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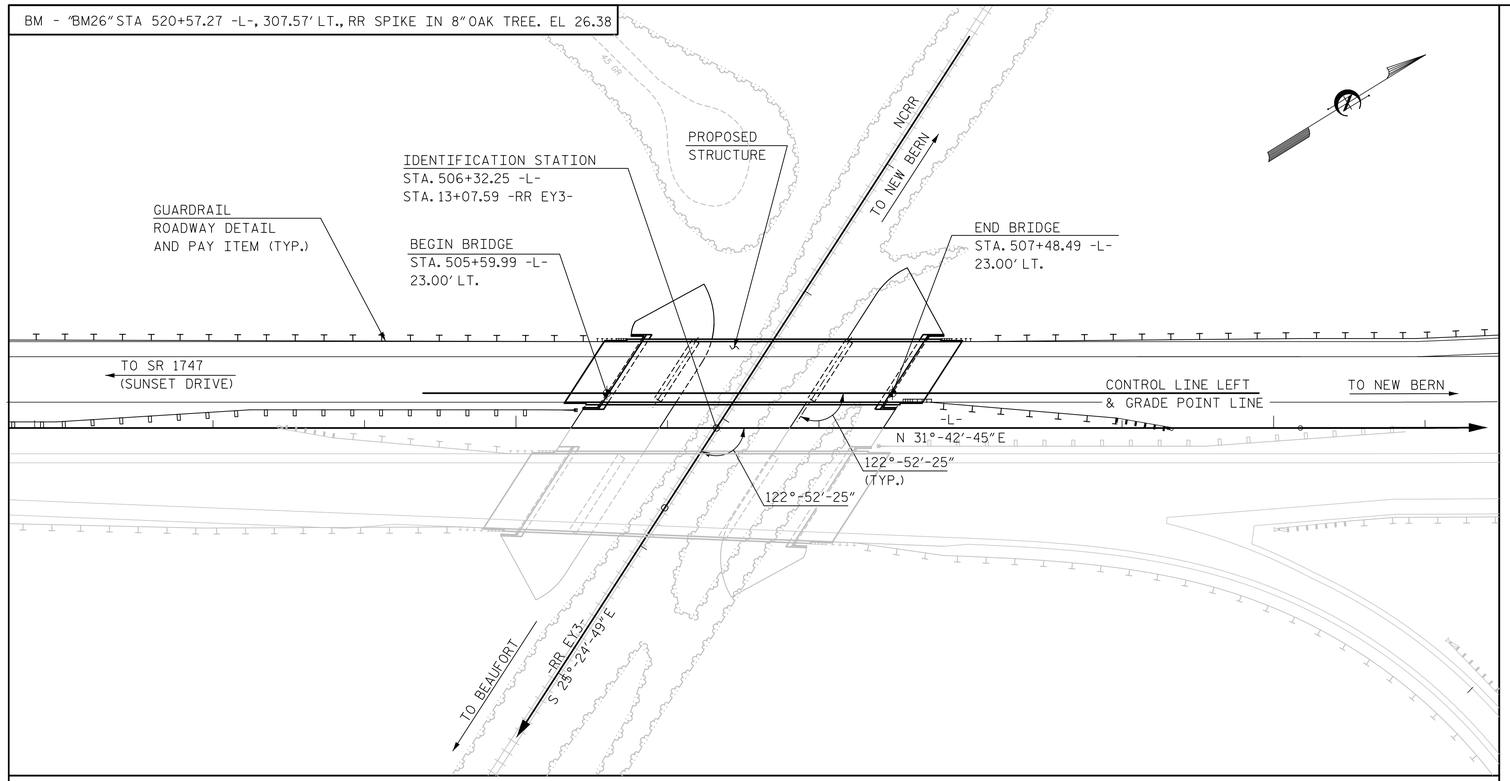


LOCATION SKETCH

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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 REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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

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

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.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION FOR BENT AT STATION 506+32.25 (LEFT LANE)	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLAB AT STATION 506+32.25 (LEFT LANE)	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	
	LUMP SUM	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	L.F.
SUPERSTRUCTURE	———	———	8,044	8,596	———	LUMP SUM	———	———	15	910.10
END BENT 1	———	———	———	———	64.0	———	7,310	———	—	———
BENT 1	LUMP SUM	———	———	———	108.6	———	13,917	2,263	—	———
BENT 2	LUMP SUM	———	———	———	110.7	———	14,182	2,401	—	———
END BENT 2	———	———	———	———	65.0	———	7,225	———	—	———
TOTAL	LUMP SUM	2	8,044	8,596	348.3	LUMP SUM	42,634	4,664	15	910.10

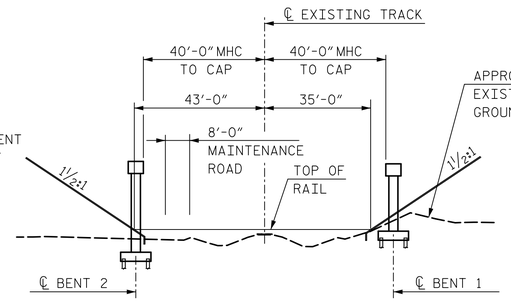
TOTAL BILL OF MATERIAL

	PILE DRIVING EQUIPMENT SETUP FOR 12" PRESTRESSED CONCRETE PILES	PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	12" PRESTRESSED CONCRETE PILES		HP 12x53 STEEL PILES		PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS
	EACH	EACH	NO.	L.F.	NO.	L.F.	EACH	L.F.	SQ. YD.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	———	———	—	———	—	———	———	413.7	———	LUMP SUM	LUMP SUM
END BENT 1	———	9	—	———	9	585	5	———	565	———	———
BENT 1	18	———	18	990	—	———	9	———	———	———	———
BENT 2	18	———	18	990	—	———	9	———	———	———	———
END BENT 2	———	9	—	———	9	540	5	———	720	———	———
TOTAL	36	18	36	1,980	18	1,125	28	413.7	1,285	LUMP SUM	LUMP SUM

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 = 60ksi.



SECTION THRU RAILROAD

LOOKING IN DIRECTION OF INCREASING STATIONS ON RAILROAD
(SPAN LENGTH IS BASED ON THIS SECTION)

MHC = MINIMUM HORIZONTAL CLEARANCE

DocuSigned by: Paul J. Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
12/6/2018

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PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 506+32.25 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
LOCATION SKETCH,
GENERAL NOTES AND
TOTAL BILL OF MATERIAL
LEFT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY N. HART DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 3

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-3
1			3			TOTAL SHEETS
2			4			39

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.03	--	1.75	0.80	1.62	C	I	23.3	0.99	1.28	B	I	19.3	0.80	0.76	1.03	B	ER	49.4	
		HL-93 (OPERATING)	N/A	--	1.70	--	1.35	0.80	2.11	C	I	23.3	0.99	1.70	B	I	19.3	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.44	51.8	1.75	0.80	2.00	C	I	23.3	0.99	1.70	B	I	19.3	0.80	0.76	1.44	B	ER	49.4	
		HS-20 (OPERATING)	36.000	--	2.25	81.0	1.35	0.80	2.60	C	I	23.3	0.99	2.25	B	I	19.3	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	3.41	46.0	1.40	0.80	5.01	C	I	23.3	0.99	5.30	B	I	19.3	0.80	0.76	3.41	B	ER	49.4	
		SNGARBS2	20.000	--	2.47	49.4	1.40	0.80	3.99	C	I	23.3	0.99	3.69	B	I	19.3	0.80	0.76	2.47	B	ER	49.4	
		SNAGRIS2	22.000	--	2.31	50.8	1.40	0.80	3.90	C	I	23.3	0.99	3.40	B	I	19.3	0.80	0.76	2.31	B	ER	49.4	
		SNCOTTS3	27.250	--	1.70	46.3	1.40	0.80	2.50	C	I	23.3	0.99	2.56	B	I	19.3	0.80	0.76	1.70	B	ER	49.4	
		SNAGGRS4	34.925	--	1.39	48.6	1.40	0.80	2.19	C	I	23.3	0.99	2.07	B	I	19.3	0.80	0.76	1.39	B	ER	49.4	
		SNS5A	35.550	--	1.36	48.4	1.40	0.80	2.13	C	I	23.3	0.99	2.09	B	I	19.3	0.80	0.76	1.36	B	ER	49.4	
		SNS6A	39.950	--	1.24	49.5	1.40	0.80	2.00	C	I	23.3	0.99	1.88	B	I	19.3	0.80	0.76	1.24	B	ER	49.4	
		SNS7B	42.000	--	1.18	49.6	1.40	0.80	1.91	C	I	23.3	0.99	1.83	B	I	19.3	0.80	0.76	1.18	B	ER	49.4	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.51	49.8	1.40	0.80	2.45	C	I	23.3	0.99	2.28	B	I	19.3	0.80	0.76	1.51	B	ER	49.4	
		TNT4A	33.075	--	1.51	49.9	1.40	0.80	2.48	C	I	23.3	0.99	2.23	B	I	19.3	0.80	0.76	1.51	B	ER	49.4	
		TNT6A	41.600	--	1.22	50.8	1.40	0.80	2.07	C	I	23.3	0.99	1.93	B	I	19.3	0.80	0.76	1.22	B	ER	49.4	
		TNT7A	42.000	--	1.22	51.2	1.40	0.80	2.10	C	I	23.3	0.99	1.90	B	I	19.3	0.80	0.76	1.22	B	ER	49.4	
		TNT7B	42.000	--	1.25	52.5	1.40	0.80	2.19	C	I	23.3	0.99	1.80	B	I	19.3	0.80	0.76	1.25	B	ER	49.4	
		TNAGRIT4	43.000	--	1.20	51.6	1.40	0.80	2.08	C	I	23.3	0.99	1.74	B	I	19.3	0.80	0.76	1.20	B	ER	49.4	
		TNAGT5A	45.000	--	1.14	51.3	1.40	0.80	1.94	C	I	23.3	0.99	1.71	B	I	19.3	0.80	0.76	1.14	B	ER	49.4	
		TNAGT5B	45.000	3	1.13	50.9	1.40	0.80	1.90	C	I	23.3	0.99	1.65	B	I	19.3	0.80	0.76	1.13	B	ER	49.4	

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.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

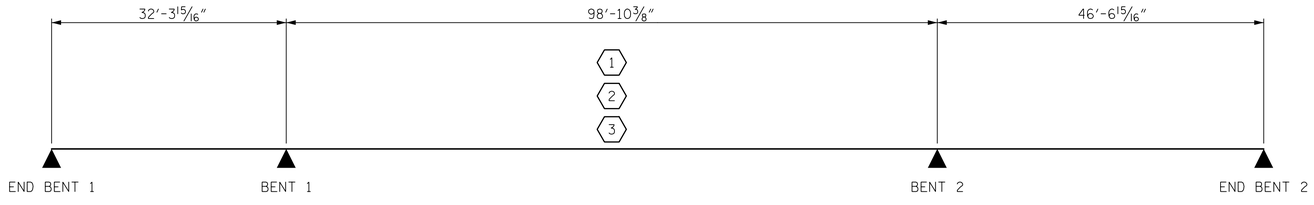
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

NOTE: SPAN LENGTHS PROVIDED ARE BEARING TO BEARING LENGTHS.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

DocuSigned by: Paul J. Barber

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-4
1			3			TOTAL SHEETS
2			4			39

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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY N. HART DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 4

ASSEMBLED BY : M. WRIGHT DATE : 8/18
CHECKED BY : N. HART DATE : 8/18

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

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

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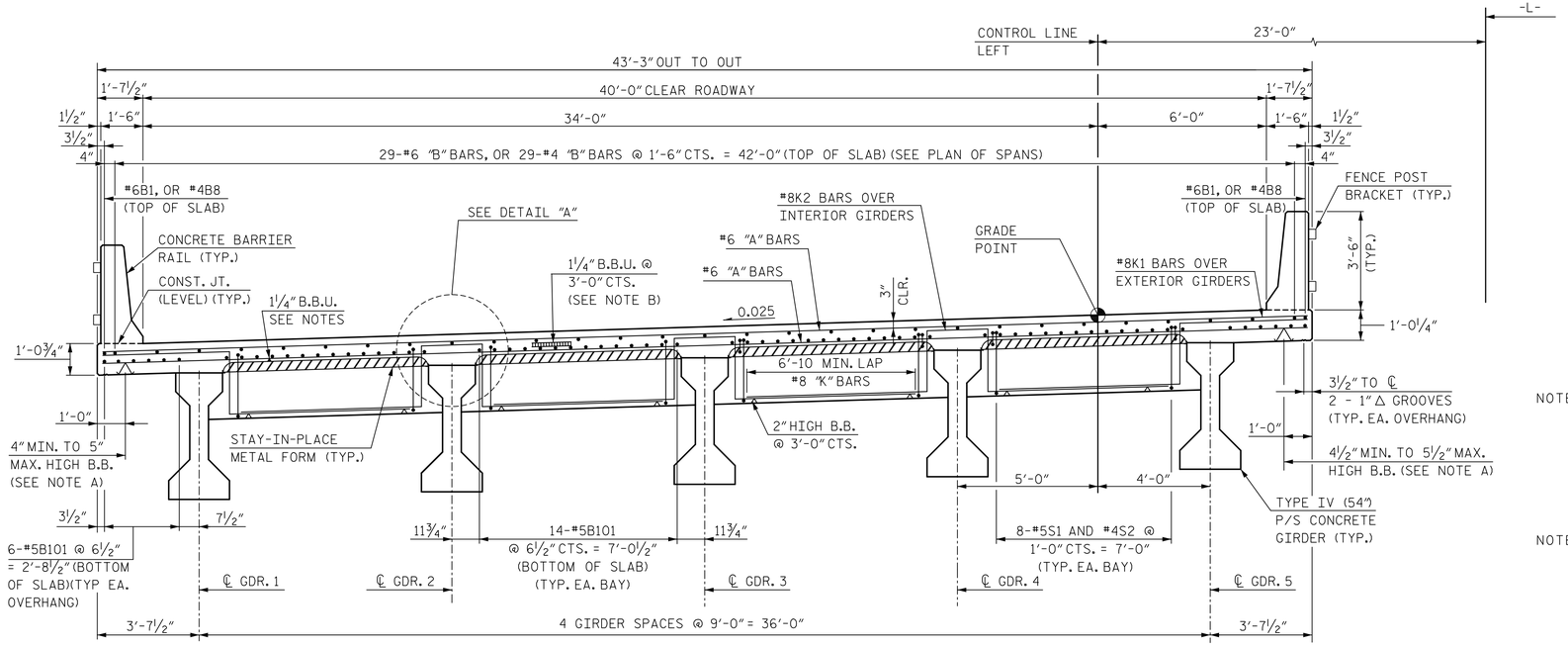
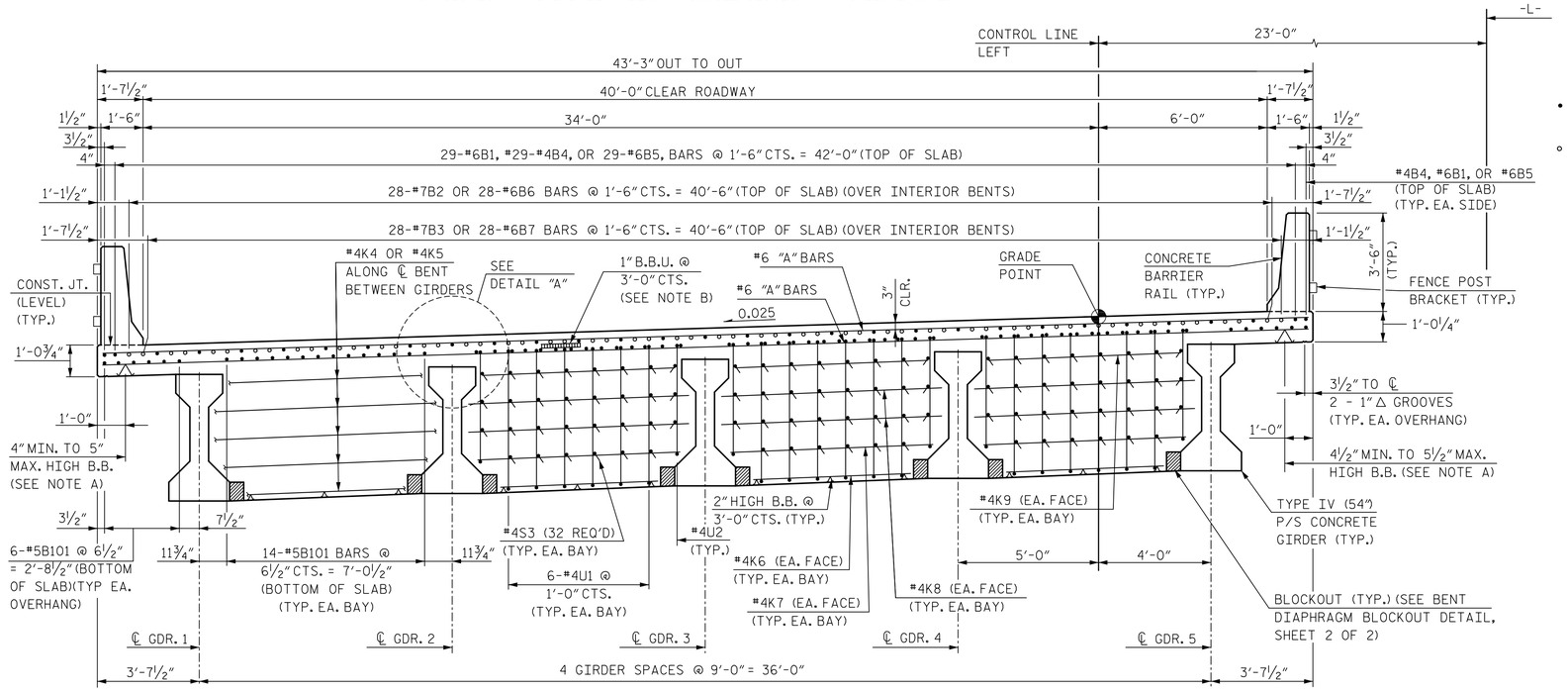
STD. NO. LRFR1



TYPICAL SECTION AT END BENT

FOR SECTION THRU END BENT DIAPHRAGM, SEE SECTION A-A, SHEET 2 OF 2.



TYPICAL SECTION AT BENT

FOR SECTION THRU BENT, SEE SECTION B-B, SHEET 2 OF 2.

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NOTES:

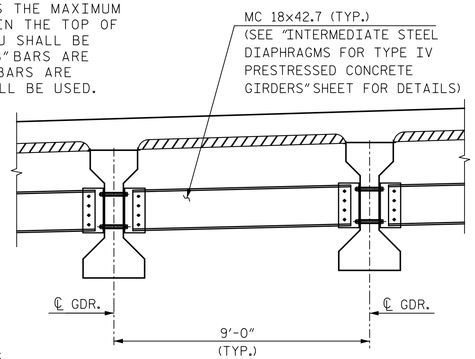
PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE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

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.

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

NOTE A: THE HEIGHT OF THE BEAM BOLSTER VARIES ALONG THE LENGTH OF THE SPAN DUE TO CAMBER AND THE VARYING HEIGHT REQUIRED FOR THE BUILDUP. THE CONTRACTOR SHALL HAVE SUFFICIENT SIZES TO PROPERLY SUPPORT THE REINFORCING STEEL.

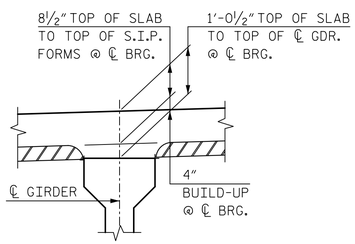
NOTE B: TO MAINTAIN PROPER LOCATION OF "A" BARS IN TOP OF SLAB, BBU DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF SLAB VARIES. A 1¼" BBU SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 "B" BARS ARE PRESENT, A ¾" BBU SHALL BE USED.



PARTIAL TYPICAL SECTION
(SHOWING INTERMEDIATE DIAPHRAGM)

"B" BAR KEY

- • CONTINUOUS BAR RUN SEE PLAN OF SPAN SHEETS.
- ◦ NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS SEE PLAN OF SPAN SHEETS.



DETAIL "A"
NOTE: BUILDUP VARIES BETWEEN ℄ BEARINGS.

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

PROJECT NO. R-1015
CRAVEN **COUNTY**
STATION: 506+32.25 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

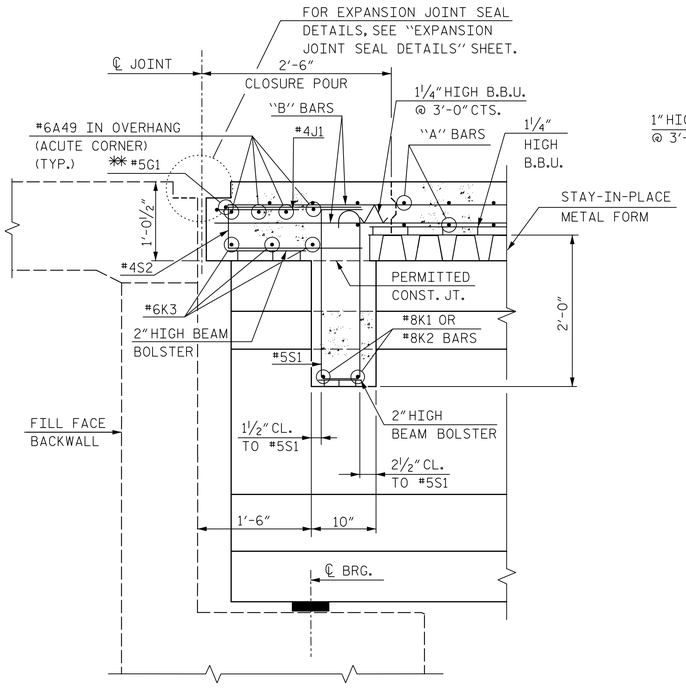
LEFT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 7/16
CHECKED BY P. BARBER DATE 8/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 5

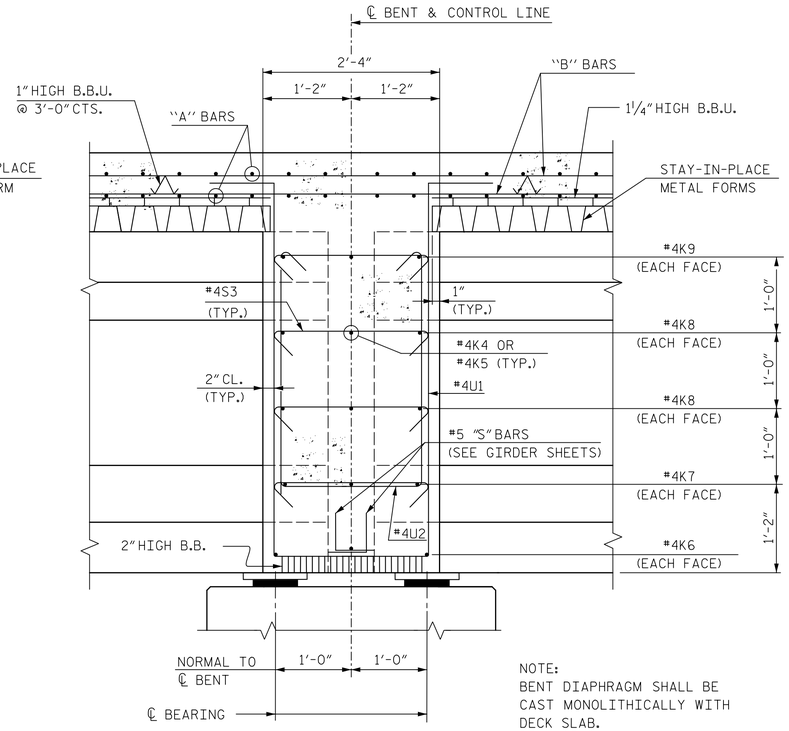
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-5
1			3			TOTAL SHEETS
2			4			39



SECTION A-A

SECTION NORMAL THRU END BENT 1 DIAPHRAGM, END BENT 2 SIMILAR

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

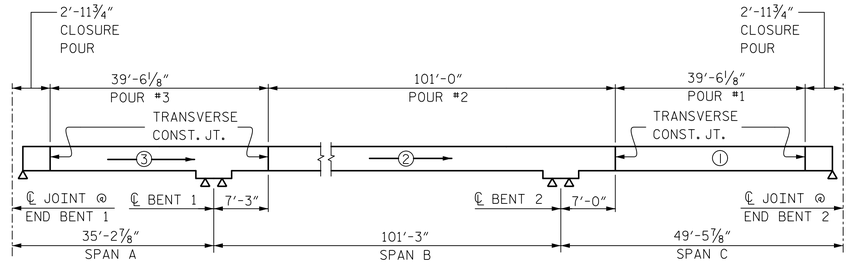


SECTION B-B

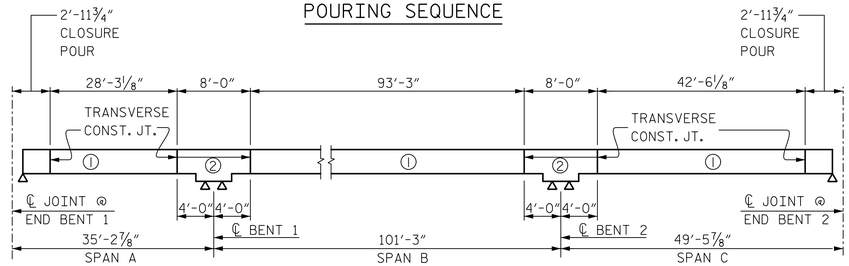
SECTION NORMAL THRU BENT 1 & BENT 2 DIAPHRAGM

NOTE:
BENT DIAPHRAGM SHALL BE CAST MONOLITHICALLY WITH DECK SLAB.

NOTE: ALL DIMENSIONS FOR POURING SEQUENCE AND OPTIONAL POURING SEQUENCE ARE ALONG CONTROL LINE LEFT.

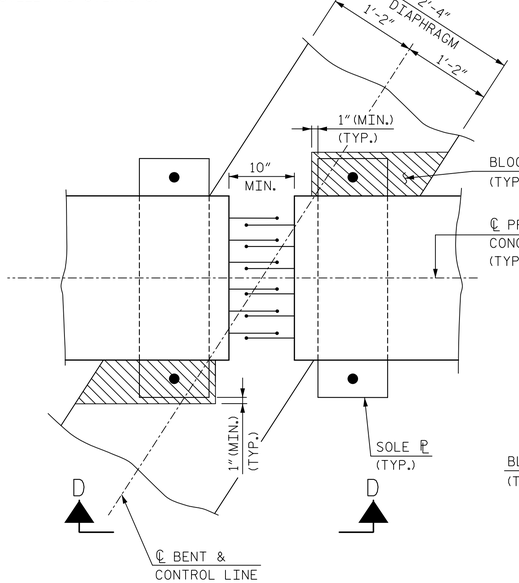


POURING SEQUENCE



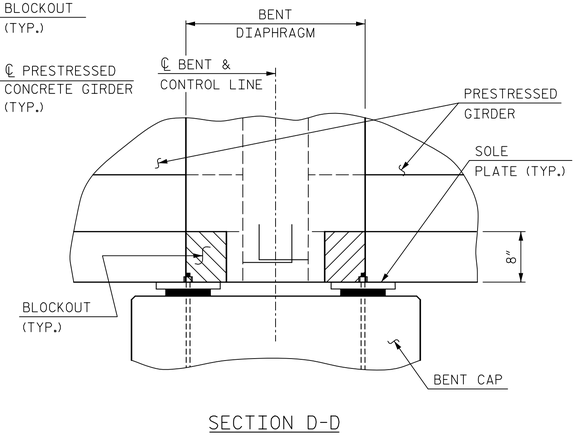
OPTIONAL POURING SEQUENCE

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



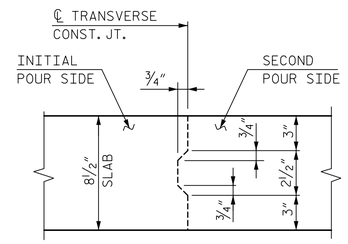
PLAN VIEW

(AT INTERIOR BENTS)



SECTION D-D

BENT DIAPHRAGM BLOCKOUT DETAILS



DECK SLAB TRANSVERSE CONSTRUCTION JOINT DETAIL

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

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

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DRAWN BY	M. WRIGHT	DATE 7/16
CHECKED BY	P. BARBER	DATE 8/16
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 6

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

LEFT LANE

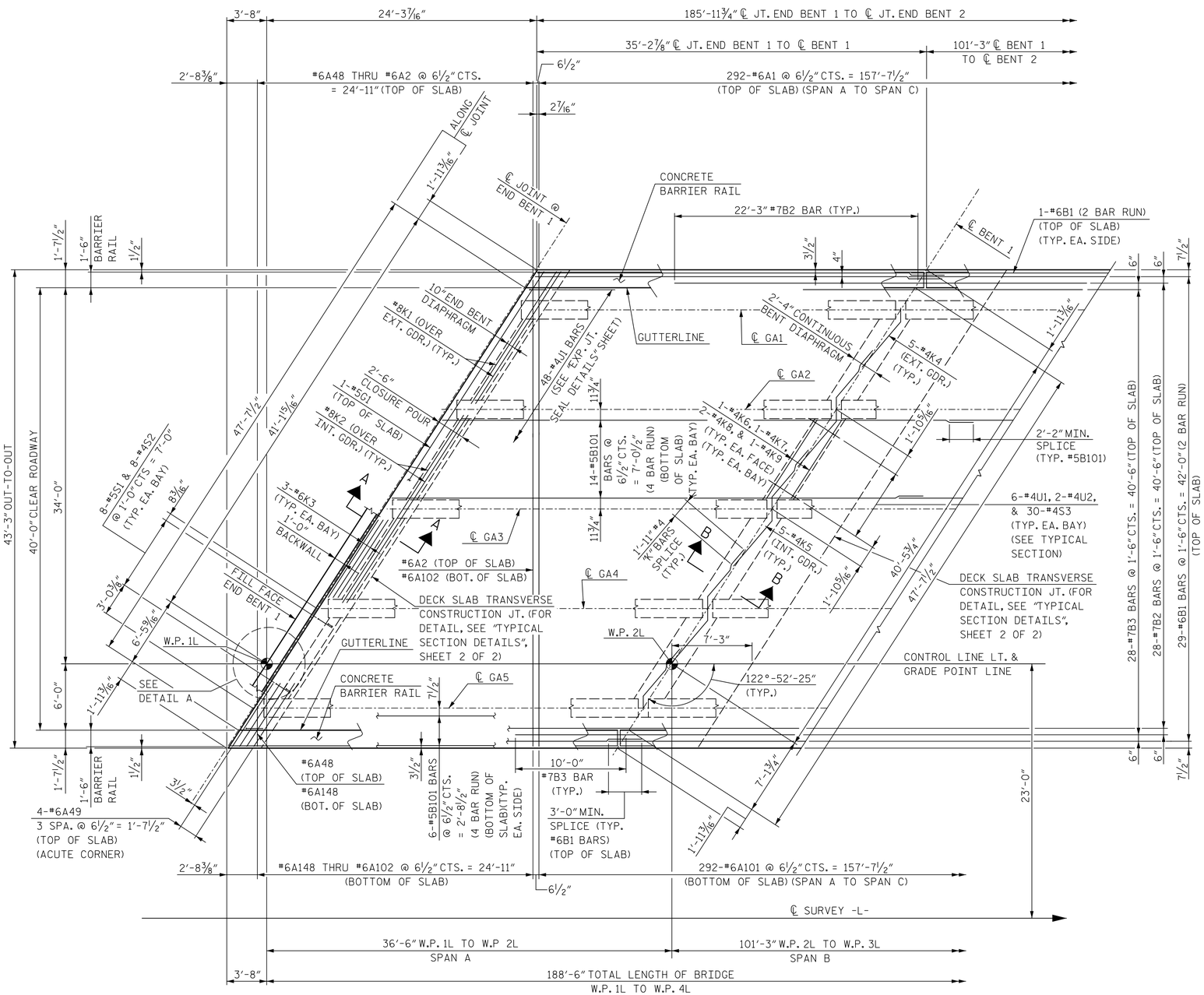
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-6
1			3			TOTAL SHEETS
2			4			39

NOTES:

FOR CONCRETE BARRIER RAIL DIMENSIONS, REINFORCING STEEL, AND JOINT SPACING, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR SECTION VIEWS, SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET 2 OF 2.

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS. FOR LOCATION, SEE "SUPERSTRUCTURE FRAMING PLANS" SHEET.



PLAN OF SPAN A

DETAIL A

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

LEFT LANE

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DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 7

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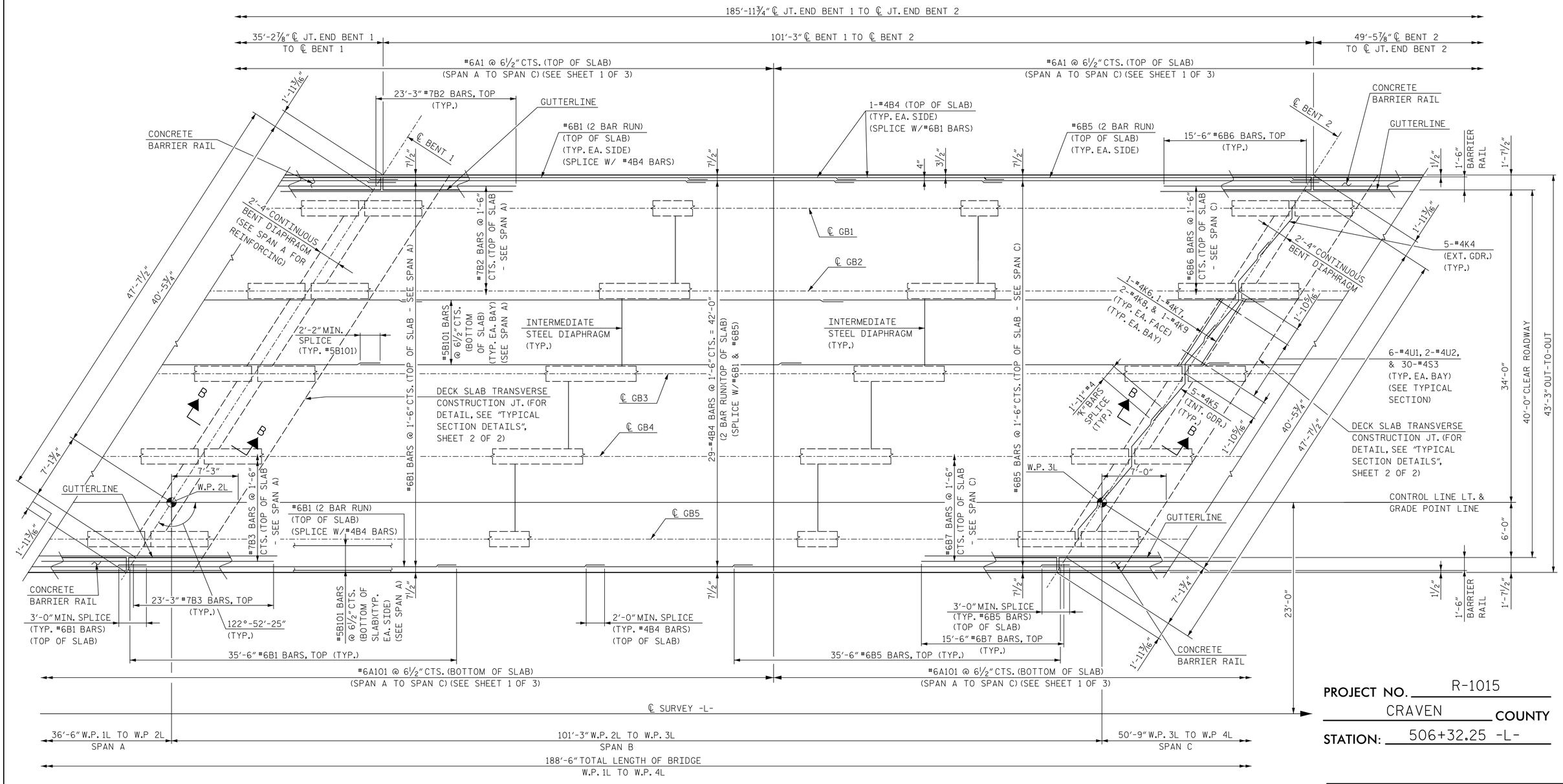
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-7
1			3			TOTAL SHEETS
2			4			39

NOTES:

FOR NOTES, SEE "SUPERSTRUCTURE PLAN OF SPAN A" SHEET.



PLAN OF SPAN B

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B

LEFT LANE

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DWG. NO. 8

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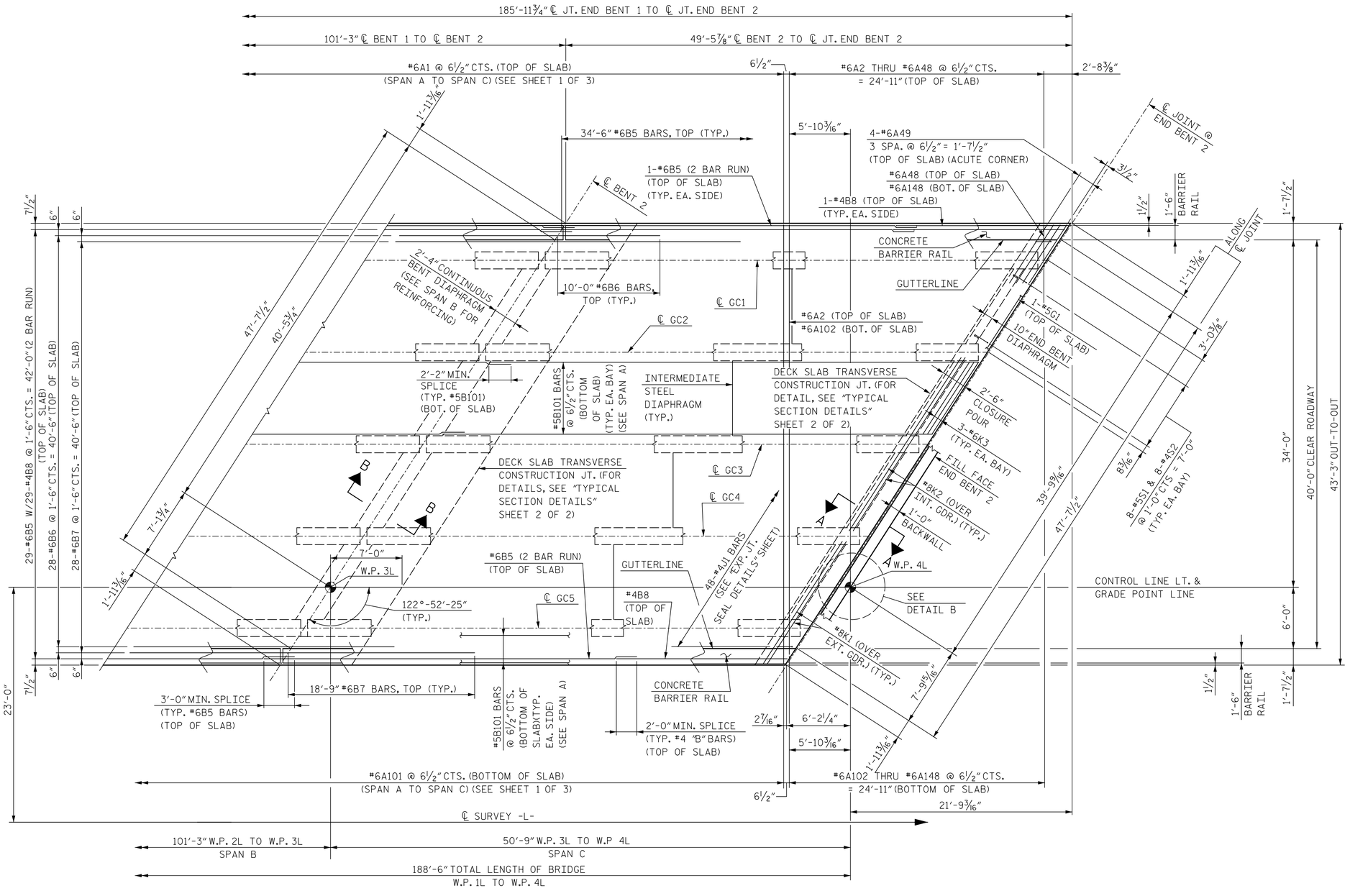
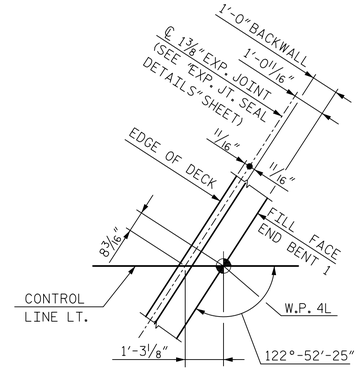
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-8
1			3			TOTAL SHEETS
2			4			39

NOTES:

FOR NOTES, SEE "SUPERSTRUCTURE PLAN OF SPAN A" SHEET.



PLAN OF SPAN C



DETAIL B

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

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DWG. NO. 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN C

LEFT LANE

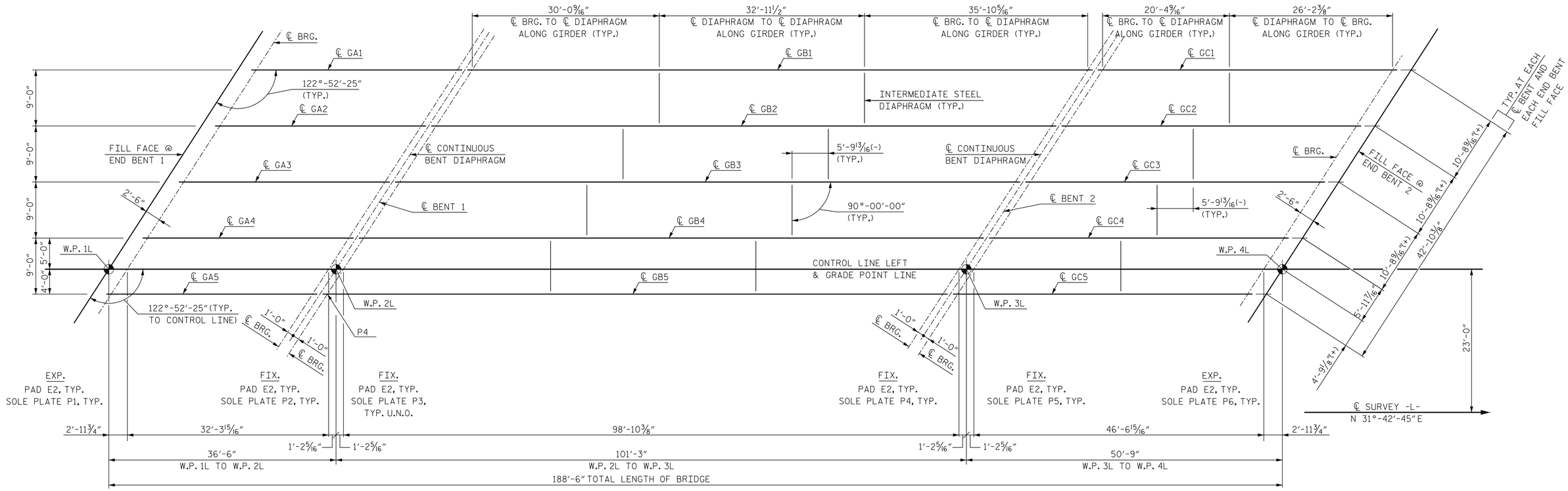
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-9
1			3			TOTAL SHEETS
2			4			39

NOTES:

ALL DIMENSIONS MEASURED ALONG ℄ GIRDER UNLESS NOTED OTHERWISE.

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

FOR GIRDER ELEVATIONS AND DETAILS, SEE PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET.



FRAMING PLAN

NOTES:

"EXP." DENOTES EXPANSION BEARING ASSEMBLY.

"FIX." DENOTES FIXED BEARING ASSEMBLY.

"E" DENOTES ELASTOMERIC BEARING PAD MARK.

"P" DENOTES STEEL SOLE PLATE MARK.

"U.N.O." UNLESS NOTED OTHERWISE

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

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DWG. NO. 10

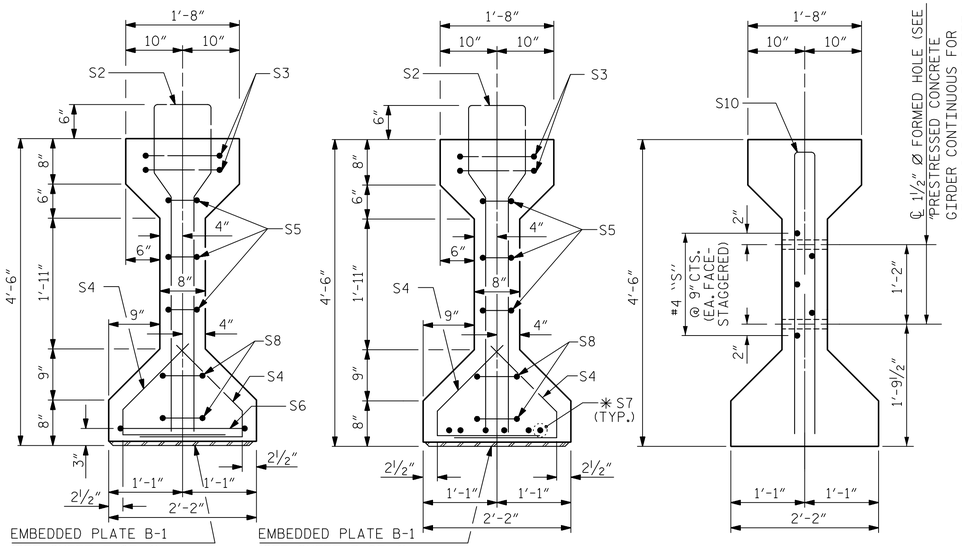
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-10
1			3			TOTAL SHEETS
2			4			39



EMBEDDED PLATE B-1
(SEE SHEET 3 OF 4)

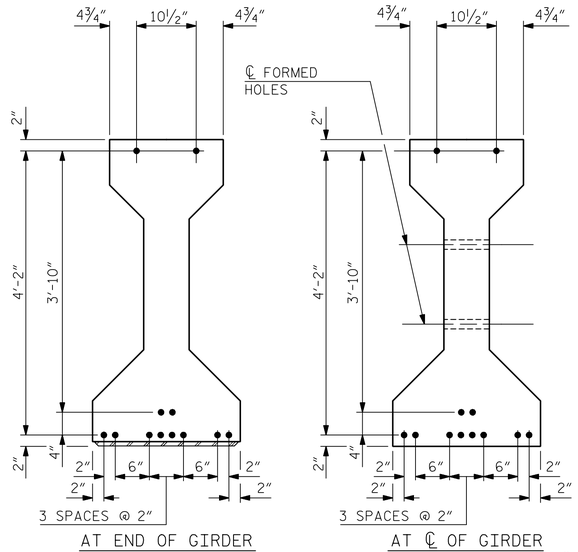
SECTION A-A

EMBEDDED PLATE B-1
(SEE SHEET 3 OF 4)

SECTION B-B

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

SECTION C-C
(S1 BARS NOT SHOWN)



AT END OF GIRDER

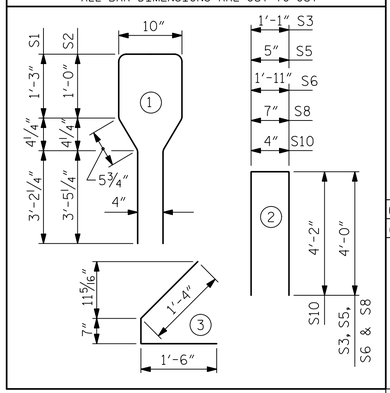
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

NOTE: ALL STRANDS SHALL BE BONDED FULL LENGTH.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



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
GA1-GA5	S1	33	#4	1	10'-8"	235
GC1-GC5	S1	42	#4	1	10'-8"	299
	S2	12	#6	1	10'-8"	192
	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
GC1, GC5	S10	2	#5	2	8'-8"	18
GC2, GC3, GC4	S10	4	#5	2	8'-8"	36
GC1, GC5	S11	5	#4	STR	7'-0"	23
GC2, GC3, GC4	S12	5	#4	STR	12'-10"	43

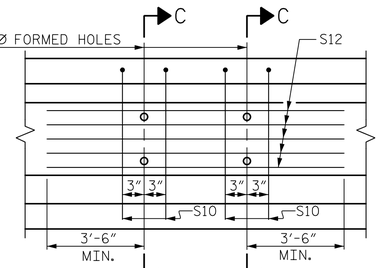
* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

QUANTITIES FOR ONE GIRDER

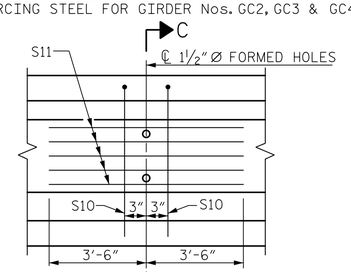
	REINFORCING STEEL LB.	5,000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
GA1	685	6.8	12
GA2	685	6.8	12
GA3	685	6.8	12
GA4	685	6.8	12
GA5	685	6.8	12
GC1	790	9.7	12
GC2	828	9.7	12
GC3	828	9.7	12
GC4	828	9.7	12
GC5	790	9.7	12

GIRDERS REQUIRED

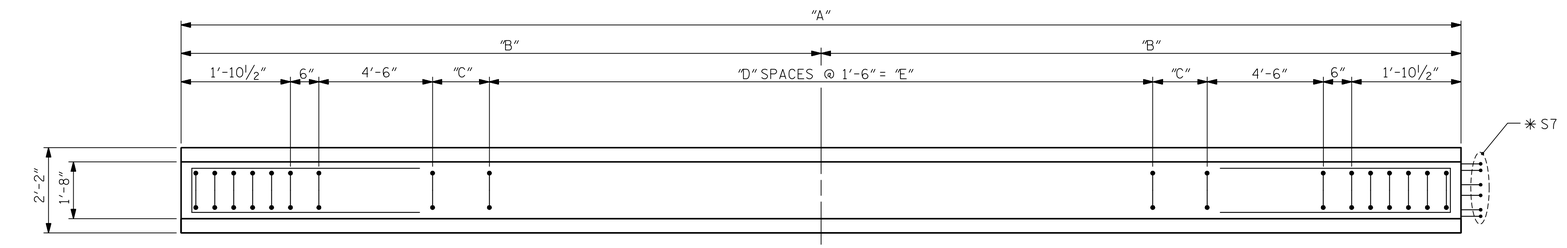
	NUMBER	LENGTH	TOTAL LENGTH
SPAN A GDR.	5	33'-8 15/16"	168.72'
SPAN C GDR.	5	47'-11 15/16"	239.97'



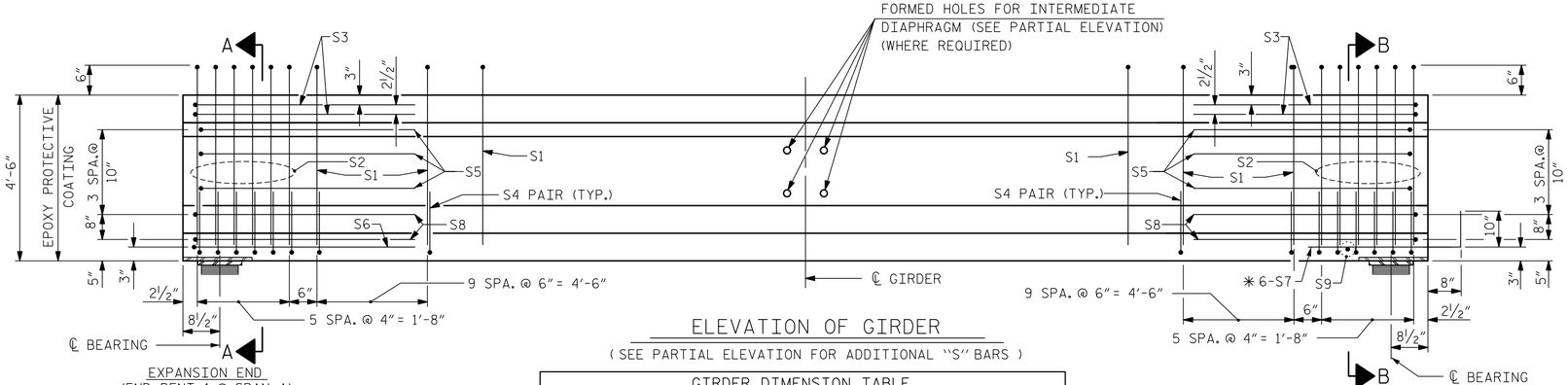
PARTIAL ELEVATION
(SPAN C ONLY)
SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. GC2, GC3 & GC4



PARTIAL ELEVATION
(SPAN C ONLY)
SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos GC1 & GC5



PLAN OF GIRDER



EXPANSION END
(END BENT 1 @ SPAN A)
(END BENT 2 @ SPAN C)

ELEVATION OF GIRDER
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

CONTINUOUS END
(BENT 1 END @ SPAN "A")
(BENT 2 END @ SPAN "C")

GIRDER DIMENSION TABLE					
GIRDERS	"A"	"B"	"C"	"D"	"E"
GA1 - GA5	33'-8 15/16"	16'-10½" (-)	1'-0" (-)	12	18'-0"
GC1 - GC5	47'-11 15/16"	24'-0" (-)	1'-4½" (-)	21	31'-6"

NOTES:

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI FOR SPAN A AND SPAN C GIRDERS.

GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI AT THE AGE OF 28 DAYS.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 4

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPANS A & C LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-11
1			3			TOTAL SHEETS
2			4			39

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DRAWN BY M. WRIGHT DATE 8/18
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DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. II

ASSEMBLED BY : M. WRIGHT DATE : 8/18
CHECKED BY : P. BARBER DATE : 8/18

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

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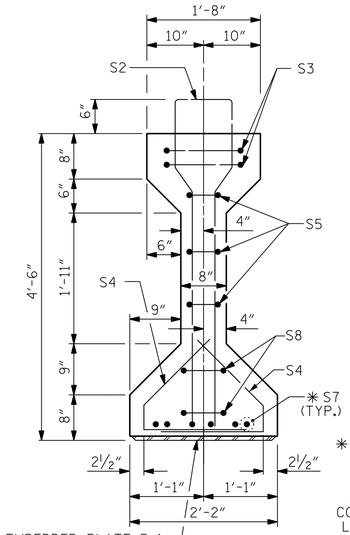
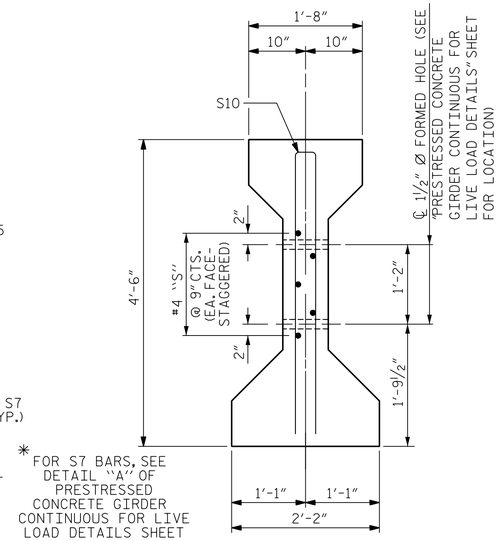
STR. #13

STD. NO. PCG6



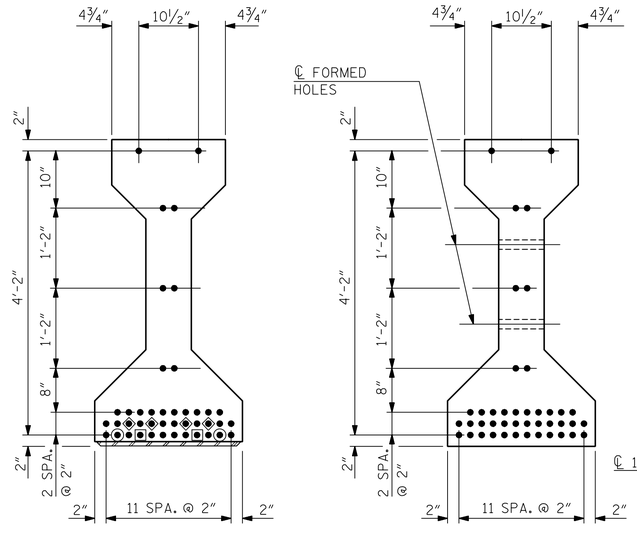
EMBEDDED PLATE B-1
(SEE SHEET 3 OF 4)

SECTION B-B



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

SECTION C-C
(S1 BARS NOT SHOWN)



AT END OF GIRDER

AT ℄ OF GIRDER

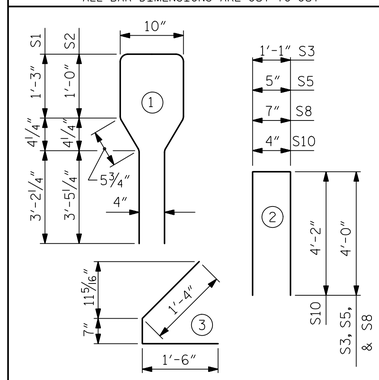
0.6"Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

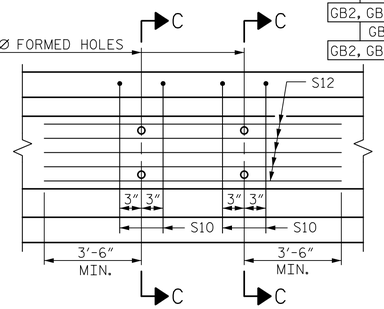
- • FULLY BONDED STRANDS
- ⊙ STRANDS DEBONDED FOR 22'-0" FROM END OF GIRDER
- ◈ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ⊡ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

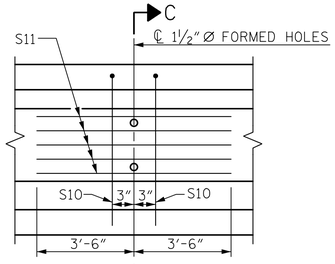


GB1, GB5	S10	4	✳5	2	8'-8"
GB2, GB3, GB4	S10	8	✳5	2	8'-8"
GB1, GB5	S11	10	✳4	STR	7'-0"
GB2, GB3, GB4	S12	10	✳4	STR	12'-10"



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. GB2, GB3, & GB4



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. GB1 & GB5

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	82	#4	1	10'-8"	584
S2	16	#6	1	10'-8"	256
S3	4	#4	2	9'-1"	24
S4	72	#4	3	3'-5"	164
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
S10	4	#5	2	8'-8"	36
S10	8	#5	2	8'-8"	72
S11	10	#4	STR	7'-0"	47
S12	10	#4	STR	12'-10"	86

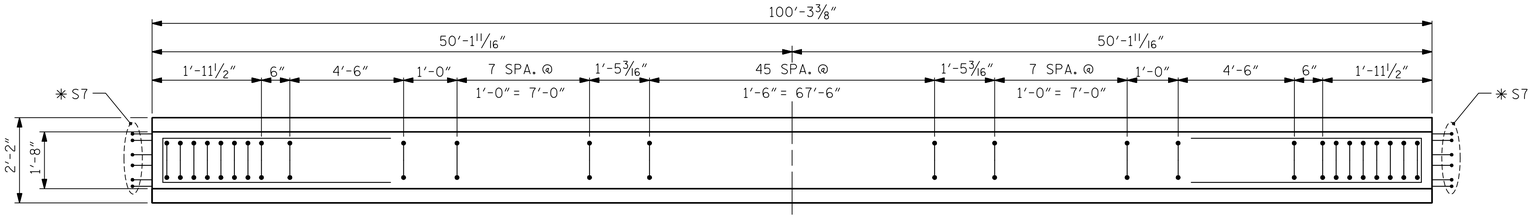
✳ NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	8,000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
GB1	1,215	20.4	42
GB2	1,290	20.4	42
GB3	1,290	20.4	42
GB4	1,290	20.4	42
GB5	1,215	20.4	42

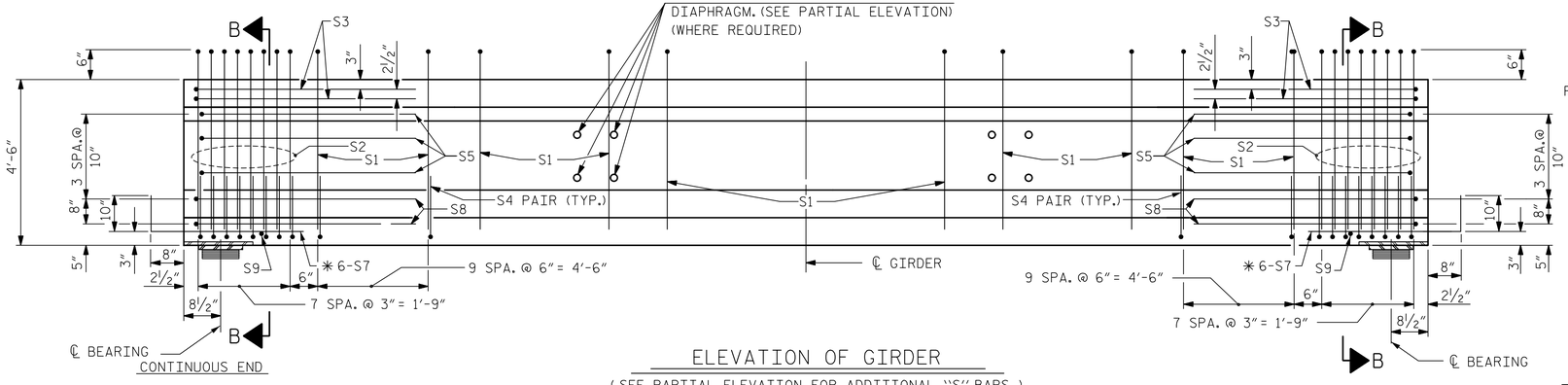
GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	100'-3⅜"	501.41'



PLAN OF GIRDER

FORMED HOLES FOR INTERMEDIATE DIAPHRAGM. (SEE PARTIAL ELEVATION (WHERE REQUIRED)



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

NOTES:

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 FOR SPAN B GIRDERS.

GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 8,000 PSI AT THE AGE OF 28 DAYS.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 4

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS							SHEET NO.
NO.	BY	DATE	NO.	BY	DATE		S13-12
1			3				TOTAL SHEETS
2			4				39

ASSEMBLED BY : M. WRIGHT	DATE : 8/18	
CHECKED BY : P. BARBER	DATE : 8/18	
DRAWN BY : ELR 8/91	REV. 10/1/11	MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15	MAA/TMG
	REV. 12/17	MAA/THC

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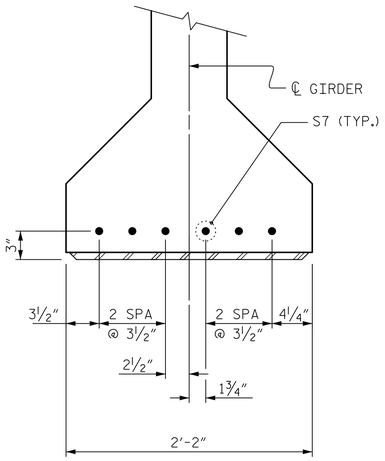
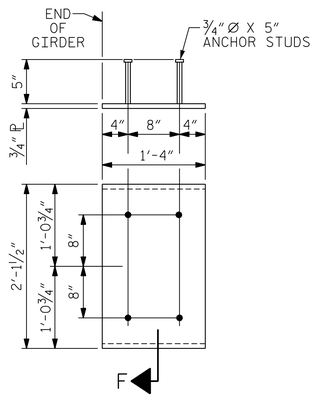
DWG. NO. 12

STD. NO. PCG6



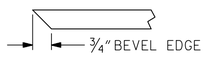
DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



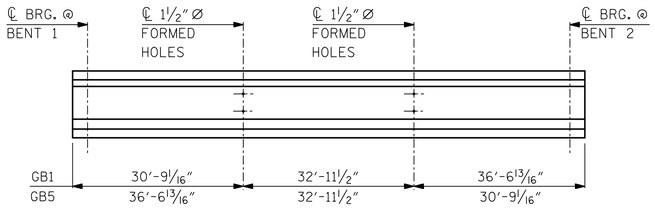
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



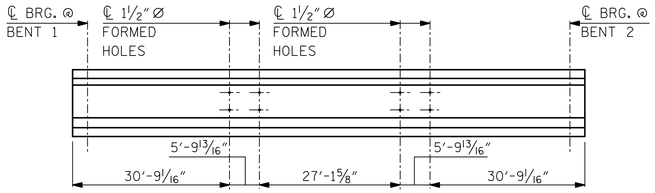
SECTION "F"

(SEE NOTES)



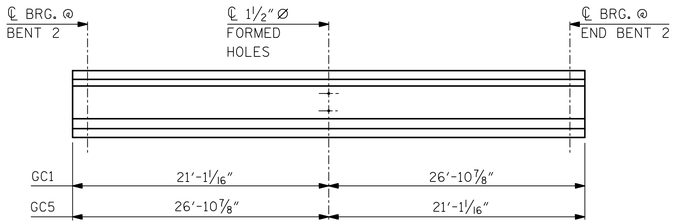
GIRDER ELEVATION

GB1 & GB5



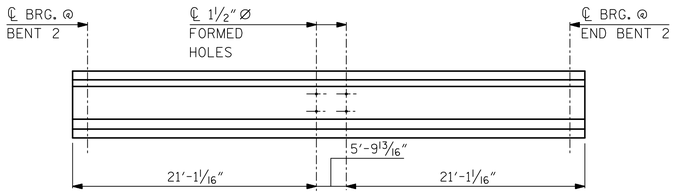
GIRDER ELEVATION

GB2, GB3 & GB4



GIRDER ELEVATION

GC1 & GC5



GIRDER ELEVATION

GC2, GC3 & GC4

1½" Ø FORMED HOLE LOCATIONS

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.

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.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 3 OF 4

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11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-13
1			3			TOTAL SHEETS
2			4			39

STR. #13

STD. NO. PCG9

ASSEMBLED BY : M. WRIGHT	DATE : 8/18	
CHECKED BY : P. BARBER	DATE : 8/18	
DRAWN BY : ELR 11/91	REV. 1/15	MAA/TMG
CHECKED BY : GRP 11/91	REV. 2/15	MAA/TMG
	REV. 12/17	MAA/THG

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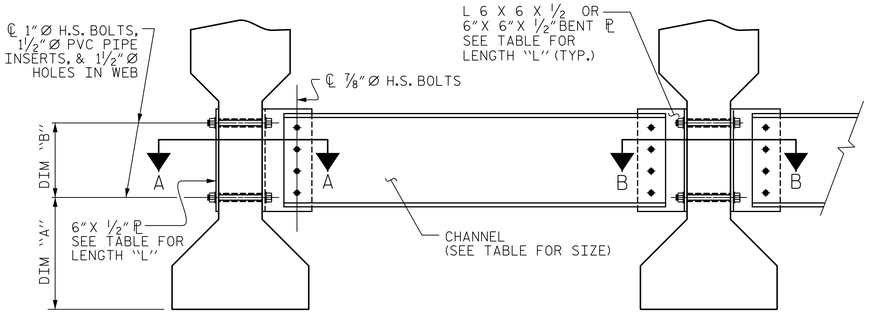
DRAWN BY	M. WRIGHT	DATE 8/18
CHECKED BY	P. BARBER	DATE 8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 13

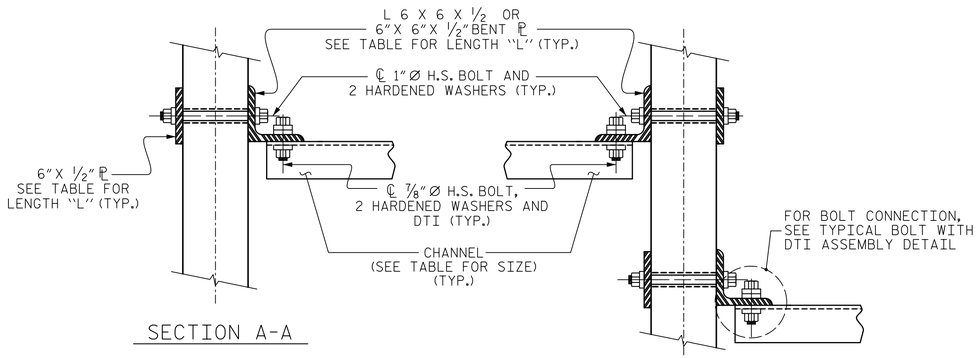


EXTERIOR GIRDER

INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM

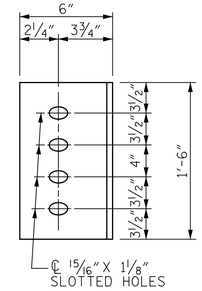
(TYPE III OR TYPE IV GIRDER SHOWN)



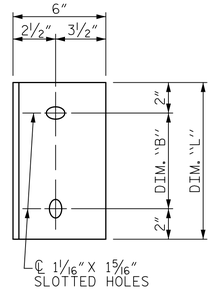
SECTION A-A

SECTION B-B

CONNECTION DETAILS



DIAPHRAGM FACE



WEB FACE

CONNECTION PLATE DETAILS

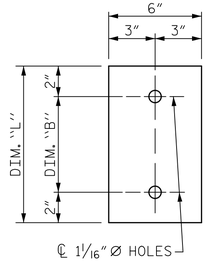
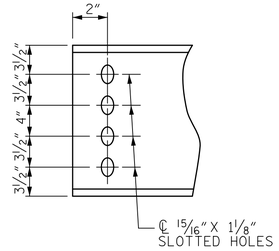


PLATE DETAILS



CHANNEL END

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 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.

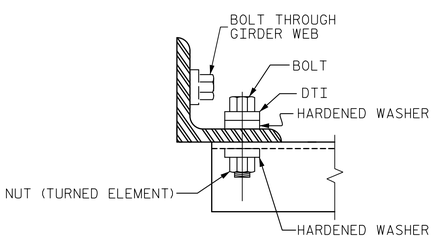
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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"



BOLT WITH DTI ASSEMBLY DETAIL

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11/14/2018

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 506+32.25 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-14
1			3			TOTAL SHEETS
2			4			39

STR. #13

STD. NO. PCG10

ASSEMBLED BY : M. WRIGHT		DATE : 8/18	
CHECKED BY : P. BARBER		DATE : 8/18	
DRAWN BY : TLA 6/05	REV. 5/1/06RRR		KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11		MAA/GM
	REV. 12/17		MAA/THC

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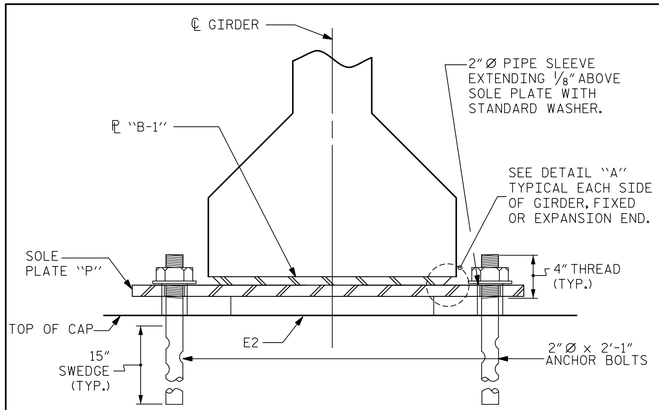
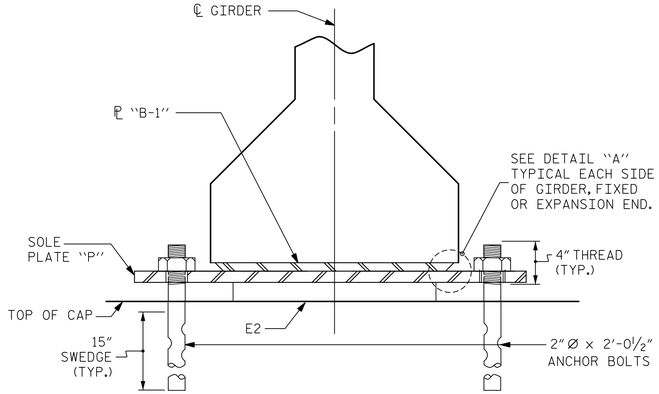
CHECKED BY	P. BARBER	DATE	8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	8/18

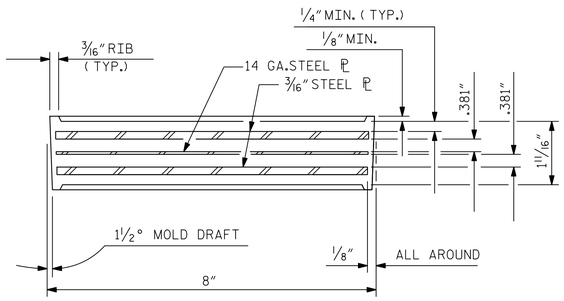
DWG. NO. 14



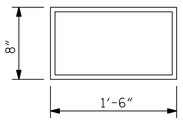
SECTION AT EXPANSION BEARING



SECTION AT FIXED BEARING



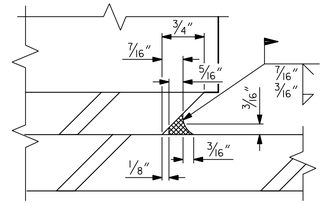
TYPICAL SECTION OF ELASTOMERIC BEARINGS



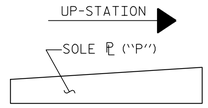
E2 (30 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE III



DETAIL "A"



SOLE ℄ PLACEMENT DETAIL

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	205 k

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.

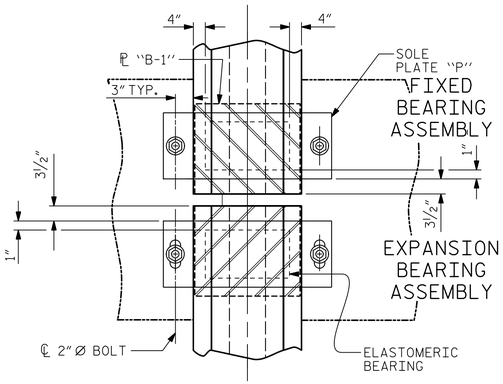
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

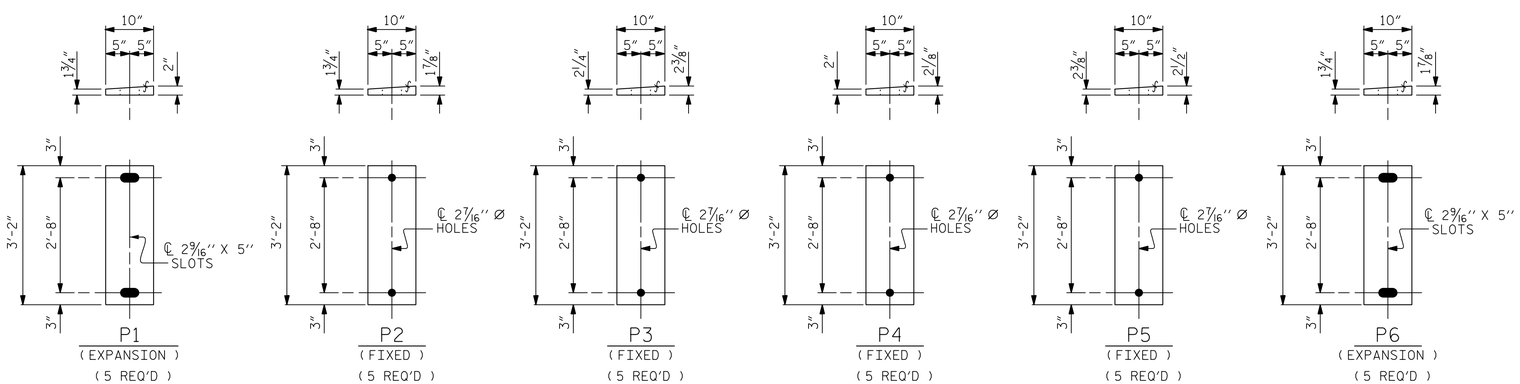
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



TYPICAL PLAN



SOLE PLATE DETAILS ("P")

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

11/14/2018

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-15
1			3			TOTAL SHEETS
2			4			39

ASSEMBLED BY : M. WRIGHT	DATE : 8/18	
CHECKED BY : P. BARBER	DATE : 8/18	
DRAWN BY : WJH 8/89	REV. 6/13	AAC/MAA.
CHECKED BY : CRK 8/89	REV. 1/15	MAA/TMG.
	REV. 12/17	MAA/THC

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DRAWN BY	M. WRIGHT	DATE 8/18
CHECKED BY	P. BARBER	DATE 8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 15

STR. #13

STD. NO. EB3

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6" Ø LOW RELAXATION STRANDS	GIRDERS 1 THRU 5										
TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.005	0.009	0.012	0.014	0.015	0.014	0.012	0.009	0.005	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.000
FINAL CAMBER ↑	0	1/16	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6" Ø LOW RELAXATION STRANDS	GIRDERS 1 THRU 5																				
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.037	0.072	0.106	0.137	0.164	0.187	0.205	0.219	0.227	0.230	0.227	0.219	0.205	0.187	0.164	0.137	0.106	0.072	0.037	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.025	0.050	0.075	0.098	0.118	0.136	0.149	0.160	0.166	0.168	0.166	0.160	0.149	0.136	0.118	0.098	0.075	0.050	0.025	0.000
FINAL CAMBER ↑	0	1/8	5/16	3/8	1/2	5/8	11/16	3/4	3/4	13/16	13/16	13/16	3/4	3/4	11/16	5/8	1/2	3/8	5/16	1/8	0

DEAD LOAD DEFLECTION TABLE FOR SPAN C

0.6" Ø LOW RELAXATION STRANDS	GIRDERS 1 THRU 5										
TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.014	0.019	0.023	0.024	0.023	0.019	0.014	0.008	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.003	0.006	0.008	0.009	0.010	0.009	0.008	0.006	0.003	0.000
FINAL CAMBER ↑	0	1/16	1/8	1/8	3/16	3/16	3/16	1/8	1/8	1/16	0

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

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

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DRAWN BY J. BAYNE DATE 10/16
CHECKED BY V. KOLLIPARA DATE 10/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 16

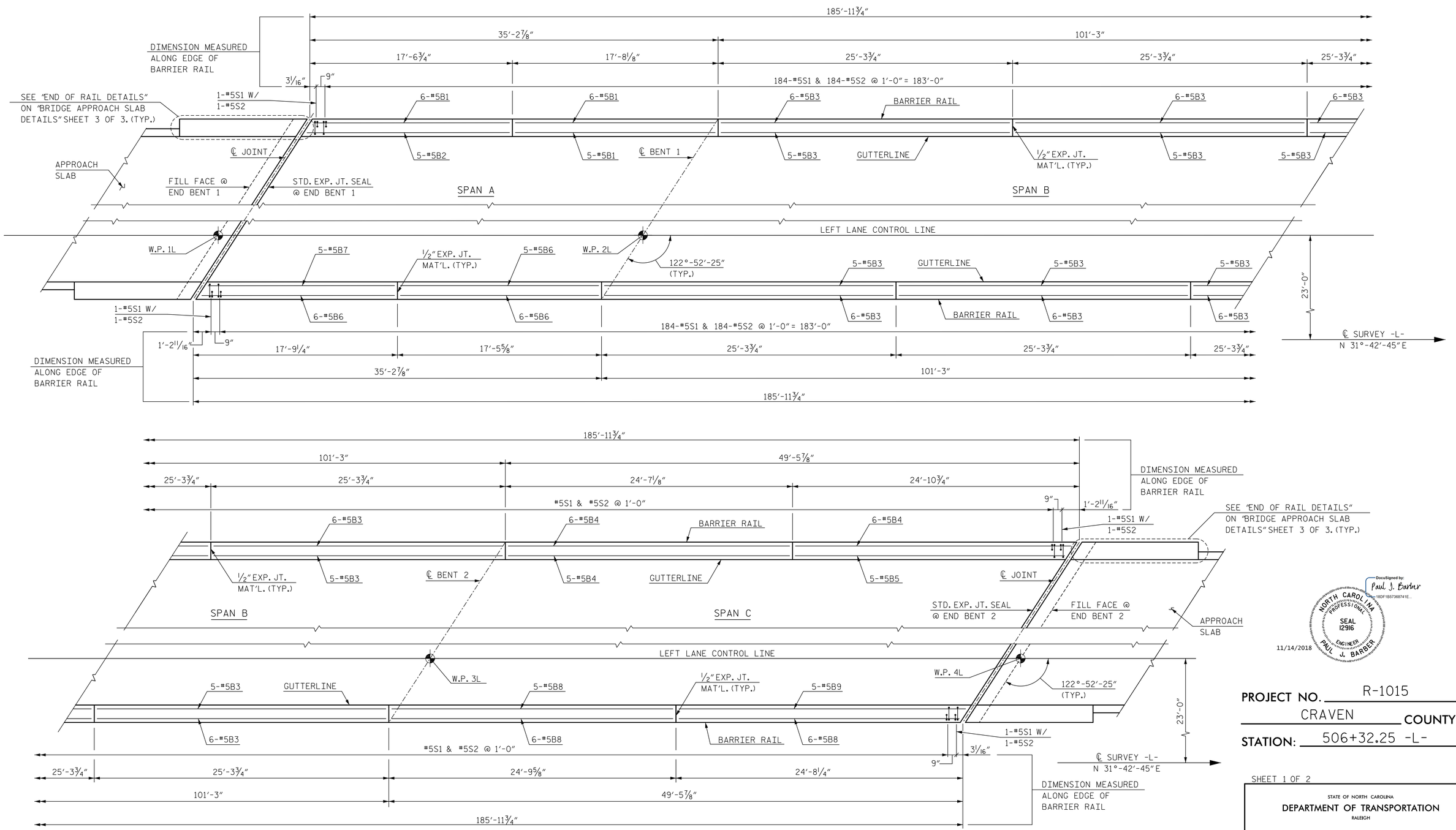
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-16
1			3			TOTAL SHEETS
2			4			39



PLAN OF BARRIER RAIL

NOTE: EDGE OF SLAB NOT SHOWN FOR CLARITY.

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE BARRIER RAIL

LEFT LANE

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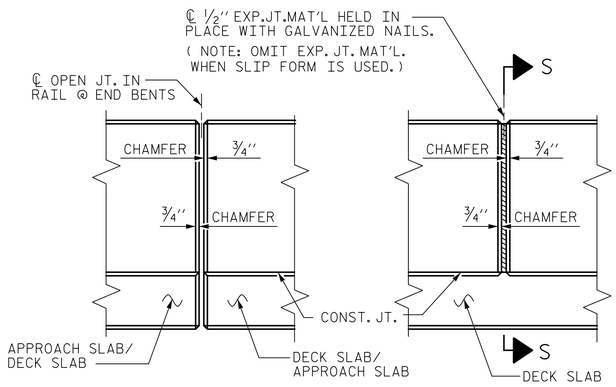
DRAWN BY	M. WRIGHT	DATE 6/16
CHECKED BY	P. BARBER	DATE 8/16
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 17

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-17
1			3			TOTAL SHEETS
2			4			39



ELEVATION AT EXPANSION JOINTS

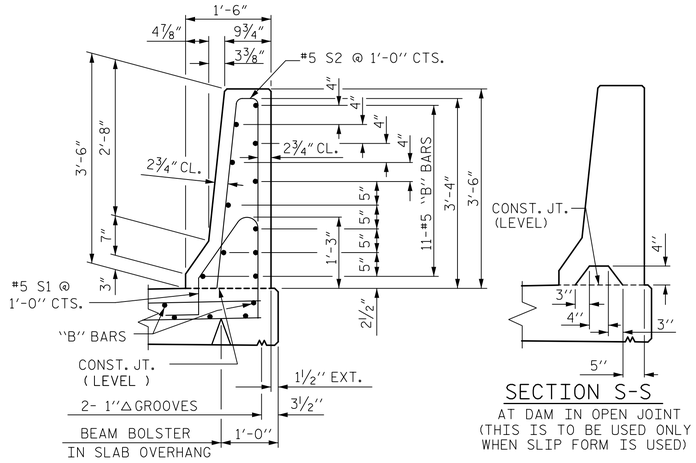
BARRIER RAIL DETAILS

NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

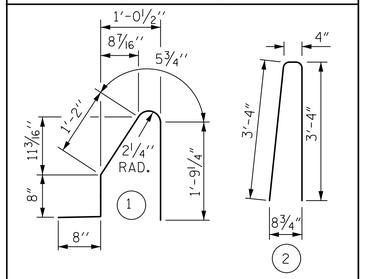


SECTION THRU RAIL

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 CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	17	#5	STR	17'-3"	306
✳ B2	5	#5	STR	17'-5"	91
✳ B3	88	#5	STR	24'-11"	2,287
✳ B4	17	#5	STR	24'-2"	428
✳ B5	5	#5	STR	23'-8"	123
✳ B6	17	#5	STR	17'-1"	303
✳ B7	5	#5	STR	16'-7"	86
✳ B8	17	#5	STR	24'-5"	433
✳ B9	5	#5	STR	24'-7"	128
✳ S1	372	#5	1	4'-9"	1,843
✳ S2	372	#5	2	7'-0"	2,716

✳ EPOXY COATED REINFORCING STEEL	8,744	LBS.
CLASS AA CONCRETE	50.6	CU. YDS.
CONCRETE BARRIER RAIL	372.0	LIN. FT.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 2

DocuSigned by: Paul J. Barber 16DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
CONCRETE
BARRIER RAIL

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-18
1			3			TOTAL SHEETS
2			4			39

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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY P. BARBER DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 18

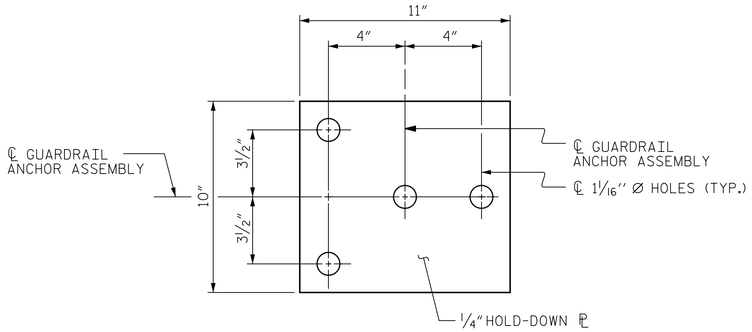
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : M. WRIGHT DATE : 8/18
CHECKED BY : P. BARBER DATE : 8/18

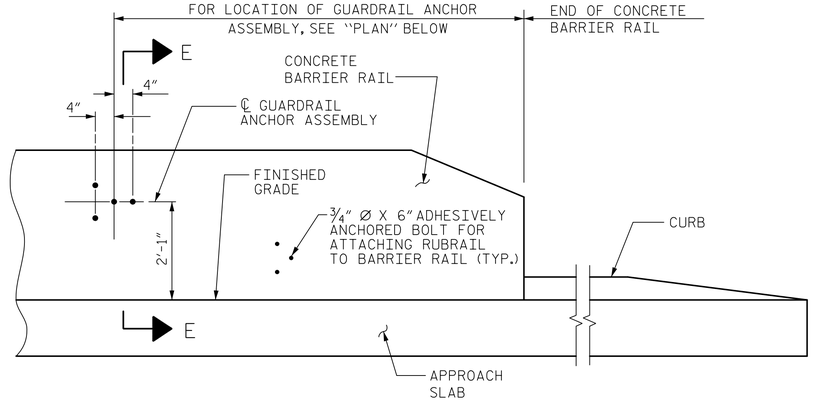
DRAWN BY : ARB 5/87
CHECKED BY : SJD 9/87

REV. 7/12	MAA/GM
REV. 6/13	MAA/GM
REV. 12/17	MAA/THC

STD. NO. CBR1



PLAN



ELEVATION

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

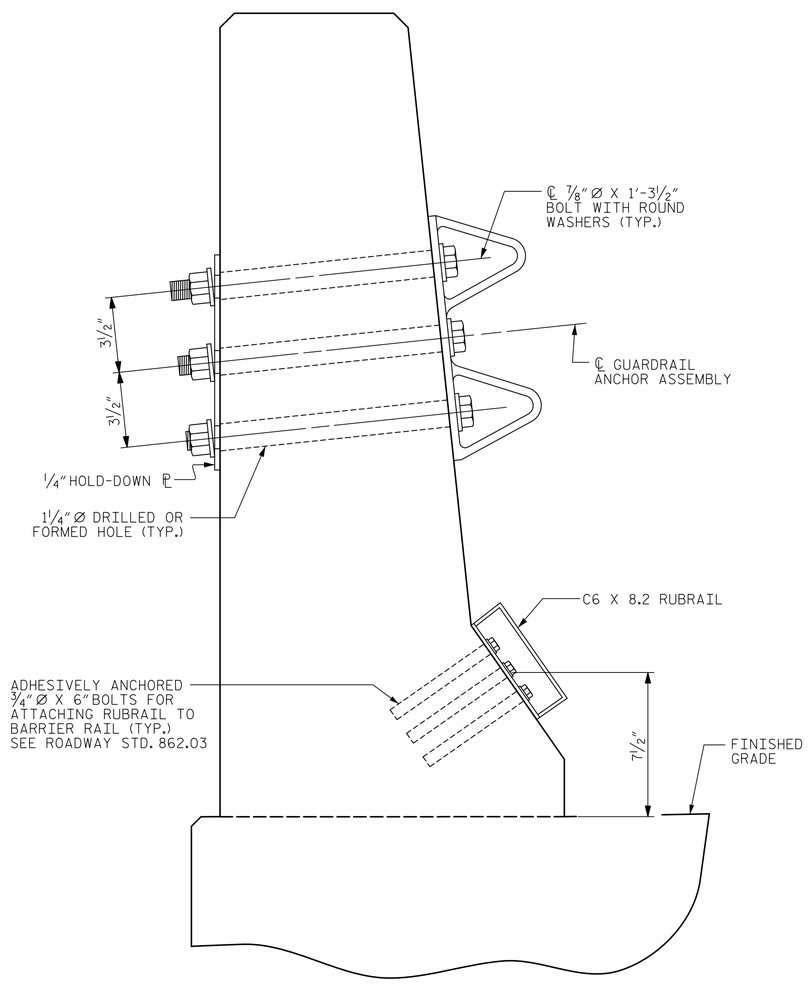
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

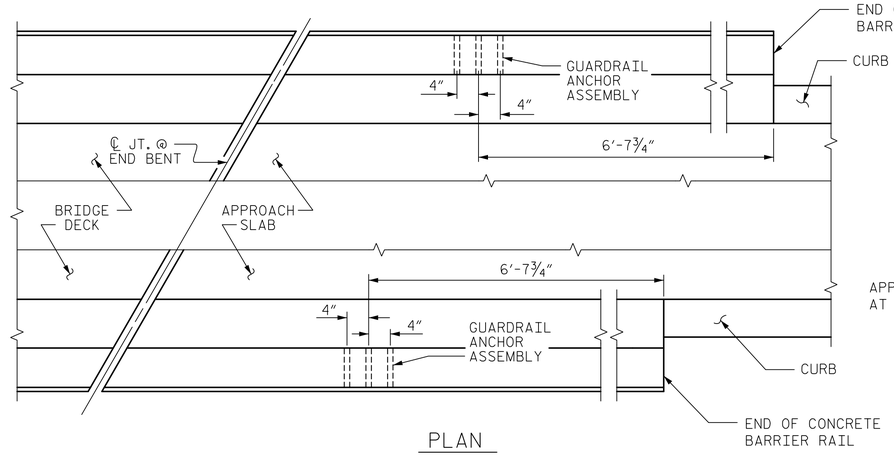
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.

