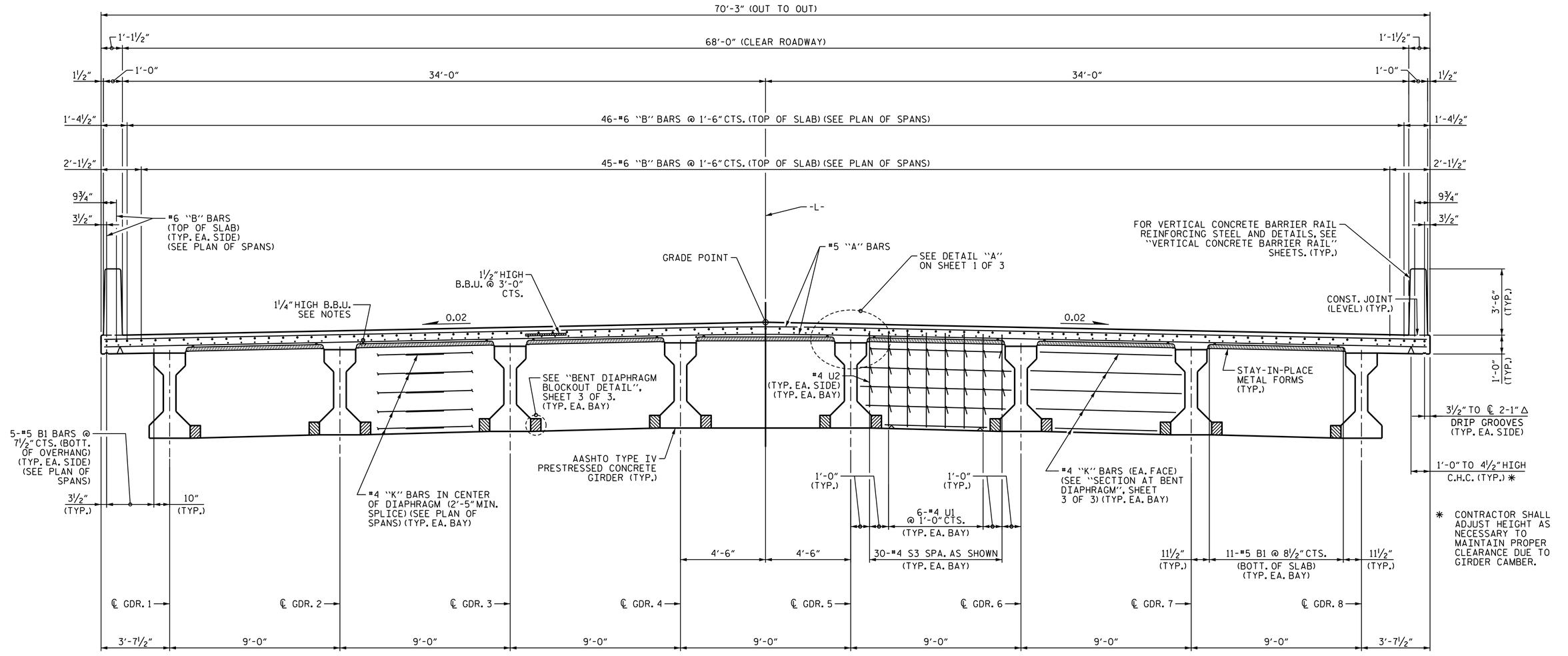

* CONTRACTOR SHALL ADJUST HEIGHT AS NECESSARY TO MAINTAIN PROPER CLEARANCE DUE TO GIRDER CAMBER.

TYPICAL SECTION AT BENT DIAPHRAGM

FOR NOTES, SEE SHEET 1 OF 3.

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

DESIGNED BY:	A. D'AIUTO	DATE :	JUL 2017
DRAWN BY:	M.J. OSTRISHKO	DATE :	JUL 2017
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02-08-2019

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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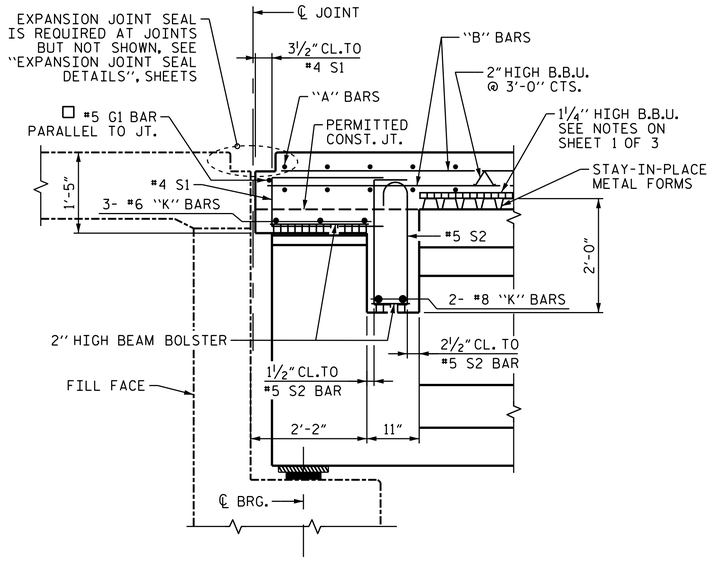
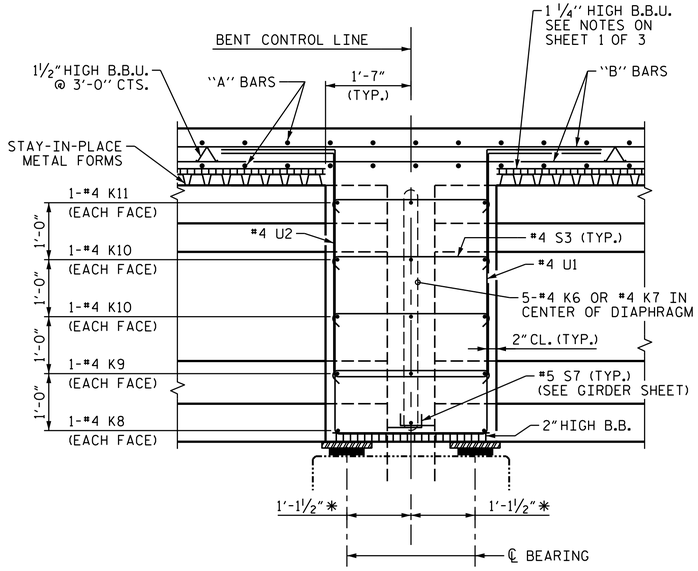


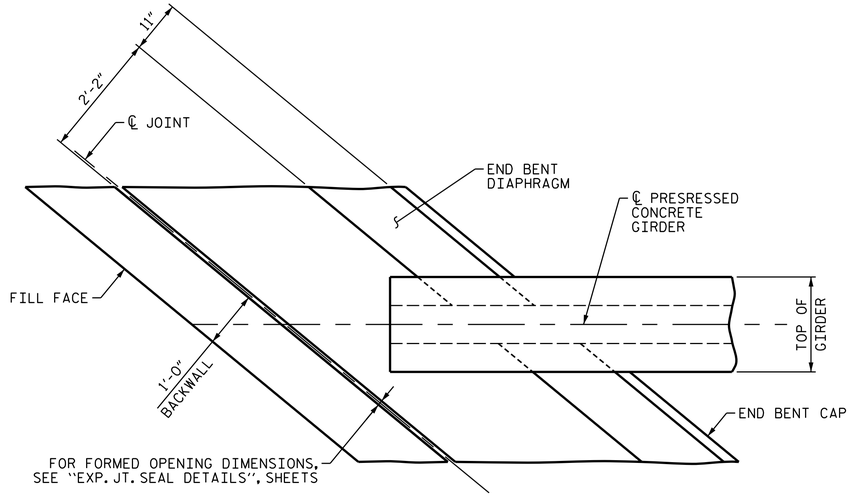
SECTION AT END BENT DIAPHRAGM

□ "G" BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.
#4 J1 BAR NOT SHOWN



SECTION AT BENT DIAPHRAGM

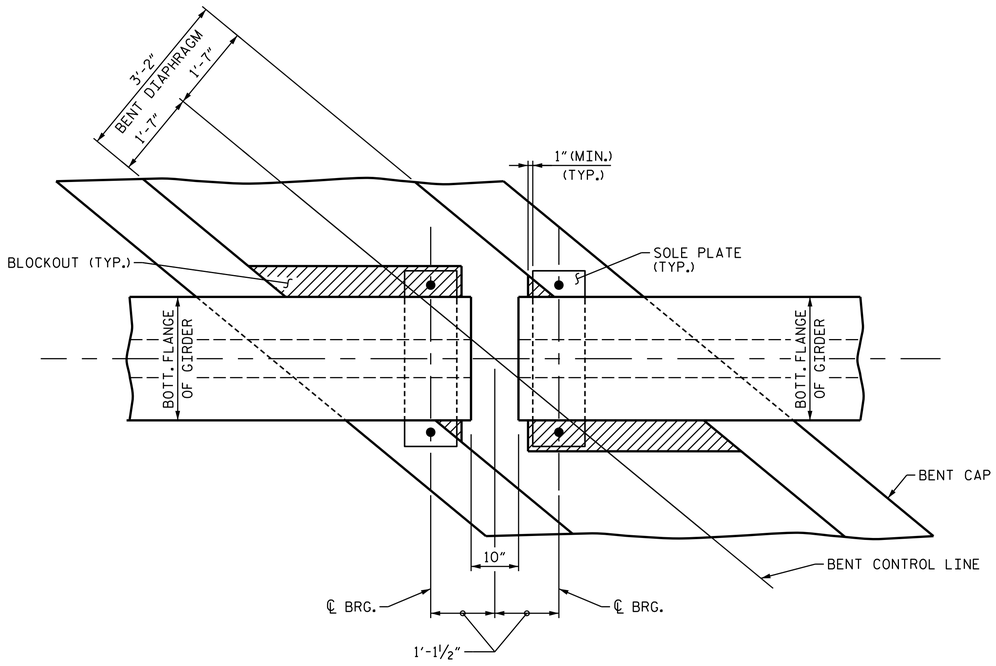
* MEASURED ALONG ℄ GIRDER



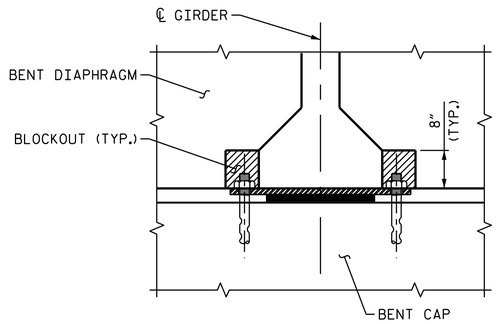
PLAN

END BENT DIAPHRAGM

END BENT 1 SHOWN, END BENT 2 SIMILAR



PLAN



SECTION

BENT DIAPHRAGM BLOCK-OUT DETAIL

PROJECT NO. B-5302
BEAUFORT COUNTY
STATION: 28+85.96 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN
DocuSigned by: Jacob P. Sherman AE832E0DCE18488...
02-08-2019

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1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
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DESIGNED BY:	A. D'AIUTO	DATE :	JUL 2017
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CHECKED BY:	J. SHERMAN	DATE :	AUG 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

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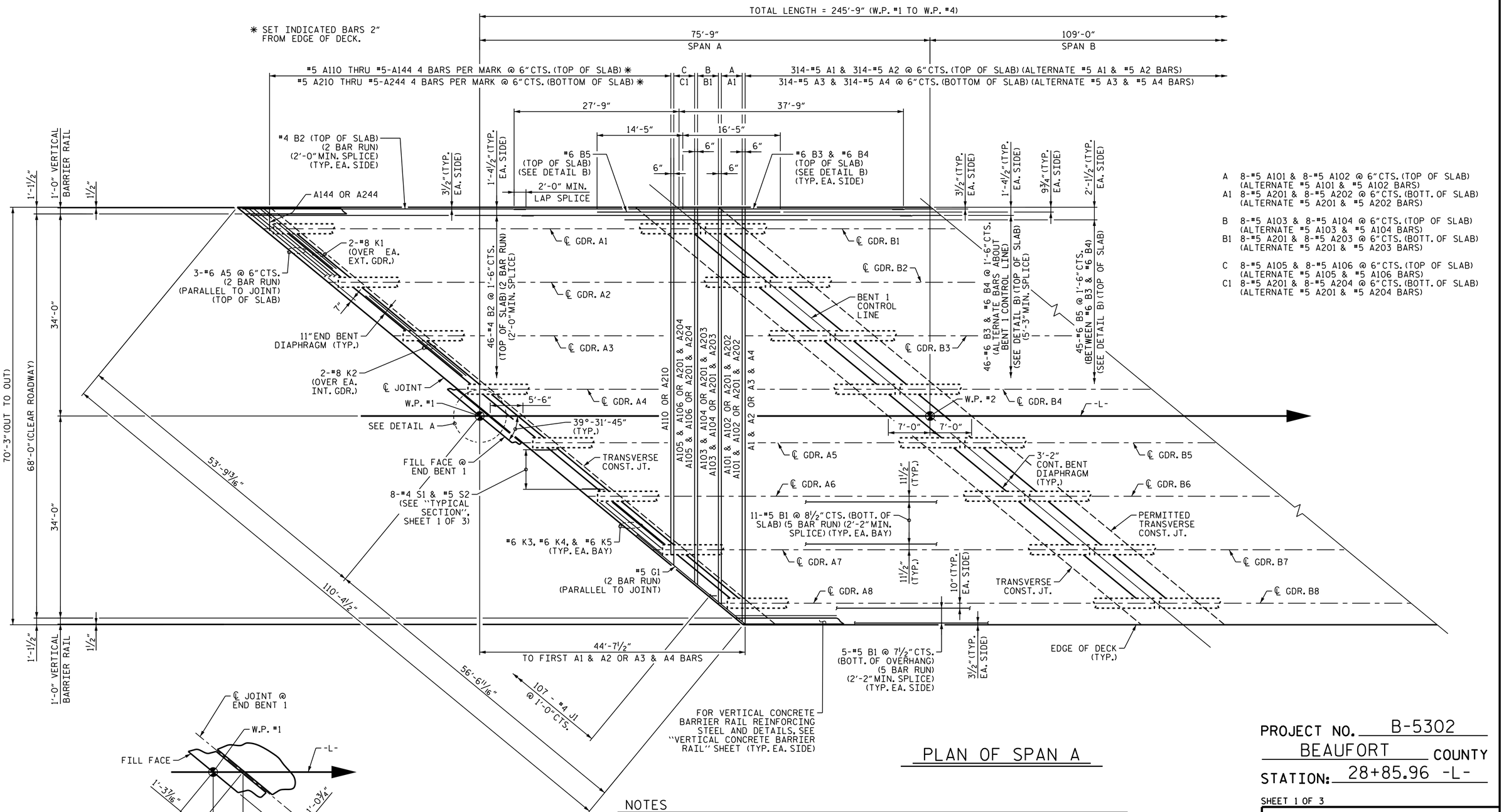
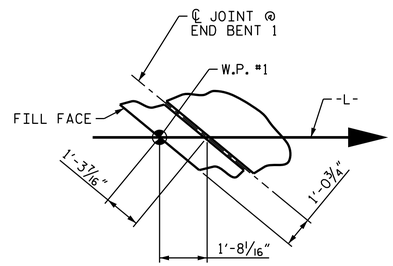


A 8-#5 A101 & 8-#5 A102 @ 6"CTS. (TOP OF SLAB) (ALTERNATE #5 A101 & #5 A102 BARS)
A1 8-#5 A201 & 8-#5 A202 @ 6"CTS. (BOTT. OF SLAB) (ALTERNATE #5 A201 & #5 A202 BARS)

B 8-#5 A103 & 8-#5 A104 @ 6"CTS. (TOP OF SLAB) (ALTERNATE #5 A103 & #5 A104 BARS)
B1 8-#5 A201 & 8-#5 A203 @ 6"CTS. (BOTT. OF SLAB) (ALTERNATE #5 A201 & #5 A203 BARS)

C 8-#5 A105 & 8-#5 A106 @ 6"CTS. (TOP OF SLAB) (ALTERNATE #5 A105 & #5 A106 BARS)
C1 8-#5 A201 & 8-#5 A204 @ 6"CTS. (BOTT. OF SLAB) (ALTERNATE #5 A201 & #5 A204 BARS)

PLAN OF SPAN A



DETAIL A

END BENT 1 SHOWN, END BENT 2 SIMILAR.

NOTES

FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEETS.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "POURING SEQUENCE" SHEET.

#5 G1 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.

FOR REINFORCING IN BENT DIAPHRAGM AT BENT 1 CONTROL LINE, SEE "PLAN OF SPAN" SHEET 2 OF 3.

FOR DETAIL B, SEE "PLAN OF SPAN" SHEET, 2 OF 3.

PROJECT NO. B-5302
BEAUFORT COUNTY
STATION: 28+85.96 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN
SPAN A

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN
DocuSigned by: Jacob P. Sherman AE832EDDCE18488... 02-08-2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

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

SHEET NO. S-9
TOTAL SHEETS 43

DESIGNED BY:	A. D'AIUTO	DATE : JULY 2017
DRAWN BY:	M.J. OSTRISHKO	DATE : AUG 2017
CHECKED BY:	J. SHERMAN	DATE : SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE : FEB 2019

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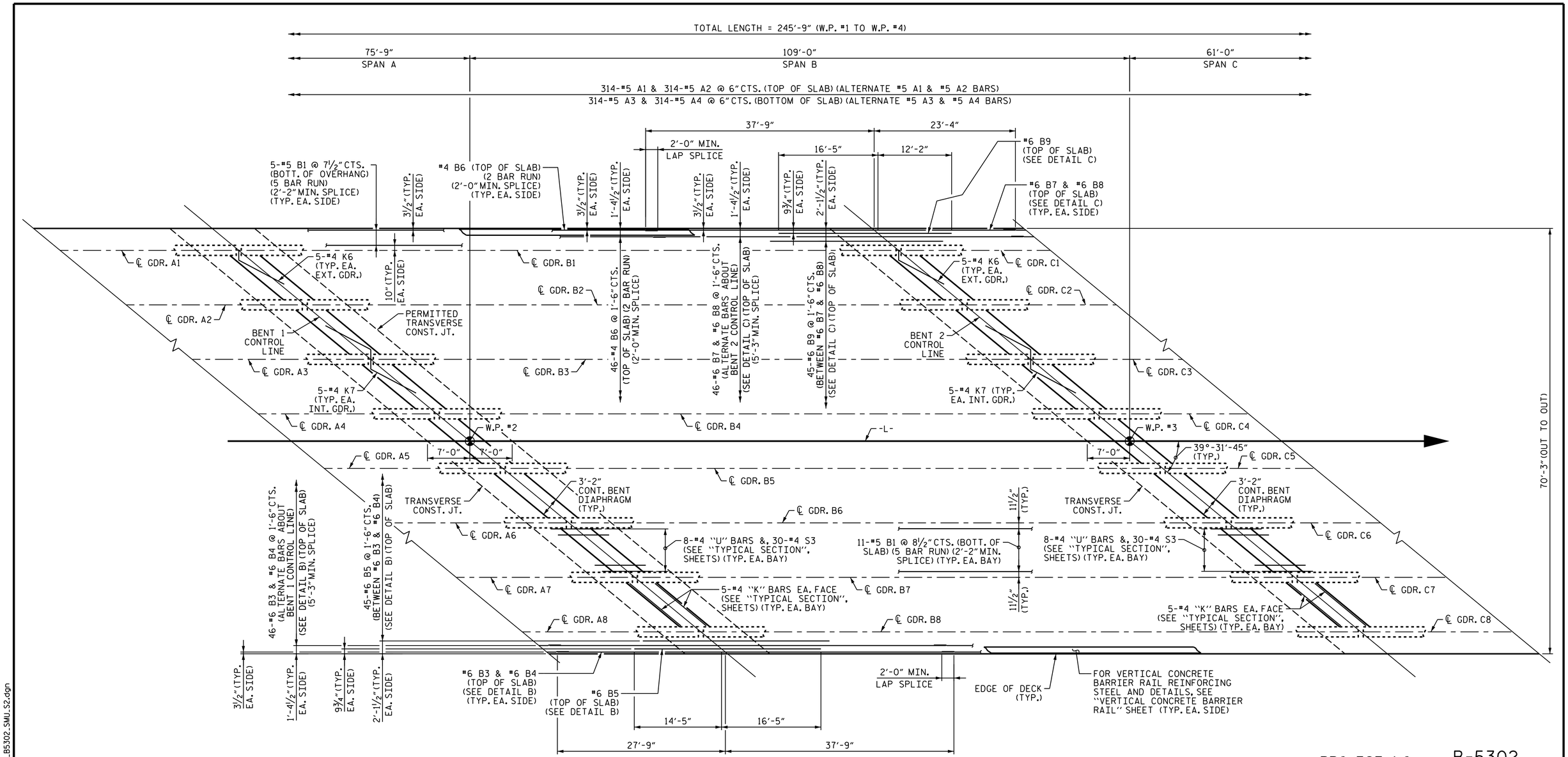
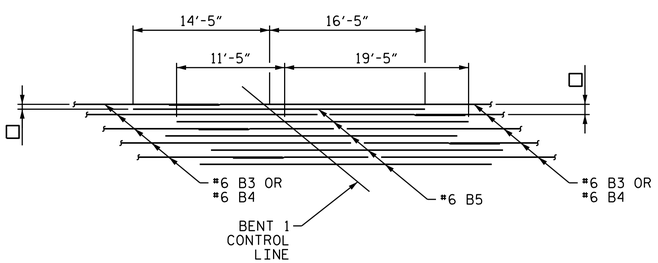


PLAN OF SPAN B



DETAIL B

TOP OF SLAB
☐ FOR SPACING OF "B" BARS REFER TO "PLAN OF SPAN A", "PLAN OF SPAN B" AND PLAN OF SPAN C"

NOTES

FOR ADDITIONAL NOTES, SEE "PLAN OF SPAN" SHEET 1 OF 3.

FOR DETAIL C, SEE "PLAN OF SPAN" SHEET 3 OF 3.

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 2 OF 3

DESIGNED BY:	A. D'AIUTO	DATE :	JUL 2017
DRAWN BY:	M.J. OSTRISHKO	DATE :	AUG 2017
CHECKED BY:	J. SHERMAN	DATE :	SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031988 JACOB P. SHERMAN

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN
SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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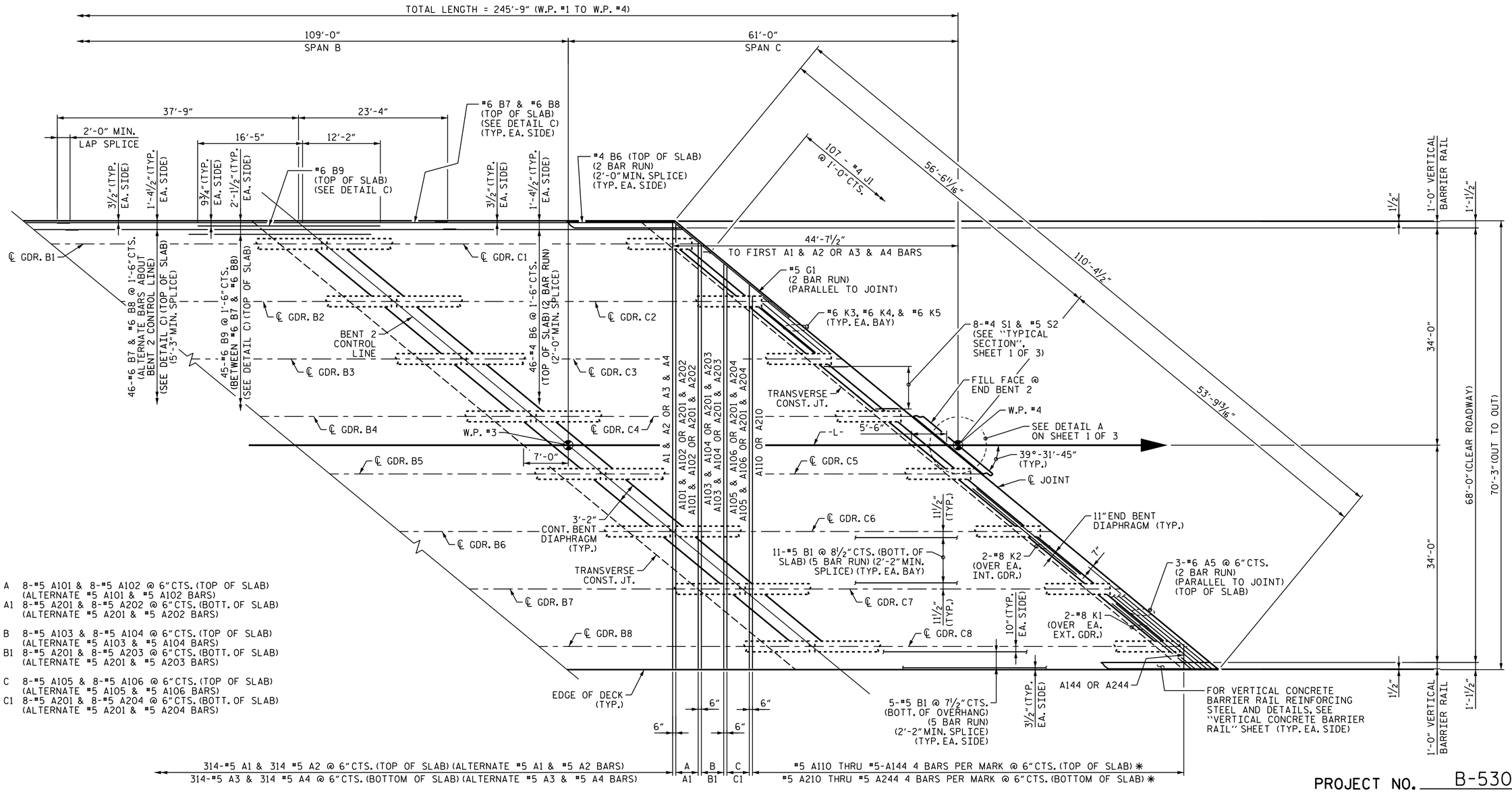


A 8-#5 A101 & 8-#5 A102 @ 6" CTS. (TOP OF SLAB)
(ALTERNATE #5 A101 & #5 A102 BARS)
A1 8-#5 A201 & 8-#5 A202 @ 6" CTS. (BOTT. OF SLAB)
(ALTERNATE #5 A201 & #5 A202 BARS)

B 8-#5 A103 & 8-#5 A104 @ 6" CTS. (TOP OF SLAB)
(ALTERNATE #5 A103 & #5 A104 BARS)
B1 8-#5 A201 & 8-#5 A203 @ 6" CTS. (BOTT. OF SLAB)
(ALTERNATE #5 A201 & #5 A203 BARS)

C 8-#5 A105 & 8-#5 A106 @ 6" CTS. (TOP OF SLAB)
(ALTERNATE #5 A105 & #5 A106 BARS)
C1 8-#5 A201 & 8-#5 A204 @ 6" CTS. (BOTT. OF SLAB)
(ALTERNATE #5 A201 & #5 A204 BARS)

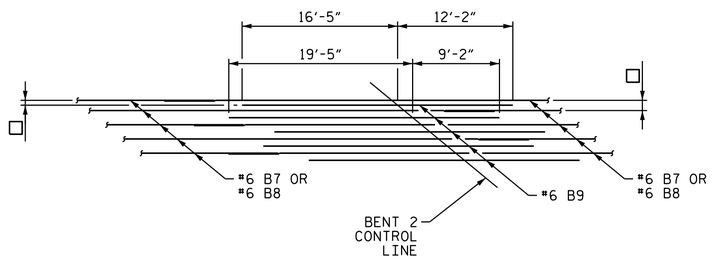
314-#5 A1 & 314 #5 A2 @ 6" CTS. (TOP OF SLAB) (ALTERNATE #5 A1 & #5 A2 BARS)
314-#5 A3 & 314 #5 A4 @ 6" CTS. (BOTTOM OF SLAB) (ALTERNATE #5 A3 & #5 A4 BARS)

A B C
A1 B1 C1

#5 A110 THRU #5-A144 4 BARS PER MARK @ 6" CTS. (TOP OF SLAB) *
#5 A210 THRU #5 A244 4 BARS PER MARK @ 6" CTS. (BOTTOM OF SLAB) *

* SET INDICATED BARS 2" FROM EDGE OF DECK.

PLAN OF SPAN C



DETAIL C

TOP OF SLAB
☐ FOR SPACING OF "B" BARS REFER TO "PLAN OF SPAN A", "PLAN OF SPAN B" AND PLAN OF SPAN C"

NOTES

FOR ADDITIONAL NOTES, SEE "PLAN OF SPAN" SHEET 1 OF 3.

FOR REINFORCING IN BENT DIAPHRAGM AT BENT 2 CONTROL LINE, SEE "PLAN OF SPAN" SHEET 2 OF 3.