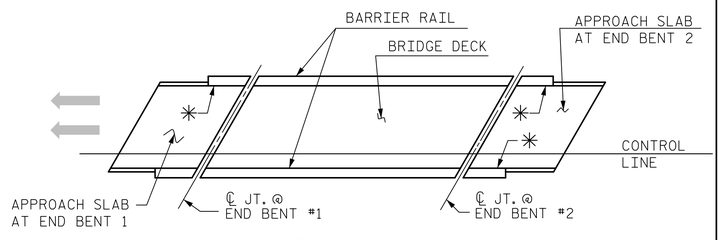


SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

LOCATION OF ANCHORS FOR GUARDRAIL

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

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 506+32.25 -L-

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

ASSEMBLED BY : M. WRIGHT		DATE : 8/18	
CHECKED BY : P. BARBER		DATE : 8/18	
DRAWN BY : TLA 5/06	REV. 7/12		MAA/GM
CHECKED BY : GM 5/06	REV. 6/13		MAA/GM
	REV. 12/17		MAA/THC

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DRAWN BY	M. WRIGHT	DATE	8/18
CHECKED BY	P. BARBER	DATE	8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	8/18

DWG. NO. 19

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

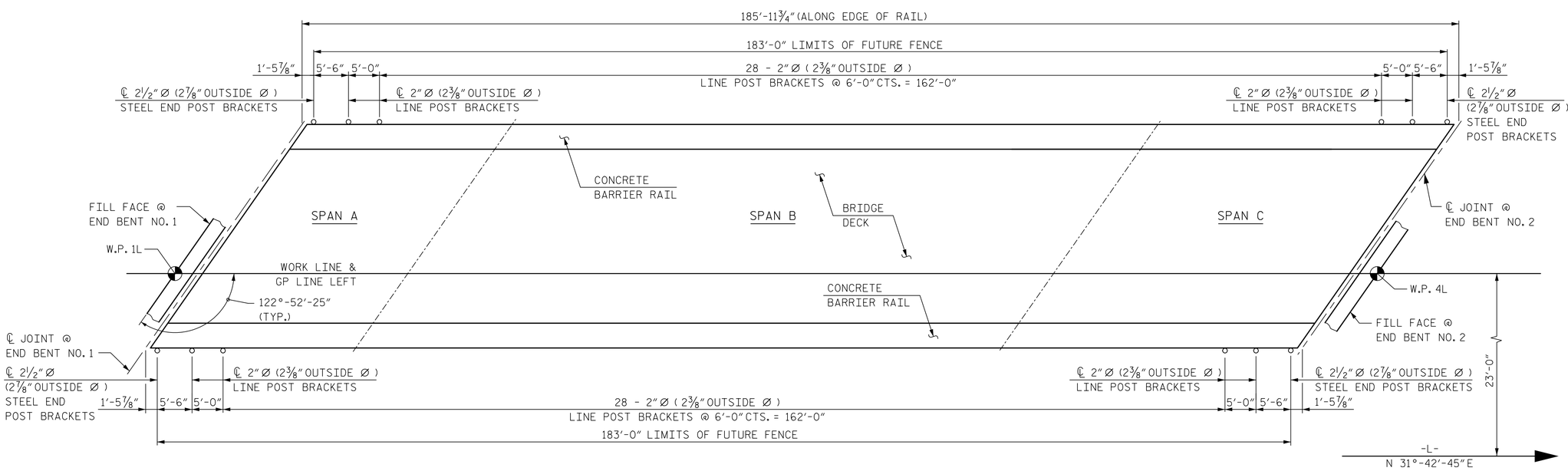
GUARDRAIL ANCHORAGE FOR BARRIER RAIL

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-19
1			3			TOTAL SHEETS
2			4			39

STR. #13

STD. NO. GRA2



PLAN OF FENCE POST SPACING
(PAY LENGTH 366.00 FEET)

NOTE: EDGE OF SLAB NOT SHOWN FOR CLARITY.

NOTES:

MATERIAL FOR ANCHOR BOLTS SHALL BE TYPE 304 STAINLESS STEEL WITH A MINIMUM 9000 PSI ULTIMATE STRENGTH. NUTS AND WASHERS SHALL BE TYPE 304 STAINLESS STEEL. ANCHOR BOLTS SHALL BE EMBEDDED AS PER ADHESIVE BONDING SYSTEM MANUFACTURER SPECIFICATIONS. NUTS SHALL BE AMERICAN STANDARD FINISHED HEXAGON THICK NUTS, CLASS 2B THREADS.

FOR SETTING ANCHOR BOLTS, THE CONTRACTOR SHALL USE AN ADHESIVE BONDING SYSTEM. SEE SECTION 420-13 OF THE STANDARD SPECIFICATIONS FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS. LEVEL ONE FIELD TESTING OF BONDING SYSTEM IS REQUIRED AND THE YIELD LOAD OF THE ¾" Ø BOLTS IS 12.0 KIPS.

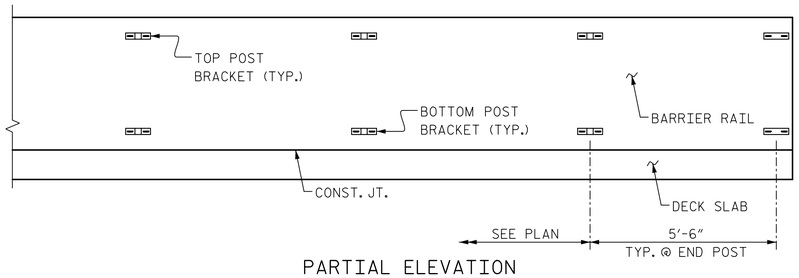
ALL BRACKETS SHALL MEET THE REQUIREMENTS OF SECTION 1050 OF THE STANDARD SPECIFICATIONS, GALVANIZE ALL STEEL PARTS AND HARDWARE IN ACCORDANCE WITH ARTICLE 1076 OF THE STANDARD SPECIFICATIONS.

FENCE POST LOCATIONS SHALL BE SHIFTED, AS NECESSARY, TO MAINTAIN 12" MINIMUM DISTANCE FROM ANCHOR BOLT TO JOINTS IN BARRIER RAIL.

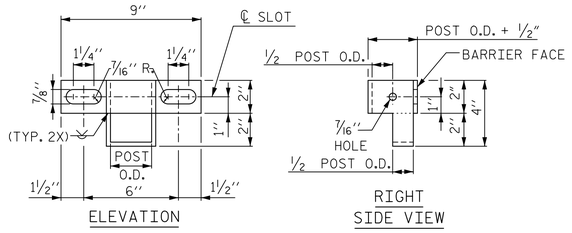
DIMENSIONS ARE SHOWN ALONG OUTSIDE FACE OF BARRIER RAIL.

BRACKETS SHALL BE INSTALLED TO PERMIT STANDARD CHAIN LINK FENCE DETAILS TO BE UTILIZED IN THE FUTURE.

ALL COSTS ASSOCIATED WITH THE MATERIALS AND INSTALLATION OF THE POST BRACKETS SHALL BE INCLUDED IN THE "CONCRETE BARRIER RAIL" PAY ITEMS.

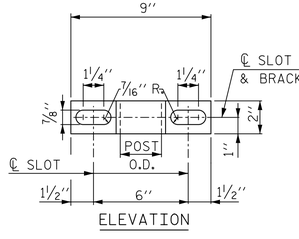


PARTIAL ELEVATION

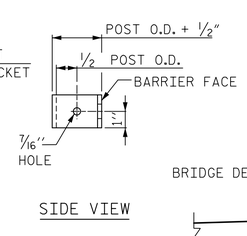


ELEVATION

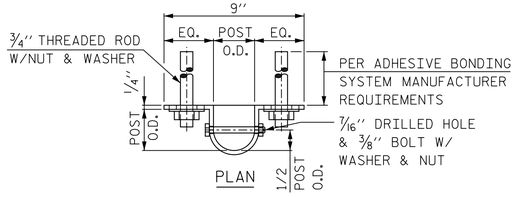
RIGHT SIDE VIEW



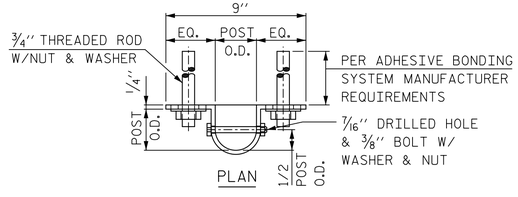
ELEVATION



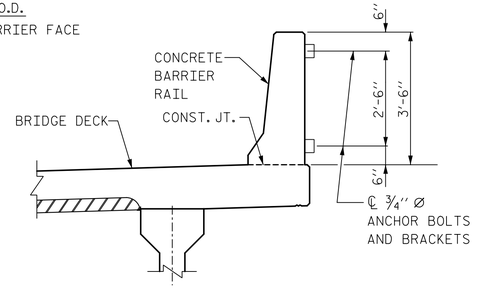
SIDE VIEW



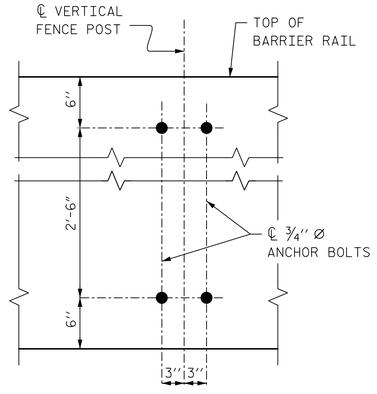
BOTTOM POST BRACKET



TOP POST BRACKET



SECTION THRU FENCE



BOLT SETTING DETAIL

DocuSigned by: Paul J. Barber
12/6/2018

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
BRIDGE MOUNTED CHAIN LINK FENCE DETAILS
LEFT LANE

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343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 6/16
CHECKED BY P. BARBER DATE 8/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 20

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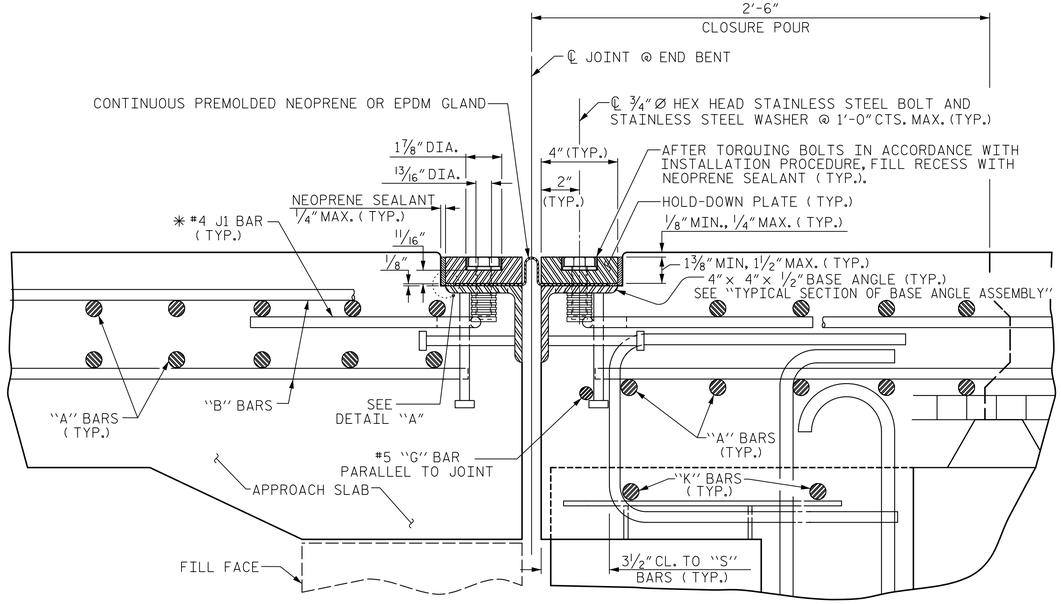
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-20
1			3			TOTAL SHEETS
2			4			39



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

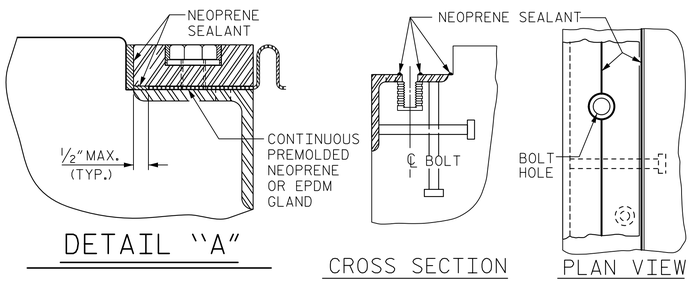
✳ THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

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 TORQUING, 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.

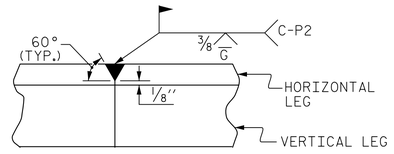
GENERAL NOTES

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.

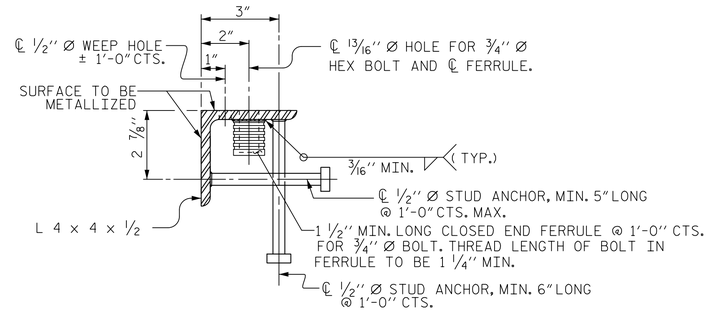


INSTALLATION SKETCH

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	122°-52'-25"	11/16"	1½"	1⅜"	1⅛"
2	122°-52'-25"	⅞"	1½"	1⅜"	1⅛"



DETAIL- FIELD WELD SPLICE OF BASE ANGLE



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 2

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-21
1			3			TOTAL SHEETS
2			4			39

STD. NO. EJS1

ASSEMBLED BY : M. WRIGHT		DATE : 8/18
CHECKED BY : P. BARBER		DATE : 8/18
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

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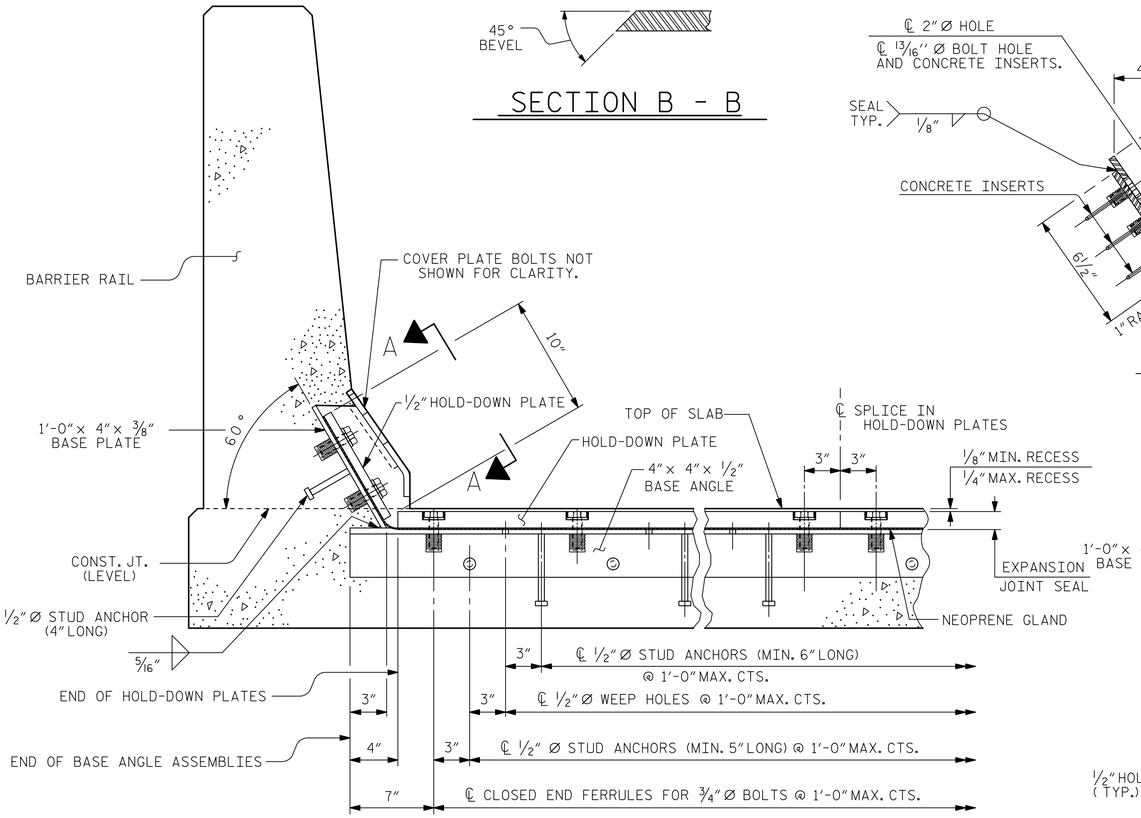
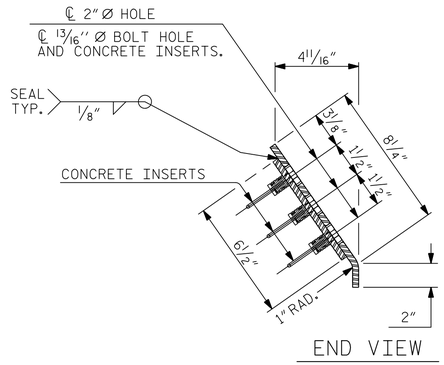
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 8/18
CHECKED BY	P. BARBER	DATE 8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

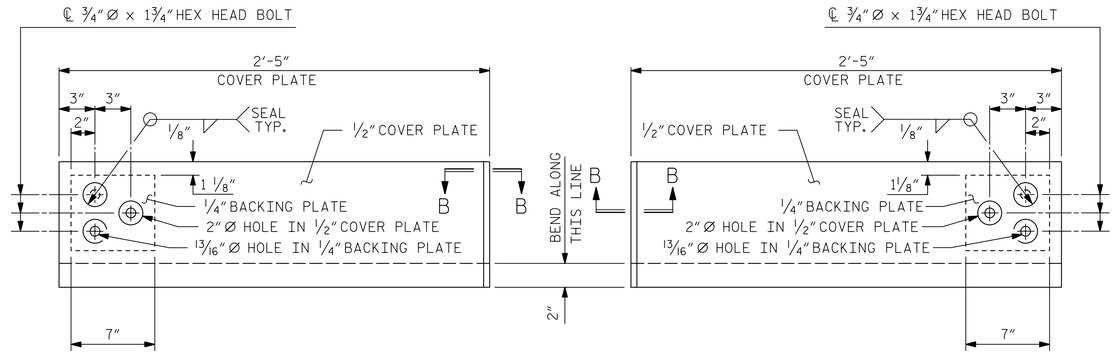
DWG. NO. 21



SECTION B - B



END VIEW



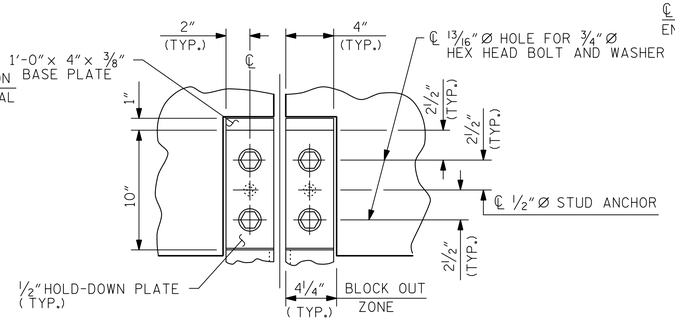
TYPE I - ELEVATION VIEW

(2 REQ'D)

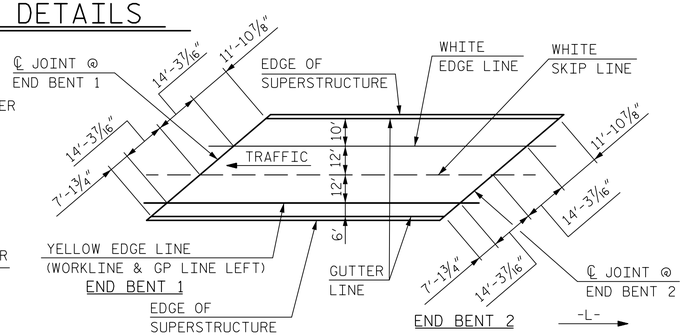
TYPE II - ELEVATION VIEW

(2 REQ'D)

COVER PLATE DETAILS

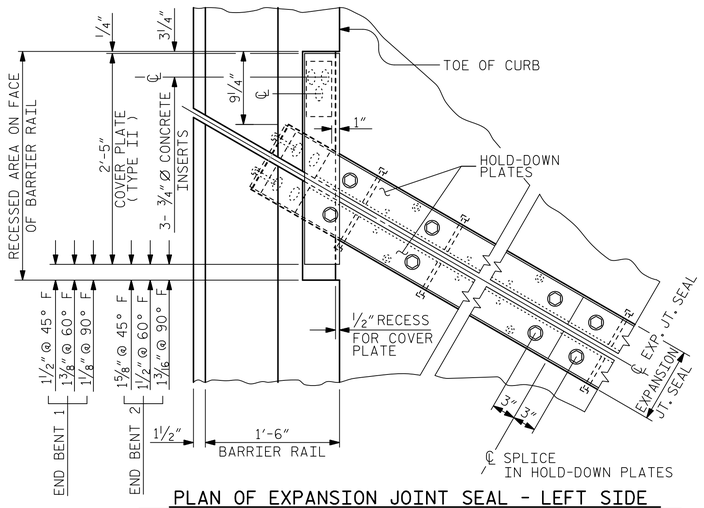


SECTION A - A



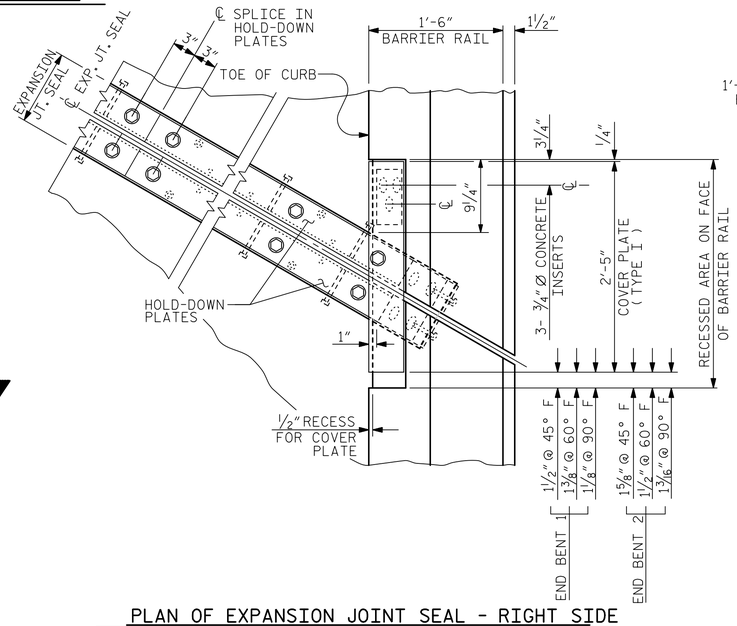
PAVEMENT MARKING ALIGNMENT

SECTION THRU RAIL NORMAL TO JOINT



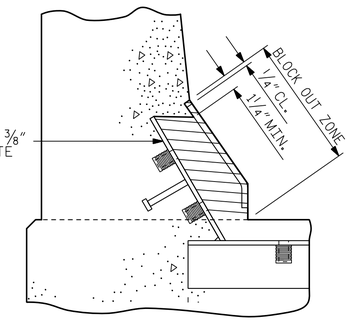
PLAN OF EXPANSION JOINT SEAL - LEFT SIDE

FLOW OF TRAFFIC



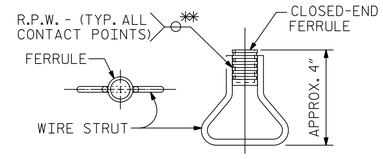
PLAN OF EXPANSION JOINT SEAL - RIGHT SIDE

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. R-1015

CRAVEN **COUNTY**

STATION: 506+32.25 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

LEFT LANE

DocuSigned by: Paul J. Barber 18DF1B573687414E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

ASSEMBLED BY : M. WRIGHT	DATE : 8/18
CHECKED BY : P. BARBER	DATE : 8/18
DRAWN BY : REK 9/87	REV. 7/12 MAA/GM
CHECKED BY : CRK 10/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/18
CHECKED BY	P. BARBER	DATE	8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	8/18

DWG. NO. 22

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-22
1			3			TOTAL SHEETS
2			4			39

STD. NO. EJS2

BILL OF MATERIAL

EPOXY COATED REINFORCING STEEL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A1	292	6	STR	42′-11″	18,823
A2	2	6	STR	42′-1″	126
A3	2	6	STR	41′-3″	124
A4	2	6	STR	40′-5″	121
A5	2	6	STR	39′-6″	119
A6	2	6	STR	38′-8″	116
A7	2	6	STR	37′-10″	114
A8	2	6	STR	37′-0″	111
A9	2	6	STR	36′-2″	109
A10	2	6	STR	35′-4″	106
A11	2	6	STR	34′-6″	104
A12	2	6	STR	33′-8″	101
A13	2	6	STR	32′-10″	99
A14	2	6	STR	32′-0″	96
A15	2	6	STR	31′-2″	94
A16	2	6	STR	30′-4″	91
A17	2	6	STR	29′-6″	89
A18	2	6	STR	28′-8″	86
A19	2	6	STR	27′-10″	84
A20	2	6	STR	27′-0″	81
A21	2	6	STR	26′-2″	79
A22	2	6	STR	25′-3″	76
A23	2	6	STR	24′-5″	73
A24	2	6	STR	23′-7″	71
A25	2	6	STR	22′-9″	68
A26	2	6	STR	21′-11″	66
A27	2	6	STR	21′-1″	63
A28	2	6	STR	20′-3″	61
A29	2	6	STR	19′-5″	58
A30	2	6	STR	18′-7″	56
A31	2	6	STR	17′-9″	53
A32	2	6	STR	16′-11″	51
A33	2	6	STR	16′-1″	48
A34	2	6	STR	15′-3″	46
A35	2	6	STR	14′-5″	43
A36	2	6	STR	13′-7″	41
A37	2	6	STR	12′-9″	38
A38	2	6	STR	11′-11″	36
A39	2	6	STR	11′-1″	33
A40	2	6	STR	10′-2″	31
A41	2	6	STR	9′-4″	28
A42	2	6	STR	8′-6″	26
A43	2	6	STR	7′-8″	23
A44	2	6	STR	6′-10″	21
A45	2	6	STR	6′-0″	18
A46	2	6	STR	5′-2″	16
A47	2	6	STR	4′-4″	13
A48	2	6	STR	3′-6″	11
A49	8	6	STR	5′-11″	71
B1	62	6	STR	36′-9″	3,422
B2	28	7	STR	45′-6″	2,604
B3	28	7	STR	33′-3″	1,903
B4	62	4	STR	18′-2″	752
B5	62	6	STR	36′-6″	3,399
B6	28	6	STR	25′-6″	1,072
B7	28	6	STR	34′-3″	1,440
B8	31	4	STR	16′-9″	347
G1	2	5	STR	51′-1″	107
J1	96	4	6	1′-5″	91
K1	8	8	2	15′-1″	322
K2	12	8	3	22′-0″	705
S1	64	5	4	5′-11″	395
S2	64	4	1	3′-10″	164
U1	48	4	3	13′-4″	428
U2	16	4	3	11′-4″	121
EPOXY COATED REINFORCING STEEL TOTAL:					39,384

BILL OF MATERIAL

REINFORCING STEEL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A101	292	6	STR	42′-11″	18,823
A102	2	6	STR	42′-1″	126
A103	2	6	STR	41′-3″	124
A104	2	6	STR	40′-5″	121
A105	2	6	STR	39′-6″	119
A106	2	6	STR	38′-8″	116
A107	2	6	STR	37′-10″	114
A108	2	6	STR	37′-0″	111
A109	2	6	STR	36′-2″	109
A110	2	6	STR	35′-4″	106
A111	2	6	STR	34′-6″	104
A112	2	6	STR	33′-8″	101
A113	2	6	STR	32′-10″	99
A114	2	6	STR	32′-0″	96
A115	2	6	STR	31′-2″	94
A116	2	6	STR	30′-4″	91
A117	2	6	STR	29′-6″	89
A118	2	6	STR	28′-8″	86
A119	2	6	STR	27′-10″	84
A120	2	6	STR	27′-0″	81
A121	2	6	STR	26′-2″	79
A122	2	6	STR	25′-3″	76
A123	2	6	STR	24′-5″	73
A124	2	6	STR	23′-7″	71
A125	2	6	STR	22′-9″	68
A126	2	6	STR	21′-11″	66
A127	2	6	STR	21′-1″	63
A128	2	6	STR	20′-3″	61
A129	2	6	STR	19′-5″	58
A130	2	6	STR	18′-7″	56
A131	2	6	STR	17′-9″	53
A132	2	6	STR	16′-11″	51
A133	2	6	STR	16′-1″	48
A134	2	6	STR	15′-3″	46
A135	2	6	STR	14′-5″	43
A136	2	6	STR	13′-7″	41
A137	2	6	STR	12′-9″	38
A138	2	6	STR	11′-11″	36
A139	2	6	STR	11′-1″	33
A140	2	6	STR	10′-2″	31
A141	2	6	STR	9′-4″	28
A142	2	6	STR	8′-6″	26
A143	2	6	STR	7′-8″	23
A144	2	6	STR	6′-10″	21
A145	2	6	STR	6′-0″	18
A146	2	6	STR	5′-2″	16
A147	2	6	STR	4′-4″	13
A148	2	6	STR	3′-6″	11
B101	272	5	STR	48′-0″	13,617
K3	24	6	STR	8′-3″	297
K4	20	4	7	6′-8″	89
K5	30	4	8	13′-0″	261
K6	16	4	STR	6′-4″	68
K7	16	4	STR	8′-11″	95
K8	32	4	STR	9′-6″	203
K9	16	4	STR	8′-4″	89
S3	240	4	5	2′-9″	441
REINFORCING STEEL TOTAL:					37,201

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″			

GROOVING BRIDGE FLOORS

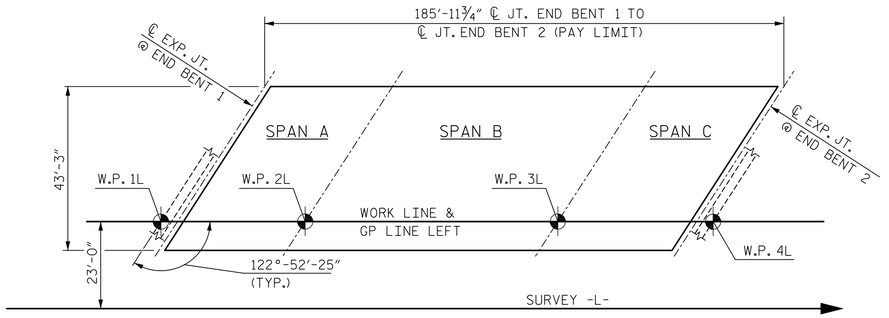
APPROACH SLABS	1,760	SQ.FT.
BRIDGE DECK	6,836	SQ.FT.
TOTAL	8,596	SQ.FT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	58.3	37,201	39,384
POUR 2	150.3		
POUR 3	73.1		
TOTALS**	281.7	37,201	39,384

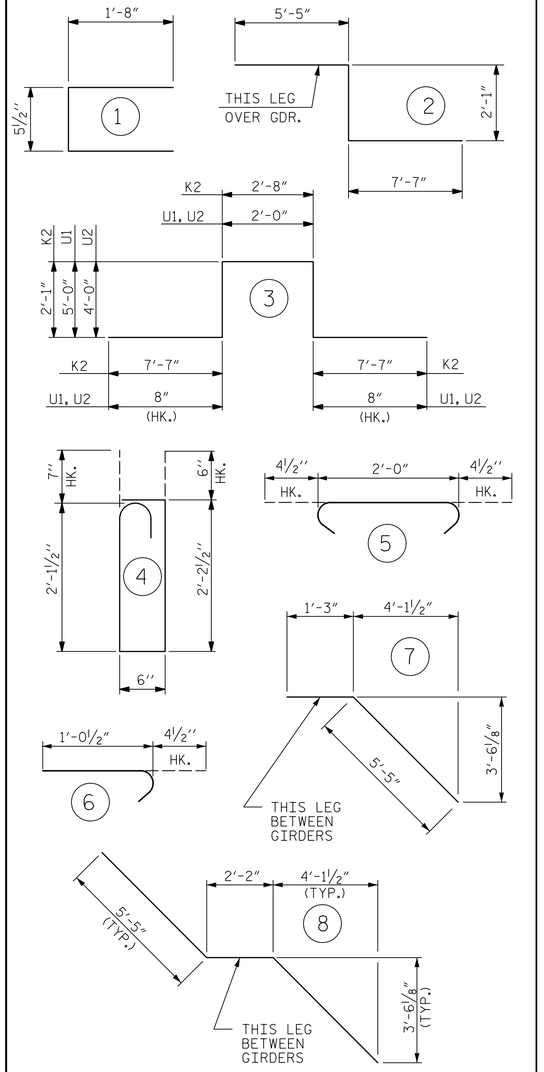
NOTE: CONCRETE IN CLOSURE POUR AT SLAB EXPANSION JOINTS IS INCLUDED IN THE ADJACENT POUR QUANTITY.

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. FOR POURING SEQUENCE, SEE SHEET "SUPERSTRUCTURE TYPICAL SECTION DETAILS".



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 8,044)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

LEFT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 8/18
CHECKED BY : P. BARBER	DATE : 8/18

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

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343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

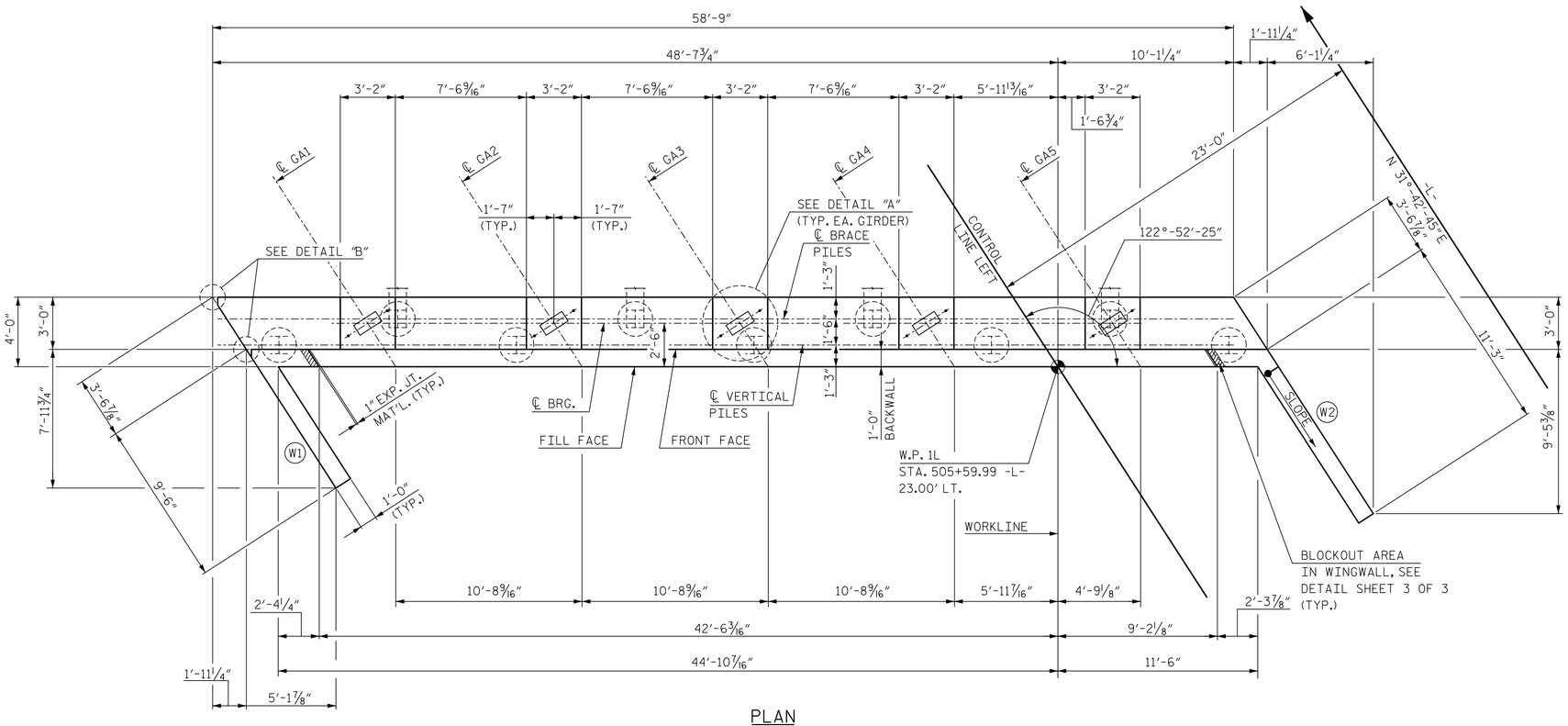
DRAWN BY M. WRIGHT	DATE 8/18
CHECKED BY P. BARBER	DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER	DATE 8/18

DWG. NO. 23

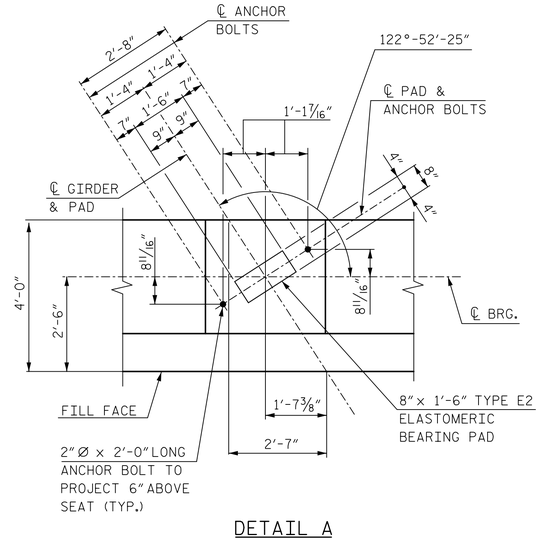
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S01-23
1			3			TOTAL SHEETS
2			4			39

STR. #13

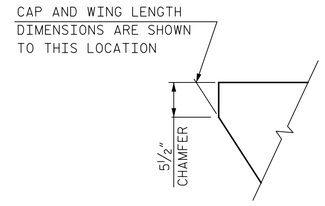
STD. NO. BOM2



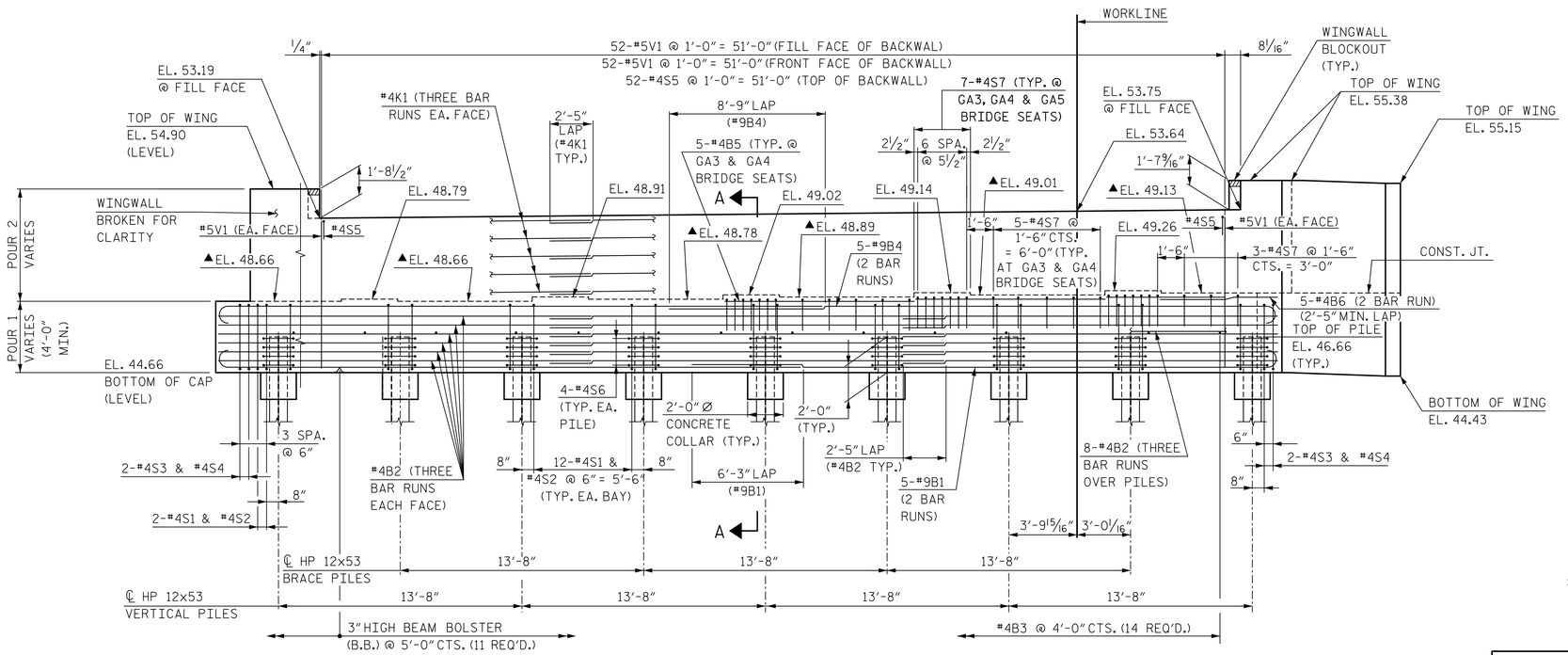
PLAN



DETAIL A



DETAIL B



ELEVATION

▲FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A, SHEET 2 OF 3.

NOTES:

FOR NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WINGWALL DETAILS AND SECTION A-A, SEE SHEET 2 OF 3.

INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 3

DocuSigned by: Paul J. Barber

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/30/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

LEFT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

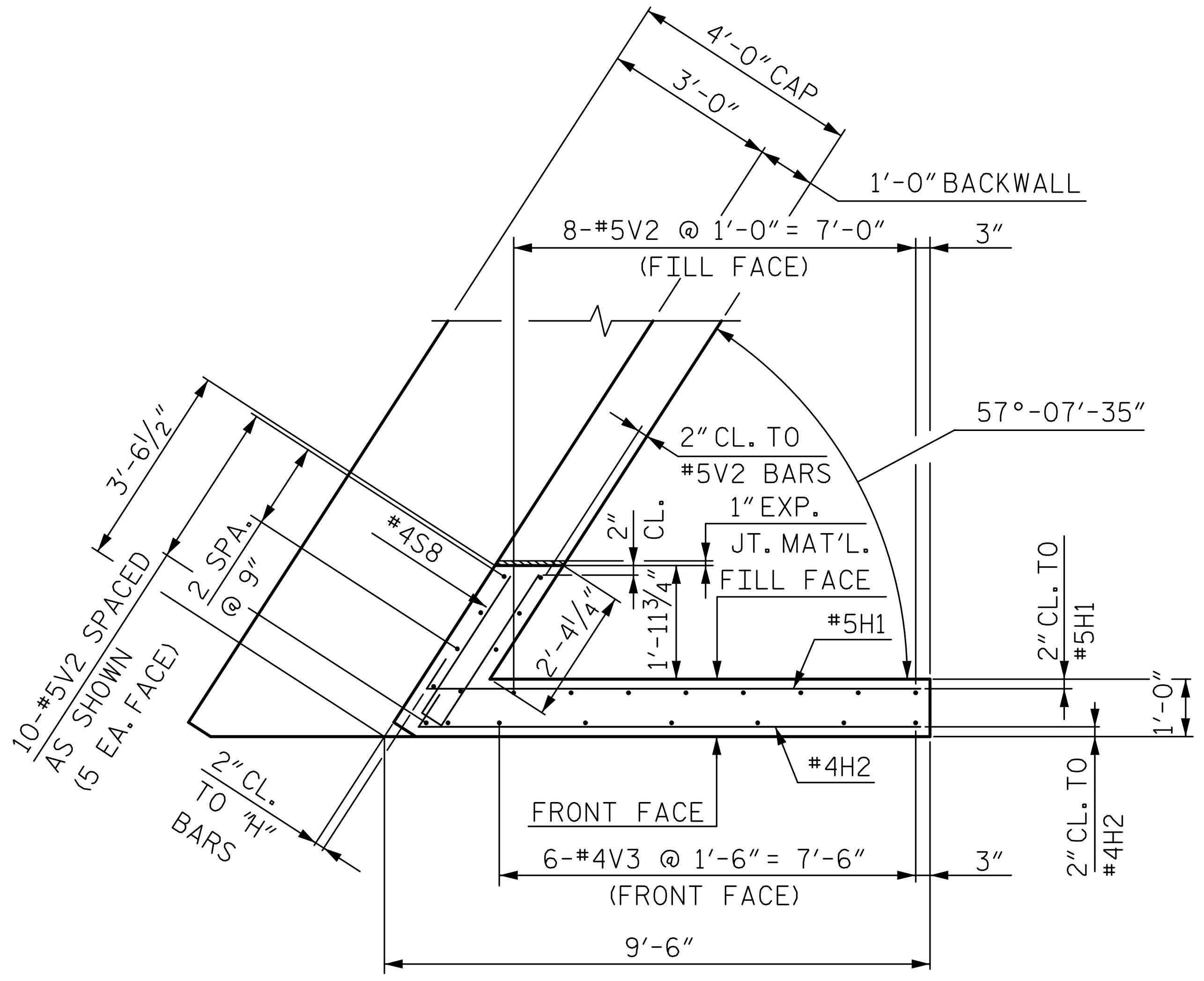
DRAWN BY J. BAYNE DATE 10/16
CHECKED BY V. KOLLIPARA DATE 10/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 24

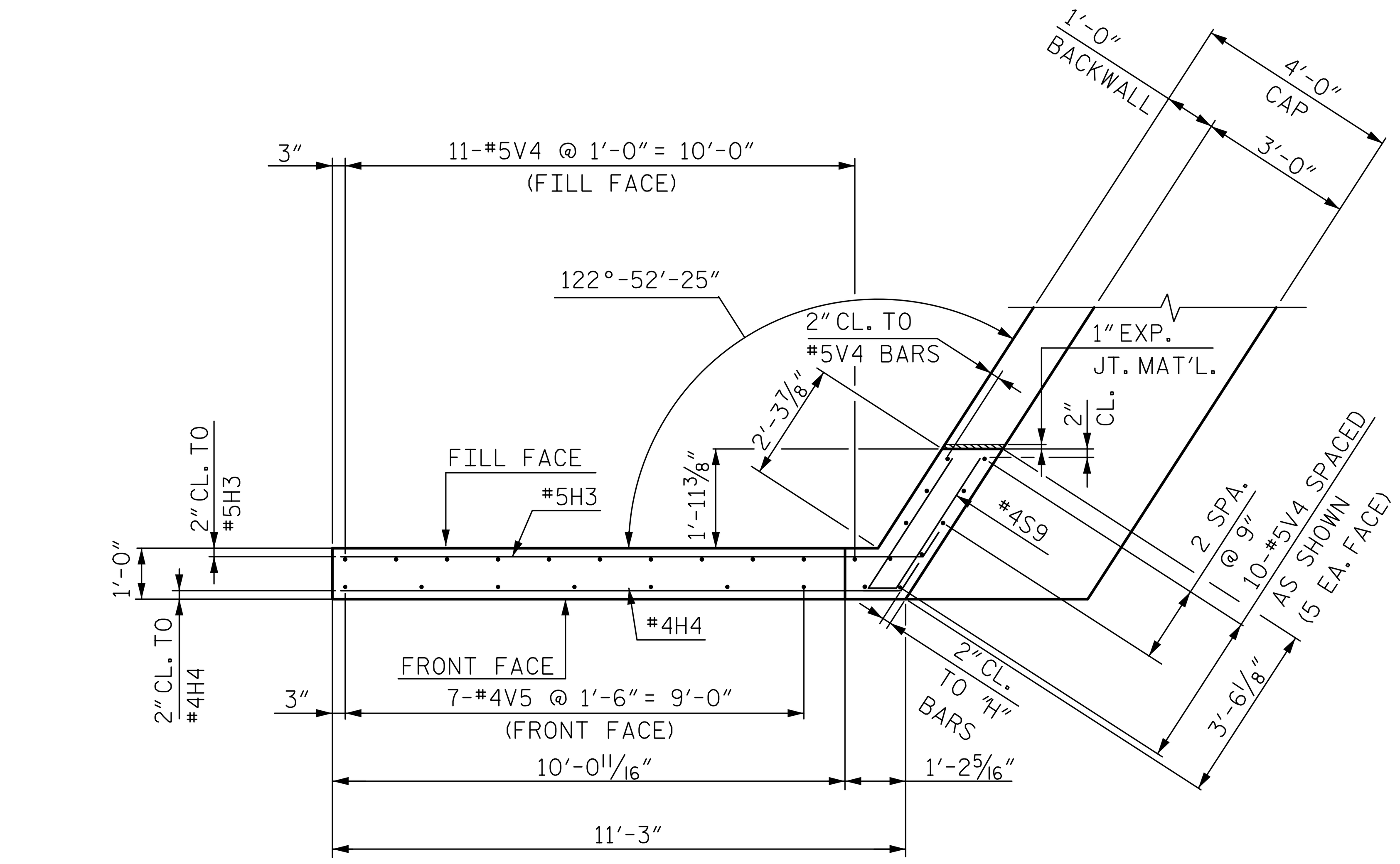
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-24
1			3			TOTAL SHEETS
2			4			39

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

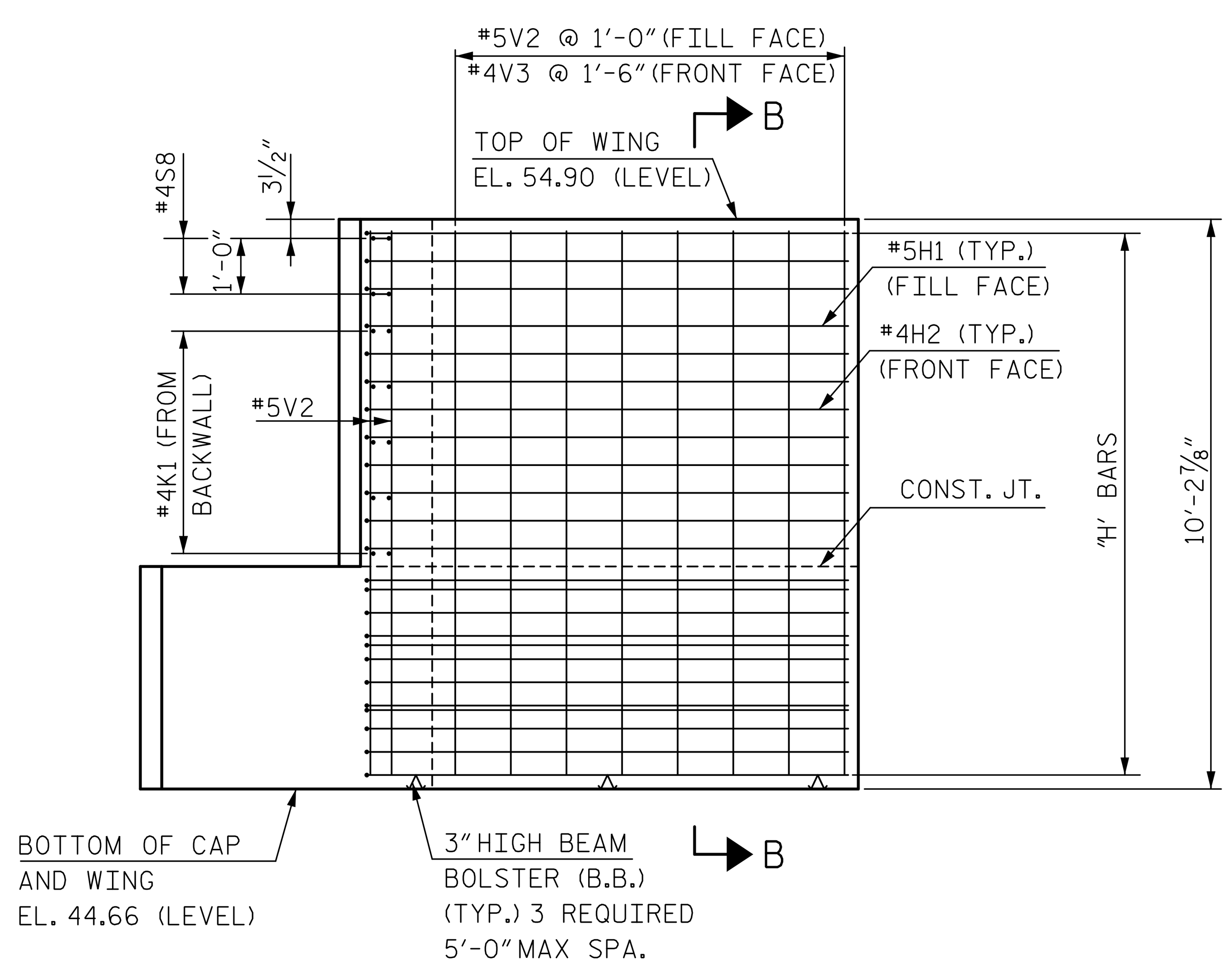
NOTES:
FOR NOTES, SEE SHEET 3 OF 3.



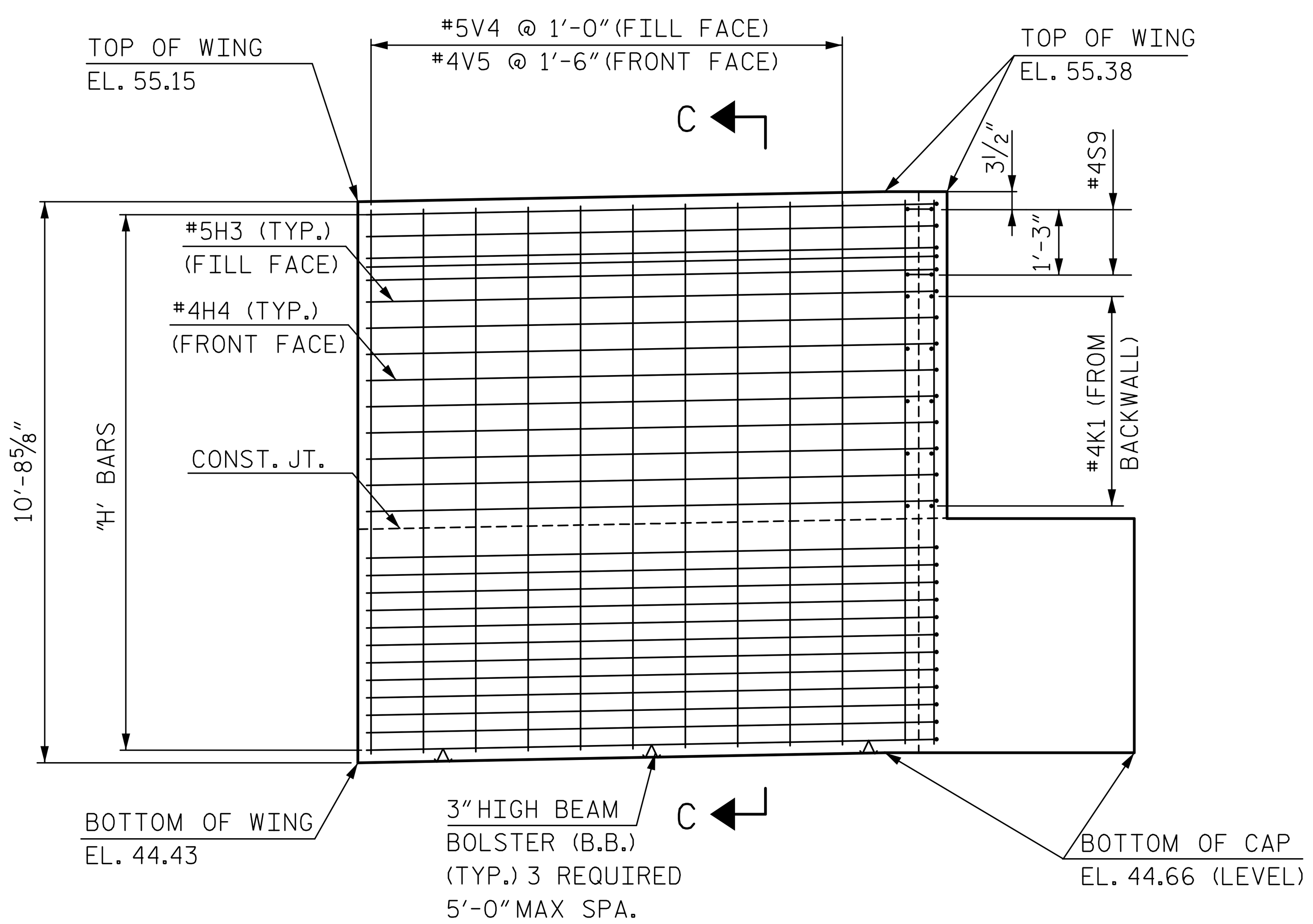
PLAN OF WING (W1)



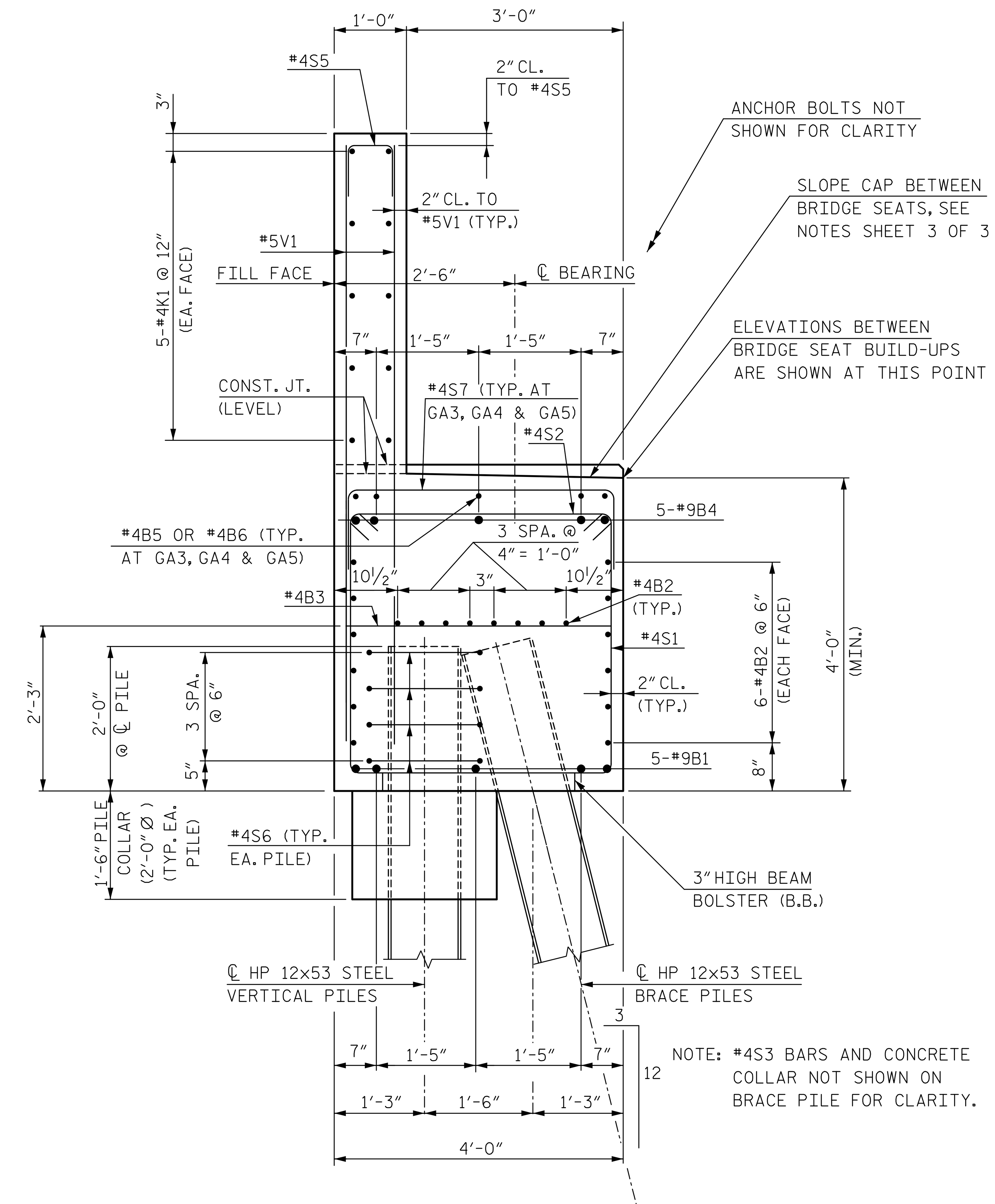
PLAN OF WING (W2)



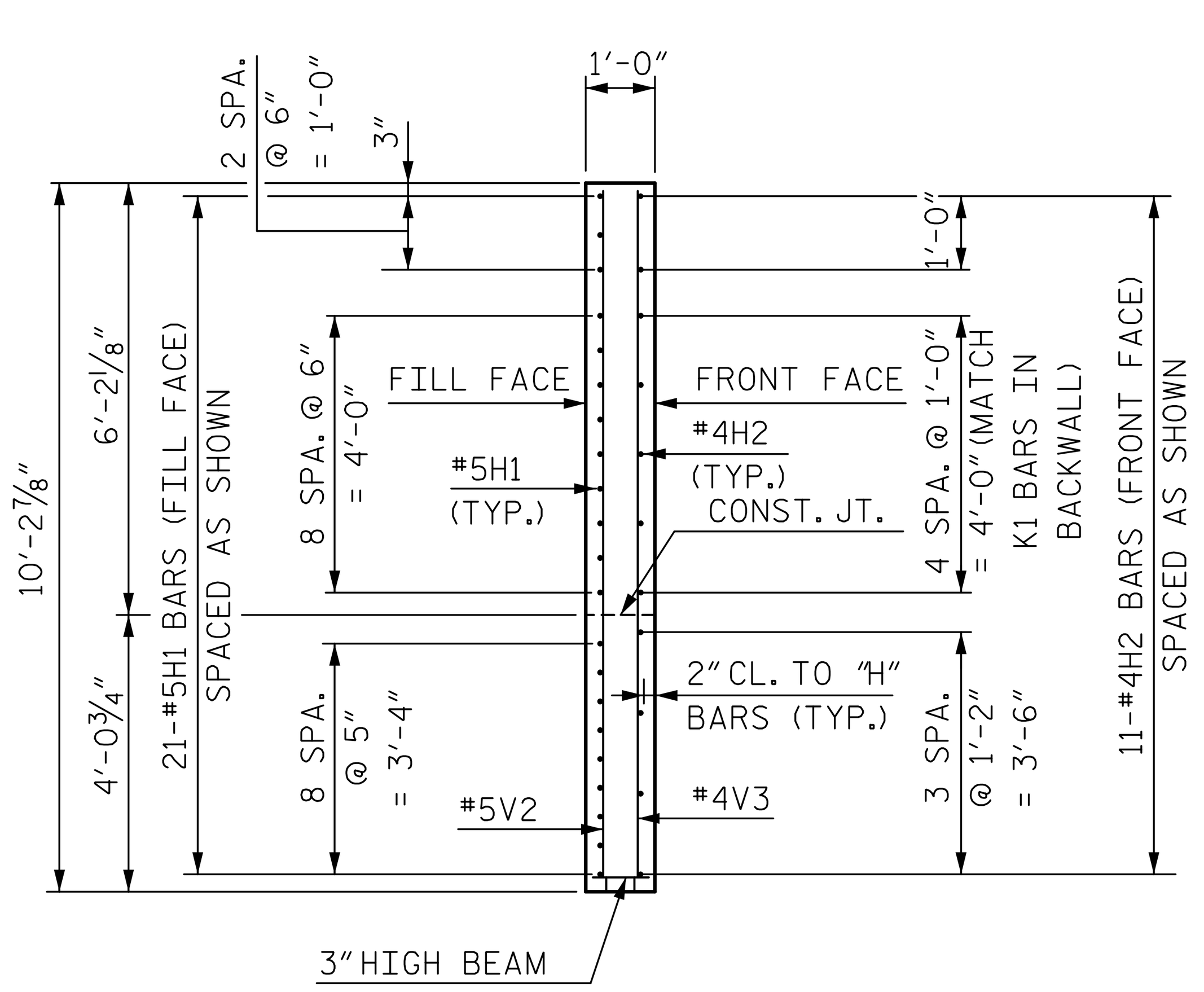
ELEVATION OF WING (W1)



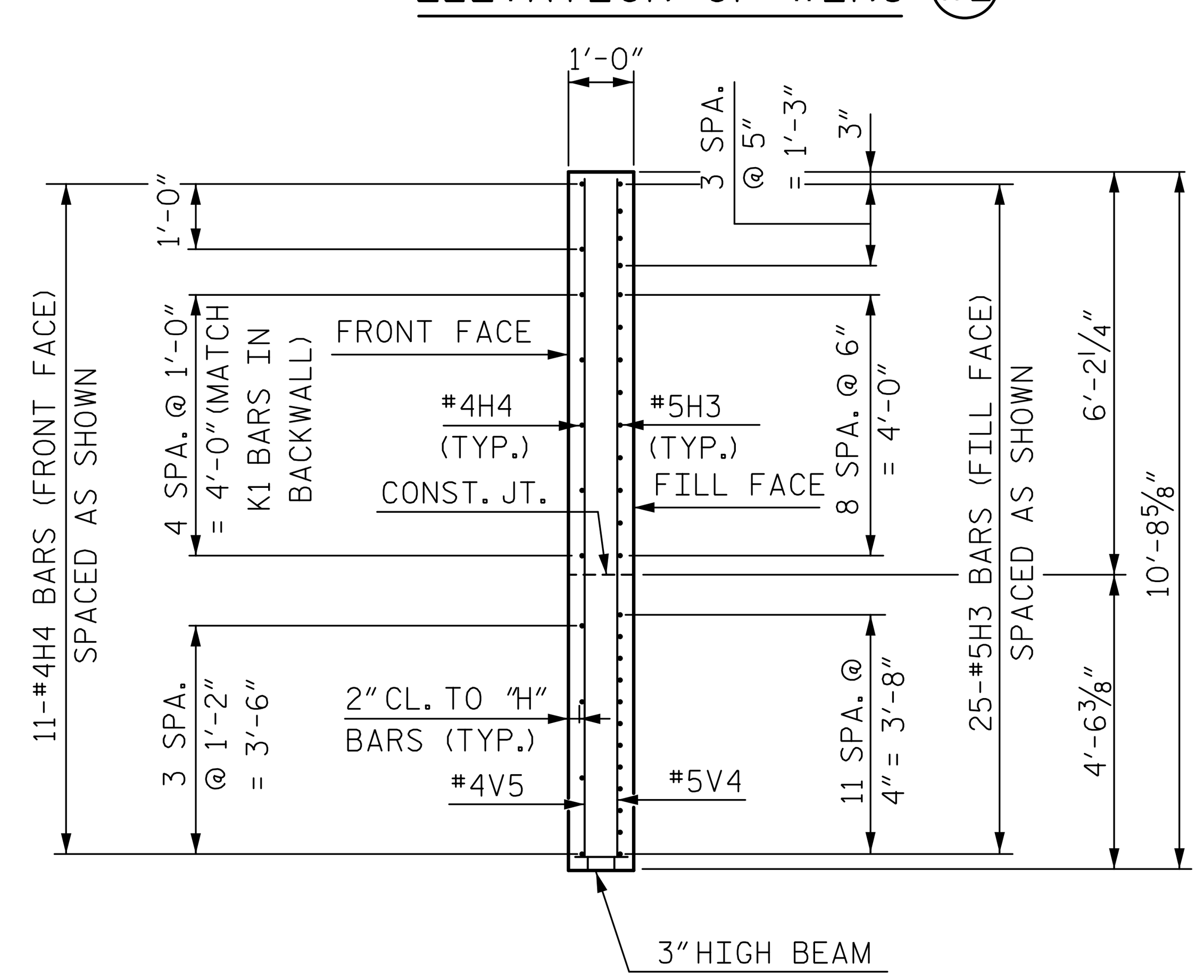
ELEVATION OF WING (W2)



SECTION A-A



SECTION B-B



SECTION C-C

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

DocuSigned by: Paul J. Barber

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER

11/30/2018

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

LEFT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	J. BAYNE	DATE	10/16
CHECKED BY	V. KOLLIPARA	DATE	10/16
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	8/18

DWG. NO. 25

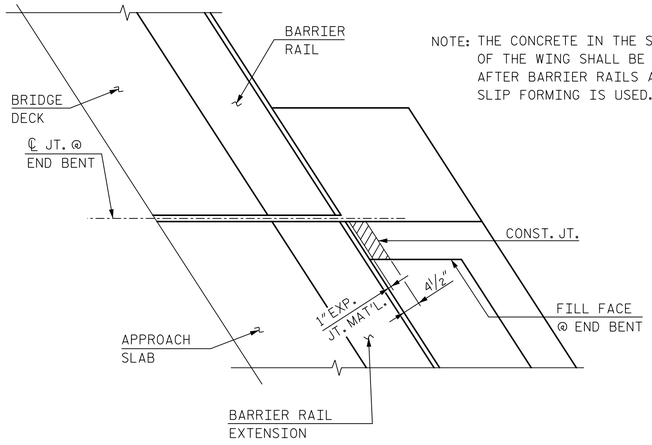
REVISIONS

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

SHEET NO. S13-25

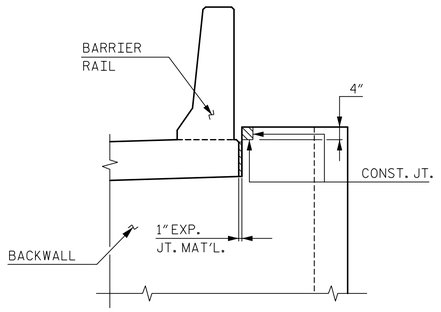
TOTAL SHEETS 39

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



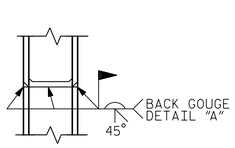
NOTE: THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

PLAN

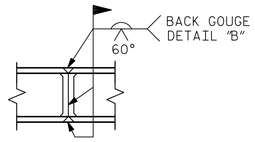


ELEVATION

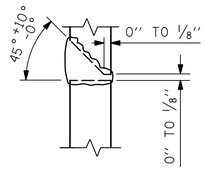
BLOCKOUT IN WINGWALL



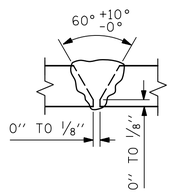
*PILE VERTICAL



*PILE HORIZONTAL OR VERTICAL



DETAIL "A"



DETAIL "B"

* POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

NOTES:

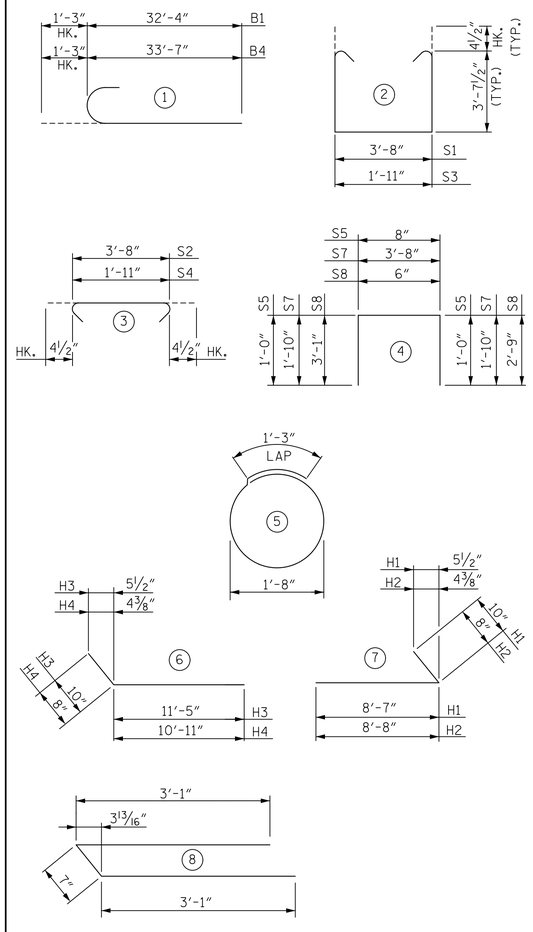
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

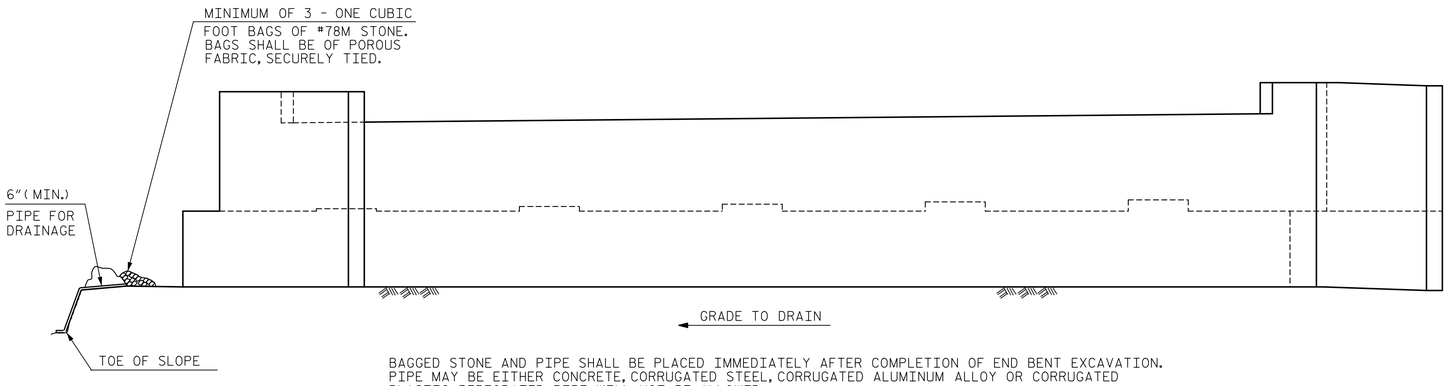
BILL OF REINFORCING

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	9	1	33'-7"	1,142
B2	60	4	STR.	21'-1"	845
B3	14	4	STR.	3'-8"	34
B4	10	9	1	34'-10"	1,184
B5	10	4	STR.	10'-6"	70
B6	10	4	STR.	6'-7"	44
H1	21	5	7	9'-5"	206
H2	11	4	7	9'-4"	69
H3	25	5	6	12'-3"	319
H4	11	4	6	11'-7"	85
K1	30	4	STR.	21'-1"	423
S1	98	4	2	11'-8"	764
S2	98	4	3	4'-5"	289
S3	4	4	2	9'-11"	26
S4	4	4	3	2'-8"	7
S5	52	4	4	2'-8"	93
S6	36	4	5	6'-5"	154
S7	34	4	4	7'-4"	167
S8	2	4	4	6'-4"	8
S9	2	4	8	6'-9"	9
V1	104	5	STR.	8'-1"	877
V2	18	5	STR.	9'-9"	183
V3	6	4	STR.	9'-9"	39
V4	21	5	STR.	10'-3"	225
V5	7	4	STR.	10'-3"	48

QUANTITIES

REINFORCING STEEL	LBS.	7,310
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP & BOT. OF WINGS	CU. YDS.	41.7
POUR 2 - TOP OF WINGS & BACKWALL	CU. YDS.	22.3
TOTAL	CU. YDS.	64.0
HP 12x53 STEEL PILES	NO.	9
	LIN. FT.	585
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	9
PILE REDRIVES	NO.	5



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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 1

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 3 OF 3

DocuSigned by: Paul J. Barber

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/30/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

LEFT LANE

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DRAWN BY J. BAYNE DATE 10/16
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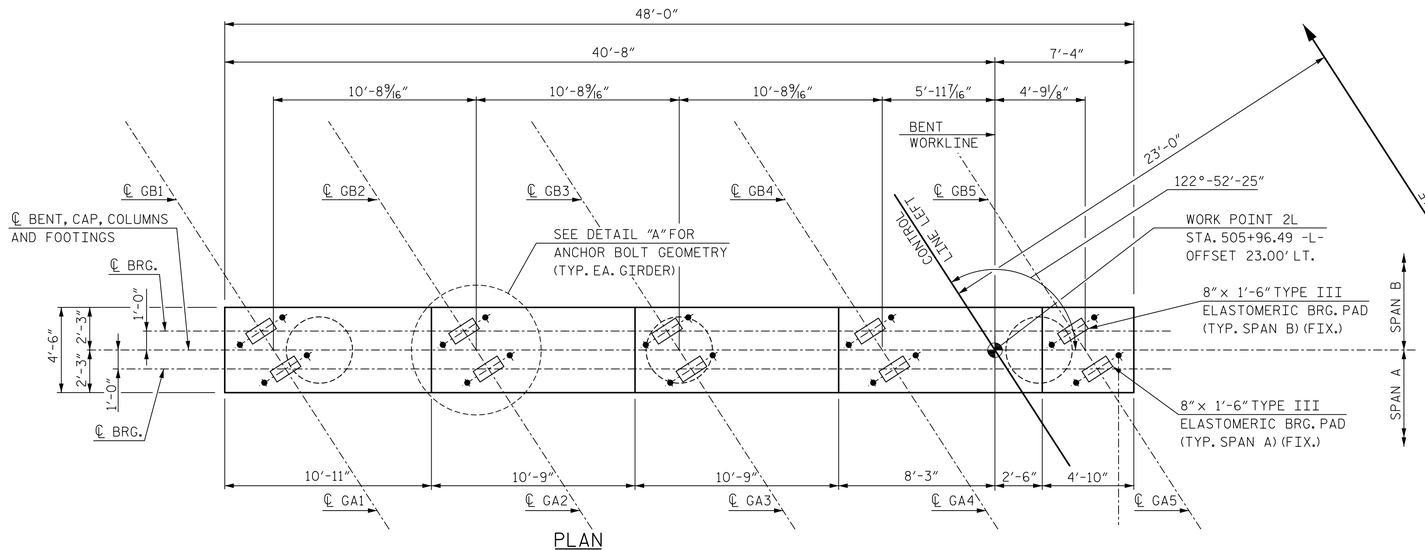
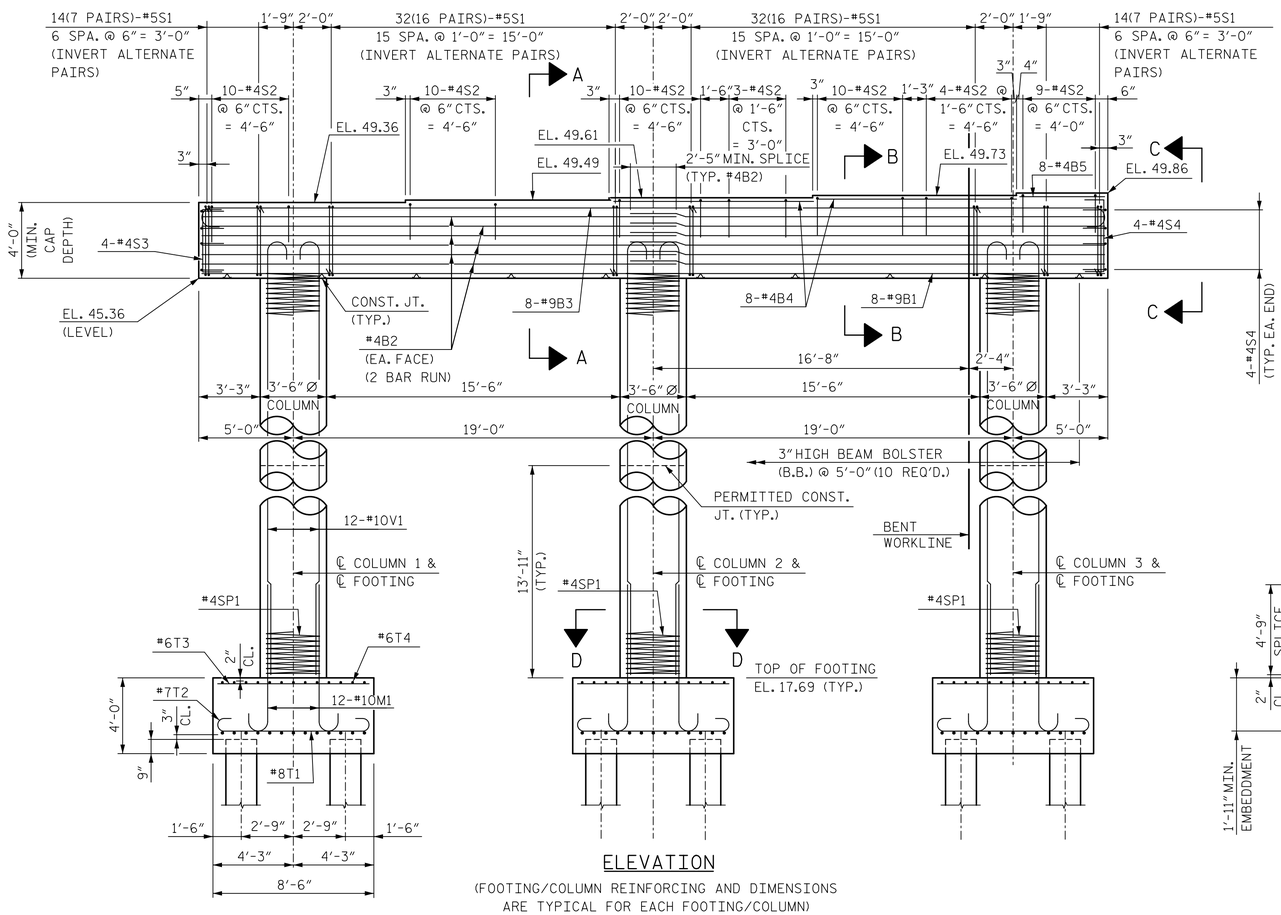
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 26

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-26
1			3			TOTAL SHEETS
2			4			39

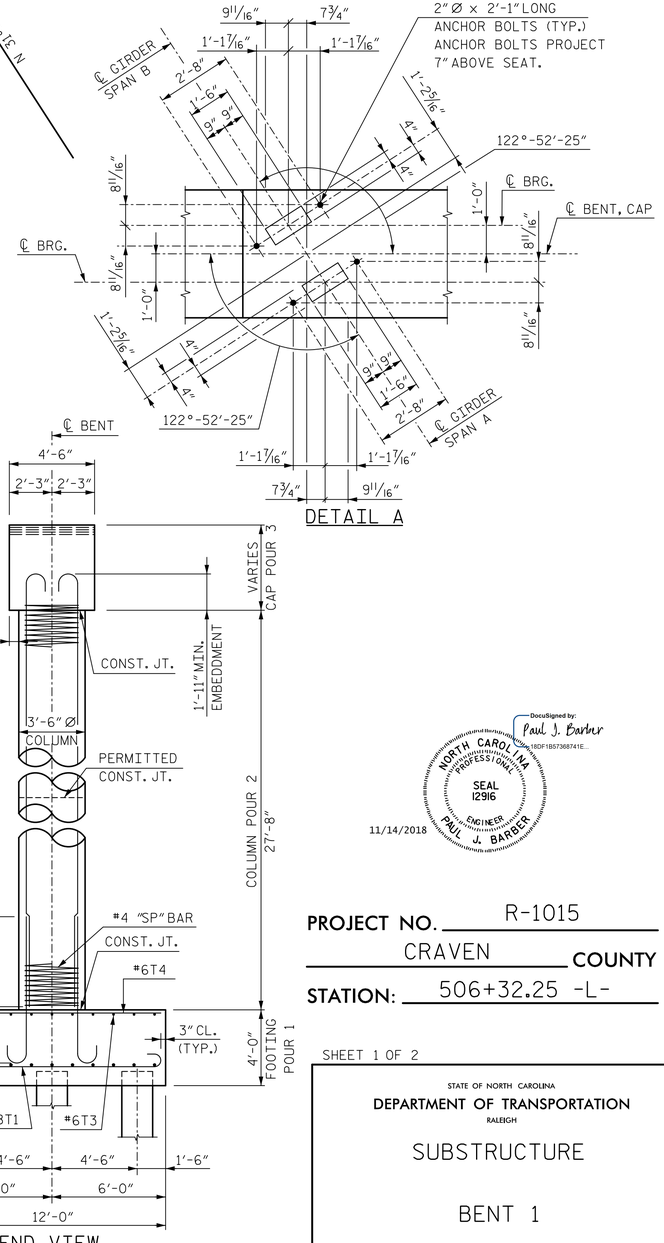


PLAN

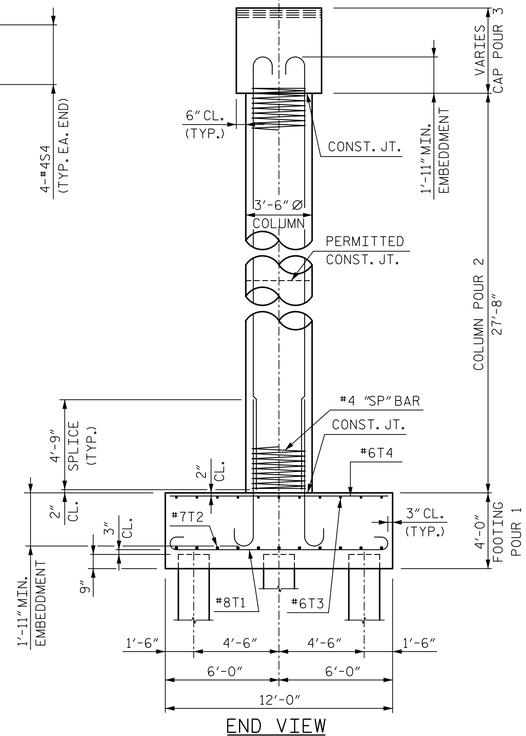


ELEVATION

(FOOTING/COLUMN REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING/COLUMN)



DETAIL A



END VIEW

NOTES:

ALL DIMENSIONS SHOWN ARE PARALLEL OR NORMAL TO ℄ BENT UNLESS NOTED.

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

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

DocuSigned by: Paul J. Barber 180F1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

LEFT LANE

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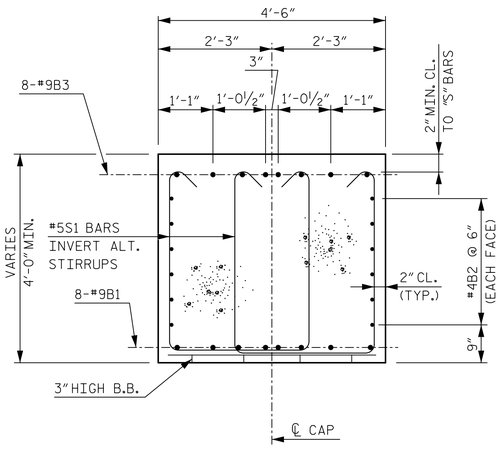
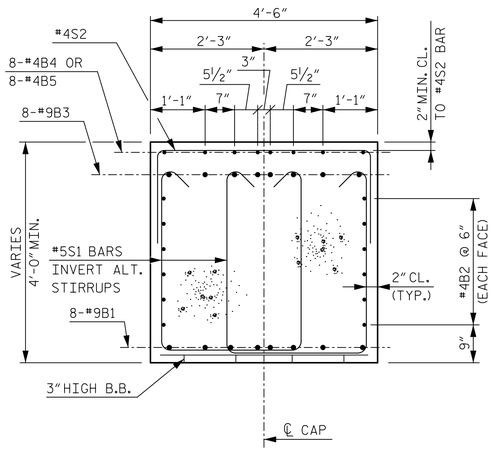
DWG. NO. 27

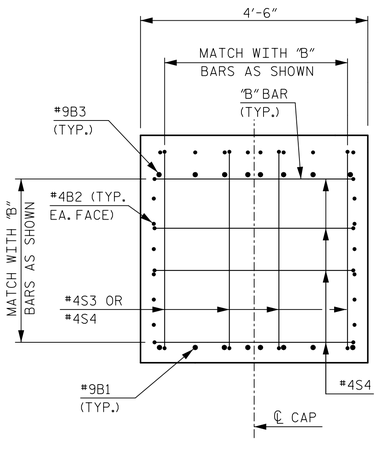
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S03-27
1			3			TOTAL SHEETS
2			4			39



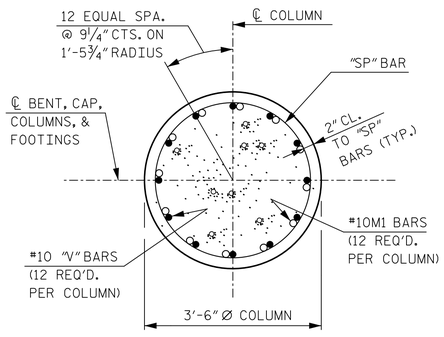
SECTION A-A



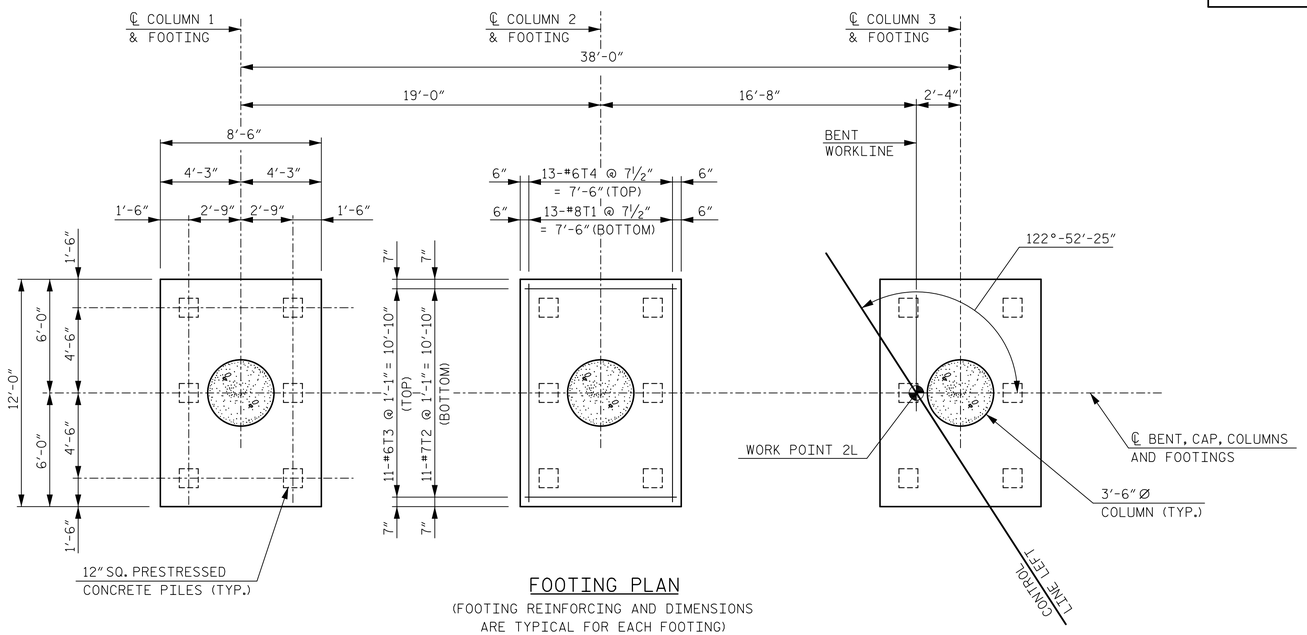
SECTION B-B



VIEW C-C



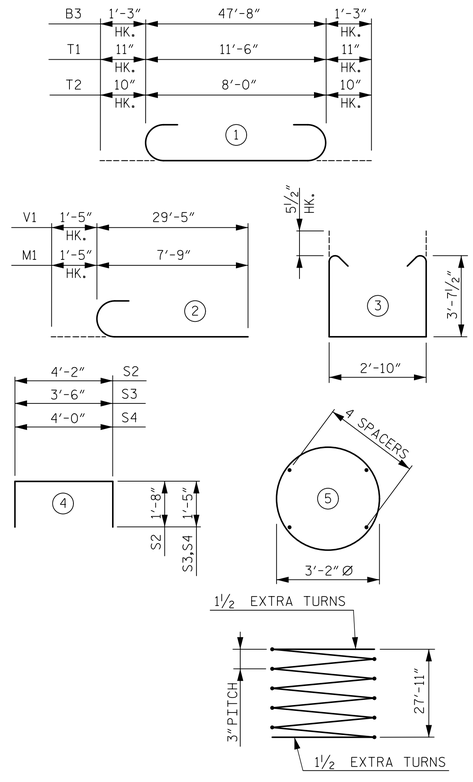
SECTION D-D



FOOTING PLAN

(FOOTING REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9	STR	47'-8"	1,297
B2	24	4	STR	25'-1"	402
B3	8	9	1	50'-2"	1,365
B4	16	4	STR	10'-7"	113
B5	8	4	STR	4'-6"	24
M1	36	10	2	9'-2"	1,420
S1	92	5	3	11'-0"	1,056
S2	56	4	4	7'-6"	281
S3	4	4	4	6'-4"	17
S4	12	4	4	6'-10"	55
T1	39	8	1	13'-4"	1,388
T2	33	7	1	9'-8"	652
T3	33	6	STR	8'-0"	397
T4	39	6	STR	11'-6"	674
V1	36	10	2	30'-10"	4,776
SP-1	3	*	5	1129'-5"	2,263

QUANTITIES

REINFORCING STEEL	LBS.	13,917
SPIRAL COLUMN REINFORCING STEEL	LBS.	2,263
CLASS A CONCRETE		
FOOTING POUR 1	CU. YDS.	45.3
COLUMN POUR 2	CU. YDS.	29.6
CAP POUR 3	CU. YDS.	33.7
TOTAL	CU. YDS.	108.6
12" SQ. PSC PILES	NO.	18
	LIN. FT.	990
FOUNDATION EXCAVATION	LUMP SUM	LS
PILE DRIVING EQUIPMENT SETUP FOR 12" SQ. PSC PILES	NO.	18
PILE REDRIVES	NO.	9

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 2

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

LEFT LANE

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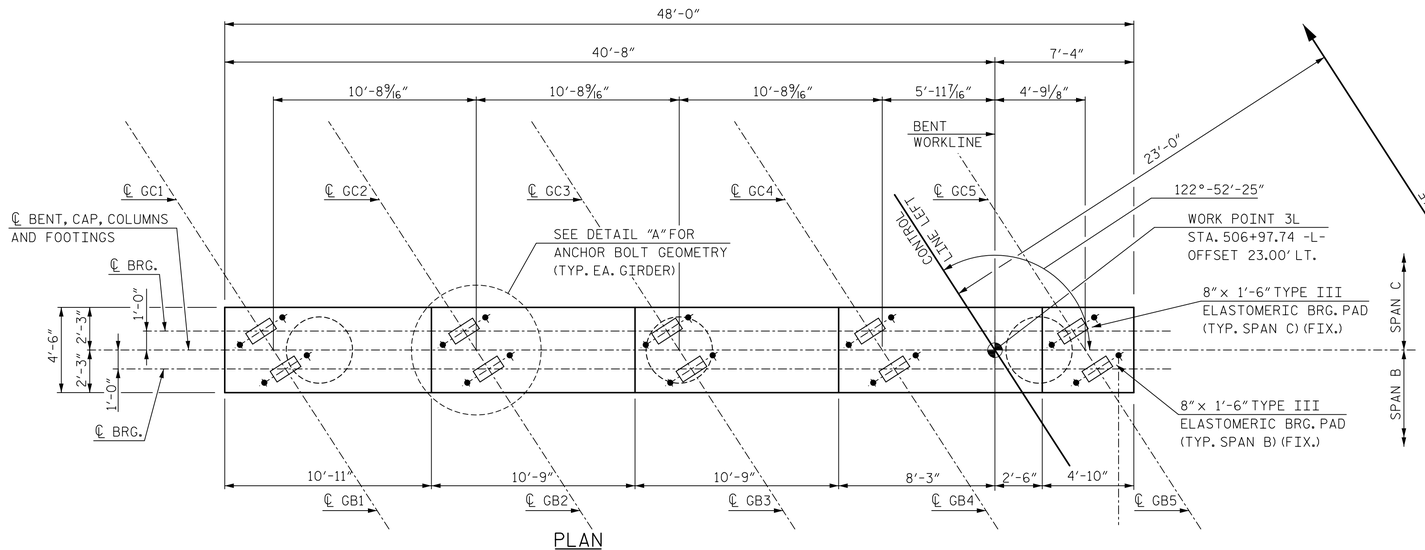
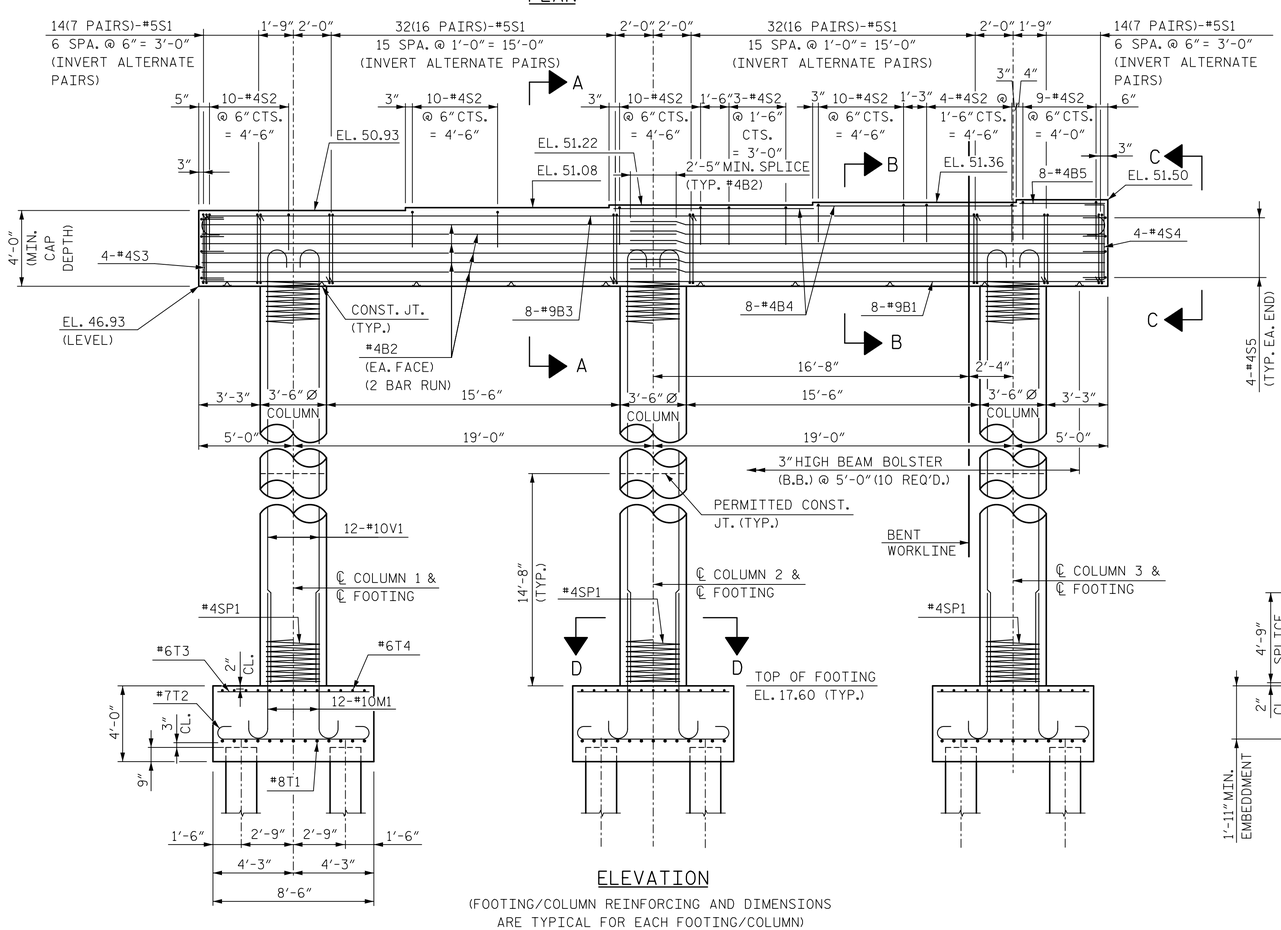
DWG. NO. 28

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S03-28
1			3			TOTAL SHEETS
2			4			39

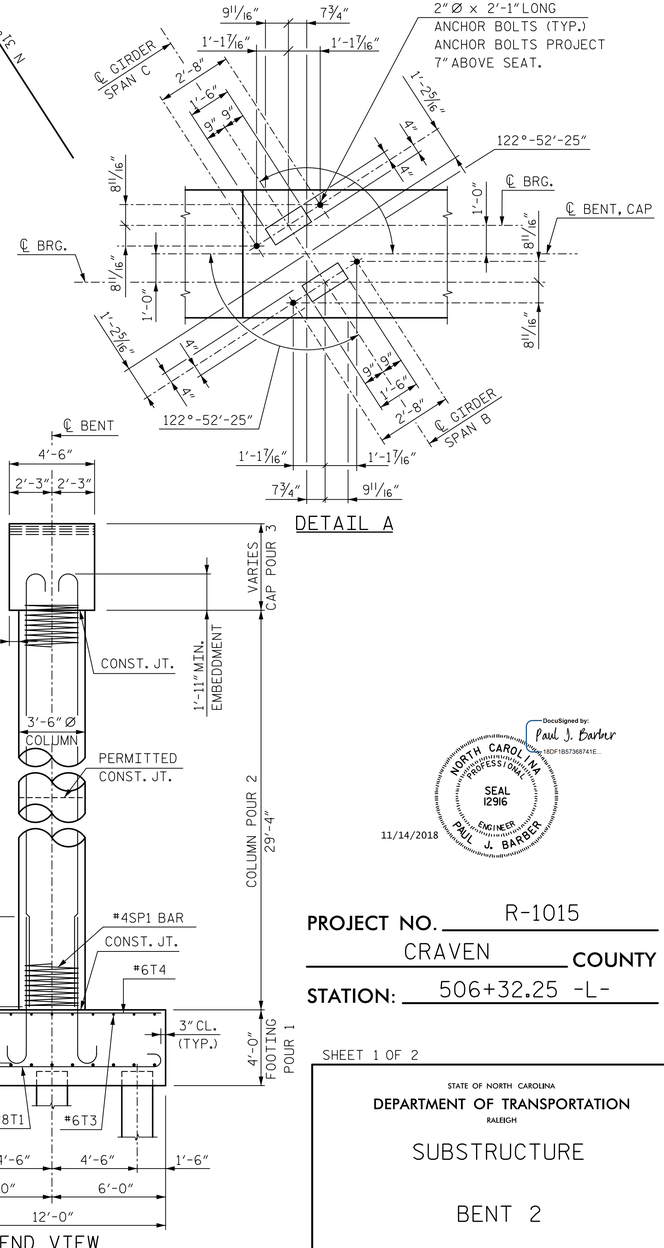


PLAN

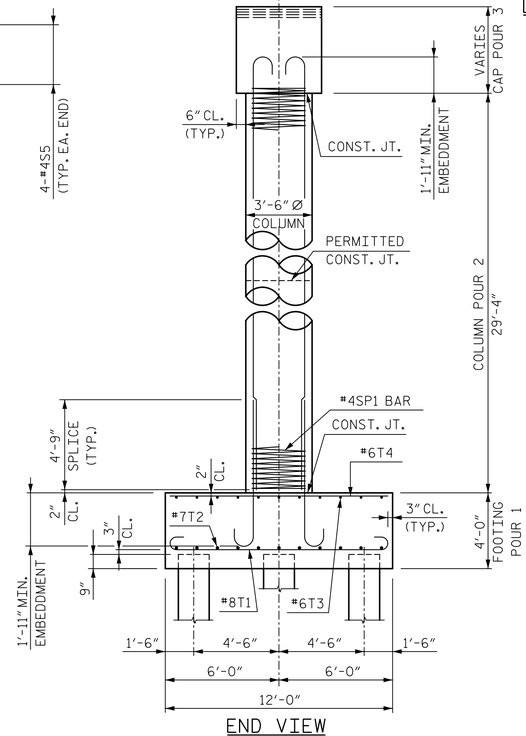


ELEVATION

(FOOTING/COLUMN REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING/COLUMN)



DETAIL A



END VIEW

NOTES:

ALL DIMENSIONS SHOWN ARE PARALLEL OR NORMAL TO ℄ BENT UNLESS NOTED.

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

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

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11/14/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

LEFT LANE

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DWG. NO. 29

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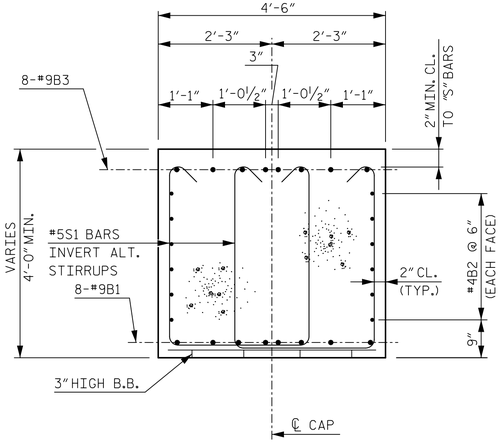
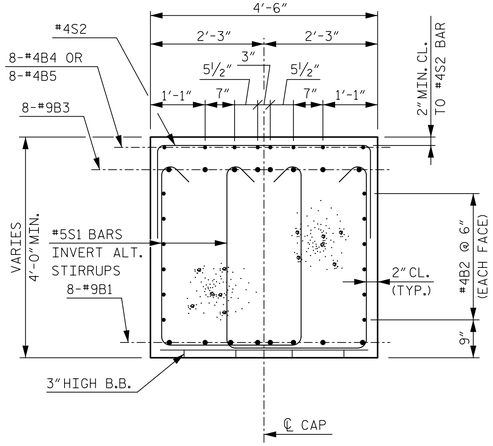
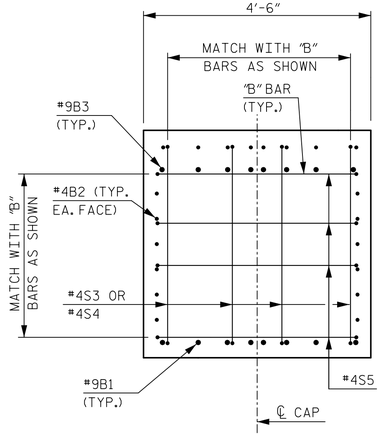
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S03-29
1			3			TOTAL SHEETS
2			4			39



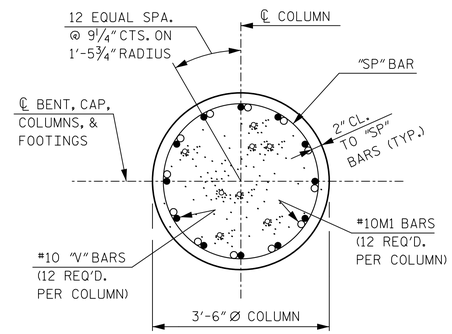
SECTION A-A



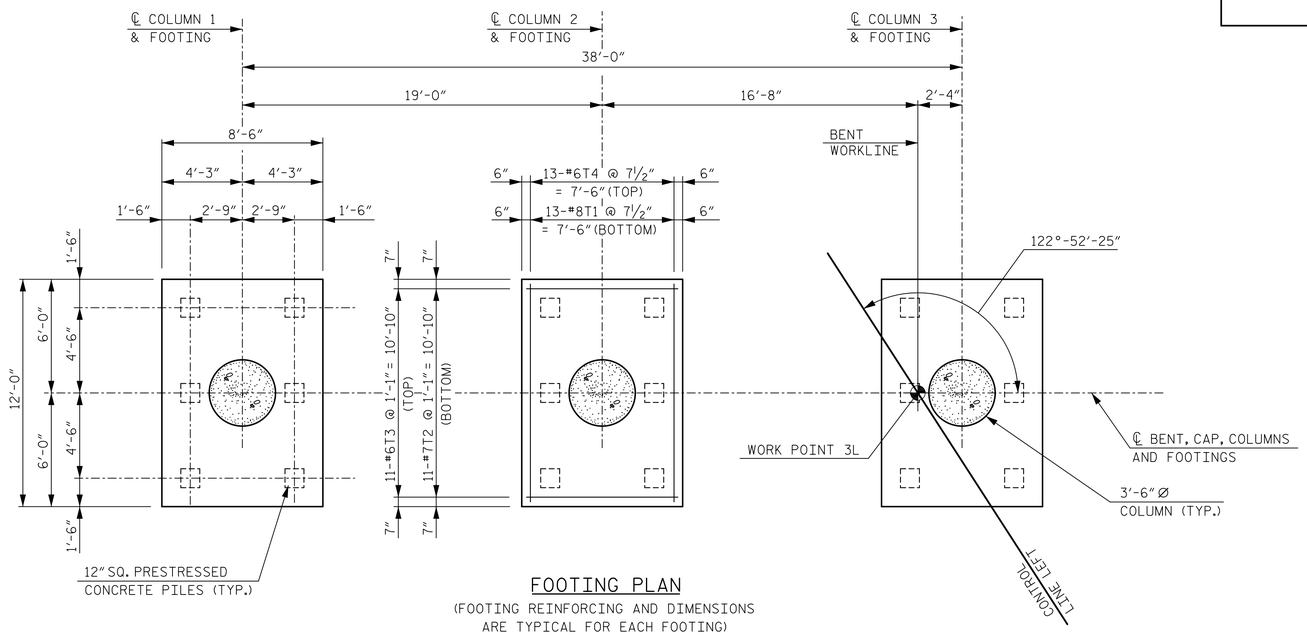
SECTION B-B



VIEW C-C



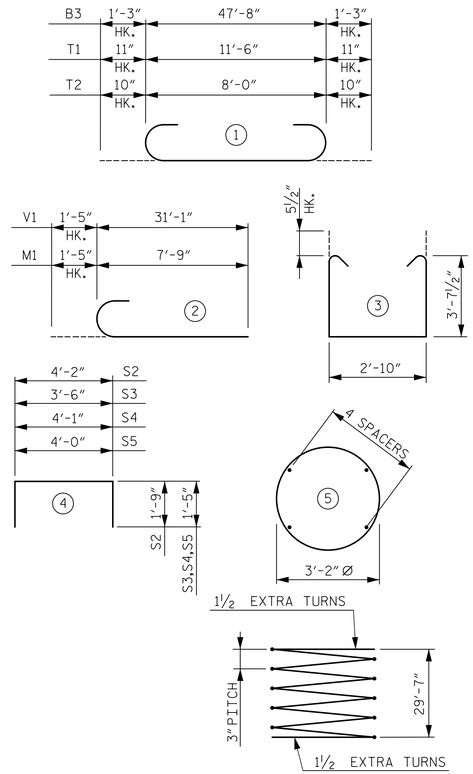
SECTION D-D



FOOTING PLAN

(FOOTING REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	9	STR	47'-8"	1,297
B2	24	4	STR	25'-1"	402
B3	8	9	1	50'-2"	1,365
B4	16	4	STR	10'-7"	113
B5	8	4	STR	4'-6"	24
M1	36	10	2	9'-2"	1,420
S1	92	5	3	11'-0"	1,056
S2	56	4	4	7'-8"	287
S3	4	4	4	6'-4"	17
S4	4	4	4	6'-11"	18
S5	8	4	4	6'-10"	37
T1	39	8	1	13'-4"	1,388
T2	33	7	1	9'-8"	652
T3	33	6	STR	8'-0"	397
T4	39	6	STR	11'-6"	674
V1	36	10	2	32'-6"	5,035
SP-1	3	*	5	1198'-2"	2,401

QUANTITIES

REINFORCING STEEL	LBS.	14,182
SPIRAL COLUMN REINFORCING STEEL	LBS.	2,401
CLASS A CONCRETE		
FOOTING POUR 1	CU. YDS.	45.3
COLUMN POUR 2	CU. YDS.	31.4
CAP POUR 3	CU. YDS.	34.0
TOTAL	CU. YDS.	110.7
12" SQ. PSC PILES	NO.	18
	LIN. FT.	990
FOUNDATION EXCAVATION	LUMP SUM	LS
PILE DRIVING EQUIPMENT SETUP FOR 12" SQ. PSC PILES	NO.	18
PILE REDRIVES	NO.	9

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 2

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11/14/2018

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DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 30

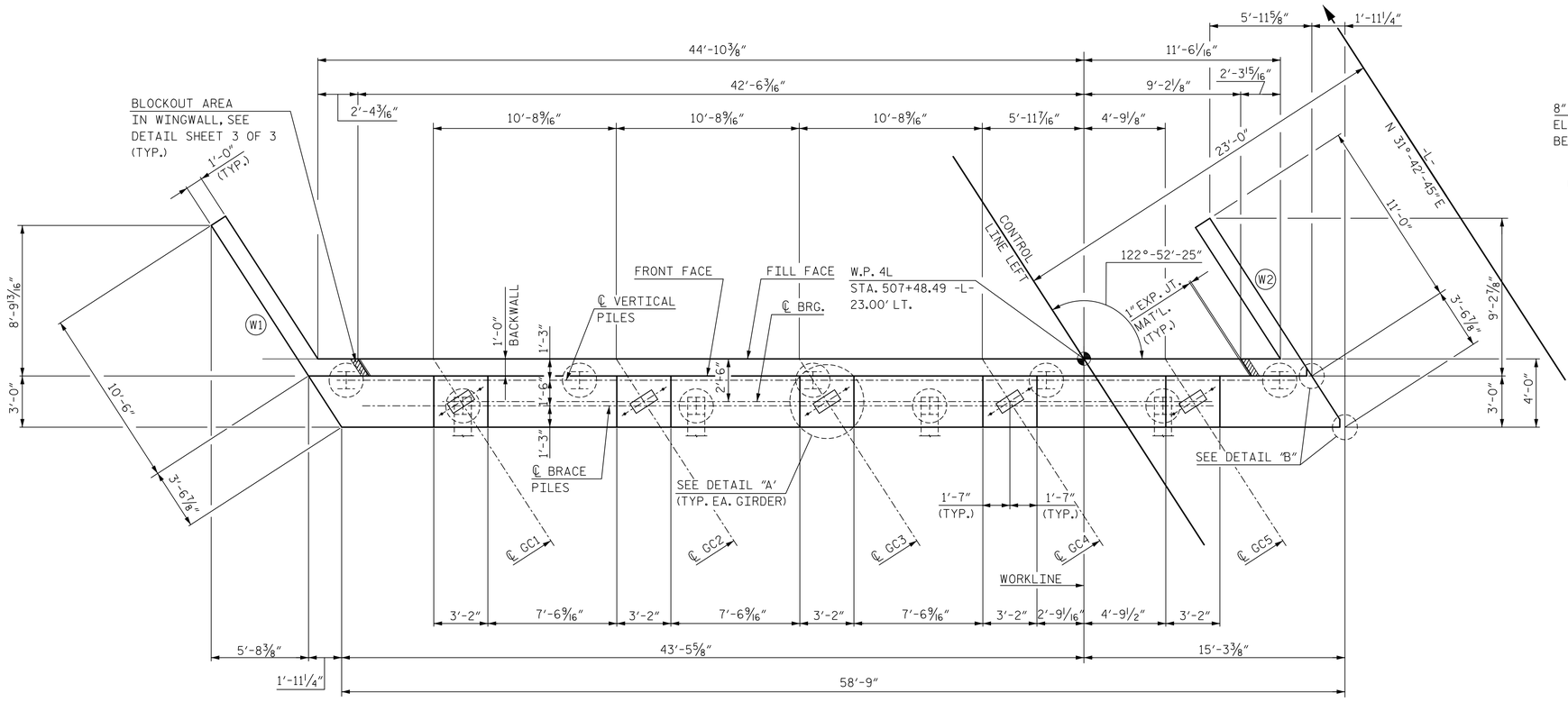
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

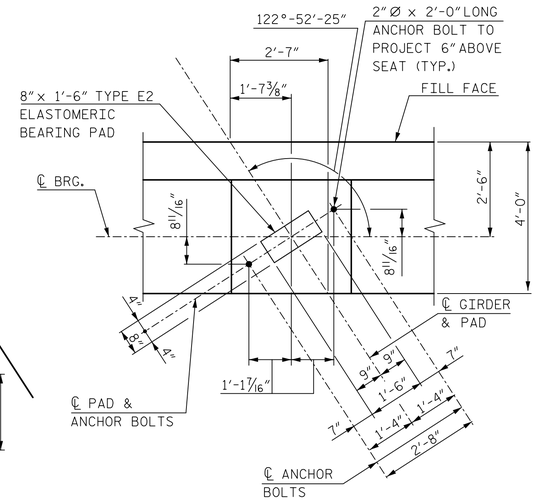
BENT 2

LEFT LANE

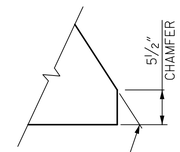
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S03-30
1			3			TOTAL SHEETS
2			4			39



PLAN



DETAIL A



CAP AND WING LENGTH DIMENSIONS ARE SHOWN TO THIS LOCATION

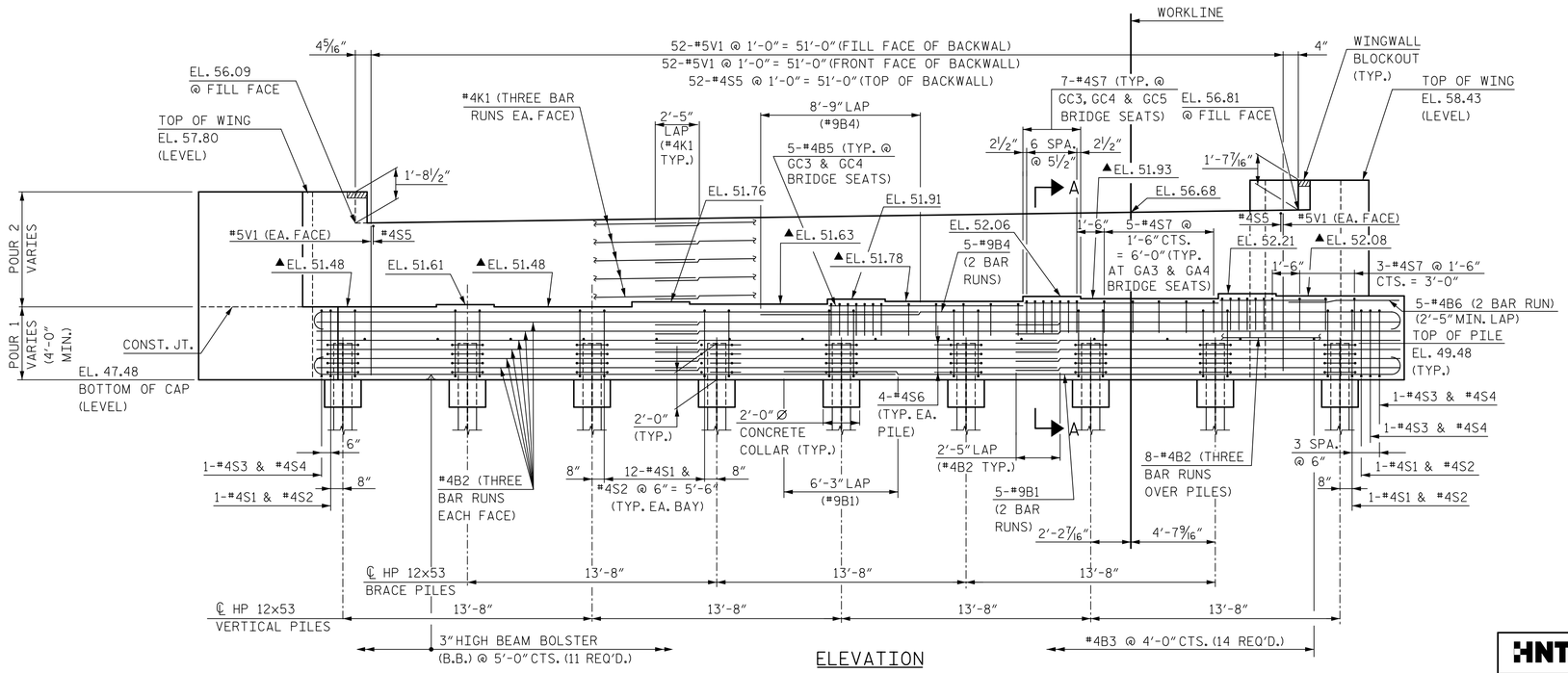
DETAIL B

NOTES:

FOR NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WINGWALL DETAILS AND SECTION A-A, SEE SHEET 2 OF 3.

[ ] INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.



ELEVATION

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A, SHEET 2 OF 3.

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PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 3

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/30/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

LEFT LANE

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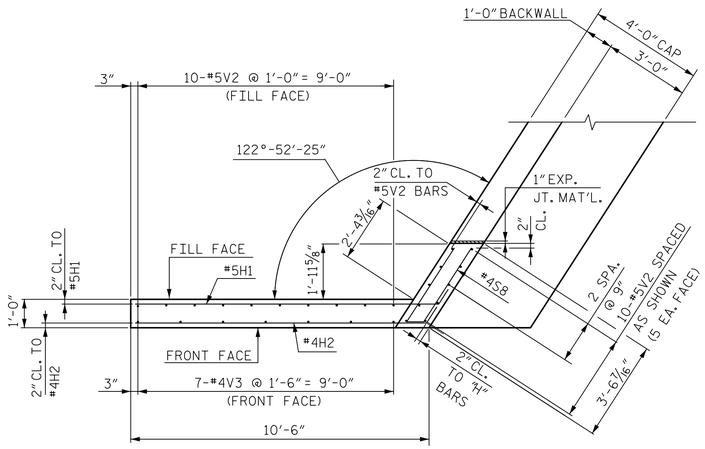
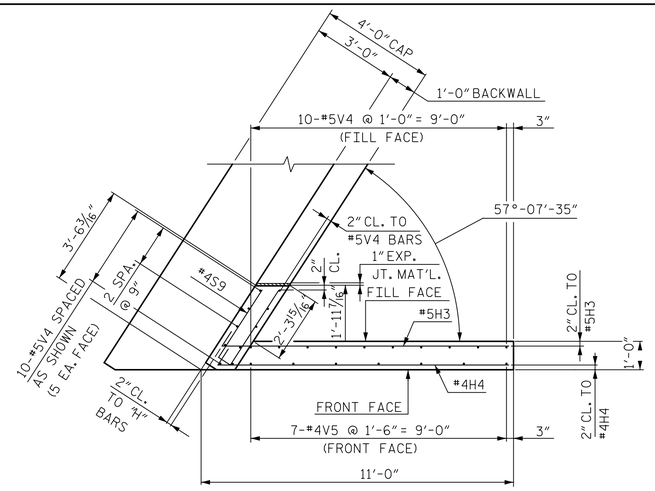
DWG. NO. 31

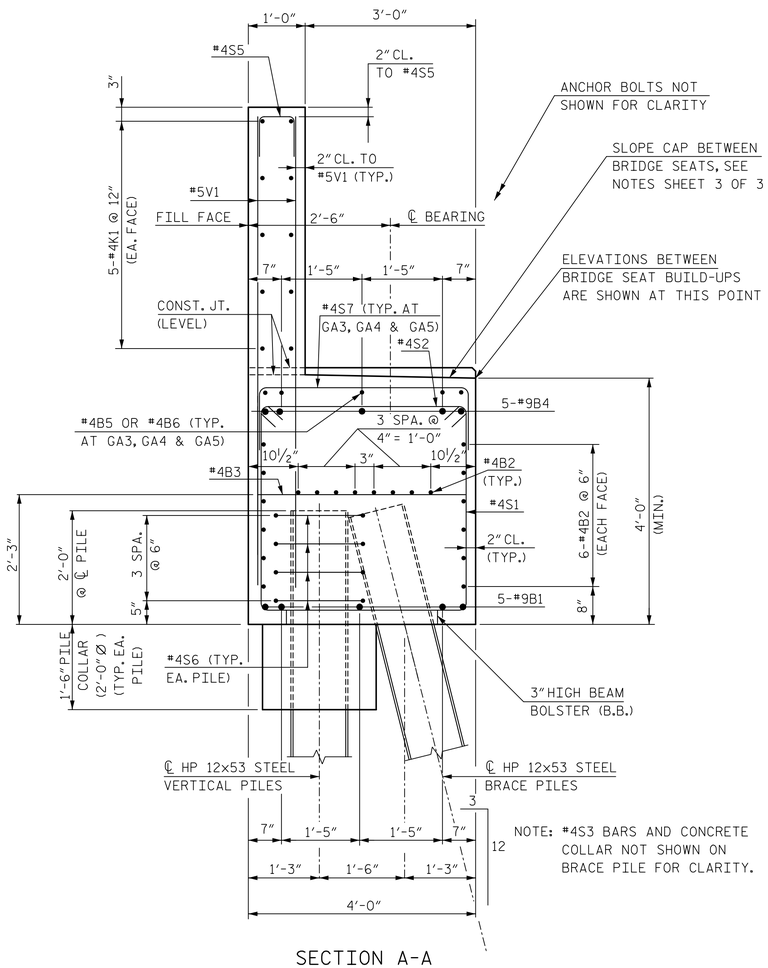
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-31
1			3			TOTAL SHEETS
2			4			39





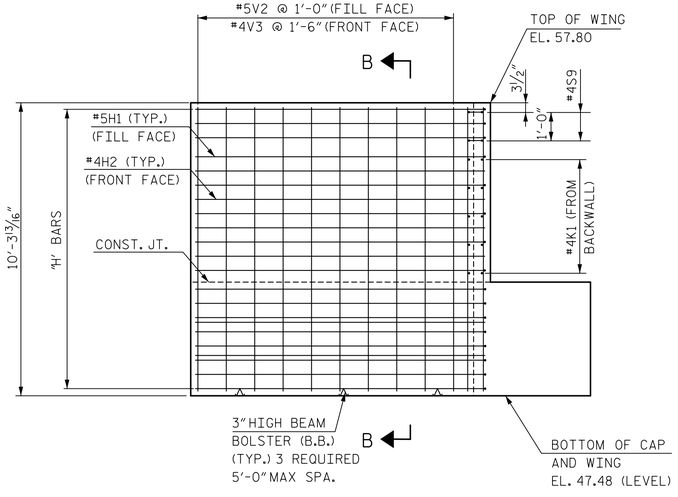
NOTES:

FOR NOTES, SEE SHEET 3 OF 3.

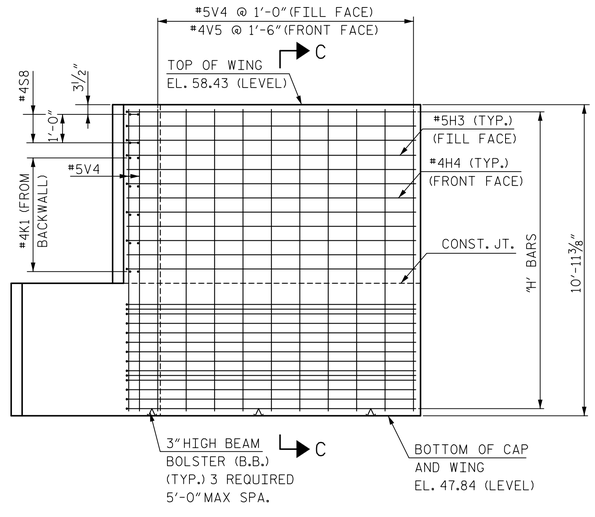


SECTION A-A

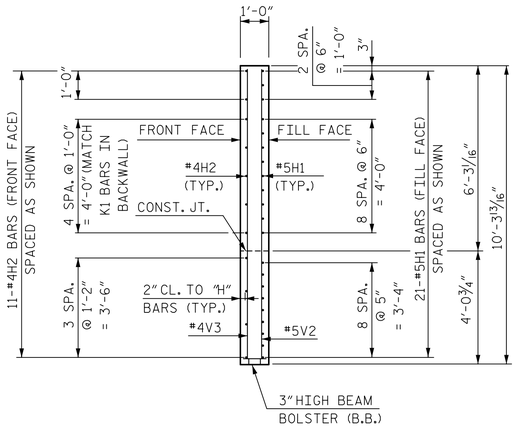
PLAN OF WING (W1)



PLAN OF WING (W2)

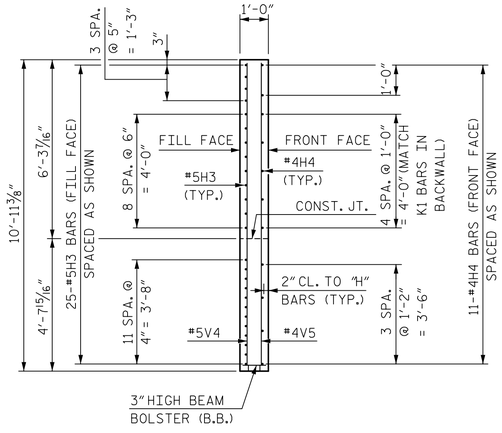


ELEVATION OF WING (W1)



SECTION B-B

ELEVATION OF WING (W2)



SECTION C-C

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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11/30/2018

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

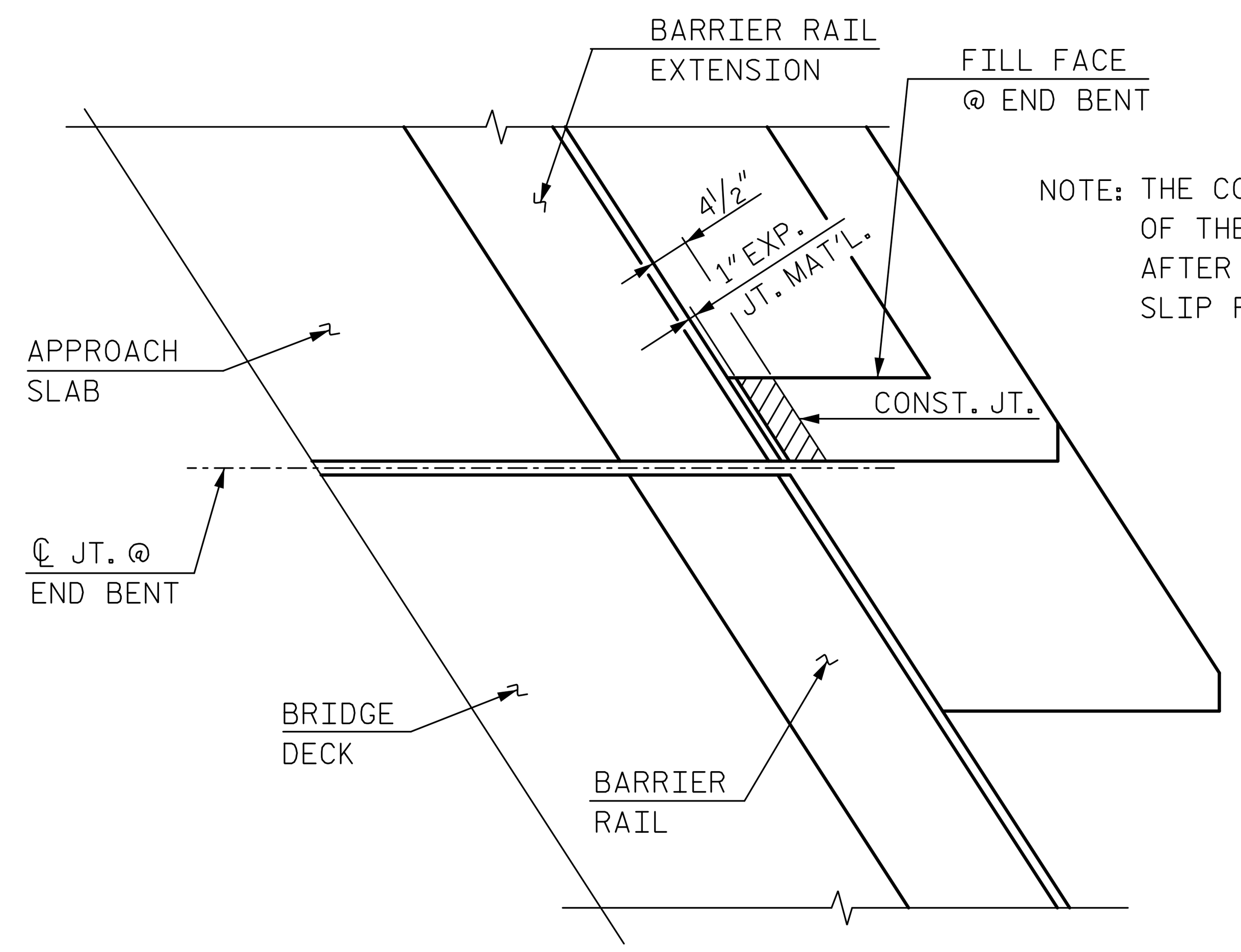
LEFT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	J. BAYNE	DATE 10/16
CHECKED BY	V. KOLLIPARA	DATE 11/16
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

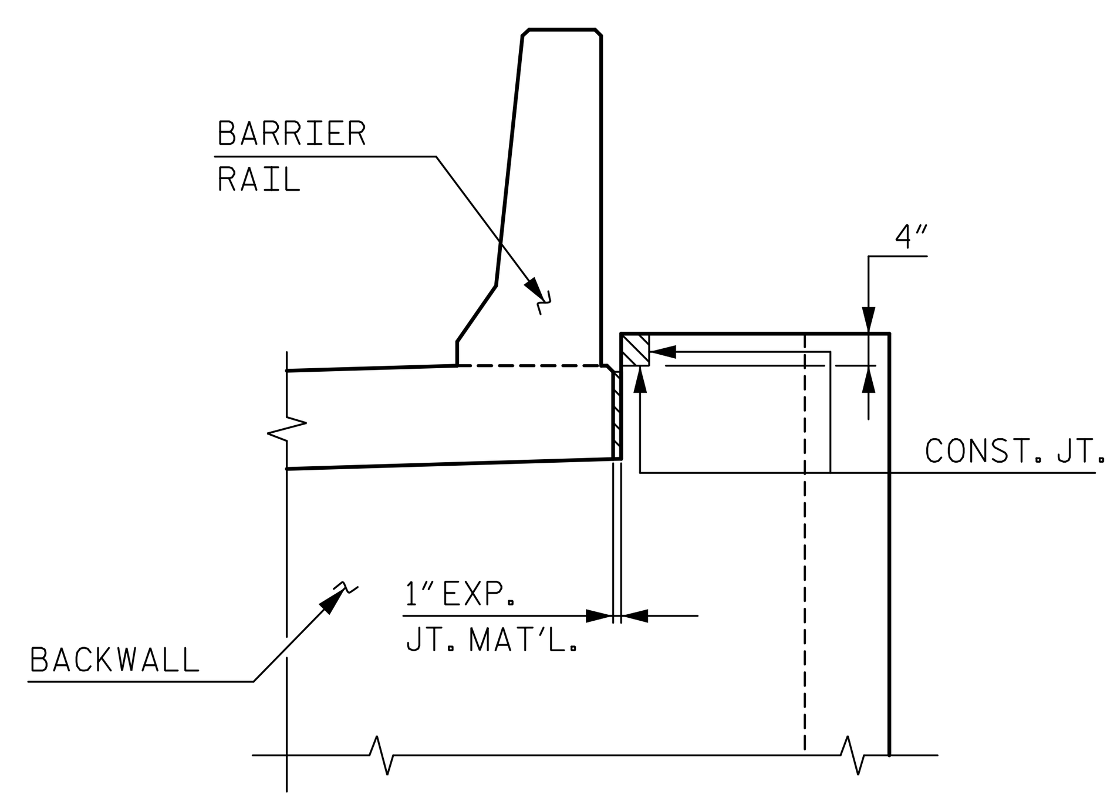
DWG. NO. 32

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-32
1			3			TOTAL SHEETS
2			4			39



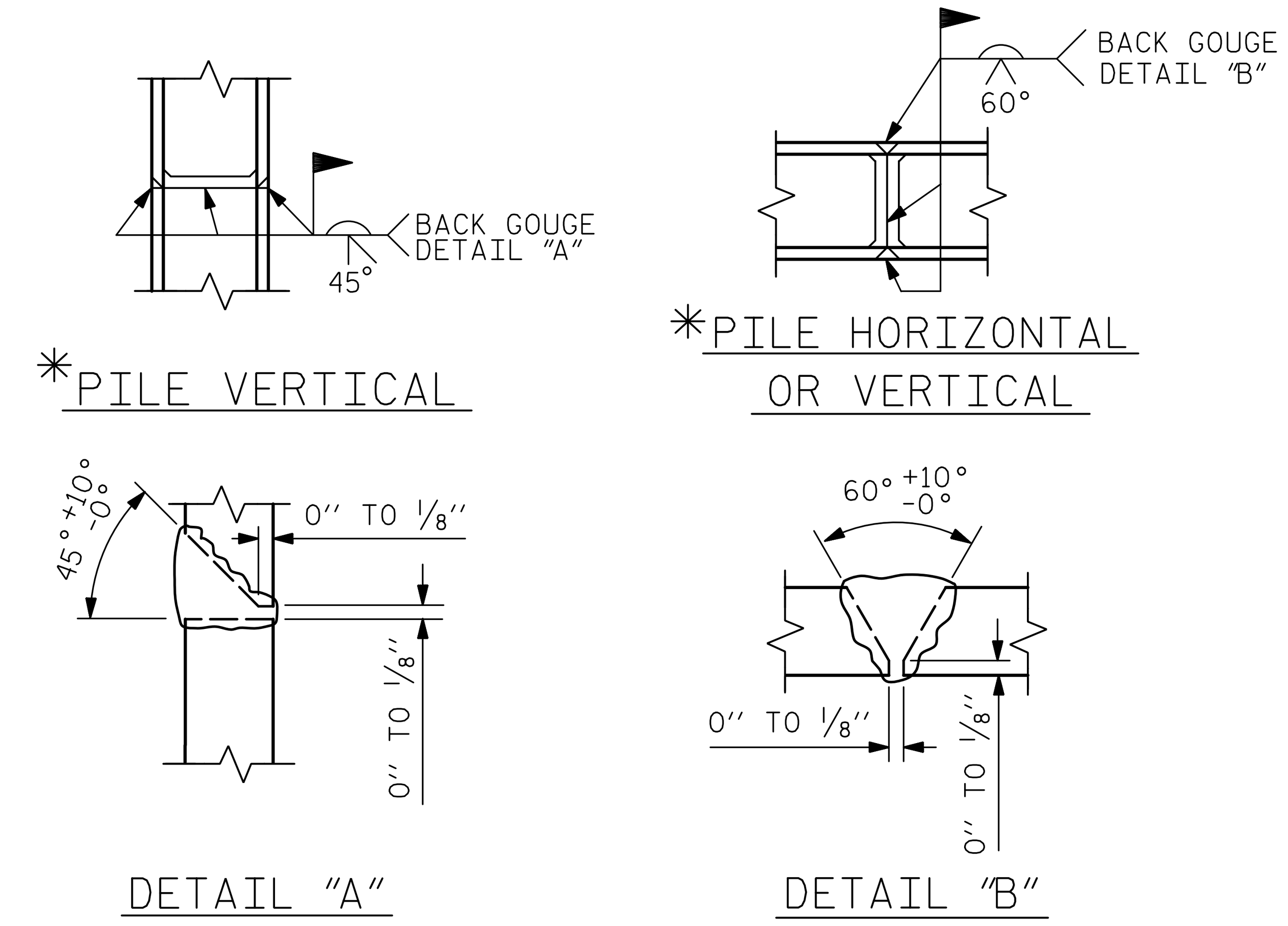
NOTE: THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

PLAN



ELEVATION

BLOCKOUT IN WINGWALL



* POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

NOTES:

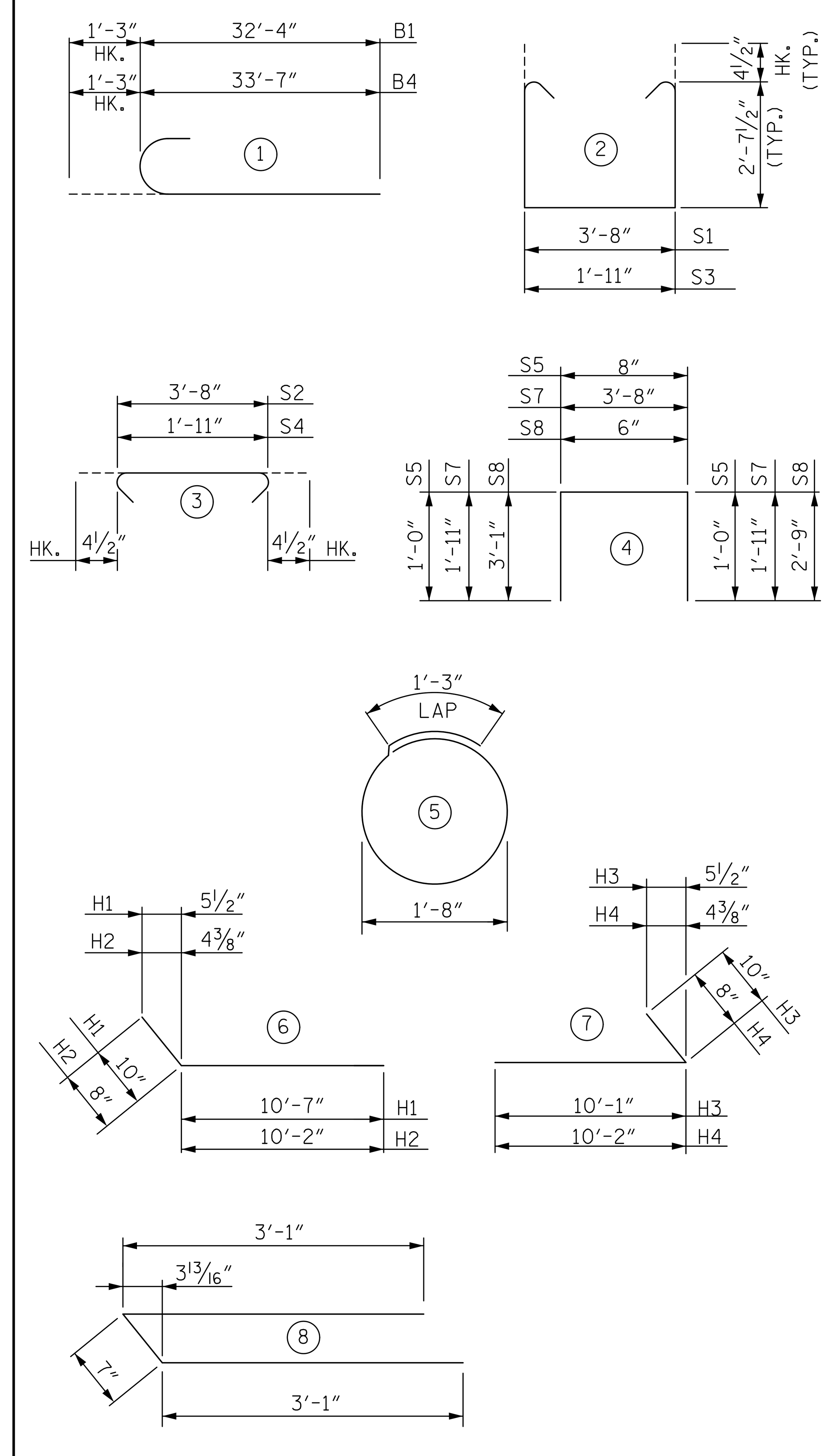
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

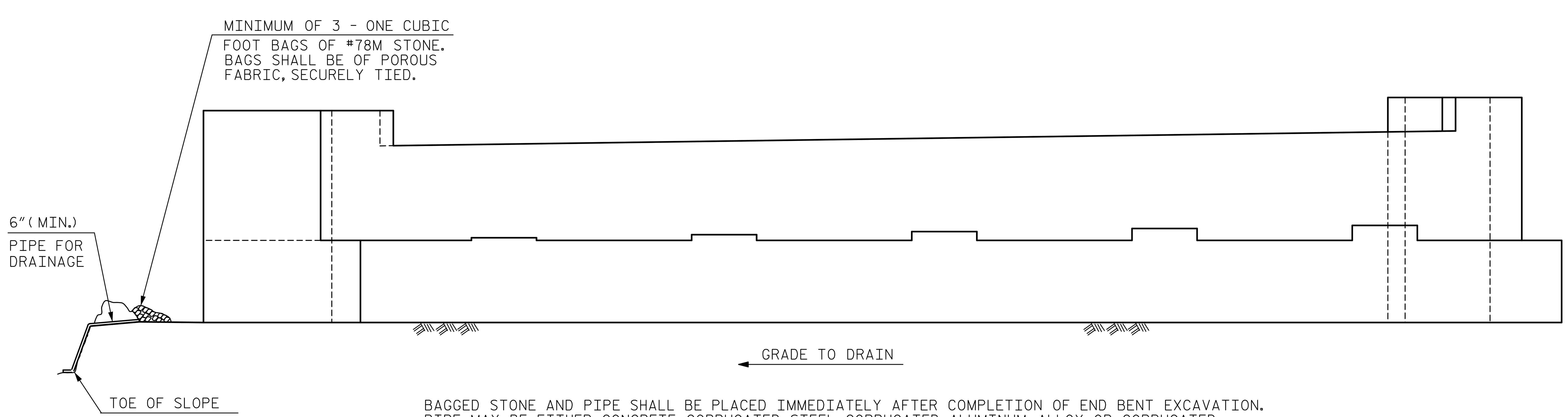
BILL OF REINFORCING

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	9	1	33'-7"	1,142
B2	60	4	STR.	21'-1"	845
B3	14	4	STR.	3'-8"	34
B4	10	9	1	34'-10"	1,184
B5	10	4	STR.	10'-6"	70
B6	10	4	STR.	6'-2"	41
H1	21	5	6	11'-5"	250
H2	11	4	6	10'-10"	80
H3	25	5	7	10'-11"	285
H4	11	4	7	10'-10"	80
K1	30	4	STR.	21'-1"	423
S1	99	4	2	9'-8"	639
S2	99	4	3	4'-5"	292
S3	3	4	2	7'-11"	16
S4	3	4	3	2'-8"	5
S5	52	4	4	2'-8"	93
S6	36	4	5	6'-5"	154
S7	34	4	4	7'-6"	170
S8	2	4	4	6'-4"	8
S9	2	4	8	6'-9"	9
V1	104	5	STR.	8'-2"	886
V2	20	5	STR.	9'-10"	205
V3	7	4	STR.	9'-10"	46
V4	20	5	STR.	10'-6"	219
V5	7	4	STR.	10'-6"	49

QUANTITIES

REINFORCING STEEL	LBS.	7,225
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP & BOT. OF WINGS	CU. YDS.	42.0
POUR 2 - TOP OF WINGS & BACKWALL	CU. YDS.	23.0
TOTAL	CU. YDS.	65.0
HP 12x53 STEEL PILES	NO.	9
	LIN. FT.	540
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	9
PILE REDRIVES	NO.	5



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.

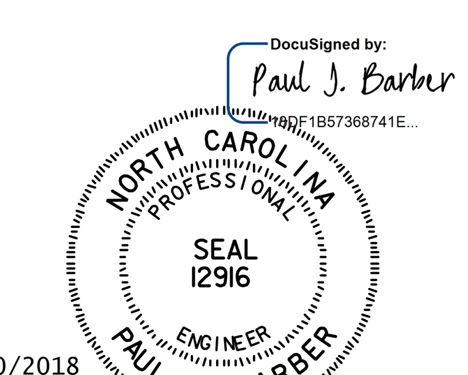
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

TEMPORARY DRAINAGE AT END BENT 2

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 506+32.25 -L-

DocuSigned by: Paul J. Barber



11/30/2018

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

LEFT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY J. BAYNE DATE 10/16
CHECKED BY V. KOLLIPARA DATE 11/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 33

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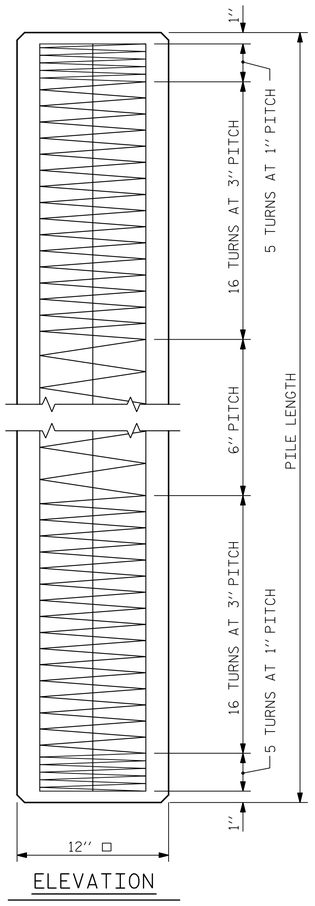
REVISIONS

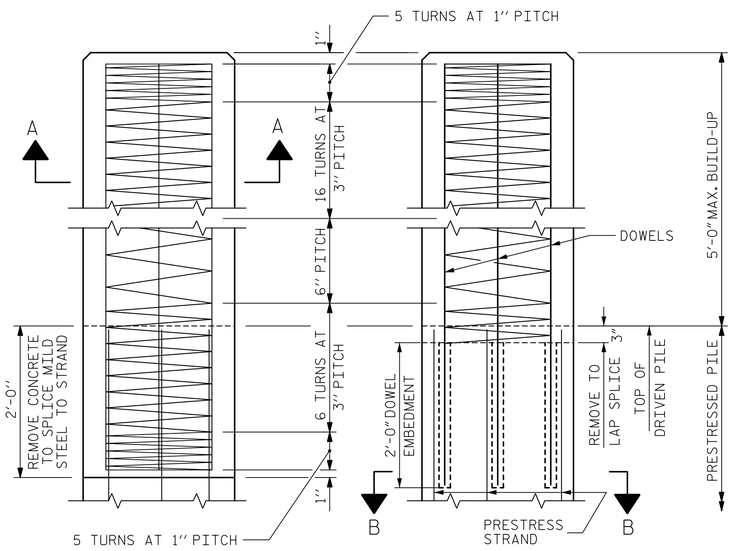
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. S13-33

TOTAL SHEETS 39

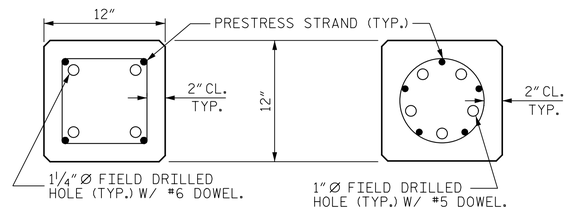


ELEVATION



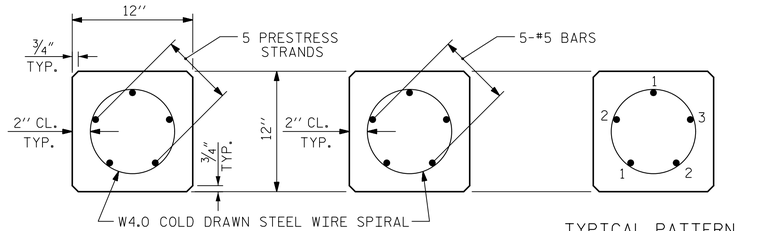
BUILD-UP AND SPIRAL REINFORCING

OPTIONAL BUILD-UP WITH DOWELS



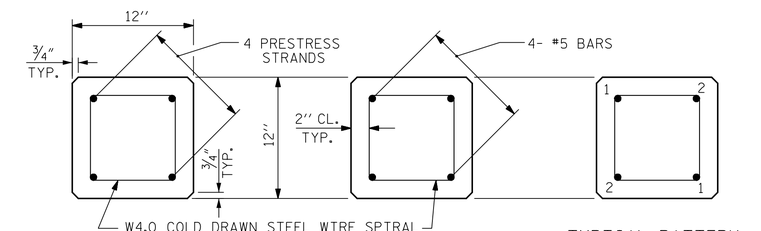
SECTION ''B-B''

(AT THE CONTRACTOR'S OPTION, PILE BUILD-UP MAY BE CONSTRUCTED WITH DOWELS.)



TYPICAL SECTION SECTION ''A-A'' TYPICAL PATTERN FOR BURNING STRANDS

½'' OR 0.6''Ø GRADE 270 L.R. PRESTRESS STRANDS



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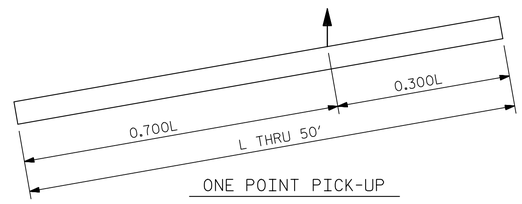
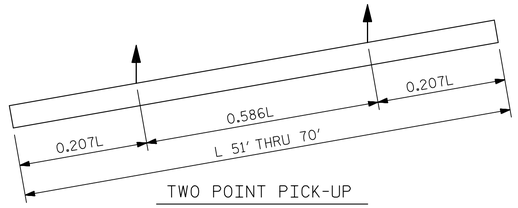


ONE POINT PICK-UP



TWO POINT PICK-UP

PICK-UP POINTS

NOTES

PRESTRESSED CONCRETE STRENGTH : f'c= 7,500 PSI

BUILD-UP CONCRETE STRENGTH : f'c= 7,500 PSI

STRAND DATA:

SIZE	GRADE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
½''	270 L.R.	0.153	41,300# PER STRAND	30,980# PER STRAND
0.6''	270 L.R.	0.217	58,600# PER STRAND	43,940# PER STRAND

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, ½'' OR 0.6'' STRANDS MAY BE USED IN EITHER THE 4 OR 5 STRAND CONFIGURATION SHOWN IN THE TYPICAL SECTION DETAIL. MIXING OF STRAND SIZE IS NOT ALLOWED.

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN PAIRS, EXCEPT WHERE 5 STRANDS ARE USED, THE LAST STRAND MAY BE BURNED SINGLY ACCORDING TO BURNING PATTERNS SHOWN. NOT MORE THAN 4 STRANDS MAY BE BURNED AT ANY ONE SECTION BEFORE THE SAME STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS ARE TO BE INDICATED WITH A 2'' WIDE BLACK MARK.

DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: f'c= 5,000 PSI

BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3'' OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING STEEL. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN ½'' CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE W4.0 COLD DRAWN WIRE WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 506+32.25 -L-

QUANTITIES FOR ONE 12'' PRESTRESSED PILE

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	ONE POINT PICK-UP 0.300L	ONE POINT PICK-UP 0.700L	TWO POINT PICK-UP 0.207L	TWO POINT PICK-UP 0.586L
25'-0''	0.91	1.85	7'-6''	17'-6''		
30'-0''	1.10	2.22	9'-0''	21'-0''		
35'-0''	1.28	2.59	10'-6''	24'-6''		
40'-0''	1.46	2.96	12'-0''	28'-0''		
45'-0''	1.64	3.33	13'-6''	31'-6''		
50'-0''	1.83	3.72	15'-0''	35'-0''		
55'-0''	2.01	4.09			11'-4½''	32'-3''
60'-0''	2.19	4.46			12'-5''	35'-2''
65'-0''	2.38	4.81			13'-5½''	38'-1''
70'-0''	2.57	5.18			14'-6''	41'-0''

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

12'' PRESTRESSED CONCRETE PILE

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-34
1			3			TOTAL SHEETS
2			4			39

ASSEMBLED BY : M. WRIGHT DATE : 8/18
CHECKED BY : N. HART DATE : 8/18

DRAWN BY : FCJ 7/88
CHECKED BY : CRK 3/89

REV. 10/1/11 MAA/GM
REV. 12/14 MAA/TMG
REV. 12/17 MAA/THC

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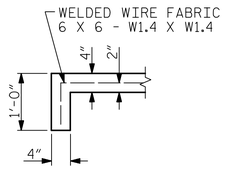
DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY N. HART DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

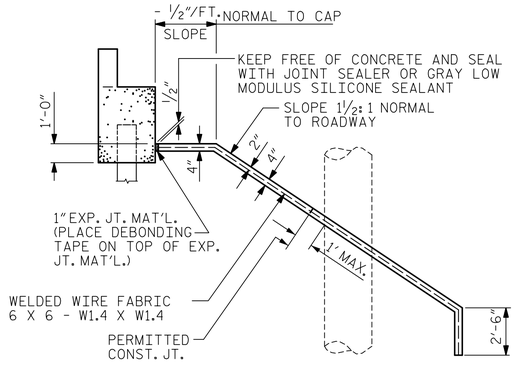
DWG. NO. 34

STD. NO. PCP1

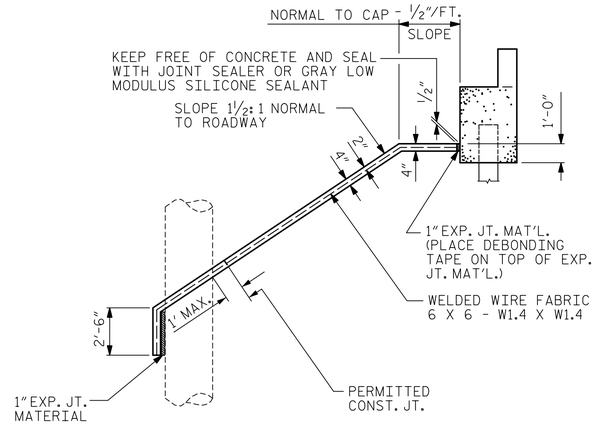


SECTION A-A

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.



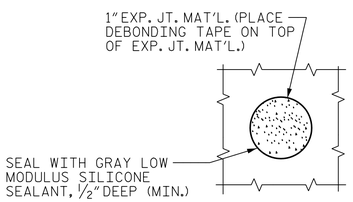
SECTION B-B



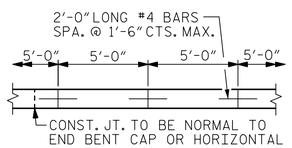
SECTION C-C

BRIDGE @ STA. 506+32.25 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	565	1,135
END BENT 2	720	1,440

* QUANTITY SHOWN IS BASED ON 5' POURS.

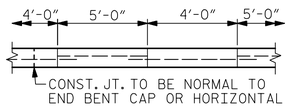


PLAN WHERE CONCRETE SLOPE PROTECTION MUST BE PLACED AROUND A BENT COLUMN



STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



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

OPTIONAL POURING DETAIL

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 2

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-35
1			3			TOTAL SHEETS
2			4			39

ASSEMBLED BY : M. WRIGHT	DATE : 8/18		
CHECKED BY : N. HART	DATE : 8/18		
DRAWN BY : ELR 5/92	REV. 12/21/11	MAA/GM	
CHECKED BY : GRP 6/92	REV. 1/16	MAA/TMG	
	REV. 12/17	MAA/THC	

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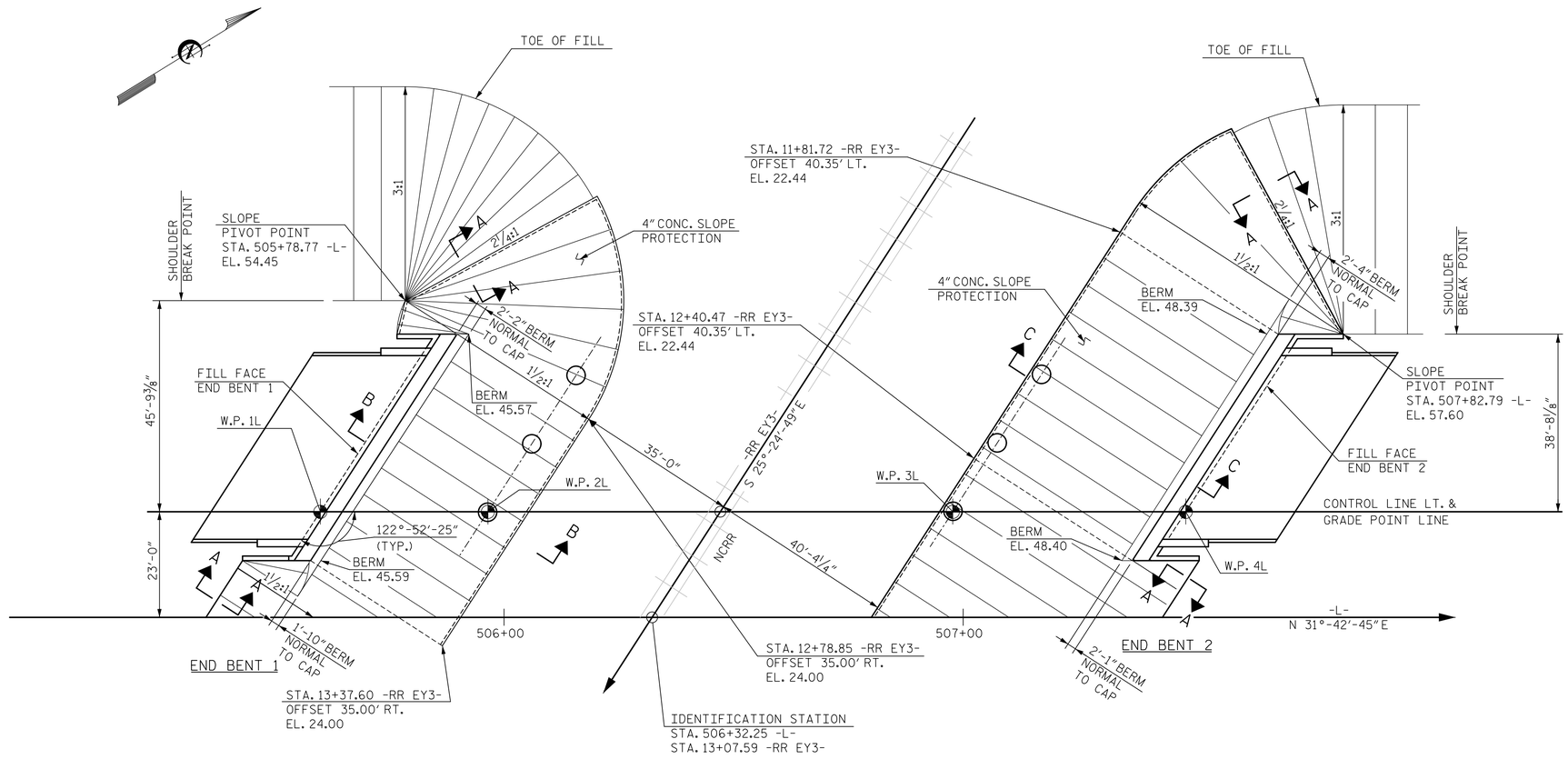
DRAWN BY	M. WRIGHT	DATE	8/18
CHECKED BY	N. HART	DATE	8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	8/18

DWG. NO. 35

STD. NO. SP1



PLAN

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 506+32.25 -L-

SHEET 2 OF 2

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

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DRAWN BY	M. WRIGHT	DATE 8/18
CHECKED BY	D. HAWKINS	DATE 8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

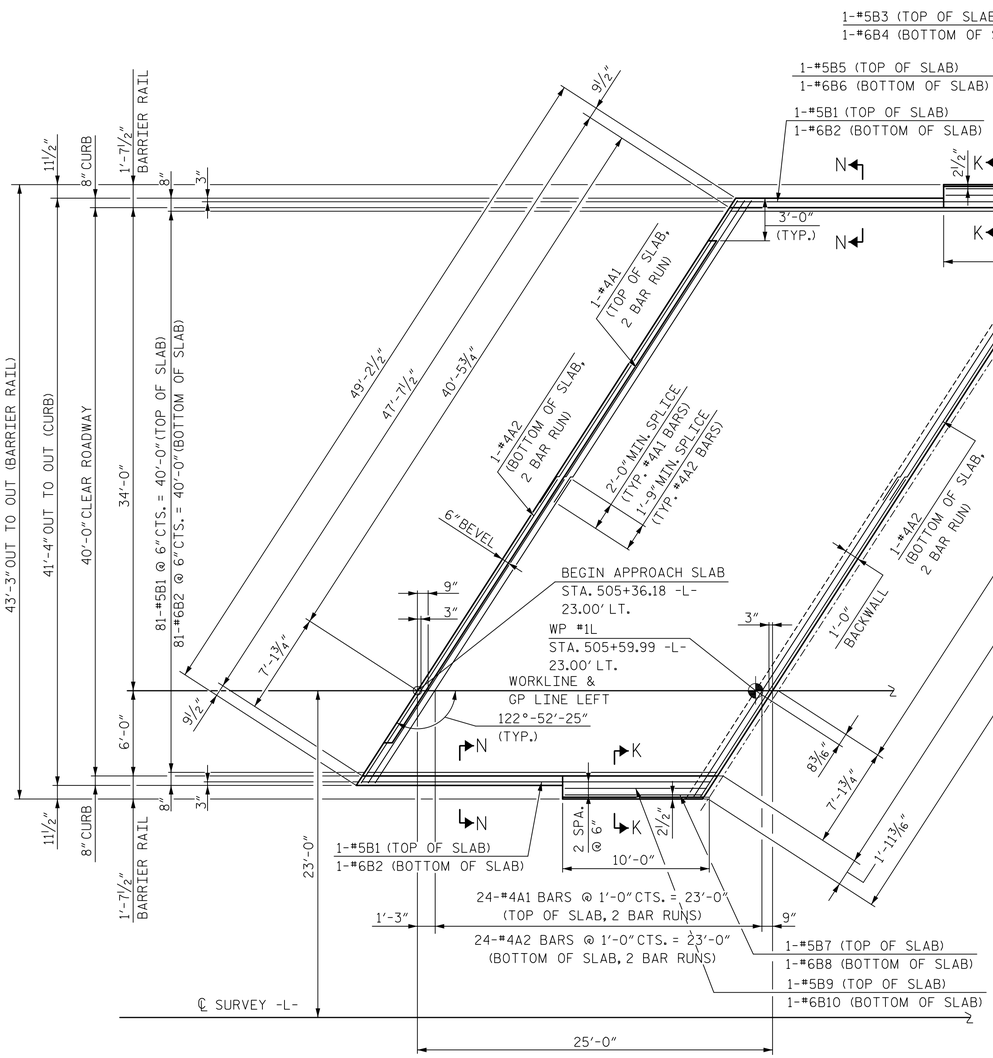
DWG. NO. 36

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

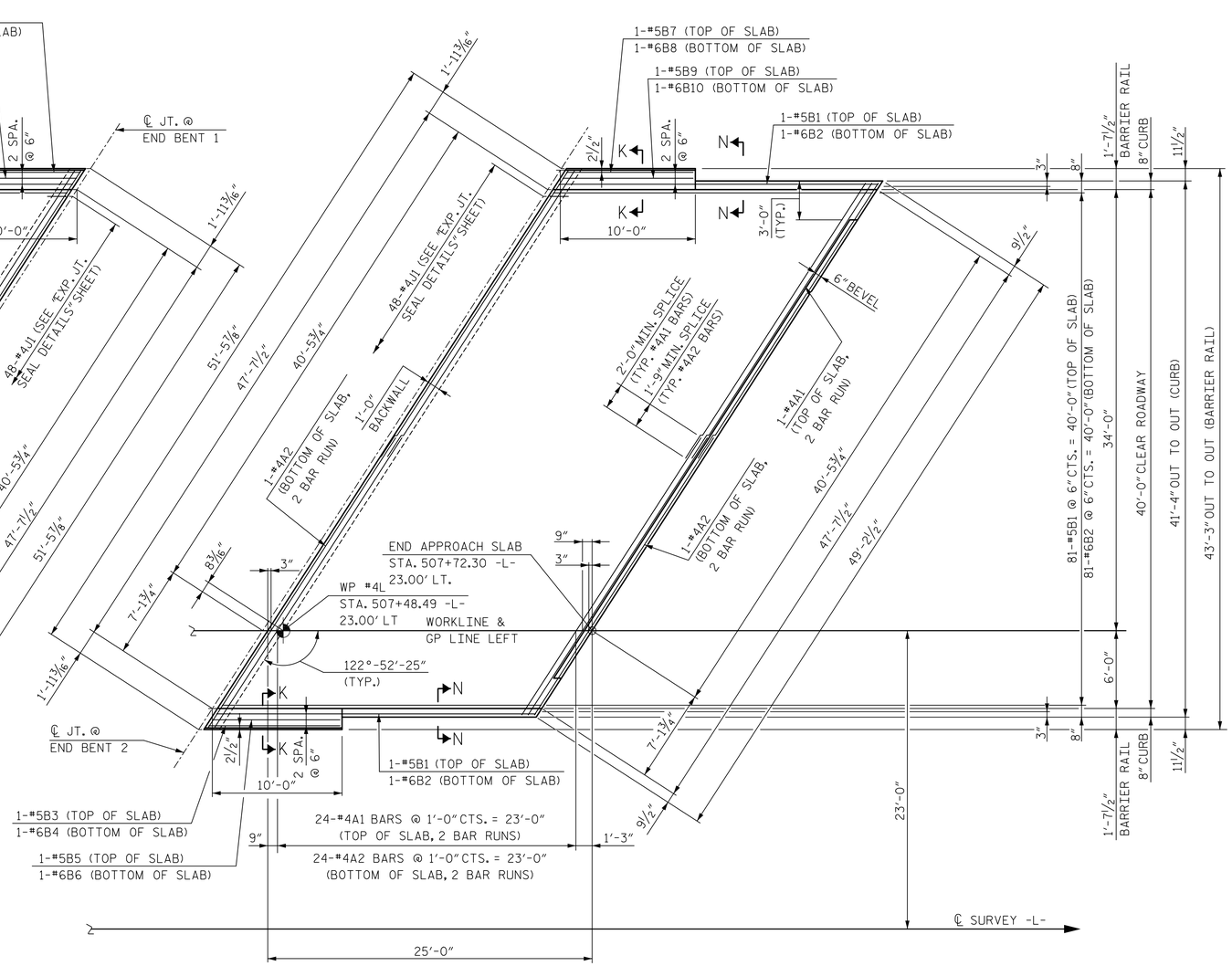
SLOPE PROTECTION DETAILS

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-36
1			3			TOTAL SHEETS
2			4			39



PLAN @ END BENT 1



PLAN @ END BENT 2

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 506+32.25 -L-

SHEET 1 OF 3

NOTES:

FOR SECTION N-N AND K-K, SEE "BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT" SHEET 2 OF 3.

FOR APPROACH SLAB BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT" SHEET 2 OF 3.

FOR BARRIER RAIL REINFORCING STEEL PLACEMENT AND BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 3 OF 3.

FOR STANDARD EXPANSION JOINT SEAL DETAILS, SEE "EXPANSION JOINT SEAL DETAILS" SHEET.

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

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DRAWN BY M. WRIGHT DATE 6/16
CHECKED BY P. BARBER DATE 8/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 37

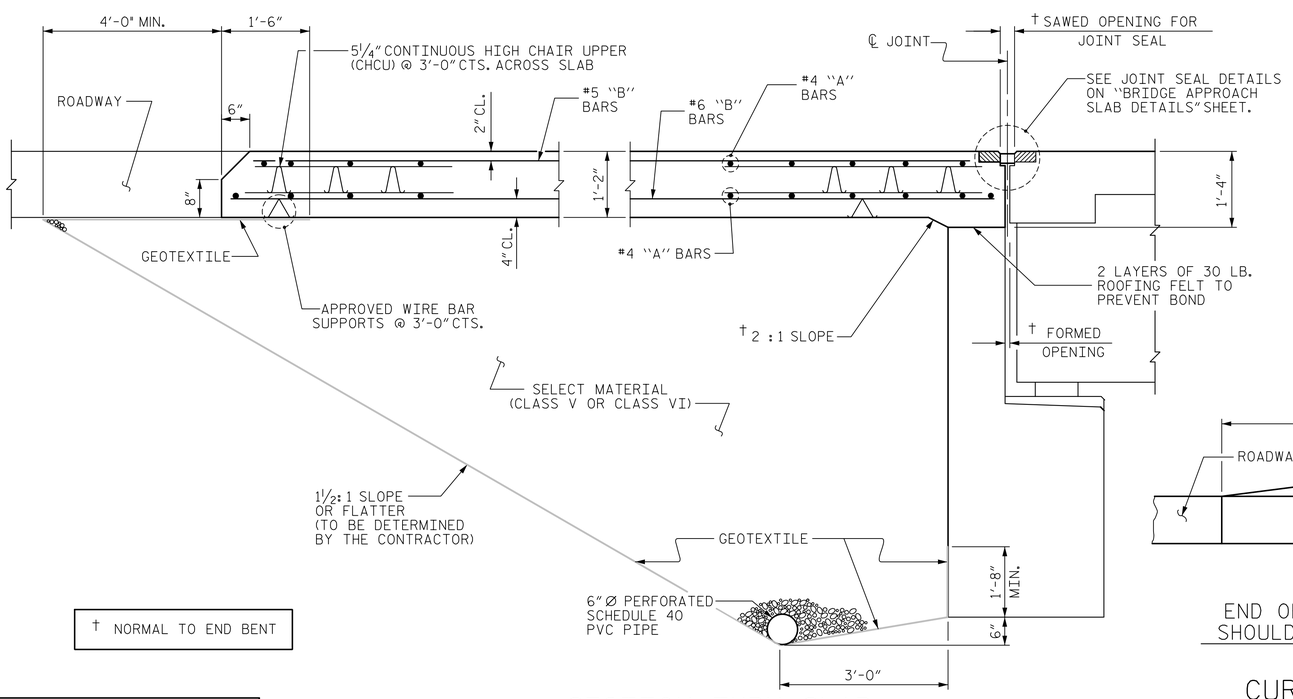
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-37
1			3			TOTAL SHEETS
2			4			39

FOR PLAN VIEW OF APPROACH SLABS AT
END BENT 1 AND END BENT 2, SEE SHEET 1 OF 3.



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

NOTES

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

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

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

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

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

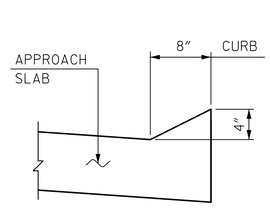
FOR THE 6"Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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

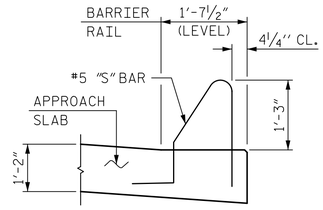
SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 3 OF 3.