PROJECT NO. B-5302
BEAUFORT COUNTY
STATION: 28+85.96 -L-
SHEET 3 OF 3

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

DESIGNED BY:	A. D'AIUTO — DATE: JUL 2017
DRAWN BY:	M.J. OSTRISHKO — DATE: AUG 2017
CHECKED BY:	J. SHERMAN — DATE: SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN — DATE: FEB 2019

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN
DocuSigned by: Jacob P. Sherman AE8326DDCE18488...
02-08-2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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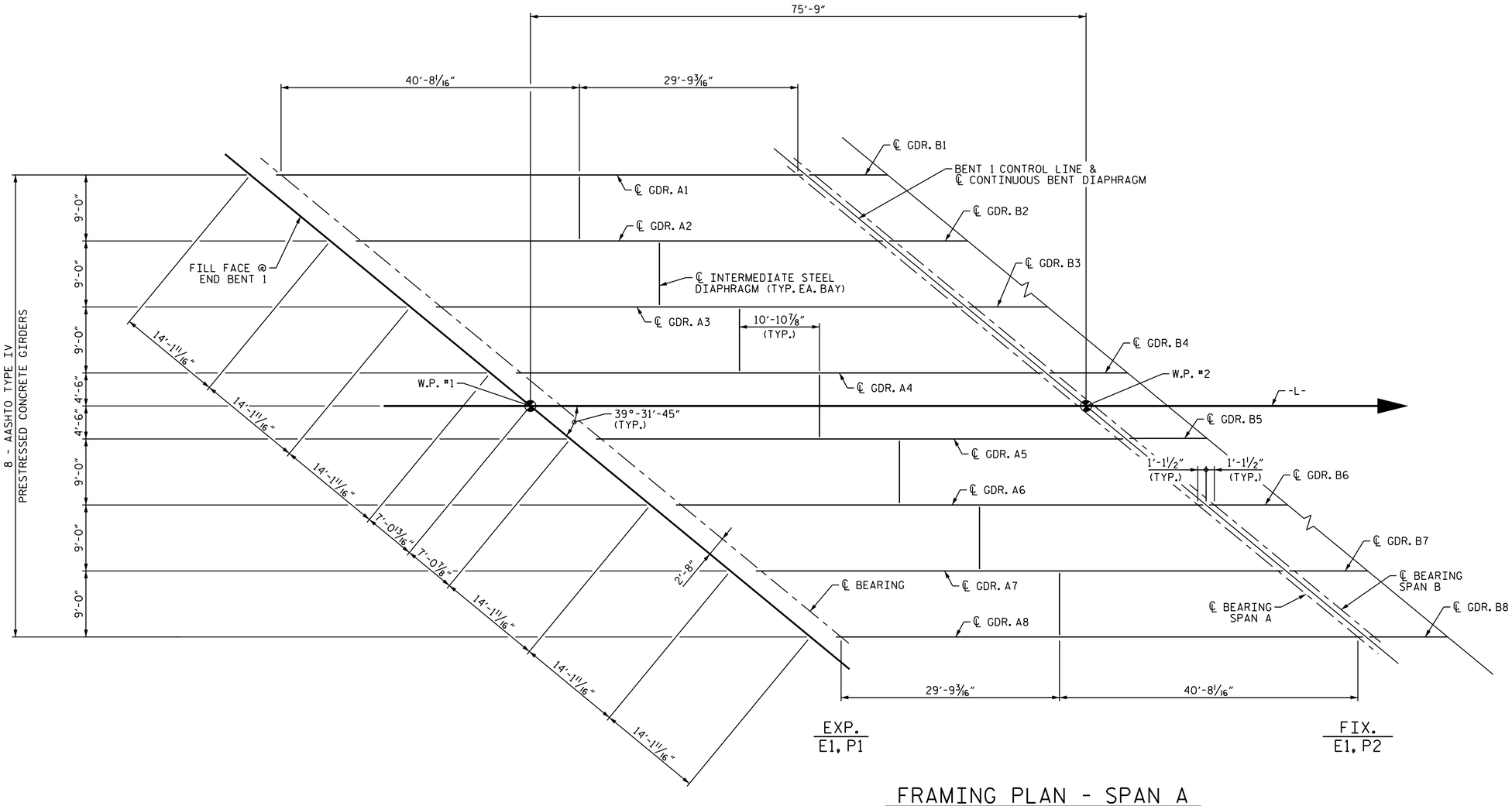


FRAMING PLAN - SPAN A

NOTES

ALL DIMENSIONS ARE HORIZONTAL.

CONTRACTOR IS RESPONSIBLE FOR FURNISHING ANY NECESSARY TEMPORARY BRACING FOR GIRDERS DURING ERECTION PRIOR TO PLACING DIAPHRAGMS AND DECK.

END BENTS AND BENTS ARE PARALLEL.

ALL GIRDERS PARALLEL TO -L-.

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPAN A

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031988 JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

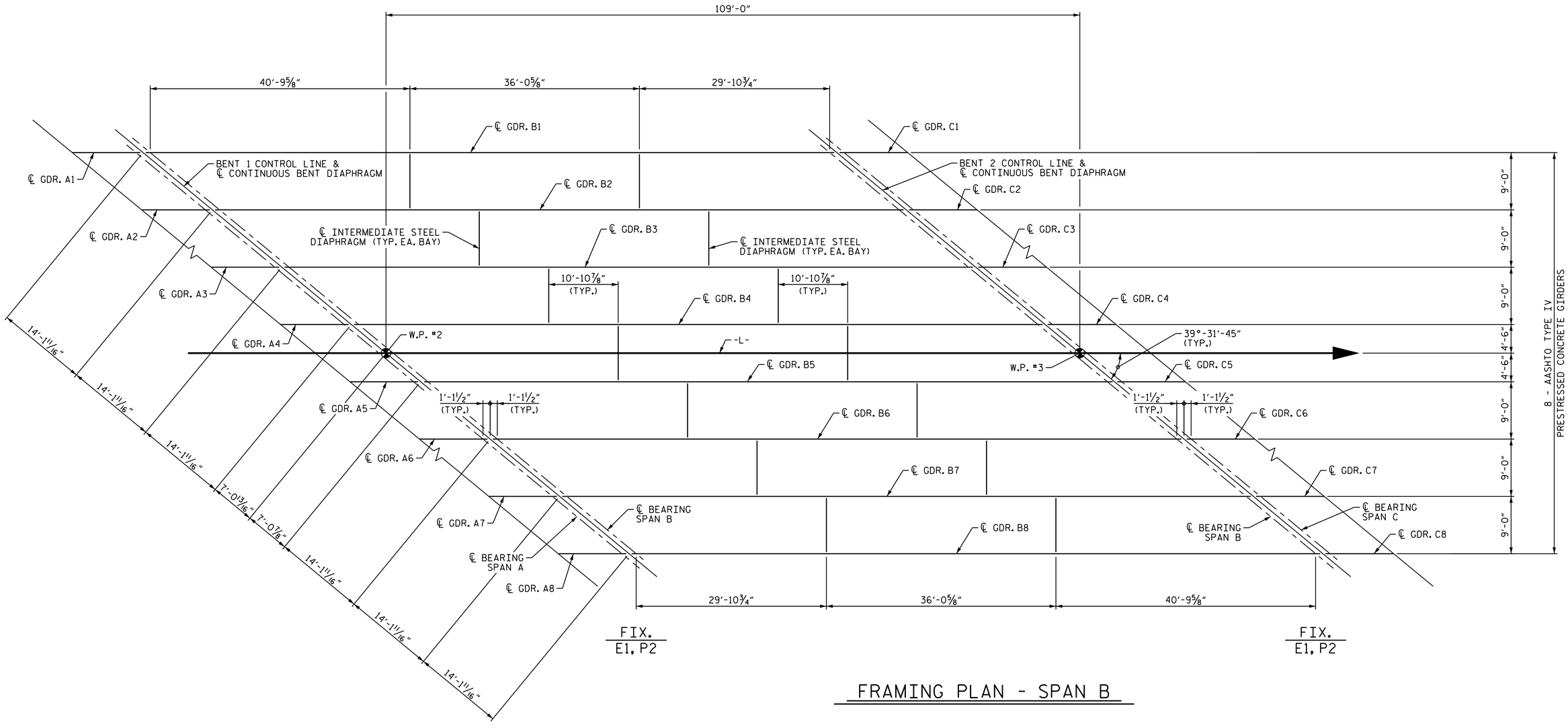
WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401

LICENSE NO. F-0165

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			43

DESIGNED BY:	A. D'AIUTO	DATE : AUG 2017
DRAWN BY:	M.J. OSTRISHKO	DATE : AUG 2017
CHECKED BY:	J. SHERMAN	DATE : SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE : FEB 2019

2/8/2019
c:\projectwise\pb\projectwiseint\shermanjp\d0225431\401.023.B5302.SMU.FP01.dgn



FRAMING PLAN - SPAN B

NOTES

FOR NOTES SEE "FRAMING PLAN", SHEET 1 OF 3.

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			43

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488...

02-08-2019

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LICENSE NO. F-0165

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DRAWN BY:	M.J. OSTRISHKO	DATE : AUG 2017
CHECKED BY:	J. SHERMAN	DATE : SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE : FEB 2019

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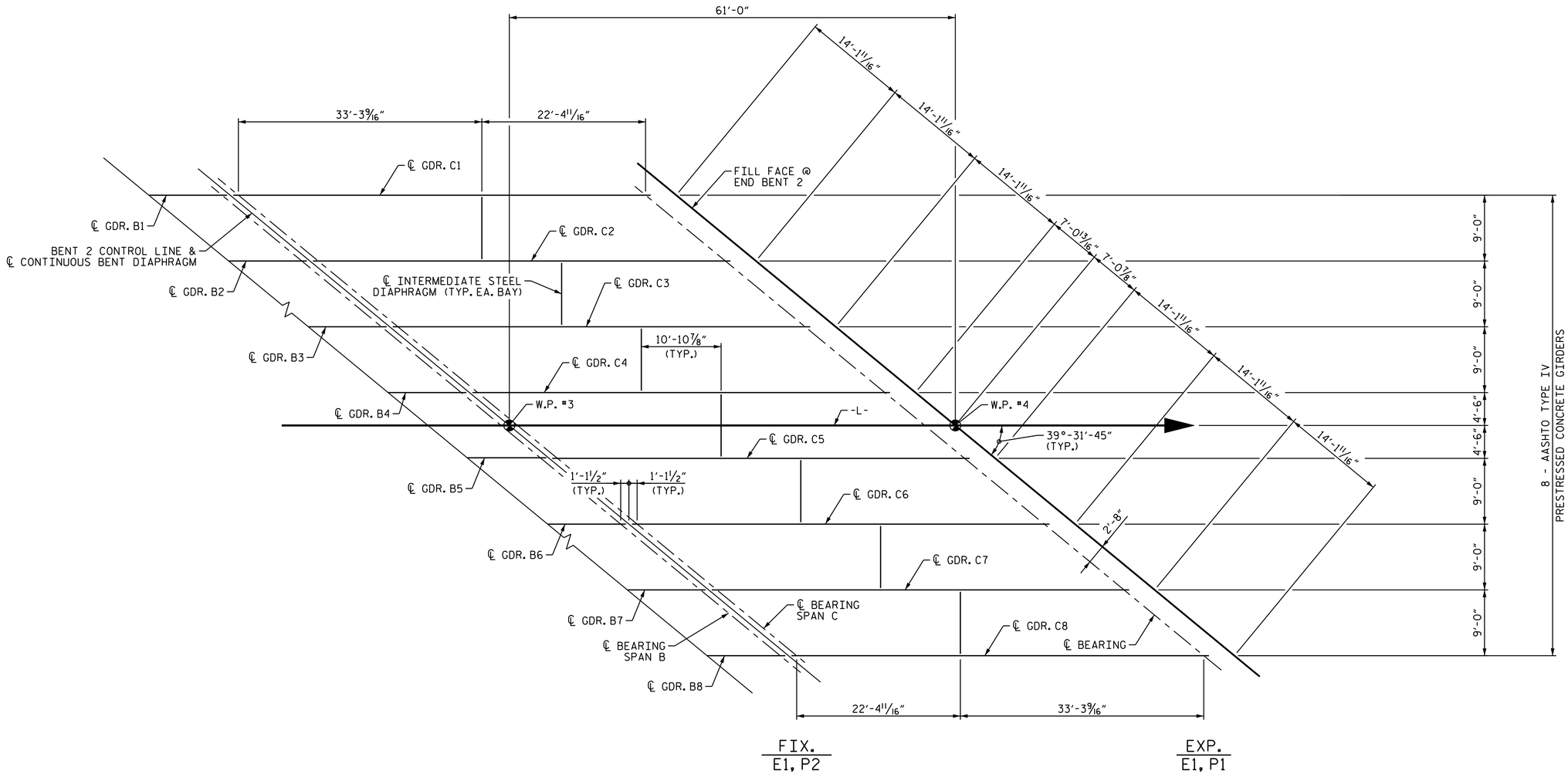

FIX.
E1, P2

EXP.
E1, P1

FRAMING PLAN - SPAN C

NOTES

FOR NOTES SEE "FRAMING PLAN", SHEET 1 OF 3.

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPAN C

DESIGNED BY:	A. D'AIUTO	DATE :	AUG 2017		
DRAWN BY:	M.J. OSTRISHKO	DATE :	AUG 2017		
CHECKED BY:	J. SHERMAN	DATE :	SEP 2017		
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019		

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE832EDDCE18488... 02-08-2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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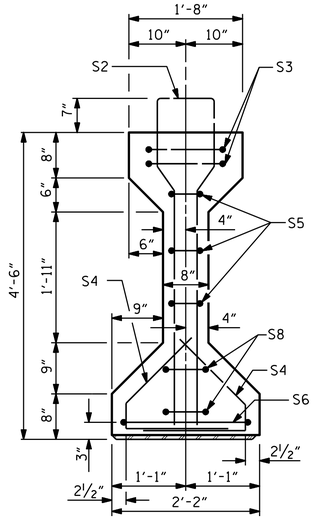
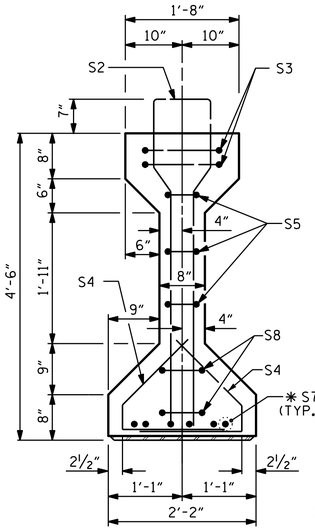
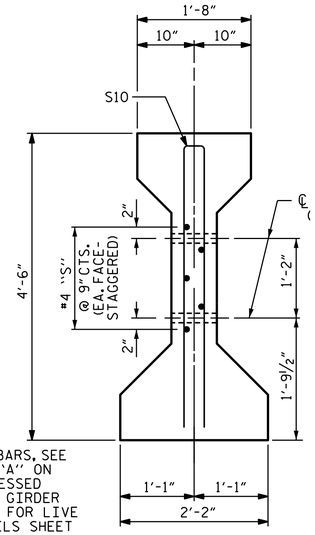


SECTION A-A



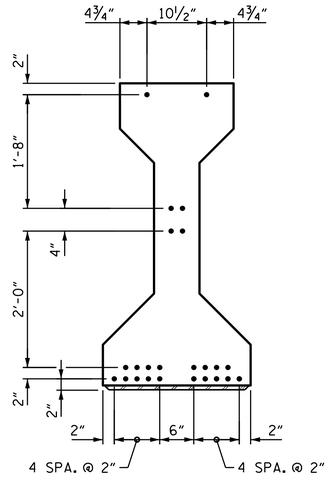
SECTION B-B



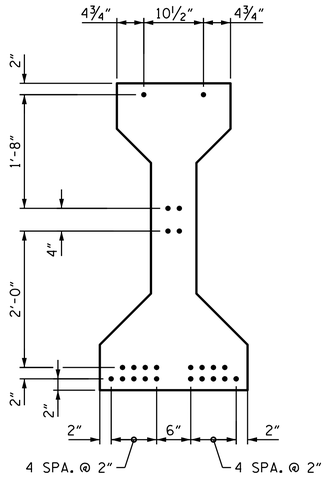
✱FOR S7 BARS, SEE DETAIL "A" ON PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION C-C

(S1 BARS NOT SHOWN)
SEE SHEET S-18 FOR SECTION CUT

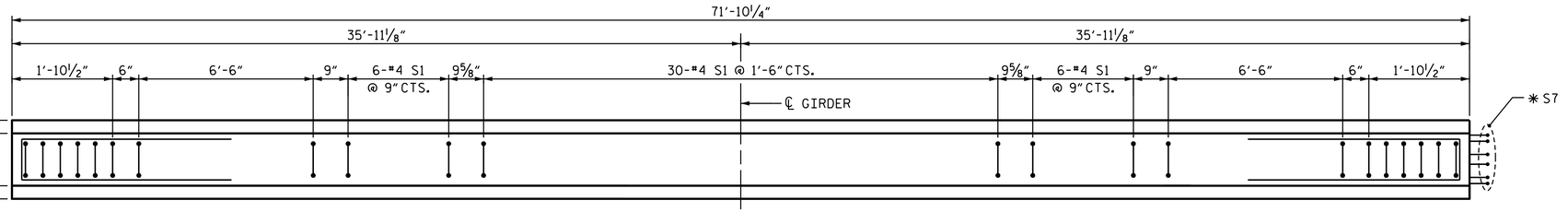


AT END OF GIRDER

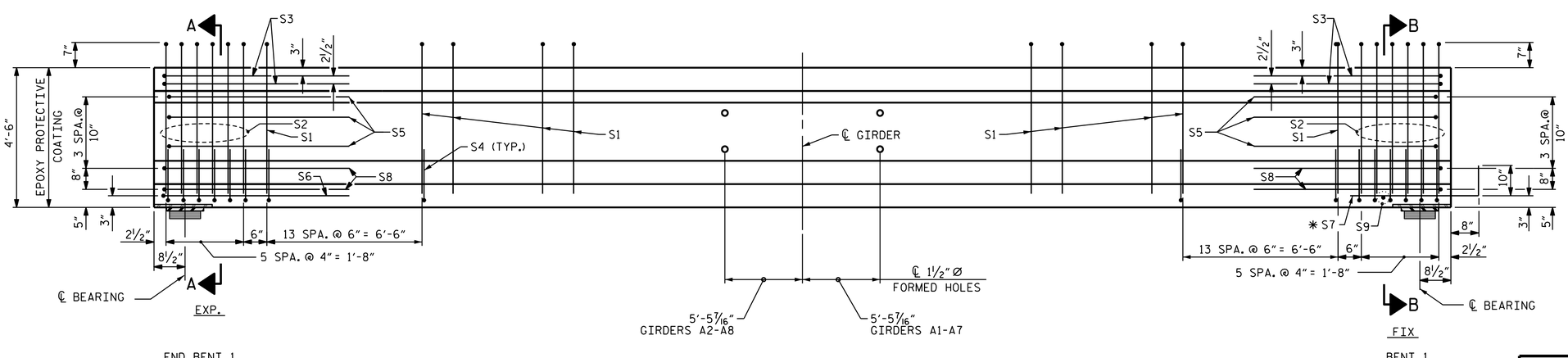


AT ℄ OF GIRDER

0.6"Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION ON SHEET S-18 FOR ADDITIONAL "S" BARS)

0.6"Ø L. R. GRADE 270 STRANDS

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

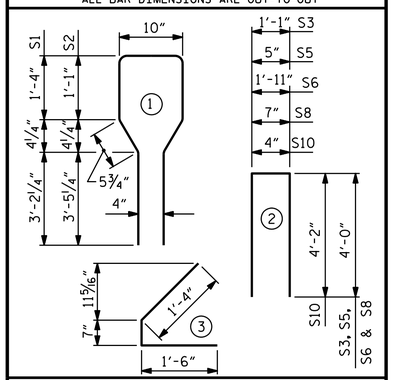
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	70	#4	1	10'-10"	507
	S2	12	#6	1	10'-10"	195
	S3	4	#4	2	9'-1"	24
	S4	80	#4	3	3'-5"	183
	S5	6	#4	2	8'-5"	34
	S6	1	#4	2	9'-11"	7
	✱S7	6	#5	STR	3'-8"	23
	S8	4	#4	2	8'-7"	23
	S9	1	#3	STR	1'-10"	1
EXTERIOR GDR.	S10	2	#5	2	8'-8"	18
INTERIOR GDR.	S10	4	#5	2	8'-8"	36
EXTERIOR GDR.	S11	5	#4	STR	7'-0"	23
INTERIOR GDR.	S12	5	#4	STR	17'-11"	60

✱NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	8,000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
EXTERIOR GIRDER	1,038	14.58	24
INTERIOR GIRDER	1,093	14.58	24

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	71.85'	574.80'

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			43

DRAWN BY : ELR 8/91	REV. 10/1/11	MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15	MAA/TMC
	REV. 12/17	MAA/THC
DESIGNED BY: J. SMITH	DATE : AUG 2017	
DRAWN BY: M.J. OSTRISHKO	DATE : AUG 2017	
CHECKED BY: J. SHERMAN	DATE : SEP 2017	
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DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

STD. NO. PCG6

2/8/2019
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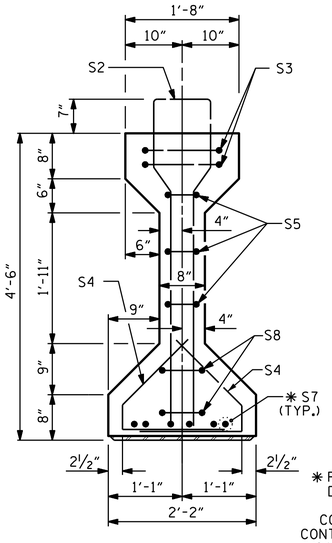
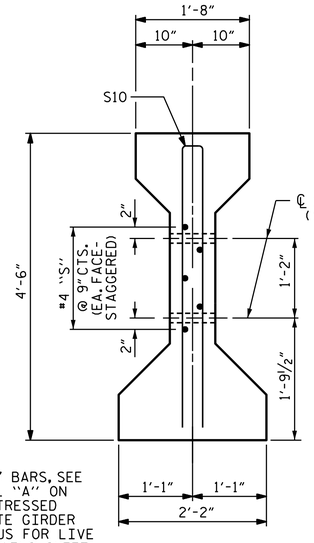


SECTION B-B

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

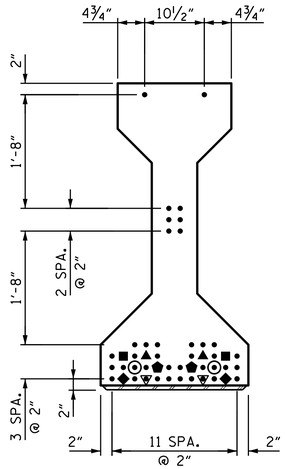


SECTION C-C

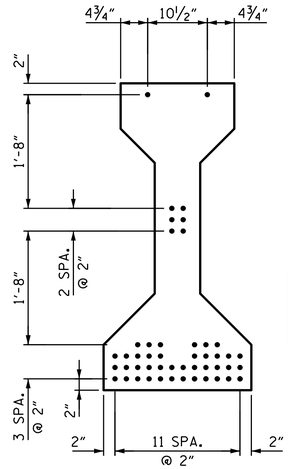
(S1 BARS NOT SHOWN)
SEE SHEET S-18 FOR SECTION CUT

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER.
- ■ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER.
- ⬟ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER.
- ⊙ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER.
- ▽ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER.
- ◆ STRANDS DEBONDED FOR 22'-0" FROM END OF GIRDER.

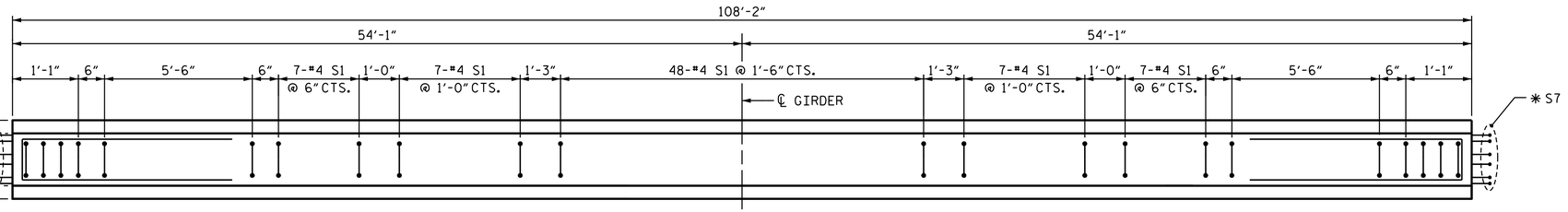


AT END OF GIRDER

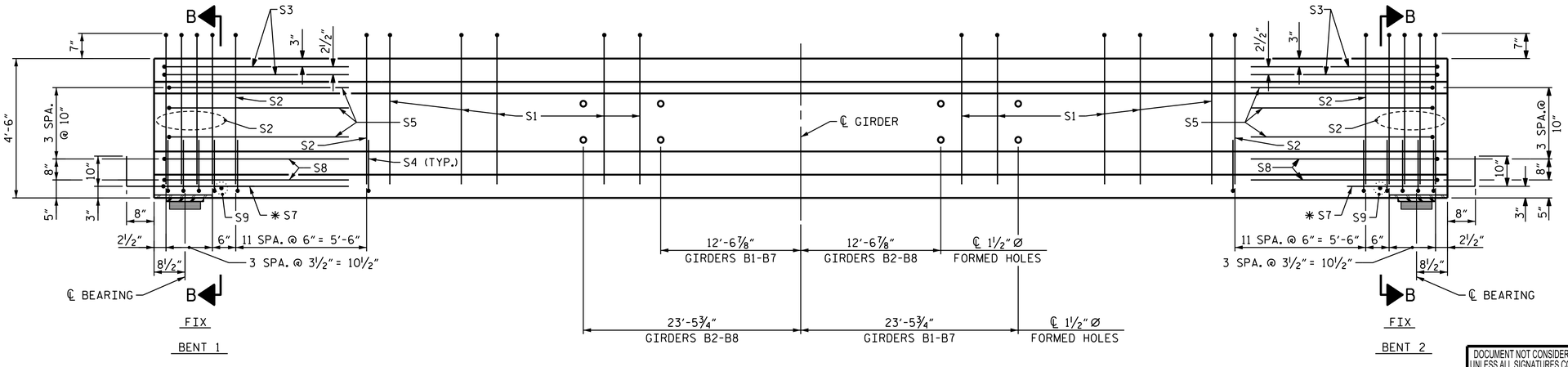


AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION ON SHEET S-18 FOR ADDITIONAL "S" BARS)

0.6" Ø L. R. GRADE 270 STRANDS

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

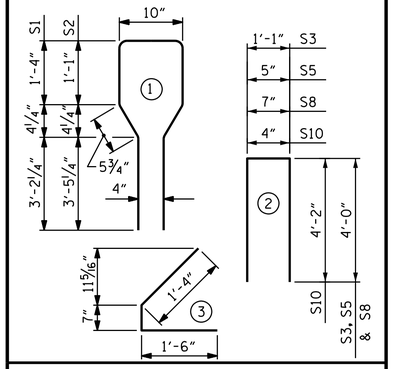
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	76	#4	1	10'-10"	550
	S2	32	#6	1	10'-10"	521
	S3	4	#4	2	9'-1"	24
	S4	64	#4	3	3'-5"	146
	S5	6	#4	2	8'-5"	34
	✱S7	12	#5	STR	3'-8"	46
	S8	4	#4	2	8'-7"	23
	S9	2	#3	STR	1'-10"	1
EXTERIOR GDR.	S10	4	#5	2	8'-8"	36
INTERIOR GDR.	S10	8	#5	2	8'-8"	72
EXTERIOR GDR.	S11	10	#4	STR	7'-0"	47
INTERIOR GDR.	S12	10	#4	STR	17'-11"	120

✱NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	9,500 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
EXTERIOR GIRDER	1,428	21.95	48
INTERIOR GIRDER	1,537	21.95	48

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	108.17'	865.36'

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			43

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN
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SUITE 610
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LICENSE NO. F-0165

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CHECKED BY : GRP 8/91	REV. 1/15	MAA/TMG
	REV. 12/17	MAA/THC
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DRAWN BY: M.J. OSTRISHKO	DATE : AUG 2017	
CHECKED BY: J. SHERMAN	DATE : SEP 2017	
DESIGN ENGINEER OF RECORD: J. SHERMAN	DATE : FEB 2019	

STD. NO. PCG6

2/8/2019
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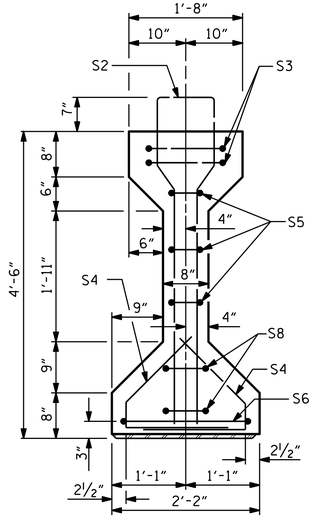
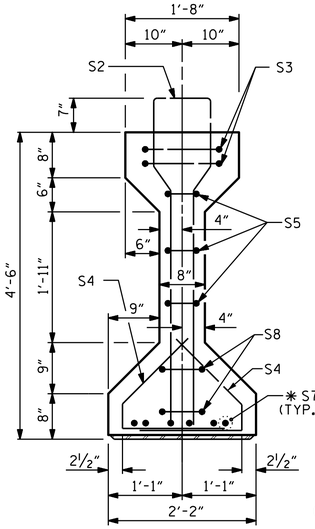
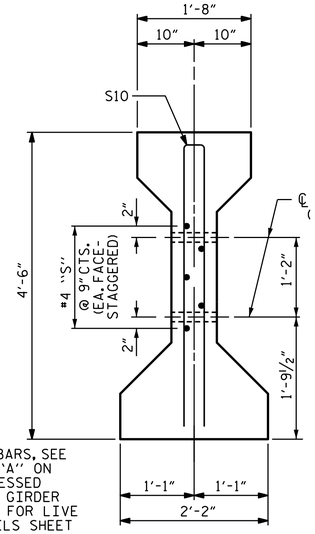


SECTION A-A



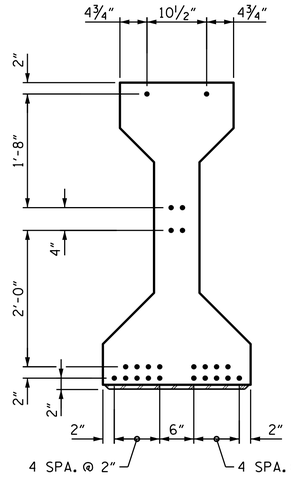
SECTION B-B



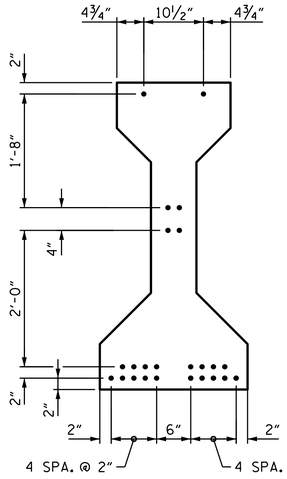
✱FOR S7 BARS, SEE DETAIL "A" ON PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION C-C

(S1 BARS NOT SHOWN)
SEE SHEET S-18 FOR SECTION CUT

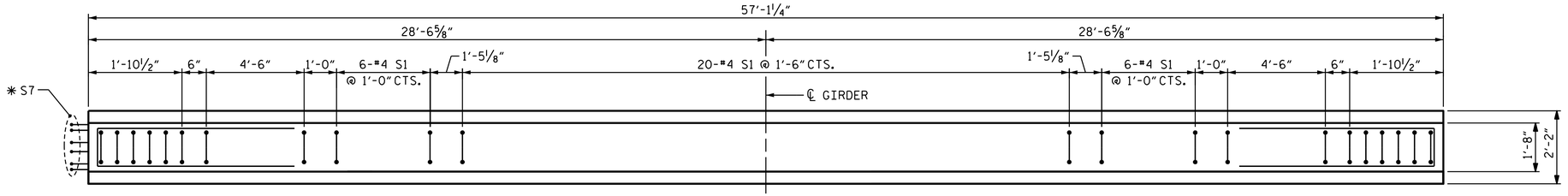


AT END OF GIRDER

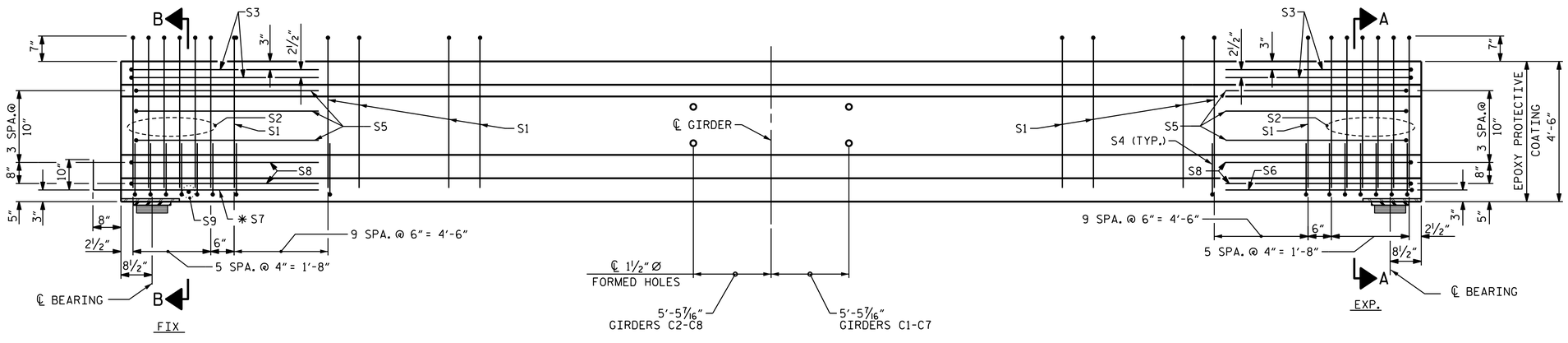


AT ℄ OF GIRDER

0.6"Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION ON SHEET S-18 FOR ADDITIONAL "S" BARS)

0.6" Ø L. R. GRADE 270 STRANDS

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

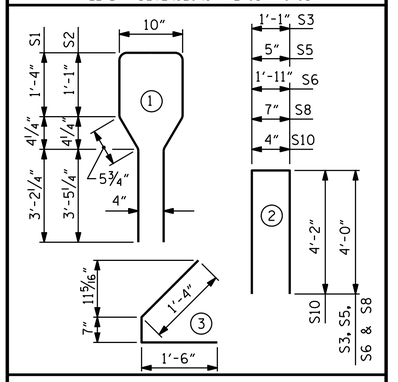
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	52	#4	1	10'-10"	376
	S2	12	#6	1	10'-10"	195
	S3	4	#4	2	9'-1"	24
	S4	64	#4	3	3'-5"	146
	S5	6	#4	2	8'-5"	34
	S6	1	#4	2	9'-11"	7
	✱S7	6	#5	STR	3'-8"	23
	S8	4	#4	2	8'-7"	23
	S9	1	#3	STR	1'-10"	1
EXTERIOR GDR.	S10	2	#5	2	8'-8"	18
INTERIOR GDR.	S10	4	#5	2	8'-8"	36
EXTERIOR GDR.	S11	5	#4	STR	7'-0"	23
INTERIOR GDR.	S12	5	#4	STR	17'-11"	60

✱NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	8,000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
EXTERIOR GIRDER	870	11.59	24
INTERIOR GIRDER	925	11.59	24

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	57.10'	456.80'

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPAN C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			43

DRAWN BY : ELR 8/91
CHECKED BY : GRP 8/91

REV. 10/1/11 MAA/GM
REV. 1/15 MAA/TMG
REV. 12/17 MAA/THC

DESIGNED BY: J. SMITH DATE : AUG 2017
DRAWN BY: M.J. OSTRISHKO DATE : AUG 2017
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2/8/2019
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DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

0.6" Ø LOW RELAXATION	GIRDERS A1 THRU A8										
TENTH POINTS	℄ BRG.	.10	.20	.30	.40	.50	.60	.70	.80	.90	℄ BRG.
CAMBER (GIRDER ALONE IN PLACE)	0	0.022	0.042	0.058	0.068	0.071	0.068	0.058	0.042	0.022	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0	0.012	0.025	0.034	0.041	0.043	0.041	0.034	0.025	0.012	0
FINAL CAMBER	0	1/8"	3/16"	1/4"	5/16"	5/16"	5/16"	1/4"	3/16"	1/8"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN B

0.6" Ø LOW RELAXATION	GIRDER B1, B2, B7 & B8																					
TWENTIETH POINTS	℄ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	℄ BRG.
CAMBER (GIRDER ALONE IN PLACE)	0	0.043	0.085	0.125	0.161	0.194	0.221	0.243	0.259	0.269	0.272	0.269	0.259	0.243	0.221	0.194	0.161	0.125	0.085	0.043	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0	0.031	0.062	0.092	0.121	0.146	0.168	0.185	0.197	0.205	0.207	0.205	0.197	0.185	0.168	0.146	0.121	0.092	0.062	0.031	0
FINAL CAMBER	0	1/8"	5/16"	3/8"	1/2"	9/16"	5/8"	11/16"	3/4"	3/4"	3/4"	3/4"	3/4"	11/16"	5/8"	9/16"	1/2"	3/8"	5/16"	1/8"	0

SPAN B

0.6" Ø LOW RELAXATION	GIRDER B3 THRU B6																					
TWENTIETH POINTS	℄ BRG.	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	℄ BRG.
CAMBER (GIRDER ALONE IN PLACE)	0	0.043	0.085	0.125	0.161	0.194	0.221	0.243	0.259	0.269	0.272	0.269	0.259	0.243	0.221	0.194	0.161	0.125	0.085	0.043	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0	0.029	0.059	0.088	0.115	0.140	0.160	0.177	0.188	0.196	0.198	0.196	0.188	0.177	0.160	0.140	0.115	0.088	0.059	0.029	0
FINAL CAMBER	0	3/16"	5/16"	7/16"	9/16"	5/8"	3/4"	13/16"	7/8"	7/8"	7/8"	7/8"	7/8"	13/16"	3/4"	5/8"	9/16"	7/16"	5/16"	3/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN C

0.6" Ø LOW RELAXATION	GIRDERS C1 THRU C8										
TENTH POINTS	℄ BRG.	.10	.20	.30	.40	.50	.60	.70	.80	.90	℄ BRG.
CAMBER (GIRDER ALONE IN PLACE)	0	0.018	0.033	0.046	0.054	0.056	0.054	0.046	0.033	0.018	0
* DEFLECTION DUE TO SUPERIMPOSED D.L.	0	0.005	0.010	0.013	0.016	0.017	0.016	0.013	0.010	0.005	0
FINAL CAMBER	0	1/8"	5/16"	3/8"	7/16"	1/2"	7/16"	3/8"	5/16"	1/8"	0

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

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

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

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

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

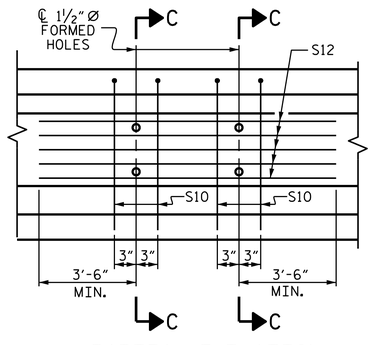
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,000 PSI (SPANS A AND C) AND 7,000 PSI (SPAN B).

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

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

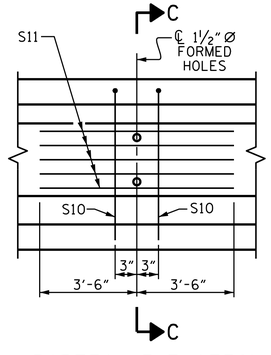
THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

GIRDER ALONE IN PLACE CAMBER PREDICTED USING REFINED METHOD FOR CAMBER, PER NCDOT POLICY.



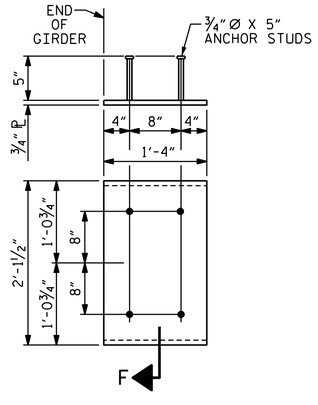
PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. A2-A7, B2-B7, C2-C7
SEE SHEET S-15, S-16 OR S-17 FOR SECTION C-C.



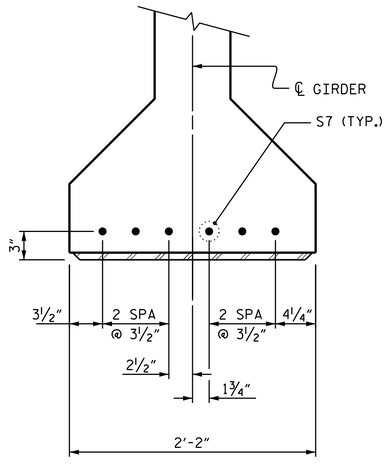
PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. A1, A8, B1, B8, C1, C8
SEE SHEET S-15, S-16 OR S-17 FOR SECTION C-C.



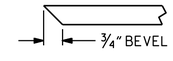
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



SECTION "F"

(SEE NOTES)

PROJECT NO. B-5302
BEAUFORT COUNTY
STATION: 28+85.96 -L-

DRAWN BY : ELR 11/91	REV. 1/15	MAA/TMG	
CHECKED BY : GRP 11/91	REV. 2/15	MAA/TMG	
	REV. 12/17	MAA/THC	
DESIGNED BY: J. SMITH	DATE : AUG 2017		
DRAWN BY: M.J. OSTRISHKO	DATE : AUG 2017		
CHECKED BY: J. SHERMAN	DATE : SEP 2017		
DESIGN ENGINEER OF RECORD: J. SHERMAN	DATE : FEB 2019		

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326EDDCE18488... 02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			43

STD. NO. PCG9

2/8/2019
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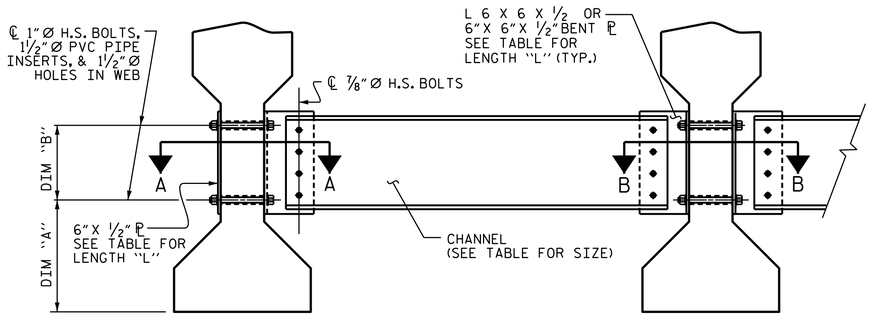
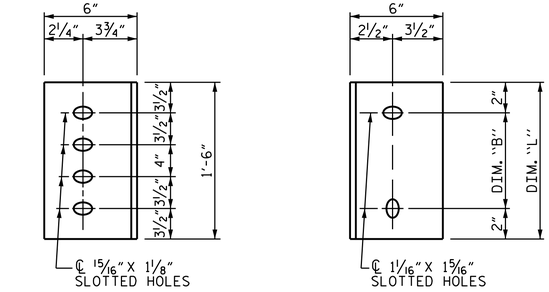


EXTERIOR GIRDER

INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE

WEB FACE

CONNECTOR PLATE DETAILS

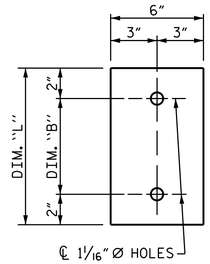
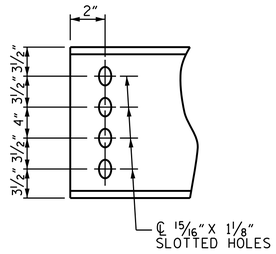
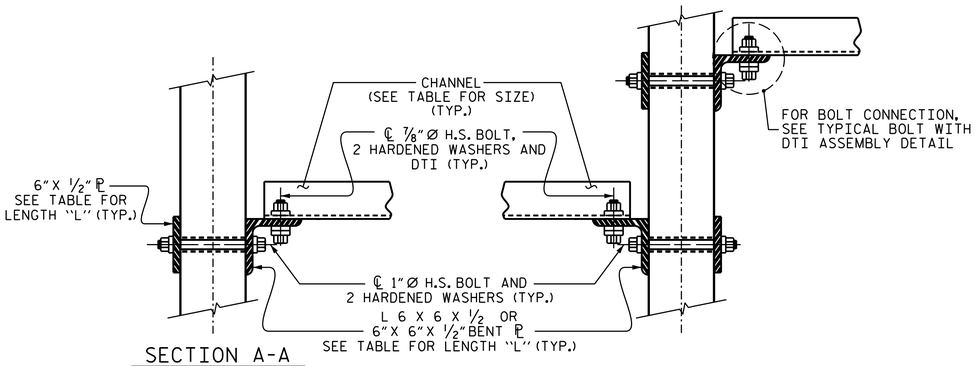


PLATE DETAILS



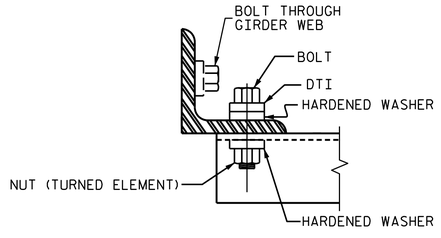
CHANNEL END



SECTION A-A

SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

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

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

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

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

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

TABLE

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

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

DRAWN BY :	TLA	6/05	REV. 5/1/06RRR	KMM/GM
CHECKED BY :	VC	6/05	REV. 10/1/11	MAA/GM
			REV. 12/17	MAA/THC
DESIGNED BY:	J. SMITH		DATE :	JUL 2017
DRAWN BY:	M.J. OSTRISHKO		DATE :	JUL 2017
CHECKED BY:	J. SHERMAN		DATE :	SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN		DATE :	FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			43

STD. NO. PCG10

2/8/2019
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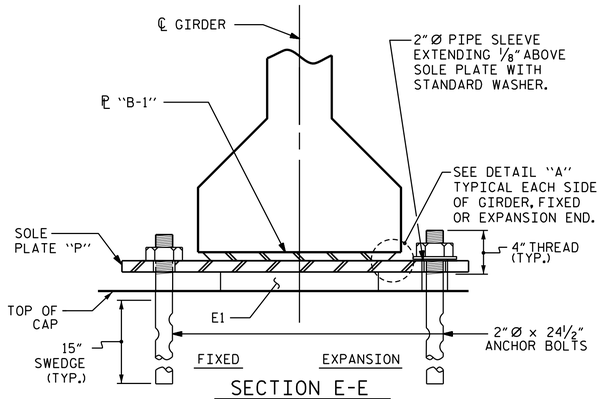
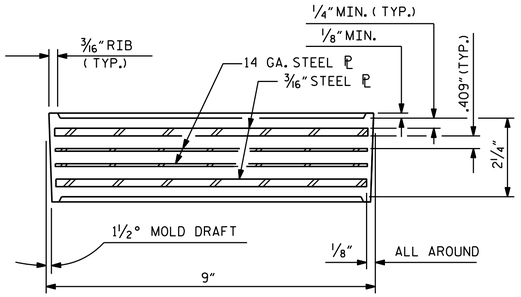
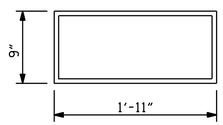


SECTION E-E



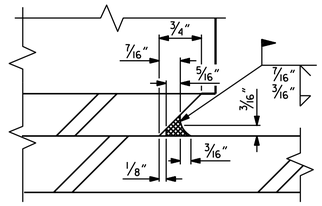
TYPICAL SECTION OF ELASTOMERIC BEARINGS



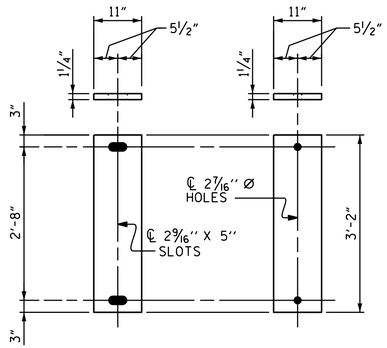
E1 (48 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

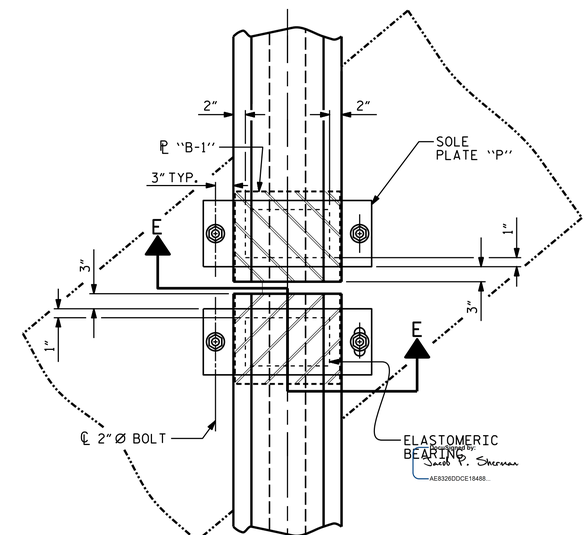
TYPE V



DETAIL "A"



SOLE PLATE DETAILS ("P")



TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT)

TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)

NOTES

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

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

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

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

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

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

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

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

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

DRAWN BY : EEM 2/97	REV. 6/13	AAC/MAA
CHECKED BY : VAP 2/97	REV. 1/15	MAA/TMG
	REV. 12/17	MAA/THC
DESIGNED BY: J. SMITH	DATE : JUL 2017	
DRAWN BY: M.J. OSTRISHKO	DATE : JUL 2017	
CHECKED BY: J. SHERMAN	DATE : SEP 2017	
DESIGN ENGINEER OF RECORD: J. SHERMAN	DATE : FEB 2019	

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401

LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			43

STD. NO. EB4

2/8/2019
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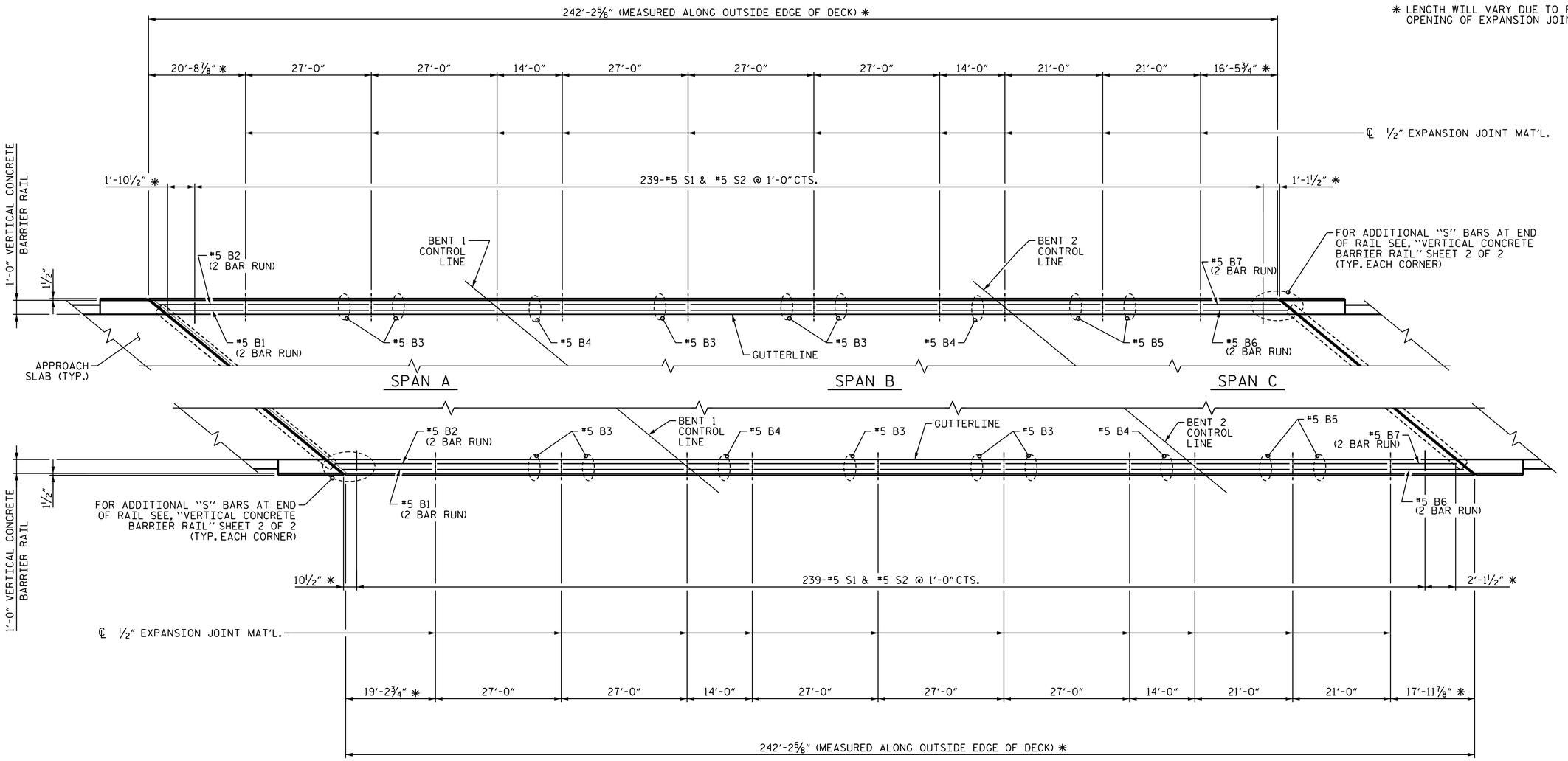
* LENGTH WILL VARY DUE TO FINAL FORMED OPENING OF EXPANSION JOINT SEAL



PLAN OF VERTICAL CONCRETE BARRIER RAIL

FOR NOTES SEE SHEET 2 OF 2

NOTE

SEE APPROACH SLAB SHEETS FOR VERTICAL CONCRETE BARRIER RAIL ON APPROACH SLAB

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

DESIGNED BY:	A. D'AIUTO	DATE :	JUL 2017
DRAWN BY:	M.J. OSTRISHKO	DATE :	JUL 2017
CHECKED BY:	J. SHERMAN	DATE :	SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488...

02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

VERICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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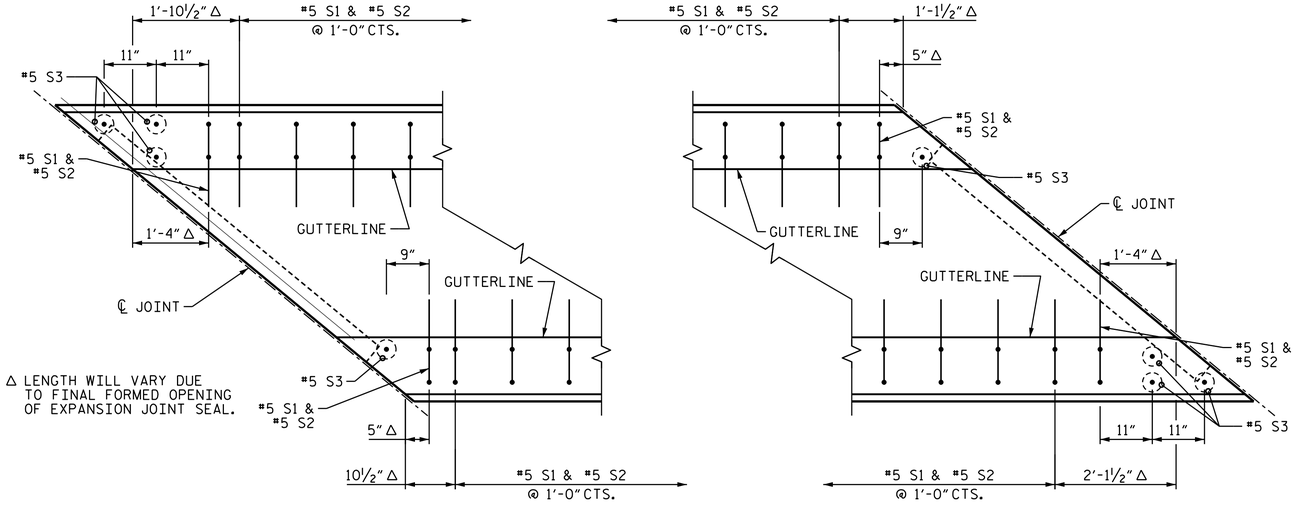
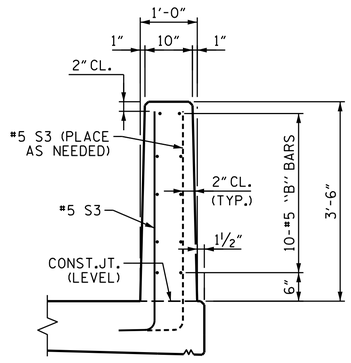


END OF RAIL
AT END BENT 1

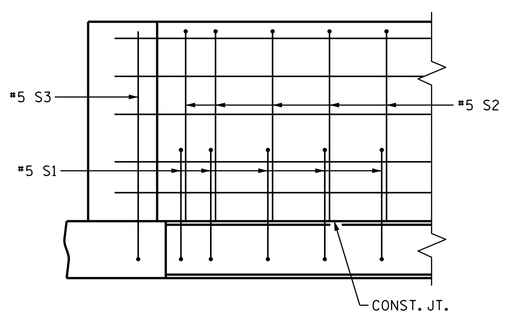
END OF RAIL
AT END BENT 2

PLAN

END POST ON APPROACH SLAB OMITTED FOR CLARITY



END VIEW



SIDE VIEW

END OF RAIL DETAILS

END BENT 1 (RIGHT SIDE SHOWN)
FOR ADDITIONAL REINFORCING STEEL REFER TO PLAN OF END OF RAIL AT END BENT 1 AND END BENT 2
EXPANSION JOINT OMITTED FOR CLARITY

NOTES

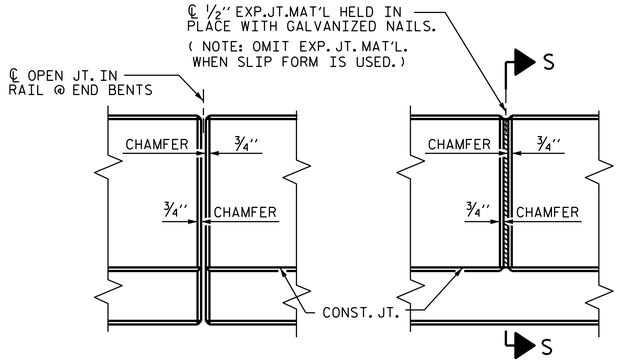
THE BARRIER RAIL IN EACH CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3 BARS SHALL BE INSTALLED WHEN #5 S1 BARS ARE INSTALLED. THE #5 S3 MAYBE SHIFTED AS NECCESSARY SO NOT TO INTERFER WITH THE EXPANSION JOINT.

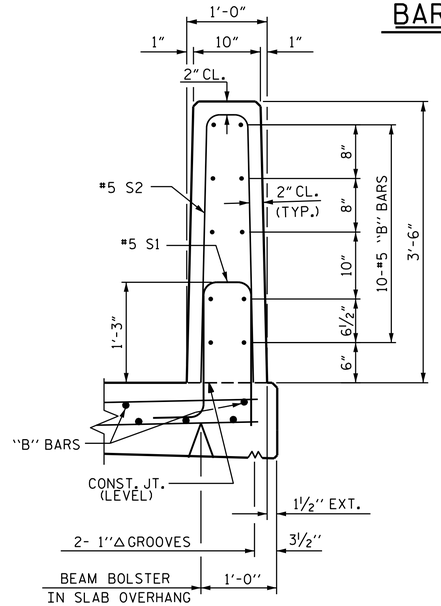
GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED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

FOR LAP SPLICES NOT SHOWN, REFER TO TABLE ON SUPERSTRUCTURE BILL OF MATERIAL SHEET.

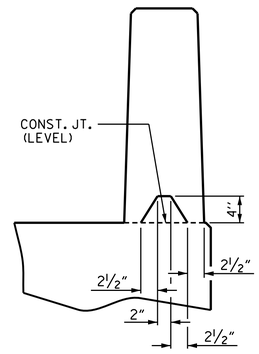


ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

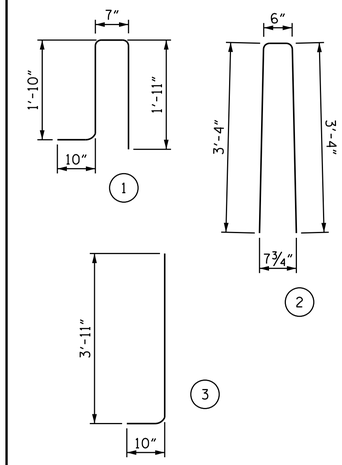


SECTION THRU RAIL



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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR VERTICAL CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B1	20	#5	STR	11'-3"	235
✱ B2	20	#5	STR	12'-0"	250
✱ B3	100	#5	STR	26'-7"	2,773
✱ B4	40	#5	STR	13'-7"	567
✱ B5	40	#5	STR	20'-7"	859
✱ B6	20	#5	STR	10'-9"	224
✱ B7	20	#5	STR	10'-0"	209
✱ S1	482	#5	1	5'-2"	2,597
✱ S2	482	#5	2	7'-2"	3,603
✱ S3	8	#5	3	4'-9"	40
✱ EPOXY COATED REINFORCING STEEL				LBS.	11,357
CLASS AA CONCRETE				CU. YDS.	57.6
✱✱ VERTICAL CONCRETE BARRIER RAIL				LIN. FT.	484.44

✱✱ QUANTITIES FOR VERTICAL CONCRETE BARRIER RAIL ON APPROACH SLAB NOT INCLUDED. SEE APPROACH SLAB SHEETS.