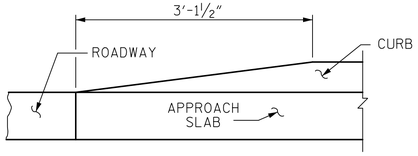
THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



SECTION N-N



SECTION K-K



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	50	#4	STR	26'-7"	888
A2	52	#4	STR	26'-5"	918
✳ B1	83	#5	STR	23'-8"	2,049
B2	83	#6	STR	24'-7"	3,065
✳ B3	1	#5	STR	10'-5"	11
B4	1	#6	STR	10'-5"	16
✳ B5	1	#5	STR	10'-1"	11
B6	1	#6	STR	10'-1"	15
✳ B7	1	#5	STR	9'-7"	10
B8	1	#6	STR	9'-7"	14
✳ B9	1	#5	STR	9'-11"	10
B10	1	#6	STR	9'-11"	15
✳ J1	48	4	1	1'-5"	45

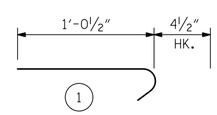
REINFORCING STEEL **	LBS.	4,043
✳ EPOXY COATED REINFORCING STEEL **	LBS.	3,024
CLASS AA CONCRETE	C.Y.	45.4

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	50	#4	STR	26'-7"	888
A2	52	#4	STR	26'-5"	918
✳ B1	83	#5	STR	23'-8"	2,049
B2	83	#6	STR	24'-7"	3,065
✳ B3	1	#5	STR	10'-5"	11
B4	1	#6	STR	10'-5"	16
✳ B5	1	#5	STR	10'-1"	11
B6	1	#6	STR	10'-1"	15
✳ B7	1	#5	STR	9'-7"	10
B8	1	#6	STR	9'-7"	14
✳ B9	1	#5	STR	9'-11"	10
B10	1	#6	STR	9'-11"	15
✳ J1	48	4	1	1'-5"	45

REINFORCING STEEL **	LBS.	4,043
✳ EPOXY COATED REINFORCING STEEL **	LBS.	3,024
CLASS AA CONCRETE	C.Y.	45.4

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 3

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

LEFT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 8/18
CHECKED BY : P. BARBER	DATE : 8/18
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

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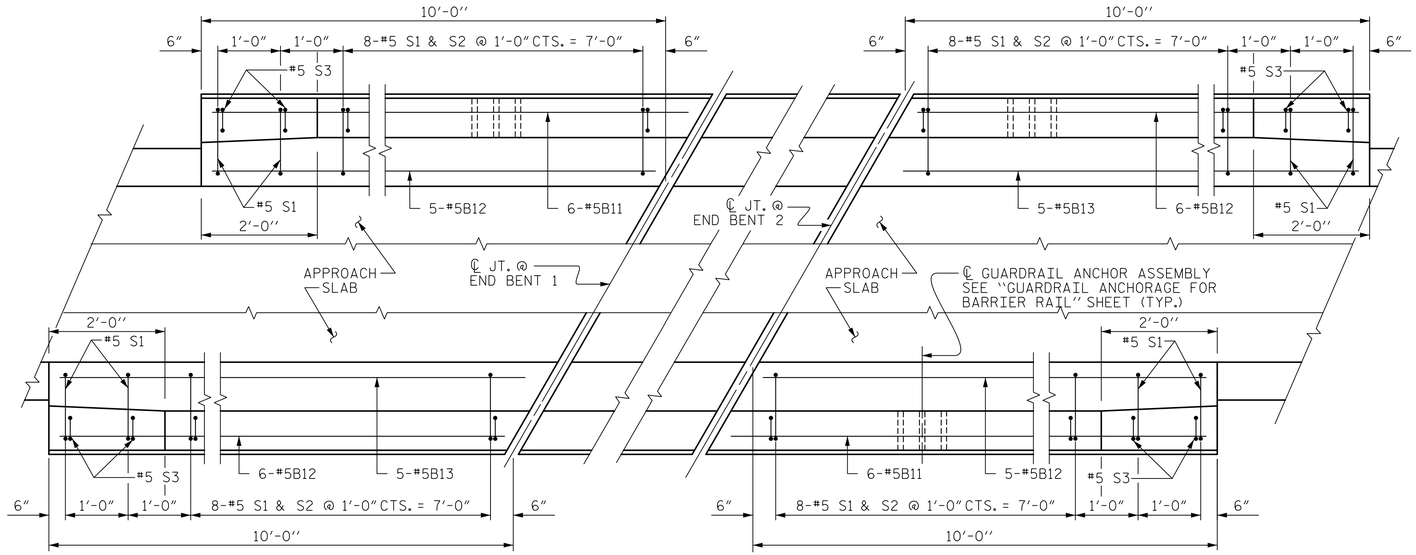
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 6/16
CHECKED BY	P. BARBER	DATE 8/16
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 38

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-38
1			3			TOTAL SHEETS
2			4			39

STD. NO. BAS2



END BENT #1 END BENT #2

PLAN OF BARRIER RAIL

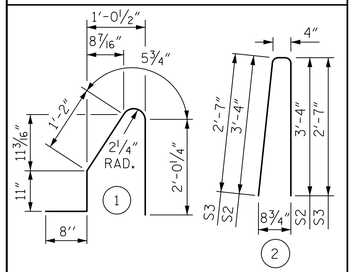
NOTES

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

THE 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



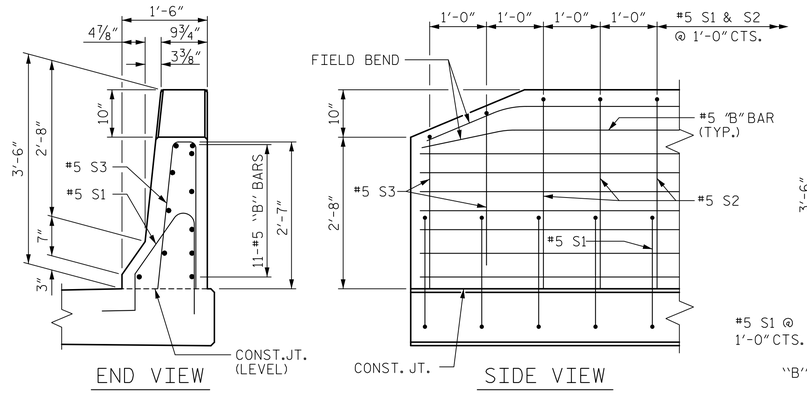
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

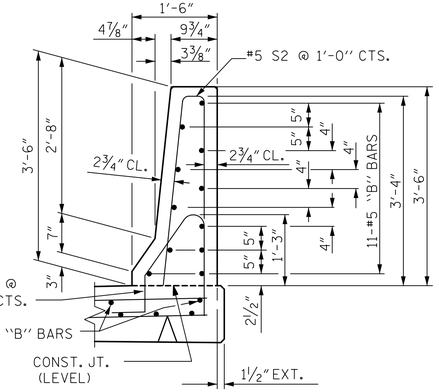
BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B11	12	#5	STR	10′-3″	128
✳B12	22	#5	STR	9′-9″	224
✳B13	10	#5	STR	9′-10″	103
✳S1	40	#5	1	5′-3″	219
✳S2	32	#5	2	7′-0″	234
✳S3	8	#5	2	5′-6″	46

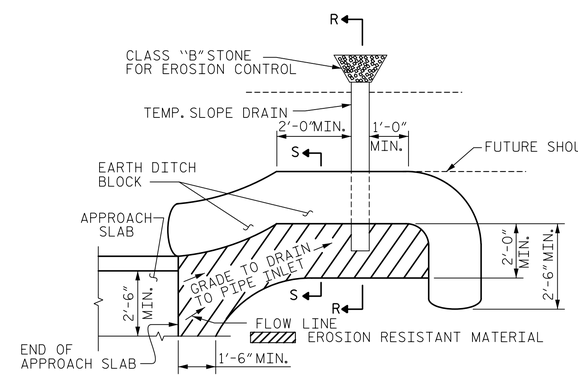
✳EPOXY COATED REINFORCING STEEL	LBS.	954
CLASS AA CONCRETE	C.Y.	5.6
CONCRETE BARRIER RAIL	LIN. FT.	41.7



END OF RAIL DETAILS

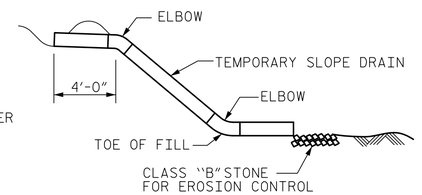


SECTION THRU RAIL

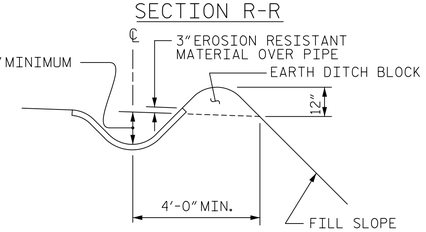


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

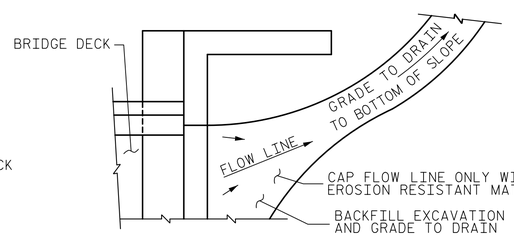
PLAN VIEW



SECTION R-R



SECTION S-S



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

DocuSigned by: Paul J. Barber 160F1857368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/14/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

LEFT LANE

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

ASSEMBLED BY : M. WRIGHT	DATE : 8/18
CHECKED BY : P. BARBER	DATE : 8/18
DRAWN BY : FCJ 11/88	REV. 6/13 MAA/GM
CHECKED BY : ARB 11/88	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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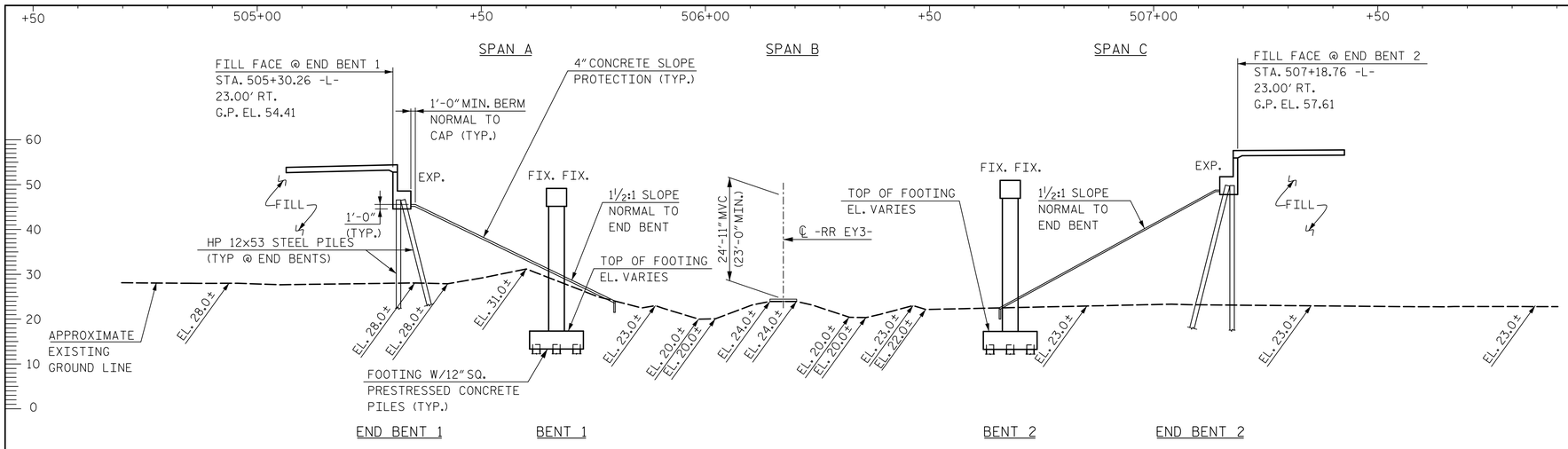
DRAWN BY	M. WRIGHT	DATE	8/18
CHECKED BY	P. BARBER	DATE	8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	8/18

DWG. NO. 39

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S13-39
1			3			TOTAL SHEETS
2			4			39

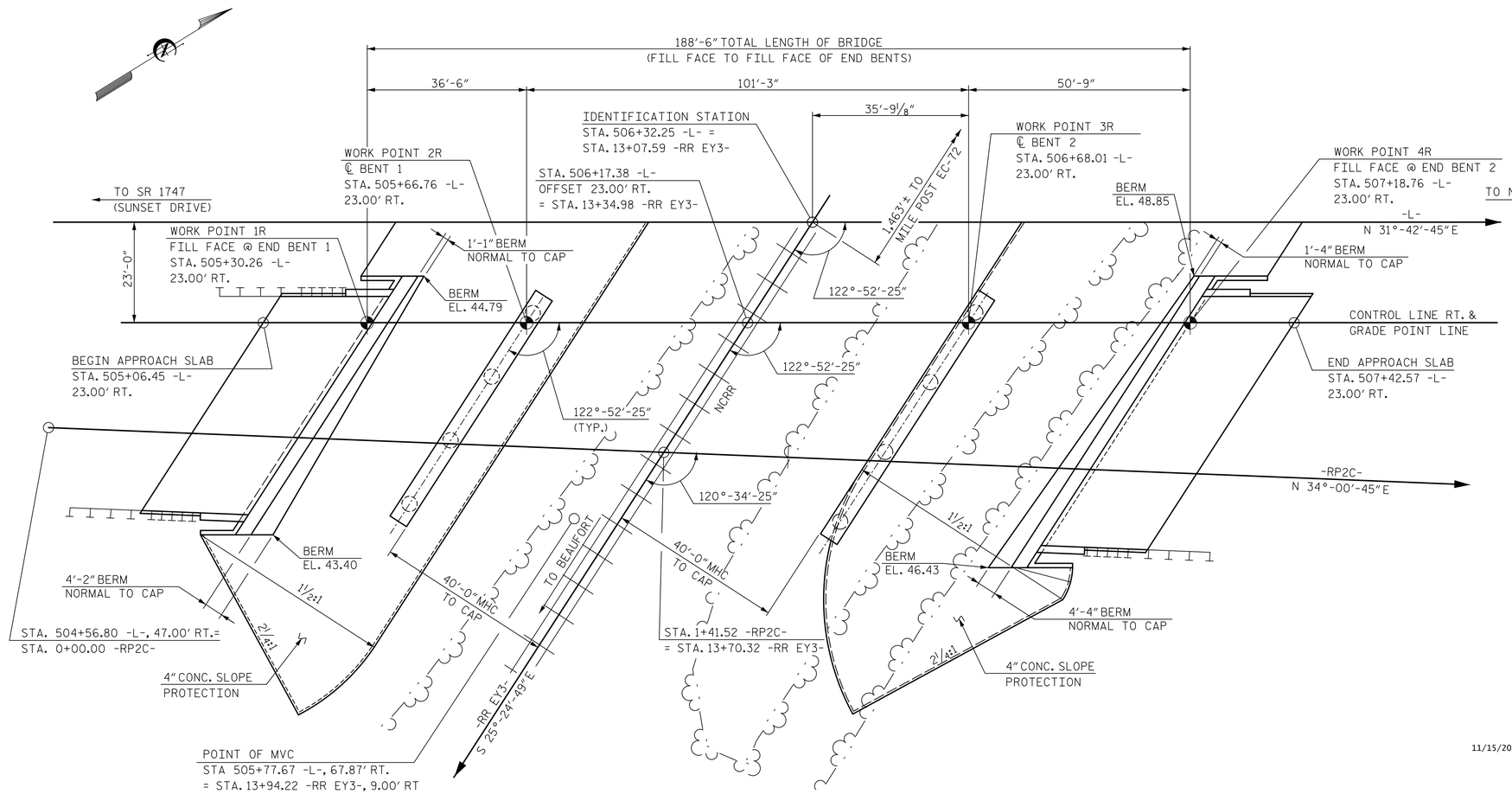
STD. NO. BAS4

F.A. PROJECT NO. NHF-70(49)



SECTION ALONG CONTROL LINE RIGHT

SECTIONS @ BENTS & END BENTS ARE AT RIGHT ANGLES



PLAN

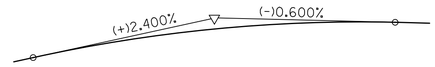
NOTES: PILES NOT SHOWN FOR CLARITY.
ALL END BENTS AND BENTS ARE PARALLEL.

NOTES:

FOR NOTES, SEE GENERAL DRAWING SHEET 3 OF 3.

MVC = MINIMUM VERTICAL CLEARANCE
MHC = MINIMUM HORIZONTAL CLEARANCE

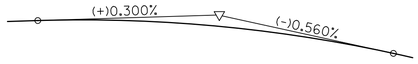
PI STA. = 508+90.00 -L-
EL = 63.34
V.C. = 1,000.00'



GRADE DATA -L-

NOTE: NO GRADE DATA REQUIRED FOR -RP2C-. PROFILE GRADE ELEVATIONS ON STRUCTURE ARE DERIVED USING -L- GRADE DATA AND CROSS SLOPES.

PI STA. = 10+00.00 -RR EY3-
EL = 26.02
L = 1,200.00'



GRADE DATA -RR EY3-

NOTE: TOP OF RAIL PROFILE WAS APPROXIMATED FROM AVAILABLE SURVEY INFORMATION.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L- =
13+07.59 -RR EY3-

BRIDGE NO. 285
SHEET 1 OF 3 NCRR MILE POST EC-72.3

DocuSigned by: Paul J. Barber 18DF1B57368741E...

11/15/2018

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER NCRR ON US 70 (HAVELOCK BYPASS) BETWEEN SR 1747 AND US 70 RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-1
1			3			TOTAL SHEETS
2			4			40

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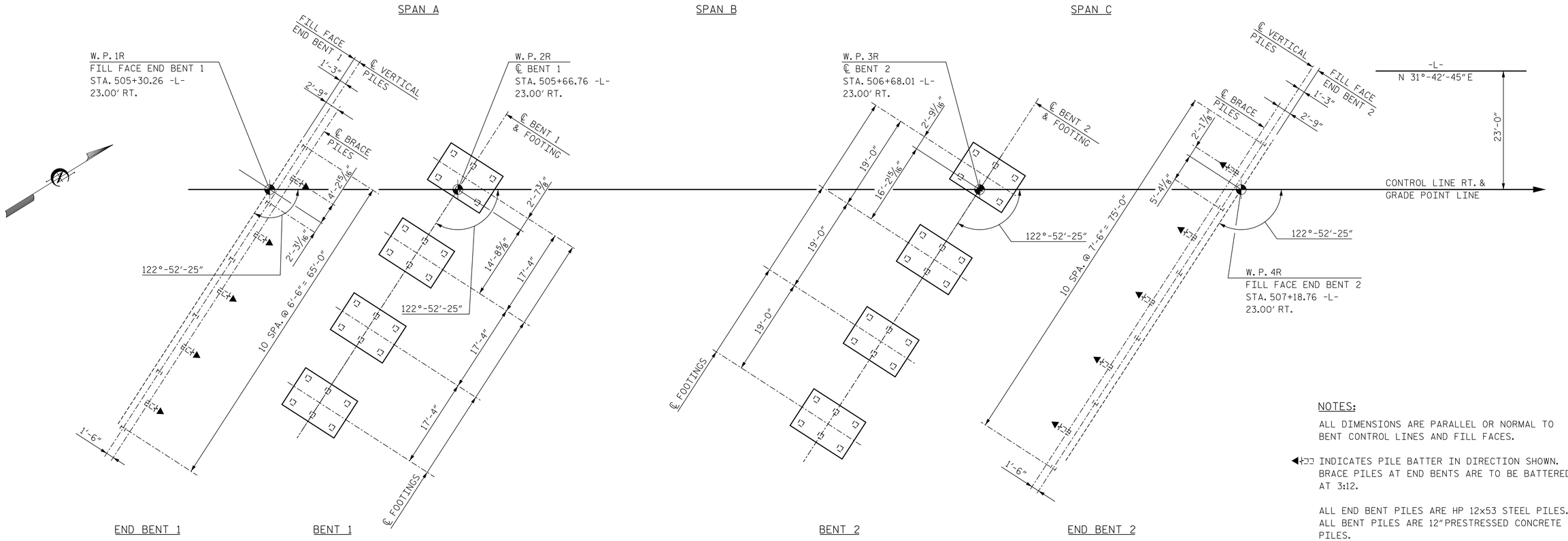
DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY N. HART DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOUNDATION LAYOUT

FOUNDATION 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 100 TONS AND 105 TONS PER PILE, RESPECTIVELY.

PILES AT BENT NO. 1 AND BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 135 TONS AND 140 TONS PER PILE, RESPECTIVELY.

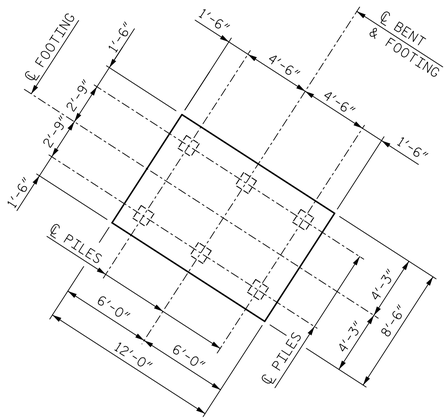
DRIVE PILES AT BENT NO. 1 AND BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 140 TONS PER PILE.

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

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

OBSERVE A TWO MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT WITHIN 2 FT. OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 1 AND END BENT NO. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

GROUNDWATER OR PERCHED WATER MAY BE ENCOUNTERED ABOVE THE BOTTOM OF FOOTING ELEVATIONS AT BENT NO. 1 AND BENT NO. 2. DEWATERING MAY BE REQUIRED FOR FOOTING CONSTRUCTION AT BENT NO. 1 AND BENT NO. 2.



TYPICAL FOOTING LAYOUT
BENT 1 AND BENT 2

NOTES:

ALL DIMENSIONS ARE PARALLEL OR NORMAL TO BENT CONTROL LINES AND FILL FACES.

◀ INDICATES PILE BATTER IN DIRECTION SHOWN. BRACE PILES AT END BENTS ARE TO BE BATTERED AT 3:12.

ALL END BENT PILES ARE HP 12x53 STEEL PILES. ALL BENT PILES ARE 12" PRESTRESSED CONCRETE PILES.

FOR FOUNDATION ELEVATIONS AND DETAILS, SEE BENT AND END BENT SHEETS.

ALL PILE DIMENSIONS ARE TO CENTERS OF PILES AT BOTTOM OF END BENTS AND FOOTINGS.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 3

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

RIGHT LANE

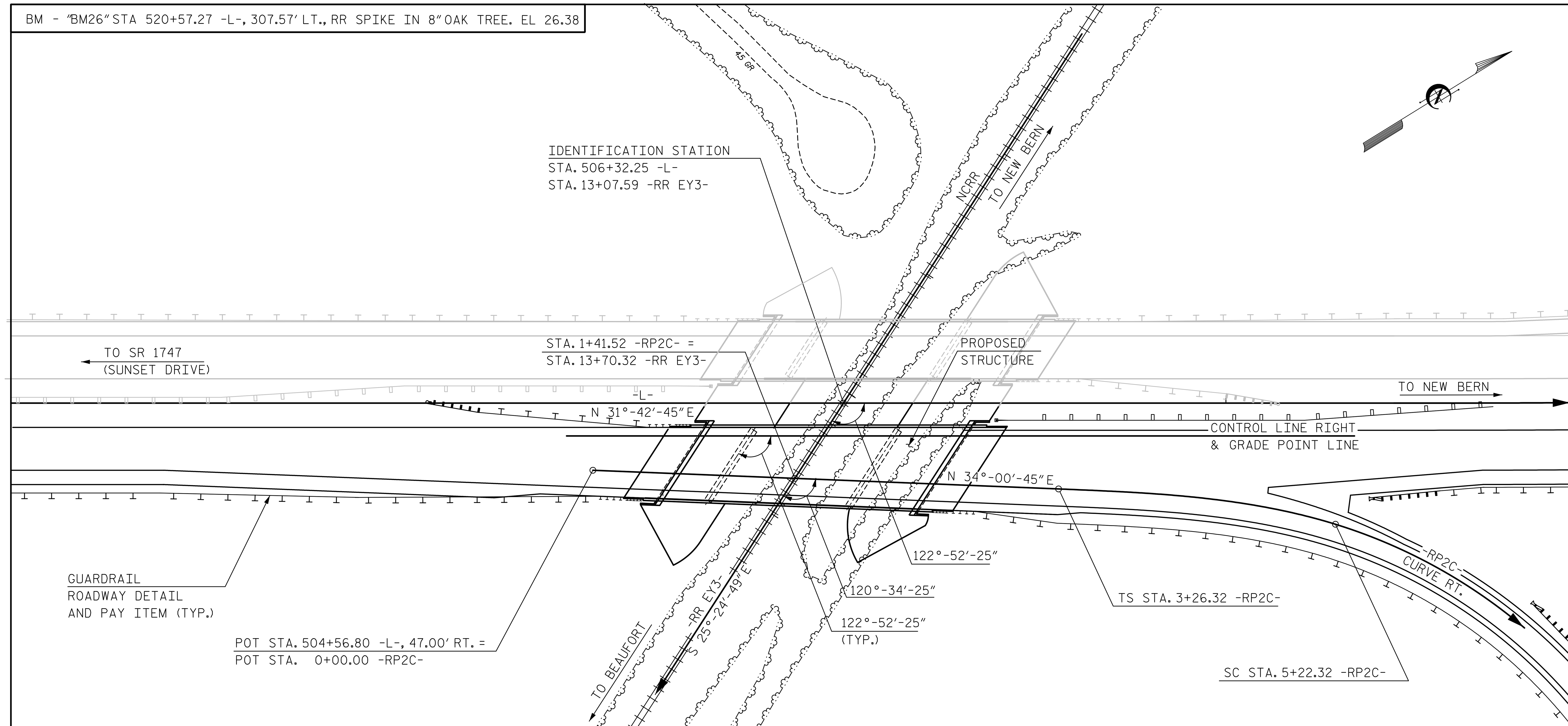
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY M. BARRAGAN DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-2
1			3			TOTAL SHEETS
2			4			40



LOCATION SKETCH

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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 REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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

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

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.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION FOR BENT AT STATION 506+32.25 (RIGHT LANE)	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLAB AT STATION 506+32.25 (RIGHT LANE)	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS	
	LUMP SUM	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	L.F.
SUPERSTRUCTURE	——	——	10,550	11,737	——	LUMP SUM	——	——	21	1,267.58
END BENT 1	——	——	——	——	63.1	——	7,601	——	—	——
BENT 1	LUMP SUM	——	——	——	141.9	——	20,817	2,959	—	——
BENT 2	LUMP SUM	——	——	——	147.7	——	21,843	3,143	—	——
END BENT 2	——	——	——	——	71.7	——	9,063	——	—	——
TOTAL	LUMP SUM	2	10,550	11,737	424.4	LUMP SUM	59,324	6,102	21	1,267.58

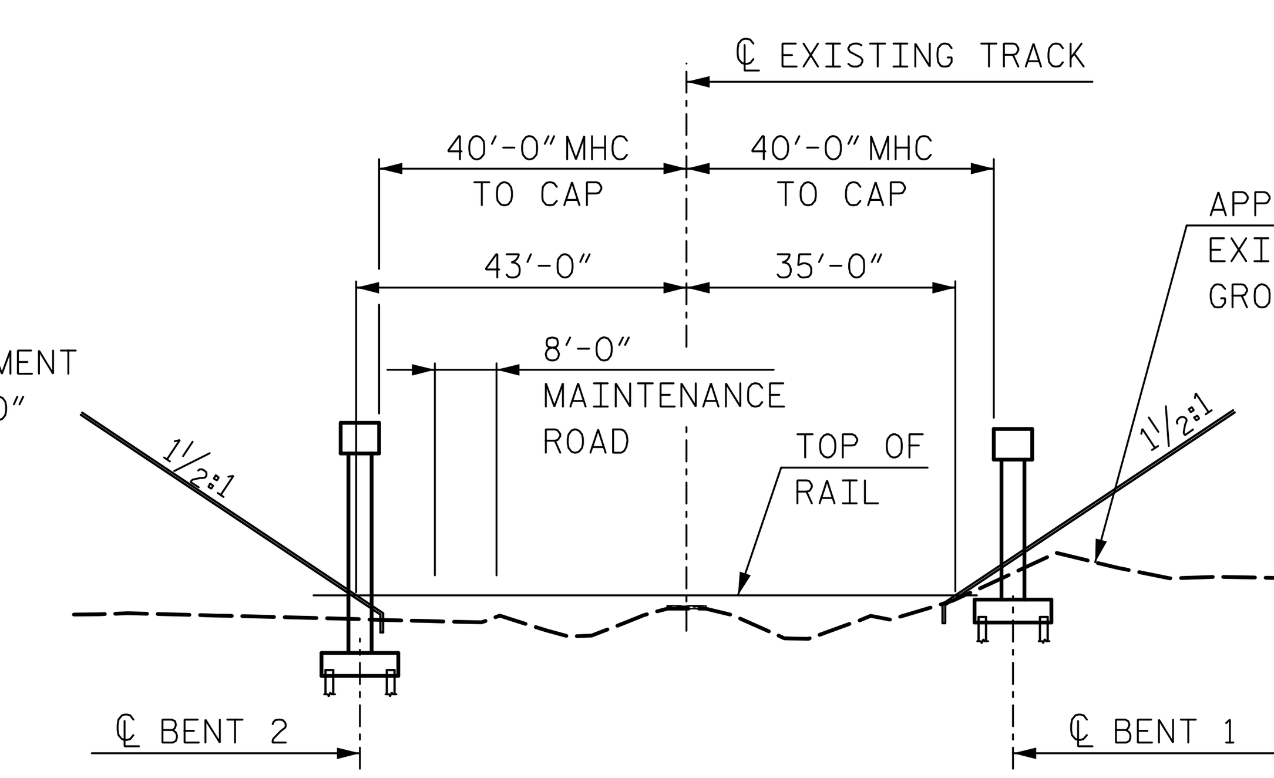
TOTAL BILL OF MATERIAL

	PILE DRIVING EQUIPMENT SETUP FOR 12" PRESTRESSED CONCRETE PILES	PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	12" PRESTRESSED CONCRETE PILES		HP 12x53 STEEL PILES		PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS
	EACH	EACH	NO.	L.F.	NO.	L.F.	EACH	L.F.	SQ. YD.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	——	——	—	——	—	——	——	409.0	——	LUMP SUM	LUMP SUM
END BENT 1	——	11	—	——	11	715	6	——	610	——	——
BENT 1	24	——	24	1,320	—	——	12	——	——	——	——
BENT 2	24	——	24	1,320	—	——	12	——	——	——	——
END BENT 2	——	11	—	——	11	660	6	——	780	——	——
TOTAL	48	22	48	2,640	22	1,375	36	409.0	1,390	LUMP SUM	LUMP SUM

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 = 60ksi.



SECTION THRU RAILROAD

LOOKING IN DIRECTION OF INCREASING STATIONS ON RAILROAD
(SPAN LENGTH IS BASED ON THIS SECTION)

MHC = MINIMUM HORIZONTAL CLEARANCE

DocuSigned by: Paul J. Barber

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

12/6/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
LOCATION SKETCH,
GENERAL NOTES AND
TOTAL BILL OF MATERIAL
RIGHT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/18
CHECKED BY	N. HART	DATE	8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	8/18

DWG. NO. 3

REVISIONS

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

SHEET NO. S14-3

TOTAL SHEETS 40

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.03	--	1.75	0.80	1.62	C	I	23.3	0.99	1.28	B	I	19.3	0.80	0.76	1.03	B	EL	49.4	
		HL-93 (OPERATING)	N/A	--	1.70	--	1.35	0.80	2.11	C	I	23.3	0.99	1.70	B	I	19.3	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.44	51.8	1.75	0.80	2.00	C	I	23.3	0.99	1.70	B	I	19.3	0.80	0.76	1.44	B	EL	49.4	
		HS-20 (OPERATING)	36.000	--	2.25	81.0	1.35	0.80	2.60	C	I	23.3	0.99	2.25	B	I	19.3	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	3.41	46.0	1.40	0.80	5.01	C	I	23.3	0.99	5.30	B	I	19.3	0.80	0.76	3.41	B	EL	49.4	
		SNGARBS2	20.000	--	2.47	49.4	1.40	0.80	3.99	C	I	23.3	0.99	3.69	B	I	19.3	0.80	0.76	2.47	B	EL	49.4	
		SNAGRIS2	22.000	--	2.31	50.8	1.40	0.80	3.90	C	I	23.3	0.99	3.40	B	I	19.3	0.80	0.76	2.31	B	EL	49.4	
		SNCOTTS3	27.250	--	1.70	46.3	1.40	0.80	2.50	C	I	23.3	0.99	2.56	B	I	19.3	0.80	0.76	1.70	B	EL	49.4	
		SNAGGRS4	34.925	--	1.39	48.6	1.40	0.80	2.19	C	I	23.3	0.99	2.07	B	I	19.3	0.80	0.76	1.39	B	EL	49.4	
		SNS5A	35.550	--	1.36	48.4	1.40	0.80	2.13	C	I	23.3	0.99	2.09	B	I	19.3	0.80	0.76	1.36	B	EL	49.4	
		SNS6A	39.950	--	1.24	49.5	1.40	0.80	2.00	C	I	23.3	0.99	1.88	B	I	19.3	0.80	0.76	1.24	B	EL	49.4	
		SNS7B	42.000	--	1.18	49.6	1.40	0.80	1.91	C	I	23.3	0.99	1.83	B	I	19.3	0.80	0.76	1.18	B	EL	49.4	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.51	49.8	1.40	0.80	2.45	C	I	23.3	0.99	2.28	B	I	19.3	0.80	0.76	1.51	B	EL	49.4	
		TNT4A	33.075	--	1.51	49.9	1.40	0.80	2.48	C	I	23.3	0.99	2.23	B	I	19.3	0.80	0.76	1.51	B	EL	49.4	
		TNT6A	41.600	--	1.22	50.8	1.40	0.80	2.07	C	I	23.3	0.99	1.93	B	I	19.3	0.80	0.76	1.22	B	EL	49.4	
		TNT7A	42.000	--	1.22	51.2	1.40	0.80	2.10	C	I	23.3	0.99	1.90	B	I	19.3	0.80	0.76	1.22	B	EL	49.4	
		TNT7B	42.000	--	1.25	52.5	1.40	0.80	2.19	C	I	23.3	0.99	1.80	B	I	19.3	0.80	0.76	1.25	B	EL	49.4	
		TNAGRIT4	43.000	--	1.20	51.6	1.40	0.80	2.08	C	I	23.3	0.99	1.74	B	I	19.3	0.80	0.76	1.20	B	EL	49.4	
		TNAGT5A	45.000	--	1.14	51.3	1.40	0.80	1.94	C	I	23.3	0.99	1.71	B	I	19.3	0.80	0.76	1.14	B	EL	49.4	
		TNAGT5B	45.000	⟨3⟩	1.13	50.9	1.40	0.80	1.90	C	I	23.3	0.99	1.65	B	I	19.3	0.80	0.76	1.13	B	EL	49.4	

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.
2.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

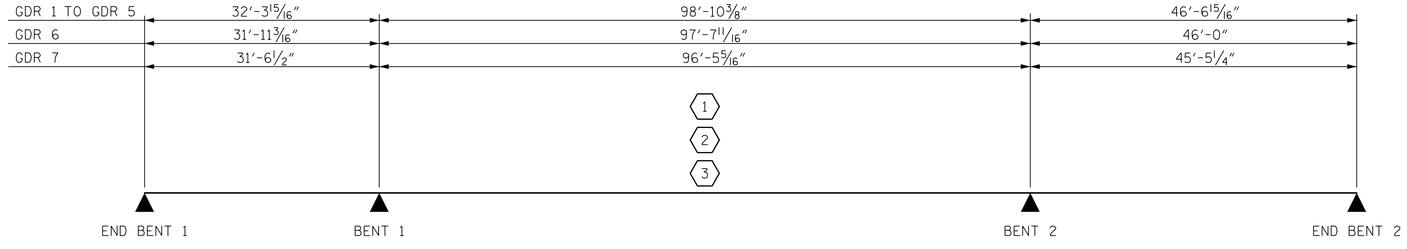
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

NOTE: SPAN LENGTHS PROVIDED ARE BEARING TO BEARING LENGTHS.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-4
1			3			TOTAL SHEETS
2			4			40

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DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY N. HART DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 4

ASSEMBLED BY : M. WRIGHT DATE : 8/18
CHECKED BY : N. HART DATE : 8/18

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

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

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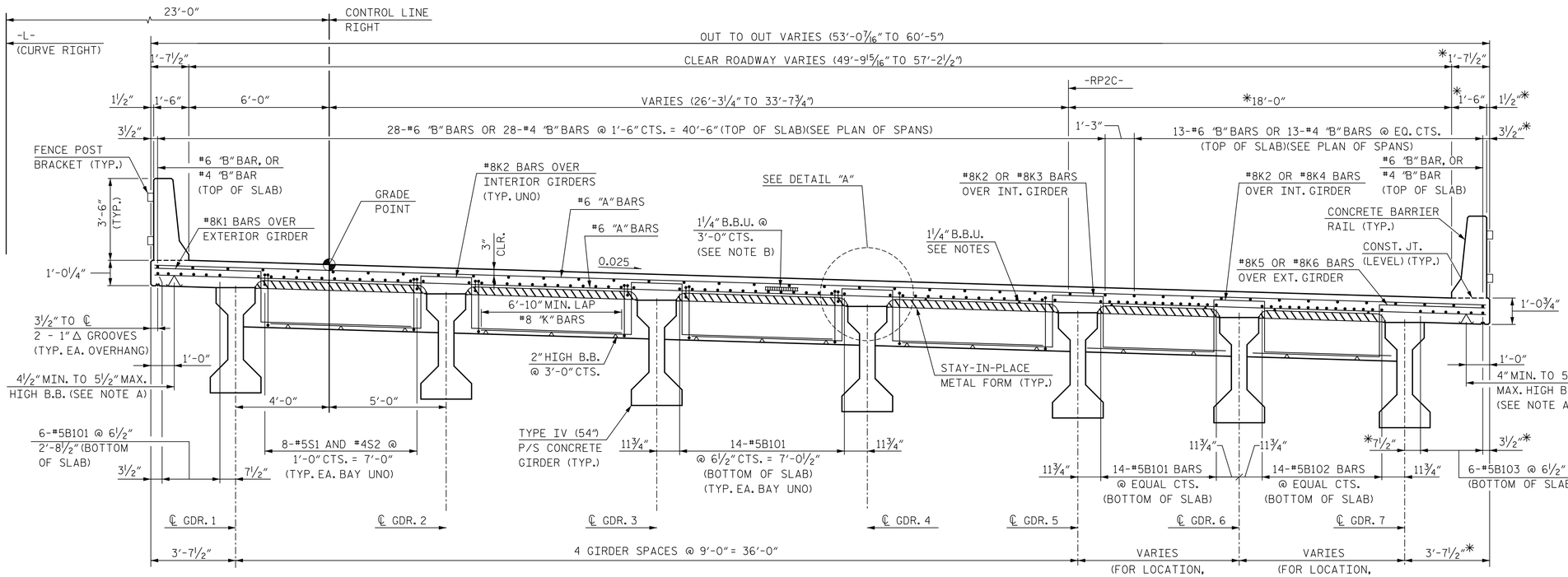
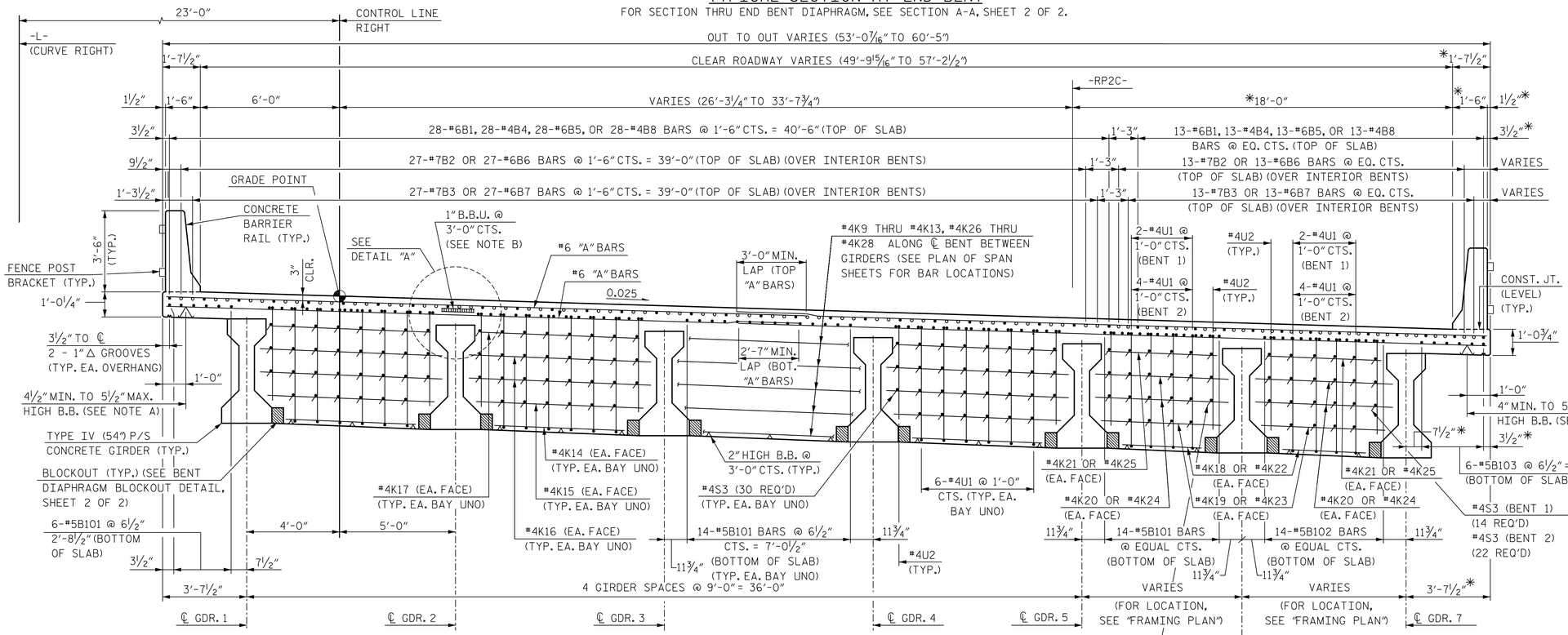
STD. NO. LRFR1



TYPICAL SECTION AT END BENT

FOR SECTION THRU END BENT DIAPHRAGM, SEE SECTION A-A, SHEET 2 OF 2.



TYPICAL SECTION AT BENT

FOR SECTION THRU BENT, SEE SECTION B-B, SHEET 2 OF 2.

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NOTES:

PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. 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 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

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.

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

FOR ADDITIONAL DETAILS AND SECTIONS, SEE "TYPICAL SECTION DETAILS" SHEET, SHEET 2 OF 2.

* DENOTES DIMENSION NORMAL TO RIGHT EDGE OF SLAB AND -RP2C-.

NOTE A: THE HEIGHT OF THE BEAM BOLSTER VARIES ALONG THE LENGTH OF THE SPAN DUE TO CAMBER AND THE VARYING HEIGHT REQUIRED FOR THE BUILDUP. THE CONTRACTOR SHALL HAVE SUFFICIENT SIZES TO PROPERLY SUPPORT THE REINFORCING STEEL.

NOTE B: TO MAINTAIN PROPER LOCATION OF "A" BARS IN TOP OF SLAB, BBU DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF SLAB VARIES. A 1 1/4" BBU SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 "B" BARS ARE PRESENT, A 1" BBU SHALL BE USED.

"B" BAR KEY

- CONTINUOUS BAR RUN SEE PLAN OF SPAN SHEETS.
- NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS SEE PLAN OF SPAN SHEETS.

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

RIGHT LANE

HNTB NORTH CAROLINA, P.C.
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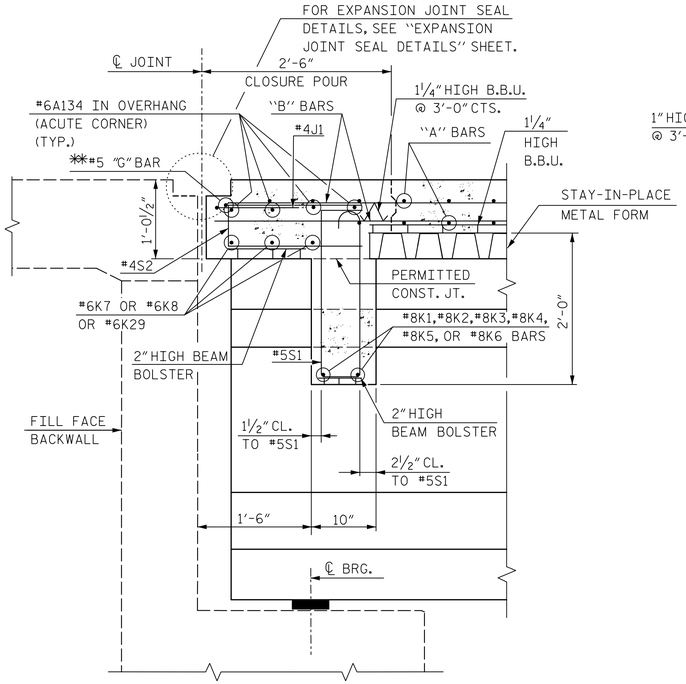
DRAWN BY M. WRIGHT DATE 8/16
CHECKED BY P. BARBER DATE 8/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 5

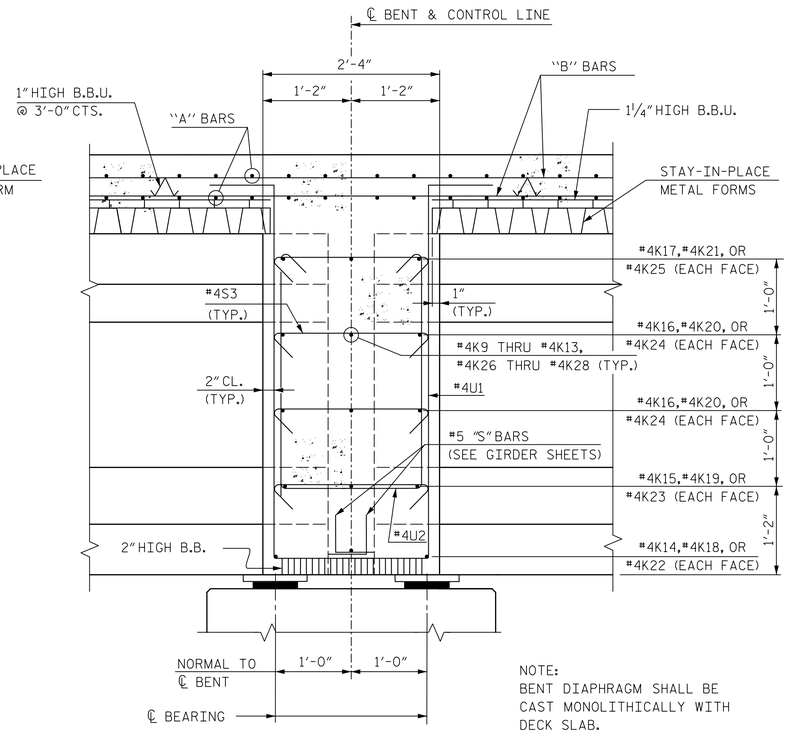
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-5
1			3			TOTAL SHEETS
2			4			40



SECTION A-A

SECTION NORMAL THRU END BENT 1 DIAPHRAGM, END BENT 2 SIMILAR

✳✳ #5 "C" BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.

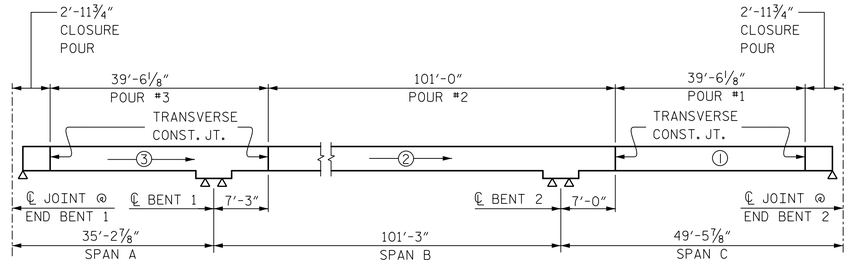


SECTION B-B

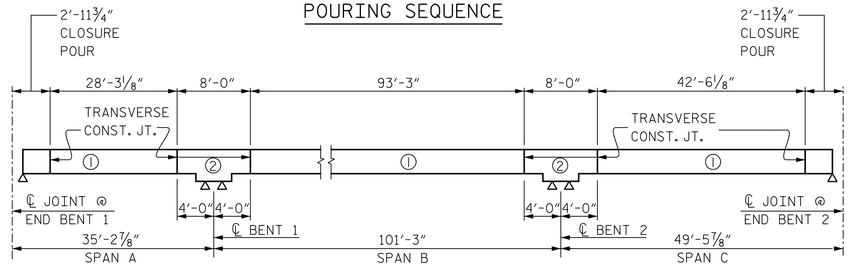
SECTION NORMAL THRU BENT 1 & BENT 2 DIAPHRAGM

NOTE:
BENT DIAPHRAGM SHALL BE CAST MONOLITHICALLY WITH DECK SLAB.

NOTE: ALL DIMENSIONS FOR POURING SEQUENCE AND OPTIONAL POURING SEQUENCE ARE ALONG CONTROL LINE RIGHT.

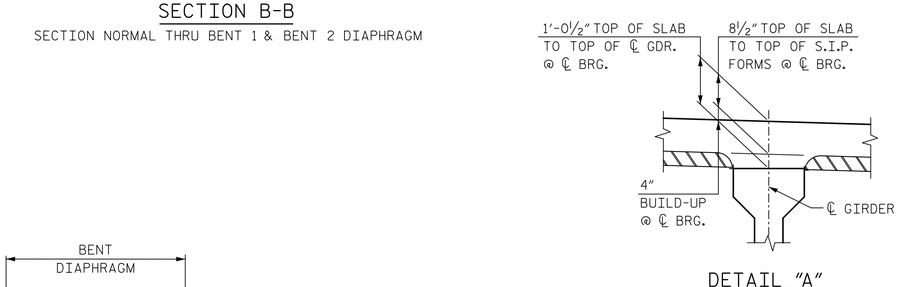


POURING SEQUENCE



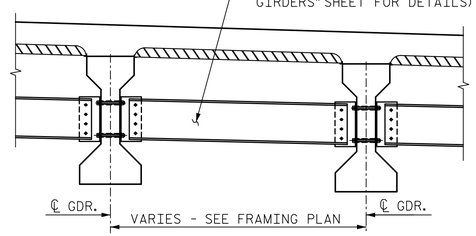
OPTIONAL POURING SEQUENCE

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



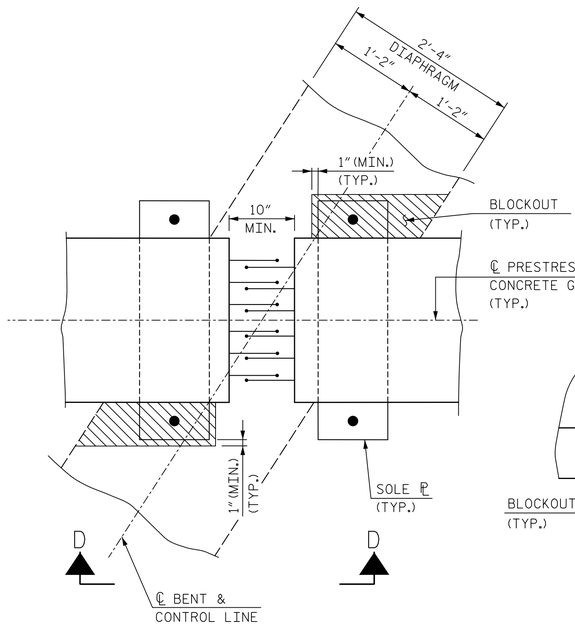
DETAIL "A"

NOTE: BUILDUP VARIES BETWEEN ℄ BEARINGS.



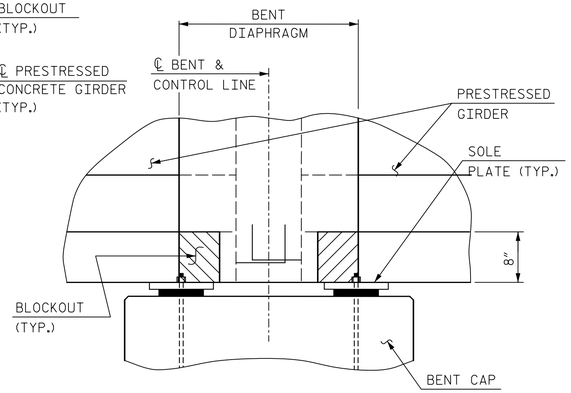
PARTIAL TYPICAL SECTION

(SHOWING INTERMEDIATE DIAPHRAGM)

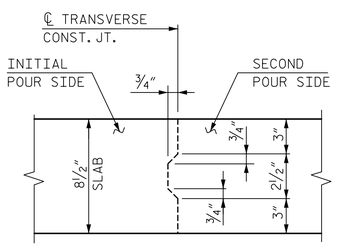


PLAN VIEW

(AT INTERIOR BENTS)



SECTION D-D



DECK SLAB TRANSVERSE CONSTRUCTION JOINT DETAIL

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

BENT DIAPHRAGM BLOCKOUT DETAILS

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11/15/2018

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

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DRAWN BY M. WRIGHT DATE 8/16
CHECKED BY P. BARBER DATE 8/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 6

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PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

RIGHT LANE

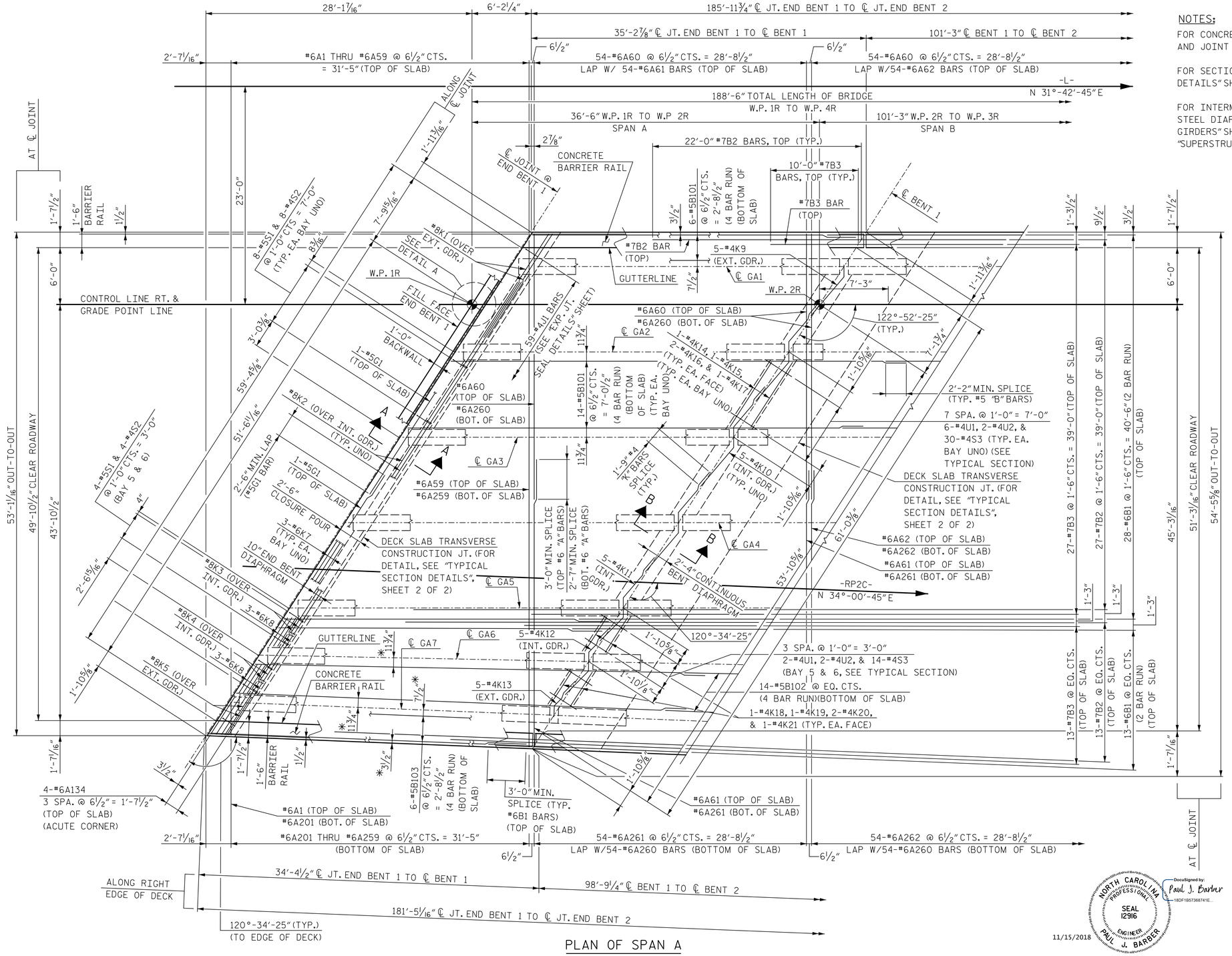
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-6
1			3			TOTAL SHEETS
2			4			40

NOTES:

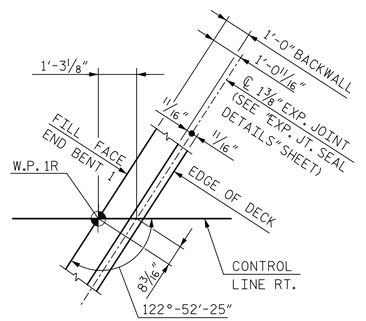
FOR CONCRETE BARRIER RAIL DIMENSIONS, REINFORCING STEEL, AND JOINT SPACING, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR SECTION VIEWS, SEE "SUPERSTRUCTURE TYPICAL SECTION DETAILS" SHEET 2 OF 2.

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS. FOR LOCATION, SEE "SUPERSTRUCTURE FRAMING PLANS" SHEET.



PLAN OF SPAN A



DETAIL A

✱ NORMAL TO -RP2C-, EDGE OF DECK OR ℄ OF GIRDER

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11/15/2018

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

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PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

RIGHT LANE

HNTB NORTH CAROLINA, P.C.
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DRAWN BY	M. WRIGHT	DATE	8/16
CHECKED BY	P. BARBER	DATE	8/16
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	8/18

DWG. NO. 7

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-7
1			3			TOTAL SHEETS
2			4			40

PLAN OF SPAN B

NOTES:

FOR NOTES, SEE "SUPERSTRUCTURE PLAN OF SPAN A" SHEET.

FOR DECK DIMENSIONS NORMAL TO CONTROL LINE AT BENT 1 AND 2, SEE "PLAN OF SPAN A" AND "PLAN OF SPAN C" SHEETS.

∗ NORMAL TO -RP2C-, EDGE OF DECK OR ℄ OF GIRDER

NOTE A: 1-#4K22, 1-#4K23, 2-#4K24, & 1-#4K25 (TYP. EA. FACE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by: Paul J. Barber

SEAL 12916 — NORTH CAROLINA PROFESSIONAL ENGINEER — PAUL J. BARBER — 11/15/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B

RIGHT LANE

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DRAWN BY	M. WRIGHT	DATE	8/16
CHECKED BY	P. BARBER	DATE	8/16
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	8/18

DWG. NO. 8

REVISIONS

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

SHEET NO. S14-8

TOTAL SHEETS 40

185′-11¾″ ℄ JT. END BENT 1 TO ℄ JT. END BENT 2

101′-3″ ℄ BENT 1 TO ℄ BENT 2

49′-5⅞″ ℄ BENT 2 TO ℄ JT. END BENT 2

#6A60 @ 6½″ CTS. LAP W/#6A64 BARS (TOP OF SLAB - SEE SHEET "PLAN OF SPAN B")

#6A60 @ 6½″ CTS., LAP W/#6A65 BARS (TOP OF SLAB - SEE SHEET "PLAN OF SPAN B")

#6A66 THRU #6A133 @ 6½″ CTS. = 36′-3½″ (TOP OF SLAB)

6½″ 6½″ 2′-7⅞″

101′-3″ W.P. 2R TO W.P. 3R SPAN B

50′-9″ W.P. 3R TO W.P 4R SPAN C

3′-8″

-L- N 31°-42′-45″E

188′-6″ TOTAL LENGTH OF BRIDGE W.P. 1R TO W.P. 4R

34′-6″ #6B5 BARS, TOP (TYP.)

#6B5 (2 BAR RUN) (TOP OF SLAB)

9′-3″ #6B6 BARS, TOP (TYP.)

18′-0″ #6B7 BARS, TOP (TYP.)

#6B6 BAR (TOP)

#6B7 BAR (TOP)

℄ BENT 2

1′-11⅜″

7′-1¾″

4-#6A134 3 SPA. @ 6½″ = 1′-7½″ (TOP OF SLAB) (ACUTE CORNER)

#6A133 (TOP OF SLAB) #6A333 (BOT. OF SLAB)

#4B8 (TOP OF SLAB)

℄ JOINT END BENT 2

3½″

1½″

1′-6″ BARRIER RAIL

ALONG ℄ JOINT

3½″

1′-7½″

AT ℄ JOINT

1′-7½″

3½″

23′-0″

6″ 6″

6′-0″

CONCRETE BARRIER RAIL

GUTTERLINE

#8K1 (OVER EXT. GDR.)

1′-11⅞″

6′-0″

CONTROL LINE RT. & GRADE POINT LINE

2′-4″ CONTINUOUS BENT DIAPHRAGM (SEE SPAN B FOR REINFORCING)

7′-0″

℄ GC1

122°-52′-25″ TYP.)

W.P. 3R

℄ GC2

W.P. 4R

SEE DETAIL B

FILL FACE END BENT 2

6′-5⅞″

3′-0⅜″

#6A60 (TOP OF SLAB) #6A260 (BOT. OF SLAB)

2′-2″ MIN. SPLICE (TYP. #5 "B" BOT. BARS)

#5B101 BARS @ 6½″ CTS. (BOTTOM OF SLAB) (TYP. EA. BAY UNO) (SEE SPAN A)

DECK SLAB TRANSVERSE CONSTRUCTION JT. (FOR DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 2 OF 2)

℄ GC3

1′-0″ BACKWALL

3-#6K7 (TYP. EA. BAY UNO)

65′-9″

58′-7¼″

#6A460 (TOP OF SLAB) #6A260 (BOT. OF SLAB)

#6A66 (TOP OF SLAB) #6A266 (BOT. OF SLAB)

℄ GC4

1-#5G2 (TOP OF SLAB)

10″ END BENT DIAPHRAGM

2′-6″ MIN. LAP (#5G2 BAR)

8-#5S1 & 8-#4S2 @ 1′-0″ CTS = 7′-0″ (TYP. EA. BAY UNO)

8⅜″

28-#4B8 @ 1′-6″ CTS. = 40′-6″ (TOP OF SLAB)

51′-1⅞″

57′-1⅞″ CLEAR ROADWAY

60′-4⅞″ OUT-TO-OUT

58′-5⅜″ OUT-TO-OUT

55′-2⅝″ CLEAR ROADWAY

49′-2⅝″

#6B5 @ 1′-6″ CTS. (2 BAR RUN) (TOP OF SLAB - SEE SPAN B)

DECK SLAB TRANSVERSE CONSTRUCTION JT. (FOR DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 2 OF 2)

#6A460 (TOP OF SLAB) #6A260 (BOT. OF SLAB)

INTERMEDIATE STEEL DIAPHRAGM (TYP.)

℄ GC5

#8K2 (OVER INT. GDR.) (TYP.)

1-#5G2 (TOP OF SLAB)

61′-7⅛″

68′-10⅛″

1′-3″

3′-0″ MIN. SPLICE (TOP #6 "A" BARS)

2′-7″ MIN. SPLICE (BOT. #6 "A" BARS)

27-#6B6 @ 1′-6″ CTS. (TOP OF SLAB)

27-#6B7 @ 1′-6″ CTS. = 39′-0″ (TOP OF SLAB)

1′-3″

1′-10⅝″

#6A64 (TOP OF SLAB) #6A264 (BOT. OF SLAB)

#6A65 (TOP OF SLAB) #6A265 (BOT. OF SLAB)

-RP2C- N 34°-00′-45″E

℄ GC6

120°-34′-25″(TYP.)

3-#6K29

2′-9¾″

3-#6K29

2′-6″ CLOSURE POUR

#8K6 (OVER EXT. GDR.)

68-#4J1 BARS (SEE "EXP. JT. SEAL DETAILS" SHEET)

8-#5S1 & 8-#4S2 @ 1′-0″ CTS = 7′-0″ (BAY 5 & 6)

13-#6B6 @ EQ. CTS. (TOP OF SLAB)

13-#6B7 @ EQ. CTS. (TOP OF SLAB)

#6B5 @ EQ. CTS. (2 BAR RUN) (TOP OF SLAB - SEE SPAN B)

#5B102 BARS @ EQ. CTS. (BOTTOM OF SLAB) (SEE SPAN A)

℄ GC7

#4B8 (TOP OF SLAB)

13-#4B8 @ EQ. CTS. (TOP OF SLAB)

1′-7⅛″

*3½″

#6A63 (TOP OF SLAB) #6A263 (BOT. OF SLAB)

120°-34′-25″(TYP.) (TO EDGE OF DECK)

3′-0″ MIN. SPLICE (TYP. #6B5 BARS) (TOP OF SLAB)

#5B103 BARS @ 6½″ CTS. (BOTTOM OF SLAB) (SEE SPAN A)

CONCRETE BARRIER RAIL

2′-0″ MIN. SPLICE (TYP. #4 "B" BARS, TOP OF SLAB)

#6B5 (2 BAR RUN) (TOP OF SLAB)

1½″

1′-6″ BARRIER RAIL

*3½″

1′-7⅛″

98′-9¼″ ℄ BENT 1 TO ℄ BENT 2

48′-3⅝″ ℄ BENT 2 TO ℄ JT. END BENT 2

5¹¹⁄₁₆″ 13⁄₁₆″

1′-10⅝″

2′-7⅞″

#6A263 @ 6½″ CTS. LAP W/#6A260 BARS (BOTTOM OF SLAB, SEE SHEET "PLAN OF SPAN B")

#6A264 @ 6½″ CTS. LAP W/#6A260 BARS (BOTTOM OF SLAB - SEE SHEET "PLAN OF SPAN B")

#6A265 @ 6½″ CTS., LAP W/#6A260 BARS (BOTTOM OF SLAB - SEE "PLAN OF SPAN B")

#6A266 THRU #6A333 @ 6½″ CTS. = 36′-3½″ (BOTTOM OF SLAB)

6½″ 6½″ 6½″

35′-4⅜″

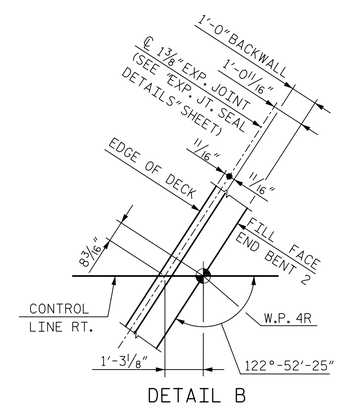
3′-8″

181′-5¹¹⁄₁₆″ ℄ JT. END BENT 1 TO ℄ JT. END BENT 2

AT ℄ JOINT

PLAN OF SPAN C

*NORMAL TO -RP2C-, EDGE OF DECK OR ℄ GIRDER



DETAIL B

NOTES:

FOR NOTES, SEE "SUPERSTRUCTURE PLAN OF SPAN A" SHEET.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

DocuSigned by: Paul J. Barber

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN C

RIGHT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 8/16
CHECKED BY P. BARBER DATE 8/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 9

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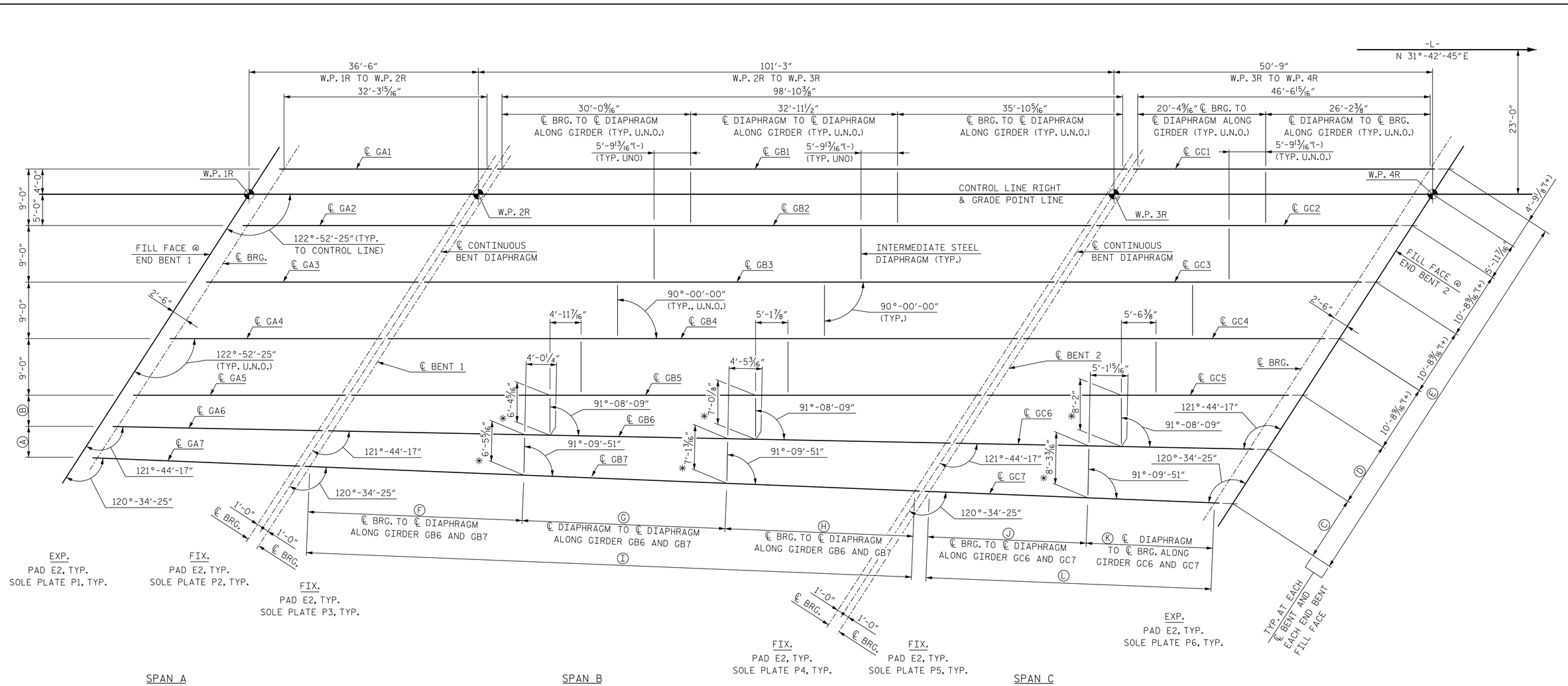
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-9
1			3			TOTAL SHEETS
2			4			40



FRAMING PLAN

DIMENSION TABLE													
DIM. / LOCATION	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	DIM. / LOCATION	Ⓕ	Ⓖ	Ⓗ	Ⓘ	Ⓙ	Ⓚ	Ⓛ
FILL FACE END BENT 1	4′-11 1/4″	4′-11 1/4″	5′-10 9/16″	5′-10 9/16″	54′-7 1/2″	GIRDER GB6	30′-6 13/16″	32′-4 1/8″	34′-8 3/4″	97′-7 11/16″	——	——	——
℄ BENT 1	5′-7 13/16″	5′-7 13/16″	6′-8 3/4″	6′-8 3/4″	56′-3 3/8″	GIRDER GB7	34′-1 9/16″	32′-4 3/16″	29′-11 9/16″	96′-5 5/16″	——	——	——
℄ BENT 2	7′-7 5/8″	7′-7 5/8″	9′-1 1/16″	9′-1 1/16″	61′-0 1/2″	GIRDER GC6	——	——	——	——	20′-5 1/2″	25′-6 1/2″	46′-0″
FILL FACE END BENT 2	8′-7 9/16″	8′-7 9/16″	10′-3 1/4″	10′-3 1/4″	63′-4 15/16″	GIRDER GC7	——	——	——	——	25′-3 1/8″	20′-2 1/8″	45′-5 1/4″

NOTES:

"EXP." DENOTES EXPANSION BEARING ASSEMBLY.

"FIX." DENOTES FIXED BEARING ASSEMBLY.

"E" DENOTES ELASTOMERIC BEARING PAD MARK.

"P" DENOTES STEEL SOLE PLATE MARK.

"U.N.O." UNLESS NOTED OTHERWISE

∗ DIMENSION IS ALONG DIAPHRAGM BETWEEN ℄ GIRDERS.

NOTES:

ALL DIMENSIONS MEASURED ALONG ℄ GIRDER UNLESS NOTED OTHERWISE.

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

FOR GIRDER ELEVATIONS AND DETAILS, SEE PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

DocuSigned by: Paul J. Barber 3BDF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

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DRAWN BY M. WRIGHT DATE 7/16
CHECKED BY P. BARBER DATE 8/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 10

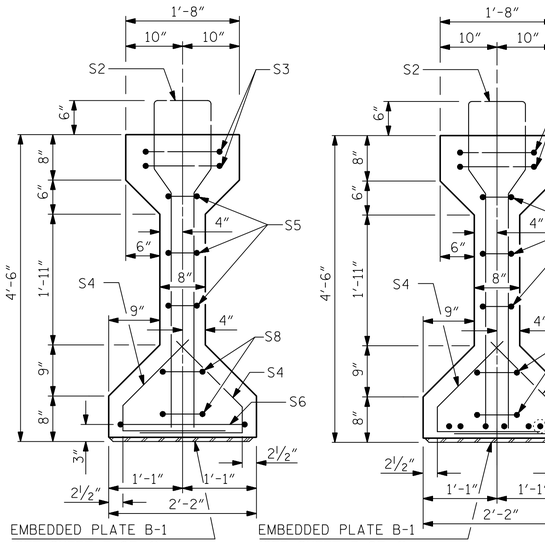
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

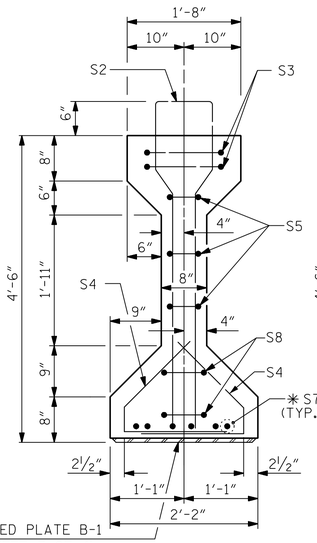
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-10
1			3			TOTAL SHEETS
2			4			40



EMBEDDED PLATE B-1
(SEE SHEET 3 OF 4)

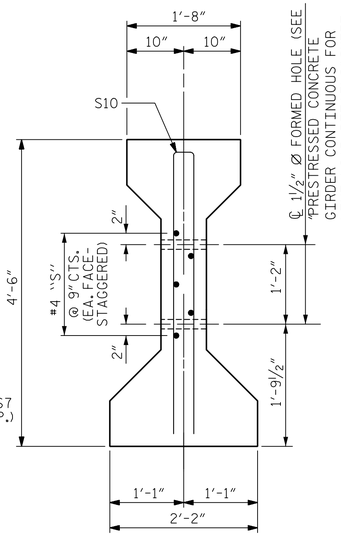
SECTION A-A



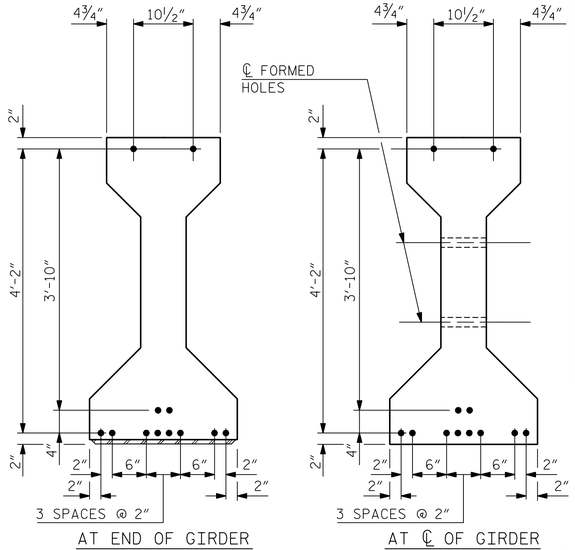
EMBEDDED PLATE B-1
(SEE SHEET 3 OF 4)

SECTION B-B

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



SECTION C-C
(S1 BARS NOT SHOWN)

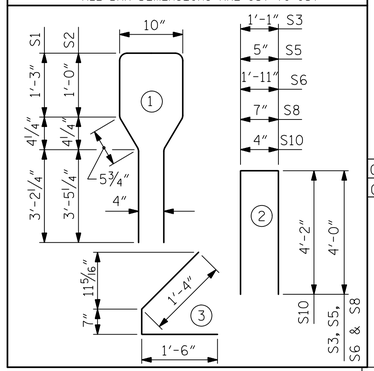


0.6" Ø LOW RELAXATION STRAND LAYOUT

NOTE: ALL STRANDS SHALL BE BONDED FULL LENGTH.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
GA1 THRU GA7	S1	33	#4	1	10'-8"	235
GC1 THRU GC7	S1	42	#4	1	10'-8"	299
	S2	12	#6	1	10'-8"	192
	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
GC1, GC7	S10	2	#5	2	8'-8"	18
GC2 THRU GC6	S10	4	#5	2	8'-8"	36
GC1, GC7	S11	5	#4	STR	7'-0"	23
GC2 THRU GC6	S12	5	#4	STR	12'-10"	43

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

0.6" Ø L. R. GRADE 270 STRANDS

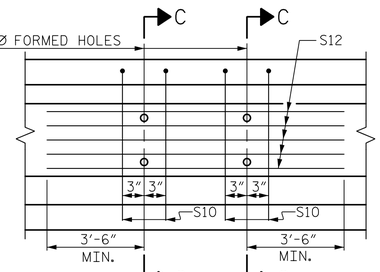
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

QUANTITIES FOR ONE GIRDER

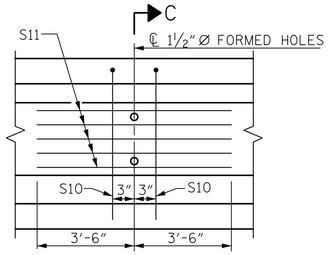
	REINFORCING STEEL LB.	5,000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
GA1 THRU GA6	685	6.8	12
GA7	685	6.7	12
GC1	790	9.7	12
GC2 THRU GC5	828	9.7	12
GC6	828	9.6	12
GC7	790	9.5	12

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
GA1 THRU GA5 (5 TOTAL)	33'-8 15⁄16"	168.72'
GA6	33'-4 1⁄8"	33.34'
GA7	32'-11 1⁄2"	32.96'
GC1 THRU GC5 (5 TOTAL)	47'-11 15⁄16"	239.97'
GC6	47'-5"	47.42'
GC7	46'-10 1⁄4"	46.85'



PARTIAL ELEVATION
(SPAN C ONLY)
SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. GC2, GC3, GC4, GC5 &GC6

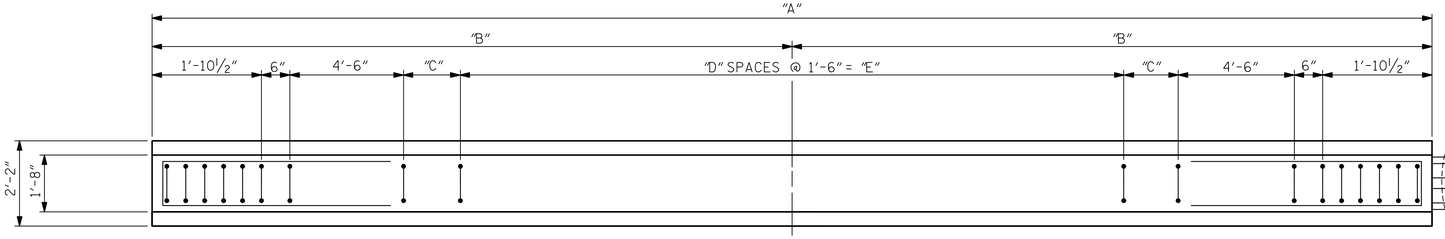


PARTIAL ELEVATION
(SPAN C ONLY)
SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos GC1 & GC7

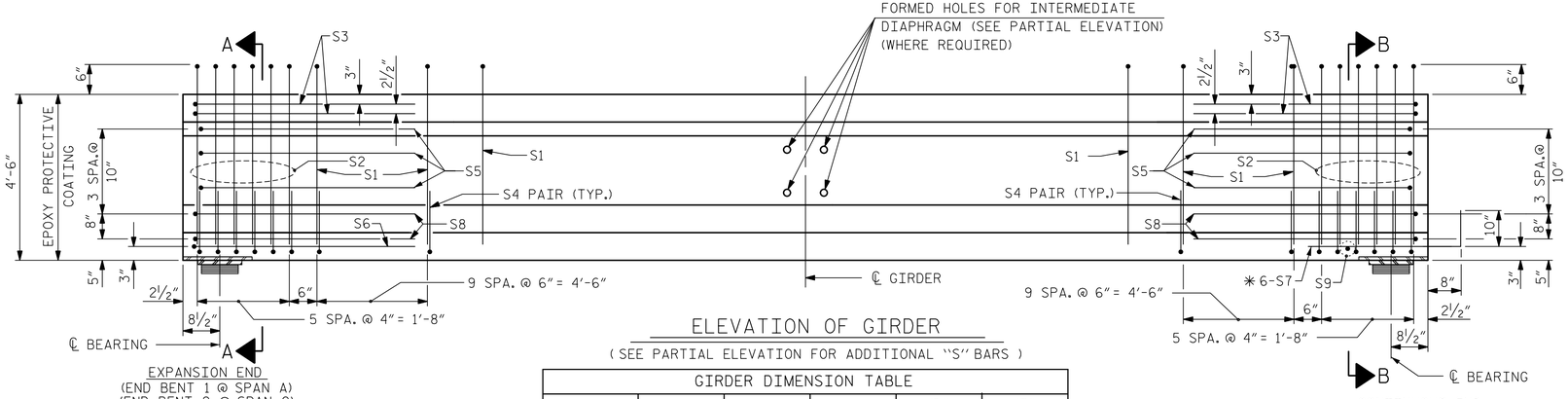
NOTES:

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,000 PSI FOR SPAN A AND SPAN C GIRDERS.

GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI AT THE AGE OF 28 DAYS.



PLAN OF GIRDER



EXPANSION END
(END BENT 1 @ SPAN A)
(END BENT 2 @ SPAN C)

ELEVATION OF GIRDER
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

CONTINUOUS END
(BENT 1 END @ SPAN "A")
(BENT 2 END @ SPAN "C")

GIRDER DIMENSION TABLE					
GIRDERS	"A"	"B"	"C"	"D"	"E"
GA1 - GA5	33'-8 15⁄16"	16'-10½" (-)	1'-0" (-)	12	18'-0"
GA-6	33'-4 1⁄8"	16'-8 1⁄16"	9 9⁄16"	12	18'-0"
GA-7	32'-11½"	16'-5¼"	7¼"	12	18'-0"
GC1 - GC5	47'-11 15⁄16"	24'-0" (-)	1'-4½" (-)	21	31'-6"
GC-6	47'-5"	23'-8½"	1'-1"	21	31'-6"
GC-7	46'-10¼"	23'-5⅛"	9⅝"	21	31'-6"

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 506+32.25 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPANS A & C RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-11
1			3			TOTAL SHEETS
2			4			40

DocuSigned by: Paul J. Barber
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
11/15/2018

ASSEMBLED BY : M. WRIGHT DATE : 8/18
CHECKED BY : P. BARBER DATE : 8/18
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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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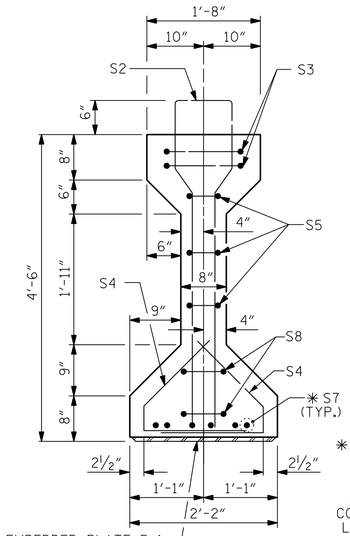
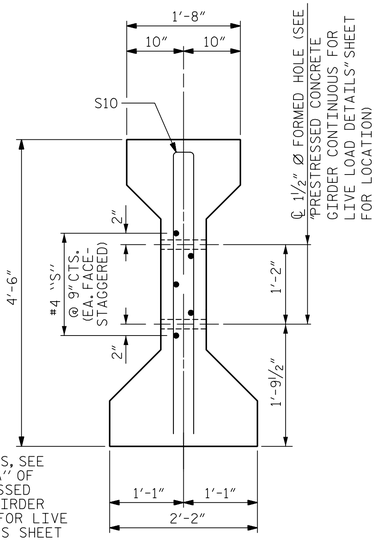
DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY P. BARBER DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18
DWG. NO. II

STD. NO. PCG6



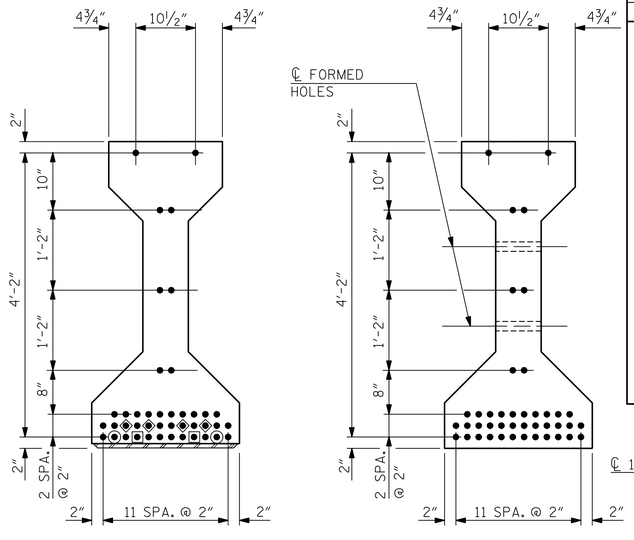
SECTION B-B



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

SECTION C-C

(S1 BARS NOT SHOWN)



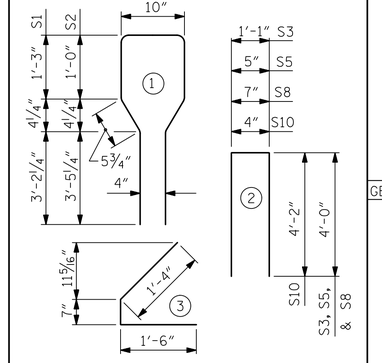
0.6"Ø LOW RELAXATION STRAND LAYOUT

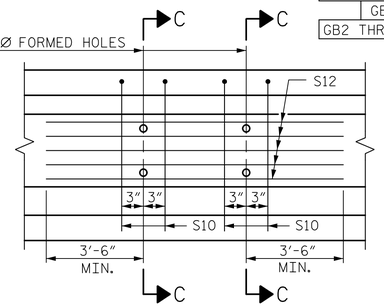
DEBONDING LEGEND

- • FULLY BONDED STRANDS
- ⊙ STRANDS DEBONDED FOR 22'-0" FROM END OF GIRDER
- ◈ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ⊡ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

BAR TYPES

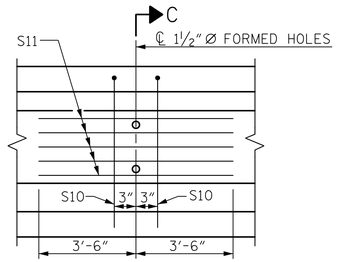
ALL BAR DIMENSIONS ARE OUT-TO-OUT





PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. GB2, GB3, GB4, GB5 & GB6



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. GB1 & GB7

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
GB1 THRU GB6	S1	82	#4	1	10'-8"	84
GB7	S1	81	#4	1	10'-8"	577
	S2	16	#6	1	10'-8"	256
	S3	4	#4	2	9'-1"	24
	S4	72	#4	3	3'-5"	164
	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
GB1, GB7	S10	4	#5	2	8'-8"	36
GB2 THRU GB6	S10	8	#5	2	8'-8"	72
GB1, GB7	S11	10	#4	STR	7'-0"	47
GB2 THRU GB6	S12	10	#4	STR	12'-10"	86

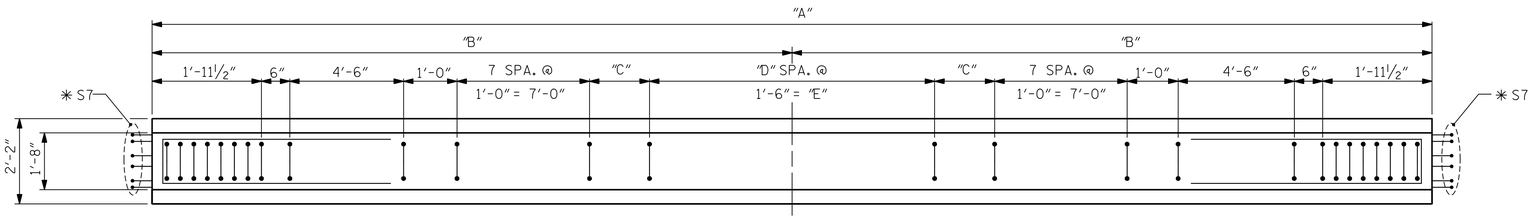
✳ NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	8,000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
GB1	1,215	20.4	42
GB2	1,290	20.4	42
GB3	1,290	20.4	42
GB4	1,290	20.4	42
GB5	1,290	20.4	42
GB6	1,290	20.1	42
GB7	1,208	19.9	42

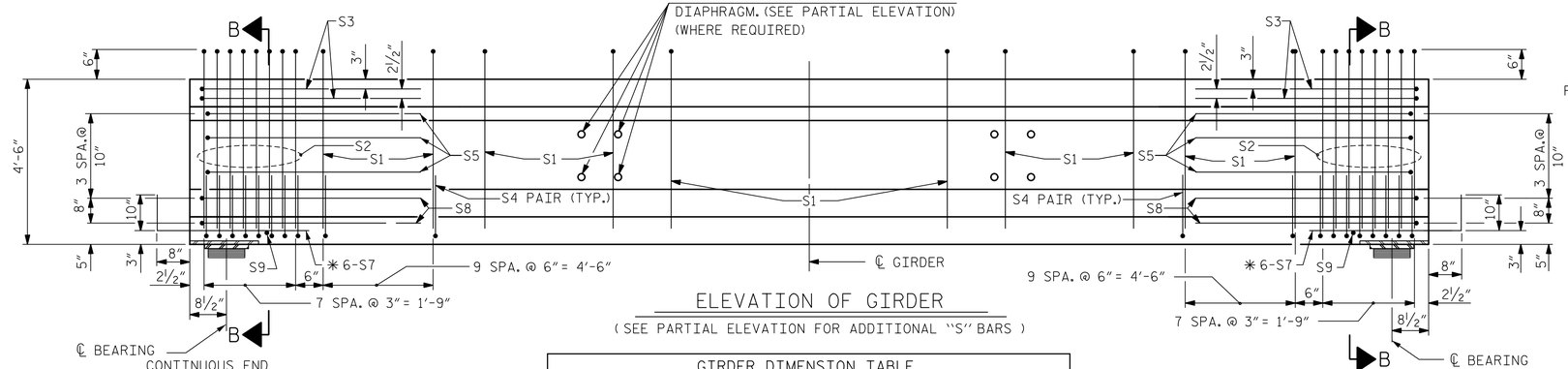
GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
GB1 THRU GB5 (5 TOTAL)	100'-3⅜"	501.41'
GB6	99'-0⅝"	99.05'
GB7	97'-10⅝"	97.86'



PLAN OF GIRDER

FORMED HOLES FOR INTERMEDIATE DIAPHRAGM. (SEE PARTIAL ELEVATION) (WHERE REQUIRED)



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

GIRDER DIMENSION TABLE					
GIRDERS	"A"	"B"	"C"	"D"	"E"
GB1 - GB5	100'-3⅜"	50'-1¹¹/₁₆"	1'-5³/₁₆"	45	67'-6"
GB6	99'-0⅝"	49'-6⁵/₁₆"	9'3⁷/₁₆"	45	67'-6"
GB7	97'-10⁵/₁₆"	48'-11³/₁₆"(-)	11'1¹/₁₆"(-)	44	66'-0"

NOTES:

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 FOR SPAN B GIRDERS.

GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 8,000 PSI AT THE AGE OF 28 DAYS.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 4

DocuSigned by: Paul J. Barber 18DF1B5736741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-12
1			3			TOTAL SHEETS
2			4			40

ASSEMBLED BY : M. WRIGHT	DATE : 8/18	
CHECKED BY : P. BARBER	DATE : 8/18	
DRAWN BY : ELR 8/91	REV. 10/1/11	MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15	MAA/TMQ
	REV. 12/17	MAA/THC

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DRAWN BY	M. WRIGHT	DATE 8/18
CHECKED BY	P. BARBER	DATE 8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 12

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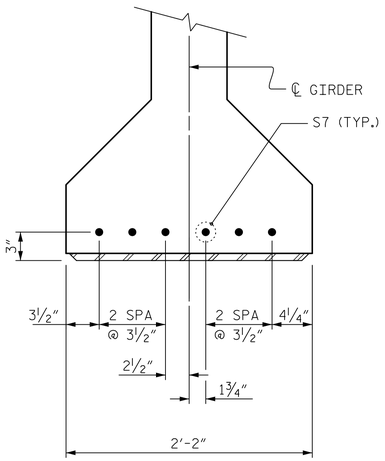
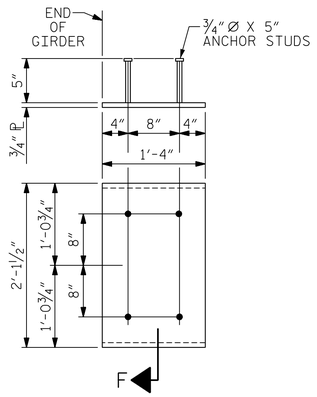
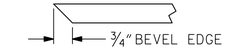
STD. NO. PCG6



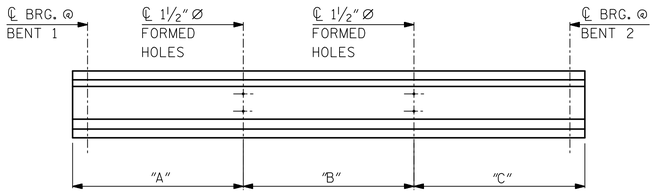
DETAIL "A"
(FOR AASHTO TYPE IV GIRDERS)



EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER
(2 REQ'D PER GIRDER)

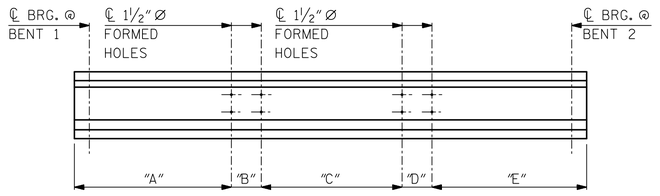


SECTION "F"
(SEE NOTES)



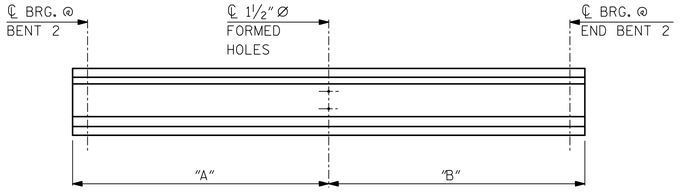
DIM.	GB1	GB7
"A"	30'-9 9/16"	34'-10 1/16"
"B"	32'-11 1/2"	32'-4 3/16"
"C"	36'-6 13/16"	30'-8 1/16"

GIRDER ELEVATION
GB1 & GB7



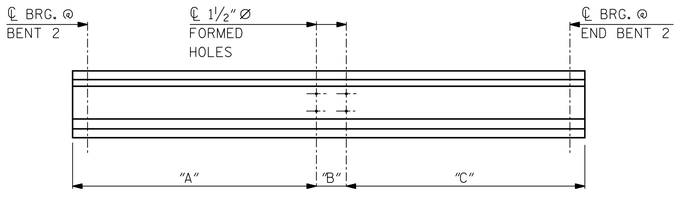
DIM.	GB2	GB3	GB4	GB5	GB6
"A"	30'-9 9/16"	30'-9 9/16"	30'-9 9/16"	31'-7 7/16"	31'-3 5/16"
"B"	5'-9 13/16"	5'-9 13/16"	5'-9 13/16"	4'-11 7/16"	4'-0 1/4"
"C"	27'-1 5/8"	27'-1 5/8"	27'-1 5/8"	27'-9 9/16"	28'-3 7/8"
"D"	5'-9 13/16"	5'-9 13/16"	5'-9 13/16"	5'-1 7/8"	4'-5 3/16"
"E"	30'-9 9/16"	30'-9 9/16"	30'-9 9/16"	30'-9 9/16"	31'-0"

GIRDER ELEVATION
GB2, GB3, GB4, GB5 & GB6



DIM.	GC1	GC7
"A"	21'-1 1/16"	25'-11 5/8"
"B"	26'-10 7/8"	20'-10 5/8"

GIRDER ELEVATION
GC1 & GC7



DIM.	GC2	GC3	GC4	GC5	GC6
"A"	21'-1 1/16"	21'-1 1/16"	21'-1 1/16"	21'-4 1/2"	21'-2"
"B"	5'-9 13/16"	5'-9 13/16"	5'-9 13/16"	5'-6 3/8	5'-1 15/16"
"C"	21'-1 1/16"	21'-1 1/16"	21'-1 1/16"	21'-1 1/16"	21'-1 1/16"

GIRDER ELEVATION
GC2, GC3, GC4, GC5 & GC6

1½" Ø FORMED HOLE LOCATIONS

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.

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.

DocuSigned by: Paul J. Barber 180F1B5736741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-13
1			3			TOTAL SHEETS
2			4			40

ASSEMBLED BY : M. WRIGHT	DATE : 8/18	
CHECKED BY : P. BARBER	DATE : 8/18	
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

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DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 13

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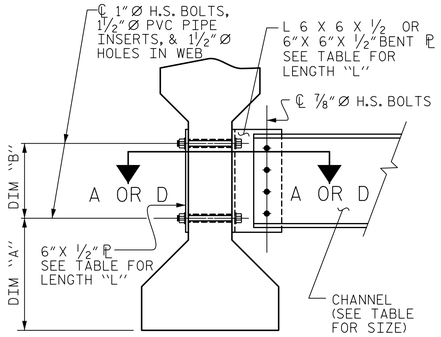
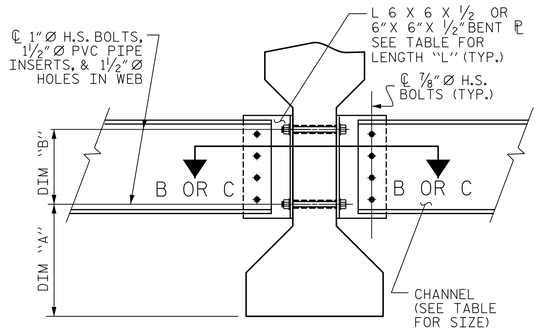
STD. NO. PCG9



EXTERIOR GIRDER



INTERIOR GIRDER

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 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.

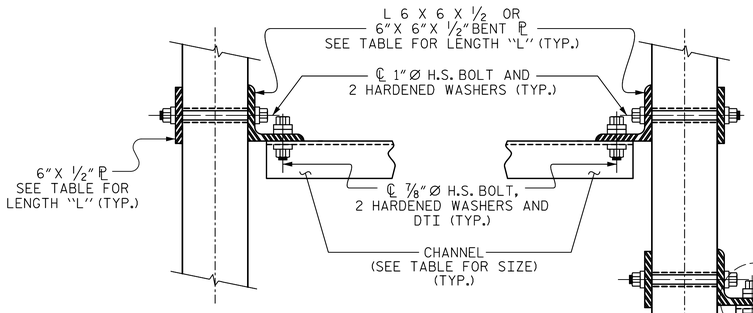
INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

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.

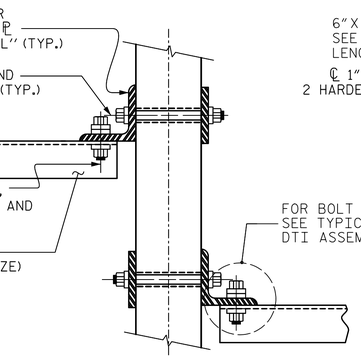
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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

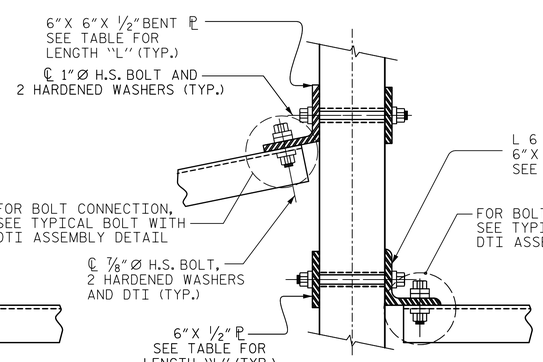
PART SECTION AT INTERMEDIATE DIAPHRAGMS



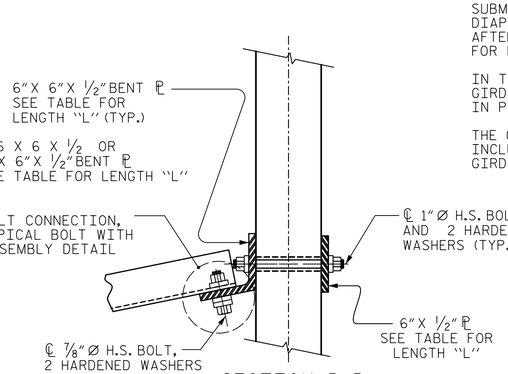
SECTION A-A
(GIRDERS GB1 OR GC1)



SECTION B-B
(GIRDERS GB2 THRU GB5 OR GC2 THRU GC5)



SECTION C-C
(GIRDERS GB6 OR GC6)

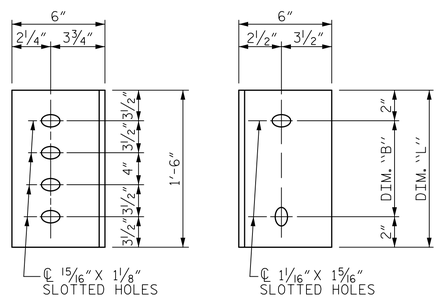


SECTION D-D
(GIRDERS GB7 OR GC7)

TABLE

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

CONNECTION DETAILS



DIAPHRAGM FACE

WEB FACE

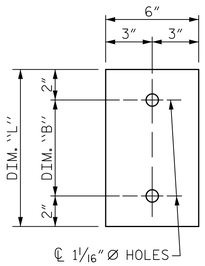
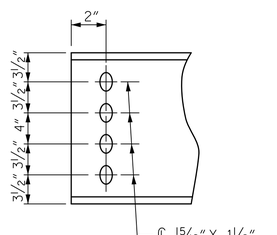
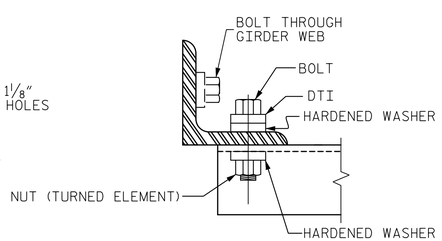


PLATE DETAIL



CHANNEL END

CONNECTOR PLATE DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-14
1			3			TOTAL SHEETS
2			4			40

STD. NO. PCG10

ASSEMBLED BY : M. WRIGHT	DATE : 8/18
CHECKED BY : P. BARBER	DATE : 8/18
DRAWN BY : TLA 6/05	REV. 5/1/06RRR KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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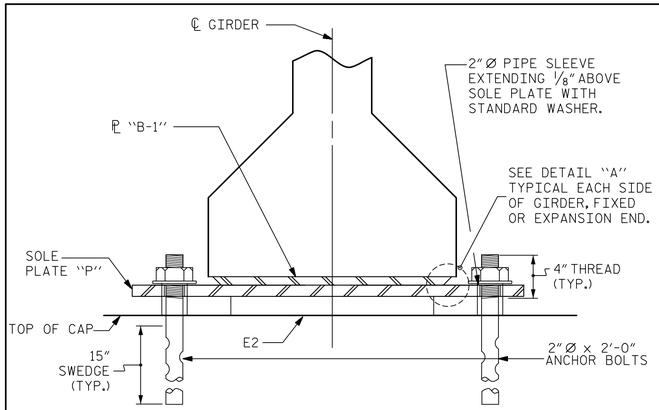
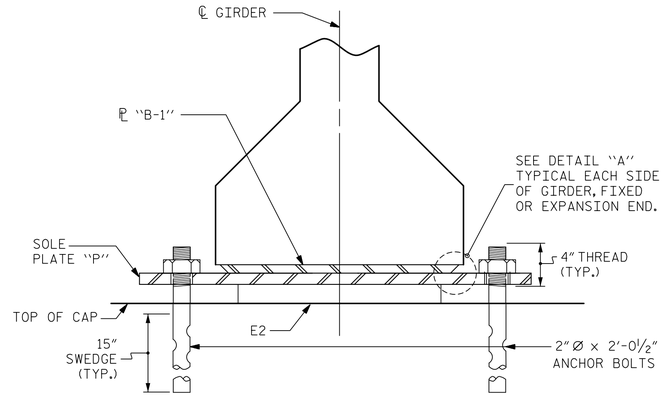
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

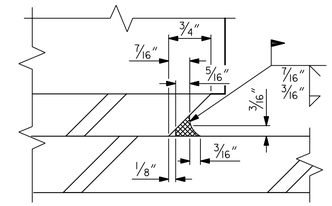
DWG. NO. 14



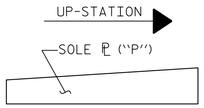
SECTION AT EXPANSION BEARING



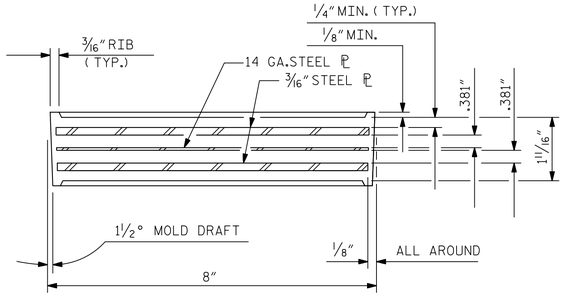
SECTION AT FIXED BEARING



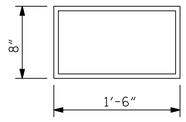
DETAIL "A"



SOLE ℄ PLACEMENT DETAIL



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E2 (42 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE III

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE III	205 k

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. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

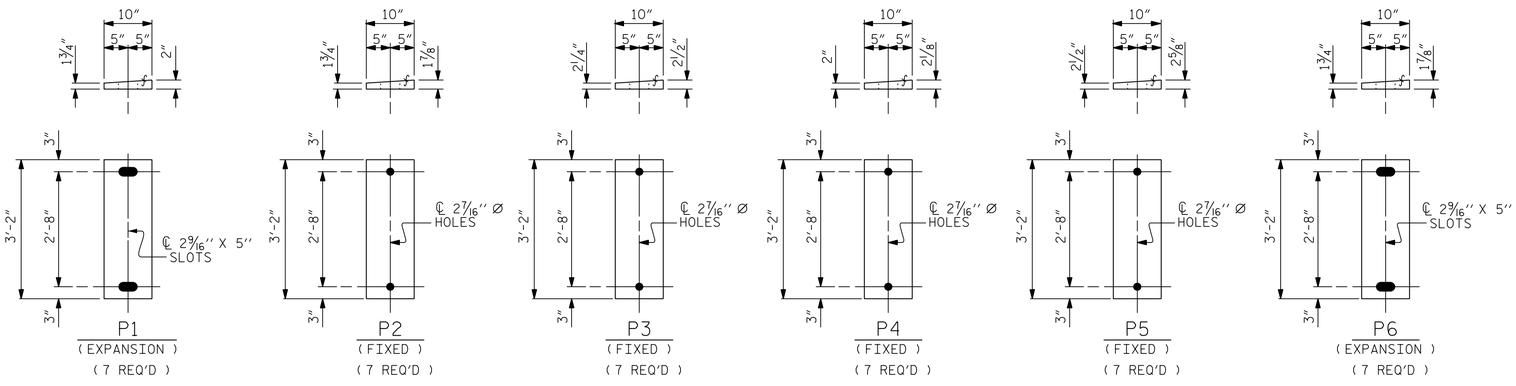
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

TYPICAL PLAN



SOLE PLATE DETAILS ("P")

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-15
1			3			TOTAL SHEETS
2			4			40

ASSEMBLED BY : M. WRIGHT	DATE : 8/18		
CHECKED BY : P. BARBER	DATE : 8/18		
DRAWN BY : WJH 8/89	REV. 6/13	AAC/MAA.	
CHECKED BY : CRK 8/89	REV. 1/15	MAA/TMG.	
	REV. 12/17	MAA/THC	

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CHECKED BY P. BARBER DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 15

STD. NO. EB3

DEAD LOAD DEFLECTION TABLE FOR SPAN A											
0.6" Ø LOW RELAXATION STRANDS	GIRDERS 1 THRU 7										
TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.005	0.009	0.012	0.014	0.015	0.014	0.012	0.009	0.005	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.000
FINAL CAMBER ↑	0	1/16	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B																						
0.6" Ø LOW RELAXATION STRANDS	GIRDERS 1 THRU 4																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.037	0.072	0.106	0.137	0.164	0.187	0.205	0.219	0.227	0.230	0.227	0.219	0.205	0.187	0.164	0.137	0.106	0.072	0.037	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.024	0.048	0.073	0.095	0.114	0.132	0.145	0.155	0.161	0.163	0.161	0.155	0.145	0.132	0.114	0.095	0.073	0.048	0.024	0.000
FINAL CAMBER ↑	0	1/8	5/16	3/8	1/2	5/8	11/16	3/4	3/4	13/16	13/16	13/16	3/4	3/4	11/16	5/8	1/2	3/8	5/16	1/8	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B																						
0.6" Ø LOW RELAXATION STRANDS	GIRDERS 5 THRU 7																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.036	0.071	0.104	0.135	0.161	0.184	0.202	0.216	0.224	0.226	0.224	0.216	0.202	0.184	0.161	0.135	0.104	0.071	0.036	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.020	0.039	0.059	0.077	0.092	0.106	0.117	0.125	0.130	0.132	0.130	0.125	0.117	0.106	0.092	0.077	0.059	0.039	0.020	0.000
FINAL CAMBER ↑	0	3/16	3/8	9/16	11/16	13/16	15/16	1	1 1/16	1 1/8	1 1/8	1 1/8	1 1/16	1	15/16	13/16	11/16	9/16	3/8	3/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN C											
0.6" Ø LOW RELAXATION STRANDS	GIRDERS 1 THRU 7										
TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.014	0.019	0.023	0.024	0.023	0.019	0.014	0.008	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.003	0.006	0.008	0.009	0.010	0.009	0.008	0.006	0.003	0.000
FINAL CAMBER ↑	0	1/16	1/8	1/8	3/16	3/16	3/16	1/8	1/8	1/16	0

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

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 506+32.25 -L-

DocuSigned by: Paul J. Barber 18DF1B573687416...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

RIGHT LANE

HNTB NORTH CAROLINA, P.C.
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343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY J. BAYNE DATE 10/16
CHECKED BY V. KOLLIPARA DATE 11/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 16

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-16
1			3			TOTAL SHEETS
2			4			40

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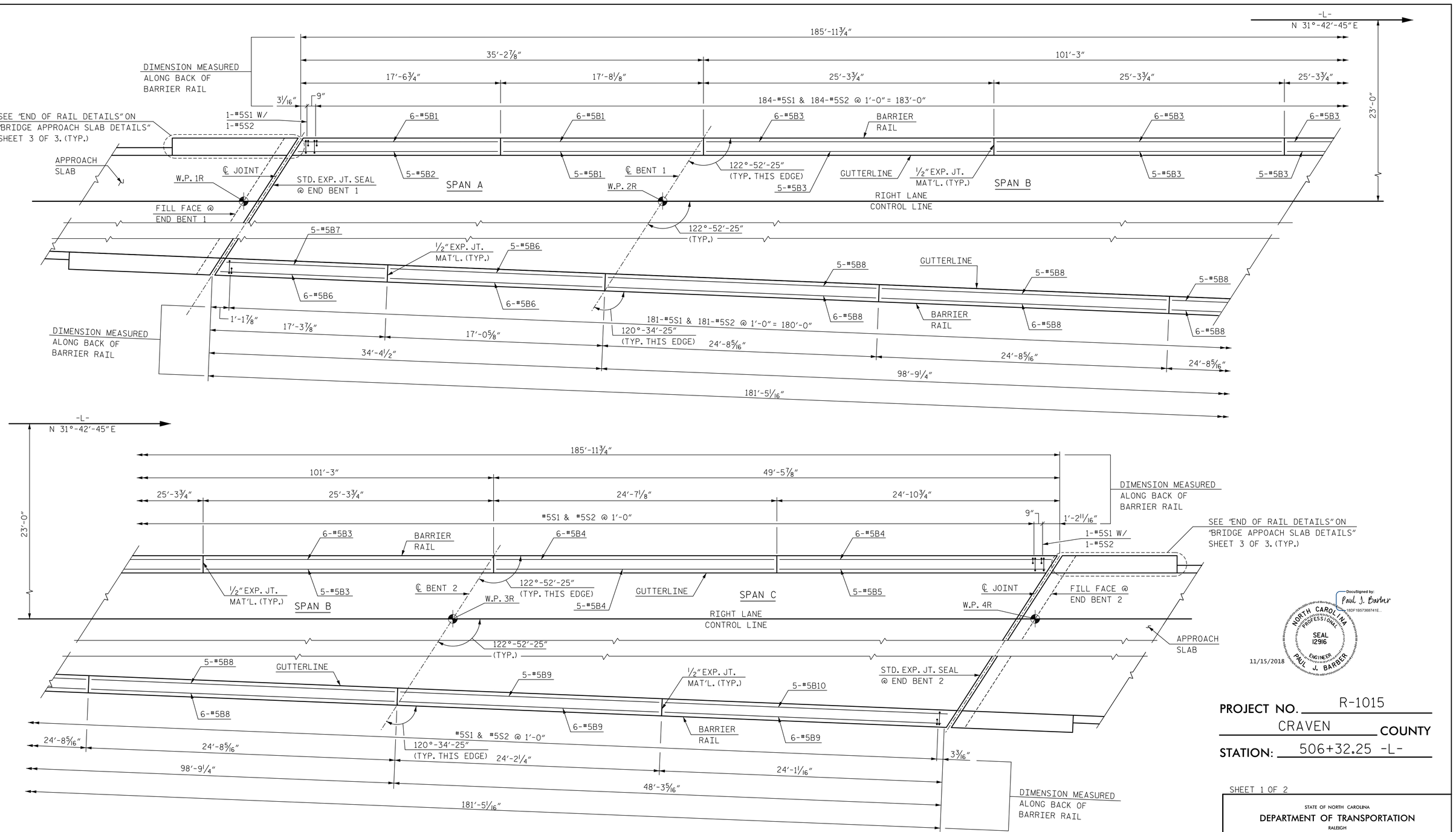

PLAN OF BARRIER RAIL

NOTE: EDGE OF SLAB NOT SHOWN FOR CLARITY.

DocuSigned by: Paul J. Barber 180F185736874E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 506+32.25 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE BARRIER RAIL

RIGHT LANE

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DRAWN BY	M. WRIGHT	DATE 6/16
CHECKED BY	P. BARBER	DATE 8/16
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 17

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-17
1			3			TOTAL SHEETS
2			4			40

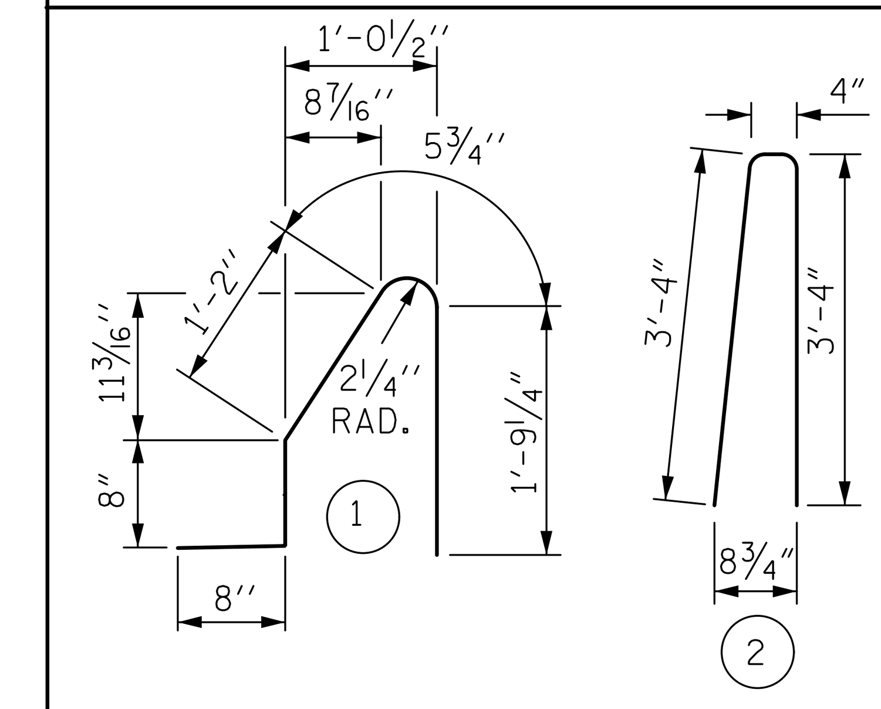
NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

BAR TYPES



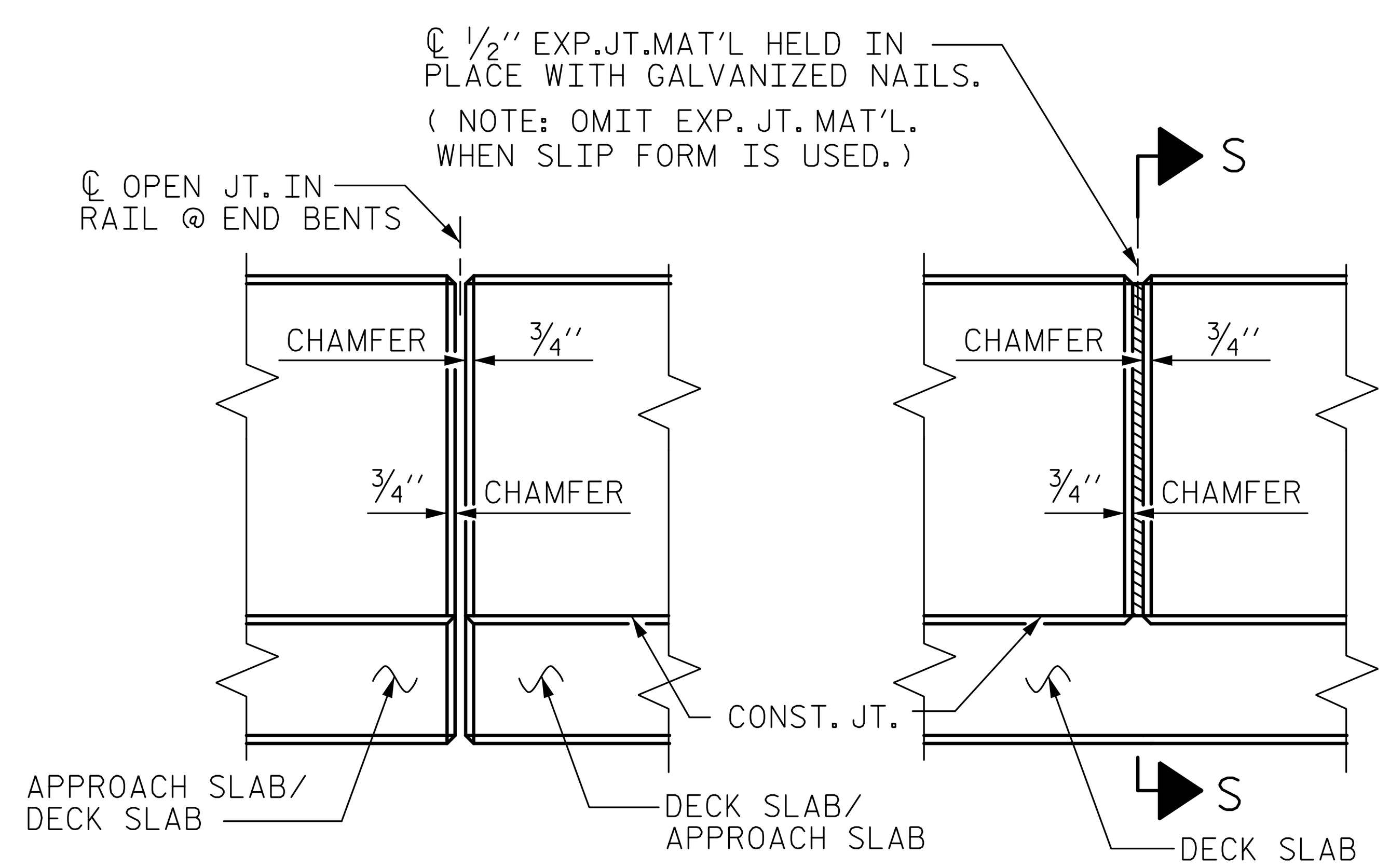
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

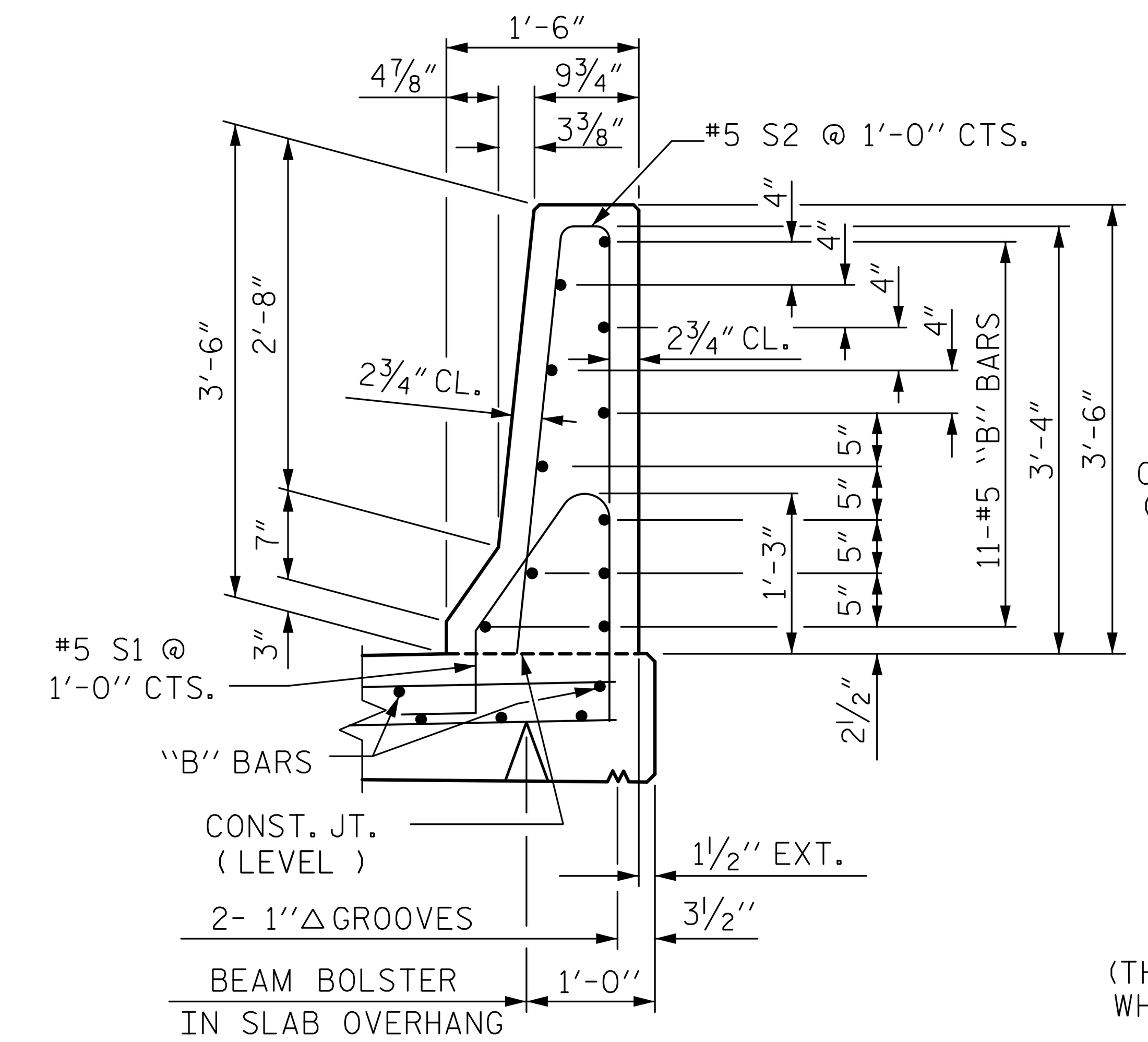
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	17	#5	STR.	17'-3"	306
* B2	5	#5	STR.	17'-5"	91
* B3	44	#5	STR.	24'-11"	1,143
* B4	17	#5	STR.	24'-2"	428
* B5	5	#5	STR.	23'-8"	123
* B6	17	#5	STR.	16'-8"	296
* B7	5	#5	STR.	16'-2"	84
* B8	44	#5	STR.	24'-3"	1,113
* B9	17	#5	STR.	23'-9"	421
* B10	5	#5	STR.	23'-11"	125
* S1	367	#5	1	4'-9"	1,818
* S2	367	#5	2	7'-0"	2,679

* EPOXY COATED REINFORCING STEEL	8,627	LBS.
CLASS AA CONCRETE	50.0	CU. YDS.
CONCRETE BARRIER RAIL	367.4	LIN. FT.

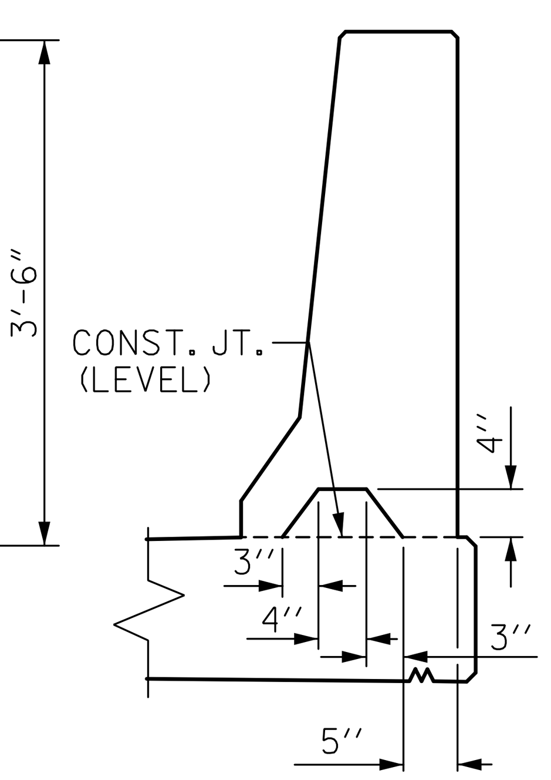


ELEVATION AT EXPANSION JOINTS

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)

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
CONCRETE BARRIER RAIL

RIGHT LANE

DocuSigned by: Paul J. Barber
18DF1B57368741E...
NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER
11/15/2018

REVISIONS								SHEET NO.
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1				3				TOTAL SHEETS
2				4				40

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343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY P. BARBER DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18
DWG. NO. 18

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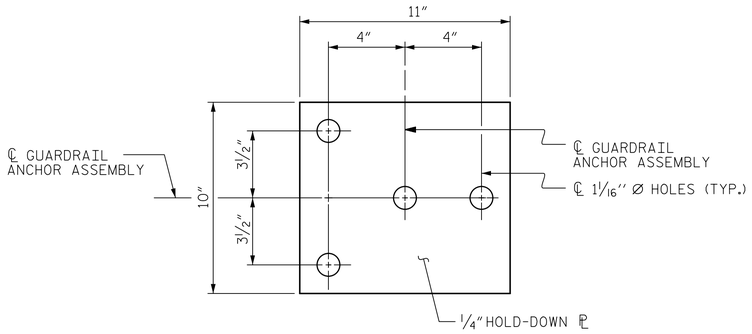
ASSEMBLED BY : M. WRIGHT DATE : 8/18
CHECKED BY : P. BARBER DATE : 8/18

DRAWN BY : ARB 5/87
CHECKED BY : SJD 9/87

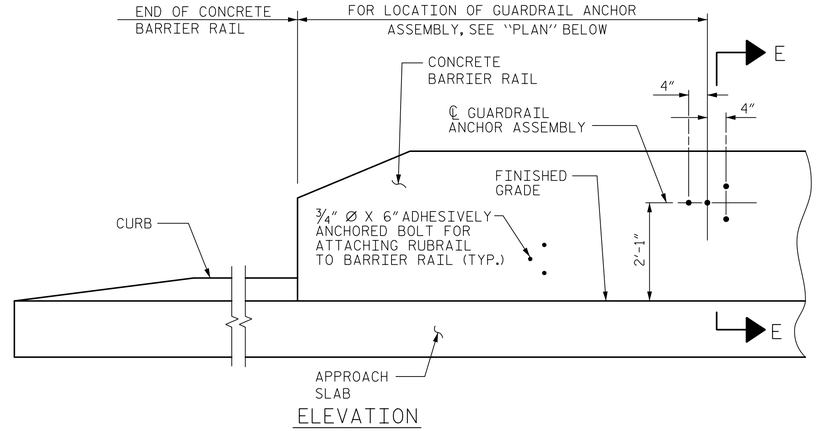
REV. 7/12 MAA/GM
REV. 6/13 MAA/GM
REV. 12/17 MAA/THC

STR. #14

STD. NO. CBR1



PLAN



ELEVATION

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8″ Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

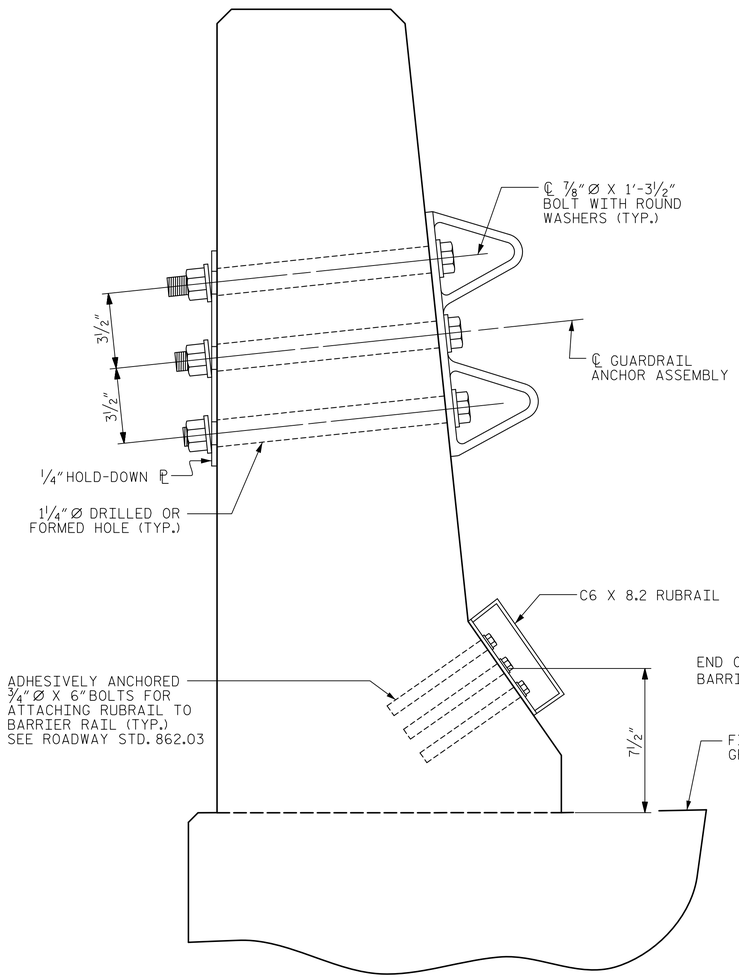
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

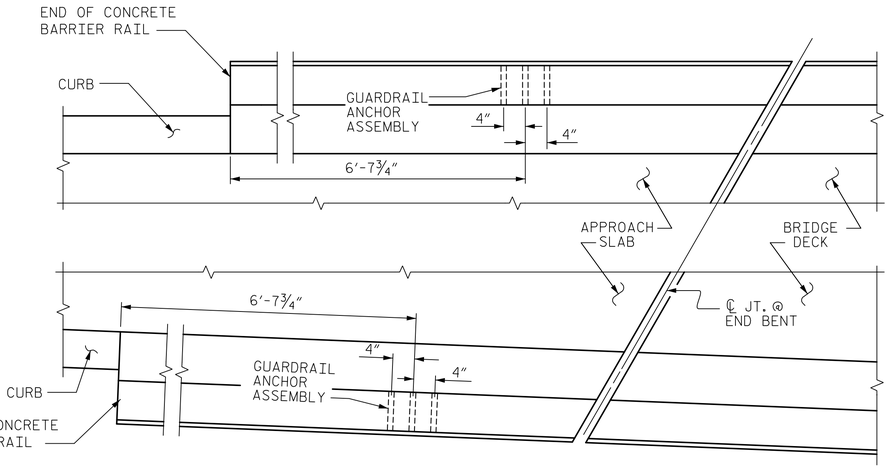
THE 1 1/4″ Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4″Ø X 6″BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4″Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SECTION E-E

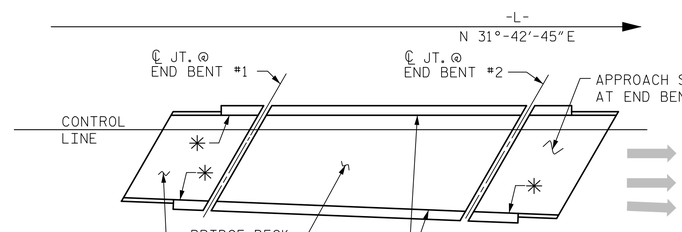
GUARDRAIL ANCHOR ASSEMBLY DETAILS



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. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

RIGHT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 8/18
CHECKED BY : P. BARBER	DATE : 8/18
DRAWN BY : TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

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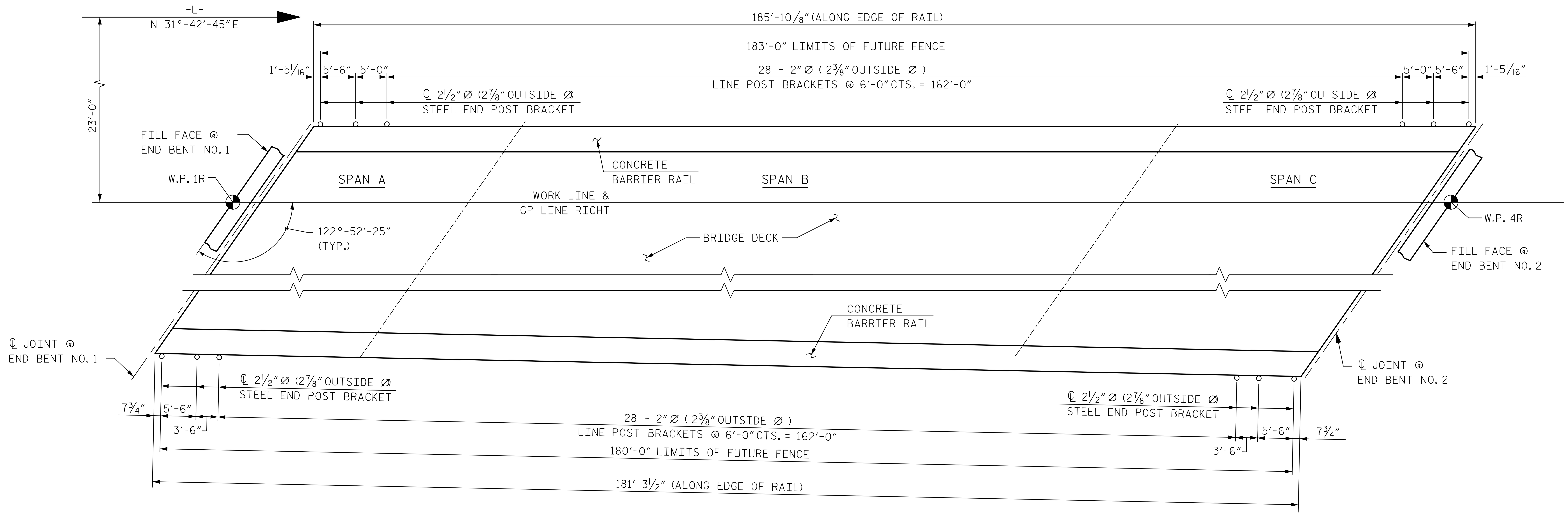
DWG. NO. 19

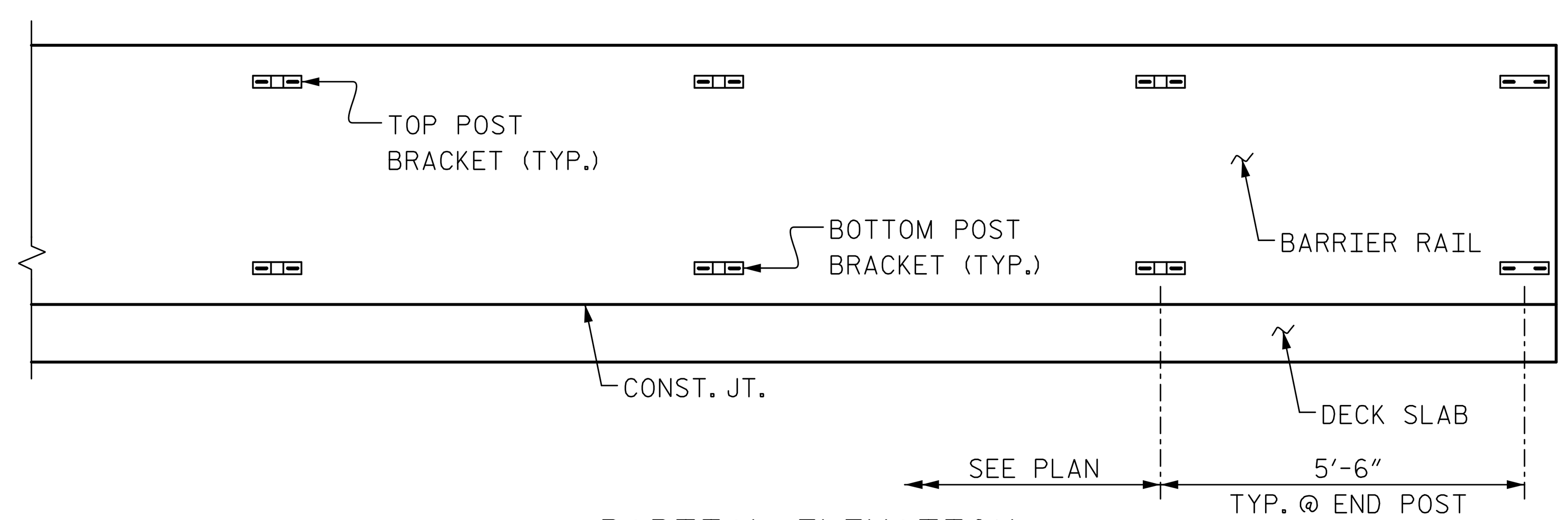
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-19
1			3			TOTAL SHEETS
2			4			40

STD. NO. GRA2

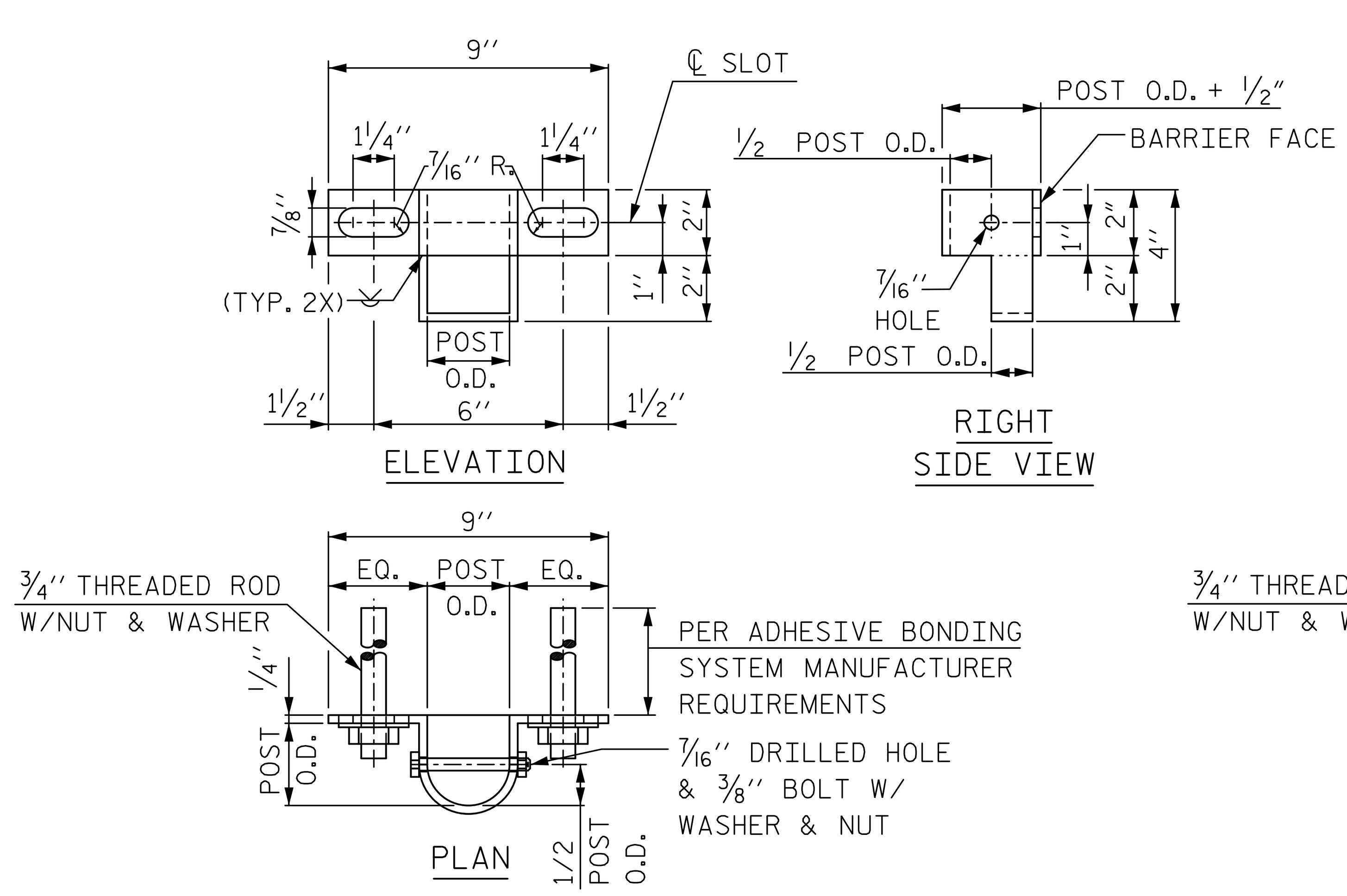


PLAN OF FENCE POST SPACING
(PAY LENGTH 369.09 FEET)

NOTE: EDGE OF SLAB NOT SHOWN FOR CLARITY.



PARTIAL ELEVATION

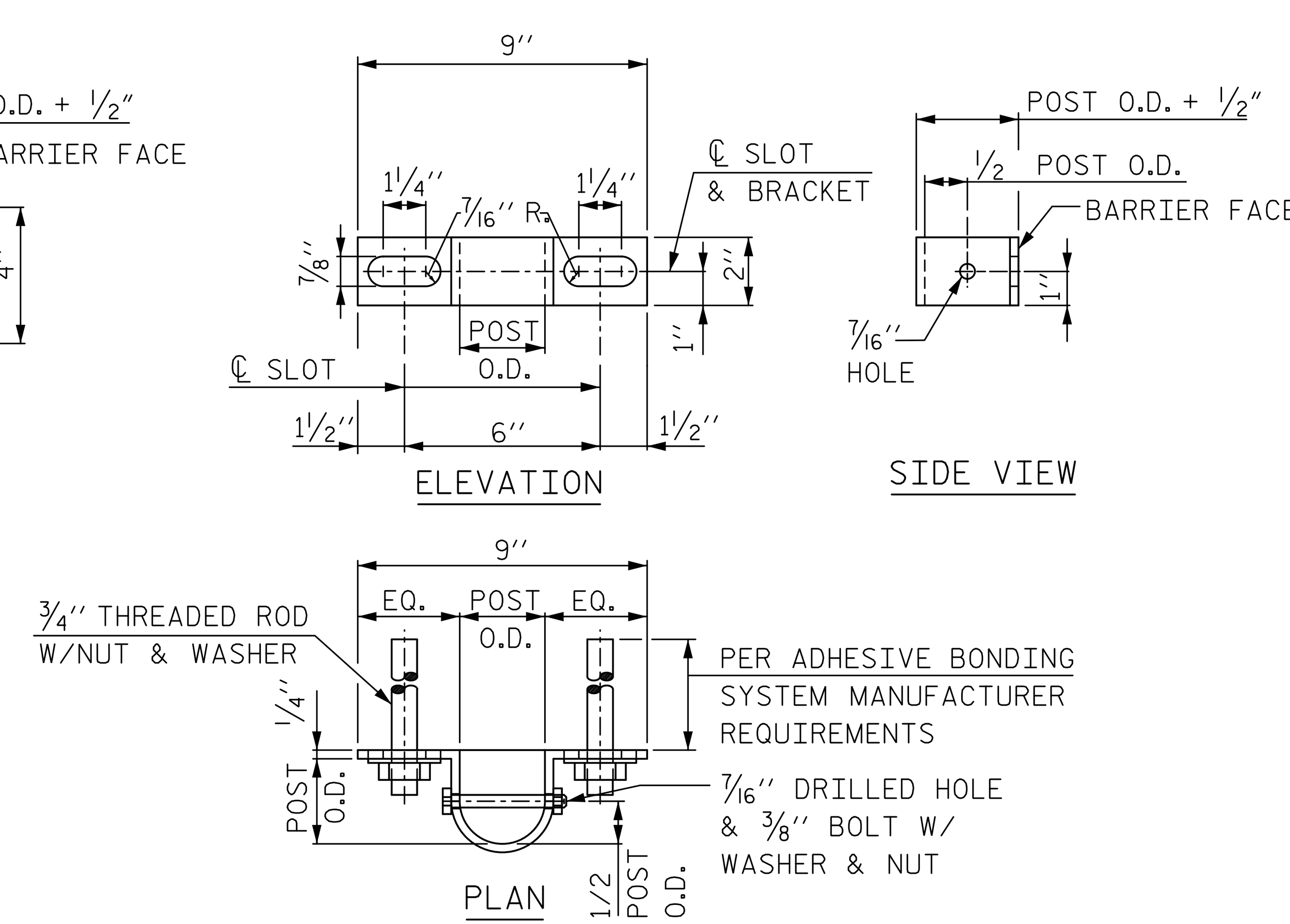


ELEVATION

RIGHT SIDE VIEW

PLAN

BOTTOM POST BRACKET

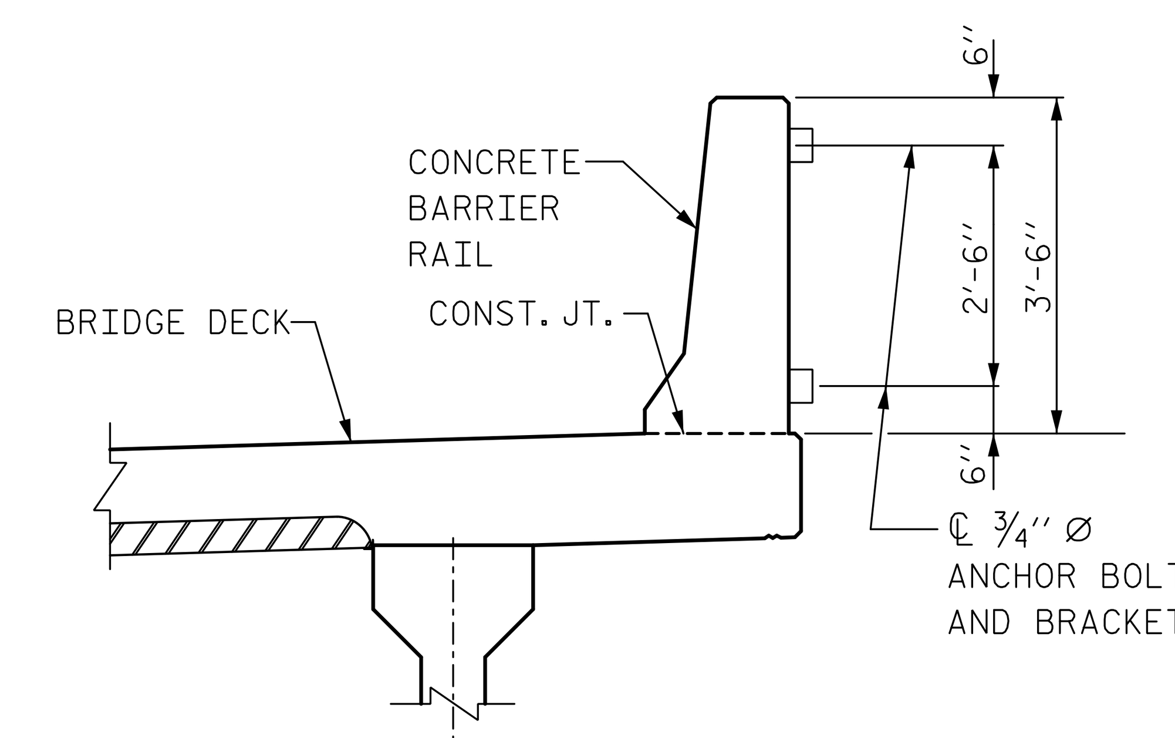


ELEVATION

SIDE VIEW

PLAN

TOP POST BRACKET



SECTION THRU FENCE

NOTES:

MATERIAL FOR ANCHOR BOLTS SHALL BE TYPE 304 STAINLESS STEEL WITH A MINIMUM 9000 PSI ULTIMATE STRENGTH. NUTS AND WASHERS SHALL BE TYPE 304 STAINLESS STEEL. ANCHOR BOLTS SHALL BE EMBEDDED AS PER ADHESIVE BONDING SYSTEM MANUFACTURER SPECIFICATIONS. NUTS SHALL BE AMERICAN STANDARD FINISHED HEXAGON THICK NUTS, CLASS 2B THREADS.

FOR SETTING ANCHOR BOLTS, THE CONTRACTOR SHALL USE AN ADHESIVE BONDING SYSTEM. SEE SECTION 420-13 OF THE STANDARD SPECIFICATIONS FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS. LEVEL ONE FIELD TESTING OF BONDING SYSTEM IS REQUIRED AND THE YIELD LOAD OF THE 3/4″ Ø BOLTS IS 12.0 KIPS.

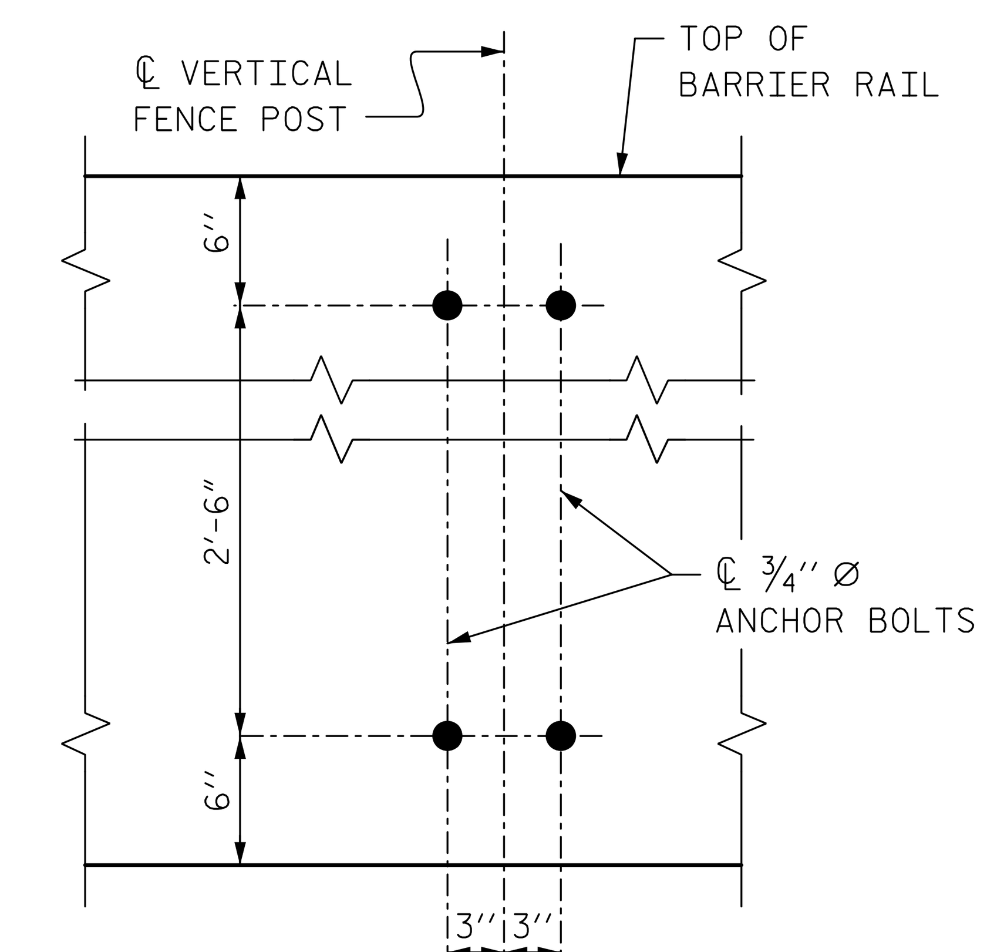
ALL BRACKETS SHALL MEET THE REQUIREMENTS OF SECTION 1050 OF THE STANDARD SPECIFICATIONS, GALVANIZE ALL STEEL PARTS AND HARDWARE IN ACCORDANCE WITH ARTICLE 1076 OF THE STANDARD SPECIFICATIONS.

FENCE POST LOCATIONS SHALL BE SHIFTED, AS NECESSARY, TO MAINTAIN 12″ MINIMUM DISTANCE FROM ANCHOR BOLT TO JOINTS IN BARRIER RAIL.

DIMENSIONS ARE SHOWN ALONG OUTSIDE FACE OF BARRIER RAIL.

BRACKETS SHALL BE INSTALLED TO PERMIT STANDARD CHAIN LINK FENCE DETAILS TO BE UTILIZED IN THE FUTURE.

ALL COSTS ASSOCIATED WITH THE MATERIALS AND INSTALLATION OF THE POST BRACKETS SHALL BE INCLUDED IN THE "CONCRETE BARRIER RAIL" PAY ITEMS.

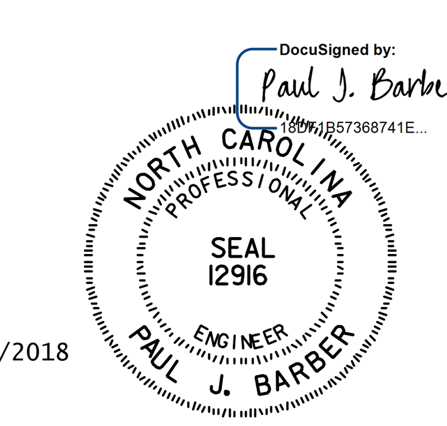


BOLT SETTING DETAIL

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 506+32.25 -L-



12/6/2018

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DRAWN BY M. WRIGHT DATE 6/16
CHECKED BY V. KOLLIPARA DATE 11/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 20

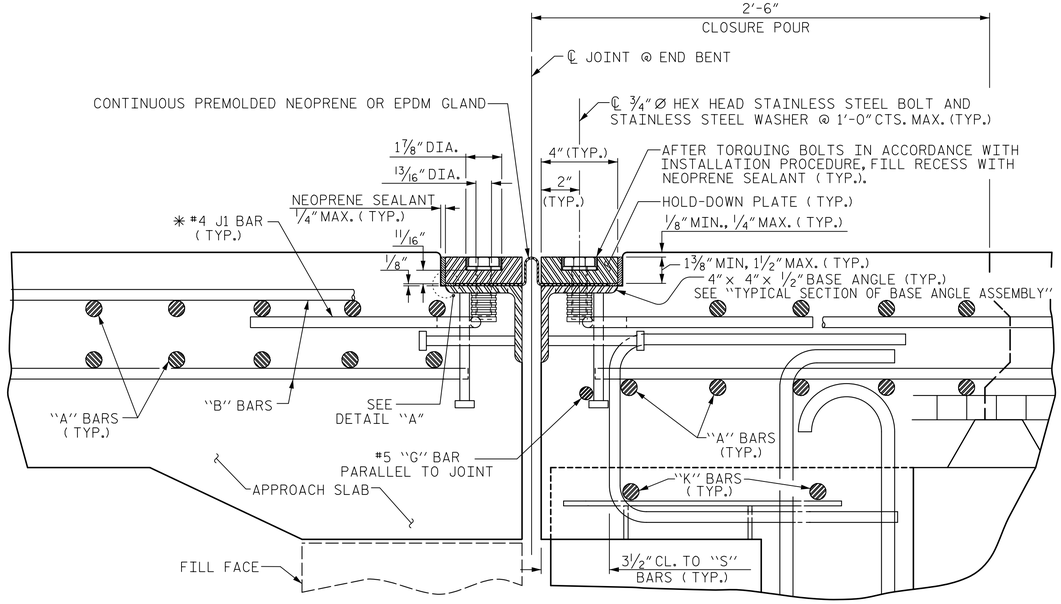
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BRIDGE MOUNTED CHAIN LINK FENCE DETAILS

RIGHT LANE

REVISIONS							
NO.	BY	DATE	NO.	BY	DATE	SHEET NO.	S14-20
1			3			TOTAL SHEETS	40
2			4				



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

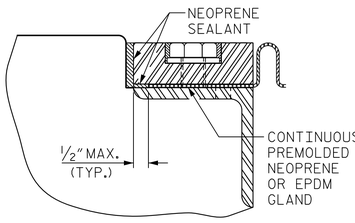
✳ THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

INSTALLATION PROCEDURE

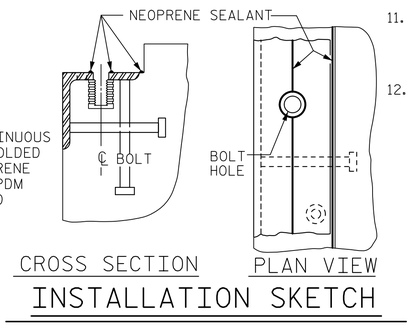
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4⅛" TO 4¼" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO 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 TORQUING, 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.

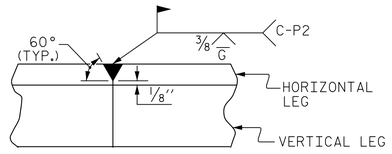


DETAIL "A"

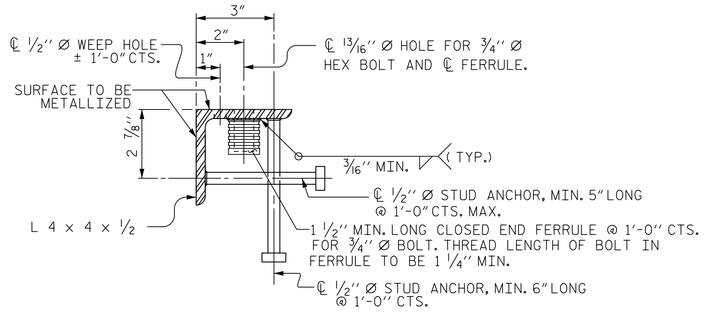


INSTALLATION SKETCH

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	122°-52'-25"	11⁄16"	1½"	1⅜"	1⅛"
2	122°-52'-25"	⅞"	1½"	1⅜"	1⅛"



DETAIL- FIELD WELD SPLICE OF BASE ANGLE



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 2

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-21
1			3			TOTAL SHEETS
2			4			40

STD. NO. EJS1

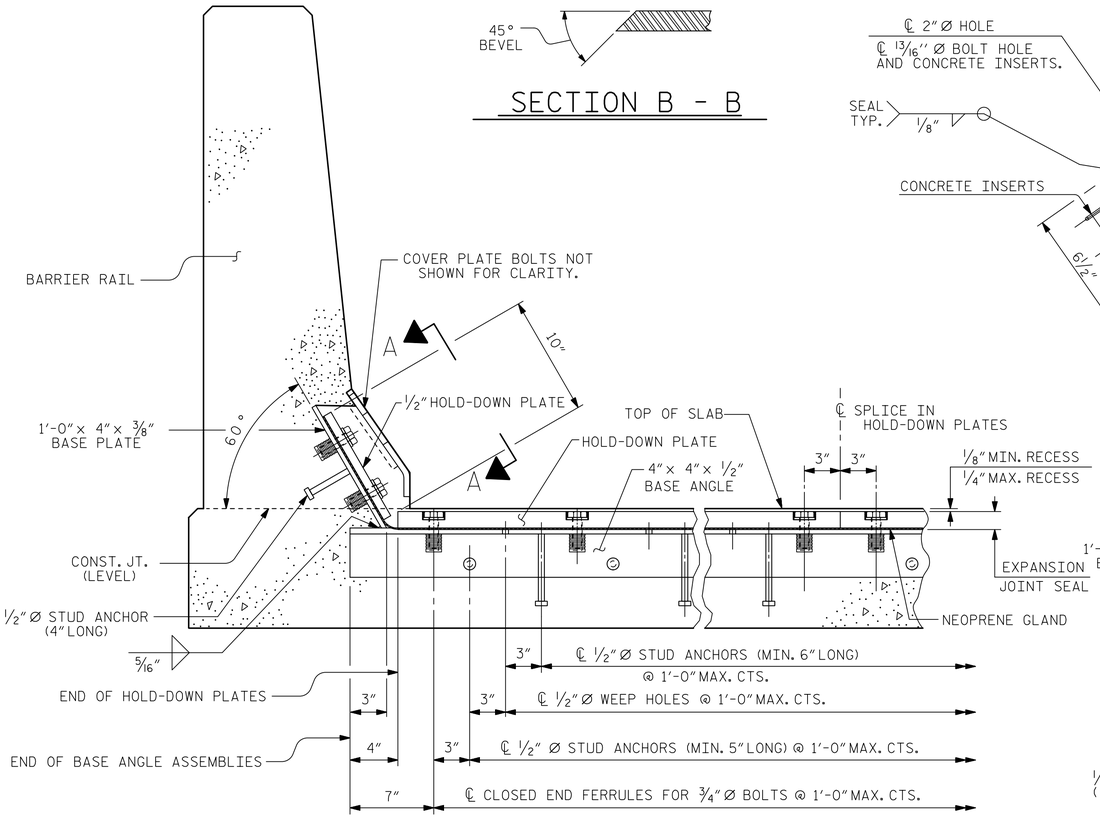
ASSEMBLED BY : M. WRIGHT		DATE : 8/18
CHECKED BY : P. BARBER		DATE : 8/18
DRAWN BY : REK 9/87	REV. 10/1/11	MAA/GM
CHECKED BY : CRK 10/87	REV. 10/17	MAA/THC
	REV. 6/18	MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

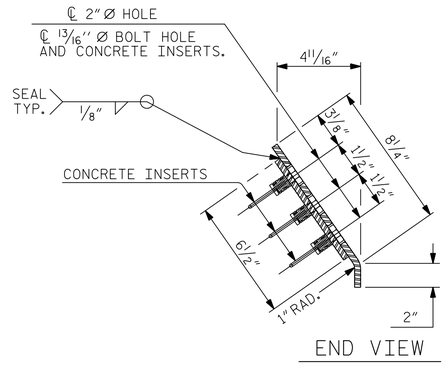
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 8/18
CHECKED BY	P. BARBER	DATE 8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

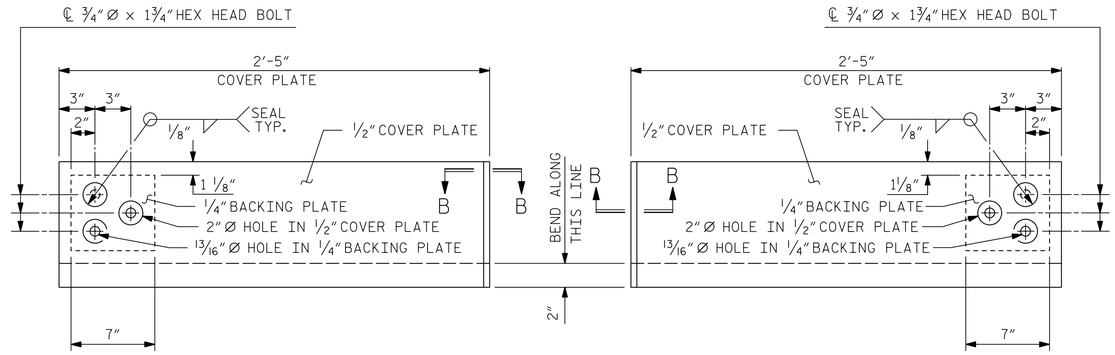
DWG. NO. 21



SECTION B - B



END VIEW



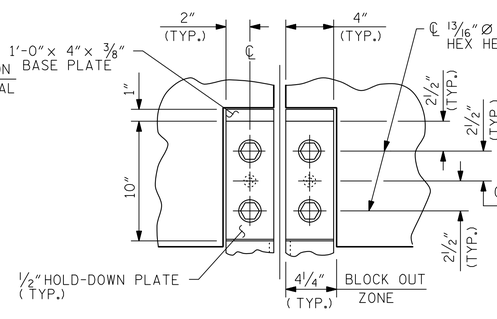
TYPE I - ELEVATION VIEW

(2 REQ'D)

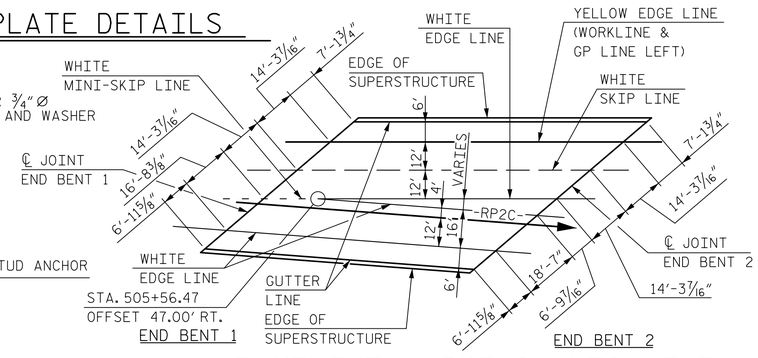
TYPE II - ELEVATION VIEW

(2 REQ'D)

COVER PLATE DETAILS

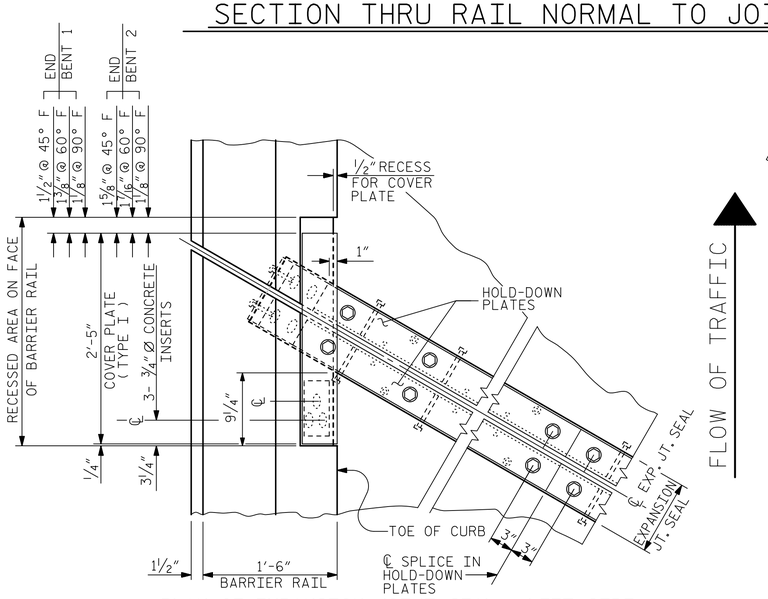


SECTION A - A



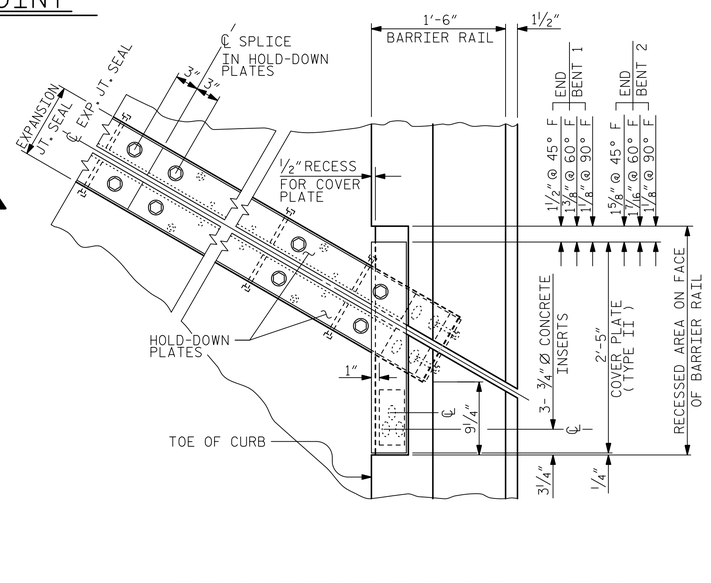
PAVEMENT MARKING ALIGNMENT

SECTION THRU RAIL NORMAL TO JOINT



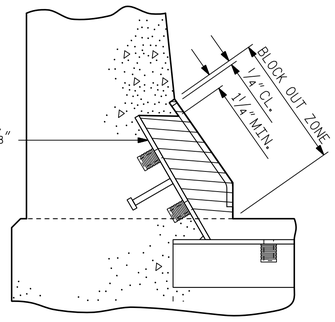
PLAN OF EXPANSION JOINT SEAL - LEFT SIDE

FLOW OF TRAFFIC



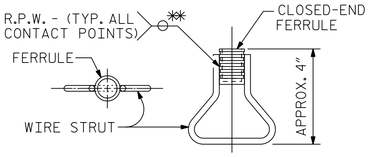
PLAN OF EXPANSION JOINT SEAL - RIGHT SIDE

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. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 2

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

RIGHT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 8/18
CHECKED BY : P. BARBER	DATE : 8/18
DRAWN BY : REK 9/87	REV. 7/12 MAA/GM
CHECKED BY : CRK 10/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	8/18
CHECKED BY	P. BARBER	DATE	8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	8/18

DWG. NO. 22

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-22
1			3			TOTAL SHEETS
2			4			40

STD. NO. EJS2

BILL OF MATERIAL

EPOXY COATED REINFORCING STEEL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A1	1	6	STR	3′-5″	5
A2	1	6	STR	4′-4″	7
A3	1	6	STR	5′-2″	8
A4	1	6	STR	6′-0″	9
A5	1	6	STR	6′-11″	10
A6	1	6	STR	7′-9″	12
A7	1	6	STR	8′-7″	13
A8	1	6	STR	9′-5″	14
A9	1	6	STR	10′-4″	16
A10	1	6	STR	11′-2″	17
A11	1	6	STR	12′-0″	18
A12	1	6	STR	12′-11″	19
A13	1	6	STR	13′-9″	21
A14	1	6	STR	14′-7″	22
A15	1	6	STR	15′-6″	23
A16	1	6	STR	16′-4″	25
A17	1	6	STR	17′-2″	26
A18	1	6	STR	18′-1″	27
A19	1	6	STR	18′-11″	28
A20	1	6	STR	19′-9″	30
A21	1	6	STR	20′-8″	31
A22	1	6	STR	21′-6″	32
A23	1	6	STR	22′-4″	34
A24	1	6	STR	23′-3″	35
A25	1	6	STR	24′-1″	36
A26	1	6	STR	24′-11″	37
A27	1	6	STR	25′-10″	39
A28	1	6	STR	26′-8″	40
A29	1	6	STR	27′-6″	41
A30	1	6	STR	28′-5″	43
A31	1	6	STR	29′-3″	44
A32	1	6	STR	30′-1″	45
A33	1	6	STR	30′-11″	46
A34	1	6	STR	31′-10″	48
A35	1	6	STR	32′-8″	49
A36	1	6	STR	33′-6″	50
A37	1	6	STR	34′-5″	52
A38	1	6	STR	35′-3″	53
A39	1	6	STR	36′-1″	54
A40	1	6	STR	37′-0″	56
A41	1	6	STR	37′-10″	57

BILL OF MATERIAL

EPOXY COATED REINFORCING STEEL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A42	1	6	STR	38′-8″	58
A43	1	6	STR	39′-7″	59
A44	1	6	STR	40′-5″	61
A45	1	6	STR	41′-3″	62
A46	1	6	STR	42′-2″	63
A47	1	6	STR	43′-0″	65
A48	1	6	STR	43′-10″	66
A49	1	6	STR	44′-9″	67
A50	1	6	STR	45′-7″	68
A51	1	6	STR	46′-5″	70
A52	1	6	STR	47′-4″	71
A53	1	6	STR	48′-2″	72
A54	1	6	STR	49′-0″	74
A55	1	6	STR	49′-10″	75
A56	1	6	STR	50′-9″	76
A57	1	6	STR	51′-7″	77
A58	1	6	STR	52′-5″	79
A59	1	6	STR	53′-4″	80
A60	271	6	STR	28′-0″	11,397
A61	54	6	STR	30′-4″	2,460
A62	54	6	STR	31′-6″	2,555
A63	54	6	STR	32′-8″	2,650
A64	54	6	STR	33′-10″	2,744
A65	55	6	STR	35′-1″	2,898
A66	1	6	STR	59′-7″	89
A67	1	6	STR	58′-9″	88
A68	1	6	STR	57′-11″	87
A69	1	6	STR	57′-1″	86
A70	1	6	STR	56′-3″	84
A71	1	6	STR	55′-5″	83
A72	1	6	STR	54′-7″	82
A73	1	6	STR	53′-9″	81
A74	1	6	STR	52′-11″	79
A75	1	6	STR	52′-1″	78
A76	1	6	STR	51′-3″	77
A77	1	6	STR	50′-5″	76
A78	1	6	STR	49′-6″	74
A79	1	6	STR	48′-8″	73
A80	1	6	STR	47′-10″	72
A81	1	6	STR	47′-0″	71
A82	1	6	STR	46′-2″	69

BILL OF MATERIAL

EPOXY COATED REINFORCING STEEL

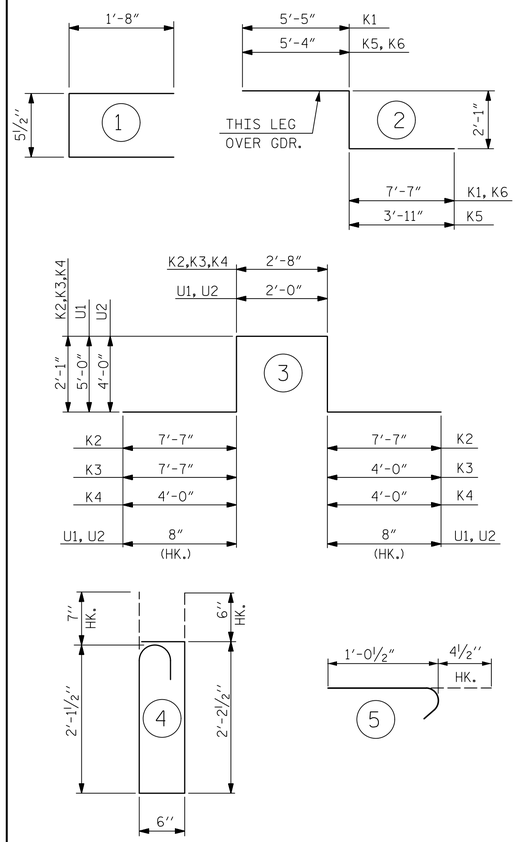
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A83	1	6	STR	45′-4″	68
A84	1	6	STR	44′-6″	67
A85	1	6	STR	43′-8″	66
A86	1	6	STR	42′-10″	64
A87	1	6	STR	42′-0″	63
A88	1	6	STR	41′-2″	62
A89	1	6	STR	40′-4″	61
A90	1	6	STR	39′-6″	59
A91	1	6	STR	38′-8″	58
A92	1	6	STR	37′-10″	57
A93	1	6	STR	37′-0″	56
A94	1	6	STR	36′-2″	54
A95	1	6	STR	35′-4″	53
A96	1	6	STR	34′-5″	52
A97	1	6	STR	33′-7″	50
A98	1	6	STR	32′-9″	49
A99	1	6	STR	31′-11″	48
A100	1	6	STR	31′-1″	47
A101	1	6	STR	30′-3″	45
A102	1	6	STR	29′-5″	44
A103	1	6	STR	28′-7″	43
A104	1	6	STR	27′-9″	42
A105	1	6	STR	26′-11″	40
A106	1	6	STR	26′-1″	39
A107	1	6	STR	25′-3″	38
A108	1	6	STR	24′-5″	37
A109	1	6	STR	23′-7″	35
A110	1	6	STR	22′-9″	34
A111	1	6	STR	21′-11″	33
A112	1	6	STR	21′-1″	32
A113	1	6	STR	20′-2″	30
A114	1	6	STR	19′-4″	29
A115	1	6	STR	18′-6″	28
A116	1	6	STR	17′-8″	27
A117	1	6	STR	16′-10″	25
A118	1	6	STR	16′-0″	24
A119	1	6	STR	15′-2″	23
A120	1	6	STR	14′-4″	22
A121	1	6	STR	13′-6″	20
A122	1	6	STR	12′-8″	19
A123	1	6	STR	11′-10″	18

BILL OF MATERIAL

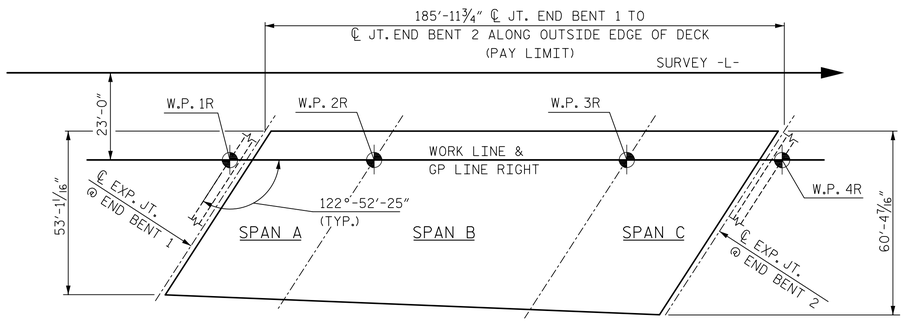
EPOXY COATED REINFORCING STEEL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A124	1	6	STR	11′-0″	17
A125	1	6	STR	10′-2″	15
A126	1	6	STR	9′-4″	14
A127	1	6	STR	8′-6″	13
A128	1	6	STR	7′-8″	12
A129	1	6	STR	6′-10″	10
A130	1	6	STR	5′-11″	9
A131	1	6	STR	5′-1″	8
A132	1	6	STR	4′-3″	6
A133	1	6	STR	3′-5″	5
A134	8	6	STR	5′-11″	71
B1	82	6	STR	36′-9″	4,526
B2	40	7	STR	45′-3″	3,700
B3	40	7	STR	33′-3″	2,719
B4	82	4	STR	18′-2″	995
B5	82	6	STR	36′-6″	4,495
B6	40	6	STR	24′-6″	1,472
B7	40	6	STR	33′-3″	1,998
B8	41	4	STR	16′-9″	459
G1	2	5	STR	32′-9″	68
G2	2	5	STR	37′-0″	77
J1	127	4	5	1′-5″	120
K1	4	8	2	15′-1″	161
K2	16	8	3	22′-0″	940
K3	2	8	3	18′-5″	98
K4	2	8	3	14′-10″	79
K5	2	8	2	11′-4″	61
K6	2	8	2	15′-0″	80
S1	88	5	4	5′-11″	543
S2	88	4	1	3′-10″	225
U1	60	4	3	13′-4″	534
U2	24	4	3	11′-4″	182
EPOXY COATED REINFORCING STEEL TOTAL:					54,041

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 10,550)

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	79.4	51,495	54,041
POUR 2	196.6		
POUR 3	91.2		
TOTALS**	367.2	51,495	54,041

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. FOR POURING SEQUENCE, SEE SHEET "SUPERSTRUCTURE TYPICAL SECTION DETAILS".