PROJECT NO. B-5302
BEAUFORT COUNTY
STATION: 28+85.96 -L-

SHEET 2 OF 2

DRAWN BY : MAA 5/10	REV. 12/5/11	MAA/GM
CHECKED BY : GM 5/10	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC
DESIGNED BY: A. D'AIUTO	DATE : JUL 2017	
DRAWN BY: M.J. OSTRISHKO	DATE : JUL 2017	
CHECKED BY: J. SHERMAN	DATE : AUG 2017	
DESIGN ENGINEER OF RECORD: J. SHERMAN	DATE : FEB 2019	

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P SHERMAN
DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			43

STD. NO. CBR2

2/8/2019
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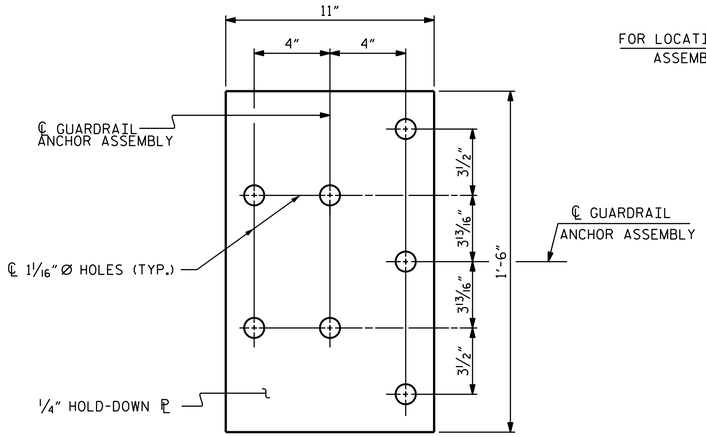
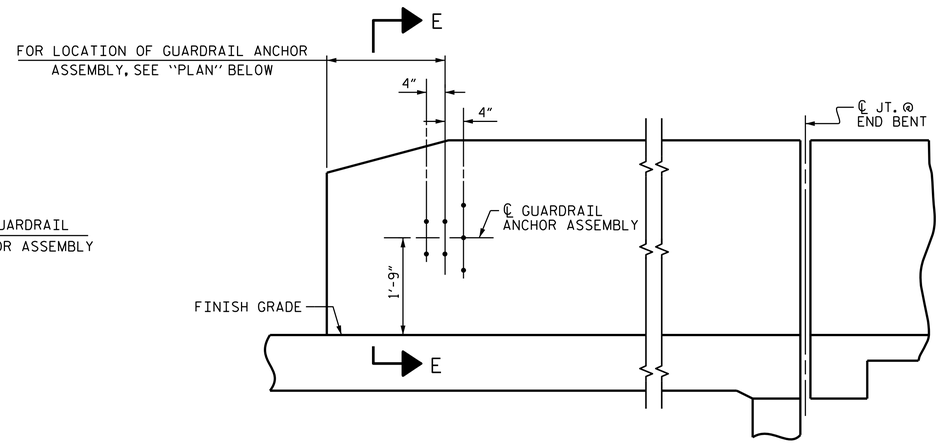


PLAN



ELEVATION

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 BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL 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.

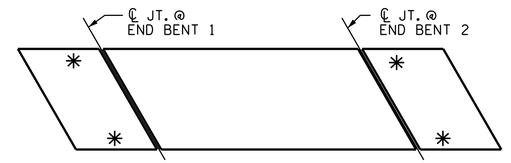
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS

PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

DESIGNED BY:	A. D'AIUTO	DATE :	JUL 2017
DRAWN BY:	M.J. OSTRISHKO	DATE :	JUL 2017
CHECKED BY:	J. SHERMAN	DATE :	SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

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LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031988 JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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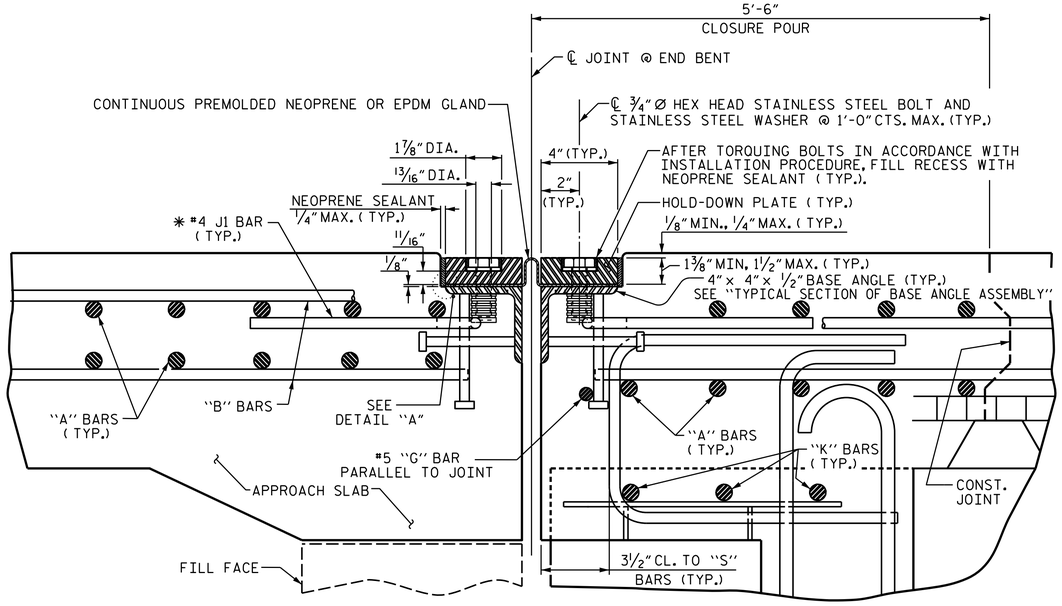


EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

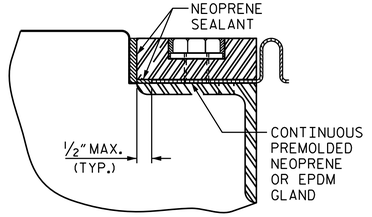
* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

INSTALLATION PROCEDURE

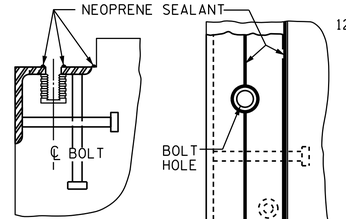
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4⅛" TO 4¼" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE ¾" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X ½" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED ⅞" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TOROUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

GENERAL NOTES

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS 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. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE " TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE ¾" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE ½" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE ¾" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.

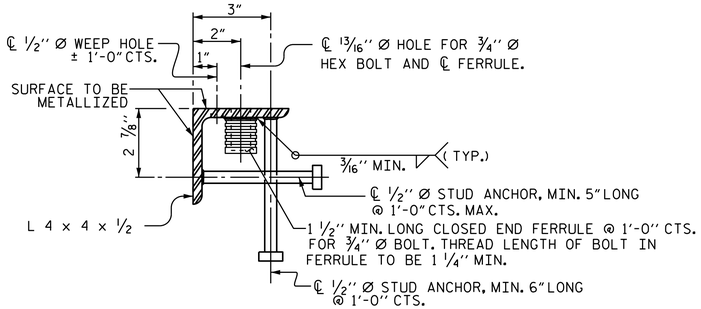


DETAIL "A"



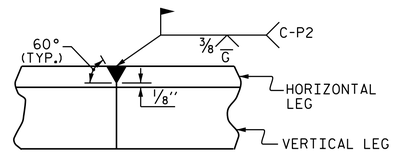
CROSS SECTION PLAN VIEW

INSTALLATION SKETCH



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG ℄ RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	39°-31'-45"	13/16"	1 9/16"	1½"	1 5/16"
2	39°-31'-45"	¾"	1 9/16"	1½"	1 5/16"



DETAIL- FIELD WELD SPLICE OF BASE ANGLE

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 1 OF 2

DRAWN BY : REK 9/87	REV. 10/1/11	MAA/GM
CHECKED BY : CRK 10/87	REV. 10/17	MAA/THC
	REV. 6/18	MAA/THC
DESIGNED BY: A. D'AIUTO	DATE : JUL 2017	
DRAWN BY: M.J. OSTRISHKO	DATE : JUL 2017	
CHECKED BY: J. SHERMAN	DATE : JUL 2017	
DESIGN ENGINEER OF RECORD: J. SHERMAN	DATE : FEB 2019	

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1001 MOREHEAD SQUARE DRIVE
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CHARLOTTE, NC 28203
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LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			43

STD. NO. EJS1

2/8/2019
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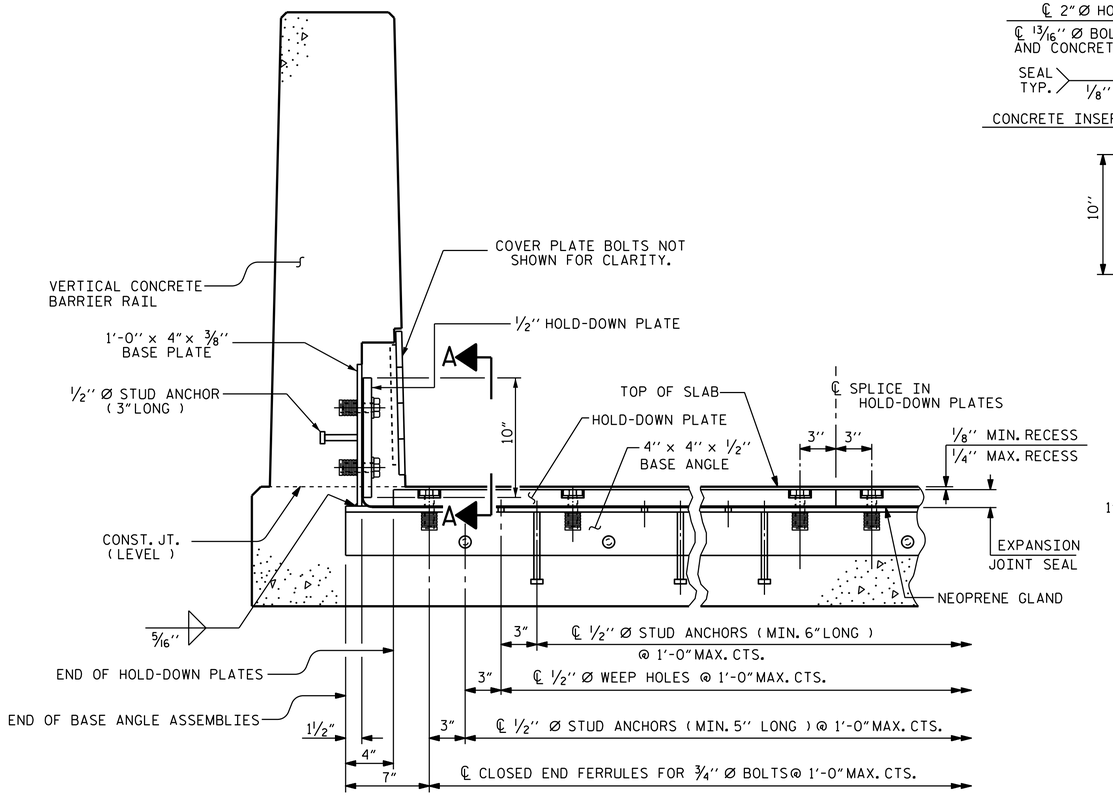
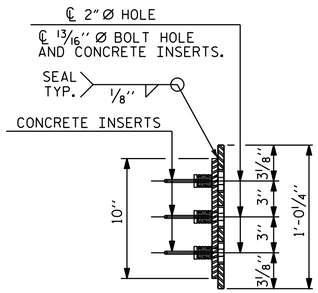
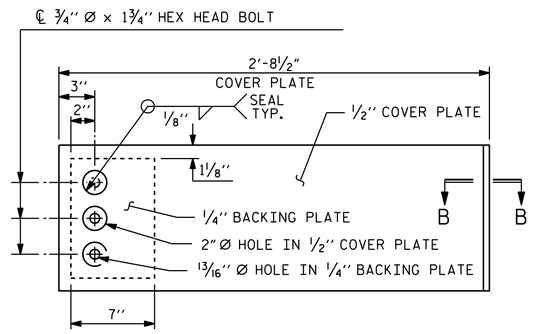


SECTION THRU RAIL NORMAL TO JOINT

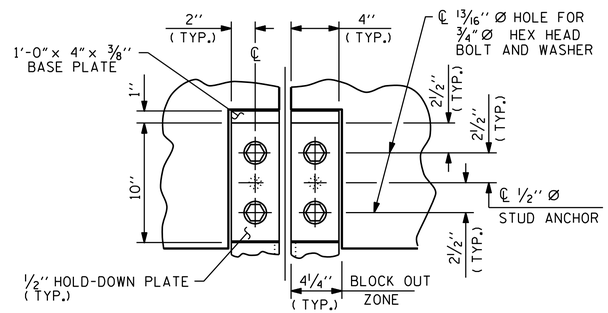


END VIEW

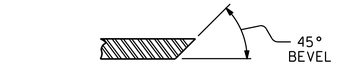


ELEVATION VIEW

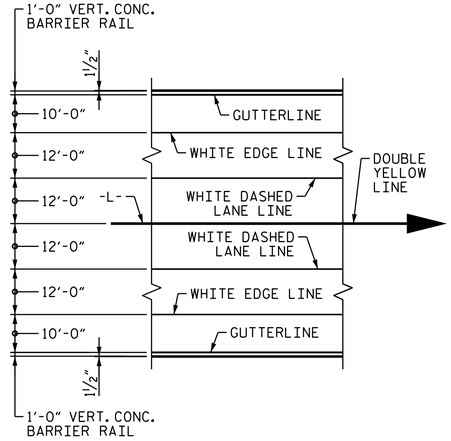
COVER PLATE DETAILS



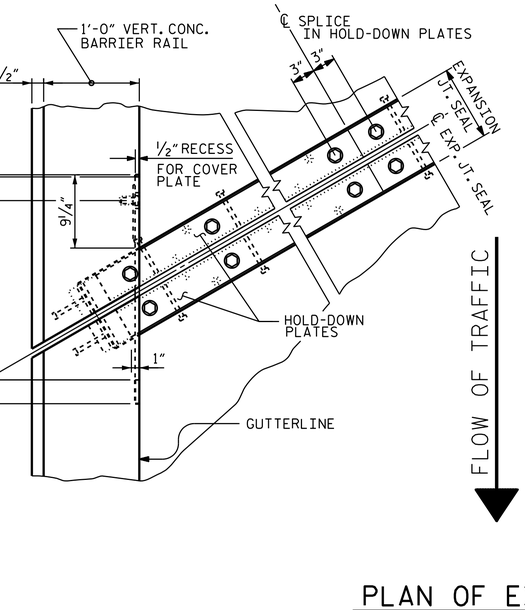
SECTION A - A



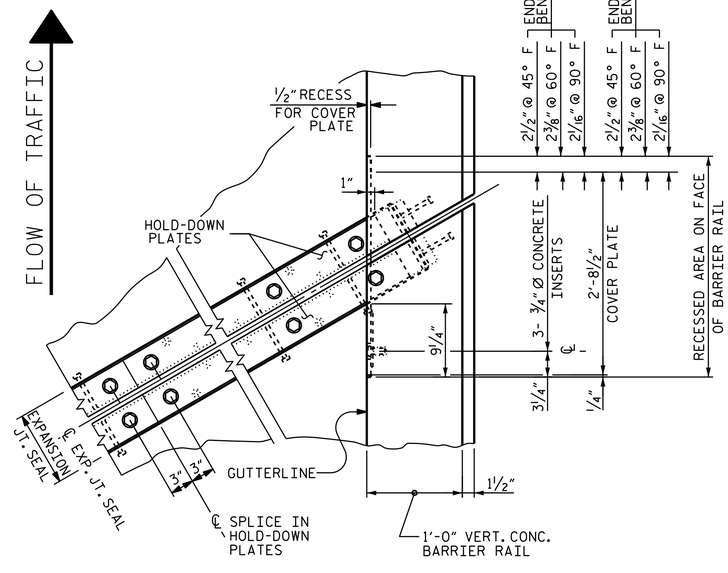
SECTION B - B



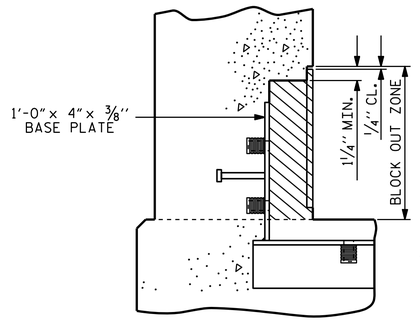
PAVEMENT MARKING ALIGNMENT



SECTION THRU RAIL NORMAL TO JOINT

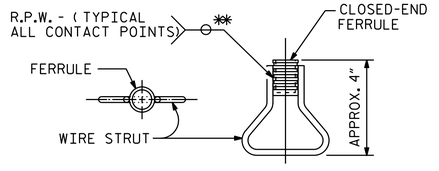


PLAN OF EXPANSION JOINT SEAL



BLOCK OUT DETAIL

SEE " SECTION A - A " FOR OTHER DETAILS.



PLAN ELEVATION

CONCRETE INSERT

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

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 2 OF 2

DESIGNED BY:	A. D'AIUTO	DATE : JUL 2017
DRAWN BY:	M.J. OSTRISHKO	DATE : JUL 2017
CHECKED BY:	J. SHERMAN	DATE : JUL 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE : FEB 2019

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SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

EXPANSION JOINT SEAL DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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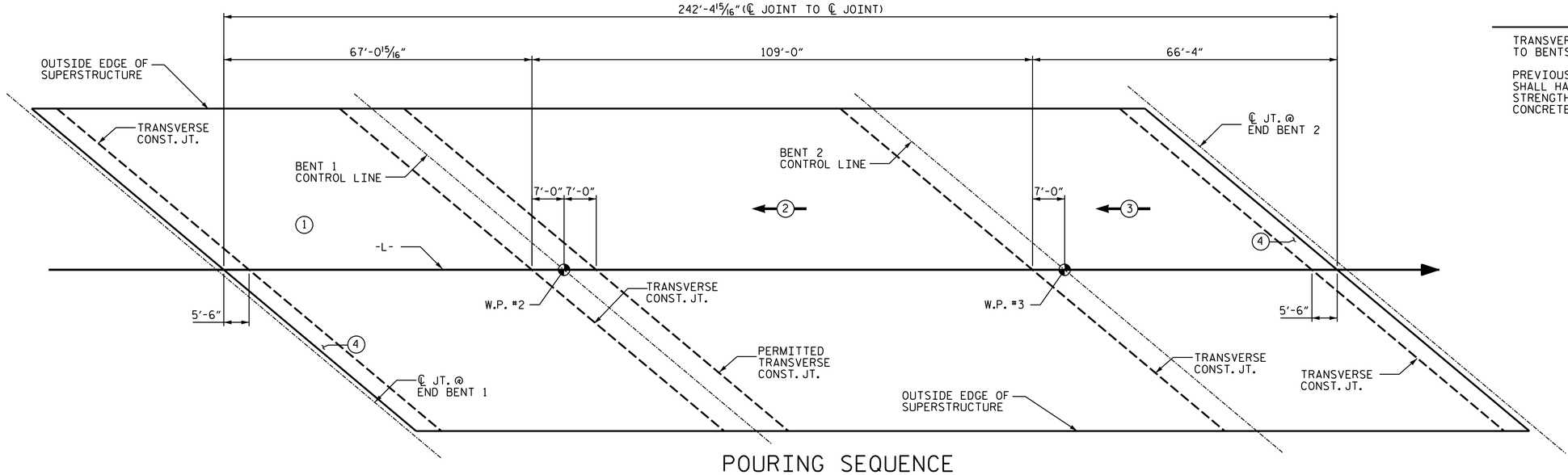
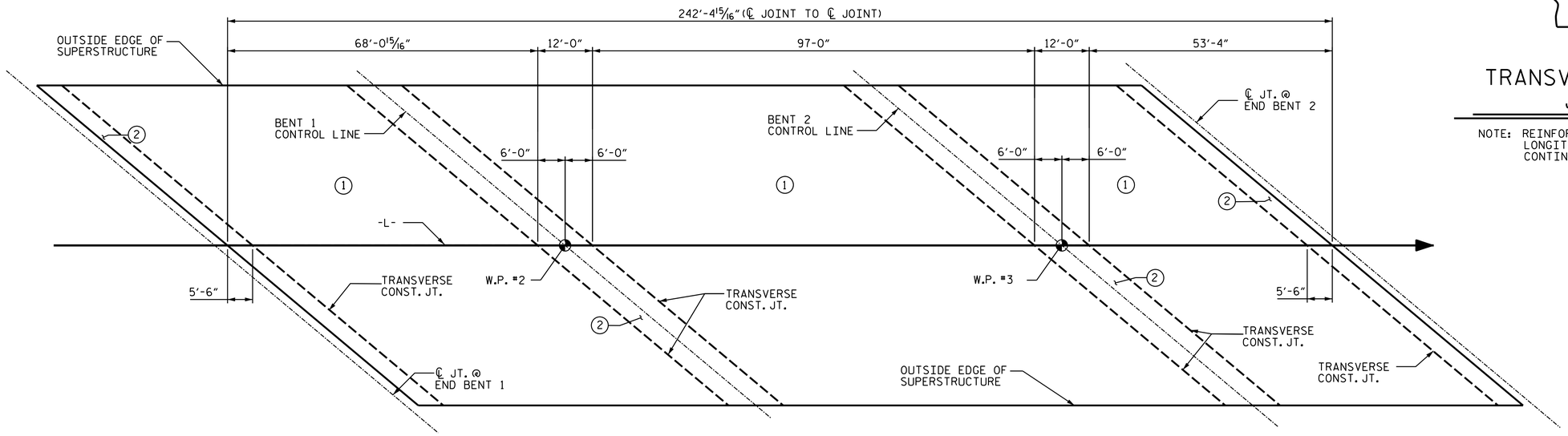


POURING SEQUENCE

= INDICATES THE NUMBER AND DIRECTION OF POUR

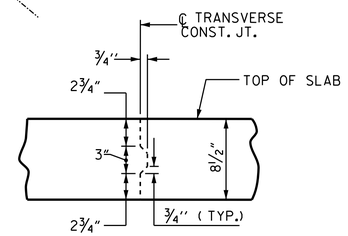


OPTIONAL POURING SEQUENCE

NOTES

TRANSVERSE CONSTRUCTION JOINTS ARE PARALLEL TO BENTS.

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.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
POURING SEQUENCE

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P SHERMAN

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WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
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LICENSE NO. F-0165

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			43

DESIGNED BY:	D. MILDE	DATE : AUG. 2017
DRAWN BY:	D. MILDE	DATE : AUG. 2017
CHECKED BY:	J. SHERMAN	DATE : AUG. 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE : FEB 2019

2/8/2019
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BILL OF MATERIAL

SPANS A, B & C

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	314	#5	STR	27'-4"	8,952	A221	8	#5	STR	40'-4"	337
* A2	314	#5	STR	45'-4"	14,847	A222	8	#5	STR	38'-8"	323
A3	314	#5	STR	40'-8"	13,318	A223	8	#5	STR	37'-0"	309
A4	314	#5	STR	31'-8"	10,371	A224	8	#5	STR	35'-4"	295
* A5	12	#6	STR	56'-6"	1,018	A225	8	#5	STR	33'-8"	281
						A226	8	#5	STR	32'-1"	268
* A101	16	#5	STR	27'-9"	463	A227	8	#5	STR	30'-3"	252
* A102	16	#5	STR	44'-6"	743	A228	8	#5	STR	28'-9"	240
* A103	16	#5	STR	29'-3"	488	A229	8	#5	STR	27'-1"	226
* A104	16	#5	STR	40'-0"	668	A230	8	#5	STR	25'-5"	212
* A105	16	#5	STR	26'-11"	449	A231	8	#5	STR	23'-9"	198
* A106	16	#5	STR	38'-10"	648	A232	8	#5	STR	22'-2"	185
						A233	8	#5	STR	20'-6"	171
* A110	8	#5	STR	58'-5"	487	A234	8	#5	STR	18'-10"	157
* A111	8	#5	STR	56'-9"	474	A235	8	#5	STR	17'-2"	143
* A112	8	#5	STR	55'-2"	460	A236	8	#5	STR	15'-6"	129
* A113	8	#5	STR	53'-6"	446	A237	8	#5	STR	13'-11"	116
* A114	8	#5	STR	51'-10"	432	A238	8	#5	STR	12'-3"	102
* A115	8	#5	STR	50'-2"	419	A239	8	#5	STR	10'-7"	88
* A116	8	#5	STR	48'-7"	405	A240	8	#5	STR	8'-11"	74
* A117	8	#5	STR	46'-11"	391	A241	8	#5	STR	7'-3"	60
* A118	8	#5	STR	45'-3"	378	A242	8	#5	STR	5'-8"	47
* A119	8	#5	STR	43'-7"	364	A243	8	#5	STR	4'-0"	33
* A120	8	#5	STR	41'-11"	350	A244	8	#5	STR	2'-4"	19
* A121	8	#5	STR	40'-4"	337						
* A122	8	#5	STR	38'-8"	323	B1	435	#5	STR	50'-3"	22,799
* A123	8	#5	STR	37'-0"	309	* B2	96	#4	STR	24'-11"	1,598
* A124	8	#5	STR	35'-4"	295	* B3	48	#6	STR	23'-0"	1,658
* A125	8	#5	STR	33'-8"	281	* B4	48	#6	STR	47'-9"	3,443
* A126	8	#5	STR	32'-1"	268	* B5	47	#6	STR	30'-10"	2,177
* A127	8	#5	STR	30'-3"	252	* B6	192	#4	STR	19'-8"	2,522
* A128	8	#5	STR	28'-9"	240	* B7	48	#6	STR	19'-0"	1,370
* A129	8	#5	STR	27'-1"	226	* B8	48	#6	STR	47'-4"	3,413
* A130	8	#5	STR	25'-5"	212	* B9	47	#6	STR	28'-7"	2,018
* A131	8	#5	STR	23'-9"	198						
* A132	8	#5	STR	22'-2"	185	* G1	4	#5	STR	56'-6"	236
* A133	8	#5	STR	20'-6"	171						
* A134	8	#5	STR	18'-10"	157	* J1	214	#4	8	1'-5"	203
* A135	8	#5	STR	17'-2"	143						
* A136	8	#5	STR	15'-6"	129	* K1	8	#8	1	18'-1"	386
* A137	8	#5	STR	13'-11"	116	* K2	24	#8	2	25'-5"	1,629
* A138	8	#5	STR	12'-3"	102	* K3	14	#6	STR	13'-6"	284
* A139	8	#5	STR	10'-7"	88	* K4	14	#6	STR	12'-2"	256
* A140	8	#5	STR	8'-11"	74	* K5	14	#6	STR	11'-0"	231
* A141	8	#5	STR	7'-3"	60	K6	20	#4	3	8'-11"	119
* A142	8	#5	STR	5'-8"	47	K7	60	#4	4	17'-7"	705
* A143	8	#5	STR	4'-0"	33	K8	28	#4	STR	8'-6"	159
* A144	8	#5	STR	2'-4"	19	K9	28	#4	STR	11'-7"	217
						K10	56	#4	STR	12'-6"	468
A201	48	#5	STR	22'-8"	1,135	K11	28	#4	STR	11'-0"	206
A202	16	#5	STR	49'-3"	822						
A203	16	#5	STR	46'-0"	768	* S1	112	#4	5	7'-2"	536
A204	16	#5	STR	42'-8"	712	* S2	112	#5	6	6'-5"	750
						S3	420	#4	7	5'-2"	1,450
A210	8	#5	STR	58'-5"	487						
A211	8	#5	STR	56'-9"	474	* U1	84	#4	2	18'-5"	1,033
A212	8	#5	STR	55'-2"	460	* U2	28	#4	2	16'-5"	307
A213	8	#5	STR	53'-6"	446						
A214	8	#5	STR	51'-10"	432						
A215	8	#5	STR	50'-2"	419						
A216	8	#5	STR	48'-7"	405						
A217	8	#5	STR	46'-11"	391						
A218	8	#5	STR	45'-3"	378	REINFORCING STEEL				LBS.	62,120
A219	8	#5	STR	43'-7"	364	* EPOXY COATED					
A220	8	#5	STR	41'-11"	350	REINFORCING STEEL				LBS.	61,197

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

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

SUPERSTRUCTURE BILL OF MATERIAL

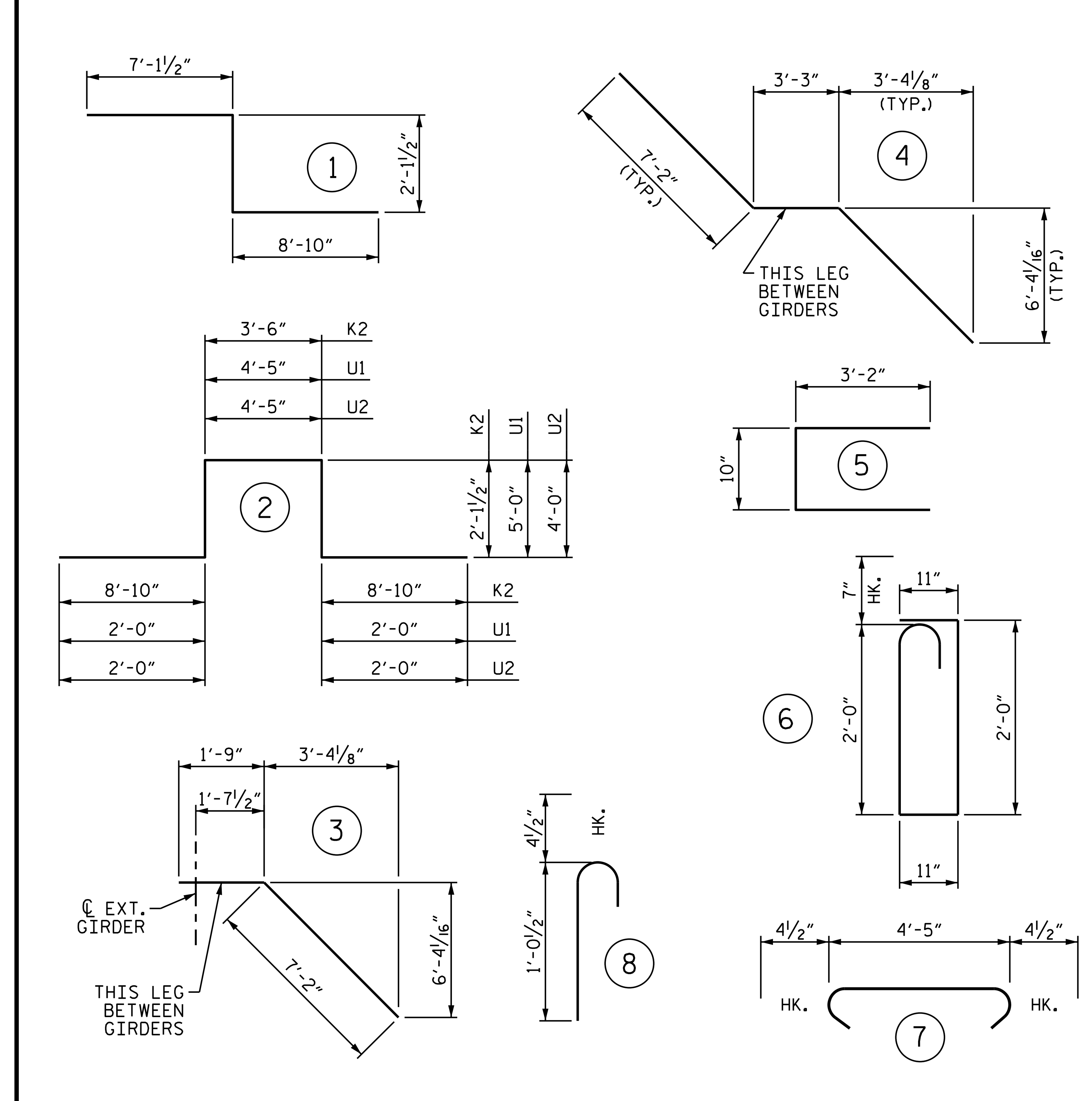
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	134.5	62,120	61,197
POUR #2	286.6		
POUR #3	181.1		
POUR #4	47.3		
TOTALS**	649.5	62,120	61,197