NOTE: CONCRETE IN CLOSURE POUR AT SLAB EXPANSION JOINTS IS INCLUDED IN THE ADJACENT POUR QUANTITY.

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″			

GROOVING BRIDGE FLOORS

APPROACH SLABS	2,403	SQ.FT.
BRIDGE DECK	9,334	SQ.FT.
TOTAL	11,737	SQ.FT.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 2

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-23
1			3			TOTAL SHEETS
2			4			40

ASSEMBLED BY : M. WRIGHT DATE : 8/18
CHECKED BY : P. BARBER DATE : 8/18

DRAWN BY : JMB 5/87
CHECKED BY : SJD 9/87

REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY P. BARBER DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 23

STD. NO. BOM2

BILL OF MATERIAL

REINFORCING STEEL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A201	1	6	STR	3′-5″	5
A202	1	6	STR	4′-4″	7
A203	1	6	STR	5′-2″	8
A204	1	6	STR	6′-0″	9
A205	1	6	STR	6′-11″	10
A206	1	6	STR	7′-9″	12
A207	1	6	STR	8′-7″	13
A208	1	6	STR	9′-5″	14
A209	1	6	STR	10′-4″	16
A210	1	6	STR	11′-2″	17
A211	1	6	STR	12′-0″	18
A212	1	6	STR	12′-11″	19
A213	1	6	STR	13′-9″	21
A214	1	6	STR	14′-7″	22
A215	1	6	STR	15′-6″	23
A216	1	6	STR	16′-4″	25
A217	1	6	STR	17′-2″	26
A218	1	6	STR	18′-1″	27
A219	1	6	STR	18′-11″	28
A220	1	6	STR	19′-9″	30
A221	1	6	STR	20′-8″	31
A222	1	6	STR	21′-6″	32
A223	1	6	STR	22′-4″	34
A224	1	6	STR	23′-3″	35
A225	1	6	STR	24′-1″	36
A226	1	6	STR	24′-11″	37
A227	1	6	STR	25′-10″	39
A228	1	6	STR	26′-8″	40
A229	1	6	STR	27′-6″	41
A230	1	6	STR	28′-5″	43
A231	1	6	STR	29′-3″	44
A232	1	6	STR	30′-1″	45
A233	1	6	STR	30′-11″	46
A234	1	6	STR	31′-10″	48
A235	1	6	STR	32′-8″	49
A236	1	6	STR	33′-6″	50
A237	1	6	STR	34′-5″	52
A238	1	6	STR	35′-3″	53
A239	1	6	STR	36′-1″	54
A240	1	6	STR	37′-0″	56
A241	1	6	STR	37′-10″	57
A242	1	6	STR	38′-8″	58
A243	1	6	STR	39′-7″	59
A244	1	6	STR	40′-5″	61
A245	1	6	STR	41′-3″	62
A246	1	6	STR	42′-2″	63
A247	1	6	STR	43′-0″	65
A248	1	6	STR	43′-10″	66
A249	1	6	STR	44′-9″	67
A250	1	6	STR	45′-7″	68
A251	1	6	STR	46′-5″	70
A252	1	6	STR	47′-4″	71
A253	1	6	STR	48′-2″	72
A254	1	6	STR	49′-0″	74
A255	1	6	STR	49′-10″	75

BILL OF MATERIAL

REINFORCING STEEL

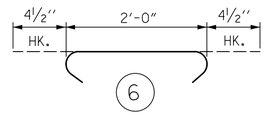
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A256	1	6	STR	50′-9″	76
A257	1	6	STR	51′-7″	77
A258	1	6	STR	52′-5″	79
A259	1	6	STR	53′-4″	80
A260	271	6	STR	28′-0″	11,397
A261	54	6	STR	29′-11″	2,426
A262	54	6	STR	31′-1″	2,521
A263	54	6	STR	32′-3″	2,616
A264	54	6	STR	33′-5″	2,710
A265	55	6	STR	34′-8″	2,864
A266	1	6	STR	59′-7″	89
A267	1	6	STR	58′-9″	88
A268	1	6	STR	57′-11″	87
A269	1	6	STR	57′-1″	86
A270	1	6	STR	56′-3″	84
A271	1	6	STR	55′-5″	83
A272	1	6	STR	54′-7″	82
A273	1	6	STR	53′-9″	81
A274	1	6	STR	52′-11″	79
A275	1	6	STR	52′-1″	78
A276	1	6	STR	51′-3″	77
A277	1	6	STR	50′-5″	76
A278	1	6	STR	49′-6″	74
A279	1	6	STR	48′-8″	73
A280	1	6	STR	47′-10″	72
A281	1	6	STR	47′-0″	71
A282	1	6	STR	46′-2″	69
A283	1	6	STR	45′-4″	68
A284	1	6	STR	44′-6″	67
A285	1	6	STR	43′-8″	66
A286	1	6	STR	42′-10″	64
A287	1	6	STR	42′-0″	63
A288	1	6	STR	41′-2″	62
A289	1	6	STR	40′-4″	61
A290	1	6	STR	39′-6″	59
A291	1	6	STR	38′-8″	58
A292	1	6	STR	37′-10″	57
A293	1	6	STR	37′-0″	56
A294	1	6	STR	36′-2″	54
A295	1	6	STR	35′-4″	53
A296	1	6	STR	34′-5″	52
A297	1	6	STR	33′-7″	50
A298	1	6	STR	32′-9″	49
A299	1	6	STR	31′-11″	48
A300	1	6	STR	31′-1″	47
A301	1	6	STR	30′-3″	45
A302	1	6	STR	29′-5″	44
A303	1	6	STR	28′-7″	43
A304	1	6	STR	27′-9″	42
A305	1	6	STR	26′-11″	40
A306	1	6	STR	26′-1″	39
A307	1	6	STR	25′-3″	38
A308	1	6	STR	24′-5″	37
A309	1	6	STR	23′-7″	35
A310	1	6	STR	22′-9″	34

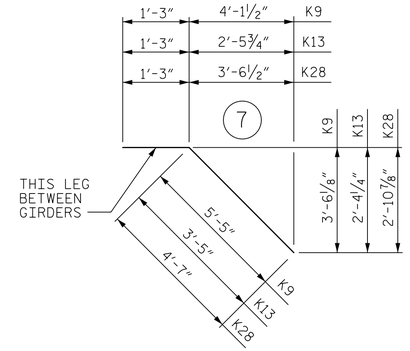
BILL OF MATERIAL

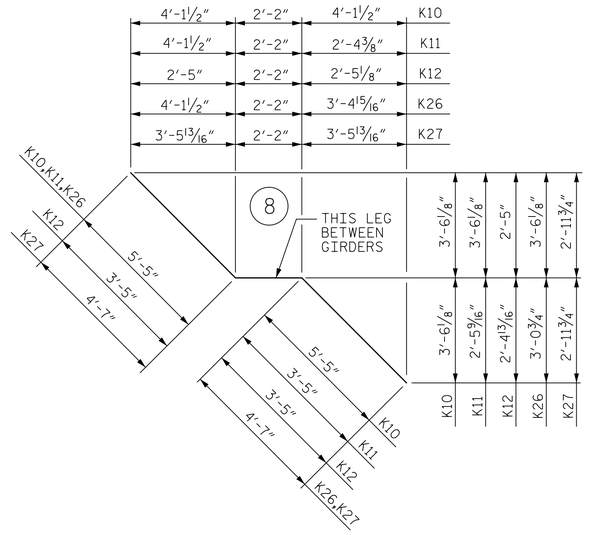
REINFORCING STEEL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A311	1	6	STR	21′-11″	33
A312	1	6	STR	21′-1″	32
A313	1	6	STR	20′-2″	30
A314	1	6	STR	19′-4″	29
A315	1	6	STR	18′-6″	28
A316	1	6	STR	17′-8″	27
A317	1	6	STR	16′-10″	25
A318	1	6	STR	16′-0″	24
A319	1	6	STR	15′-2″	23
A320	1	6	STR	14′-4″	22
A321	1	6	STR	13′-6″	20
A322	1	6	STR	12′-8″	19
A323	1	6	STR	11′-10″	18
A324	1	6	STR	11′-0″	17
A325	1	6	STR	10′-2″	15
A326	1	6	STR	9′-4″	14
A327	1	6	STR	8′-6″	13
A328	1	6	STR	7′-8″	12
A329	1	6	STR	6′-10″	10
A330	1	6	STR	5′-11″	9
A331	1	6	STR	5′-1″	8
A332	1	6	STR	4′-3″	6
A333	1	6	STR	3′-5″	5
B101	304	5	STR	48′-0″	15,219
B102	56	5	STR	47′-5″	2,770
B103	24	5	STR	46′-11″	1,174
K7	24	6	STR	8′-3″	297
K8	6	6	STR	3′-6″	32
K9	10	4	7	6′-8″	45
K10	30	4	8	13′-0″	261
K11	5	4	8	11′-0″	37
K12	5	4	8	9′-0″	30
K13	5	4	7	4′-8″	16
K14	16	4	STR	6′-4″	68
K15	16	4	STR	8′-11″	95
K16	32	4	STR	9′-6″	203
K17	16	4	STR	8′-4″	89
K18	4	4	STR	2′-4″	6
K19	4	4	STR	4′-11″	13
K20	8	4	STR	5′-5″	29
K21	4	4	STR	4′-3″	11
K22	4	4	STR	4′-8″	12
K23	4	4	STR	7′-3″	19
K24	8	4	STR	7′-10″	42
K25	4	4	STR	6′-8″	18
K26	5	4	8	12′-2″	41
K27	5	4	8	11′-4″	38
K28	5	4	7	5′-10″	19
K29	6	6	STR	7′-9″	70
S3	312	4	6	2′-9″	573
	REINFORCING STEEL TOTAL:				51,495

BAR TYPES







ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 506+32.25 -L-

SHEET 2 OF 2

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-24
1			3			TOTAL SHEETS
2			4			40

ASSEMBLED BY : M. WRIGHT	DATE : 8/18	
CHECKED BY : P. BARBER	DATE : 8/18	
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

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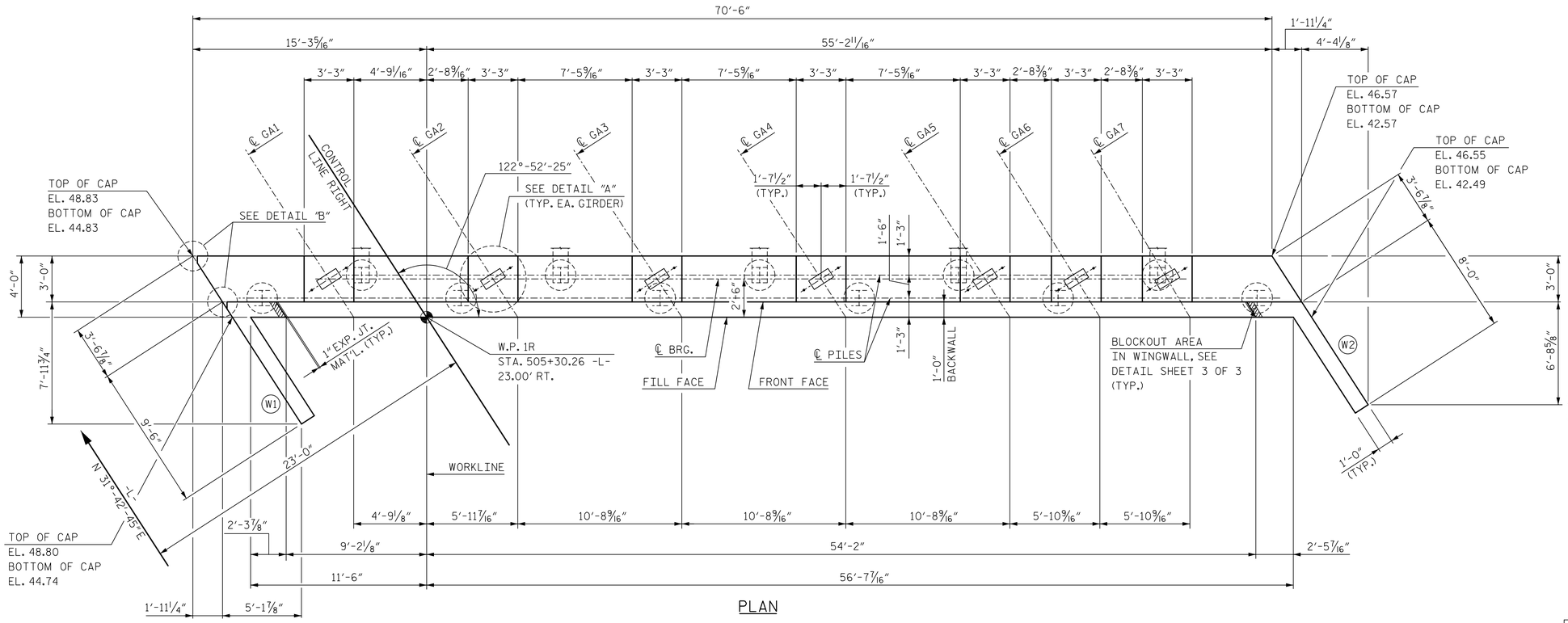
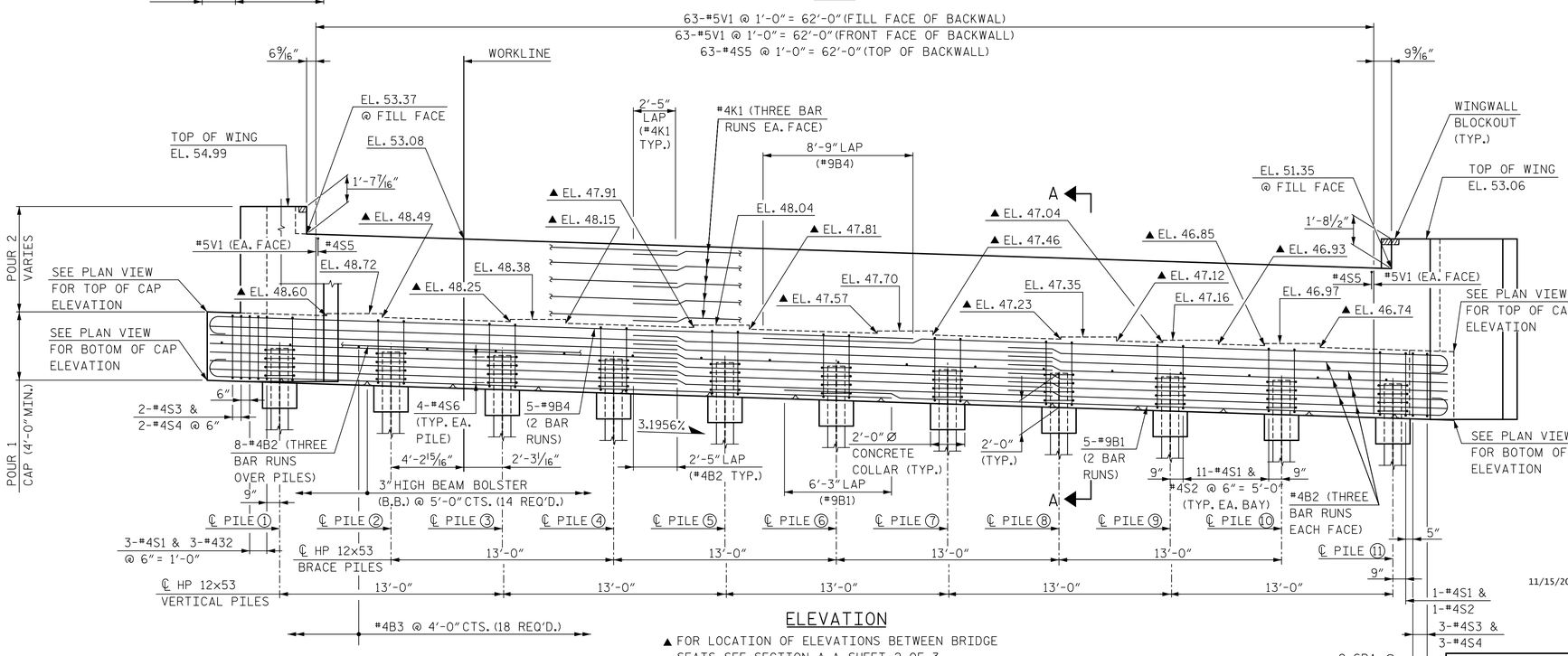
DRAWN BY	M. WRIGHT	DATE 8/18
CHECKED BY	P. BARBER	DATE 8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 24

STD. NO. BOM2



PLAN



ELEVATION

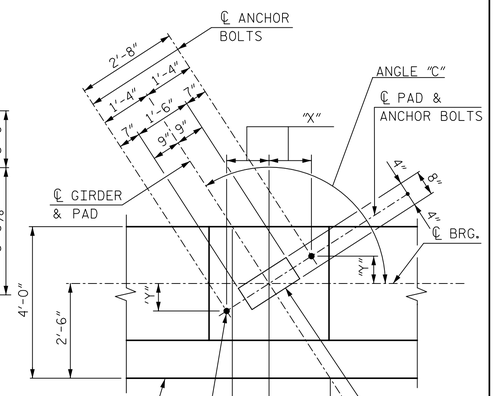
▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A, SHEET 2 OF 3.

NOTES:

FOR NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WINGWALL DETAILS AND SECTION A-A, SEE SHEET 2 OF 3.

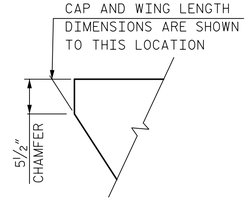
INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.



DETAIL A

GIRDER	"A"	"B"	ANGLE "C"	"X"	"Y"
GA1-GA5	1'-7 3/8"	2'-7"	122°-52'-25"	1'-1 7/16"	8 11/16"
GA6	1'-6 9/16"	2'-5 11/16"	121°-44'-17"	1'-1 5/8"	8 5/16"
GA7	1'-5 3/4"	2'-4 3/8"	120°-34'-25"	1'-1 3/4"	8 1/8"

TOP OF PILE ELEVATIONS	
PILE	ELEVATION
①	46.68
②	46.48
③	46.27
④	46.06
⑤	45.85
⑥	45.64
⑦	45.44
⑧	45.23
⑨	45.02
⑩	44.81
⑪	44.61



DETAIL B

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 3

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

RIGHT LANE

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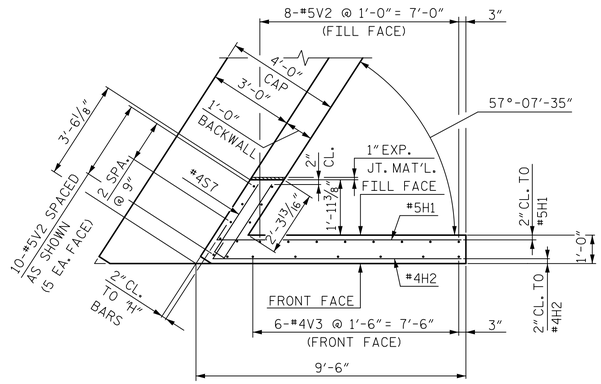
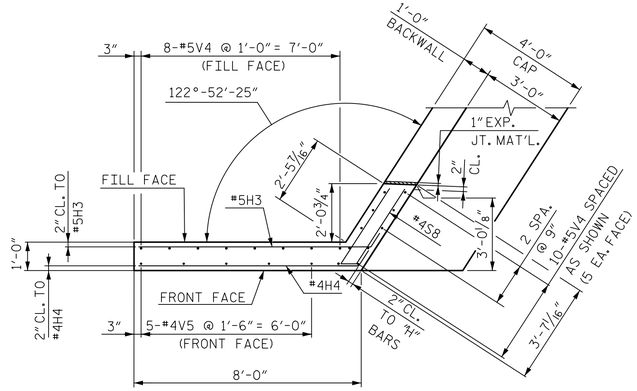
CHECKED BY	V. KOLLIPARA	DATE 11/16
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 25

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-25
1			3			TOTAL SHEETS
2			4			40



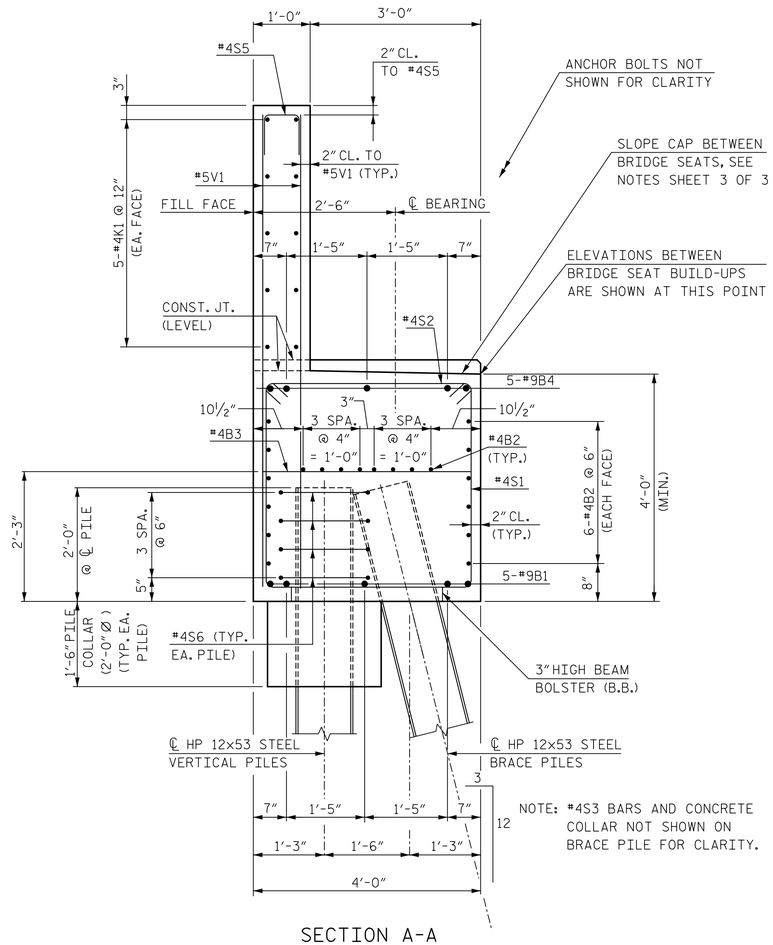
PLAN OF WING (W1)



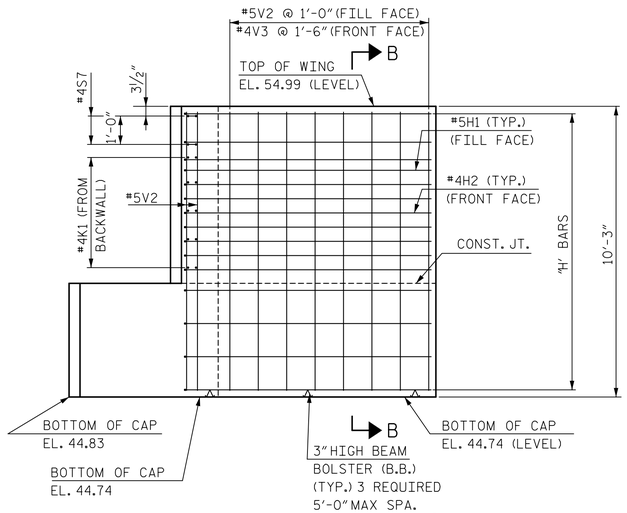
PLAN OF WING (W2)

NOTES:

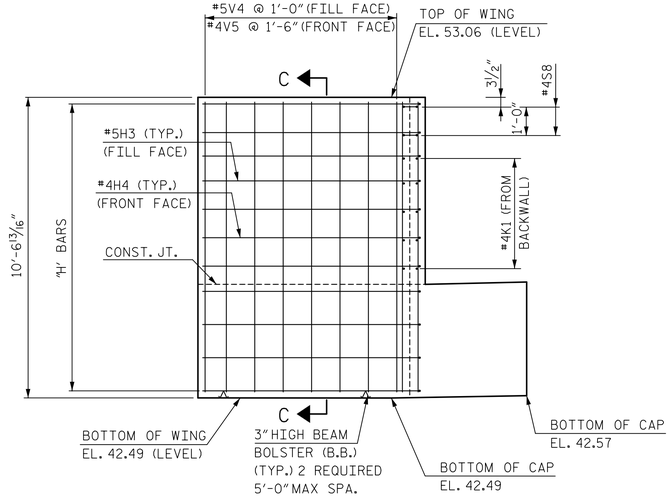
FOR NOTES, SEE SHEET 3 OF 3.



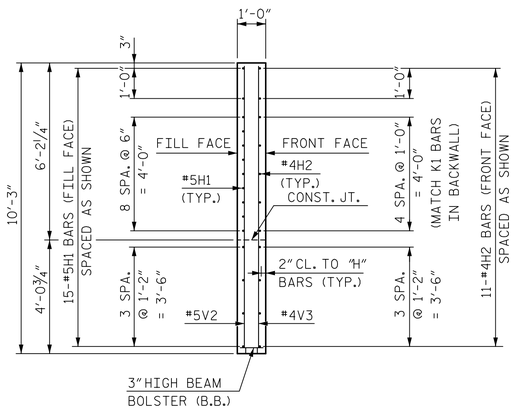
SECTION A-A



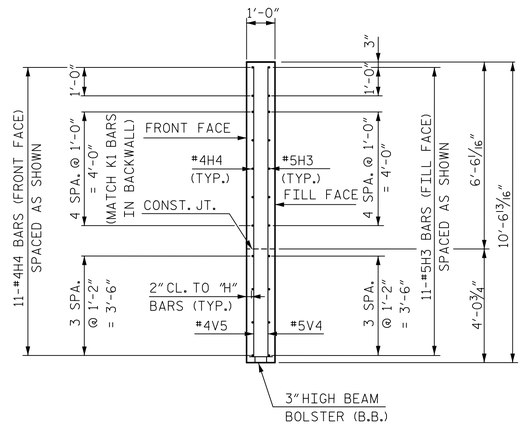
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION B-B



SECTION C-C

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 3

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

RIGHT LANE

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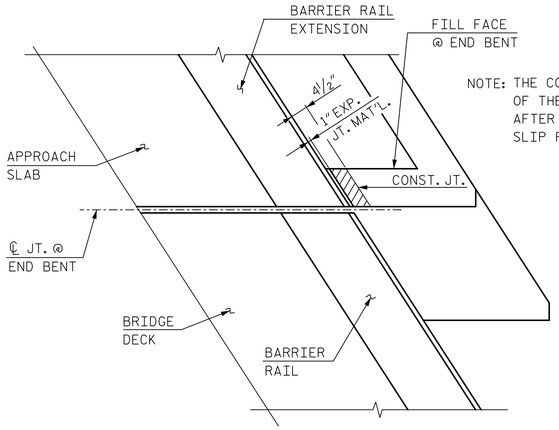
CHECKED BY V. KOLLIPARA DATE 11/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

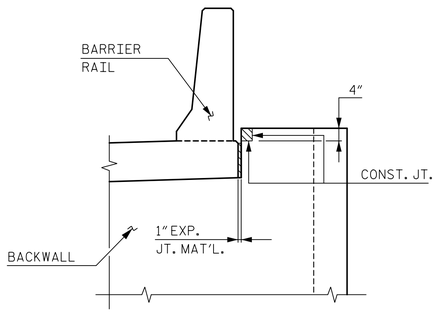
DWG. NO. 26

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-26
1			3			TOTAL SHEETS
2			4			40



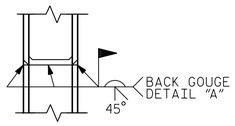
PLAN

NOTE: THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

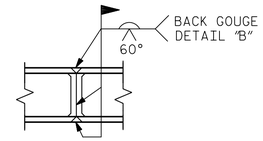


ELEVATION

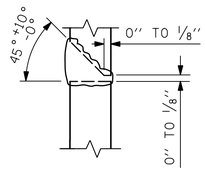
BLOCKOUT IN WINGWALL



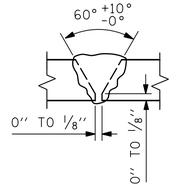
*PILE VERTICAL



*PILE HORIZONTAL OR VERTICAL



DETAIL "A"



DETAIL "B"

* POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

NOTES:

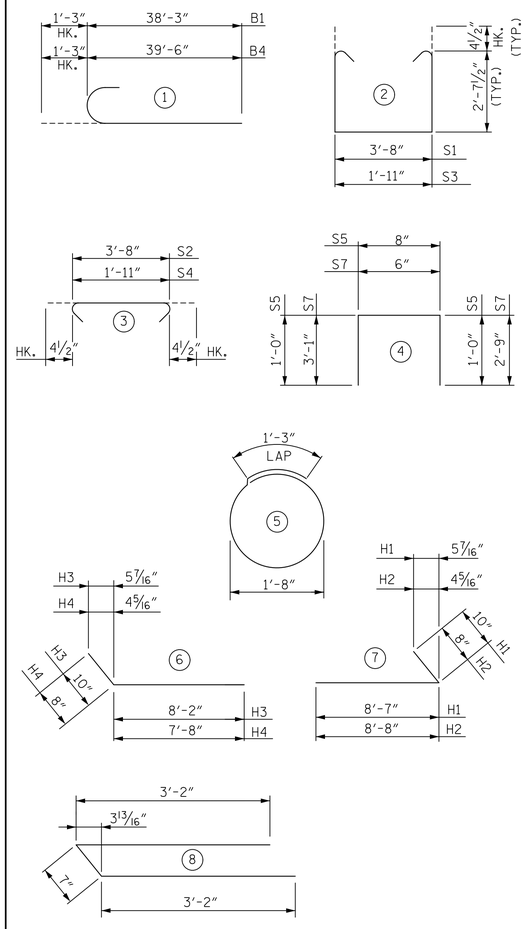
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

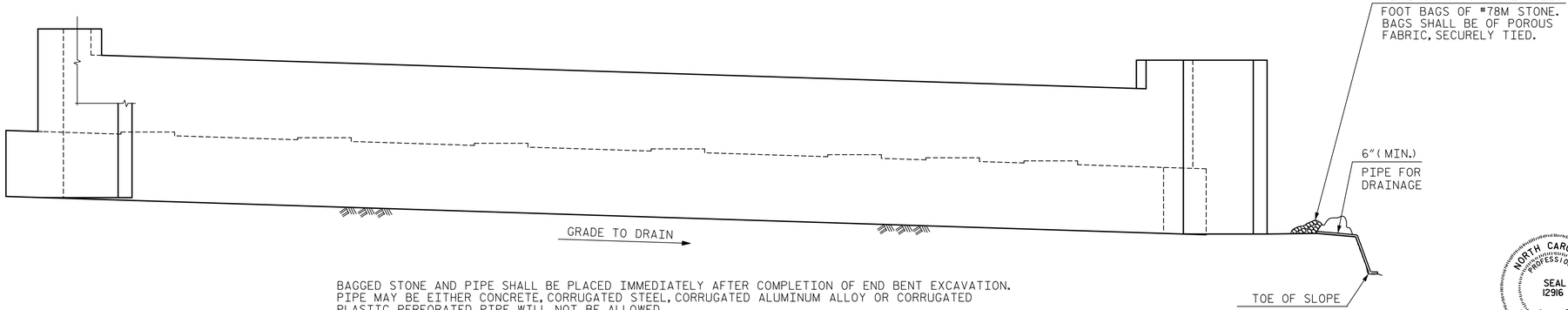
BILL OF REINFORCING

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	9	1	39'-6"	1,343
B2	60	4	STR	25'-0"	1,002
B3	18	4	STR	3'-8"	44
B4	10	9	1	40'-9"	1,386
H1	15	5	7	9'-5"	147
H2	11	4	7	9'-4"	69
H3	11	5	6	9'-0"	103
H4	11	4	6	8'-4"	61
K1	30	4	STR	25'-0"	501
S1	114	4	2	9'-8"	736
S2	114	4	3	4'-5"	336
S3	5	4	2	7'-11"	26
S4	5	4	3	2'-8"	9
S5	63	4	4	2'-8"	112
S6	44	4	5	6'-5"	189
S7	2	4	4	6'-4"	8
S8	2	4	8	6'-11"	9
V1	126	5	STR	8'-2"	1,073
V2	18	5	STR	9'-10"	185
V3	6	4	STR	9'-10"	39
V4	18	5	STR	10'-1"	189
V5	5	4	STR	10'-1"	34

QUANTITIES

REINFORCING STEEL	LBS.	7,601
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP & BOT. OF WINGS	CU. YDS.	46.8
POUR 2 - TOP OF WINGS & BACKWALL	CU. YDS.	16.3
TOTAL	CU. YDS.	63.1
HP 12x53 STEEL PILES	NO.	11
	LIN. FT.	715
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	11
PILE REDRIVES	NO.	6



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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 1

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11/15/2018

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DRAWN BY M. WRIGHT DATE 11/16
CHECKED BY V. KOLLIPARA DATE 11/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 27

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 3 OF 3

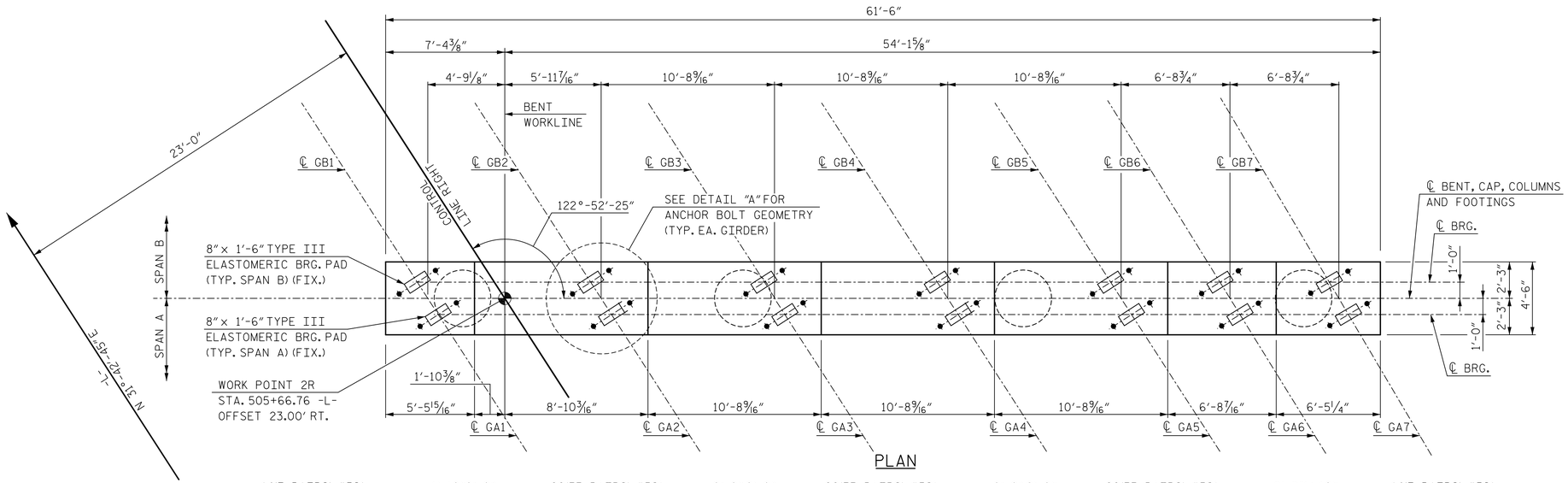
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

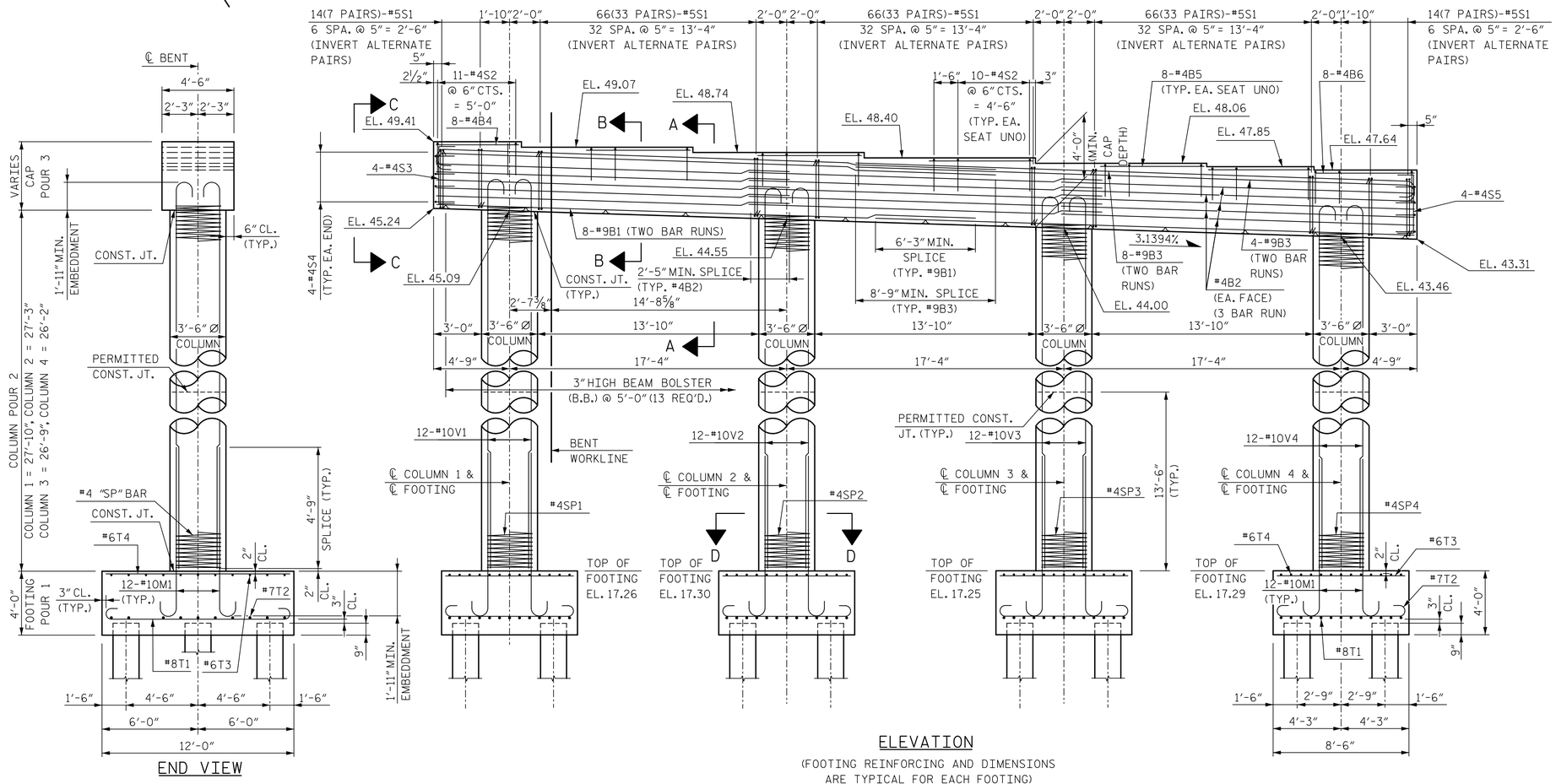
END BENT 1

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-27
1			3			TOTAL SHEETS
2			4			40



PLAN



ELEVATION

(FOOTING REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING)

END VIEW

NOTES:

ALL DIMENSIONS SHOWN ARE PARALLEL OR NORMAL TO ℄ BENT UNLESS NOTED.

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

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

FOR DETAIL "A", SEE SHEET "SUBSTRUCTURE BENT 1 RIGHT LANE, SHEET 2 OF 2".

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

RIGHT LANE

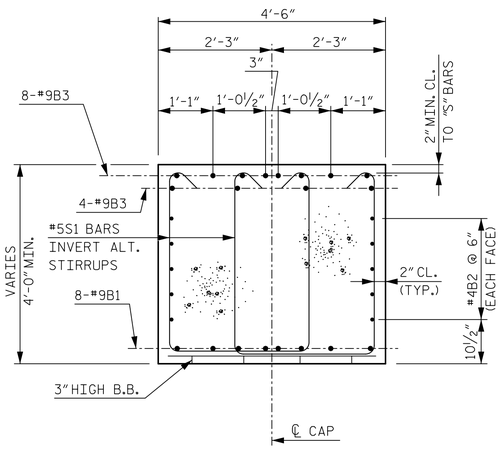
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

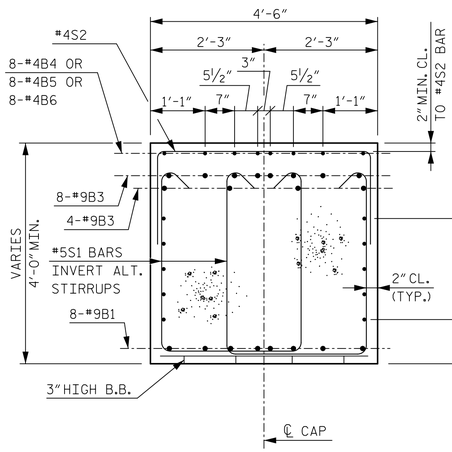
DRAWN BY M. WRIGHT DATE 11/16
CHECKED BY V. KOLLIPARA DATE 11/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 28

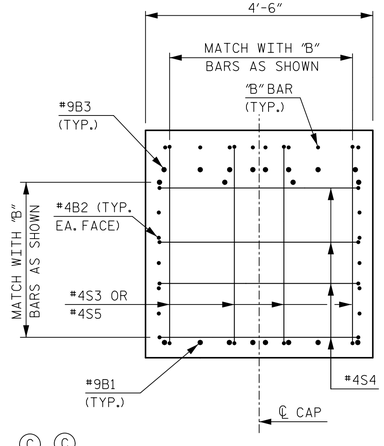
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-28
1			3			TOTAL SHEETS
2			4			40



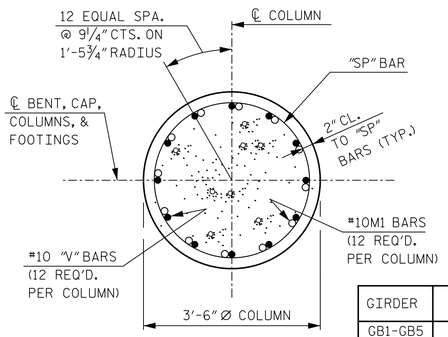
SECTION A-A



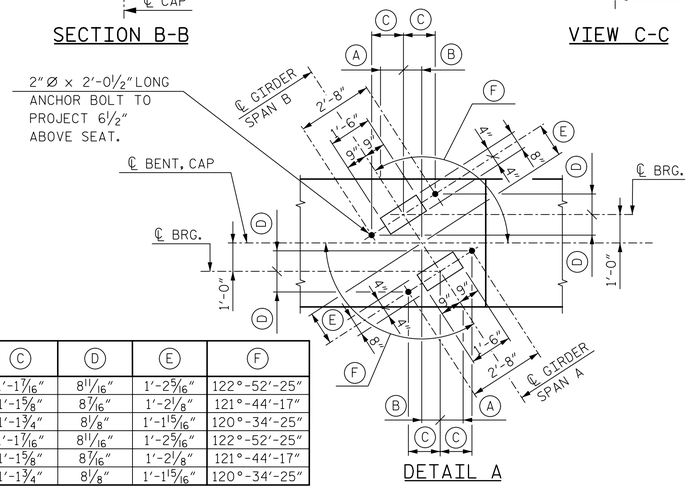
SECTION B-B



VIEW C-C

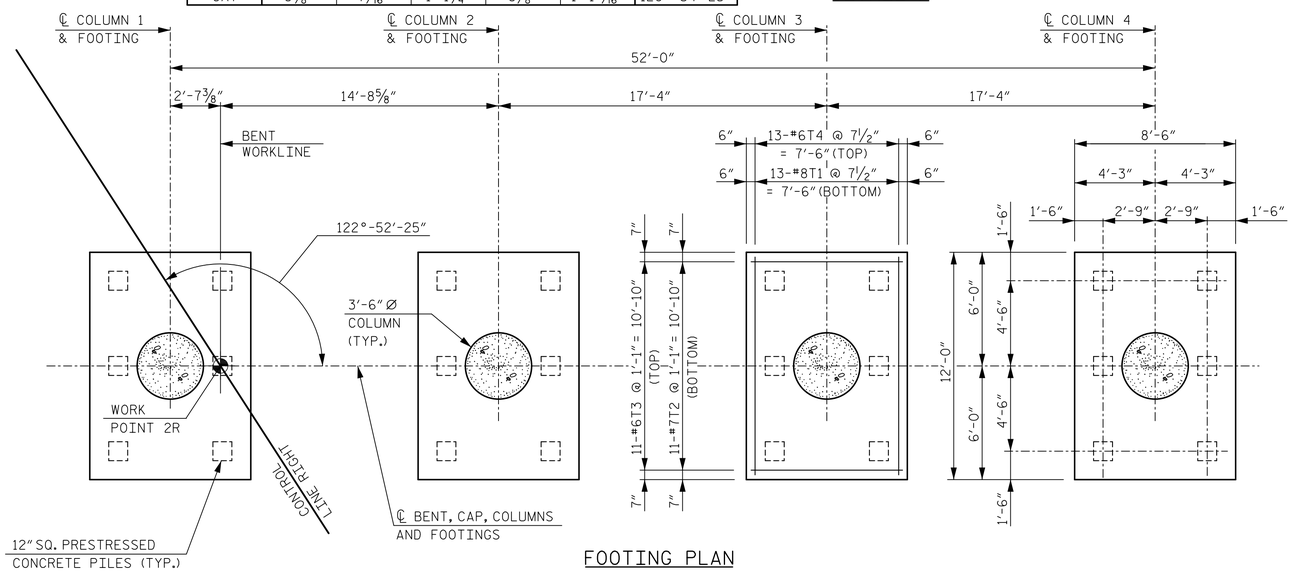


SECTION D-D



GIRDER	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ
GB1-GB5	9 11/16"	7 3/4"	1'-1 7/16"	8 11/16"	1'-2 5/16"	122°-52'-25"
GB6	9 1/4"	7 7/16"	1'-1 5/8"	8 7/16"	1'-2 1/8"	121°-44'-17"
GB7	8 7/8"	7 1/16"	1'-1 3/4"	8 1/8"	1'-1 15/16"	120°-34'-25"
GA1-GA5	9 11/16"	7 3/4"	1'-1 7/16"	8 11/16"	1'-2 5/16"	122°-52'-25"
GA6	9 1/4"	7 7/16"	1'-1 5/8"	8 7/16"	1'-2 1/8"	121°-44'-17"
GA7	8 7/8"	7 1/16"	1'-1 3/4"	8 1/8"	1'-1 15/16"	120°-34'-25"

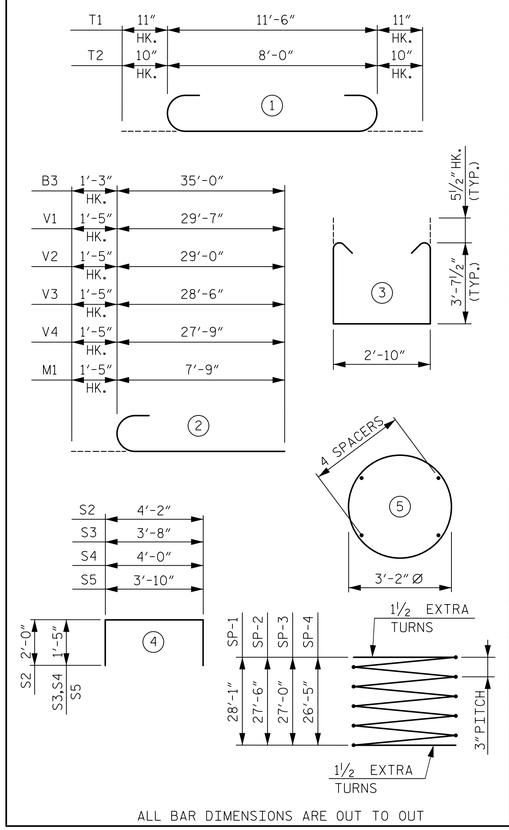
DETAIL A



FOOTING PLAN

(FOOTING REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	9	STR	33'-9"	1,836
B2	30	4	STR	22'-0"	441
B3	24	9	2	36'-3"	2,958
B4	8	4	STR	5'-1"	27
B5	40	4	STR	6'-6"	174
B6	8	4	STR	6'-2"	33
M1	48	10	2	9'-2"	1,893
S1	226	5	3	11'-0"	2,593
S2	77	4	4	8'-2"	420
S3	4	4	4	6'-6"	17
S4	8	4	4	6'-10"	37
S5	4	4	4	6'-8"	18
T1	52	8	1	13'-4"	1,851
T2	44	7	1	9'-8"	869
T3	44	6	STR	8'-0"	529
T4	52	6	STR	11'-6"	898
V1	12	10	2	31'-0"	1,601
V2	12	10	2	30'-5"	1,571
V3	12	10	2	29'-11"	1,545
V4	12	10	2	29'-2"	1,506
SP-1	1	✳	5	1139'-3"	761
SP-2	1	✳	5	1119'-7"	748
SP-3	1	✳	5	1099'-11"	735
SP-4	1	✳	5	1070'-6"	715

QUANTITIES

REINFORCING STEEL	LBS.	20,817
SPIRAL COLUMN REINFORCING STEEL	LBS.	2,959
CLASS A CONCRETE		
FOOTING POUR 1	CU. YDS.	60.4
COLUMN POUR 2	CU. YDS.	38.5
CAP POUR 3	CU. YDS.	43.0
TOTAL	CU. YDS.	141.9
12" SQ. PSC PILES	NO.	24
	LIN. FT.	1,320
FOUNDATION EXCAVATION	LUMP SUM	LS
PILE DRIVING EQUIPMENT SETUP FOR 12" SQ. PSC PILES	NO.	24
PILE REDRIVES	NO.	12

✳ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 2

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

RIGHT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 11/16
CHECKED BY V. KOLLIPARA DATE 11/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 29

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-29
1			3			TOTAL SHEETS
2			4			40

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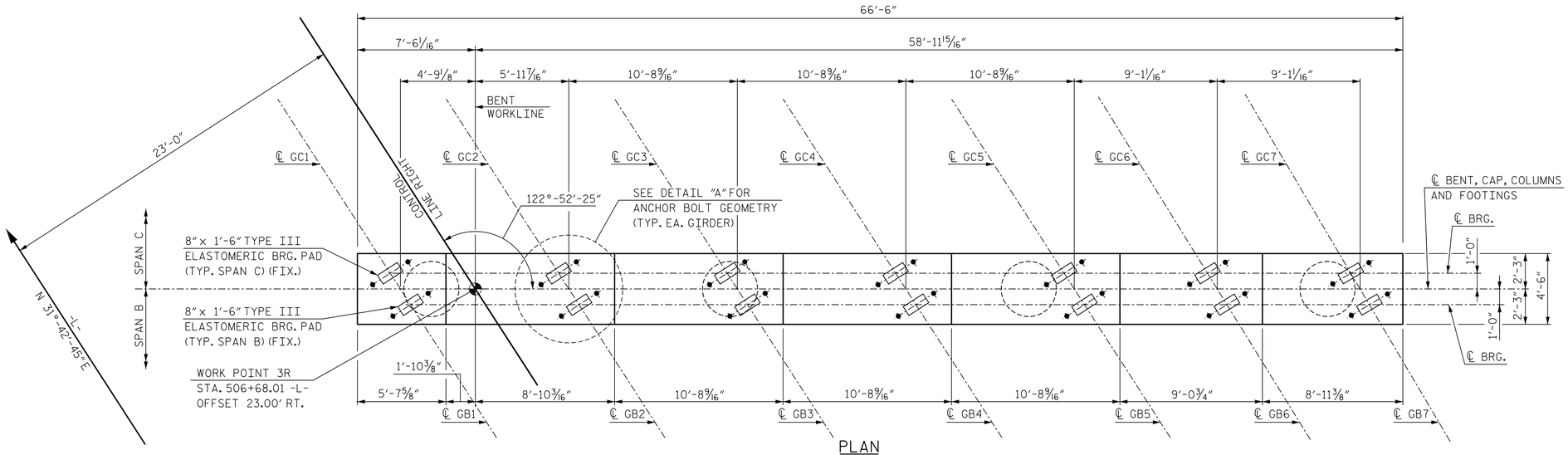
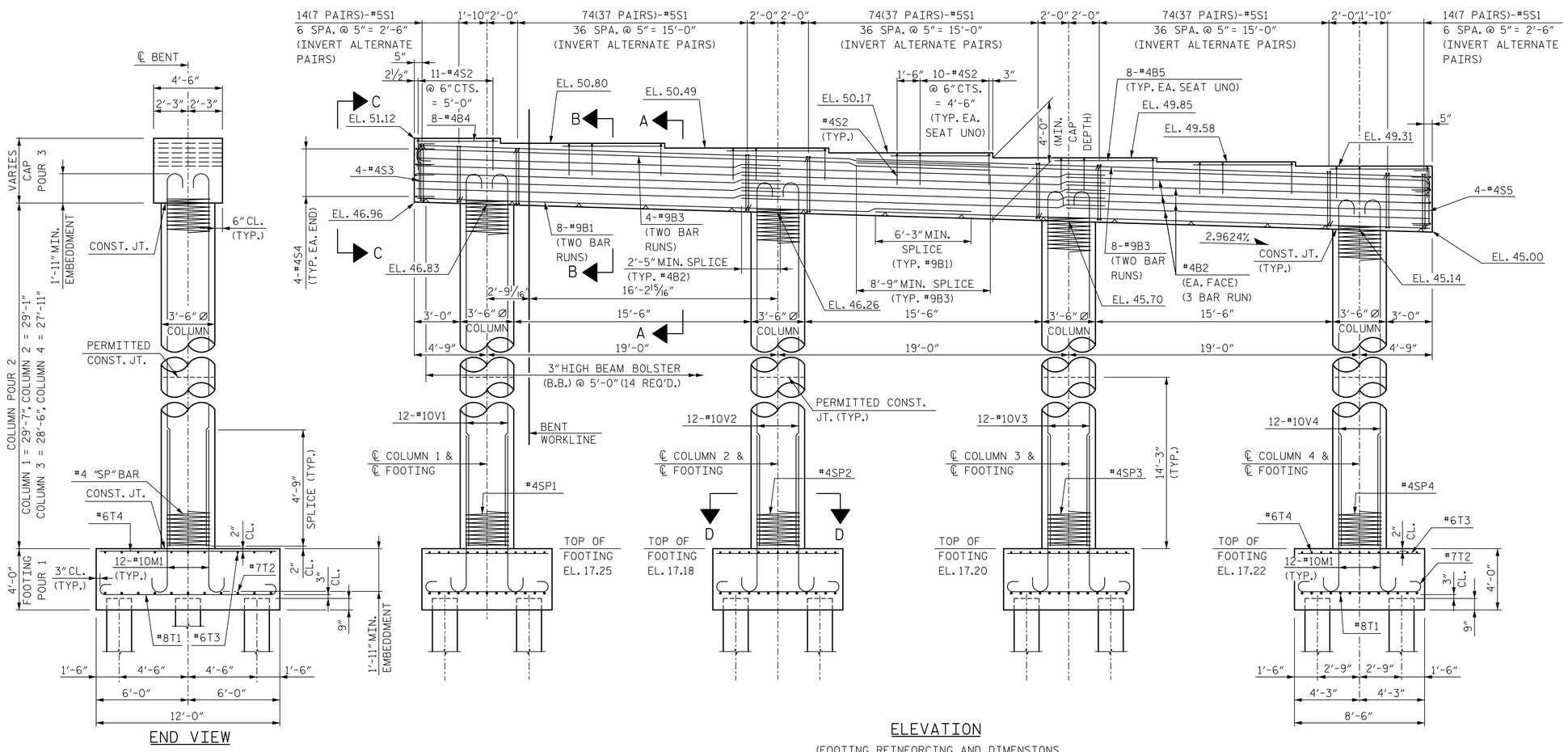


PLAN



END VIEW

ELEVATION

(FOOTING REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NOTES:

ALL DIMENSIONS SHOWN ARE PARALLEL OR NORMAL TO ℄ BENT UNLESS NOTED.

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

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

FOR DETAIL "A", SEE SHEET "SUBSTRUCTURE BENT 2 RIGHT LANE, SHEET 2 OF 2".

DocuSigned by: Paul J. Barber 16DF1857368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

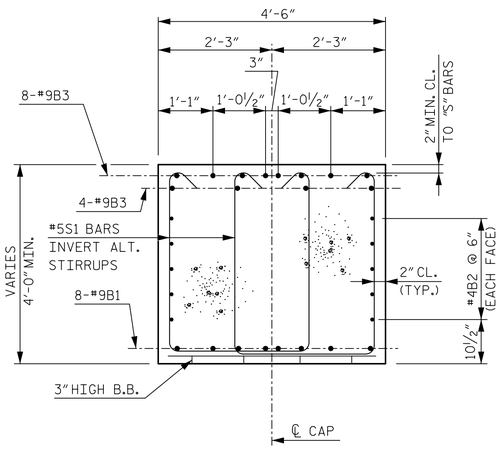
RIGHT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

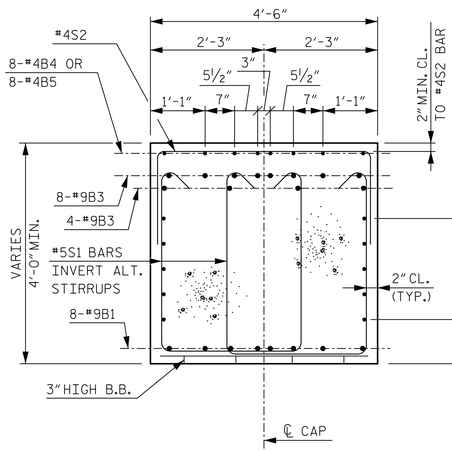
DRAWN BY	M. WRIGHT	DATE 11/16
CHECKED BY	V. KOLLIPARA	DATE 11/16
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 30

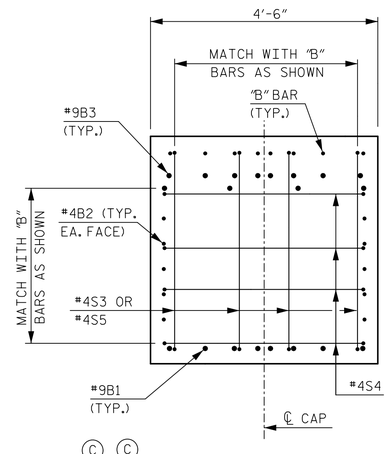
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-30
1			3			TOTAL SHEETS
2			4			40



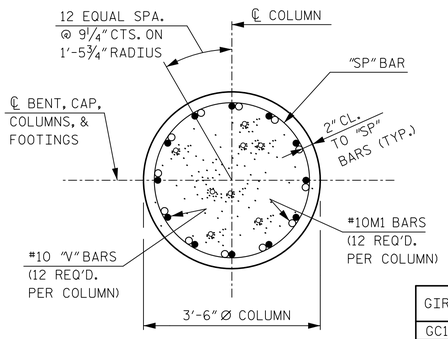
SECTION A-A



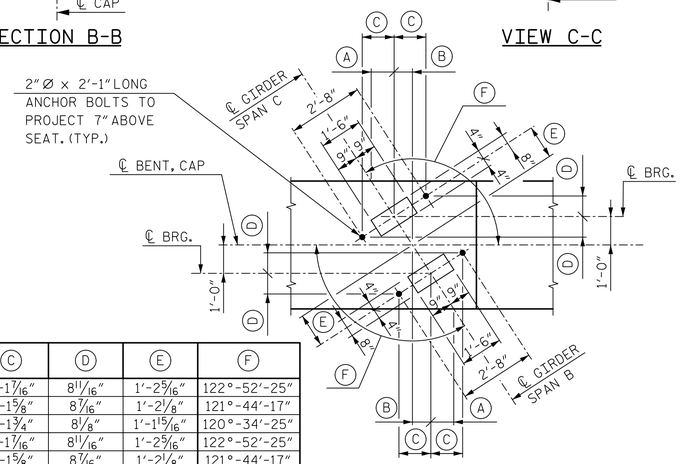
SECTION B-B



VIEW C-C

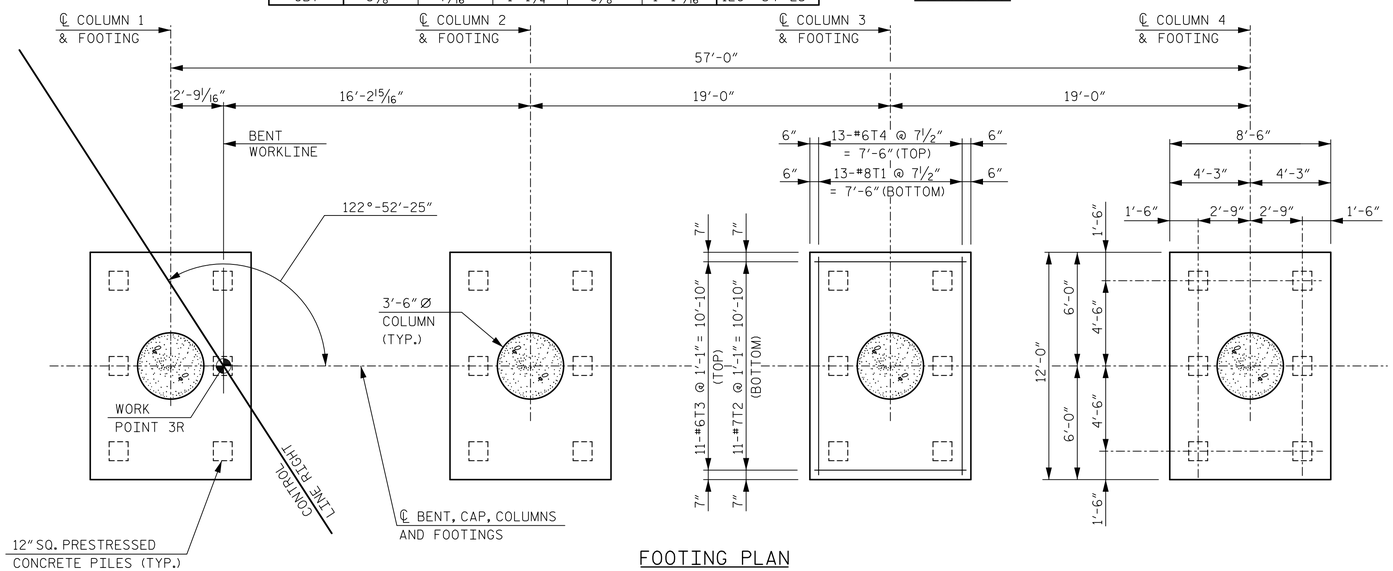


SECTION D-D



GIRDER	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ
GC1-GC5	9 11/16"	7 3/4"	1'-1 7/16"	8 11/16"	1'-2 5/16"	122°-52'-25"
GC6	9 1/4"	7 7/16"	1'-1 5/8"	8 7/16"	1'-2 1/8"	121°-44'-17"
GC7	8 7/8"	7 1/16"	1'-1 3/4"	8 1/8"	1'-1 15/16"	120°-34'-25"
GB1-GB5	9 11/16"	7 3/4"	1'-1 7/16"	8 11/16"	1'-2 5/16"	122°-52'-25"
GB6	9 1/4"	7 7/16"	1'-1 5/8"	8 7/16"	1'-2 1/8"	121°-44'-17"
GB7	8 7/8"	7 1/16"	1'-1 3/4"	8 1/8"	1'-1 15/16"	120°-34'-25"

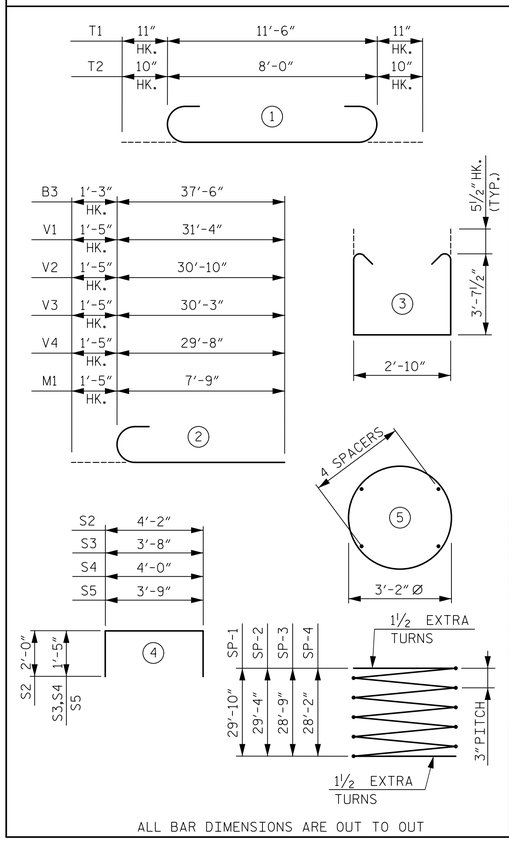
DETAIL A



FOOTING PLAN

(FOOTING REINFORCING AND DIMENSIONS
ARE TYPICAL FOR EACH FOOTING)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	9	STR	36'-3"	1,972
B2	30	4	STR	23'-8"	474
B3	24	9	2	38'-9"	3,162
B4	8	4	STR	5'-3"	28
B5	48	4	STR	6'-7"	211
M1	48	10	2	9'-2"	1,893
S1	250	5	3	11'-0"	2,868
S2	77	4	4	8'-2"	420
S3	4	4	4	6'-6"	17
S4	8	4	4	6'-10"	37
S5	4	4	4	6'-7"	18
T1	52	8	1	13'-4"	1,851
T2	44	7	1	9'-8"	869
T3	44	6	STR	8'-0"	529
T4	52	6	STR	11'-6"	898
V1	12	10	2	32'-9"	1,691
V2	12	10	2	32'-3"	1,665
V3	12	10	2	31'-8"	1,635
V4	12	10	2	31'-1"	1,605
SP-1	1	✳	5	1208'-0"	807
SP-2	1	✳	5	1188'-4"	794
SP-3	1	✳	5	1168'-8"	781
SP-4	1	✳	5	1139'-3"	761

QUANTITIES

REINFORCING STEEL	LBS.	21,843
SPIRAL COLUMN REINFORCING STEEL	LBS.	3,143
CLASS A CONCRETE		
FOOTING POUR 1	CU. YDS.	60.4
COLUMN POUR 2	CU. YDS.	41.0
CAP POUR 3	CU. YDS.	46.3
TOTAL	CU. YDS.	147.7
12" SQ. PSC PILES	NO.	24
	LIN. FT.	1,320
FOUNDATION EXCAVATION	LUMP SUM	LS
PILE DRIVING EQUIPMENT SETUP FOR 12" SQ. PSC PILES	NO.	24
PILE REDRIVES	NO.	12

✳ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 2

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

RIGHT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 11/16
CHECKED BY V. KOLLIPARA DATE 11/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 31

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-31
1			3			TOTAL SHEETS
2			4			40

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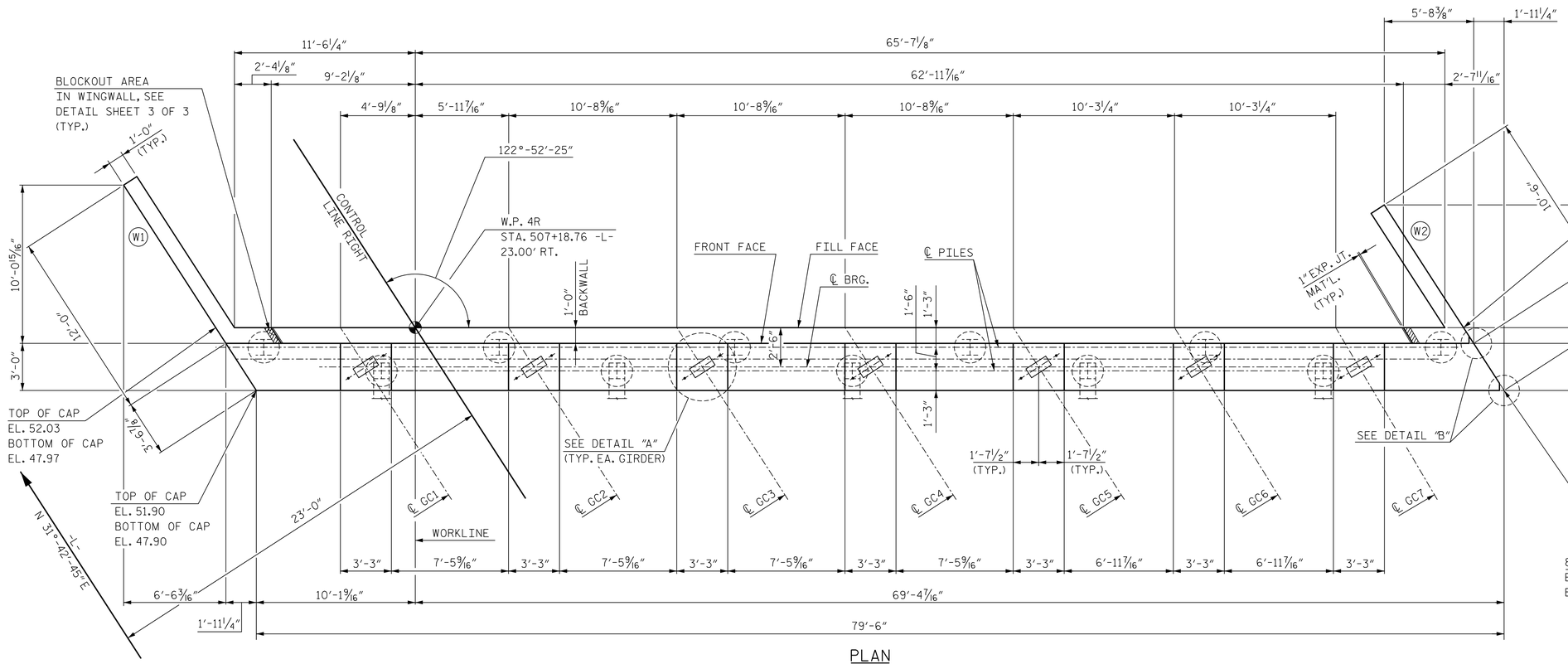
NOTES:

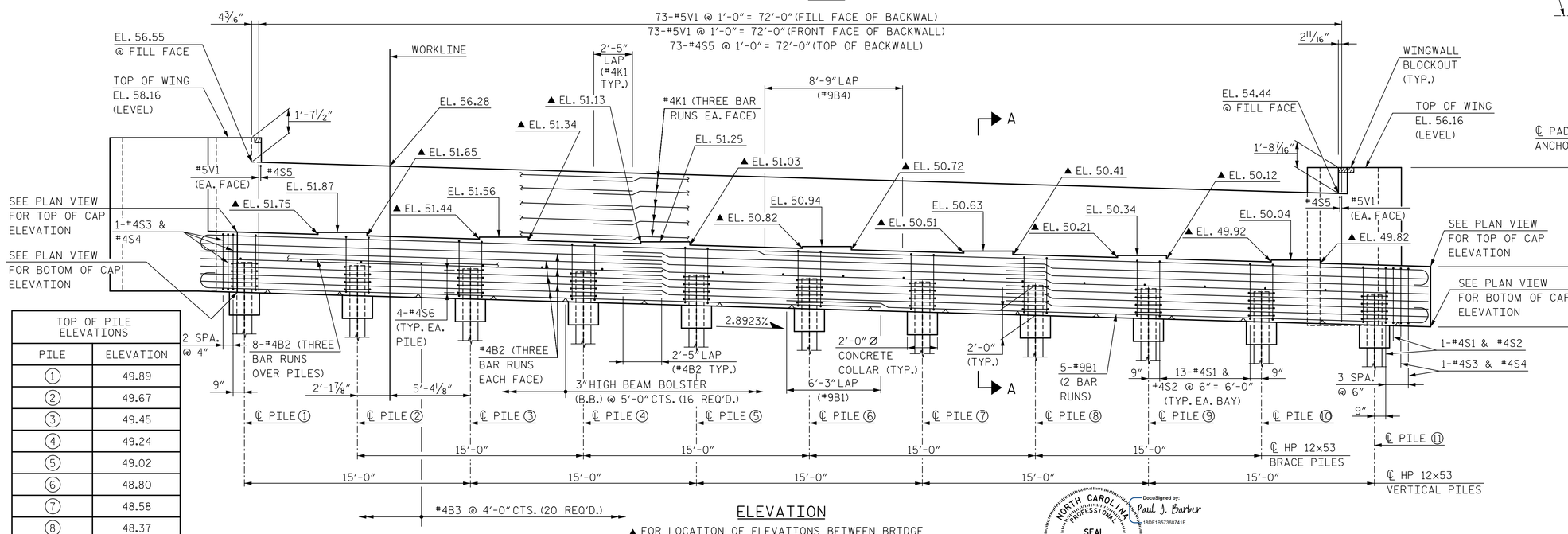
FOR NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR WINGWALL DETAILS AND SECTION A-A, SEE SHEET 2 OF 3.

INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.



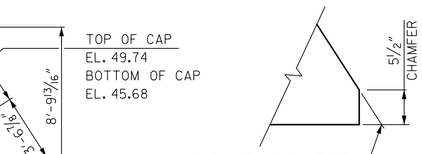
PLAN



ELEVATION

▲ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A, SHEET 2 OF 3.

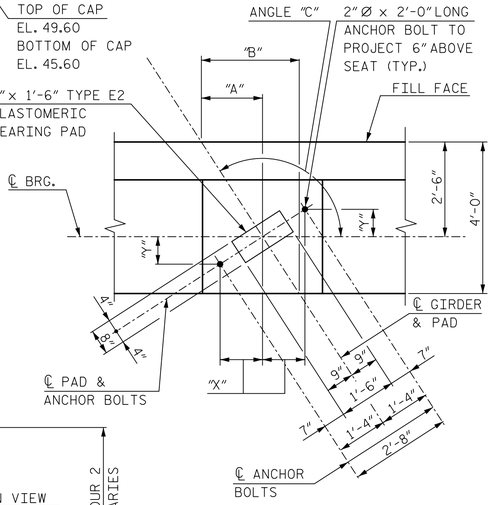
TOP OF PILE ELEVATIONS	
PILE	ELEVATION
①	49.89
②	49.67
③	49.45
④	49.24
⑤	49.02
⑥	48.80
⑦	48.58
⑧	48.37
⑨	48.15
⑩	47.93
⑪	47.72



CAP AND WING LENGTH DIMENSIONS ARE SHOWN TO THIS LOCATION

DETAIL B

GIRDER	"A"	"B"	ANGLE "C"	"X"	"Y"
GC1-GC5	1'-7 3/8"	2'-7"	122°-52'-25"	1'-1 1/16"	8 11/16"
GC6	1'-6 9/16"	2'-5 11/16"	121°-44'-17"	1'-1 5/8"	8 7/16"
GC7	1'-5 3/4"	2'-4 3/8"	120°-34'-25"	1'-1 3/4"	8 1/8"



DETAIL A

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

RIGHT LANE

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

DocuSigned by: Paul J. Barber 18DF1B57368741E...

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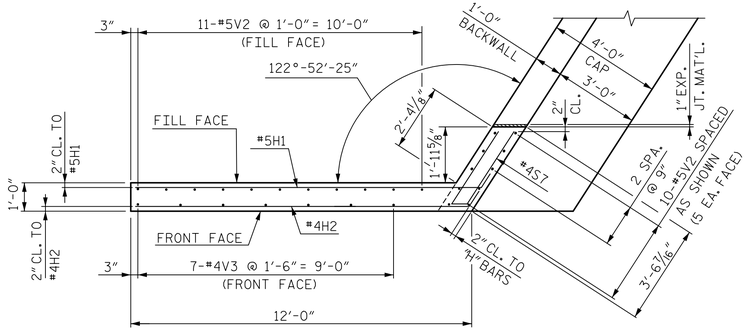
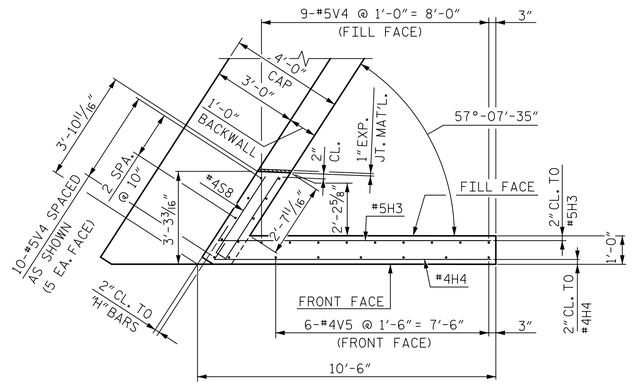
DRAWN BY M. WRIGHT DATE 11/16
CHECKED BY V. KOLLIPARA DATE 11/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 32

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-32
1			3			TOTAL SHEETS
2			4			40



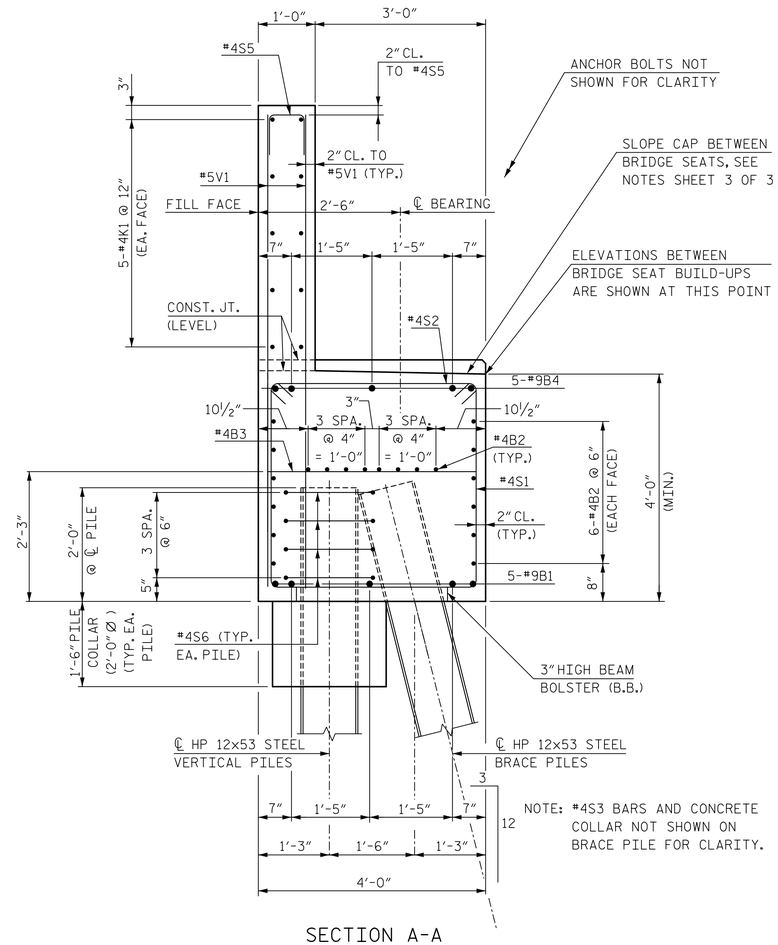
PLAN OF WING (W1)



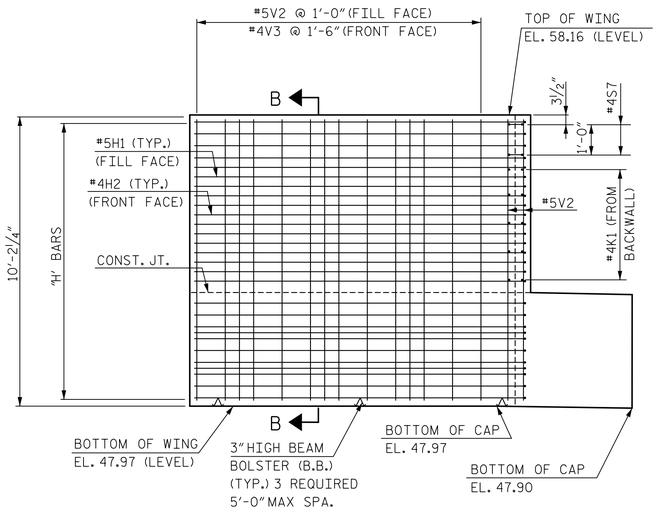
PLAN OF WING (W2)

NOTES:

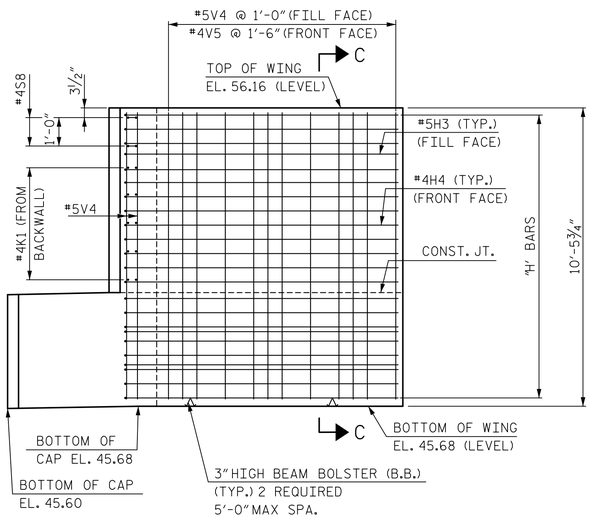
FOR NOTES, SEE SHEET 3 OF 3.



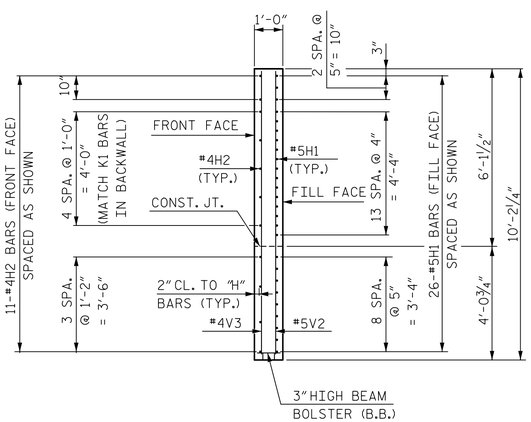
SECTION A-A



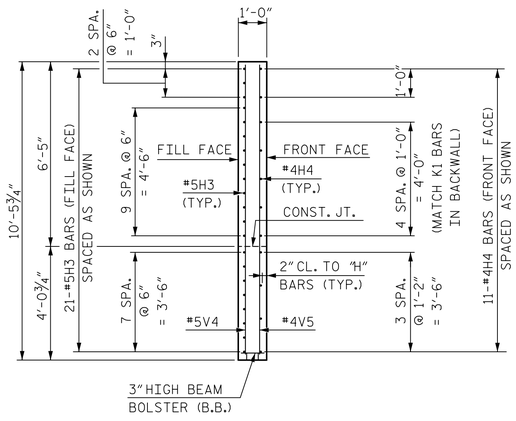
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION B-B



SECTION C-C

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 2 OF 3

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

RIGHT LANE

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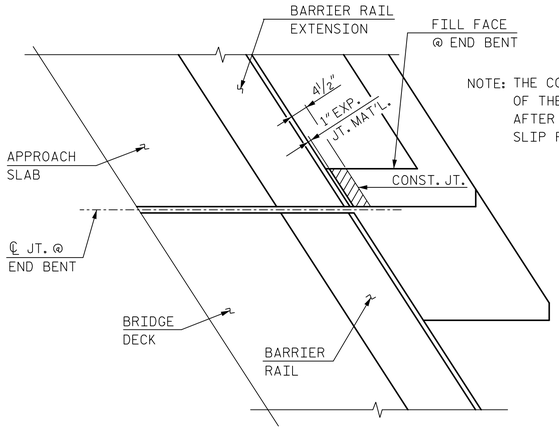
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 11/16
CHECKED BY	V. KOLLIPARA	DATE 11/16
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

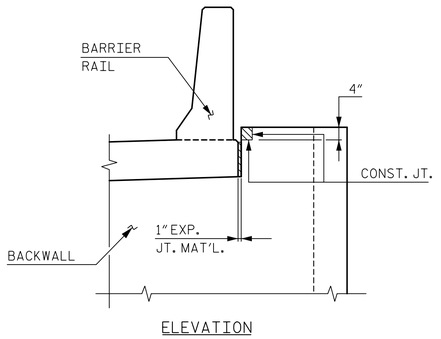
DWG. NO. 33

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-33
1			3			TOTAL SHEETS
2			4			40



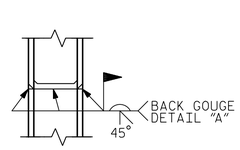
PLAN

NOTE: THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

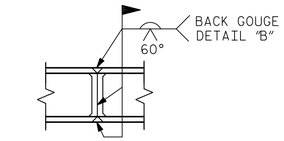


ELEVATION

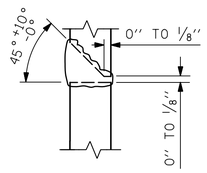
BLOCKOUT IN WINGWALL



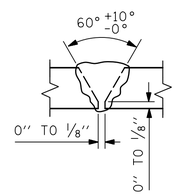
*PILE VERTICAL



*PILE HORIZONTAL OR VERTICAL



DETAIL "A"



DETAIL "B"

* POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

NOTES:

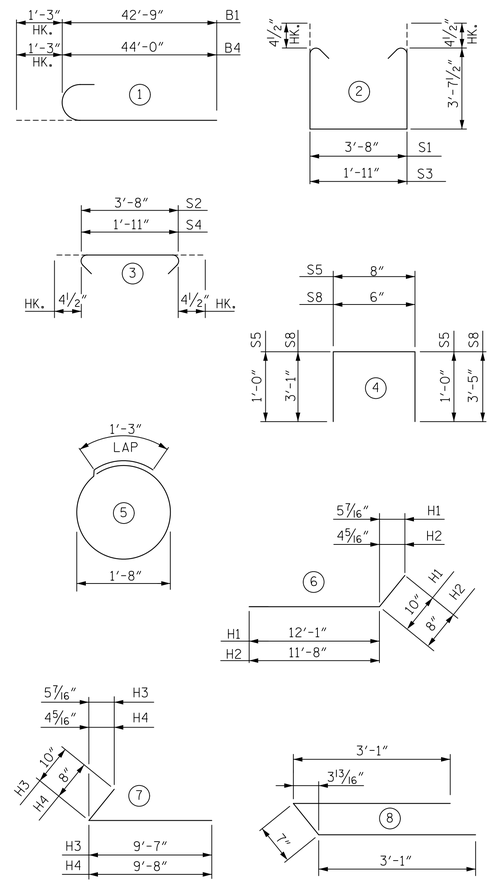
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

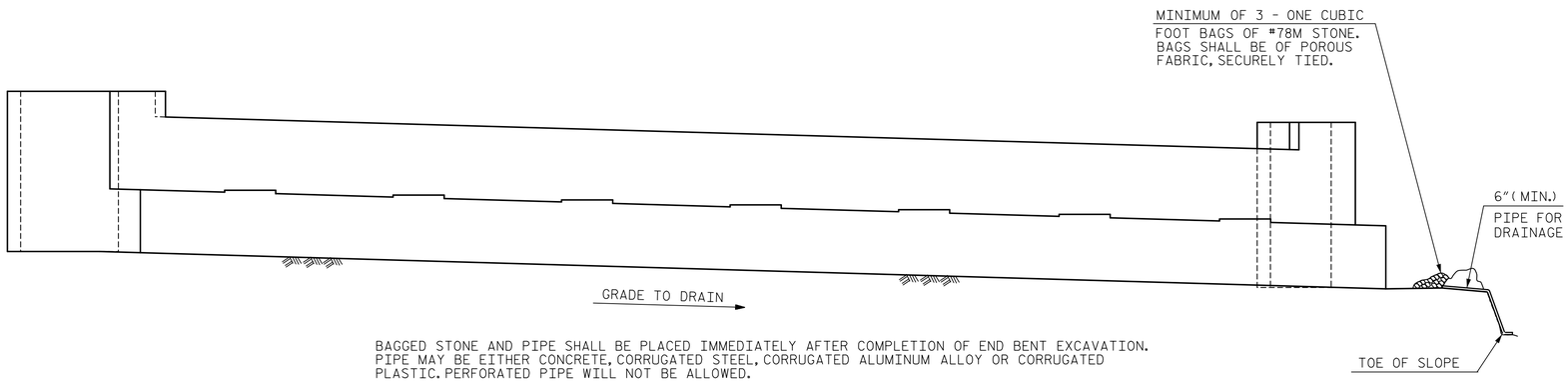
BILL OF REINFORCING

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	9	1	44'-0"	1,496
B2	60	4	STR	28'-0"	1,122
B3	20	4	STR	3'-8"	49
B4	10	9	1	45'-3"	1,539
H1	26	5	6	12'-11"	350
H2	11	4	6	12'-4"	91
H3	21	5	7	10'-5"	228
H4	11	4	7	10'-4"	76
K1	30	4	STR	28'-0"	561
S1	132	4	2	11'-8"	1,029
S2	132	4	3	4'-5"	389
S3	5	4	2	9'-11"	33
S4	5	4	3	2'-8"	9
S5	73	4	4	2'-8"	130
S6	44	4	5	6'-5"	189
S7	2	4	8	6'-9"	9
S8	2	4	4	7'-0"	9
V1	146	5	STR	8'-3"	1,256
V2	21	5	STR	9'-9"	214
V3	7	4	STR	9'-9"	46
V4	19	5	STR	10'-0"	198
V5	6	4	STR	10'-0"	40

QUANTITIES

REINFORCING STEEL	LBS.	9,063
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP & BOT. OF WINGS	CU. YDS.	52.9
POUR 2 - TOP OF WINGS & BACKWALL	CU. YDS.	18.8
TOTAL	CU. YDS.	71.7
HP 12x53 STEEL PILES	NO.	11
	LIN. FT.	660
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	11
PILE REDRIVES	NO.	6



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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 2

DocuSigned by: Paul J. Barber 1CF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

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CHECKED BY V. KOLLIPARA DATE 11/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 34

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 3 OF 3

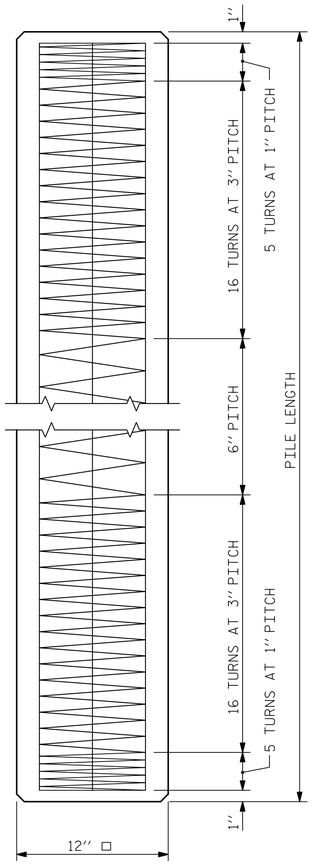
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

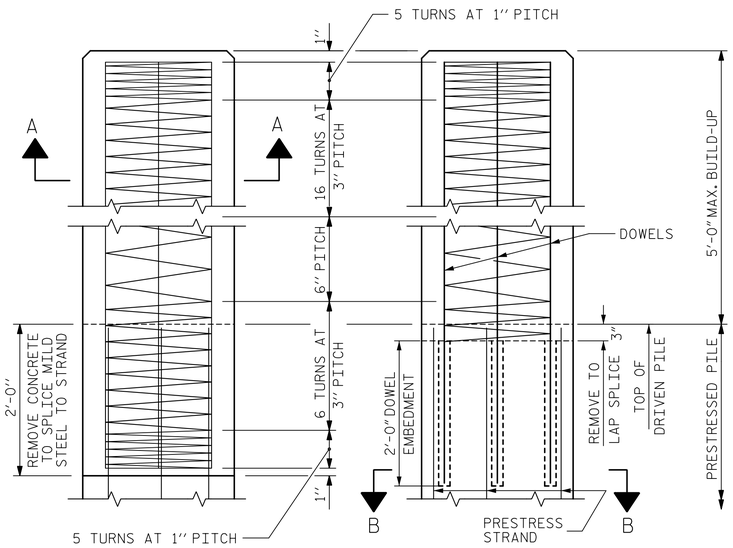
END BENT 2

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-34
1			3			TOTAL SHEETS
2			4			40

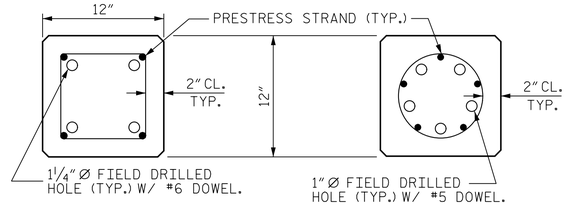


ELEVATION



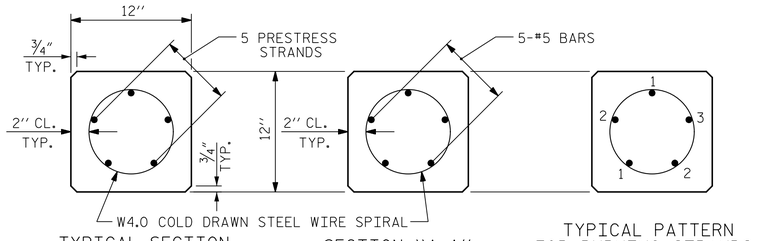
BUILD-UP AND SPIRAL REINFORCING

OPTIONAL BUILD-UP WITH DOWELS



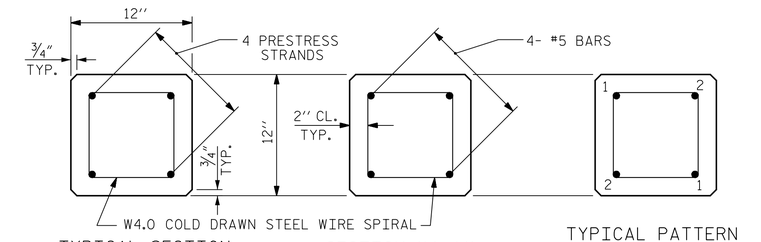
SECTION ''B-B''

(AT THE CONTRACTOR'S OPTION, PILE BUILD-UP MAY BE CONSTRUCTED WITH DOWELS.)



TYPICAL SECTION SECTION ''A-A'' TYPICAL PATTERN FOR BURNING STRANDS

½'' OR 0.6'' Ø GRADE 270 L.R. PRESTRESS STRANDS



TYPICAL SECTION SECTION ''A-A'' TYPICAL PATTERN FOR BURNING STRANDS

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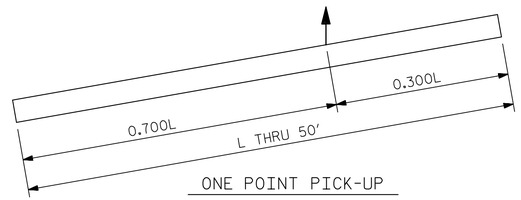
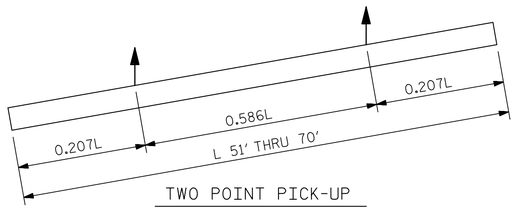


ONE POINT PICK-UP



TWO POINT PICK-UP

PICK-UP POINTS

QUANTITIES FOR ONE 12'' PRESTRESSED PILE						
	CONCRETE	PILE WT.	ONE POINT PICK-UP		TWO POINT PICK-UP	
LENGTH	CU. YDS.	TONS	0.300L	0.700L	0.207L	0.586L
25'-0''	0.91	1.85	7'-6''	17'-6''		
30'-0''	1.10	2.22	9'-0''	21'-0''		
35'-0''	1.28	2.59	10'-6''	24'-6''		
40'-0''	1.46	2.96	12'-0''	28'-0''		
45'-0''	1.64	3.33	13'-6''	31'-6''		
50'-0''	1.83	3.72	15'-0''	35'-0''		
55'-0''	2.01	4.09			11'-4½''	32'-3''
60'-0''	2.19	4.46			12'-5''	35'-2''
65'-0''	2.38	4.81			13'-5½''	38'-1''
70'-0''	2.57	5.18			14'-6''	41'-0''

NOTES

PRESTRESSED CONCRETE STRENGTH : f'c= 7,500 PSI

BUILD-UP CONCRETE STRENGTH : f'c= 7,500 PSI

STRAND DATA:

SIZE	GRADE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
½''	270 L.R.	0.153	41,300# PER STRAND	30,980# PER STRAND
0.6''	270 L.R.	0.217	58,600# PER STRAND	43,940# PER STRAND

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, ½'' OR 0.6'' STRANDS MAY BE USED IN EITHER THE 4 OR 5 STRAND CONFIGURATION SHOWN IN THE TYPICAL SECTION DETAIL. MIXING OF STRAND SIZE IS NOT ALLOWED.

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN PAIRS, EXCEPT WHERE 5 STRANDS ARE USED, THE LAST STRAND MAY BE BURNED SINGLY ACCORDING TO BURNING PATTERNS SHOWN. NOT MORE THAN 4 STRANDS MAY BE BURNED AT ANY ONE SECTION BEFORE THE SAME STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS ARE TO BE INDICATED WITH A 2'' WIDE BLACK MARK.

DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: f'c= 5,000 PSI

BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3'' OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING STEEL. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN ½'' CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE W4.0 COLD DRAWN WIRE WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

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NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

12'' PRESTRESSED CONCRETE PILE

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-35
1			3			TOTAL SHEETS
2			4			40

ASSEMBLED BY : M. WRIGHT	DATE : 8/18	
CHECKED BY : N. HART	DATE : 8/18	
DRAWN BY : FCJ 7/88	REV. 10/1/11	MAA/GM
CHECKED BY : CRK 3/89	REV. 12/14	MAA/TMG
	REV. 12/17	MAA/THC

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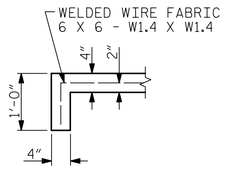
CHECKED BY N. HART DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

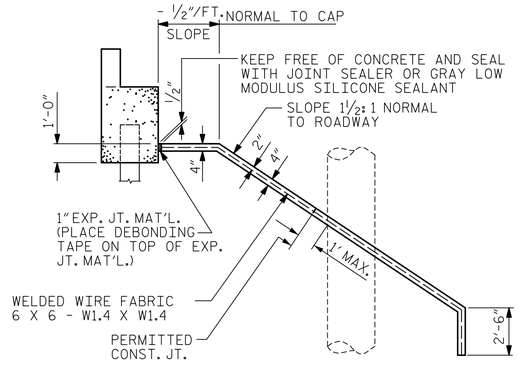
DWG. NO. 35

STD. NO. PCP1

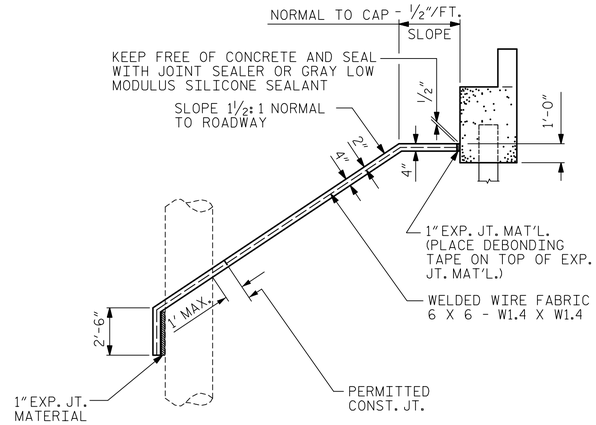


SECTION A-A

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.



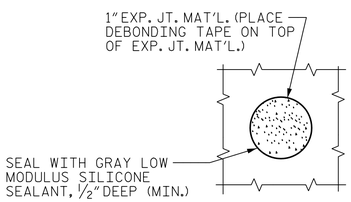
SECTION B-B



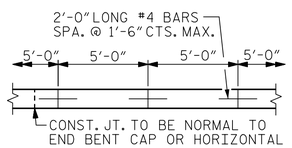
SECTION C-C

BRIDGE @ STA. 506+32.25 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	610	1,220
END BENT 2	780	1,565

* QUANTITY SHOWN IS BASED ON 5' POURS.

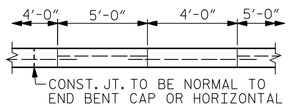


PLAN WHERE CONCRETE SLOPE PROTECTION MUST BE PLACED AROUND A BENT COLUMN



STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



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

OPTIONAL POURING DETAIL

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 2

DocuSigned by: Paul J. Barber

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-36
1			3			TOTAL SHEETS
2			4			40

ASSEMBLED BY : M. WRIGHT	DATE : 8/18
CHECKED BY : N. HART	DATE : 8/18
DRAWN BY : ELR 5/92	REV. 12/21/11 MAA/GM
CHECKED BY : GRP 6/92	REV. 1/16 MAA/TMG
	REV. 12/17 MAA/THC

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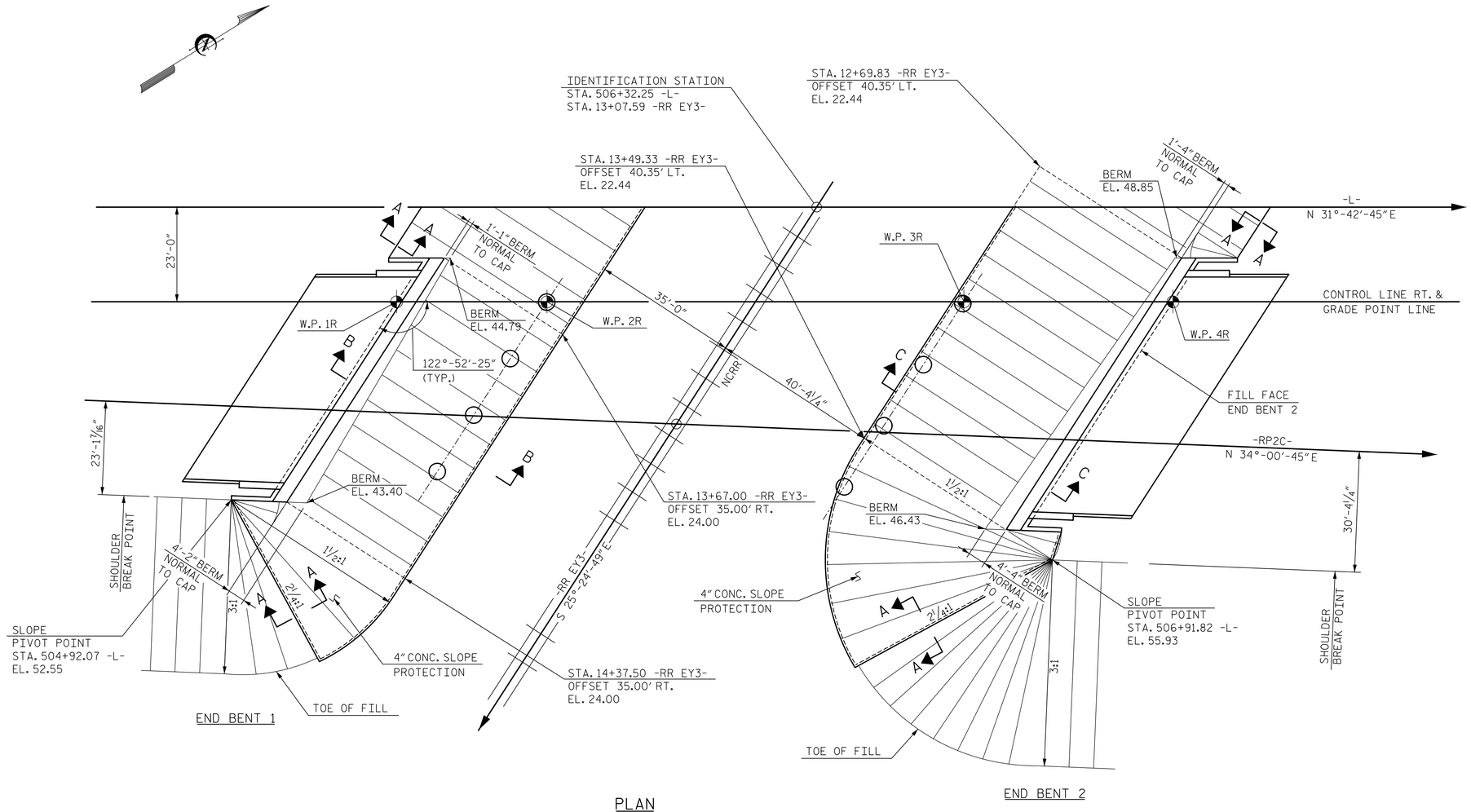
CHECKED BY	N. HART	DATE 8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 36

STD. NO. SP1



PROJECT NO. R-1015

CRAVEN COUNTY

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SHEET 2 OF 2

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11/15/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

RIGHT LANE

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DWG. NO. 37

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-37
1			3			TOTAL SHEETS
2			4			40

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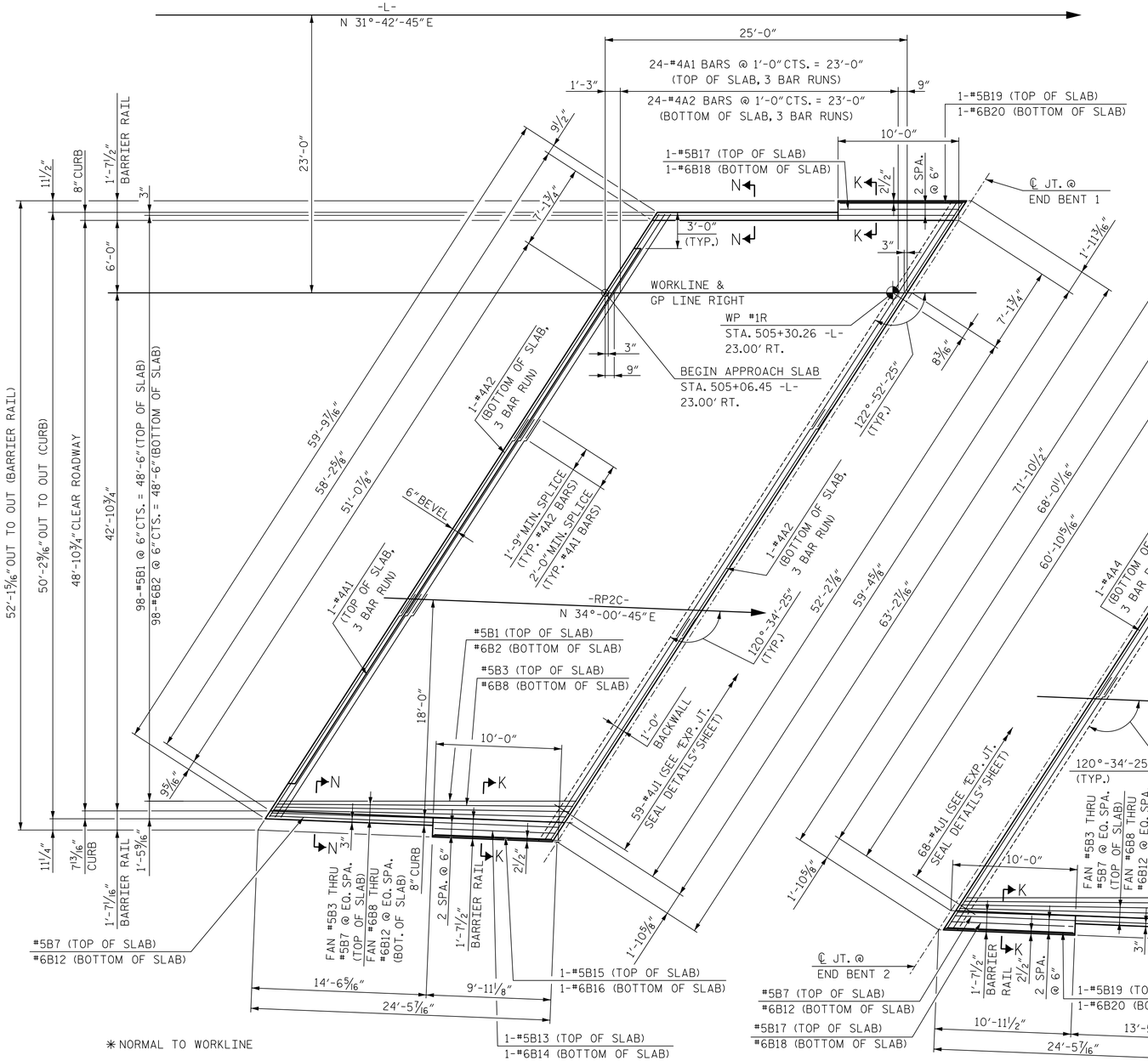
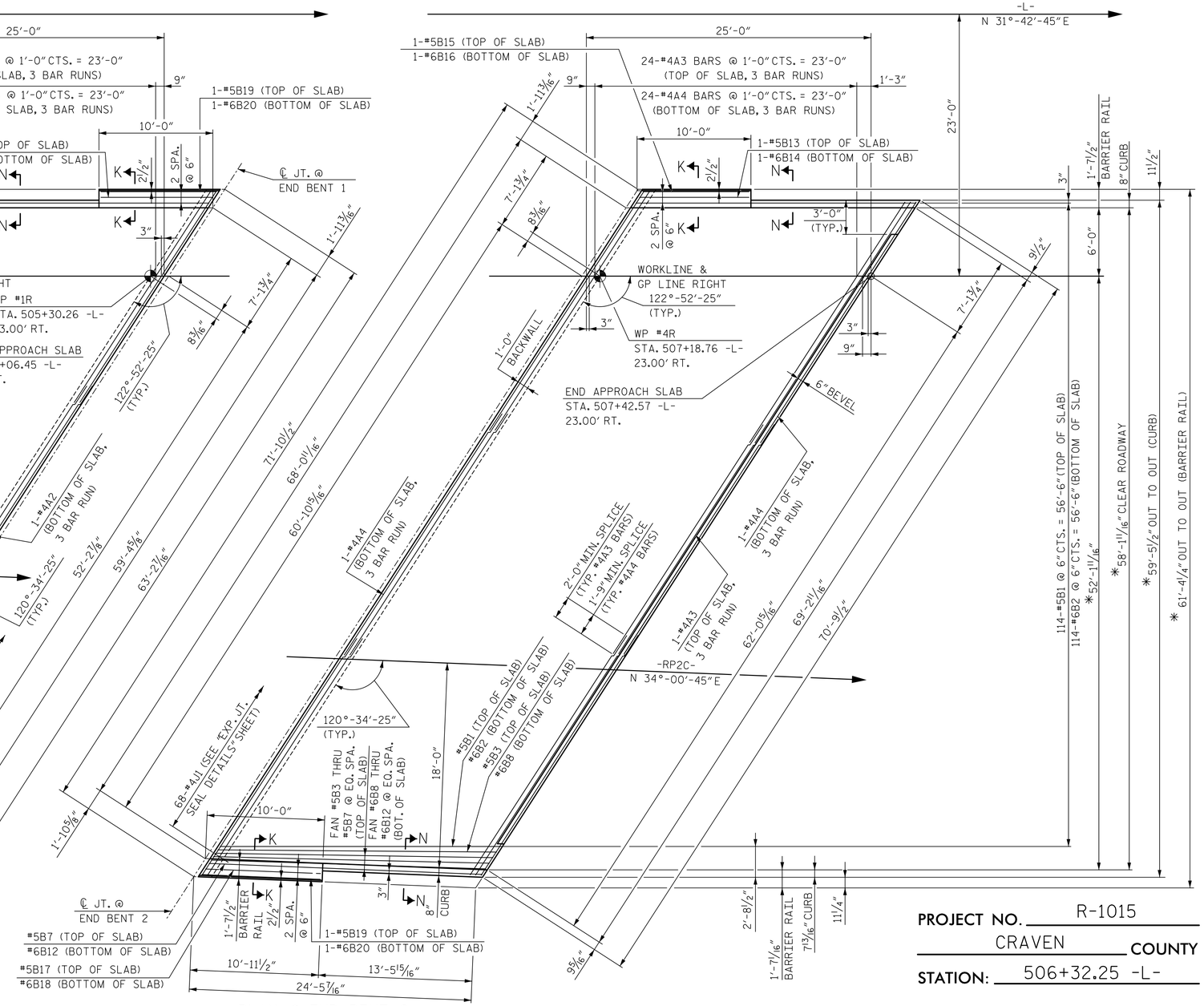


PLAN @ END BENT 1



PLAN @ END BENT 2

NOTES:

FOR SECTION N-N AND K-K, SEE "BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT" SHEET 2 OF 3.

FOR APPROACH SLAB BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT" SHEET 2 OF 3.

FOR BARRIER RAIL REINFORCING STEEL PLACEMENT AND BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 3 OF 3.

FOR STANDARD EXPANSION JOINT SEAL DETAILS, SEE "EXPANSION JOINT SEAL DETAILS" SHEET.

FOR DIMENSIONS NORMAL TO WORKLINE AT ℄ JOINT AT END BENT 1, SEE "PLAN OF SPAN A" SHEET.

FOR DIMENSIONS NORMAL TO WORKLINE AT ℄ JOINT AT END BENT 2, SEE "PLAN OF SPAN C" SHEET.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by: Paul J. Barber 180F1B5736B741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

RIGHT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 8/16
CHECKED BY P. BARBER DATE 9/16
DESIGN ENGINEER OF RECORD P. BARBER DATE 8/18

DWG. NO. 38

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-38
1			3			TOTAL SHEETS
2			4			40

FOR PLAN VIEW OF APPROACH SLABS AT
END BENT 1 AND END BENT 2, SEE SHEET 1 OF 3.

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.

BILL OF MATERIAL
APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	75	#4	STR	22'-4"	1,119
A2	78	#4	STR	22'-2"	1,155
✳B1	98	#5	STR	23'-8"	2,419
B2	98	#6	STR	24'-6"	3,606
✳B3	1	#5	STR	23'-6"	25
✳B4	1	#5	STR	23'-5"	24
✳B5	1	#5	STR	23'-4"	24
✳B6	1	#5	STR	23'-3"	24
✳B7	1	#5	STR	23'-1"	24
B8	1	#6	STR	24'-5"	37
B9	1	#6	STR	24'-3"	36
B10	1	#6	STR	24'-2"	36
B11	1	#6	STR	24'-1"	36
B12	1	#6	STR	23'-11"	36
✳B13	1	#5	STR	9'-10"	10
B14	1	#6	STR	9'-10"	15
✳B15	1	#5	STR	9'-7"	10
B16	1	#6	STR	9'-7"	14
✳B17	1	#5	STR	10'-1"	11
B18	1	#6	STR	10'-1"	15
✳B19	1	#5	STR	10'-4"	11
B20	1	#6	STR	10'-4"	16
✳J1	59	#4	1	1'-5"	56

REINFORCING STEEL	✳✳LBS.	5,002
✳EPOXY COATED REINFORCING STEEL	✳✳LBS.	3,757
CLASS AA CONCRETE	✳✳C.Y.	55.7

BILL OF MATERIAL
APPROACH SLAB AT EB #2

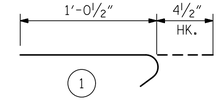
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A3	75	#4	STR	25'-2"	1,261
A4	78	#4	STR	25'-0"	1,303
✳B1	114	#5	STR	23'-8"	2,814
B2	114	#6	STR	24'-6"	4,195
✳B3	1	#5	STR	23'-6"	25
✳B4	1	#5	STR	23'-5"	24
✳B5	1	#5	STR	23'-4"	24
✳B6	1	#5	STR	23'-3"	24
✳B7	1	#5	STR	23'-1"	24
B8	1	#6	STR	24'-5"	37
B9	1	#6	STR	24'-3"	36
B10	1	#6	STR	24'-2"	36
B11	1	#6	STR	24'-1"	36
B12	1	#6	STR	23'-11"	36
✳B13	1	#5	STR	9'-10"	10
B14	1	#6	STR	9'-10"	15
✳B15	1	#5	STR	9'-7"	10
B16	1	#6	STR	9'-7"	14
✳B17	1	#5	STR	10'-1"	11
B18	1	#6	STR	10'-1"	15
✳B19	1	#5	STR	10'-4"	11
B20	1	#6	STR	10'-4"	16
✳J1	68	#4	1	1'-5"	64

REINFORCING STEEL	✳✳LBS.	5,739
✳EPOXY COATED REINFORCING STEEL	✳✳LBS.	4,302
CLASS AA CONCRETE	✳✳C.Y.	64.7

SPLICE LENGTHS

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

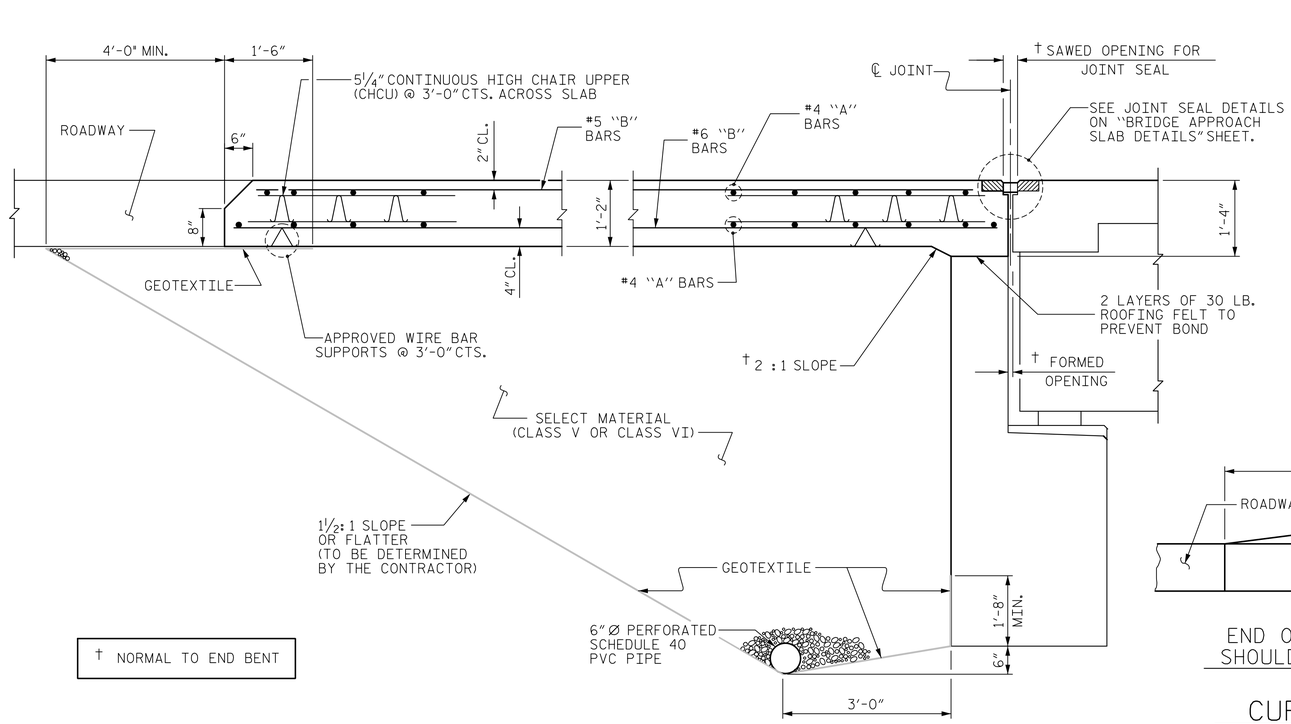
BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

✳✳ QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 3 OF 3.

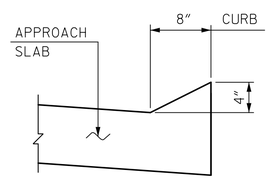
THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



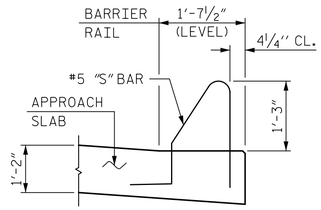
† NORMAL TO END BENT

SECTION THRU SLAB

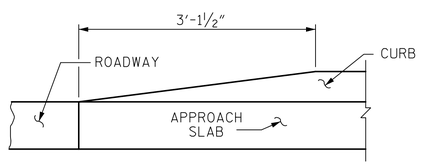
(TYPE I - STANDARD APPROACH FILL)



SECTION N-N



SECTION K-K



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

DocuSigned by: Paul J. Barber 18DF1B57368741E...

STATE OF NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 506+32.25 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

RIGHT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 8/18
CHECKED BY : P. BARBER	DATE : 8/18
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

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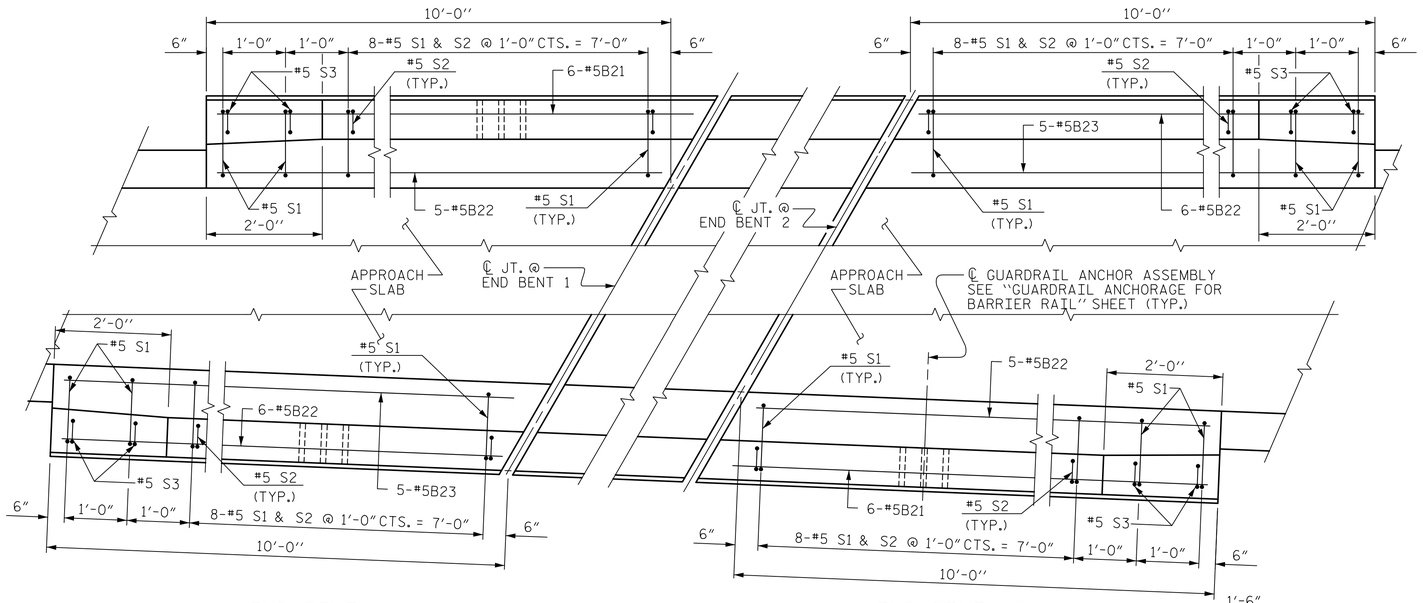
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 8/18
CHECKED BY	P. BARBER	DATE 8/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 8/18

DWG. NO. 39

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-39
1			3			TOTAL SHEETS
2			4			40

STD. NO. BAS2



END BENT #1 END BENT #2

PLAN OF BARRIER RAIL

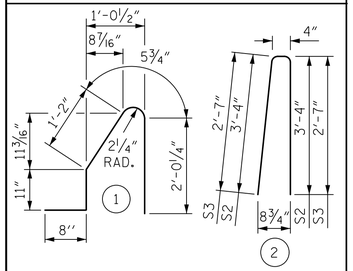
NOTES

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

THE 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

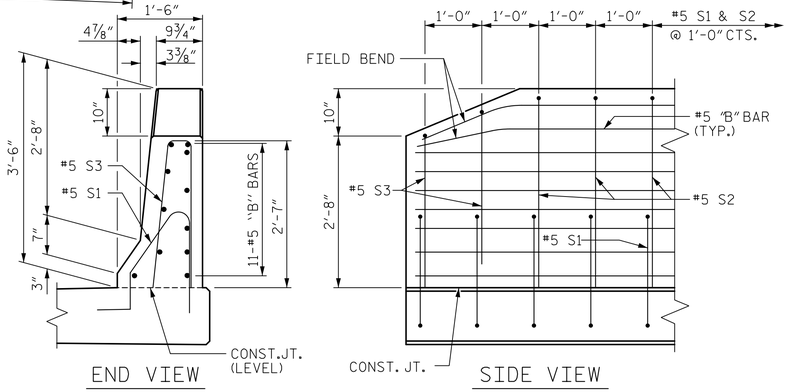


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BARRIER RAIL ONLY

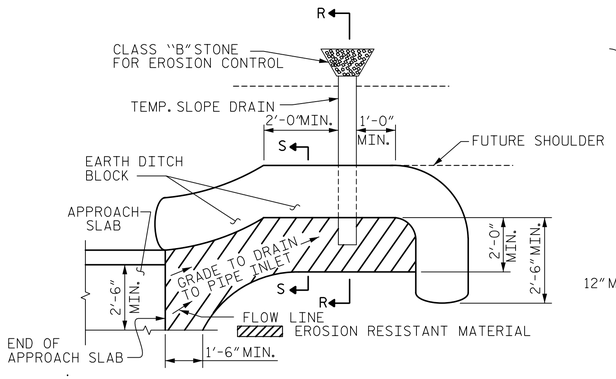
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B21	12	#5	STR	10′-3″	128
✳B22	22	#5	STR	9′-8″	222
✳B23	10	#5	STR	9′-10″	103
✳S1	40	#5	1	5′-3″	219
✳S2	32	#5	2	7′-0″	234
✳S3	8	#5	2	5′-6″	46
✳EPOXY COATED REINFORCING STEEL				LBS.	952
CLASS AA CONCRETE				C. Y.	5.6
CONCRETE BARRIER RAIL				LIN. FT.	41.6



END VIEW SIDE VIEW

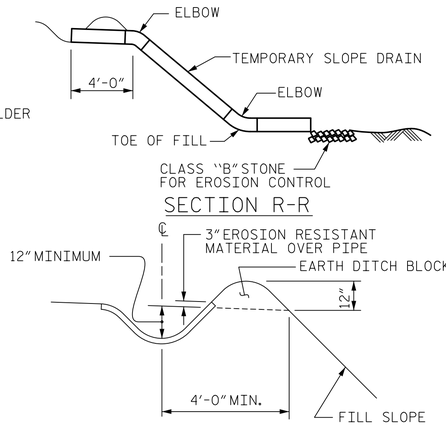
END OF RAIL DETAILS

SECTION THRU RAIL



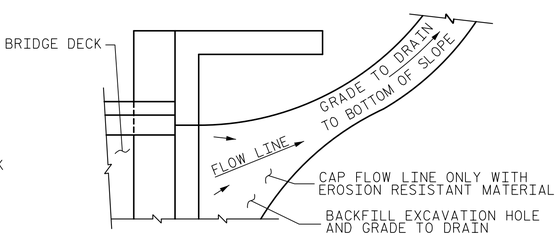
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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



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

DocuSigned by: Paul J. Barber 18DF1B57368741E...

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER

11/15/2018

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 506+32.25 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

RIGHT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 8/18
CHECKED BY : P. BARBER	DATE : 8/18

DRAWN BY : FCJ 11/88	REV. 6/13 MAA/GM
CHECKED BY : ARB 11/88	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT	DATE 8/18
CHECKED BY P. BARBER	DATE 8/18
DESIGN ENGINEER OF RECORD P. BARBER	DATE 8/18

DWG. NO. 40

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S14-40
1			3			TOTAL SHEETS
2			4			40

STD. NO. BAS4

F.A. PROJECT NO. NHF-70(49)

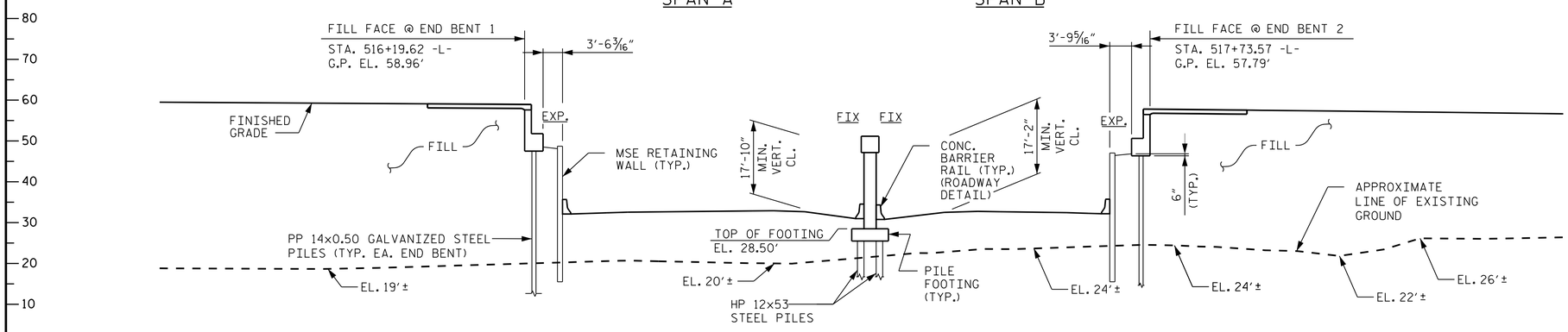
516+00 517+00 518+00

(+)2.4000% (-)0.6000% (-)2.9307%

P.I. STA. = 508+90.00
EL. = 63.34'
V.C. = 1,000.00'

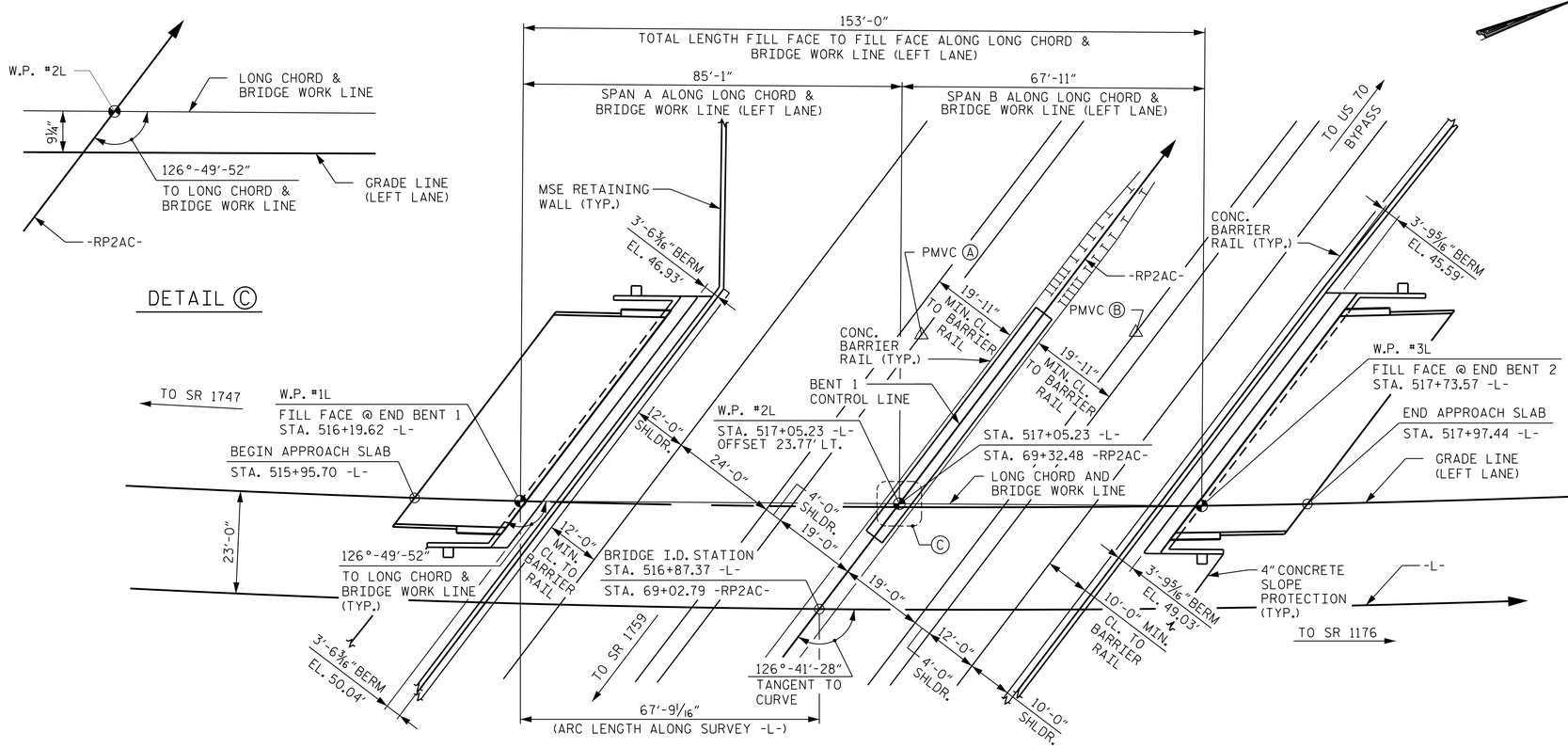
P.I. STA. = 520+43.00
EL. = 56.42'
V.C. = 800.00'

-L- GRADE DATA



SECTION ALONG GRADE LINE (LEFT LANE)

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



PLAN

PILES, FOOTINGS, AND COLUMNS NOT SHOWN IN PLAN VIEW FOR CLARITY

PMVC-DENOTES POINT OF MINIMUM VERTICAL CLEARANCE

-L- HORIZONTAL CURVE DATA

P.I. STA. 520+78.98
△ = 22°57' 38.8" (LT)
D = 1°31'06.9"
L = 1,512.00'
T = 766.28'
R = 3,773.00'

Ⓐ STA. 517+12.32 -L-
G.P. EL. 58.33'
OFFSET 64.62' LT.
= STA. 69+69.32 -RP2AC-
G.P. EL. 32.83'
OFFSET 19.00' LT.

Ⓑ STA. 517+60.62 -L-
G.P. EL. 57.91'
OFFSET 64.12' LT.
= STA. 69+97.78 -RP2AC-
G.P. EL. 33.06'
OFFSET 19.00' RT.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-
69+02.79 -RP2AC-

SHEET 1 OF 4 BRIDGE NO. 286

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON US 70 BYPASS OVER US 70 BUS. BETWEEN SR 1747 AND SR 1176

LEFT LANE

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

DocuSigned by: Andrew L. Phillips 2BB69ABAD40D03... 12/7/2018

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

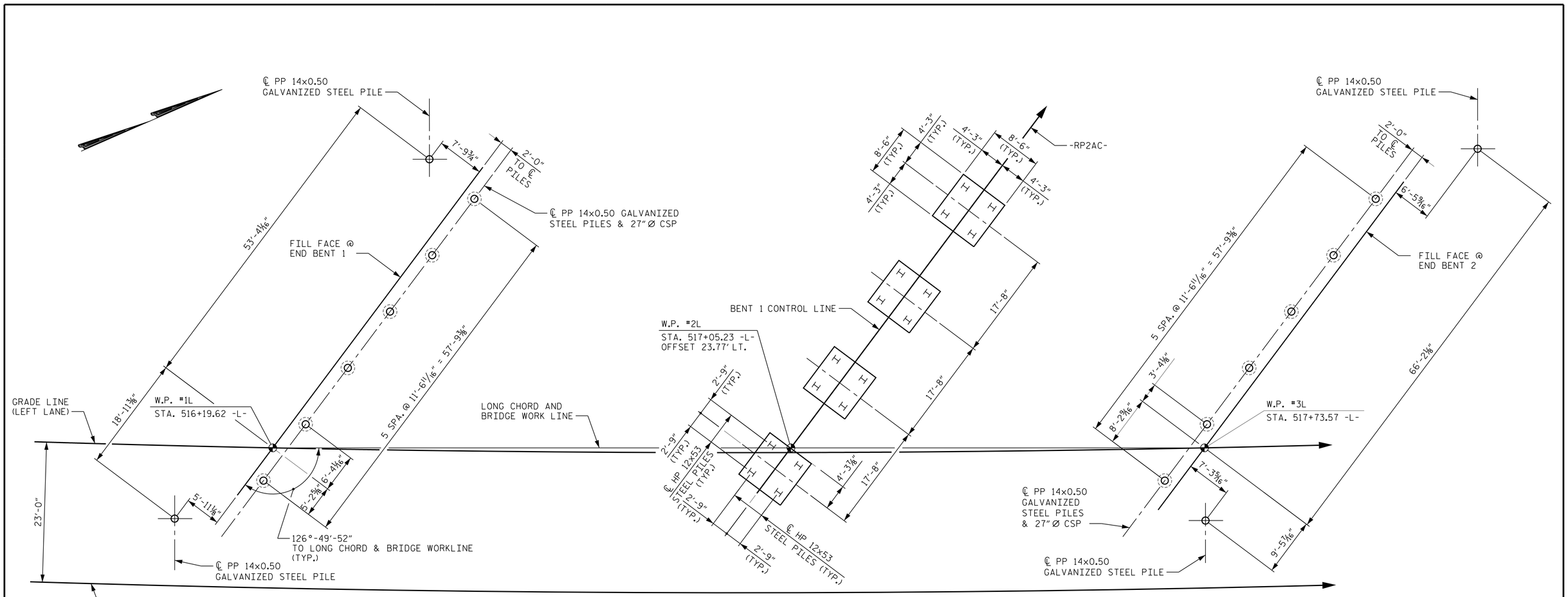
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-1
1			3			TOTAL SHEETS
2			4			44

DRAWN BY: D. D. LOWERY DATE: 10/18
CHECKED BY: P. D. COOKSEY DATE: 10/18
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 10/18

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STRUCTURE 15

12/7/2018 K:\RDT_Structures_Bridge\NC\011036303 - R-1015\CAD\Dgn\Structure 415\R1015_SMU_G01_240286.dgn



NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 150 TONS PER PILE.

PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 130 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 220 TONS PER PILE.

PIPE PILE PLATES ARE REQUIRED FOR STEEL PIPE PILES AT END BENT 1 AND END BENT 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.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT BENT 1. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT END BENT 1 OR END BENT 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

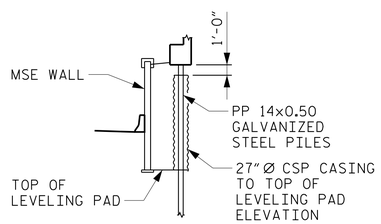
OBSERVE A TWO MONTH WAITING PERIOD AFTER CONSTRUCTING THE MECHANICALLY STABILIZED EARTH (MSE) ABUTMENT WALL TO WITHIN 1 FT. OF THE BOTTOM OF CAP ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT 1 AND END BENT 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.

27"DIAMETER CSP SLEEVES SHOULD BE INSTALLED DURING MSE WALL CONSTRUCTION FOR PILES TO BE INSTALLED AFTER MSE WALL CONSTRUCTION AT END BENT 1 AND END BENT 2. THE SLEEVES SHOULD BE FILLED WITH SAND AFTER THE PILES ARE INSTALLED. SEE MSE WALL PLANS.

DRIVE PILES AT END BENT 1 AND END BENT 2 AFTER WAITING PERIOD.

FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES AT BOTTOM OF CAP OR FOOTING)



27"Ø CSP CASING DETAIL

(END BENT 2 SHOWN, END BENT 1 SIMILAR)

-L- HORIZONTAL CURVE DATA

P.I. STA. 520+78.98
△ = 22°57' 38.8" (LT)
D = 1°31'06.9"
L = 1,512.00'
T = 766.28'
R = 3,773.00'

DRAWN BY: D. D. LOWERY	DATE: 10/18
CHECKED BY: P. D. COOKSEY	DATE: 10/18
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS	DATE: 10/18

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

DocuSigned by: Andrew L. Phillips 2BB69ABAD4004D3... 12/7/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

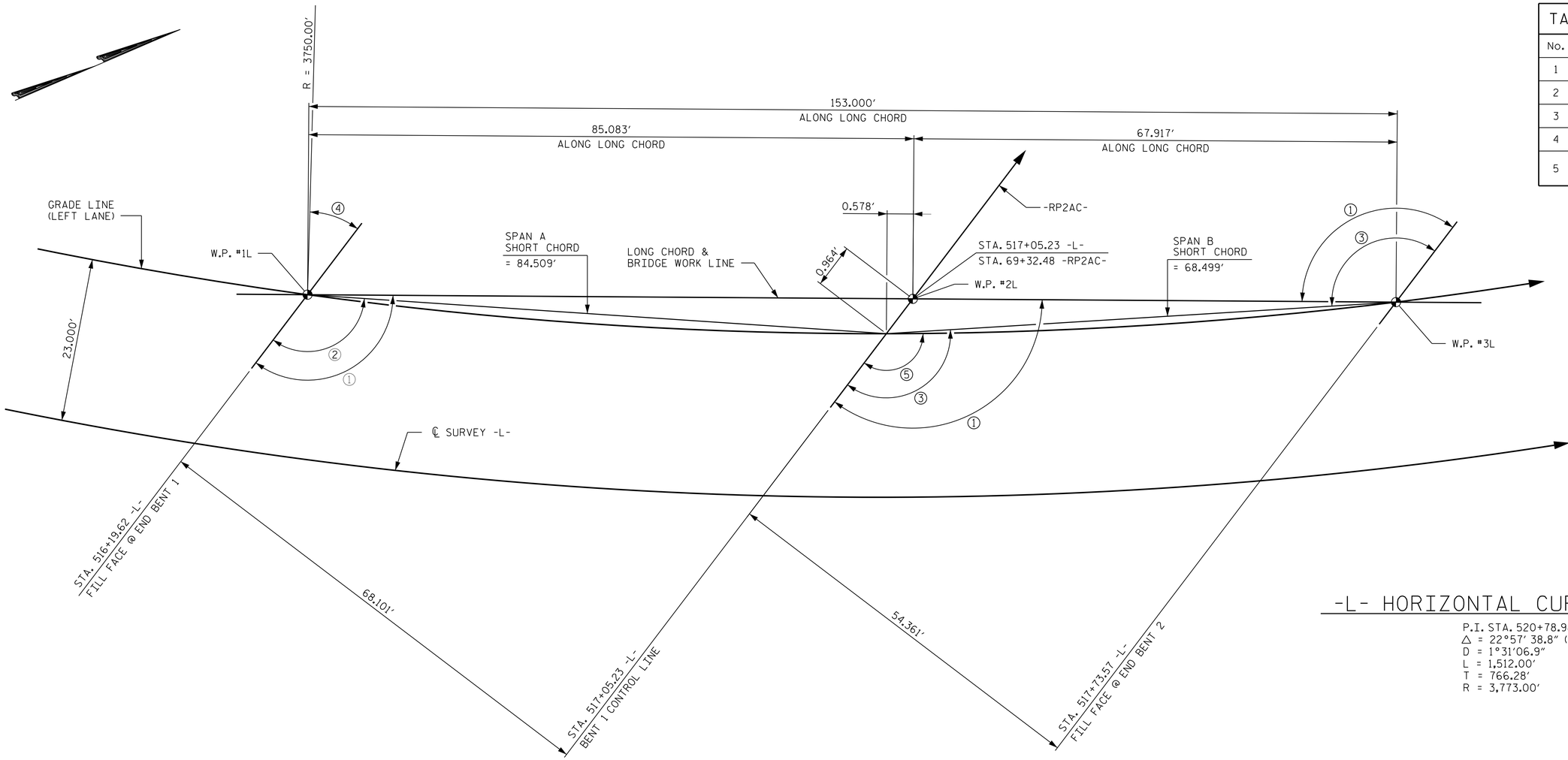
FOR BRIDGE ON US 70
BYPASS OVER US 70 BUS. BETWEEN
SR 1747 AND SR 1176
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-2
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15

12/7/2018 K:\RDT_Structures_Bridge\NC\01036303 - R-1015\CAD\Dgn\Structure 415\R1015_SMU_FL1_240286.dgn

TABLE OF ANGLES	
No.	ANGLES
1	126°-49′-52″
2	126°-18′-28″
3	127°-28′-36″
4	35°-39′-43″
5	126°-57′-12″ (TANGENT TO CURVE)



LONG CHORD LAYOUT
(ALL BENTS ARE PARALLEL)

-L- HORIZONTAL CURVE DATA

P.I. STA. 520+78.98
△ = 22°57′ 38.8″ (LT)
D = 1°31′06.9″
L = 1,512.00′
T = 766.28′
R = 3,773.00′

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON US 70
BYPASS OVER US 70 BUS. BETWEEN
SR 1747 AND SR 1176
LEFT LANE

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS
DocuSigned by: Andrew L. Phillips 2BB69A8AD4004D3... 12/7/2018

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NC LICENSE # F-0102

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15

DRAWN BY: D. D. LOWERY DATE: 10/18
CHECKED BY: P. D. COOKSEY DATE: 10/18
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 10/18

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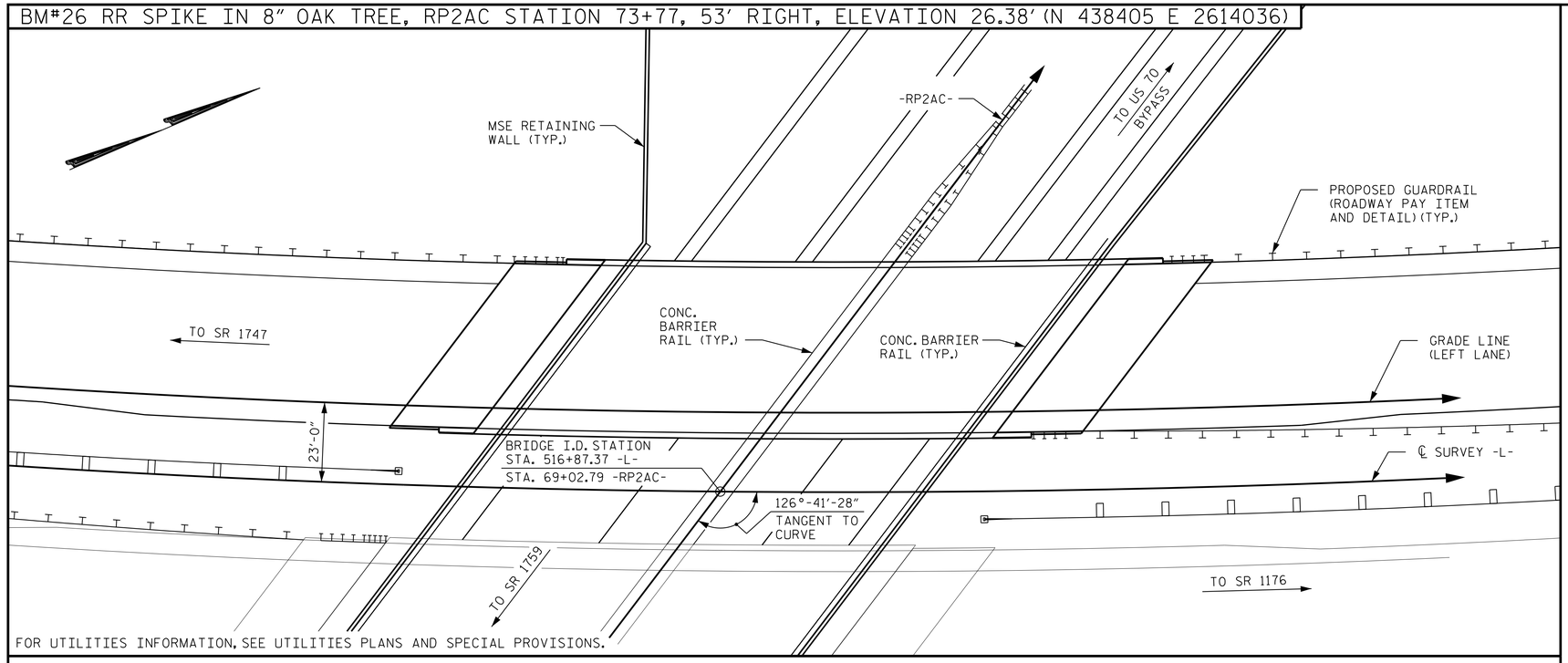

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

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 REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

TOTAL BILL OF MATERIAL

	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE (BRIDGE)	BRIDGE APPROACH SLABS STA. 516+87.37 -L-	REINFORCING STEEL (BRIDGE)	SPIRAL COLUMN REINFORCING STEEL (BRIDGE)	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	PILE DRIVING EQUIPMENT SETUP FOR PP 14x0.50 GALVANIZED STEEL PILES	HP 12x53 STEEL PILES		PP 14x0.50 GALVANIZED STEEL PILES		STEEL PILE POINTS	PIPE PILE PLATES	PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS
	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	EA.	EA.	NO.	LIN. FT.	NO.	LIN. FT.	EA.	EA.	EA.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE		7,722	8,820		LUMP SUM			12	882.13										341.6		LUMP SUM	LUMP SUM
END BENT 1				66.4		7,936					8			8	700		8	3		54		
BENT 1				99.3		14,538	1,638			16		16	1,240			16		8				
END BENT 2				68.3		8,187					8			8	700		8	3		58		
TOTAL	1	7,722	8,820	234.0	LUMP SUM	30,661	1,638	12	882.13	16	16	16	1,240	16	1,400	16	16	14	341.6	112	LUMP SUM	LUMP SUM

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 f_y = 60ksi.

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON US 70 BYPASS OVER US 70 BUS. BETWEEN SR 1747 AND SR 1176

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-4
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

DocuSigned by: Andrew L. Phillips 12/7/2018
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DRAWN BY: D. D. LOWERY DATE: 10/18
CHECKED BY: P. D. COOKSEY DATE: 10/18
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 10/18

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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 × RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR					MOMENT						
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.01	--	1.75	0.721	1.59	A	I	40.340	1.017	1.23	A	I	7.500	0.80	0.721	1.01	A	I	40.340	
		HL-93 (OPERATING)	N/A	--	1.63	--	1.35	0.733	2.07	A	EL	40.340	1.017	1.63	A	I	7.500	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.35	48.60	1.75	0.733	2.14	A	EL	40.340	1.017	1.62	A	I	7.500	0.80	0.721	1.35	A	I	40.340	
		HS-20 (OPERATING)	36.000	--	2.13	76.68	1.35	0.721	2.77	A	I	40.340	1.017	2.13	A	I	7.500	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	3.13	42.26	1.40	0.721	6.18	A	I	40.340	1.017	5.14	A	I	7.500	0.80	0.721	3.13	A	I	40.340	
		SNGARBS2	20.000	--	2.30	46.00	1.40	0.721	4.54	A	I	40.340	1.017	3.61	A	I	7.500	0.80	0.721	2.30	A	I	40.340	
		SNAGRIS2	22.000	--	2.16	47.52	1.40	0.721	4.27	A	I	40.340	1.017	3.34	A	I	7.500	0.80	0.721	2.16	A	I	40.340	
		SNCOTTS3	27.250	--	1.55	42.24	1.40	0.733	3.07	A	EL	40.340	1.017	2.48	A	I	7.500	0.80	0.721	1.55	A	I	40.340	
		SNAGGRS4	34.925	--	1.29	45.05	1.40	0.721	2.54	A	I	40.340	1.017	1.99	A	I	7.500	0.80	0.721	1.29	A	I	40.340	
		SNS5A	35.550	--	1.26	44.79	1.40	0.721	2.48	A	I	40.340	1.017	2.00	A	I	7.500	0.80	0.721	1.26	A	I	40.340	
		SNS6A	39.950	--	1.15	45.94	1.40	0.721	2.27	A	I	40.340	1.017	1.81	A	I	7.500	0.80	0.721	1.15	A	I	40.340	
		SNS7B	42.000	--	1.09	45.78	1.40	0.721	2.16	A	I	40.340	1.017	1.77	A	I	7.500	0.80	0.721	1.09	A	I	40.340	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.40	46.20	1.40	0.721	2.77	A	I	40.340	1.017	2.44	A	I	7.500	0.80	0.721	1.40	A	I	40.340	
		TNT4A	33.075	--	1.41	46.64	1.40	0.733	2.78	A	EL	40.340	1.017	2.22	A	I	7.500	0.80	0.721	1.41	A	I	40.340	
		TNT6A	41.600	--	1.14	47.42	1.40	0.733	2.26	A	EL	40.340	1.017	1.98	A	I	7.500	0.80	0.721	1.14	A	I	40.340	
		TNT7A	42.000	--	1.15	48.30	1.40	0.733	2.27	A	EL	40.340	1.017	1.84	A	I	7.500	0.80	0.721	1.15	A	I	40.340	
		TNT7B	42.000	--	1.18	49.56	1.40	0.721	2.33	A	I	40.340	1.017	1.73	A	I	7.500	0.80	0.721	1.18	A	I	40.340	
		TNAGRIT4	43.000	--	1.13	48.59	1.40	0.733	2.23	A	EL	40.340	1.017	1.75	A	I	7.500	0.80	0.721	1.13	A	I	40.340	
		TNAGT5A	45.000	--	1.07	48.15	1.40	0.721	2.10	A	I	40.340	1.017	1.73	A	I	7.500	0.80	0.721	1.07	A	I	40.340	
		TNAGT5B	45.000	⟨3⟩	1.05	47.25	1.40	0.721	2.08	A	I	40.340	1.017	1.68	A	I	7.500	0.80	0.721	1.05	A	I	40.340	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

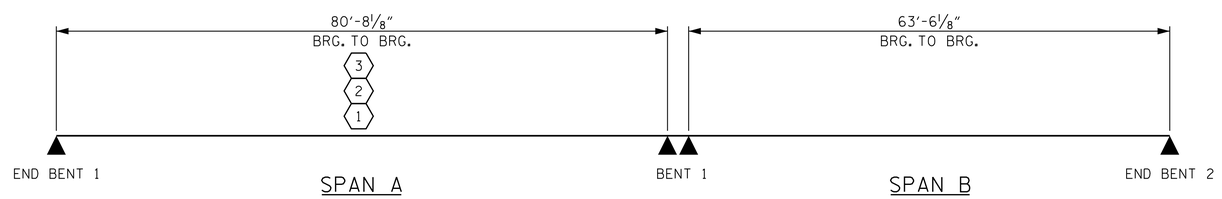
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

DocuSigned by: Andrew L. Phillips 12/7/2018
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NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-5
1			3			TOTAL SHEETS
2			4			44

ASSEMBLED BY : D. D. LOWERY	DATE : 10/18		
CHECKED BY : A. L. PHILLIPS	DATE : 10/18		
DRAWN BY : MAA 1/08	REV. 11/12/08RR	MAA/GM	
CHECKED BY : GM/DI 2/08	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THC	

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STRUCTURE 15 STD. NO. LRFR1

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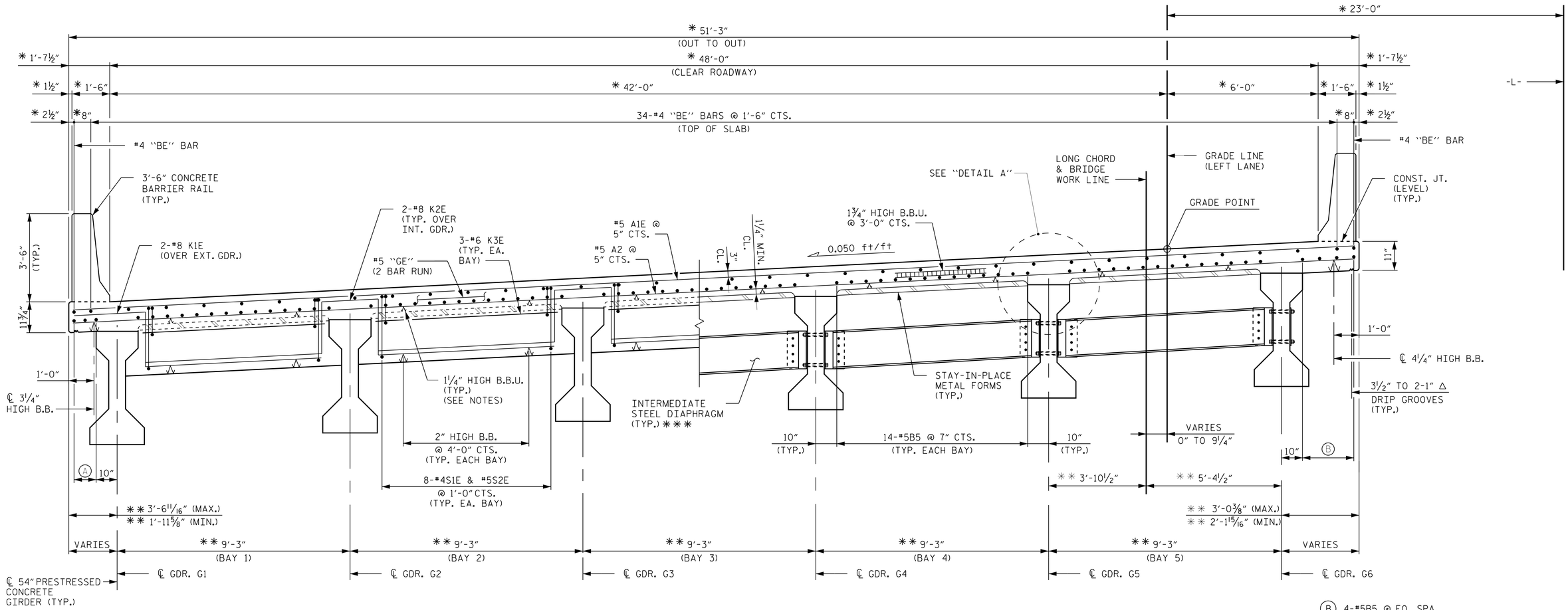


PART SECTION - END BENT DIAPHRAGM

PART SECTION - INTERMEDIATE DIAPHRAGM

TYPICAL SECTION

* DENOTES RADIAL DIMENSION

** DENOTES DIMENSIONS MEASURED PERPENDICULAR TO LONG CHORD & BRIDGE WORK LINE

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

NOTES:

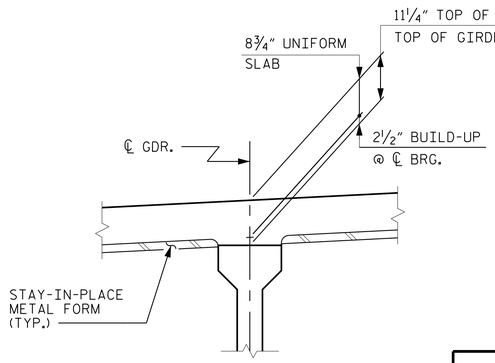
PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE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

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

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

FOR "SECTION THRU END BENT DIAPHRAGM" SEE "TYPICAL SECTION" SHEET 3 OF 3.

BARRIER RAIL IN CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A COMPRESSIVE STRENGTH OF 3000 PSI.



DETAIL "A"
(TYP. EA. GDR. @ EA. BENT)

DRAWN BY: D. D. LOWERY DATE: 10/18
CHECKED BY: P. D. COOKSEY DATE: 10/18
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 10/18

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NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

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PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 1 OF 3

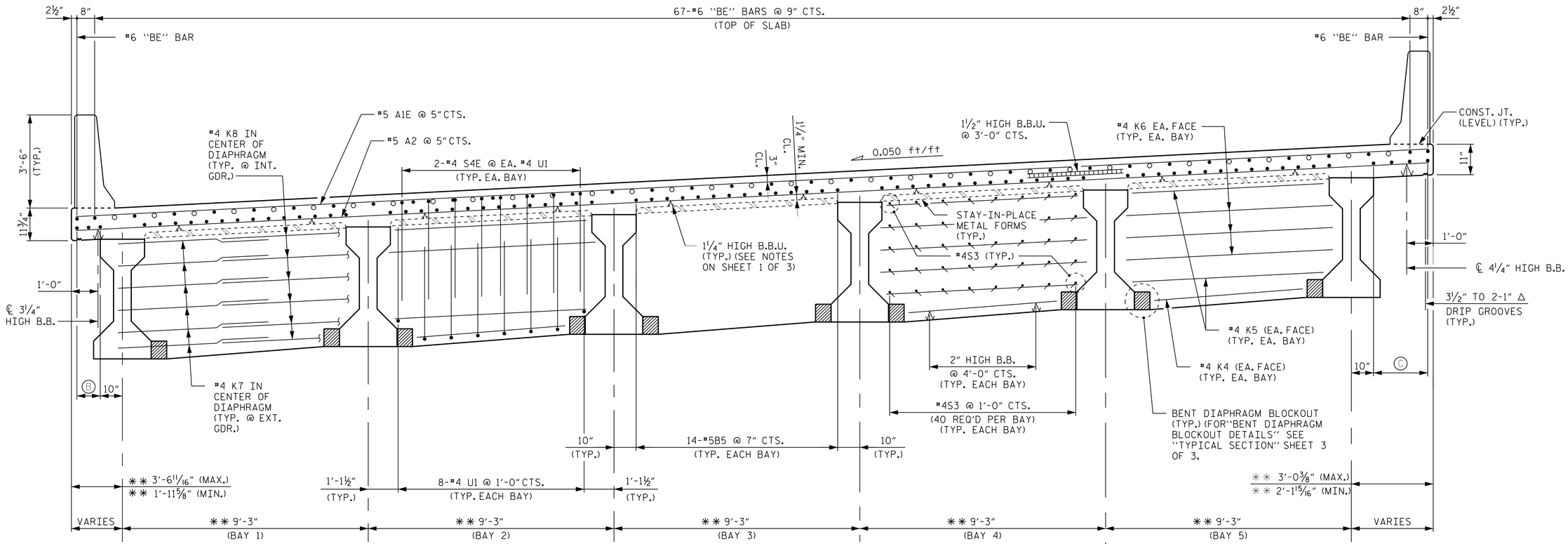
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-6
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15

12/7/2018



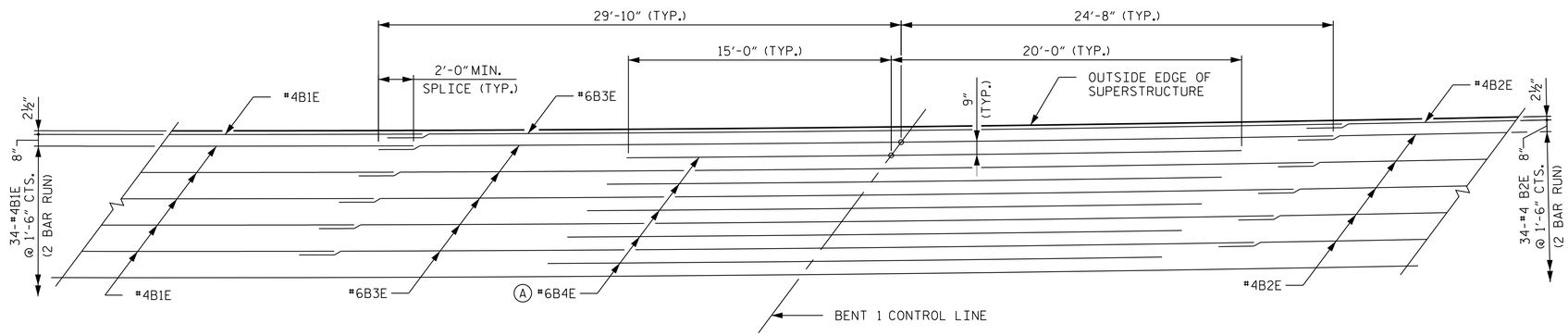
Ⓑ 3-#5B5 @ EQ. SPA.
(BOT. OF OVERHANG)

Ⓒ 4-#5B5 @ EQ. SPA.
(BOT. OF OVERHANG)

SECTION - BENT DIAPHRAGM

TYPICAL SECTION

✱✱ DENOTES DIMENSIONS MEASURED PERPENDICULAR TO LONG CHORD & BRIDGE WORK LINE



PART SLAB PLAN OVER BENT

LONGITUDINAL REINFORCING (TOP OF SLAB)
REINFORCING IS SYMMETRICAL ABOUT BRIDGE ℄

Ⓐ #6 B4E NON-CONTINUOUS REINFORCING BAR BETWEEN CONTINUOUS REINFORCING OVER INTERIOR BENT.

- ○ INDICATES NON-CONTINUOUS REINFORCING STEEL OVER BENT.
- • INDICATES CONTINUOUS REINFORCING FROM END BENT 1 TO END BENT 2.

NOTE:

FOR SUPERSTRUCTURE NOTES, SEE "TYPICAL SECTION", SHEET 1 OF 3.

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15

DRAWN BY:	D. D. LOWERY	DATE: 10/18
CHECKED BY:	P. D. COOKSEY	DATE: 10/18
DESIGN ENGINEER OF RECORD:	A.L. PHILLIPS	DATE: 10/18

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12/7/2018

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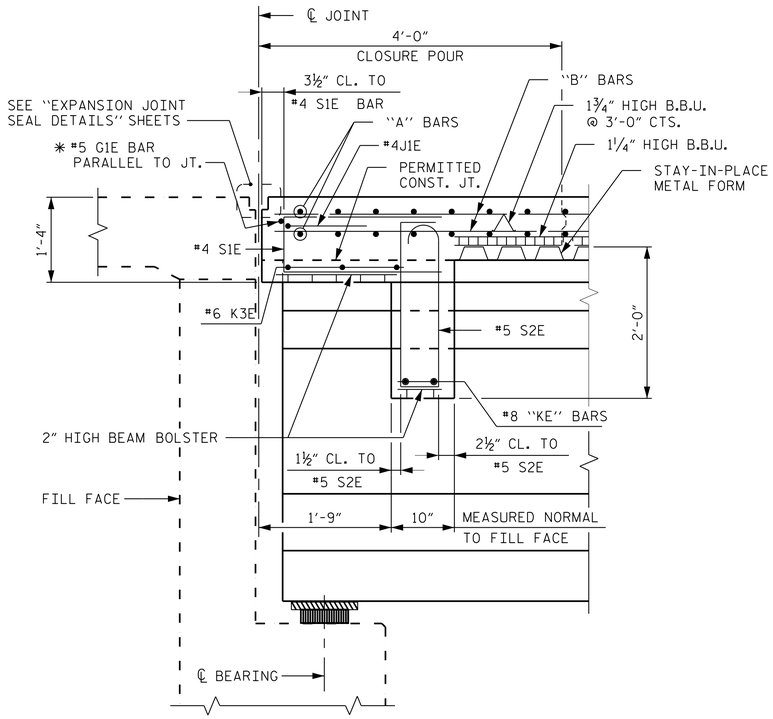
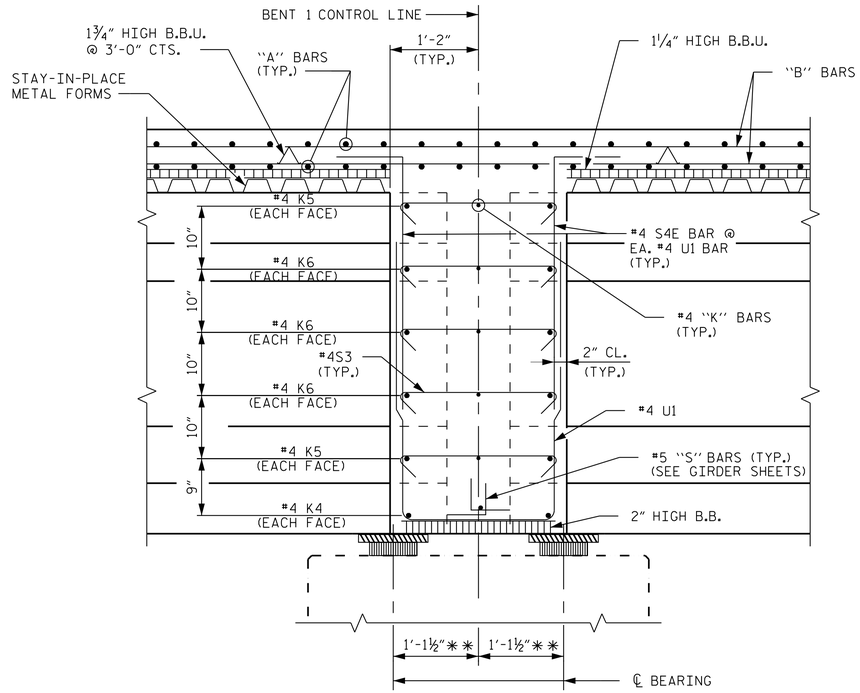


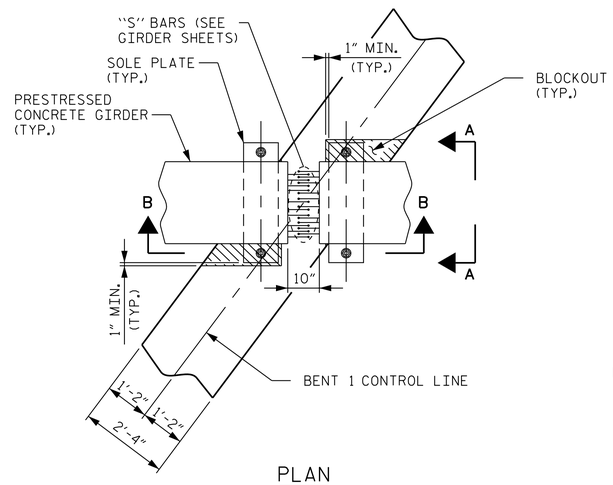
SECTION THRU END BENT DIAPHRAGM

* #5G1E BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS

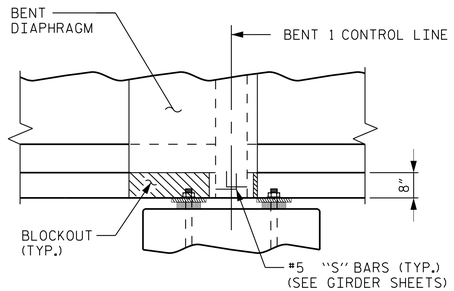


SECTION THRU BENT DIAPHRAGM

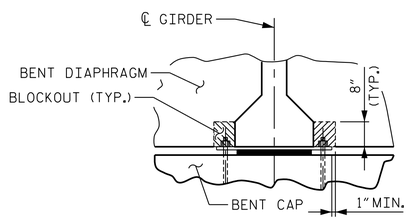
** DIMENSION ALONG ℄ GIRDER



PLAN



SECTION B-B



SECTION A-A

BENT DIAPHRAGM BLOCKOUT DETAIL

K:\RDT_Structures_Bridge\NC\101036303 - R-1015\CAD\Dgn\Structure 415\R1015_SMU_TS3_240286.dgn

12/7/2018

DRAWN BY: D. D. LOWERY DATE: 10/18
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DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 10/18

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PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 3 OF 3

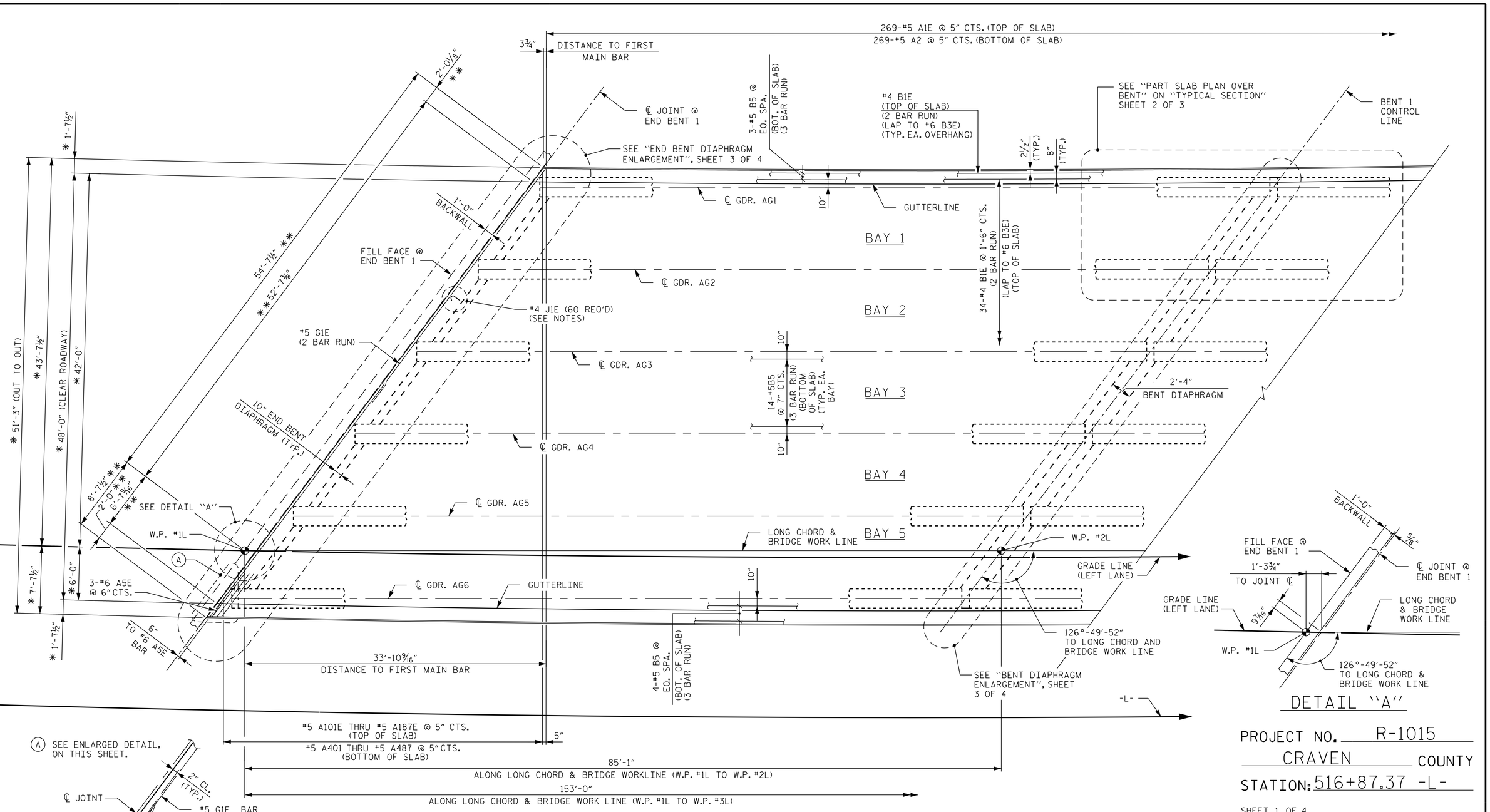
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

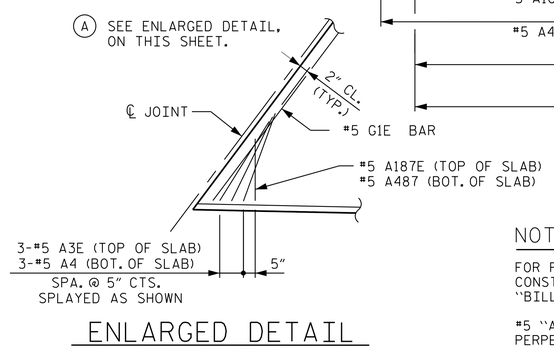
TYPICAL SECTION

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-8
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15





ENLARGED DETAIL

(RIGHT SIDE SHOWN, LEFT SIDE SIMILAR)

DETAIL "A"

SPAN A

PART PLAN OF SPANS

* DENOTES RADIAL DIMENSION
** DENOTES MEASURED ALONG ℄ JOINT

NOTES:

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

#5 "A" AND "AE" BARS TO BE PLACED PERPENDICULAR TO AND ALONG LONG CHORD.

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

FOR CONCRETE BARRIER RAIL STEEL SEE "CONCRETE BARRIER RAIL" SHEET.

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

FOR END BENT AND BENT ENLARGEMENT DETAILS SEE "PLAN OF SPAN" SHEET 3 OF 4.

FOR PLACEMENT OF #4 J1E BARS, SEE "EXPANSION JOINT SEAL DETAILS" SHEET 1 OF 2.