** QUANTITIES FOR VERTICAL CONCRETE BARRIER RAILS ARE NOT INCLUDED

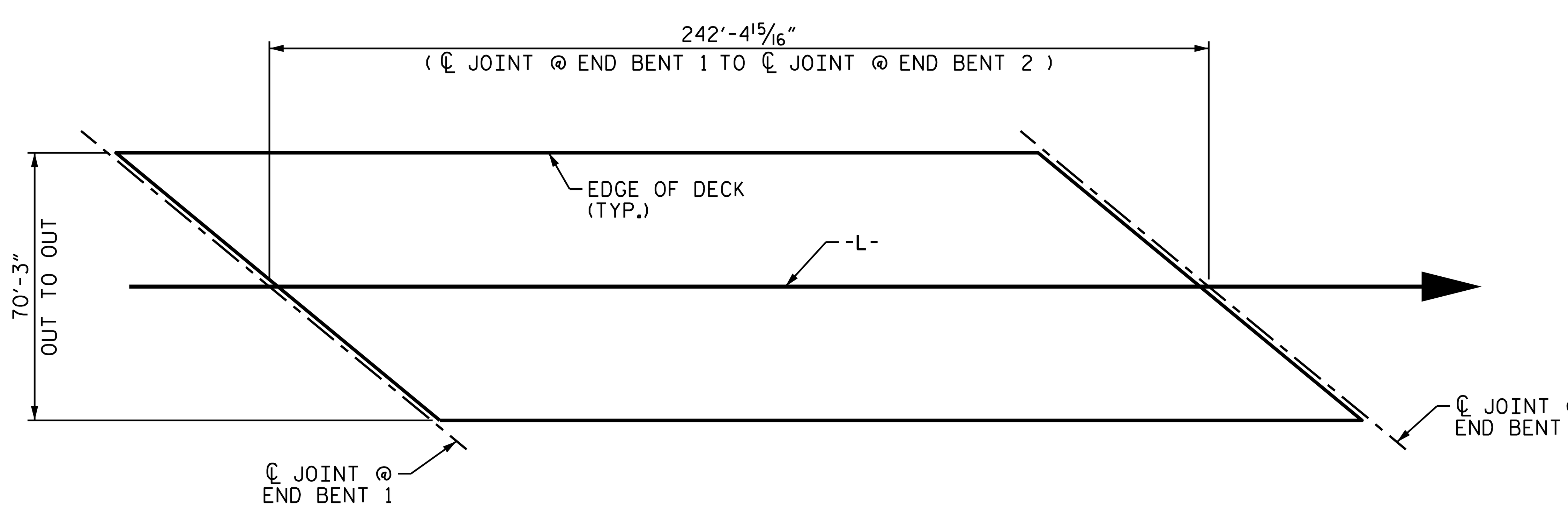
GROOVING BRIDGE FLOORS

APPROACH SLABS	3,044	SQ.FT.
BRIDGE DECK	15,643	SQ.FT.
TOTAL	18,687	SQ.FT.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



LAYOUT FOR COMPUTING AREA
REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 17,029)

PROJECT NO. B-5302
BEAUFORT COUNTY
STATION: 28+85.96 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SUPERSTRUCTURE
BILL OF MATERIAL

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031988 JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman 02-08-2019

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1001 MOREHEAD SQUARE DRIVE
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			43

STD. NO. BOM2

DRAWN BY : JMB 5/87		REV. 5/1/06	TLA/GM
CHECKED BY : SJD 9/87		REV. 10/1/11	MAA/GM
		REV. 12/17	MAA/THC

DESIGNED BY:	A. D'AIUTO	DATE :	AUG 2017
DRAWN BY:	M.J. OSTRISHKO	DATE :	SEP 2017
CHECKED BY:	J. SHERMAN	DATE :	SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

2/8/2019
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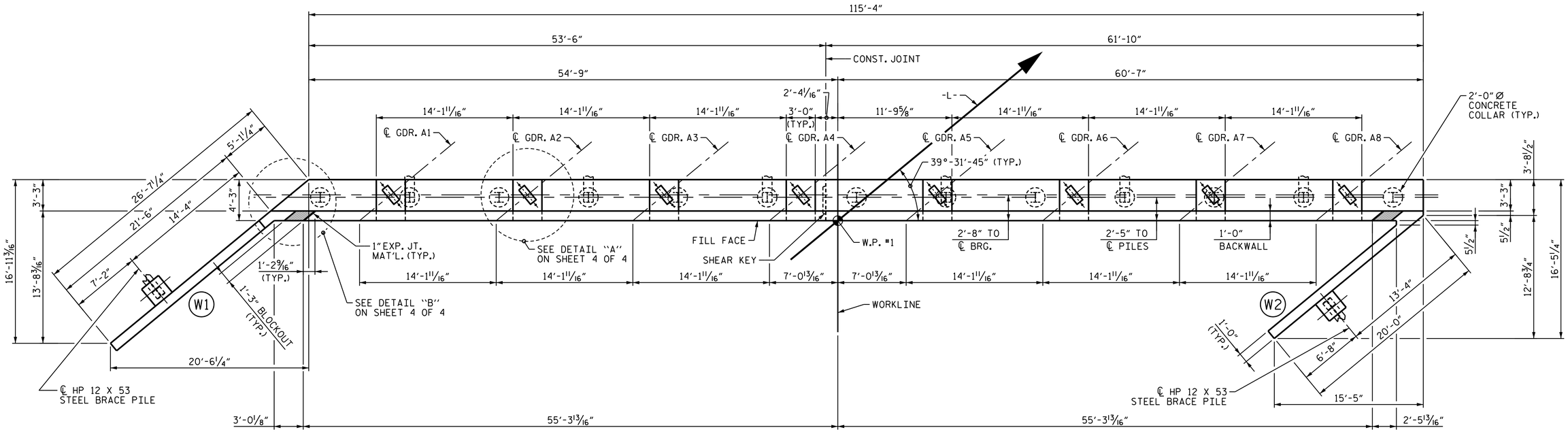
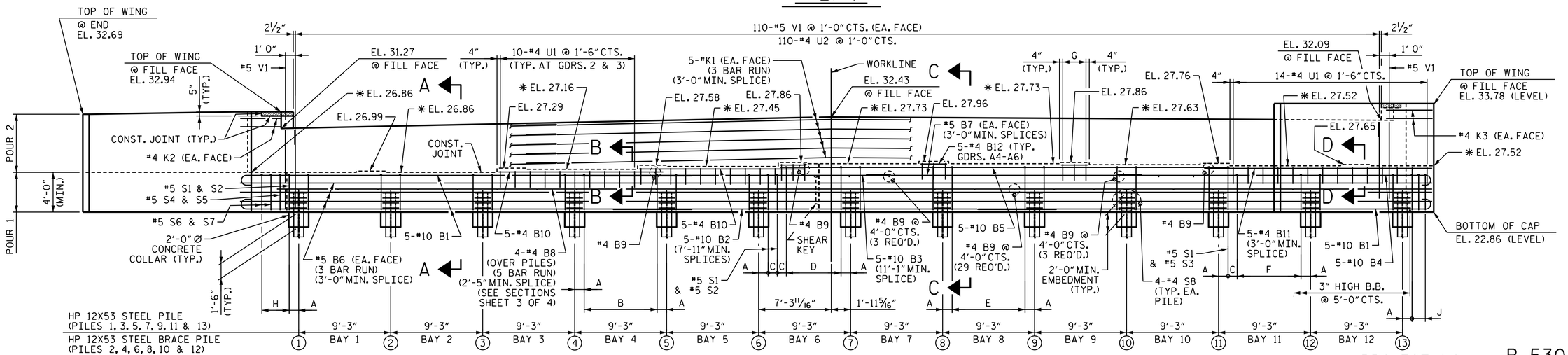


PLAN



ELEVATION

*FOR LOCATION OF ELEVATION BETWEEN BUILDUPS, SEE SECTIONS A-A, B-B, C-C & D-D ON SHEET 3 OF 4. FOR SHEAR KEY DETAILS, SEE SHEET 3 OF 4. WING BRACE PILES OMITTED FOR CLARITY.

NOTES

FOR SECTION A-A , B-B, C-C AND D-D SEE SHEET 3 OF 4.

STIRUPS AND #4 U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY CLEAR ANCHOR BOLTS.

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 THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE 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 VERTICAL CONCRETE BARRIER RAIL IS IF SLIP FORMING IS USED.

DATA

A	11 1/2"	F	8-#5 S1 & #5 S2 @ 11" CTS.
B	9-#5 S1 & #5 S2 @ 11" CTS. (TYP. BAYS 1 THRU 5 & 12)	G	3-#4 U1 @ 1'-2" CTS. (TYP. UNDER GDRS. A4 THRU A6)
C	11"	H	4-#5 "S" BARS @ 11" MAX. CTS.
D	7-#5 S1 & #5 S3 @ 11" CTS.	J	3-#5 S1 & #5 S2 @ 7" CTS.
E	9-#5 S1 & #5 S3 @ 11" CTS. (TYP. BAYS 7 THRU 10)		

DESIGNED BY:	A. D'AIUTO	DATE :	JUL 2017
DRAWN BY:	M.J. OSTRISHKO	DATE :	JUL 2017
CHECKED BY:	J. SHERMAN	DATE :	OCT 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

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1001 MOREHEAD SQUARE DRIVE
SUITE 610
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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P SHERMAN

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PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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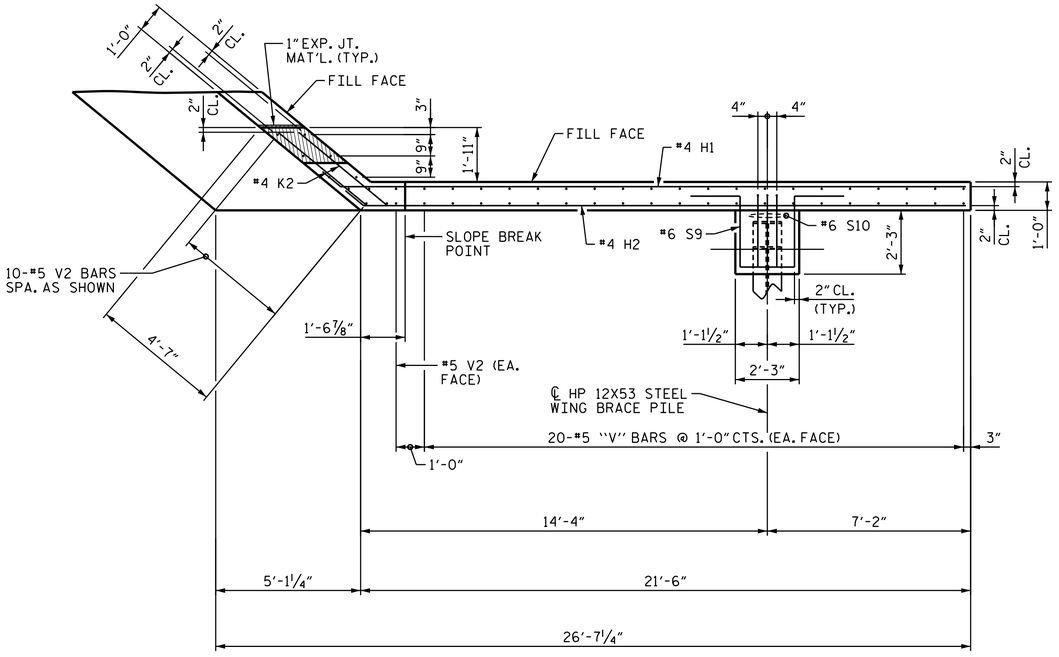
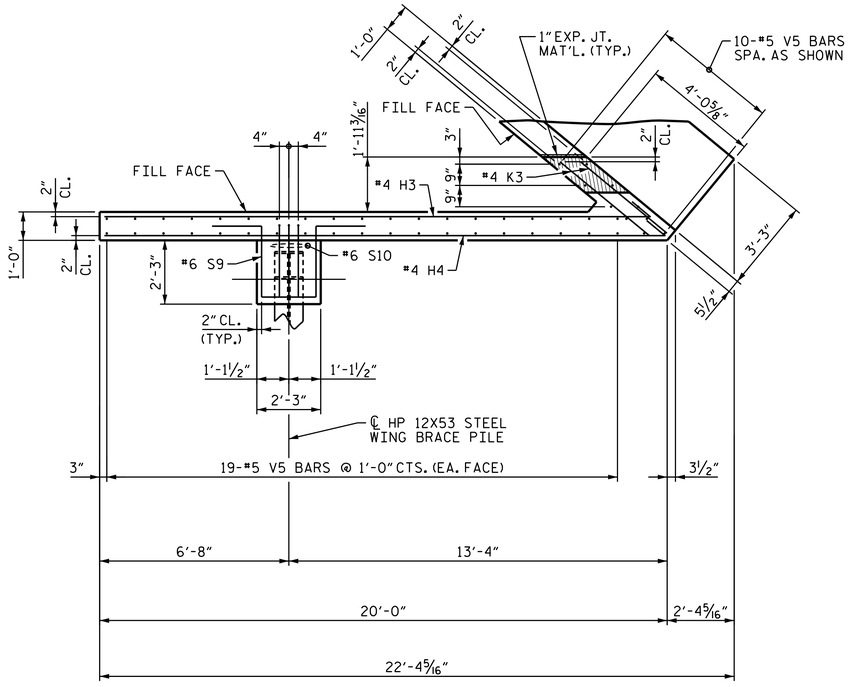
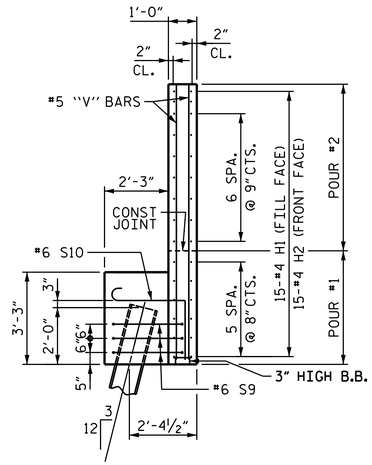


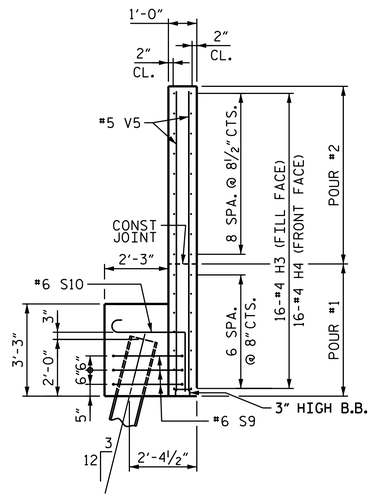
PLAN OF WING (W1)



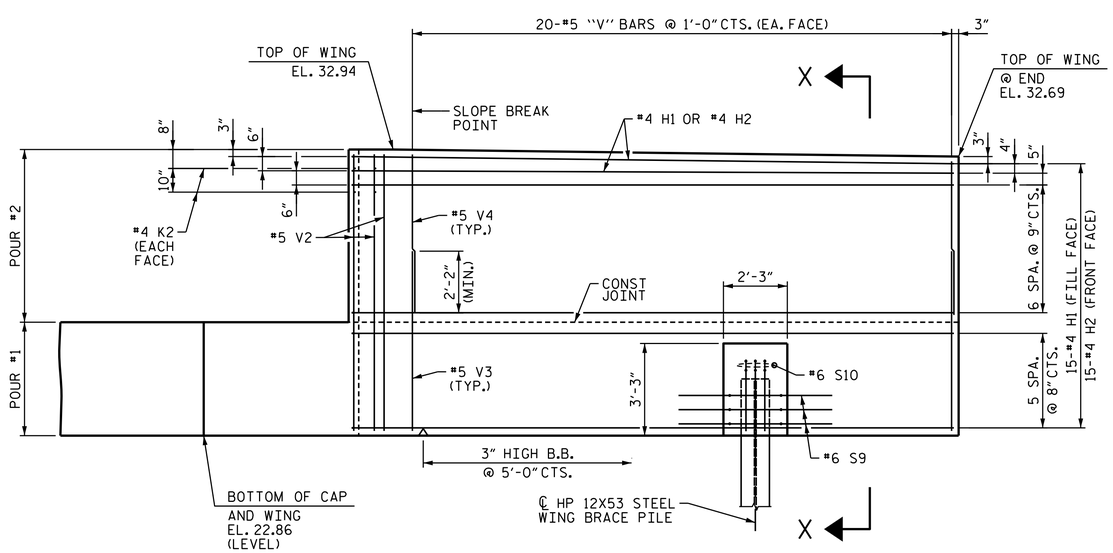
PLAN OF WING (W2)



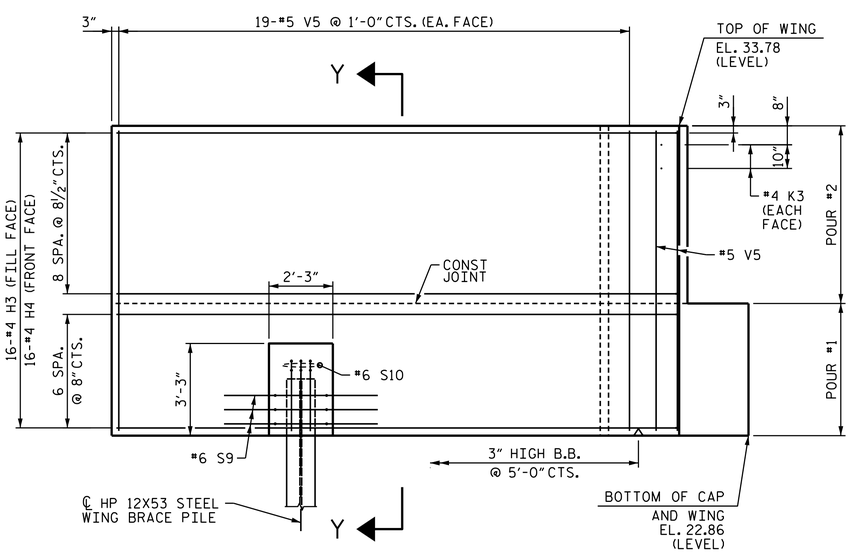
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

DESIGNED BY:	A. D'AIUTO	DATE :	JUL 2017
DRAWN BY:	M.J. OSTRISHKO	DATE :	JUL 2017
CHECKED BY:	J. SHERMAN	DATE :	OCT 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

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02-08-2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			43

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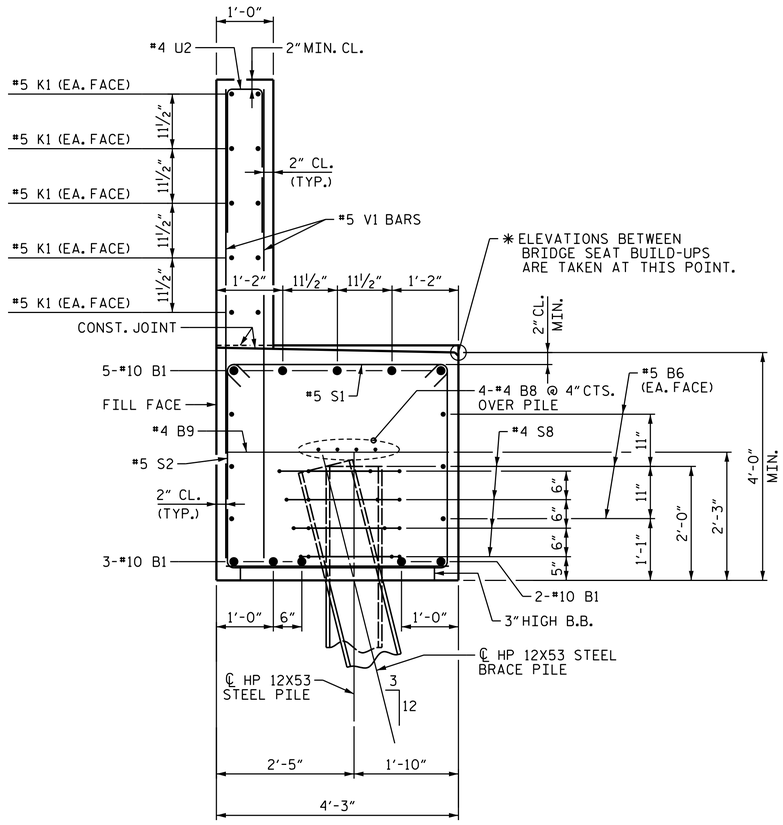
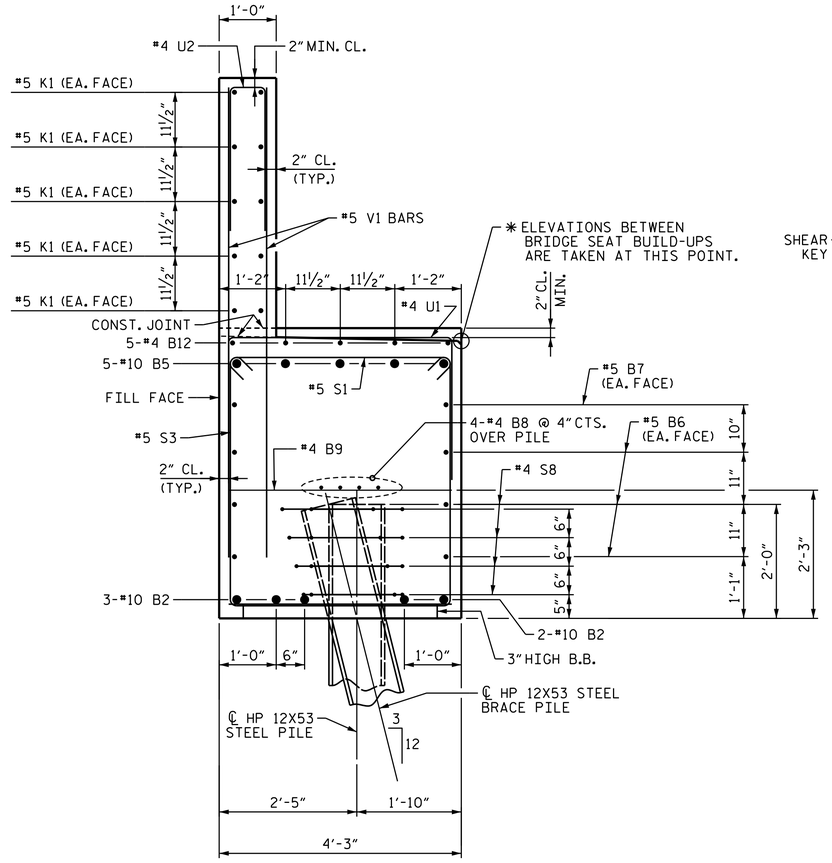
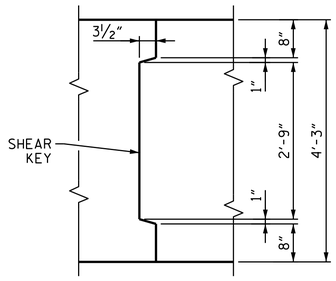


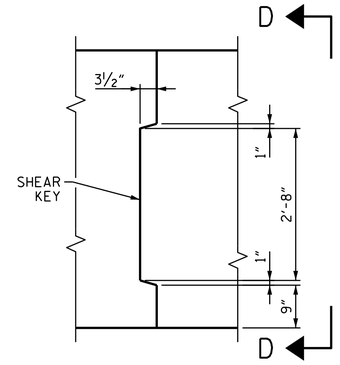
SECTION A-A



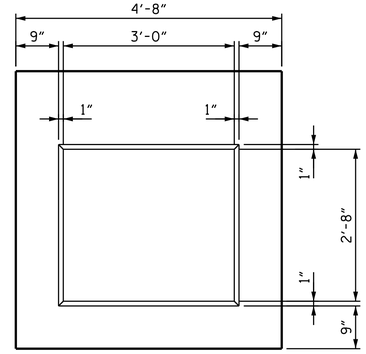
SECTION C-C



PLAN

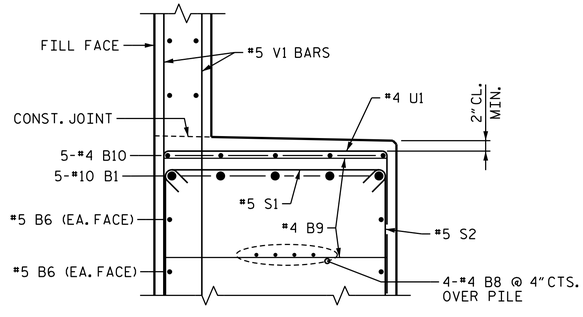


ELEVATION

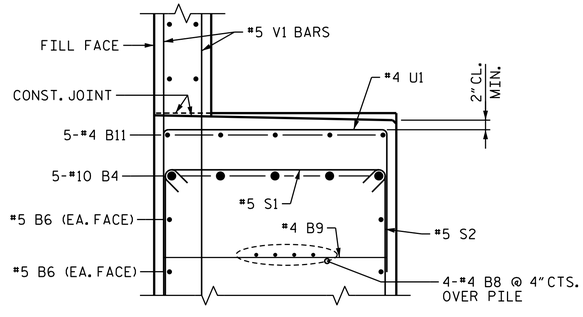


SECTION D-D

SHEAR KEY DETAILS



SECTION B-B



SECTION D-D

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401

LICENSE NO. F-0165

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			43

DESIGNED BY:	A. D'AIUTO	DATE : JUL 2017
DRAWN BY:	M.J. OSTRISHKO	DATE : JUL 2017
CHECKED BY:	J. SHERMAN	DATE : OCT 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE : FEB 2019

2/8/2019
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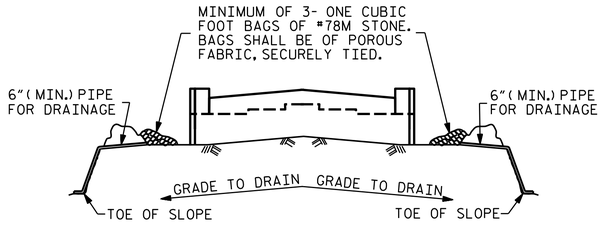
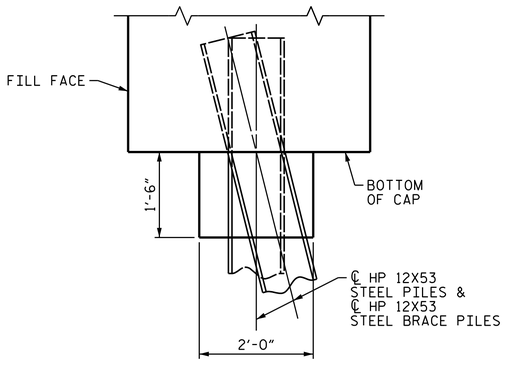


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

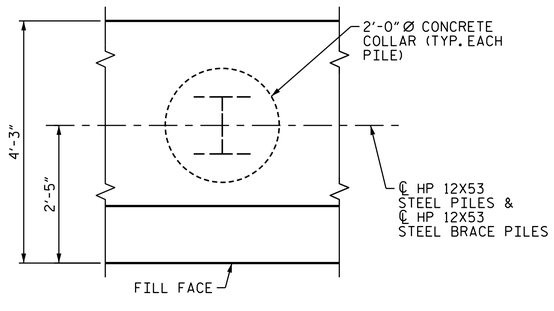
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

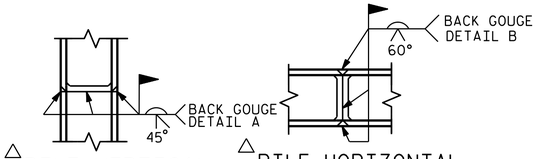


ELEVATION



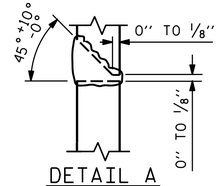
PLAN

CORROSION PROTECTION FOR STEEL PILES DETAIL

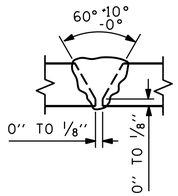


△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



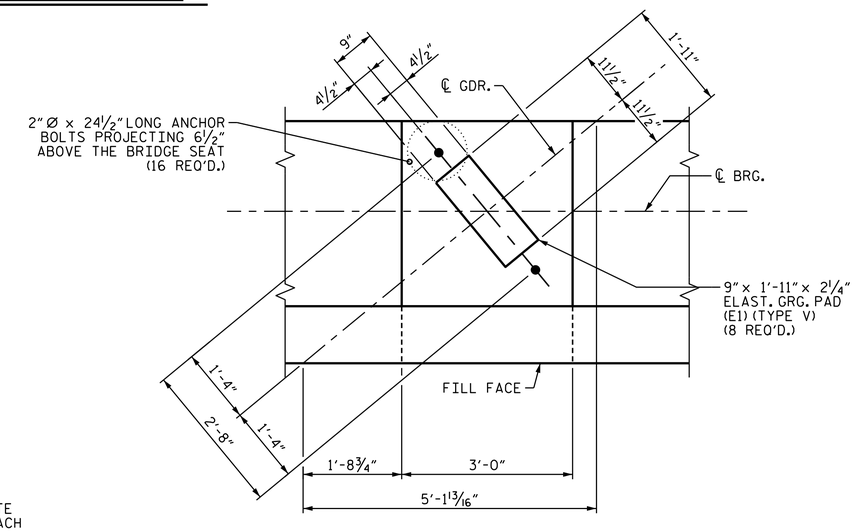
DETAIL A



DETAIL B

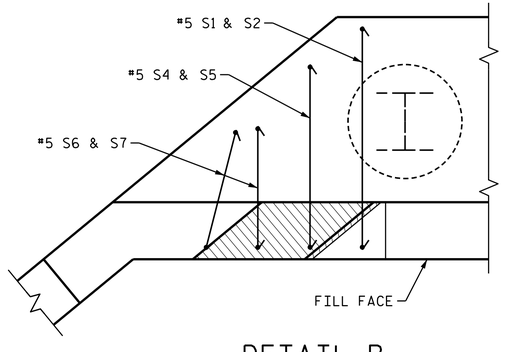
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