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-9
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15

DRAWN BY: D. D. LOWERY	DATE:	10/18
CHECKED BY: P. D. COOKSEY	DATE:	10/18
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS	DATE:	10/18

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L PHILLIPS

DocuSigned by: Andrew L Phillips 12/7/2018
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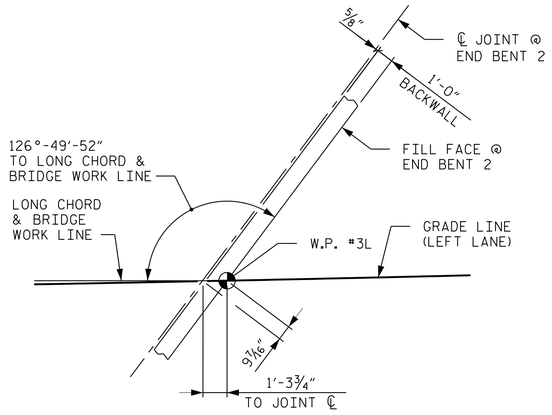
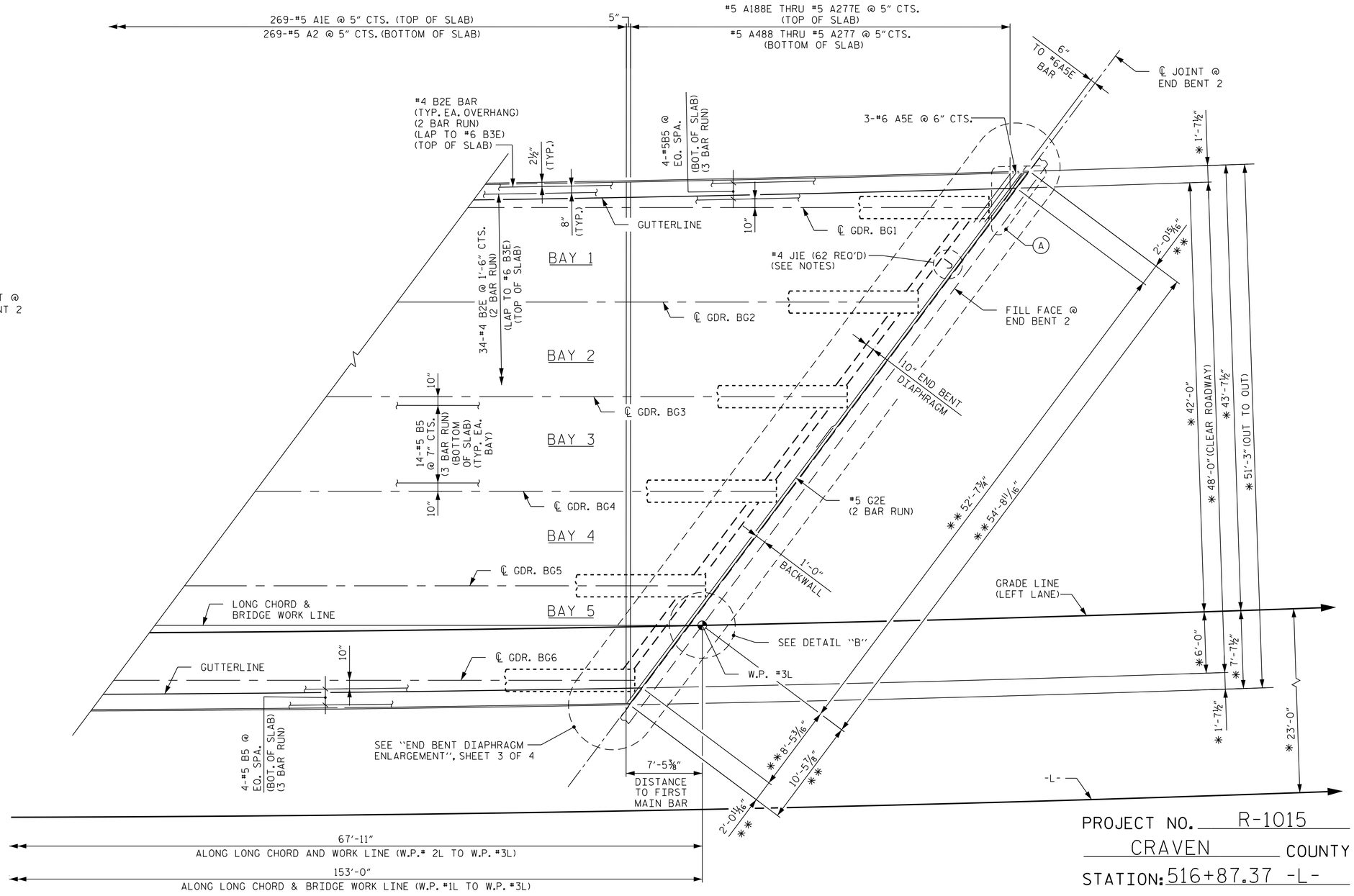


DETAIL ''B''



SPAN B

PART PLAN OF SPANS

* DENOTES RADIAL DIMENSION
** DENOTES MEASURED ALONG ℄ JOINT

Ⓐ SEE ENLARGED DETAIL, ON SHEET 1 OF 3.

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

LEFT LANE

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-10
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15

DRAWN BY: D. D. LOWERY DATE: 10/18
CHECKED BY: P. D. COOKSEY DATE: 10/18
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 10/18

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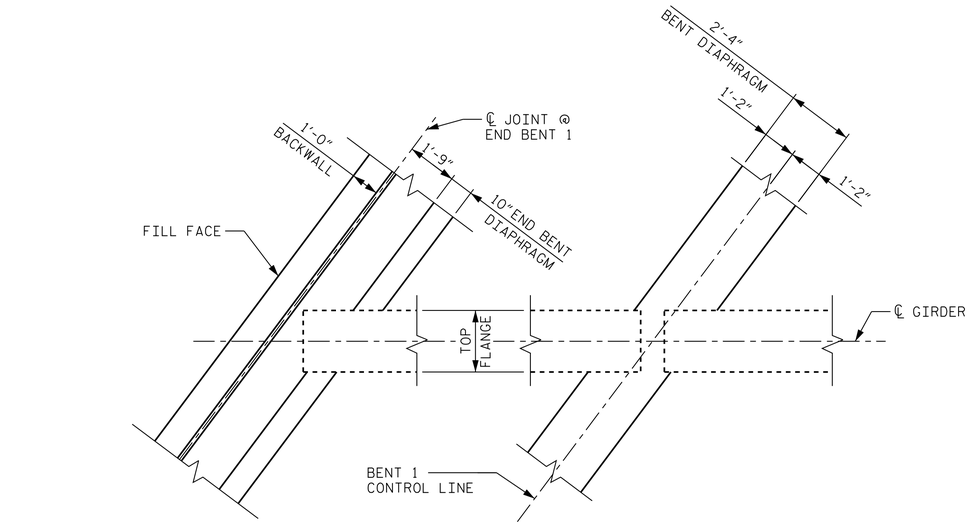
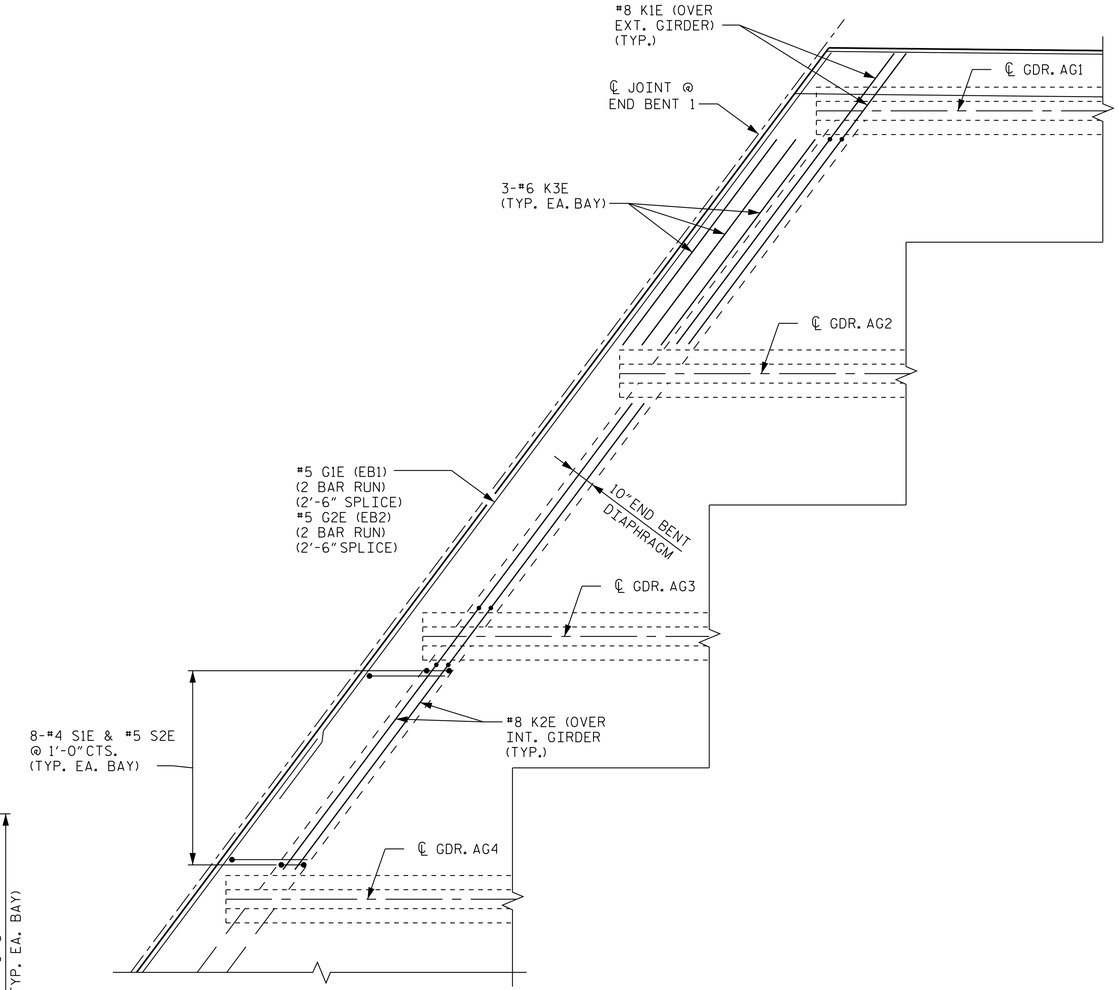


END BENT DIAPHRAGM
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

BENT DIAPHRAGM

PLAN



END BENT DIAPHRAGM ENLARGEMENT
END BENT 1 SHOWN, END BENT 2 SIMILAR

BENT DIAPHRAGM ENLARGEMENT

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-11
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS
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DESIGN ENGINEER OF RECORD:	A. L. PHILLIPS	DATE: 10/18

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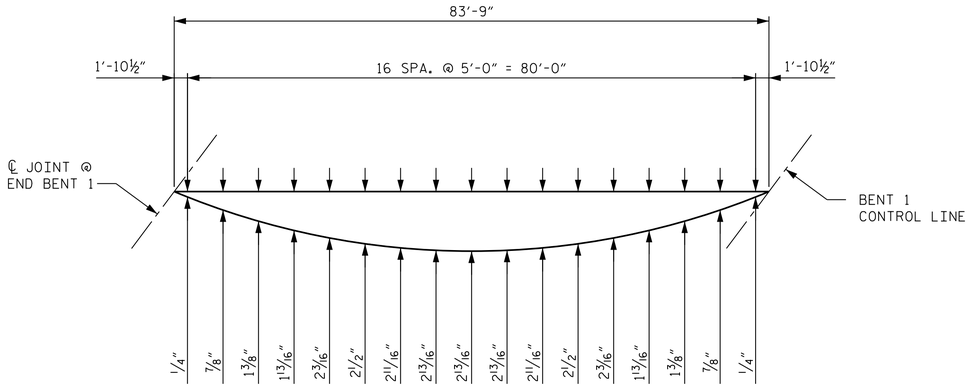
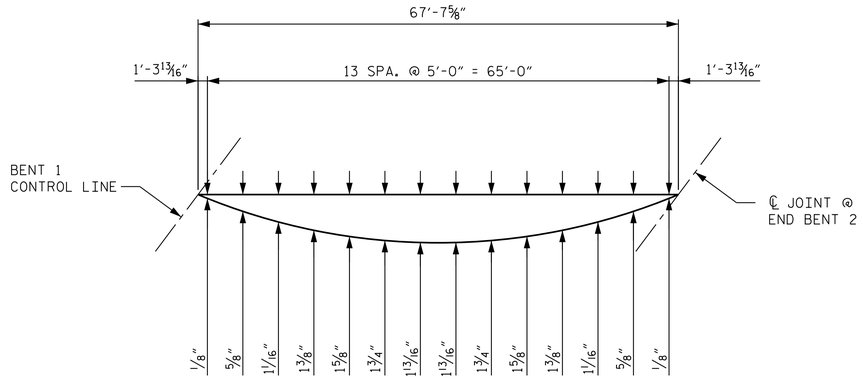
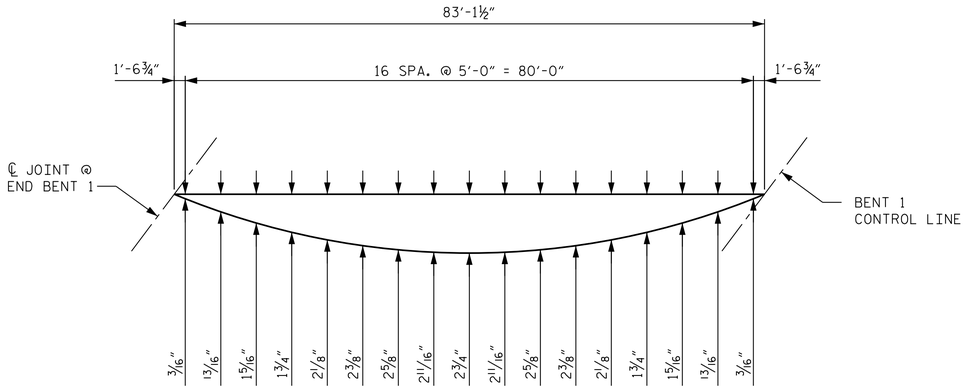


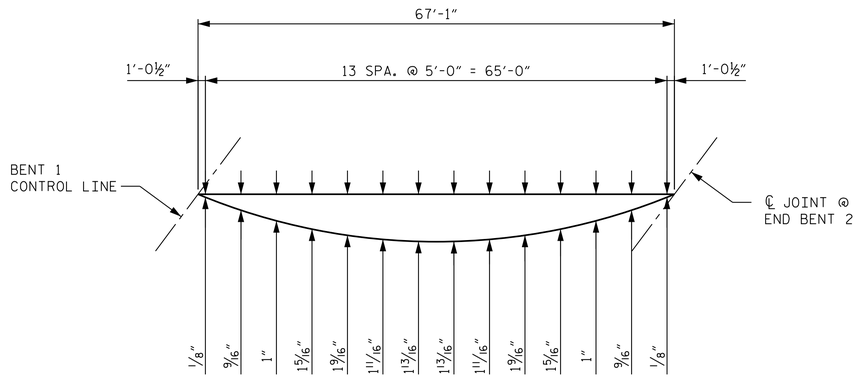
SPAN A ARC OFFSETS - LEFT SLAB EDGE



SPAN B ARC OFFSETS - LEFT SLAB EDGE



SPAN A ARC OFFSETS - RIGHT SLAB EDGE



SPAN B ARC OFFSETS - RIGHT SLAB EDGE

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-12
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L PHILLIPS

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DRAWN BY:	D. D. LOWERY	DATE:	10/18
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DESIGN ENGINEER OF RECORD:	A. L. PHILLIPS	DATE:	10/18

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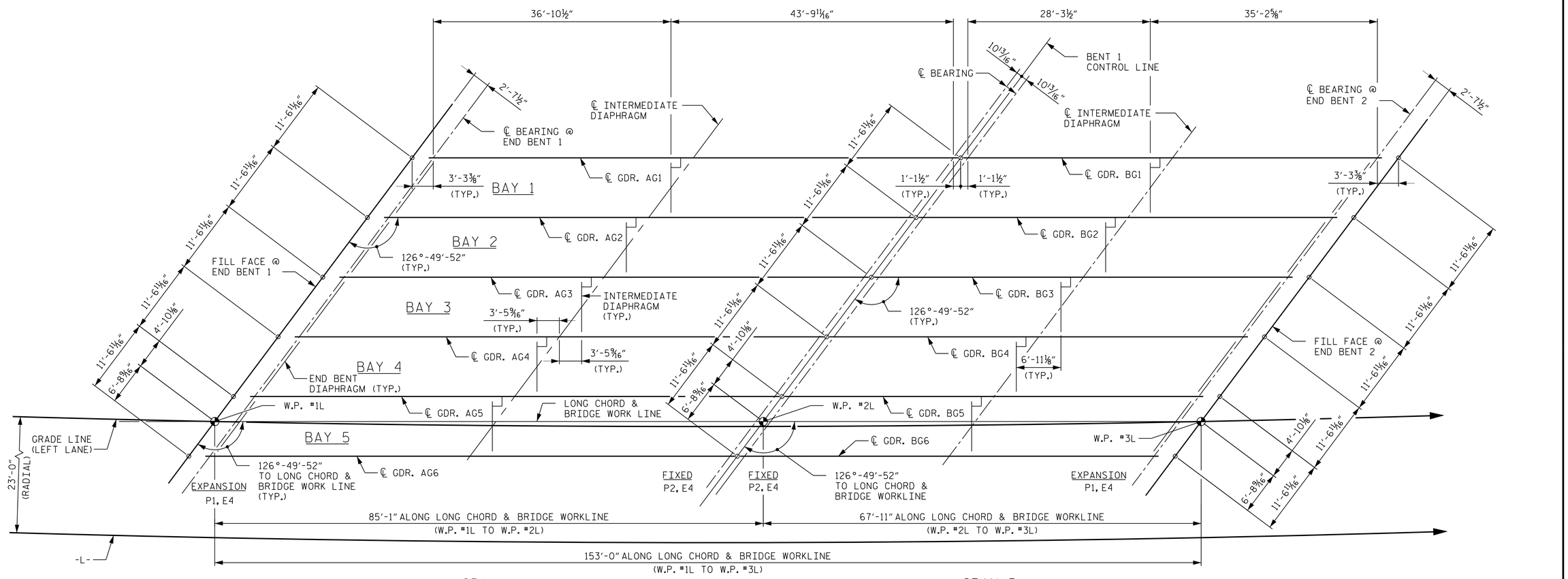
NOTES:

ALL GIRDERS ARE PARALLEL TO LONG CHORD AND BRIDGE WORK LINE.

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



FRAMING PLAN

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L PHILLIPS

DocuSigned by: Andrew L Phillips 12/7/2018

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-13
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15

DRAWN BY: D. D. LOWERY DATE: 10/18
CHECKED BY: P. D. COOKSEY DATE: 10/18
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 10/18

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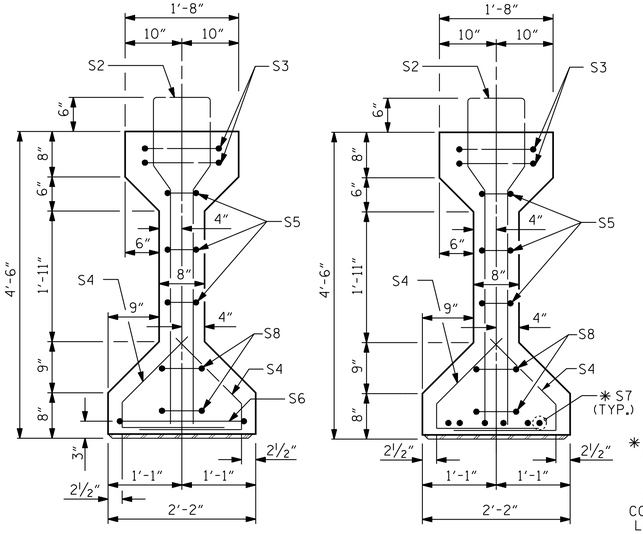
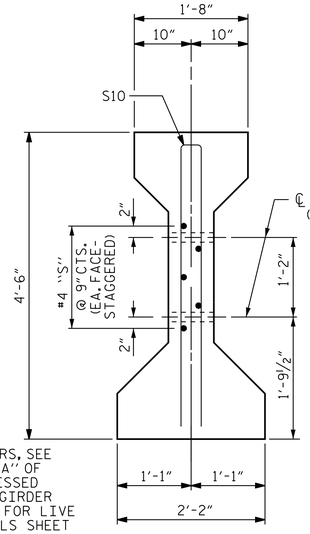


SECTION A-A

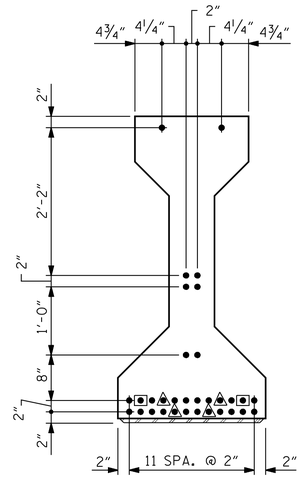
SECTION B-B



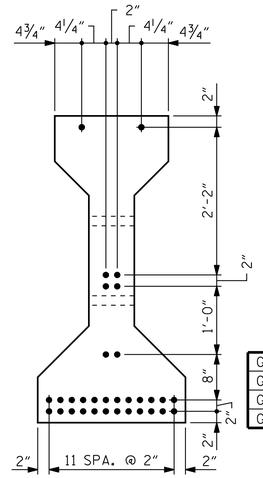
SECTION C-C

(S1 BARS NOT SHOWN)

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



AT END OF GIRDER

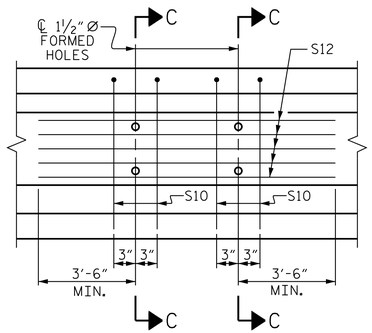


AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

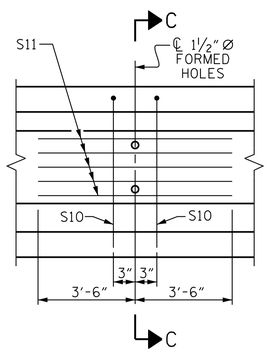
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ◭ STRANDS DEBONDED FOR 6'-0" FROM END OF GIRDER
- ◙ STRANDS DEBONDED FOR 20'-0" FROM END OF GIRDER



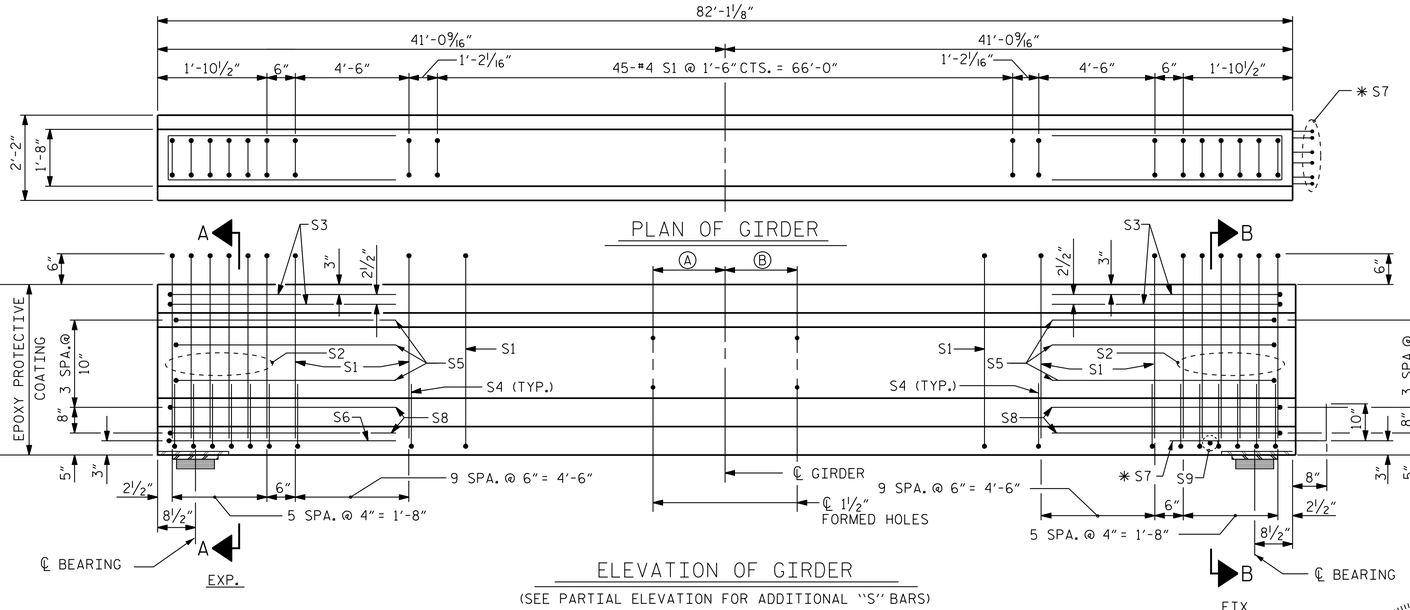
PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. AG2-AG5



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. AG1 & AG6



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

GDR.	Ⓐ	Ⓑ
AG1	3'-5⅝"	-
AG2-AG5	3'-5⅝"	3'-5⅝"
AG6	-	3'-5⅝"

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

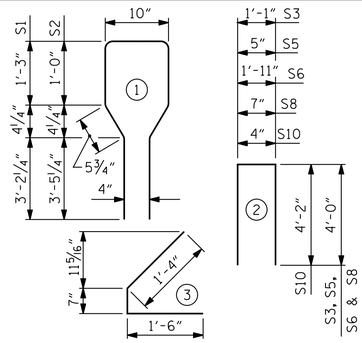
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	65	#4	1	10'-8"	463
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✱S7	6	#5	STR	3'-8"	23
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S10	4	#5	2	8'-8"	36
S11	5	#4	STR	7'-0"	23
S12	5	#4	STR	14'-0"	47

GDR. AG1 & AG6	
GDR. AG2 - AG5	
GDR. AG1 & AG6	
GDR. AG2 - AG5	

✱ 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	6500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GDR. AG1 & AG6	954	16.7	32
GDR. AG2 - AG5	996	16.7	32

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	82'-1⅛"	492'-6¾"

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
(SPAN A)
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-14
1			3			TOTAL SHEETS
2			4			44

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L PHILLIPS

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NC LICENSE # F-0102

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ASSEMBLED BY : D. D. LOWERY	DATE : 10/18		
CHECKED BY : A. L. PHILLIPS	DATE : 10/18		
DRAWN BY : ELR 8/91	REV. 10/1/11	MAA/GM	
CHECKED BY : GRP 8/91	REV. 1/15	MAA/TMG	
	REV. 12/17	MAA/THC	

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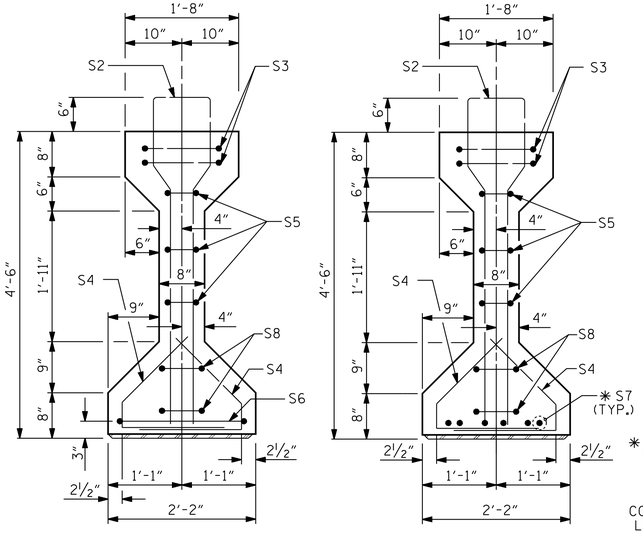
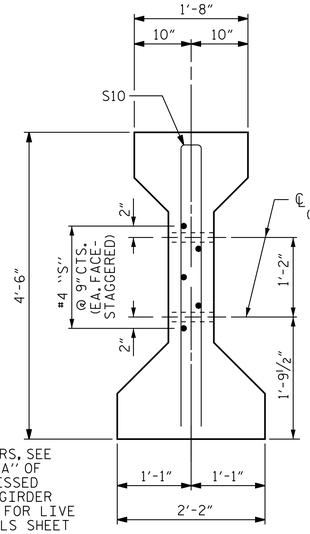
STRUCTURE 15 STD. NO. PCG6



SECTION A-A

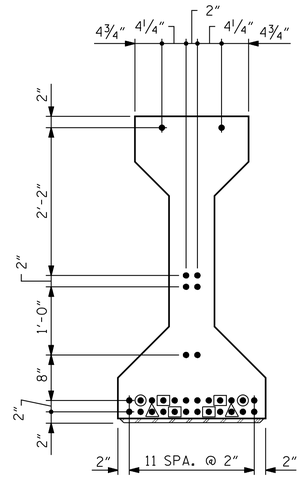
SECTION B-B



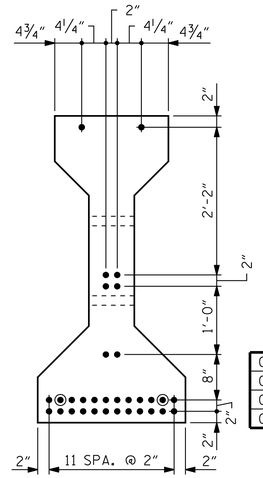
SECTION C-C

(S1 BARS NOT SHOWN)

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



AT END OF GIRDER

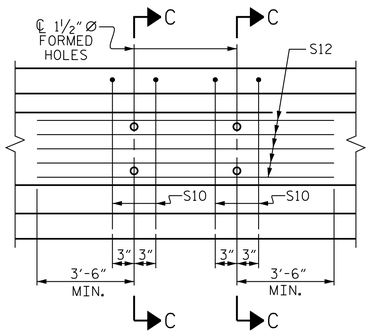


AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

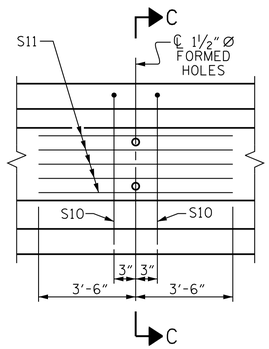
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ⦿ FULLY DEBONDED STRANDS (DEBOND FULL LENGTH OF GIRDER)
- △ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ▣ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER



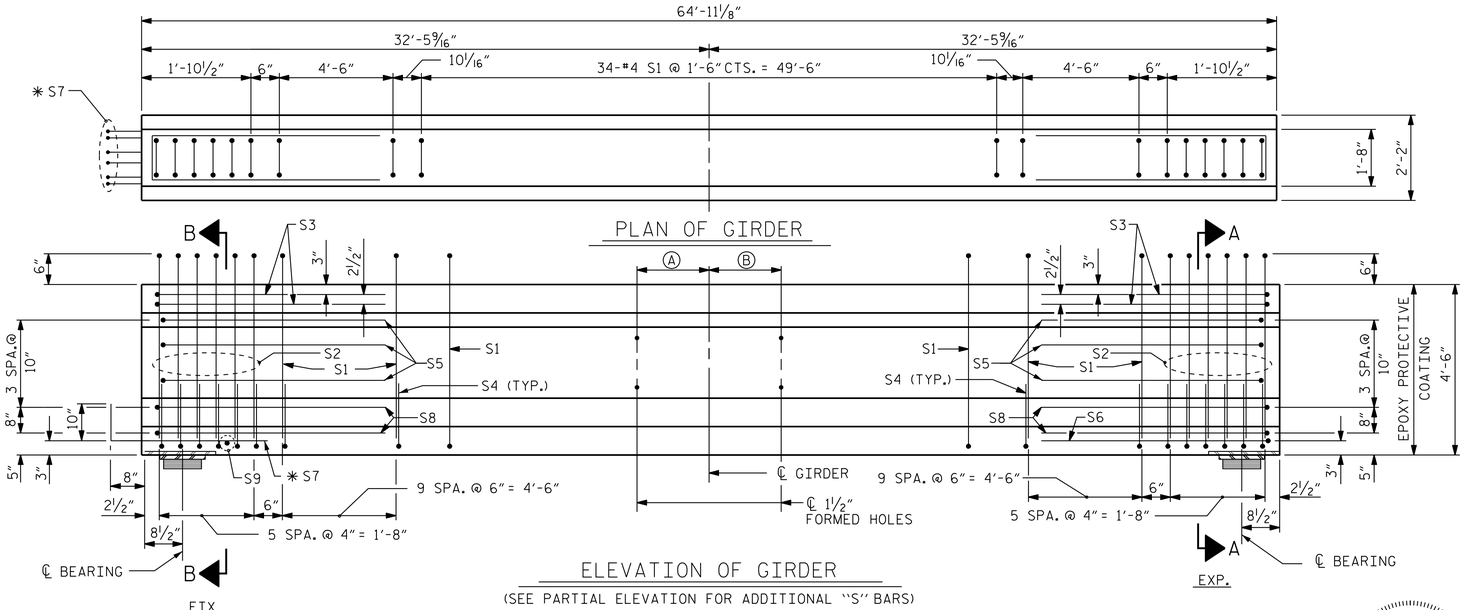
PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. BG2-BG5



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. BG1 & BG6



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

GDR.	Ⓐ	Ⓑ
BG1	3'-5⁹⁄₁₆"	-
BG2-BG5	3'-5⁹⁄₁₆"	3'-5⁹⁄₁₆"
BG6	-	3'-5⁹⁄₁₆"

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

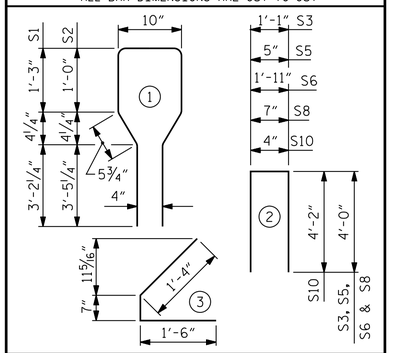
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	54	#4	1	10'-8"	385
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✱S7	6	#5	STR	3'-8"	23
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S10	4	#5	2	8'-8"	36
S11	5	#4	STR	7'-0"	23
S12	5	#4	STR	14'-0"	47

GDR. BG1 & BG6
GDR. BG2 - BG5
GDR. BG1 & BG6
GDR. BG2 - BG5

✱ 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	6500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GDR. BG1 & BG6	876	13.2	32
GDR. BG2 - BG5	918	13.2	32

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	64'-11⅛"	389'-6¾"

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
(SPAN B)
LEFT LANE

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L PHILLIPS

DocuSigned by: Andrew L Phillips 2BB86ABAD4004D3... 12/7/2018

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ASSEMBLED BY : D. D. LOWERY	DATE : 10/18
CHECKED BY : A. L. PHILLIPS	DATE : 10/18
DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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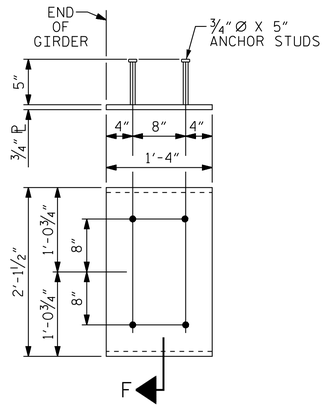
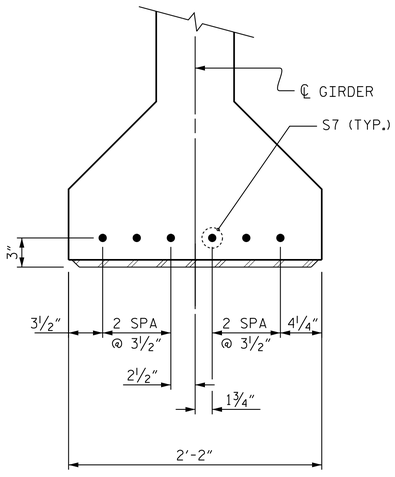
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15 STD. NO. PCG6

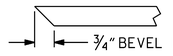


EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



DETAIL "A"



SECTION "F"

(SEE NOTES)

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO 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 5,000 PSI.

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

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

FOR SECTION C-C, SEE "AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD" SHEETS 1 OF 4 & 2 OF 4.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

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CHECKED BY : A. L. PHILLIPS	DATE :	10/18
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CHECKED BY : GRP 11/91	REV. 2/15	MAA/TMG
	REV. 12/17	MAA/THC

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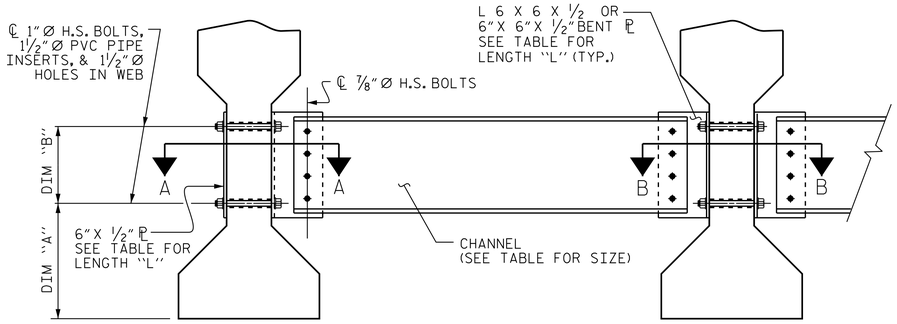
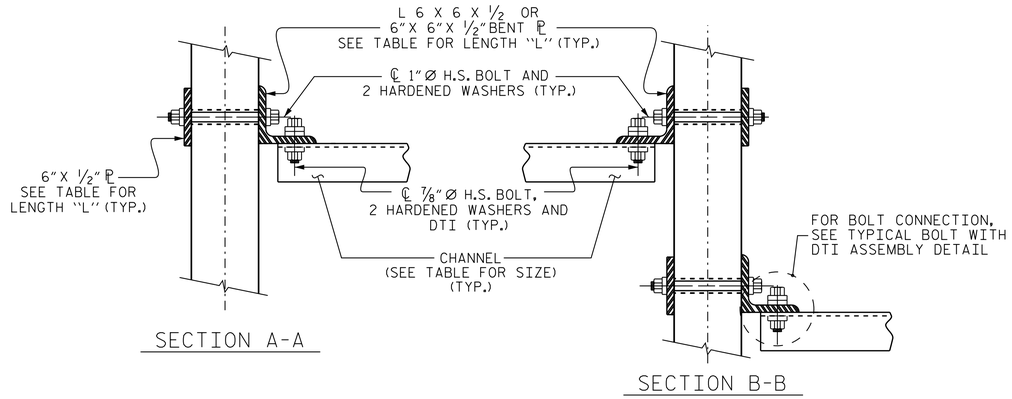
STRUCTURE 15 STD. NO. PCG9



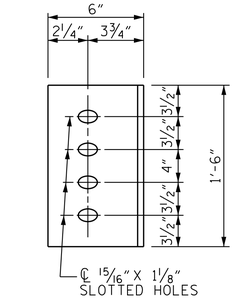
EXTERIOR GIRDER INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM

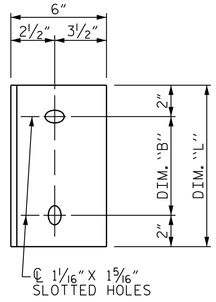


SECTION A-A SECTION B-B

CONNECTION DETAILS

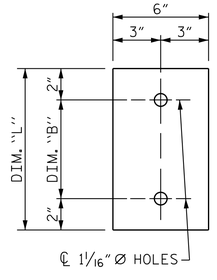


DIAPHRAGM FACE



WEB FACE

CONNECTOR PLATE DETAILS



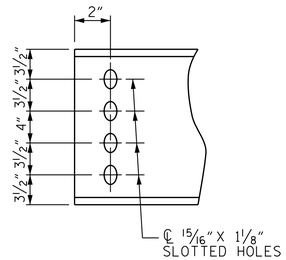


PLATE DETAILS CHANNEL END

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 METALIZED 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 (METALIZATION) SEE SPECIAL PROVISIONS.

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.

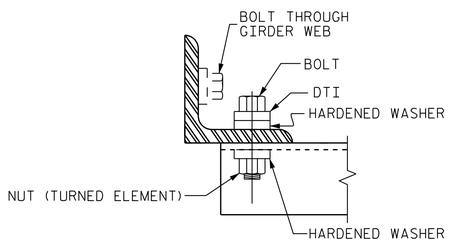
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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"



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

SHEET 4 OF 4

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:	S15-17
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NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

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ASSEMBLED BY : D.D.LOWERY	DATE : 10/18		
CHECKED BY : A.L.PHILLIPS	DATE : 10/18		
DRAWN BY : TLA 6/05	REV. 5/1/06RRR	KMM/GM	
CHECKED BY : VC 6/05	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THC	

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STRUCTURE 15 STD. NO. PCG10

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION STRANDS	SPAN A										
	GIRDERS AG1 AND AG6										
TENTH POINTS	BRG.	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.047	0.089	0.121	0.142	0.149	0.142	0.121	0.089	0.047	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.023	0.046	0.063	0.074	0.078	0.074	0.063	0.046	0.023	0.000
FINAL CAMBER ↑	0	1/4"	1/2"	11/16"	3/4"	13/16"	3/4"	11/16"	1/2"	1/4"	0

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION STRANDS	SPAN A										
	GIRDERS AG2, AG3, AG4, AND AG5										
TENTH POINTS	BRG.	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.047	0.089	0.121	0.142	0.149	0.142	0.121	0.089	0.047	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.026	0.050	0.069	0.081	0.086	0.081	0.069	0.050	0.025	0.000
FINAL CAMBER ↑	0	1/4"	7/16"	9/16"	11/16"	3/4"	11/16"	9/16"	7/16"	1/4"	0

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION STRANDS	SPAN B										
	GIRDERS BG1 AND BG6										
TENTH POINTS	BRG.	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.032	0.061	0.083	0.098	0.103	0.098	0.083	0.061	0.032	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.009	0.017	0.024	0.029	0.030	0.029	0.024	0.017	0.009	0.000
FINAL CAMBER ↑	0	1/4"	1/2"	11/16"	13/16"	13/16"	13/16"	11/16"	1/2"	1/4"	0

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

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION STRANDS	SPAN B										
	GIRDERS BG2, BG3, 4BG, AND BG5										
TENTH POINTS	BRG.	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.032	0.061	0.083	0.098	0.103	0.098	0.083	0.061	0.032	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.010	0.019	0.027	0.031	0.033	0.031	0.027	0.019	0.010	0.000
FINAL CAMBER ↑	0	1/4"	1/2"	5/8"	3/4"	13/16"	3/4"	5/8"	1/2"	1/4"	0

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

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

GIRDER DEFLECTION AND CAMBER SCHEDULES

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-18
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2			4			44

STRUCTURE 15

DRAWN BY: D. D. LOWERY DATE: 10/18
CHECKED BY: P. D. COOKSEY DATE: 10/18
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 10/18

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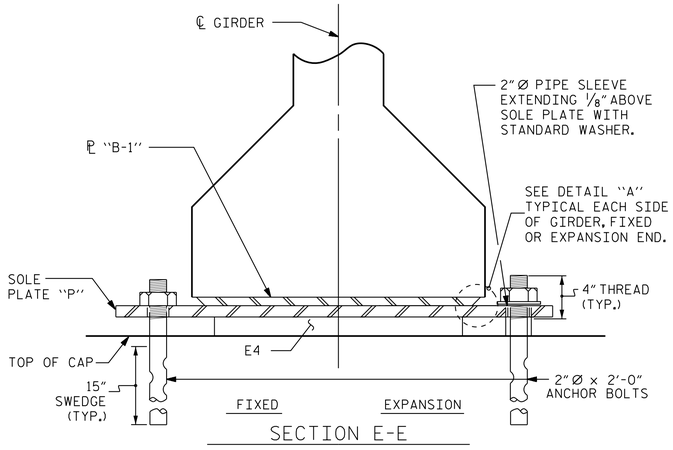
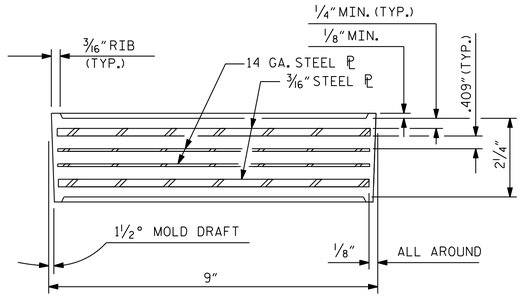
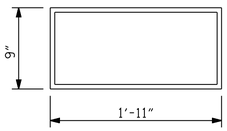


SECTION E-E



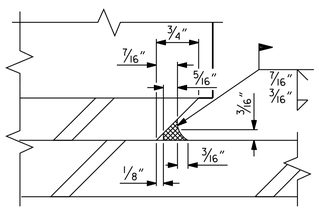
TYPICAL SECTION OF ELASTOMERIC BEARINGS



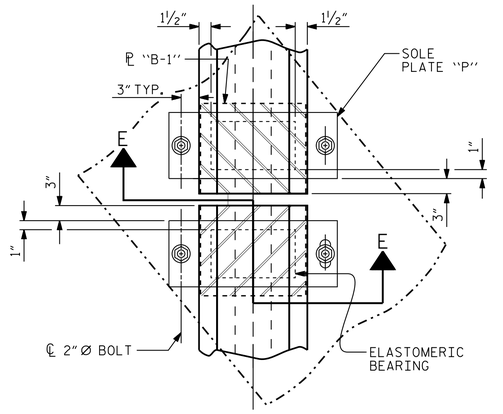
E4 (24 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V

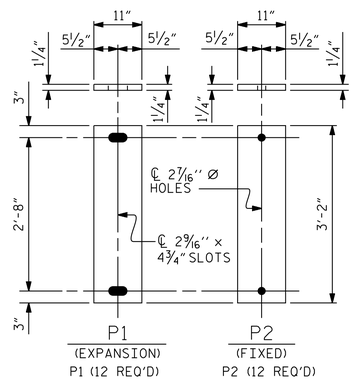


DETAIL "A"



TYPICAL HALF-PLAN (FIXED)

TYPICAL HALF-PLAN (EXPANSION)



SOLE PLATE DETAILS ("P")

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

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. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-19
1			3			TOTAL SHEETS
2			4			44

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ASSEMBLED BY : D.D.LOWERY		DATE :	10/18
CHECKED BY : A.L.PHILLIPS		DATE :	10/18
DRAWN BY : WJH 8/89	REV. 6/13		AAC/MAA
CHECKED BY : CRK 8/89	REV. 1/15		MAA/TMG
	REV. 12/17		MAA/THC

12/7/2018

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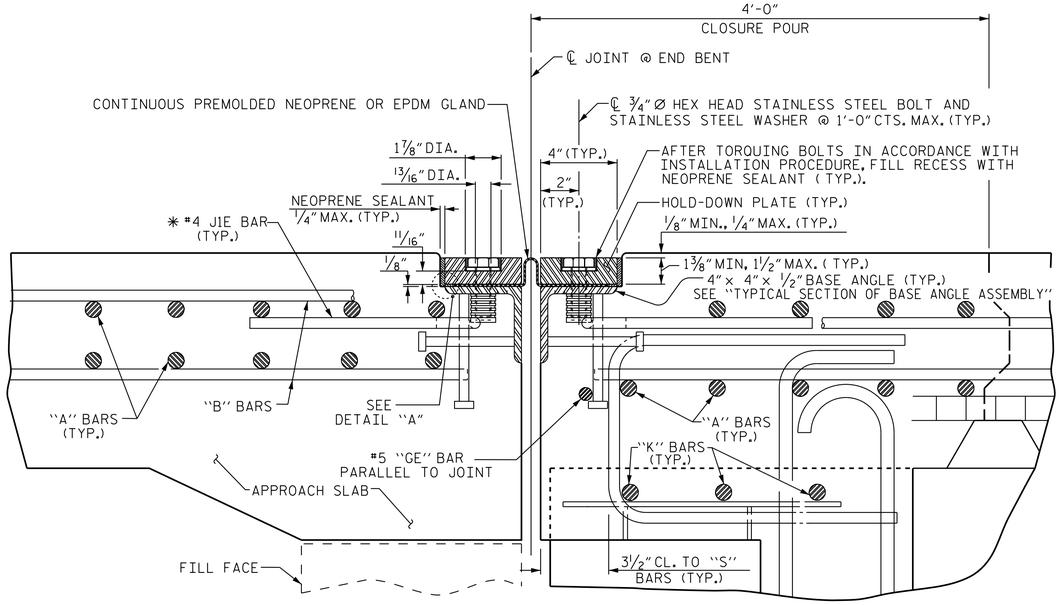
STRUCTURE 15 STD. NO. EB4



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

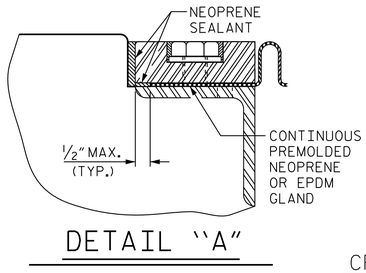
* THE QUANTITY OF #4 J1E BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1E BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1E BARS SPECIFIED, ADDITIONAL J1E BARS WILL NOT BE REQUIRED.

INSTALLATION PROCEDURE

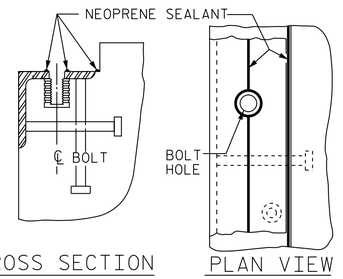
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4⅛" TO 4¼" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO 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 TORQUING, 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 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.

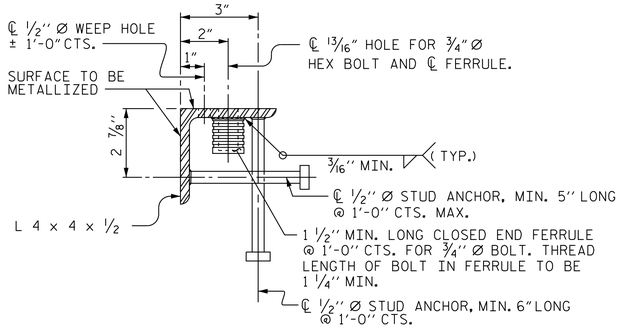


DETAIL "A"



CROSS SECTION PLAN VIEW

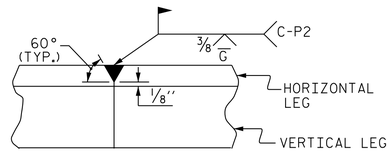
INSTALLATION SKETCH



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

MOVEMENT AND SETTING AT JOINT					
BENT NO.	SKEW ANGLE	TOTAL MOVEMENT	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
EB 1	126°-49'-52"	½"	1 5/16"	1¼"	1⅛"
EB 2	126°-49'-52"	7/16"	1¼"	1 3/16"	1 1/16"

TOTAL MOVEMENT IS CALCULATED ALONG THE CENTERLINE OF THE GIRDER. JOINT OPENINGS ARE MEASURED PERPENDICULAR TO THE JOINT.



DETAIL- FIELD WELD SPLICE OF BASE ANGLE

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

DocuSigned by: Andrew L. Phillips 2BB69A8AD4004D3... 12/7/2018

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PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
EXPANSION JOINT SEAL DETAILS

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
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STRUCTURE 15 STD. NO. EJS1

ASSEMBLED BY : D. D. LOWERY	DATE : 10/18		
CHECKED BY : A. L. PHILLIPS	DATE : 10/18		
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	

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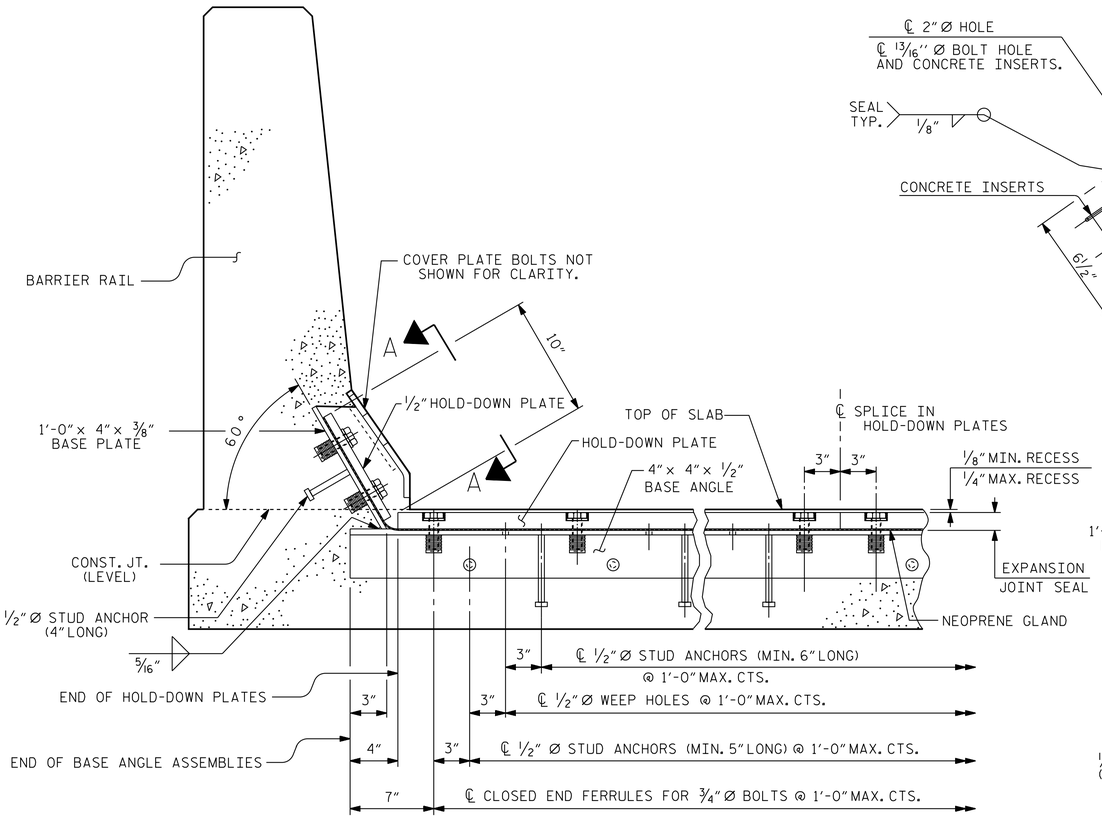
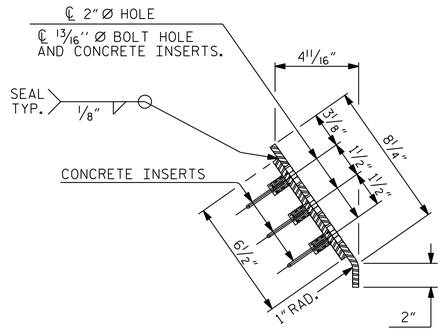
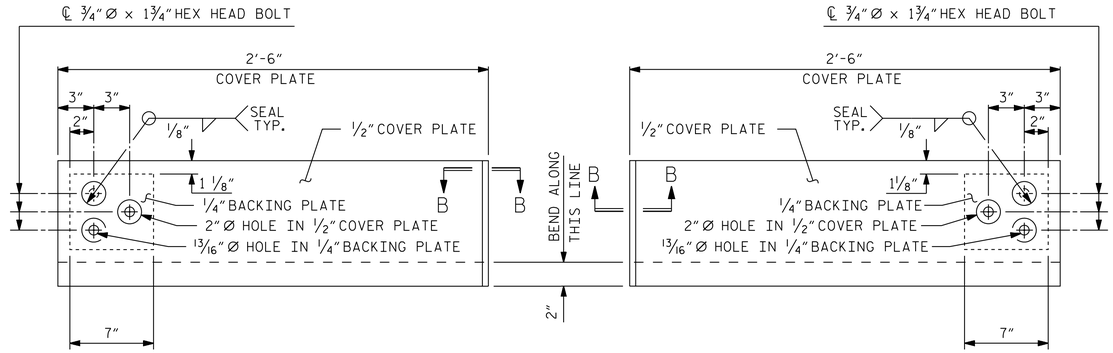


SECTION THRU RAIL NORMAL TO JOINT



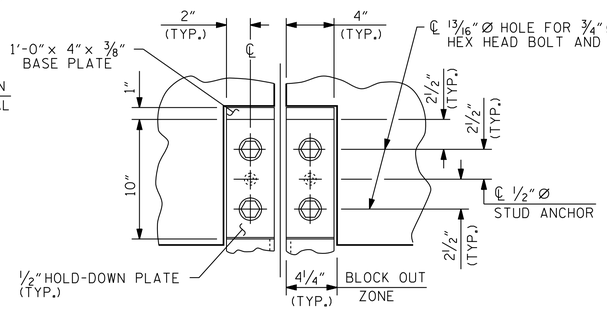
END VIEW



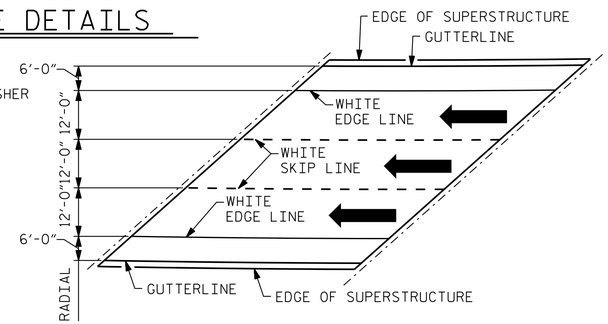
TYPE I - ELEVATION VIEW

TYPE II - ELEVATION VIEW

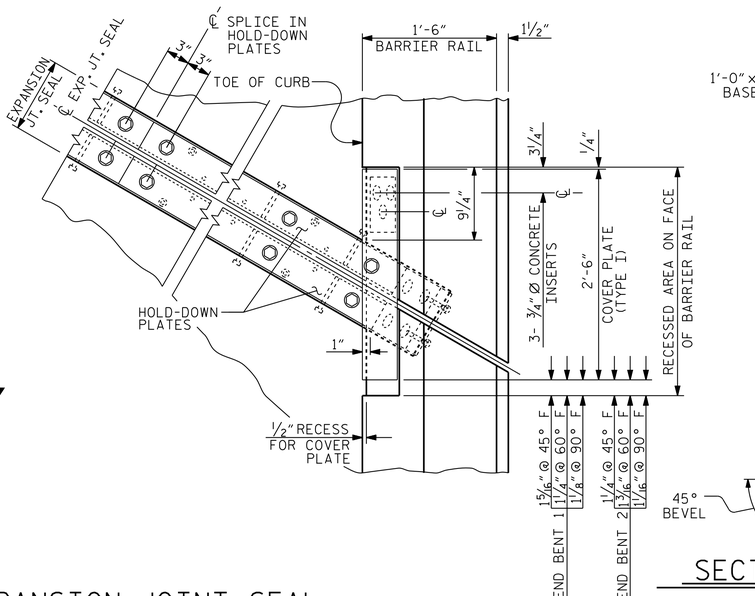
COVER PLATE DETAILS



SECTION A - A

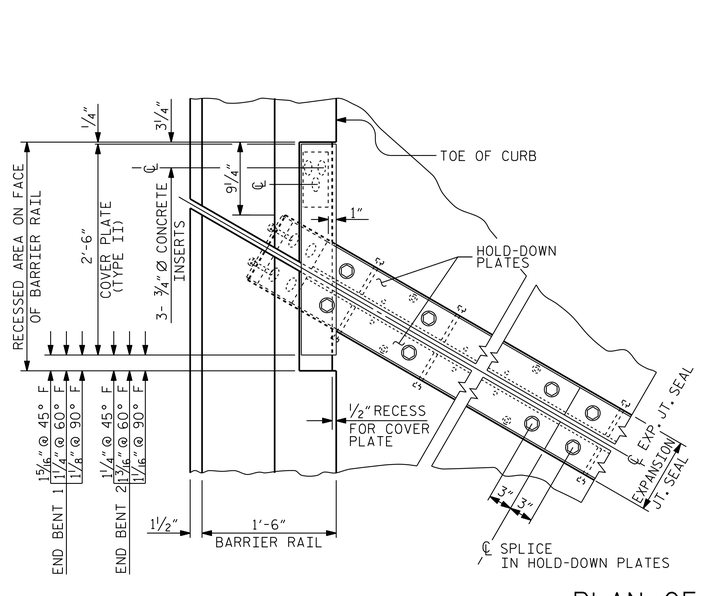


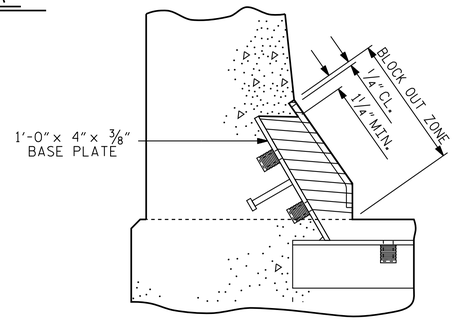
PAVEMENT MARKING ALIGNMENT



PLAN OF EXPANSION JOINT SEAL

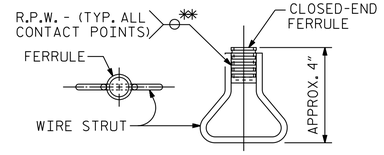
FLOW OF TRAFFIC





BLOCK OUT DETAIL

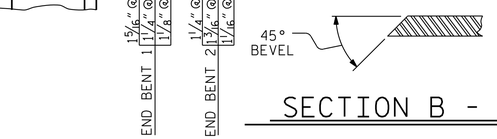
SEE " SECTION A - A " FOR OTHER DETAILS.



PLAN ELEVATION

CONCRETE INSERT

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



SECTION B - B

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

DocuSigned by: Andrew L. Phillips 2BB86ABAD4004D3... 12/7/2018

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ASSEMBLED BY : D. D. LOWERY		DATE :	10/18
CHECKED BY : A. L. PHILLIPS		DATE :	10/18
DRAWN BY : REK 9/87	REV. 7/12		MAA/GM
CHECKED BY : CRK 10/87	REV. 6/13		MAA/GM
	REV. 12/17		MAA/THC

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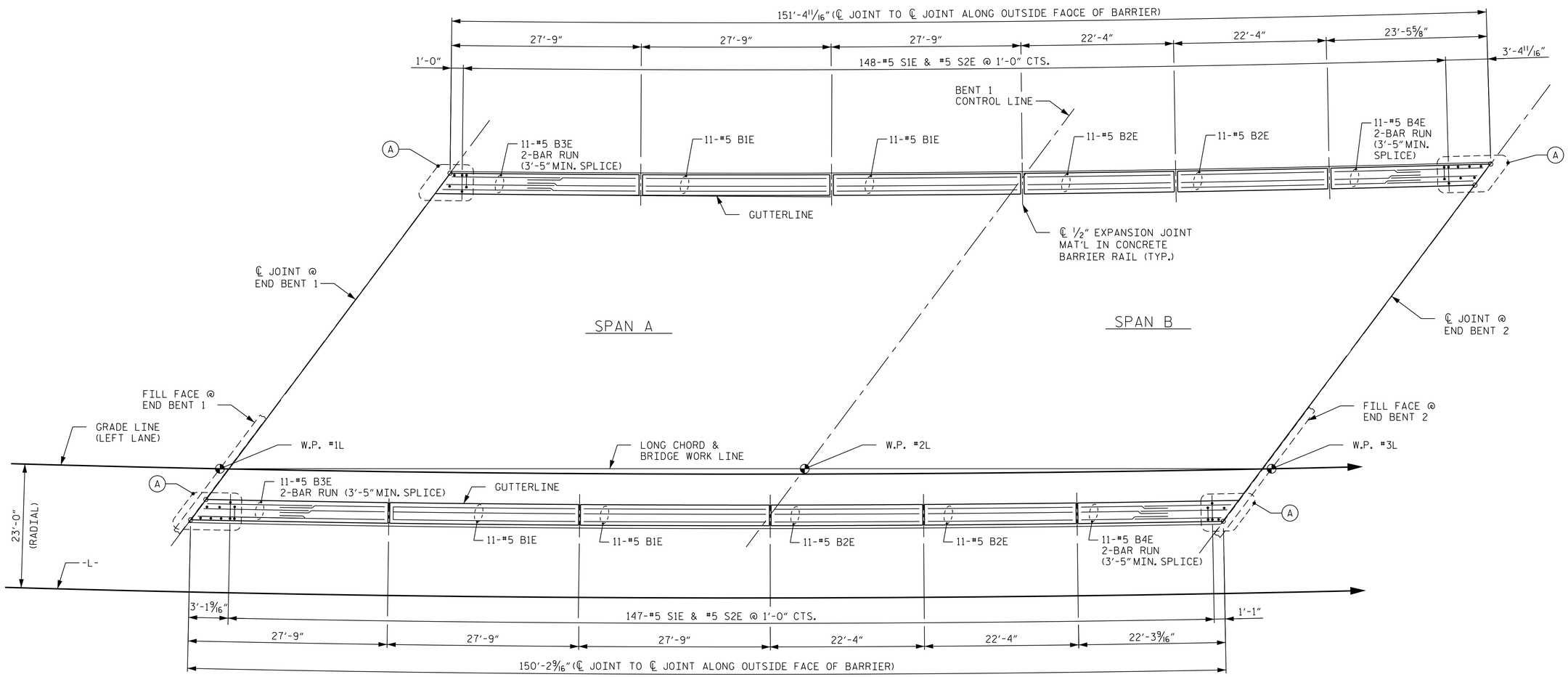
12/7/2018

STRUCTURE 15 STD. NO. EJS2

NOTES

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



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

PLAN OF BARRIER RAIL

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

CONCRETE BARRIER RAIL LAYOUT
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-22
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STRUCTURE 15

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DRAWN BY: D. D. LOWERY DATE: 10/18
CHECKED BY: P. D. COOKSEY DATE: 10/18
DESIGN ENGINEER OF RECORD: A.L. PHILLIPS DATE: 10/18

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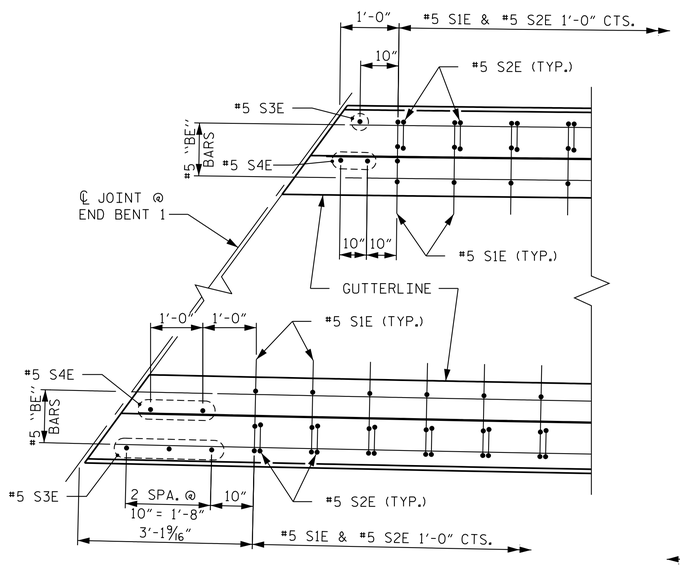
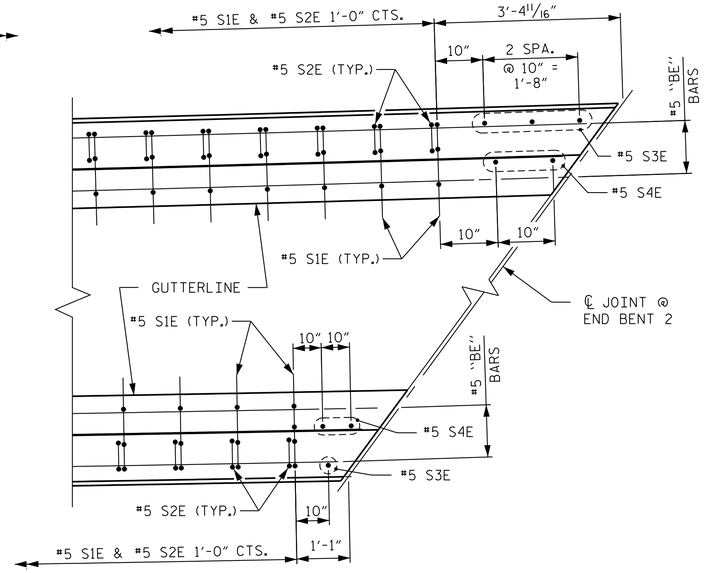


END BENT 1



END BENT 2

PLAN AT END OF RAIL

NOTES

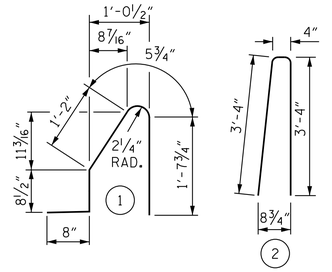
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

QUANTITIES FOR BARRIER RAIL ON APPROACH SLAB ARE INCLUDED ON BRIDGE APPROACH SLAB SHEETS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

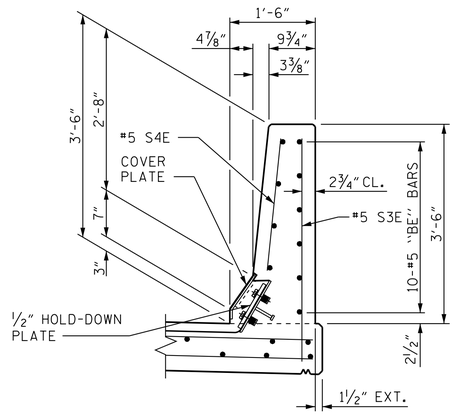
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1E	44	#5	STR	27'-4"	1,254
B2E	44	#5	STR	21'-11"	1,006
B3E	44	#5	STR	16'-0"	734
B4E	44	#5	STR	13'-3"	608
S1E	295	#5	1	4'-8"	1,436
S2E	295	#5	2	7'-0"	2,154
S3E	8	#5	STR	3'-11"	33
S4E	8	#5	STR	2'-4"	19

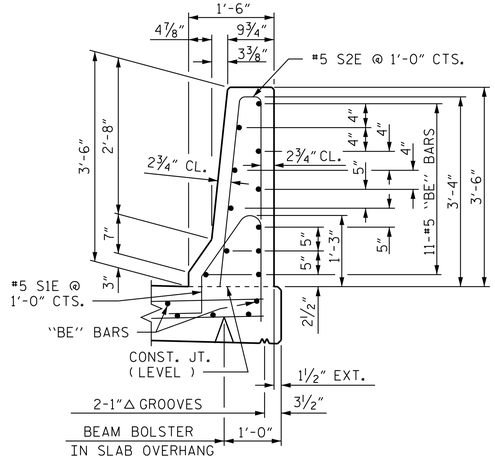
EPOXY COATED REINFORCING STEEL	7,244 LBS.
CLASS AA CONCRETE	41.1 CU. YDS.
CONCRETE BARRIER RAIL **	301.6 LIN. FT.

"E" INDICATES EPOXY COATED REINFORCING STEEL.

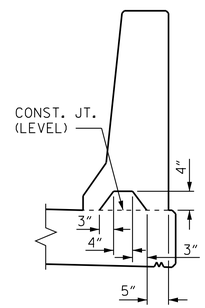
** DOES NOT INCLUDE BARRIER RAIL ON APPROACH SLABS.



SECTION THRU RAIL @ END VIEW

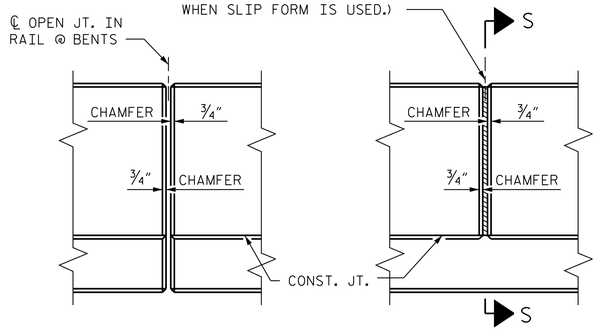


SECTION THRU RAIL



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

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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS
DocuSigned by: Andrew L. Phillips 2BB69A8AD400403...
12/7/2018

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ASSEMBLED BY : D.D.LOWERY		DATE :	10/18
CHECKED BY : A.L.PHILLIPS		DATE :	10/18
DRAWN BY : ARB 5/87	REV. 7/12		MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13		MAA/GM
	REV. 12/17		MAA/THC

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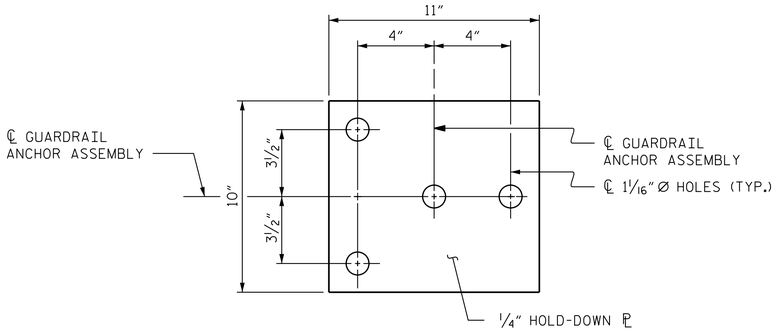
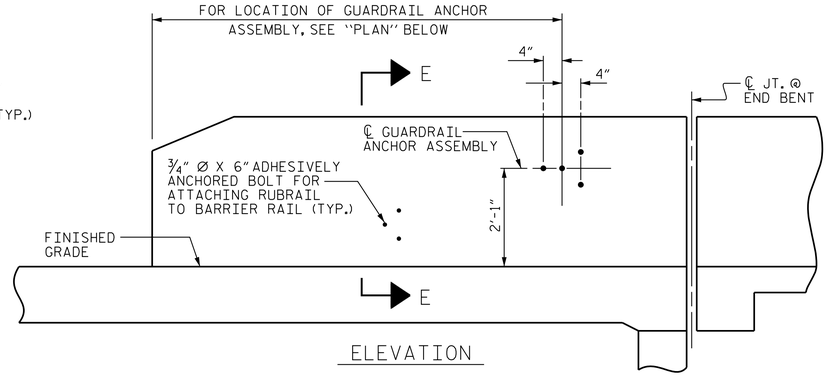
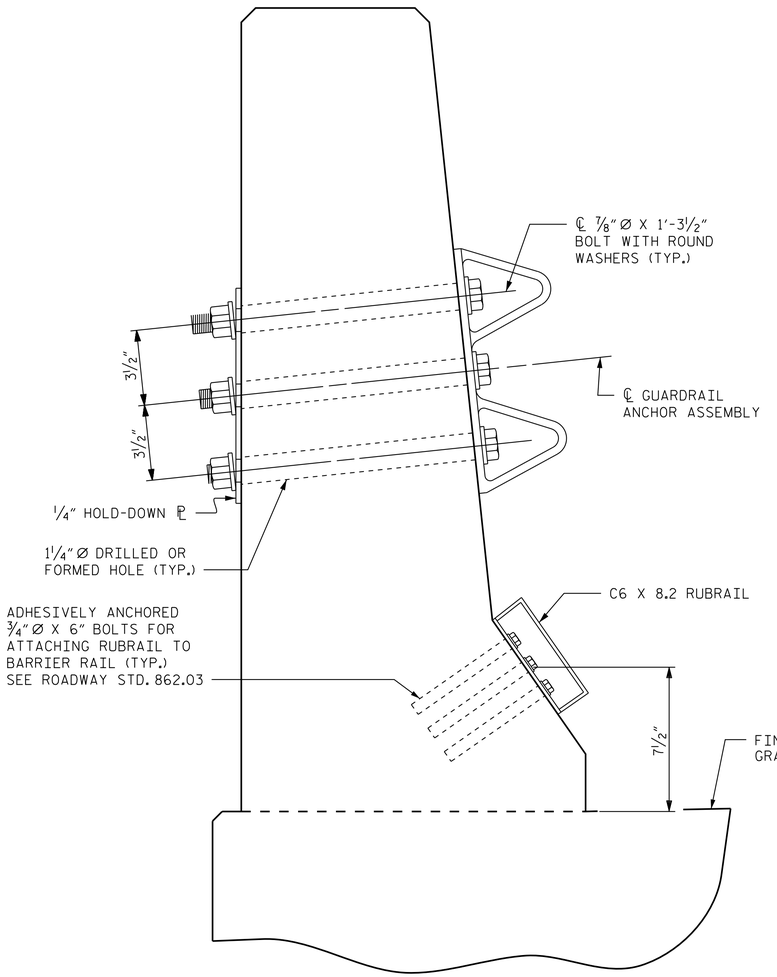
STRUCTURE 15 STD. NO. CBR1



PLAN



ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS

PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR

SEE "SKETCH SHOWING POINTS OF ATTACHMENTS" FOR ACTUAL LOCATIONS OF GUARDRAIL ATTACHMENT

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

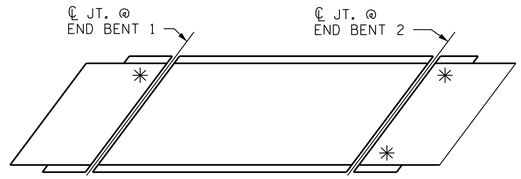
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

DocuSigned by: Andrew L. Phillips 2BB69ABAD4004D3... 12/7/2018

Kimley»Horn
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NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-24
1			3			TOTAL SHEETS
2			4			44

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : D. D. LOWERY		DATE :	10/18
CHECKED BY : A. L. PHILLIPS		DATE :	10/18
DRAWN BY : TLA 5/06	REV. 7/12		MAA/GM
CHECKED BY : GM 5/06	REV. 6/13		MAA/GM
	REV. 12/17		MAA/THC

12/7/2018

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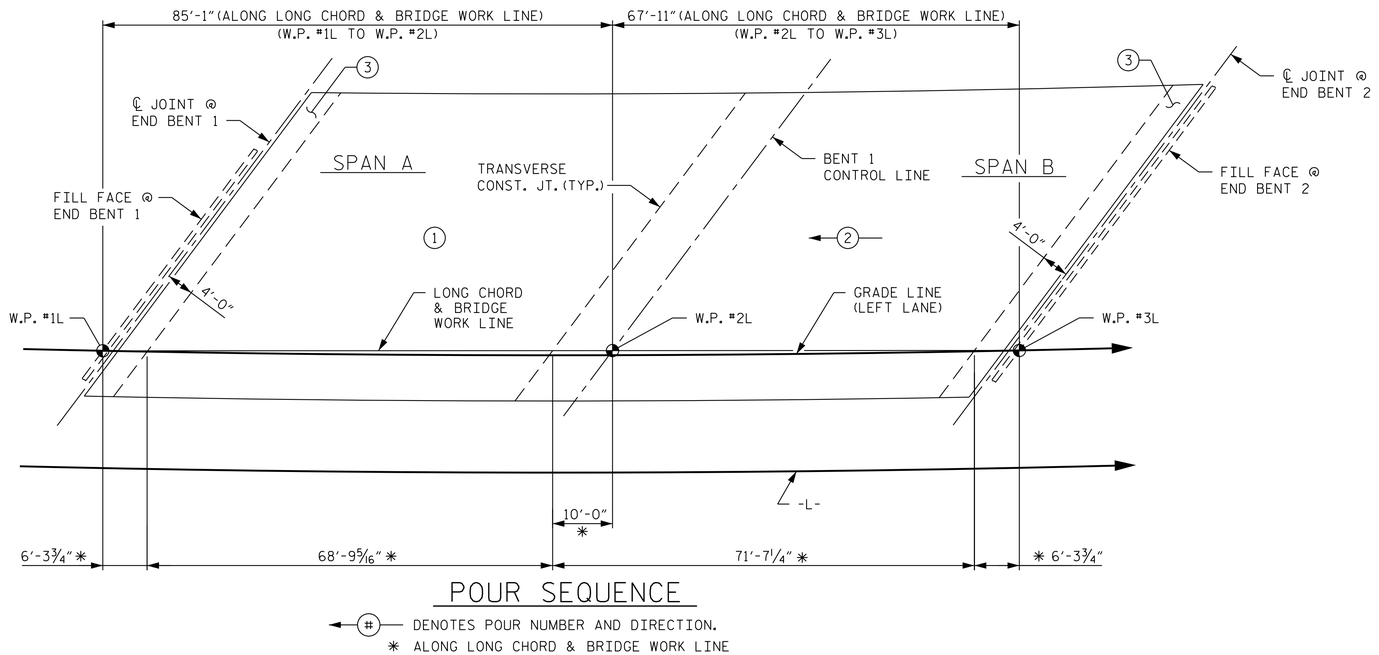
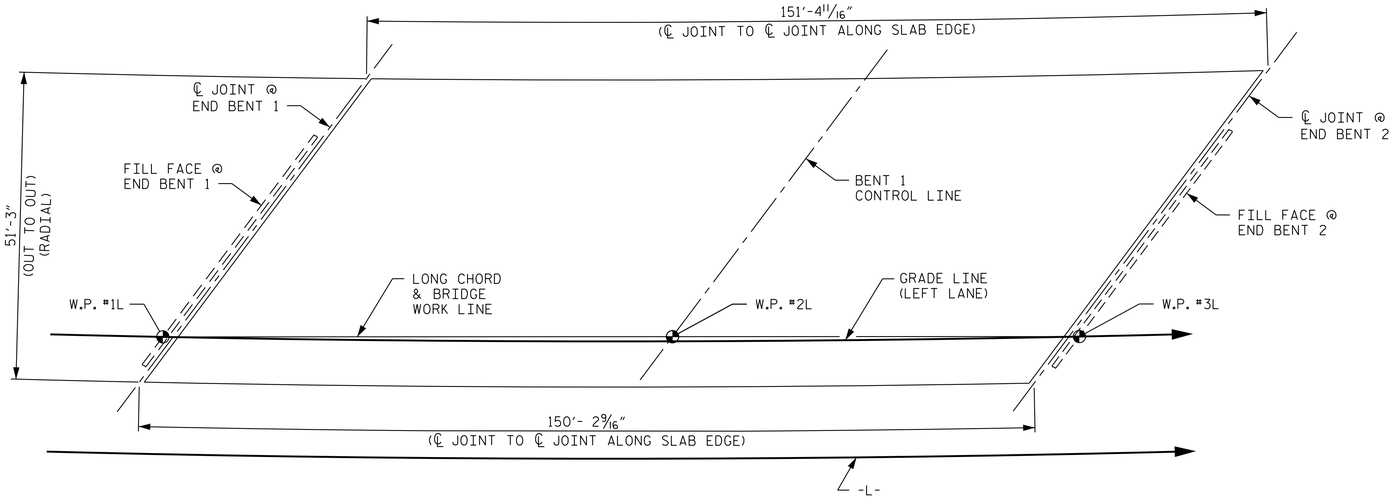
STRUCTURE 15 STD. NO. GRA2



POUR SEQUENCE

(#) DENOTES POUR NUMBER AND DIRECTION.

* ALONG LONG CHORD & BRIDGE WORK LINE



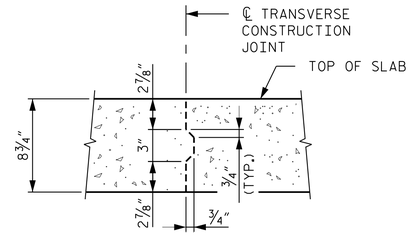
LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE SLAB

(SQ. FT. = 7,722)

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	100.1		
POUR 2	125.3		
POUR 3	20.5		
TOTALS **	245.9	32,975	29,278

** QUANTITIES FOR BARRIER RAILS NOT INCLUDED.

GROOVING BRIDGE FLOORS	
APPROACH SLABS	2,188 SQ.FT.
BRIDGE DECK	6,632 SQ.FT.
TOTAL	8,820 SQ.FT.



TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB

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

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 516+87.37 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

DocuSigned by: Andrew L. Phillips 12/7/2018

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

BILL OF MATERIAL

LEFT LANE

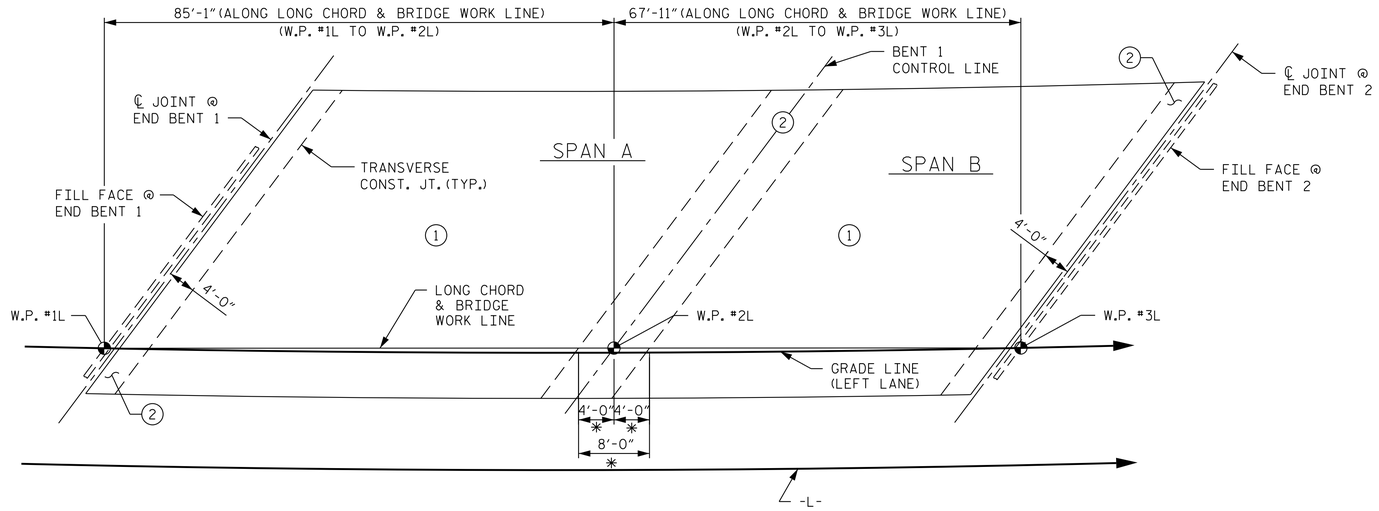
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-25
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY:	D. D. LOWERY	DATE: 10/18
CHECKED BY:	P. D. COOKSEY	DATE: 10/18
DESIGN ENGINEER OF RECORD:	A.L. PHILLIPS	DATE: 10/18

12/7/2018 K:\RDT_Structures_Bridge\NC\01036303 - R-1015\CAD\Dgn\Structure 415\R1015_SMU_BMI_240286.dgn

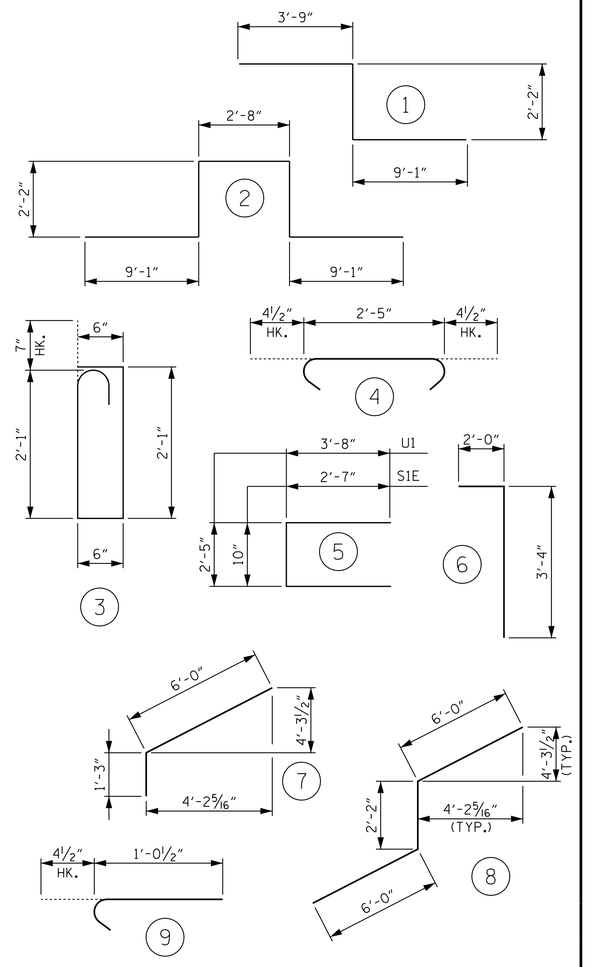


OPTIONAL POUR SEQUENCE

POUR #2 CAN NOT BE STARTED UNTIL BOTH ADJACENT POUR #1 REACH A MINIMUM OF 3,000 PSI.

* ALONG LONG CHORD & BRIDGE WORK LINE.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

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"			

DRAWN BY: D. D. LOWERY DATE: 10/18
CHECKED BY: P. D. COOKSEY DATE: 10/18
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 10/18

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NORTH CAROLINA PROFESSIONAL SEAL 040769 ENGINEER ANDREW L. PHILLIPS

DocuSigned by: Andrew L. Phillips 2BB69ABAD4004D3... 12/7/2018

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PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 516+87.37 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

BILL OF MATERIAL

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S15-26
1			3			TOTAL SHEETS
2			4			44

STRUCTURE 15