DETAIL A

TYPICAL EACH GIRDER



DETAIL B

BILL OF MATERIAL

END BENT 1

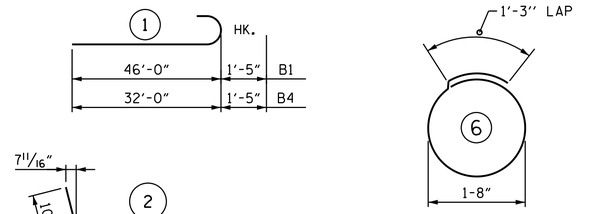
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	15	#10	1	47'-5"	3,061
B2	5	#10	STR	45'-0"	968
B3	5	#10	STR	31'-5"	676
B4	5	#10	1	33'-5"	719
B5	5	#10	STR	45'-1"	970
B6	18	#5	STR	42'-2"	792
B7	2	#5	STR	29'-4"	61
B8	20	#4	STR	25'-7"	342
B9	38	#4	STR	3'-11"	99
B10	10	#4	STR	16'-10"	112
B11	5	#4	STR	23'-0"	77
B12	15	#4	STR	2'-8"	27
H1	15	#4	2	22'-10"	229
H2	15	#4	2	22'-1"	221
H3	16	#4	3	20'-2"	216
H4	16	#4	3	20'-7"	220
K1	30	#5	STR	42'-2"	1,319
K2	4	#4	STR	4'-0"	11
K3	4	#4	STR	3'-11"	10
S1	112	#5	4	4'-10"	565
S2	68	#5	5	12'-1"	857
S3	44	#5	5	13'-8"	627
S4	1	#5	4	4'-2"	4
S5	1	#5	5	11'-5"	12
S6	2	#5	4	3'-1"	6
S7	2	#5	5	10'-4"	22
S8	52	#4	6	6'-6"	226
S9	6	#6	7	9'-11"	89
S10	6	#6	8	5'-4"	48
U1	43	#4	9	6'-11"	199
U2	110	#4	9	3'-8"	269
V1	222	#5	STR	8'-0"	1,852
V2	12	#5	STR	9'-9"	122
V3	40	#5	STR	6'-6"	271
V4	40	#5	STR	5'-3"	219
V5	48	#5	STR	10'-7"	530
REINFORCING STEEL				LBS.	16,048

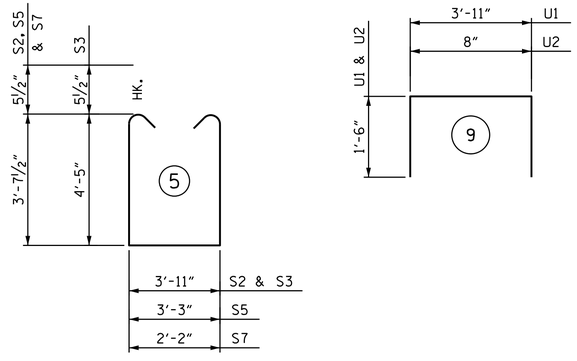
CLASS A CONCRETE BREAKDOWN

POUR #1	CAP, LOWER WINGS, WING BRACE PILES & CONCRETE COLLARS	CU. YDS.	94.6
POUR #2	BACKWALL & UPPER WINGS	CU. YDS.	29.9
TOTAL		CU. YDS.	124.5

HP 12x53 STEEL PILES 15 REQUIRED.	LIN. FT.	1,200
PILE DRIVING EQUIPMENT SETUP FOR 12x53 STEEL PILES	EA.	15
PILE REDRIVES	EA.	15

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 4 OF 4

DESIGNED BY:	A. D'AIUTO	DATE :	JUL 2017
DRAWN BY:	M.J. OSTRISHKO	DATE :	JUL 2017
CHECKED BY:	J. SHERMAN	DATE :	OCT 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401

LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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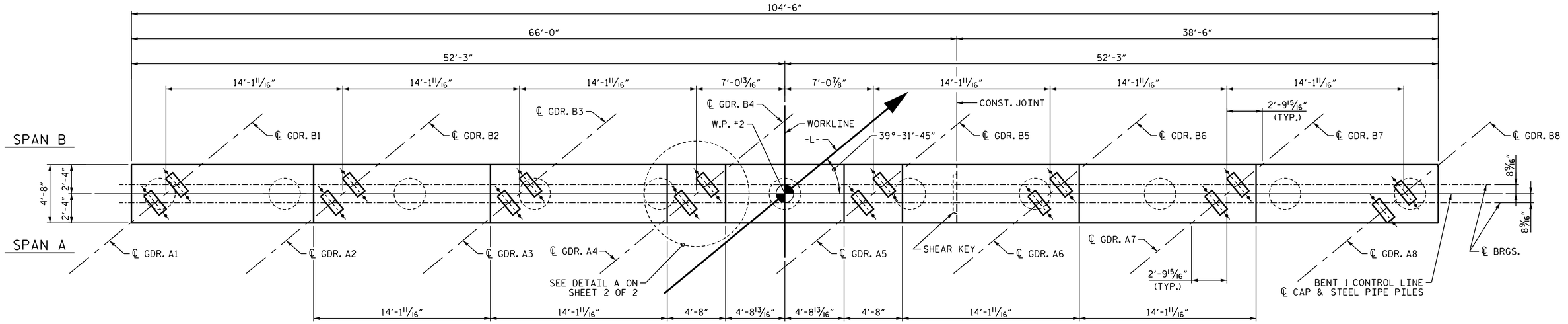
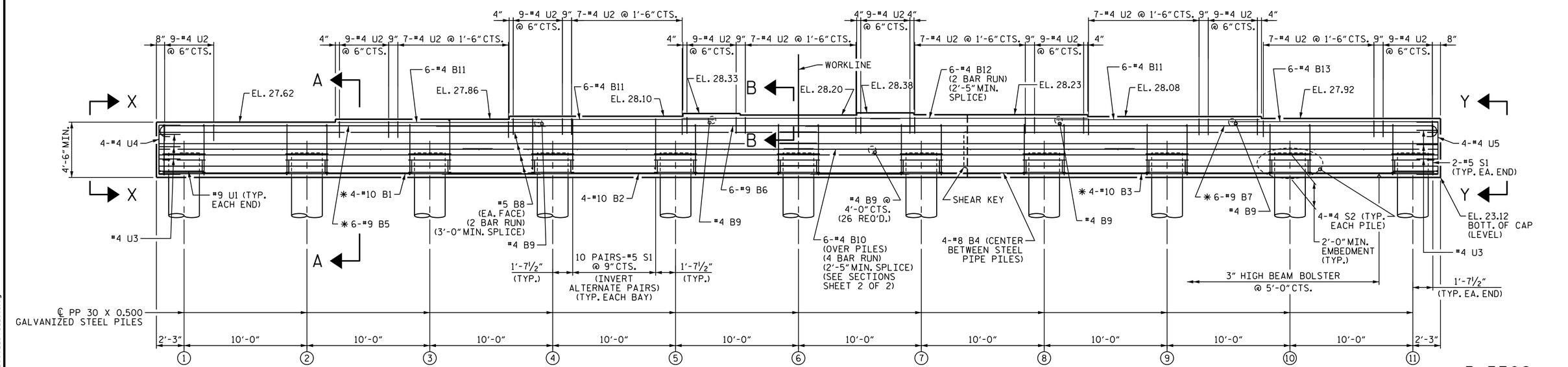


PLAN



✱ ALTERNATE ENDS #10 B1 AND #10 B3 BARS (7′-11″MIN. SPLICE) AND #9 B5 AND #9 B7 BARS (8′-9″MIN. SPLICE) SO TO STAGGER THE SPLICE LOCATIONS.

ELEVATION

NOTES

STIRRUPS AND "U" BARS MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

FOR DETAIL A, SECTIONS A-A, B-B, X-X, Y-Y AND SHEAR KEY DETAILS, SEE SHEET 2 OF 2.

FOR PP 30 X 0.500 GALVANIZED STEEL PILE DETAILS, SEE "30″STEEL PIPE PILE" SHEET.

GALVANIZED THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 30 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1

DESIGNED BY:	S. NATARAJAN	DATE :	SEP 2017
DRAWN BY:	M.J. OSTRISHKO	DATE :	OCT 2017
CHECKED BY:	J. SHERMAN	DATE :	OCT 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401

LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488...

02-08-2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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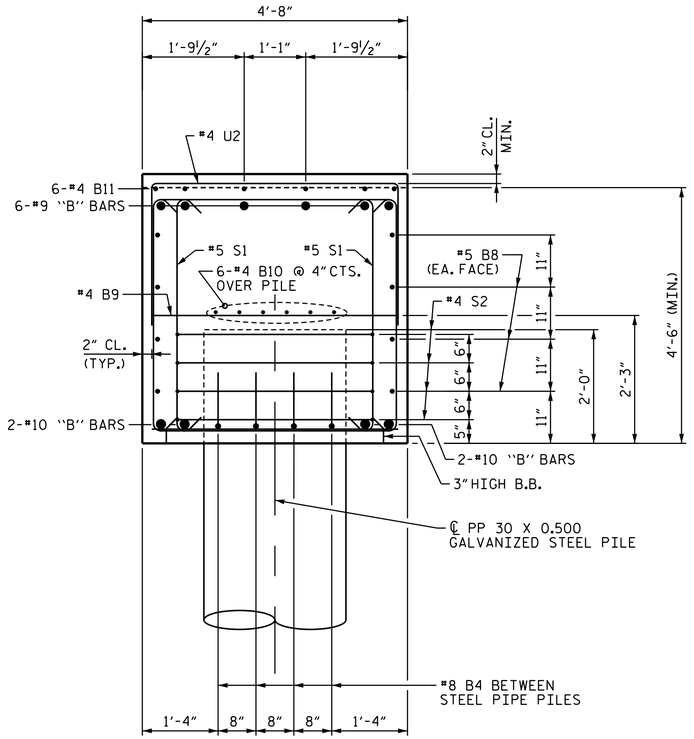
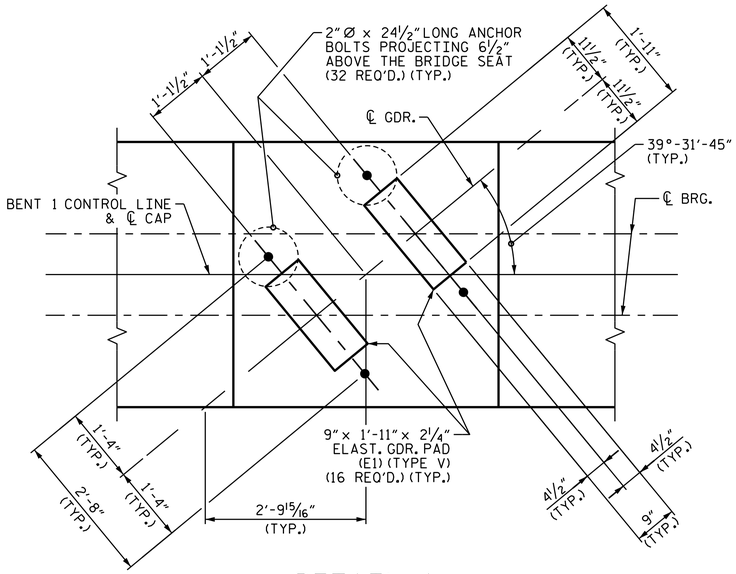


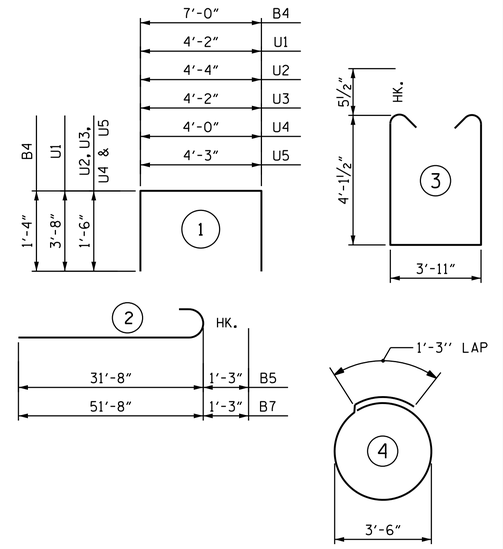
SECTION A-A



DETAIL A

TYPICAL EACH GIRDER

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1

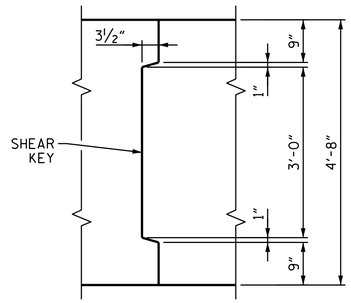
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	STR	31'-3"	538
B2	4	#10	STR	38'-0"	654
B3	4	#10	STR	51'-3"	882
B4	40	#8	1	9'-8"	1,032
B5	6	#9	2	32'-11"	672
B6	6	#9	STR	38'-10"	792
B7	6	#9	2	52'-11"	1,080
B8	16	#5	STR	53'-9"	897
B9	30	#4	STR	4'-4"	87
B10	24	#4	STR	28'-0"	449
B11	18	#4	STR	16'-9"	201
B12	12	#4	STR	24'-9"	198
B13	6	#4	STR	17'-2"	69
S1	204	#5	3	13'-1"	2,784
S2	44	#4	4	12'-3"	360
U1	2	#9	1	11'-6"	78
U2	114	#4	1	7'-4"	558
U3	6	#4	1	7'-2"	29
U4	4	#4	1	7'-0"	19
U5	4	#4	1	7'-3"	19
REINFORCING STEEL				LBS.	11,398

CLASS A CONCRETE

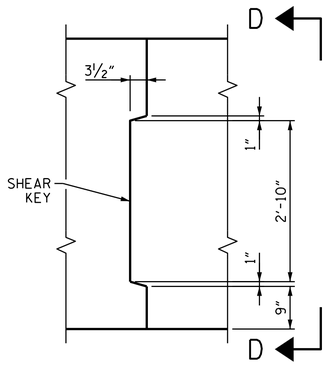
BENT CAP	CU. YDS.	84.5
TOTAL	CU. YDS.	84.5

THE CONCRETE DISPLACED BY THE PLUGGED PP 30 X 0.500 GALVANIZED STEEL PILES HAS BEEN DEDUCTED FROM THE QUANTITY OF THE CLASS A CONCRETE FOR THE BENT CAP.

PP 30 X 0.500 GALVANIZED STEEL PILE 11 REQUIRED.	LIN. FT.	1,265
PILE DRIVING EQUIPMENT SETUP FOR PP 30 x 0.500 GALVANIZED STEEL PILES	EA.	11
PIPE PILE PLATES PER EACH	TOTAL	11
PILE REDRIVES PER EACH	TOTAL	11

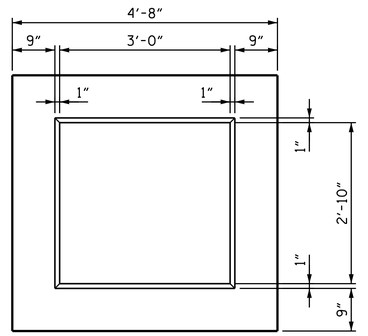


PLAN



ELEVATION

SHEAR KEY DETAILS



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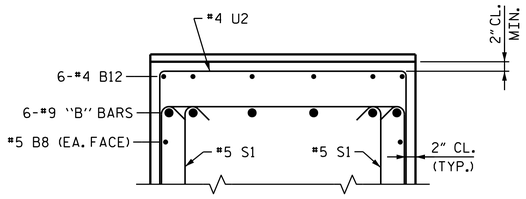
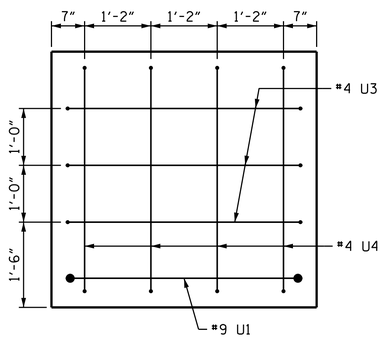
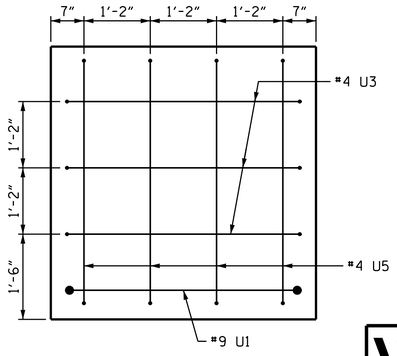


SECTION B-B



SECTION X-X



SECTION Y-Y

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			43

DESIGNED BY: S. NATARAJAN DATE : SEP 2017
DRAWN BY: M.J. OSTRISHKO DATE : OCT 2017
CHECKED BY: J. SHERMAN DATE : OCT 2017
DESIGN ENGINEER OF RECORD: J. SHERMAN DATE : FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

2/8/2019
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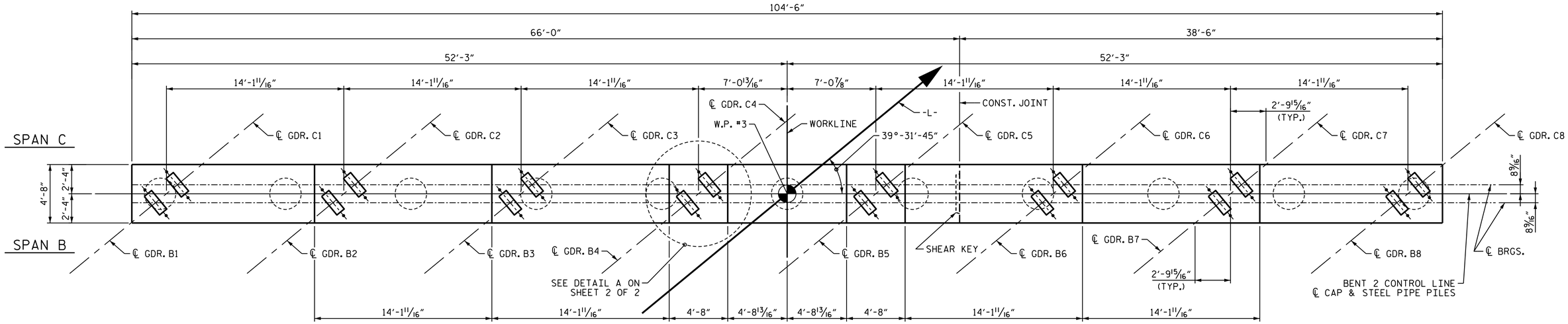
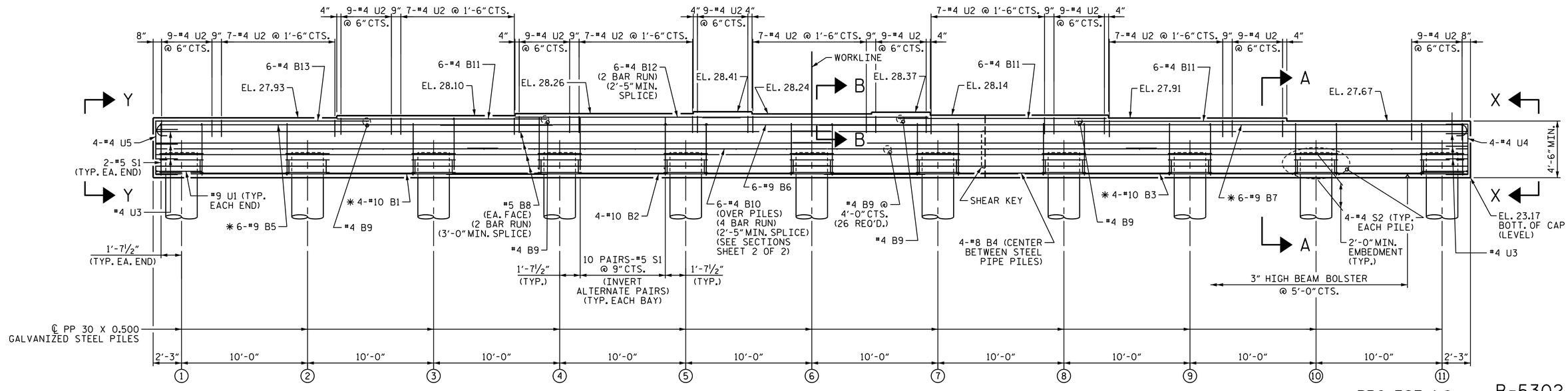


PLAN



✱ ALTERNATE ENDS #10 B1 AND #10 B3 BARS (7′-11″ MIN. SPLICE) AND #9 B5 AND #9 B7 BARS (8′-9″ MIN. SPLICE) SO TO STAGGER THE SPLICE LOCATIONS.

ELEVATION

NOTES

STIRRUPS AND "U" BARS MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

FOR DETAIL A, SECTIONS A-A, B-B, X-X, Y-Y AND SHEAR KEY DETAILS, SEE SHEET 2 OF 2.

FOR PP 30 X 0.500 GALVANIZED STEEL PILE DETAILS, SEE " 30″STEEL PIPE PILE " SHEET.

GALVANIZED THE TOP OF EACH INTERIOR BENT PILE A MINIMUM OF 30 FEET. GALVANIZE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2

DESIGNED BY:	S. NATARAJAN	DATE :	SEP 2017		
DRAWN BY:	M.J. OSTRISHKO	DATE :	OCT 2017		
CHECKED BY:	J. SHERMAN	DATE :	OCT 2017		
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019		

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DocuSigned by: Jacob P. Sherman AE8326DDCE18488...

02-08-2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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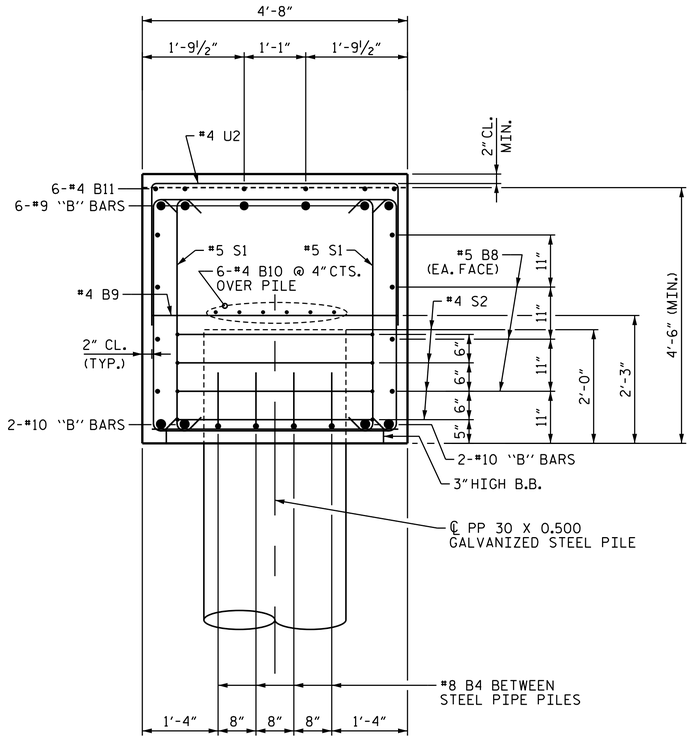
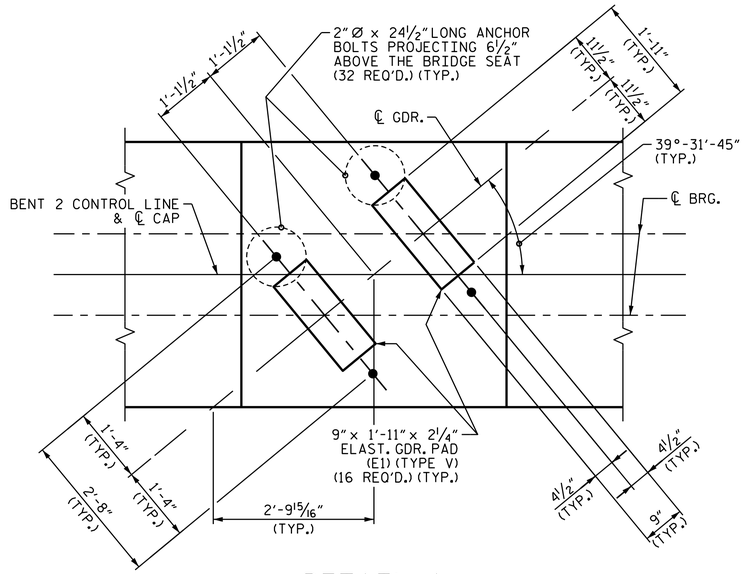


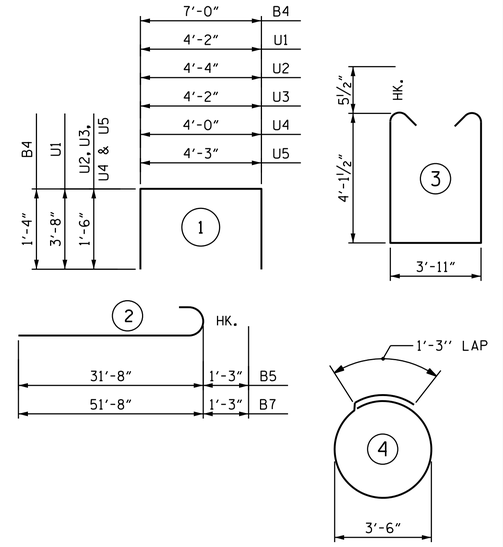
SECTION A-A



DETAIL A

TYPICAL EACH GIRDER

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 2

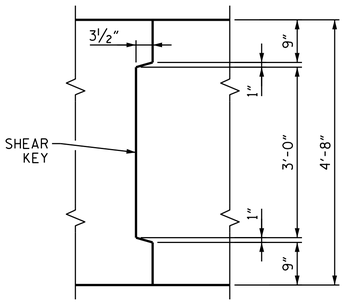
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	STR	31'-3"	538
B2	4	#10	STR	38'-0"	654
B3	4	#10	STR	51'-3"	882
B4	40	#8	1	9'-8"	1,032
B5	6	#9	2	32'-11"	672
B6	6	#9	STR	38'-10"	792
B7	6	#9	2	52'-11"	1,080
B8	16	#5	STR	53'-9"	897
B9	30	#4	STR	4'-4"	87
B10	24	#4	STR	28'-0"	449
B11	18	#4	STR	16'-9"	201
B12	12	#4	STR	17'-8"	142
B13	6	#4	STR	17'-2"	69
S1	204	#5	3	13'-1"	2,784
S2	44	#4	4	12'-3"	360
U1	2	#9	1	11'-6"	78
U2	114	#4	1	7'-4"	558
U3	6	#4	1	7'-2"	29
U4	4	#4	1	7'-0"	19
U5	4	#4	1	7'-3"	19
REINFORCING STEEL				LBS.	11,342

CLASS A CONCRETE

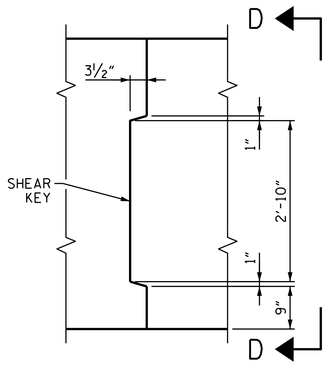
BENT CAP	CU. YDS.	84.3
TOTAL	CU. YDS.	84.3

THE CONCRETE DISPLACED BY THE PLUGGED PP 30 X 0.500 GALVANIZED STEEL PILES HAS BEEN DEDUCTED FROM THE QUANTITY OF THE CLASS A CONCRETE FOR THE BENT CAP.

PP 30 X 0.500 GALVANIZED STEEL PILE 11 REQUIRED.	LIN. FT.	1,265
PILE DRIVING EQUIPMENT SETUP FOR PP 30 x 0.500 GALVANIZED STEEL PILES	EA.	11
PIPE PILE PLATES PER EACH	TOTAL	11
PILE REDRIVES PER EACH	TOTAL	11

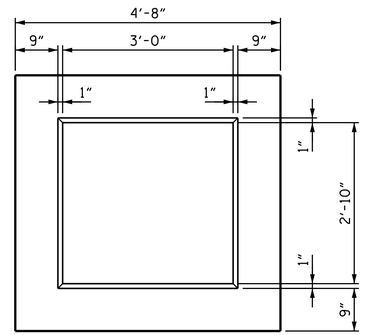


PLAN

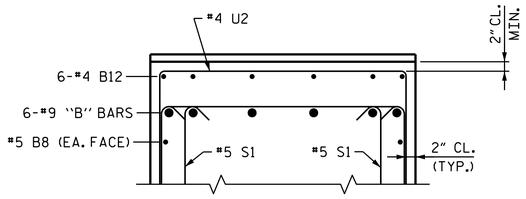


ELEVATION

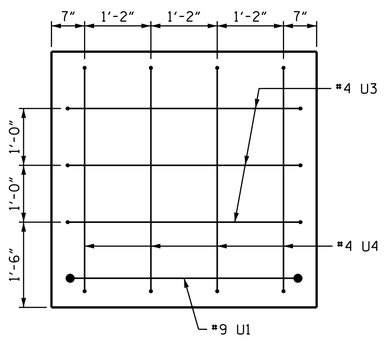
SHEAR KEY DETAILS



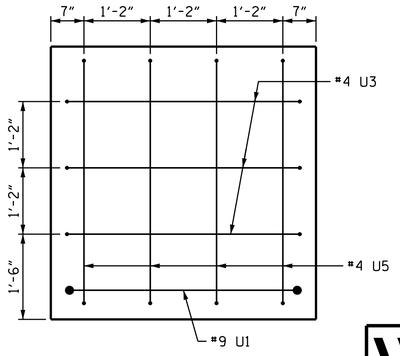
SECTION D-D



SECTION B-B



SECTION X-X



SECTION Y-Y

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			43

DESIGNED BY: S. NATARAJAN DATE: SEP 2017
DRAWN BY: M.J. OSTRISHKO DATE: OCT 2017
CHECKED BY: J. SHERMAN DATE: OCT 2017
DESIGN ENGINEER OF RECORD: J. SHERMAN DATE: FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

2/8/2019
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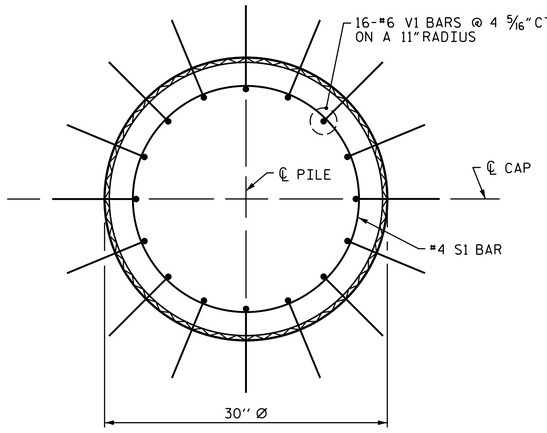
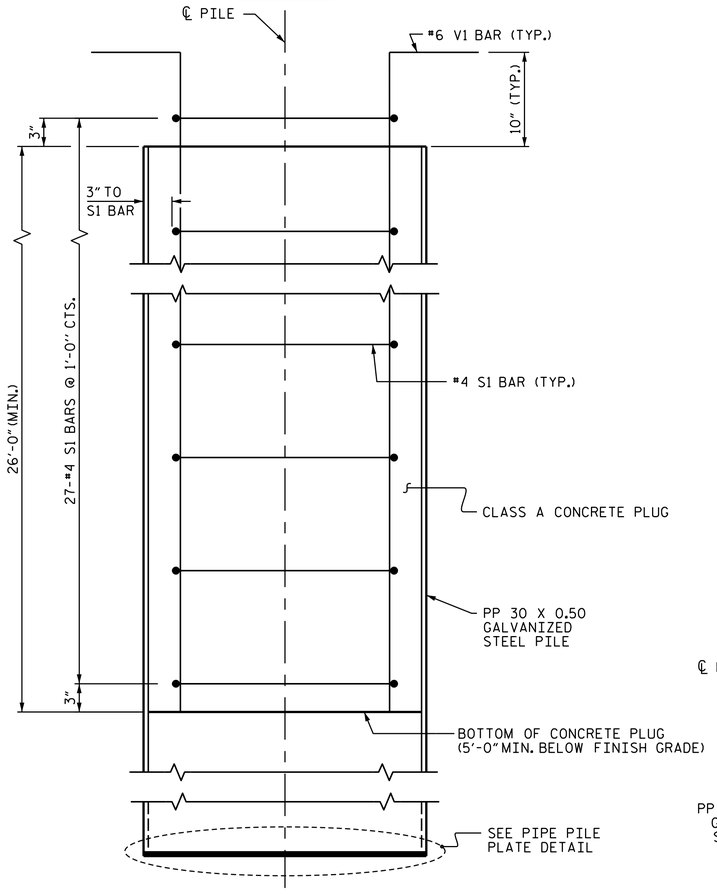


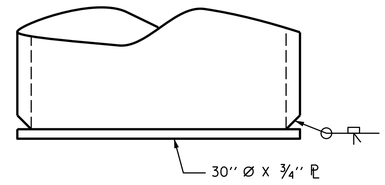
PLAN



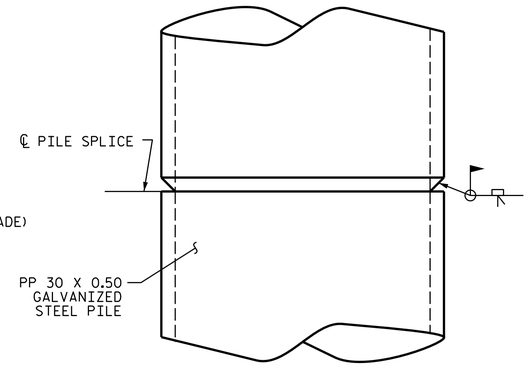
ELEVATION

PP 30 X 0.50 GALVANIZED STEEL PILE

(CLOSED END)



PIPE PILE PLATE DETAIL



PIPE PILE SPLICE DETAIL

NOTES

PIPE PILES SHALL BE IN ACCORDANCE WITH SECTION 1084 OF THE STANDARD SPECIFICATIONS.

GALVANIZE STEEL PIPE PILES IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS UNLESS METALLIZING IS REQUIRED. GALVANIZING OR METALLIZING PIPE PILE PLATES IS NOT REQUIRED.

PIPE PILE PLATES, IF REQUIRED, SHALL BE IN ACCORDANCE WITH SECTION 450 OF THE STANDARD SPECIFICATIONS.

REMOVE AND REPLACE OR REPAIR TO THE SATISFACTION OF THE ENGINEER PILES THAT ARE DAMAGED, DEFORMED OR COLLAPSED DURING INSTALLATION OR DRIVING.

PILE SPLICES SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND AWS D1.1.

FOR CLOSED END PIPE PILES, REMOVE ALL SOIL AND WATER FROM INSIDE THE PILES JUST PRIOR TO PLACING REINFORCING STEEL AND CONCRETE FOR THE CONCRETE PLUG.

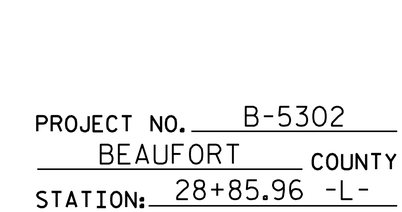
FORM THE CONCRETE PLUG SUCH THAT THE REINFORCING STEEL OR CONCRETE DOES NOT MOVE AND THE CLEARANCE FROM THE REINFORCING STEEL TO THE INSIDE OF THE PILE IS MAINTAINED AFTER CONCRETE PLACEMENT. DO NOT PLACE CONCRETE IN THE BENT CAP UNTIL THE CONCRETE PLUG HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI.

THE REINFORCING STEEL, CLASS A CONCRETE, AND GALVANIZING ARE CONSIDERED INCIDENTAL TO THE CONTRACT UNIT PRICE BID PER LINEAR FOOT FOR PP 30 X 0.50 GALVANIZED STEEL PILES.

BILL OF MATERIAL FOR ONE PP 30 X 0.50 GALVANIZED STEEL PILE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
S1	27	#4	1	7'-7"	137
V1	16	#6	2	27'-10"	669
REINFORCING STEEL =				806	lbs
CLASS A CONCRETE					
26'-0" MINIMUM PLUG					4.7 CY

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

30" STEEL PIPE PILE

DESIGNED BY: S. NATARAJAN DATE : AUG 2017
DRAWN BY: M.J. OSTRISHKO DATE : AUG 2017
CHECKED BY: J. SHERMAN DATE : OCT 2017
DESIGN ENGINEER OF RECORD: J. SHERMAN DATE : FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
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TEL: 1.704.342.5401
LICENSE NO. F-0165

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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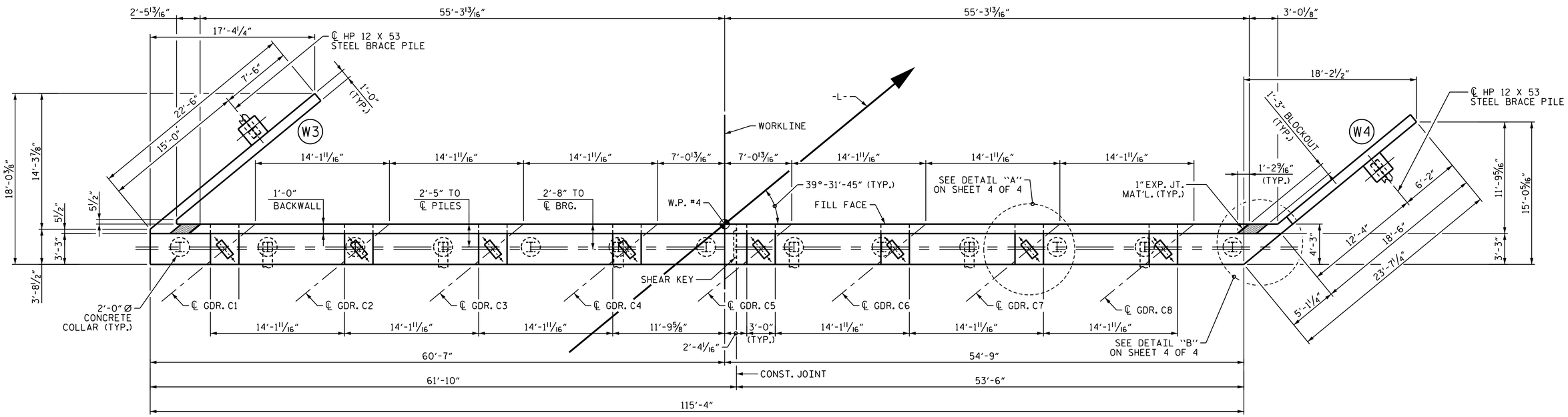
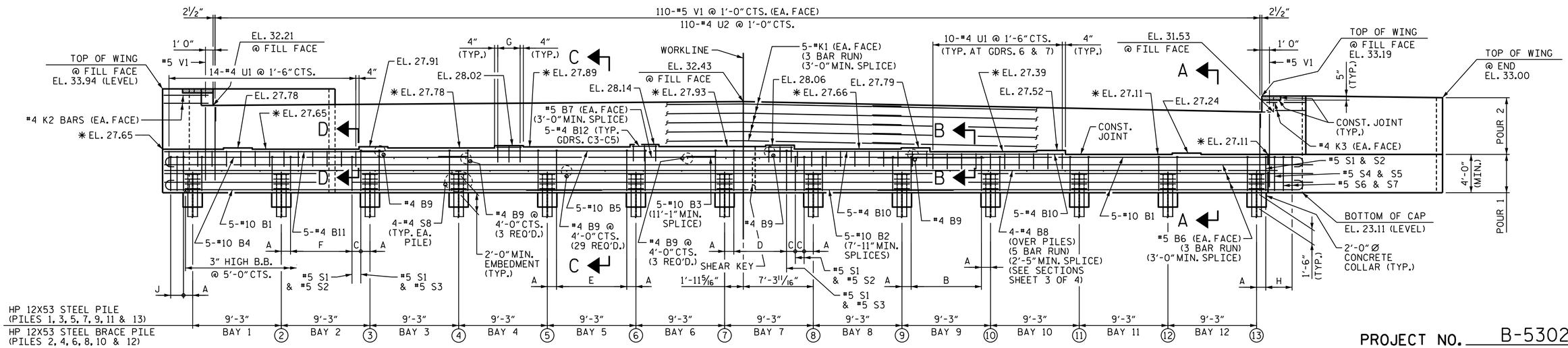


PLAN



ELEVATION

✱FOR LOCATION OF ELEVATION BETWEEN BUILDUPS, SEE SECTIONS A-A, B-B, C-C & D-D ON SHEET 3 OF 4. FOR SHEAR KEY DETAILS, SEE SHEET 3 OF 4. WING BRACE PILES OMITTED FOR CLARITY.

NOTES

FOR SECTION A-A , B-B, C-C AND D-D SEE SHEET 3 OF 4.

STIRUPS AND #4 U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY CLEAR ANCHOR BOLTS.

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 THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE 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 VERTICAL CONCRETE BARRIER RAIL IS IF SLIP FORMING IS USED.

DATA

A	11 1/2"	F	8-#5 S1 & #5 S2 @ 11" CTS.
B	9-#5 S1 & #5 S2 @ 11" CTS. (TYP. BAYS 1 & 8 THRU 12)	G	3-#4 U1 @ 1'-2" CTS. (TYP. UNDER GDRS. C3 THRU C5)
C	11"	H	4-#5 "S" BARS @ 11" MAX. CTS.
D	7-#5 S1 & #5 S3 @ 11" CTS.	J	3-#5 S1 & #5 S2 @ 7" CTS.
E	9-#5 S1 & #5 S3 @ 11" CTS. (TYP. BAYS 3 THRU 6)		

DESIGNED BY:	A. D'AIUTO	DATE :	JUL 2017
DRAWN BY:	M.J. OSTRISHKO	DATE :	JUL 2017
CHECKED BY:	J. SHERMAN	DATE :	OCT 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE :	FEB 2019

WSP USA
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SUITE 610
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TEL: 1.704.342.5401
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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488...

02-08-2019

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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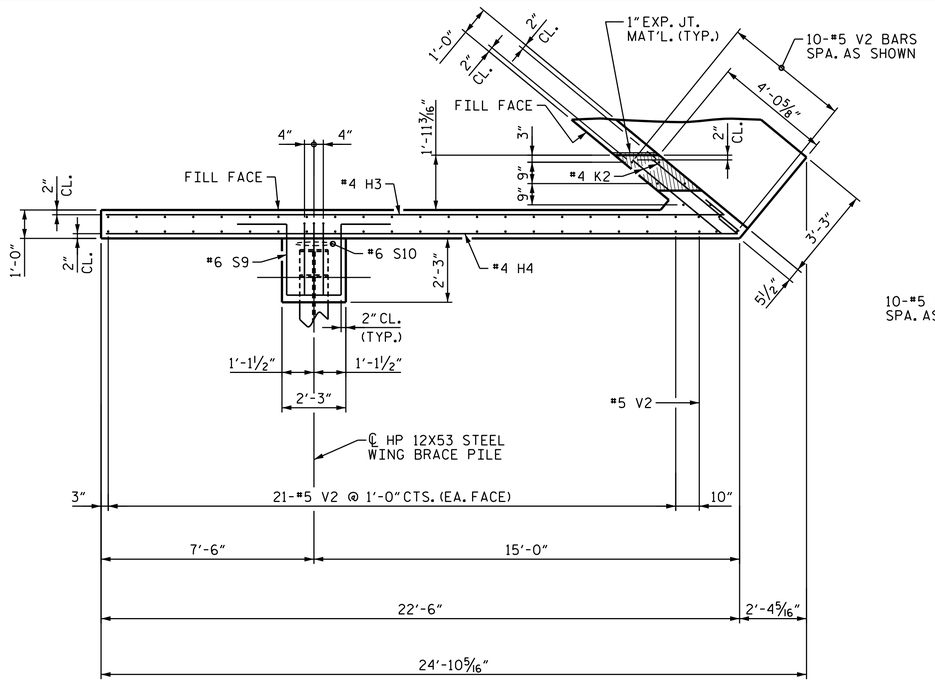
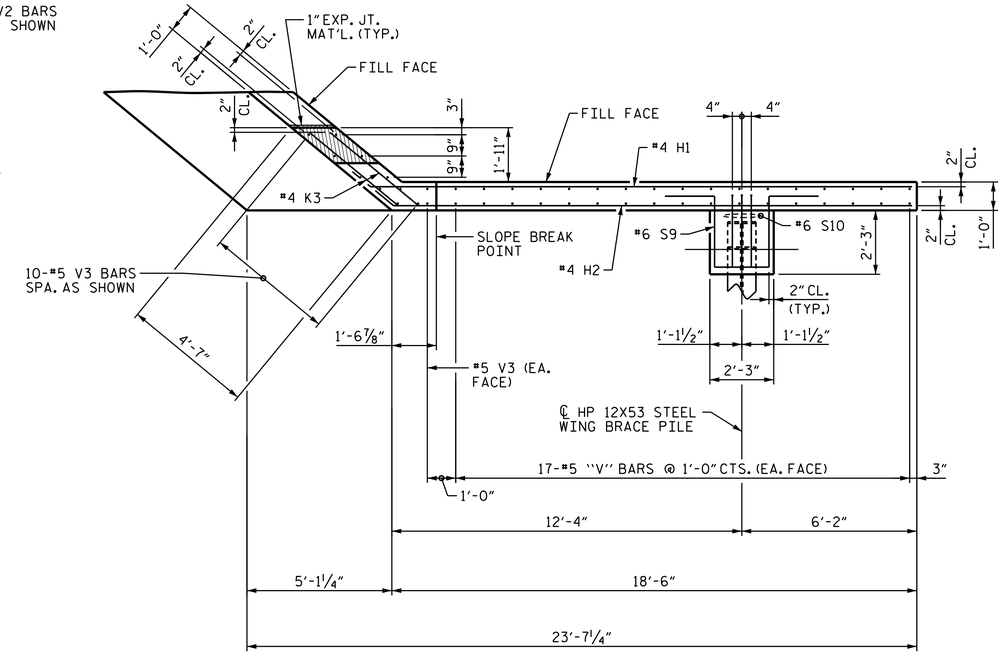
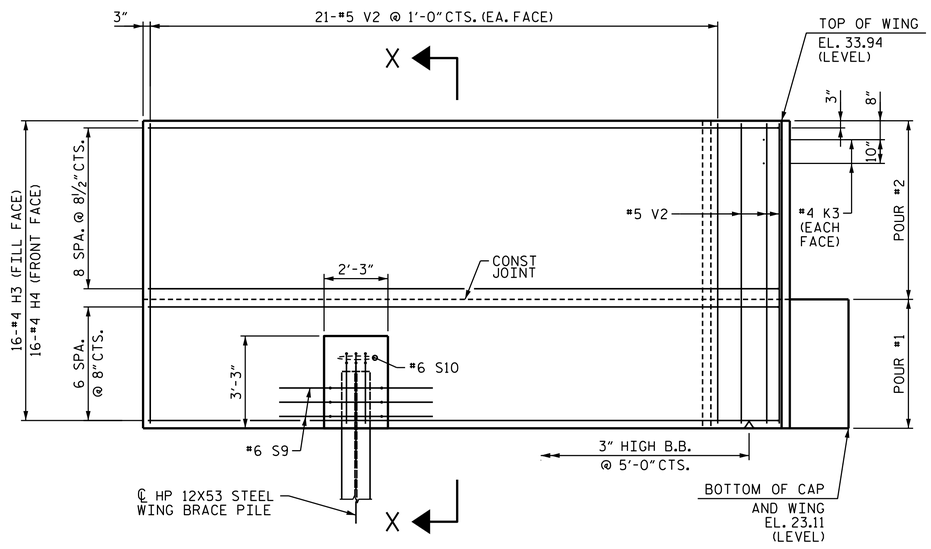


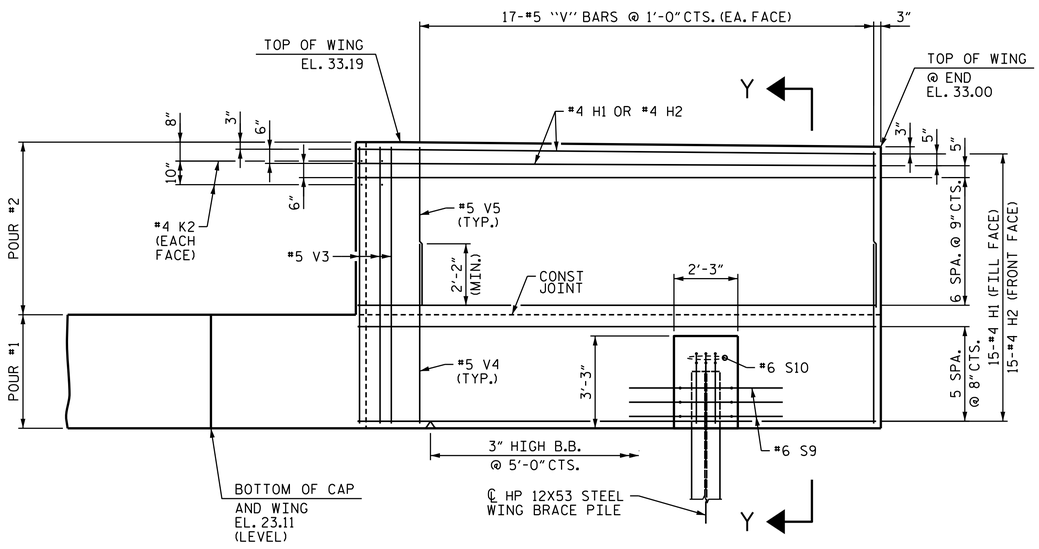
PLAN OF WING (W3)



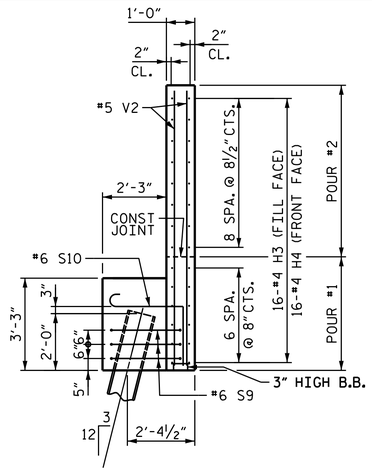
PLAN OF WING (W4)



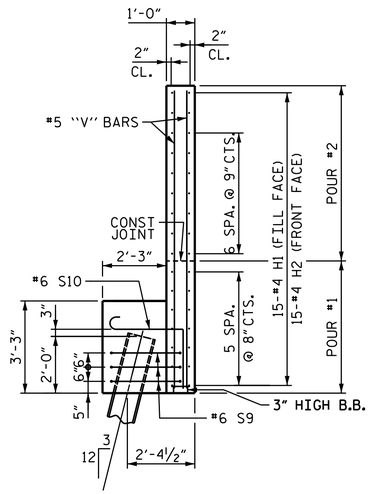
ELEVATION OF WING (W3)



ELEVATION OF WING (W4)



SECTION X-X



SECTION Y-Y

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

DESIGNED BY: A. D'AIUTO DATE : JUL 2017
DRAWN BY: M.J. OSTRISHKO DATE : JUL 2017
CHECKED BY: J. SHERMAN DATE : OCT 2017
DESIGN ENGINEER OF RECORD: J. SHERMAN DATE : FEB 2019

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN
DocuSigned by: Jacob P. Sherman
AE8326DDCE18488... 02-08-2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401

LICENSE NO. F-0165

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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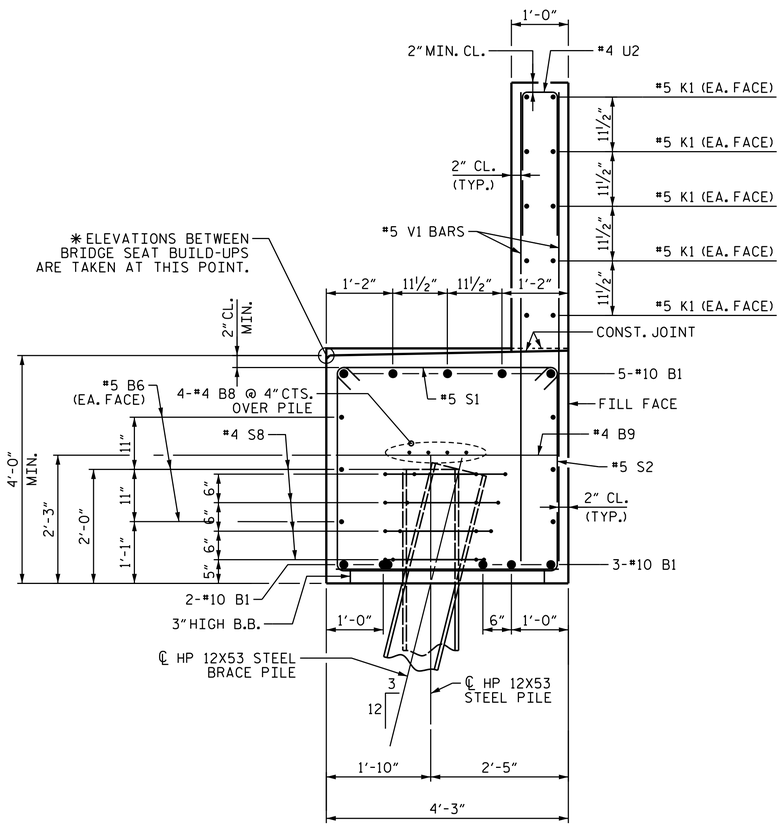
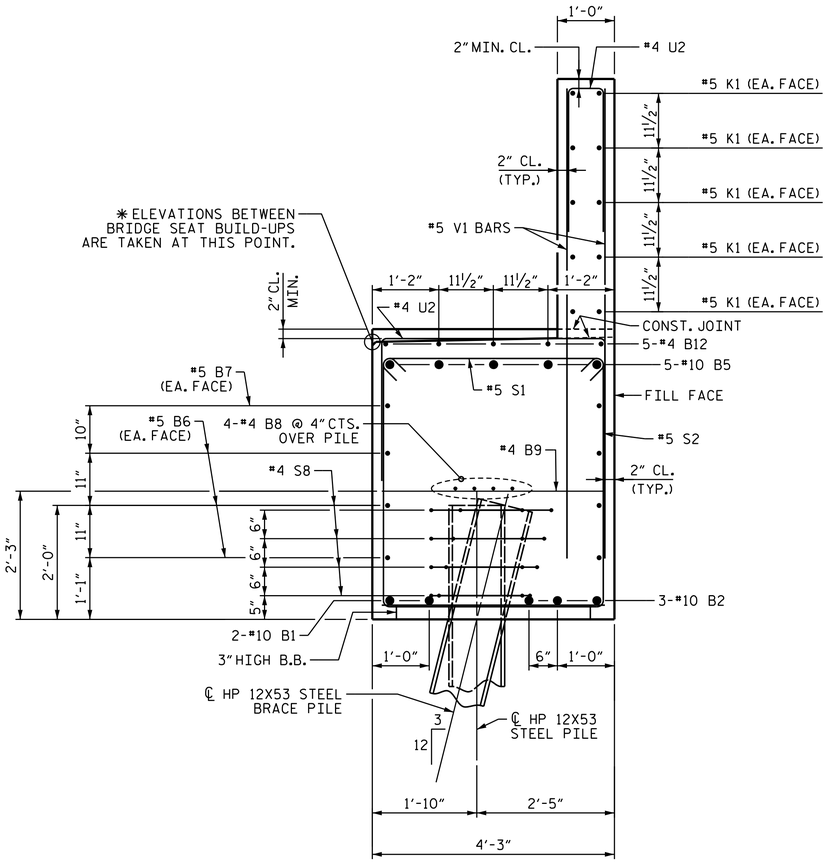
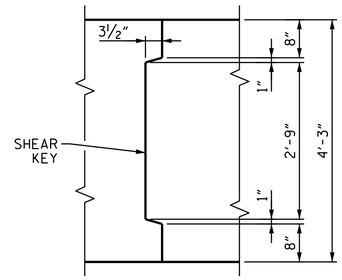


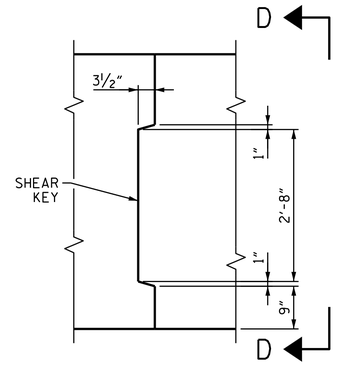
SECTION A-A



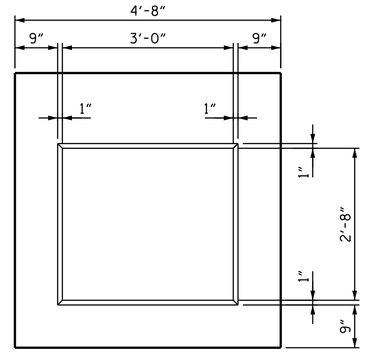
SECTION C-C



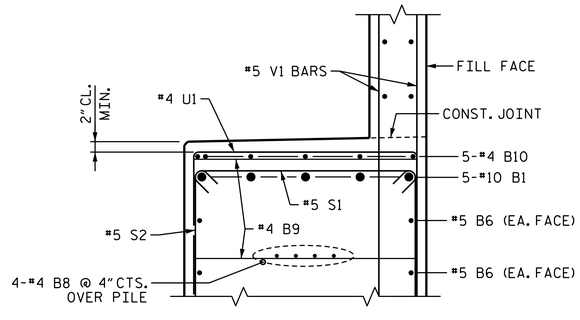
PLAN



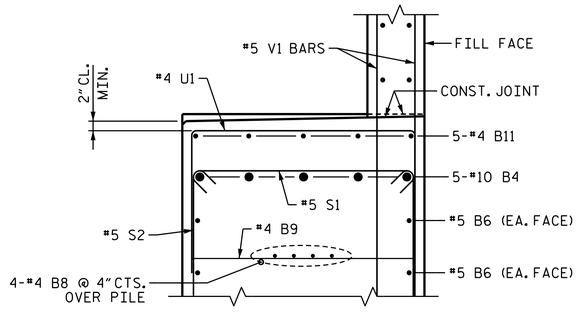
ELEVATION



SECTION D-D



SECTION B-B



SECTION D-D

SHEAR KEY DETAILS

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

DESIGNED BY:	A. D'AIUTO — DATE : JUL 2017
DRAWN BY:	M.J. OSTRISHKO — DATE : JUL 2017
CHECKED BY:	J. SHERMAN — DATE : OCT 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN — DATE : FEB 2019

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NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			43

2/8/2019
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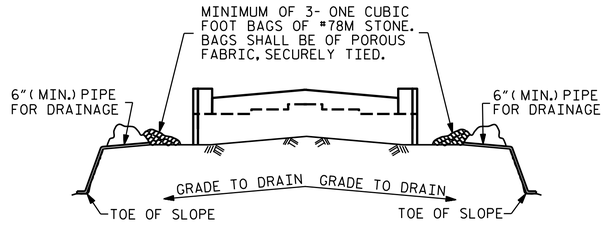
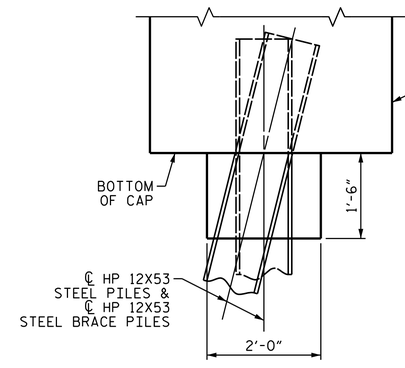


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

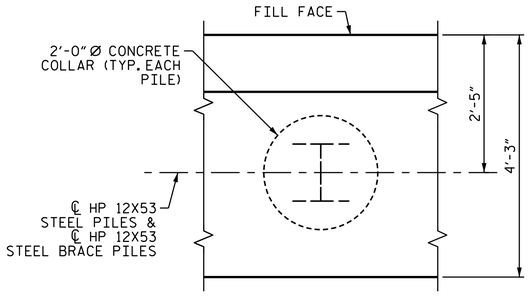
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

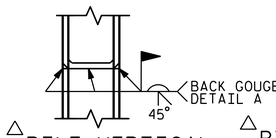


ELEVATION

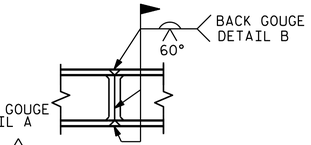


PLAN

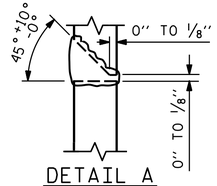
CORROSION PROTECTION FOR STEEL PILES DETAIL



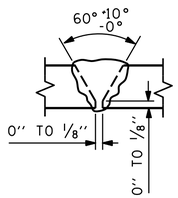
△ PILE VERTICAL



△ PILE HORIZONTAL OR VERTICAL



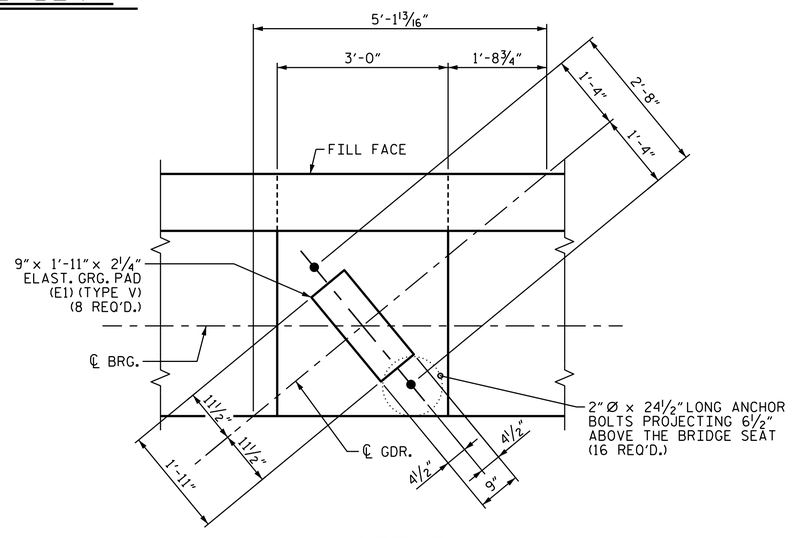
DETAIL A



DETAIL B

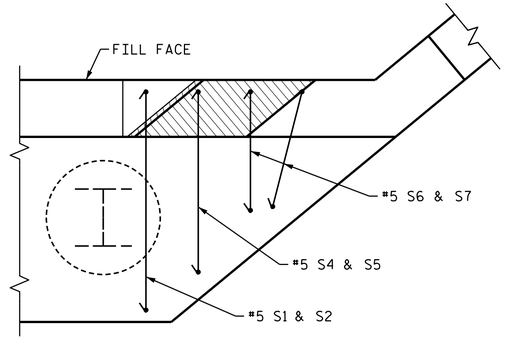
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



DETAIL A

TYPICAL EACH GIRDER



DETAIL B

BILL OF MATERIAL

END BENT 2

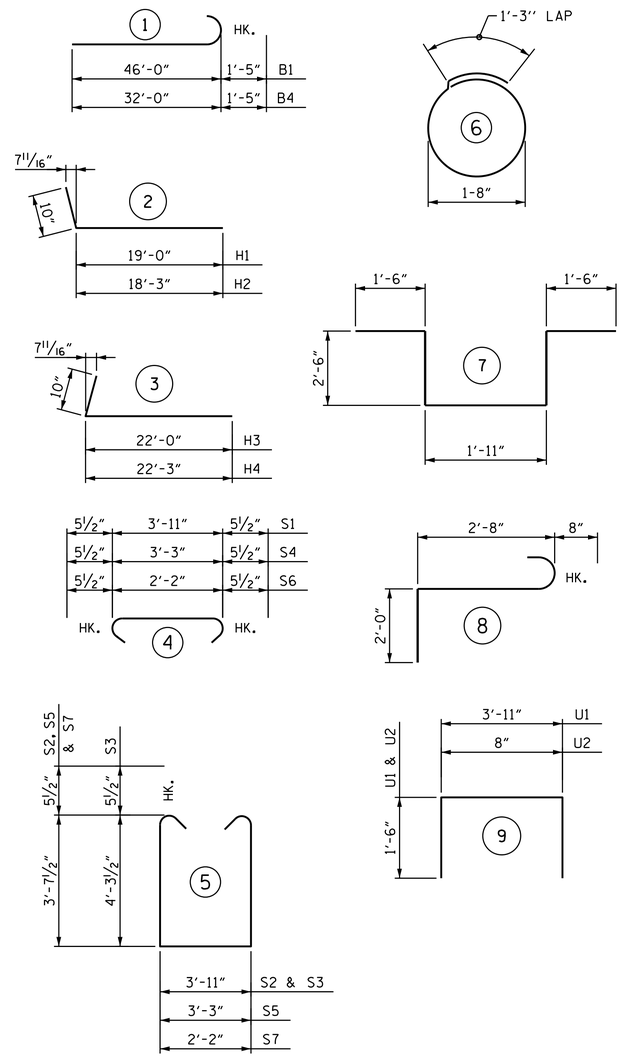
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	15	#10	1	47'-5"	3,061
B2	5	#10	STR	45'-0"	968
B3	5	#10	STR	31'-5"	676
B4	5	#10	1	33'-5"	719
B5	5	#10	STR	45'-1"	970
B6	18	#5	STR	42'-2"	792
B7	2	#5	STR	29'-4"	61
B8	20	#4	STR	25'-7"	342
B9	38	#4	STR	3'-11"	99
B10	10	#4	STR	16'-10"	112
B11	5	#4	STR	23'-0"	77
B12	15	#4	STR	2'-8"	27
H1	15	#4	2	19'-10"	199
H2	15	#4	2	19'-1"	191
H3	16	#4	3	22'-10"	244
H4	16	#4	3	23'-1"	247
K1	30	#5	STR	42'-2"	1,319
K2	4	#4	STR	4'-0"	11
K3	4	#4	STR	3'-11"	10
S1	112	#5	4	4'-10"	565
S2	68	#5	5	12'-1"	857
S3	44	#5	5	13'-8"	627
S4	1	#5	4	4'-2"	4
S5	1	#5	5	11'-5"	12
S6	2	#5	4	3'-1"	6
S7	2	#5	5	10'-4"	22
S8	52	#4	6	6'-6"	226
S9	6	#6	7	9'-11"	89
S10	6	#6	8	5'-4"	48
U1	43	#4	9	6'-11"	199
U2	110	#4	9	3'-8"	269
V1	222	#5	STR	8'-0"	1,852
V2	52	#5	STR	10'-6"	569
V3	12	#5	STR	9'-9"	122
V4	34	#5	STR	6'-6"	231
V5	34	#5	STR	5'-4"	189
REINFORCING STEEL				LBS.	16,012

CLASS A CONCRETE BREAKDOWN

POUR #1	CAP, LOWER WINGS, WING BRACE PILES & CONCRETE COLLARS	CU. YDS. 93.4
POUR #2	BACKWALL & UPPER WINGS	CU. YDS. 29.8
TOTAL		CU. YDS. 123.2

HP 12x53 STEEL PILES 15 REQUIRED.	LIN. FT.	1,200
PILE DRIVING EQUIPMENT SETUP FOR 12x53 STEEL PILES	EA.	15
PILE REDRIVES	EA.	15

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			43

DESIGNED BY: A. D'AIUTO DATE: JUL 2017
DRAWN BY: M.J. OSTRISHKO DATE: JUL 2017
CHECKED BY: J. SHERMAN DATE: OCT 2017
DESIGN ENGINEER OF RECORD: J. SHERMAN DATE: FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE16488... 02-08-2019

2/8/2019
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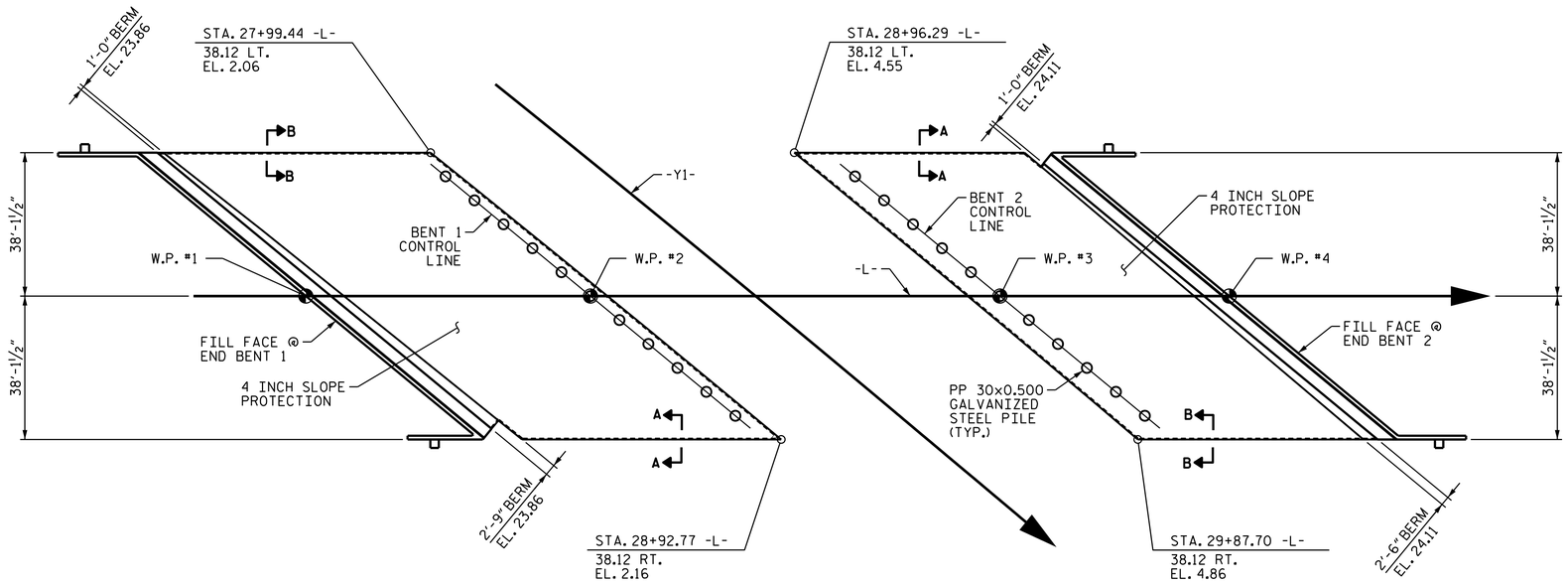


END BENT 1

END BENT 2

PLAN OF SLOPE PROTECTION

GENERAL NOTES

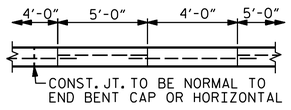
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

SLOPE PROTECTION

SLOPE PROTECTION SHALL CONSIST OF 4'' POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS ''B''. THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60'' WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE ''POURING DETAIL'' WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE ''OPTIONAL POURING DETAIL'' WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6''. THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

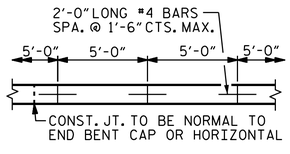
BRIDGE @ STA. 28+85.96 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	724	1,448
END BENT 2	616	1,232

* QUANTITY SHOWN IS BASED ON 5' POURS.



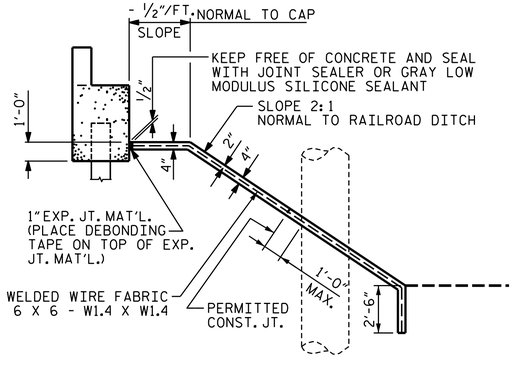
POUR A 4'-0'' STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL

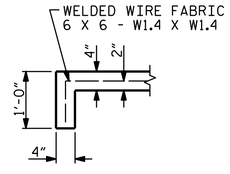


STRIP WIDTHS MAY VARY IN CURVED PORTION.

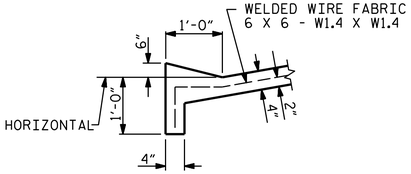
POURING DETAIL



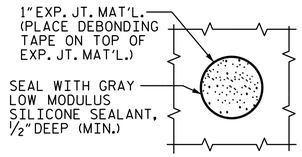
SECTION ALONG ℄ SURVEY WITH INTERIOR BENT



SECTION A-A



SECTION B-B



PLAN WHERE CONCRETE SLOPE PROTECTION MUST BE PLACED AROUND A BENT PILE

DETAILS FOR SLOPE PROTECTION

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

DRAWN BY : ELR 5/92	REV. 12/21/11	MAA/GM
CHECKED BY : GRP 6/92	REV. 1/16	MAA/GM
	REV. 12/17	MAA/THC
DESIGNED BY: A. D'AIUTO	DATE : SEP 2017	
DRAWN BY: M.J. OSTRISHKO	DATE : SEP 2017	
CHECKED BY: J. SHERMAN	DATE : SEP 2017	
DESIGN ENGINEER OF RECORD: J. SHERMAN	DATE : FEB 2019	

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TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			43

STD. NO. SP1

2/8/2019
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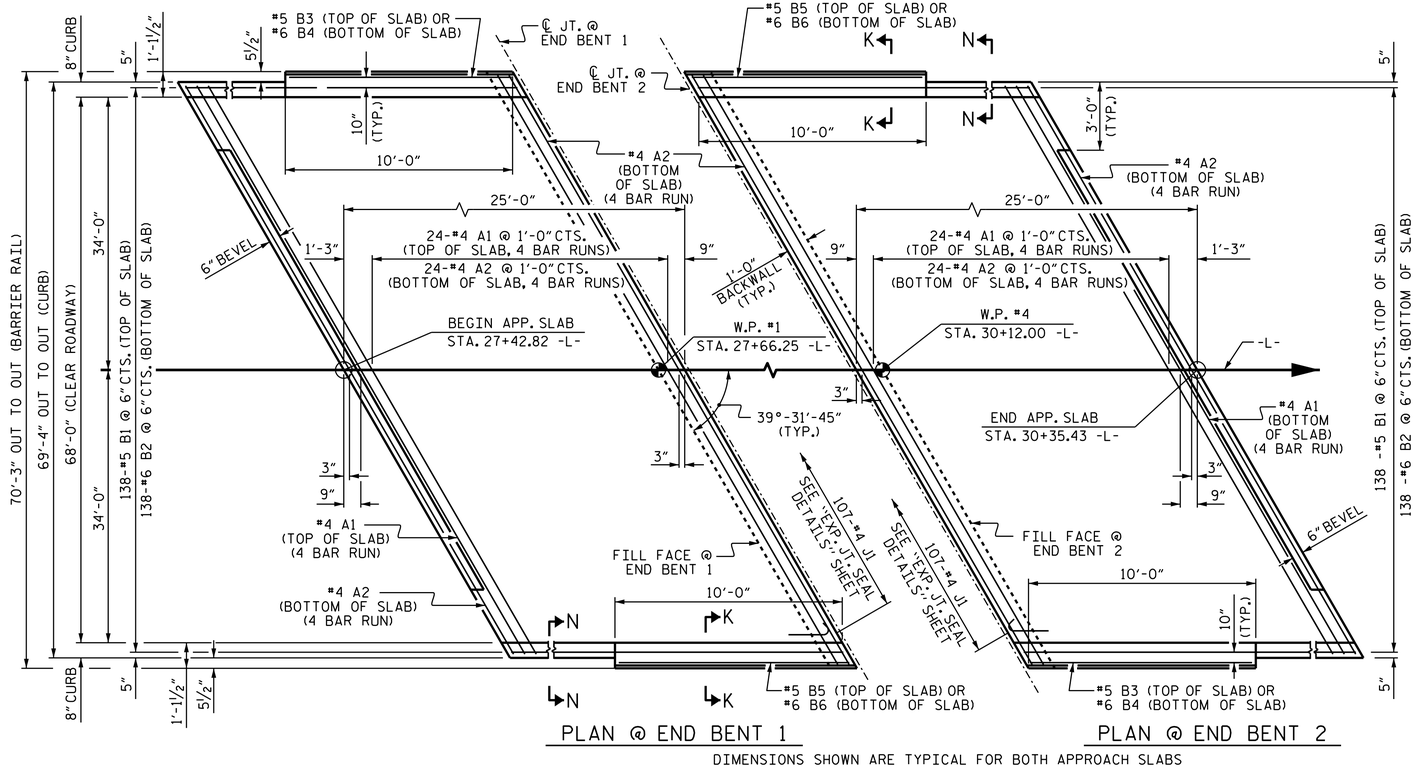
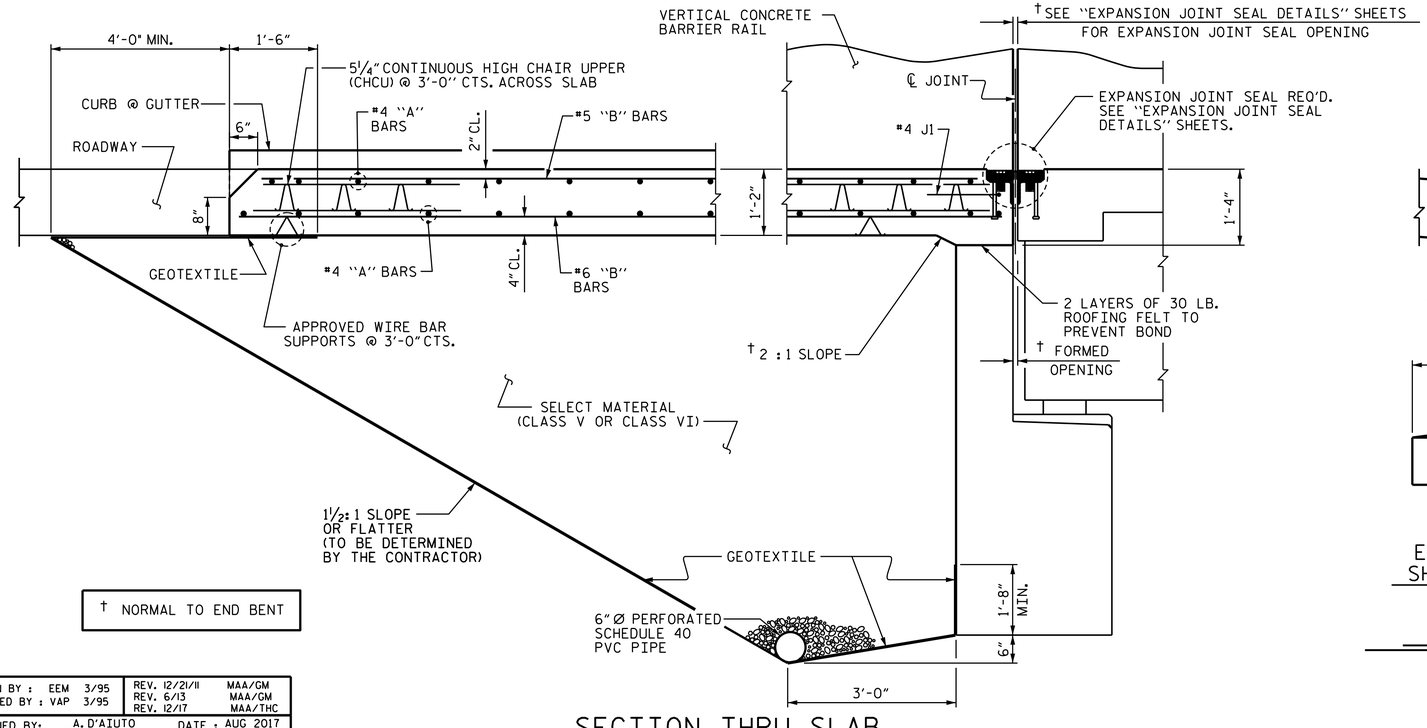


PLAN @ END BENT 1

PLAN @ END BENT 2

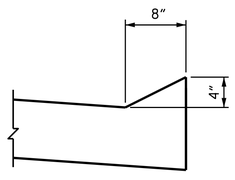
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



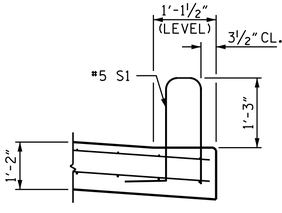
† NORMAL TO END BENT

SECTION THRU SLAB

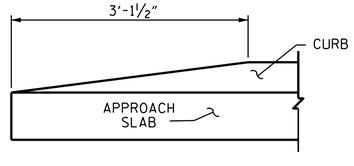
(TYPE I - STANDARD APPROACH FILL)



SECTION N-N



SECTION K-K



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

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 EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

BILL OF MATERIAL

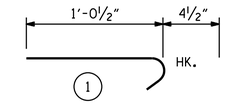
APPROACH SLAB AT END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	100	#4	STR	29'-1"	1,943
A2	104	#4	STR	28'-10"	2,003
✱ B1	138	#5	STR	23'-10"	3,430
B2	138	#6	STR	24'-8"	5,113
✱ B3	1	#5	STR	9'-7"	10
B4	1	#6	STR	9'-9"	15
✱ B5	1	#5	STR	9'-11"	10
B6	1	#6	STR	10'-1"	15
✱ J1	107	#4	1	1'-5"	101
REINFORCING STEEL ✱✱				LBS.	7,146
✱ EPOXY COATED REINFORCING STEEL ✱✱				LBS.	5,494
CLASS AA CONCRETE ✱✱				C. Y.	80.0

APPROACH SLAB AT END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	100	#4	STR	29'-1"	1,943
A2	104	#4	STR	28'-10"	2,003
✱ B1	138	#5	STR	23'-10"	3,430
B2	138	#6	STR	24'-8"	5,113
✱ B3	1	#5	STR	9'-7"	10
B4	1	#6	STR	9'-9"	15
✱ B5	1	#5	STR	9'-11"	10
B6	1	#6	STR	10'-1"	15
✱ J1	107	#4	1	1'-5"	101
REINFORCING STEEL ✱✱				LBS.	7,146
✱ EPOXY COATED REINFORCING STEEL ✱✱				LBS.	5,494
CLASS AA CONCRETE ✱✱				C. Y.	80.0

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

✱✱ QUANTITIES FOR VERTICAL CONCRETE BARRIER RAIL NOT INCLUDED. SEE SHEET 2 OF 2.

NOTE: THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 1 OF 2

DRAWN BY : EEM 3/95	REV. 12/21/11	MAA/GM
CHECKED BY : VAP 3/95	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC
DESIGNED BY:	A. D'AIUTO	DATE : AUG 2017
DRAWN BY:	M.J. OSTRISHKO	DATE : AUG 2017
CHECKED BY:	J. SHERMAN	DATE : SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE : FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P. SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-42
1			3			TOTAL SHEETS
2			4			43

STD. NO. BAS2 (SHT 4a)

2/8/2019
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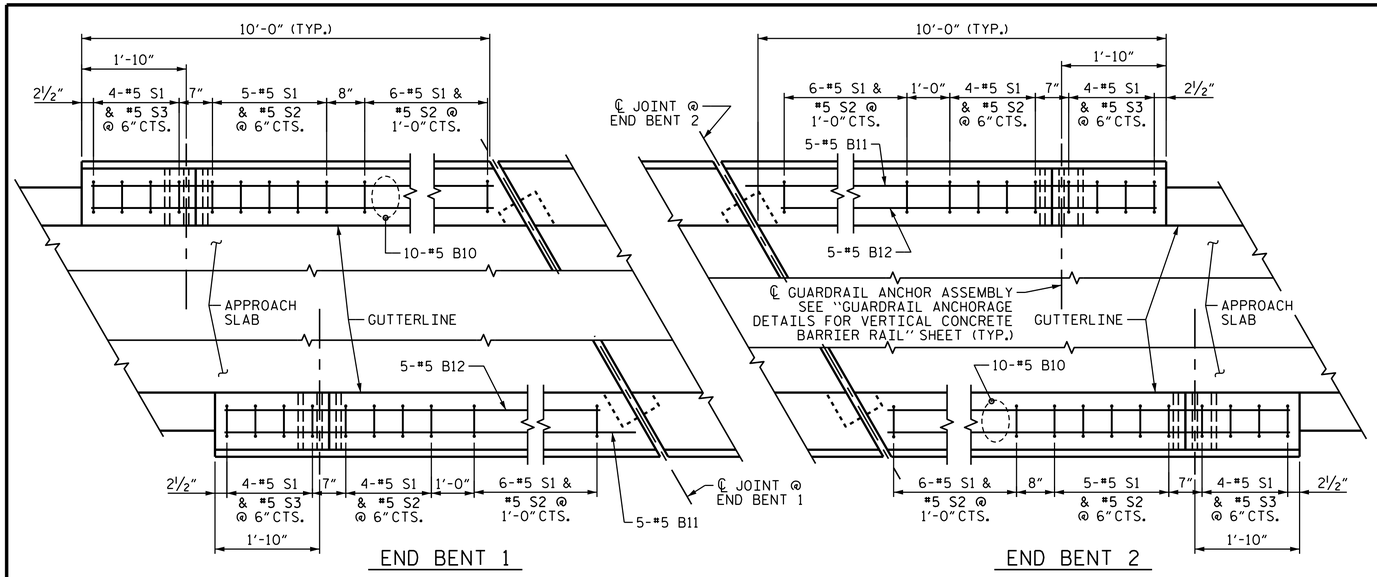


PLAN OF BARRIER RAIL

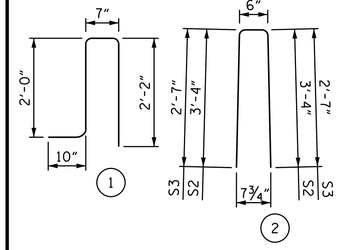
NOTES

THE COST OF THE VERTICAL CONCRETE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "VERTICAL CONCRETE BARRIER RAIL".

THE VERTICAL CONCRETE BARRIER RAIL 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 BARRIER RAILS SHALL BE EPOXY COATED.

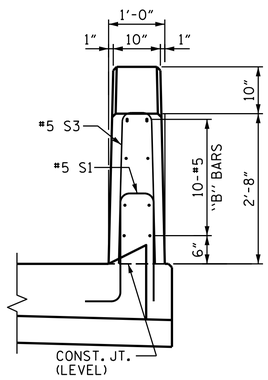
BAR TYPES



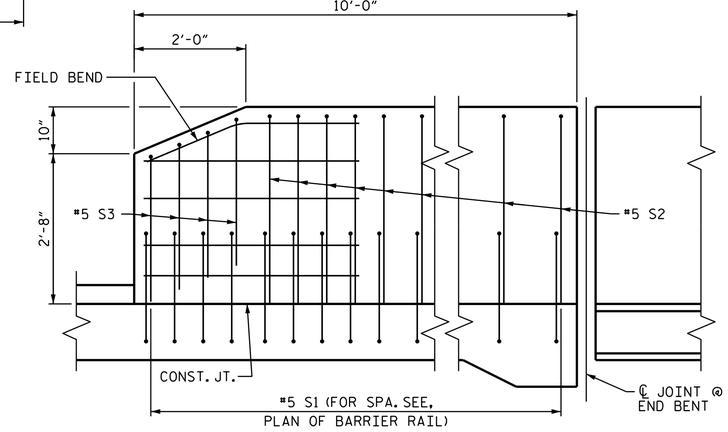
BILL OF MATERIAL

BARRIER RAIL ONLY

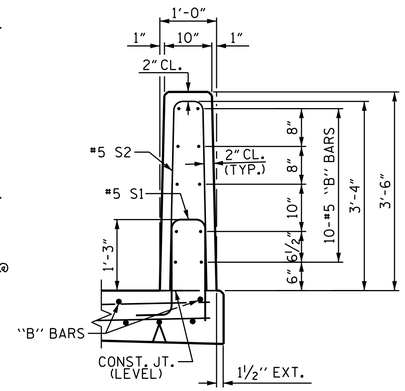
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B10	20	#5	STR	10'-0"	209
✱B11	10	#5	STR	10'-2"	106
✱B12	10	#5	STR	9'-5"	98
✱S1	58	#5	1	5'-7"	338
✱S2	42	#5	2	7'-2"	314
✱S3	16	#5	2	5'-8"	95
✱EPOXY COATED REINFORCING STEEL				LBS.	1,160
CLASS AA CONCRETE				C.Y.	4.8
CONCRETE BARRIER RAIL				LIN.FT.	40.0



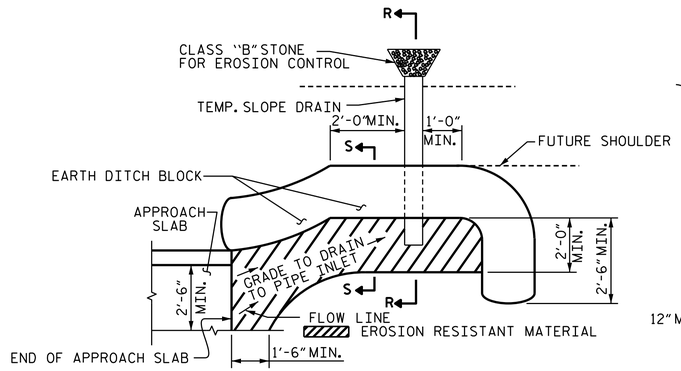
END VIEW



SIDE VIEW

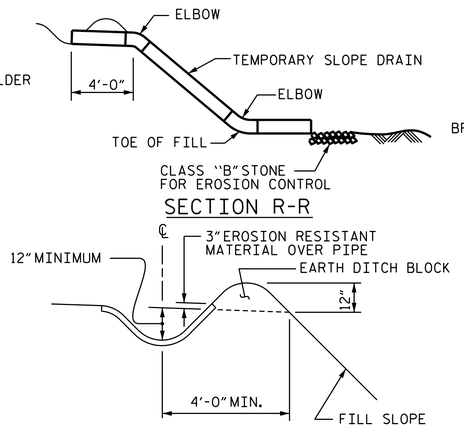


SECTION THRU RAIL



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.

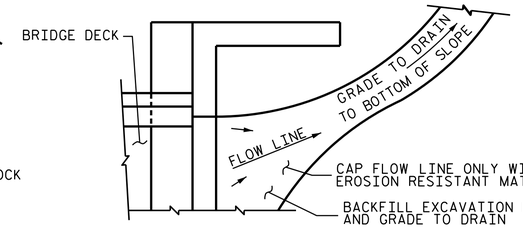
PLAN VIEW



SECTION R-R

SECTION S-S

END OF RAIL DETAILS



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

TEMPORARY DRAINAGE DETAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. B-5302

BEAUFORT COUNTY

STATION: 28+85.96 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 031988 ENGINEER JACOB P SHERMAN

DocuSigned by: Jacob P. Sherman AE8326DDCE18488... 02-08-2019

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

DESIGNED BY:	A.D'AIUTO	DATE : AUG 2017
DRAWN BY:	M.J. OSTRISHKO	DATE : AUG 2017
CHECKED BY:	J. SHERMAN	DATE : SEP 2017
DESIGN ENGINEER OF RECORD:	J. SHERMAN	DATE : FEB 2019

WSP USA
1001 MOREHEAD SQUARE DRIVE
SUITE 610
CHARLOTTE, NC 28203
TEL: 1.704.342.5401
LICENSE NO. F-0165

2/8/2019
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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.

ENGLISH

JANUARY, 1990

STD. NO. SN

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