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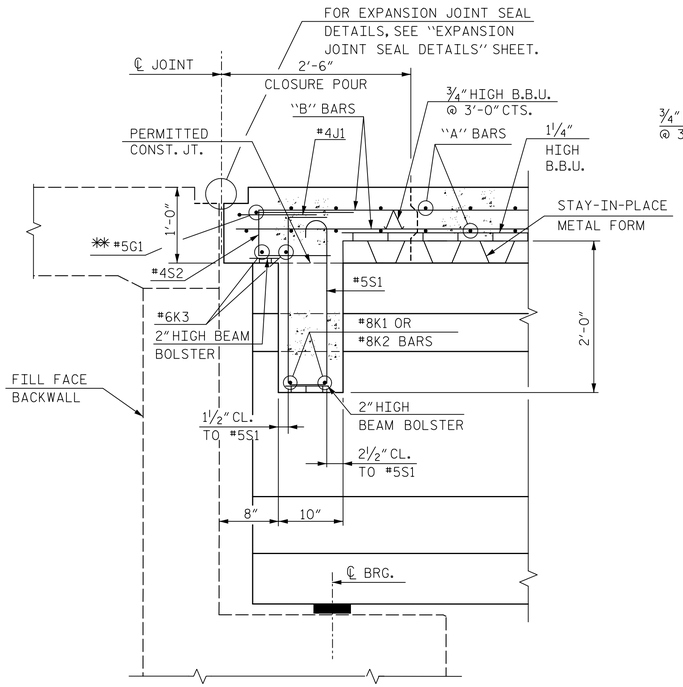
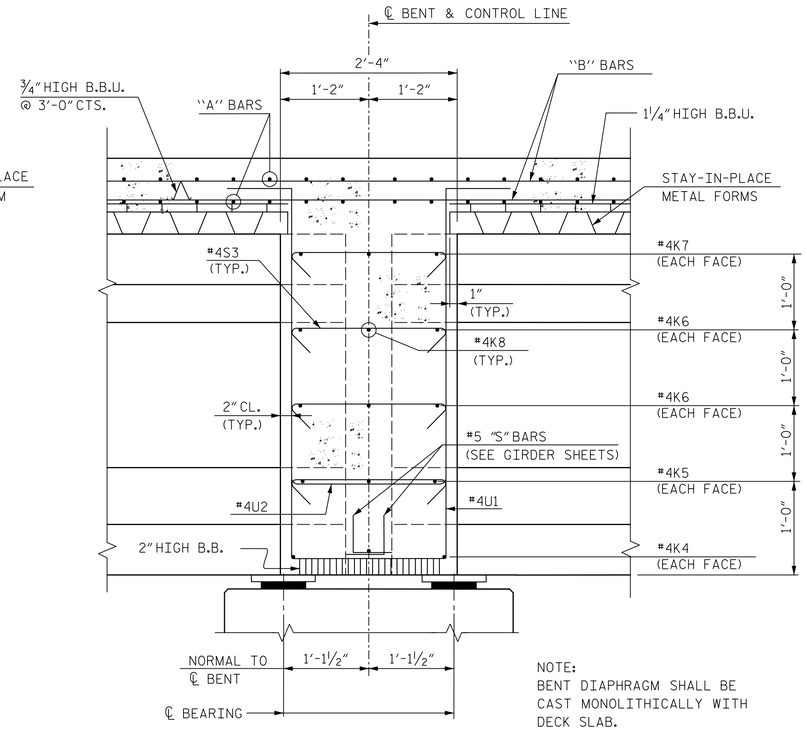


SECTION A-A

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

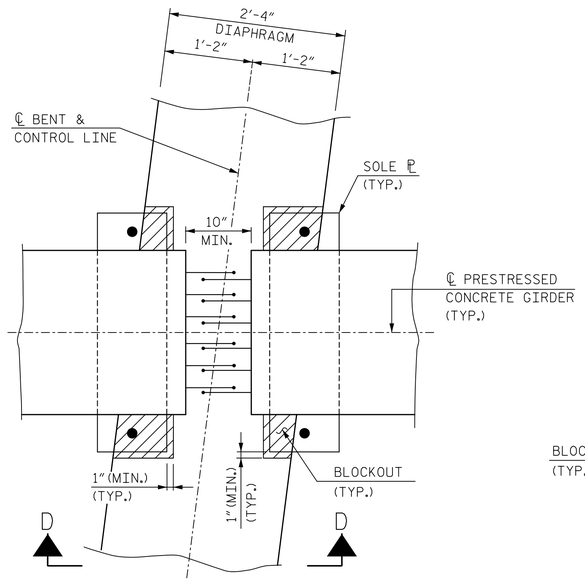
** #5 "G" BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.



SECTION B-B

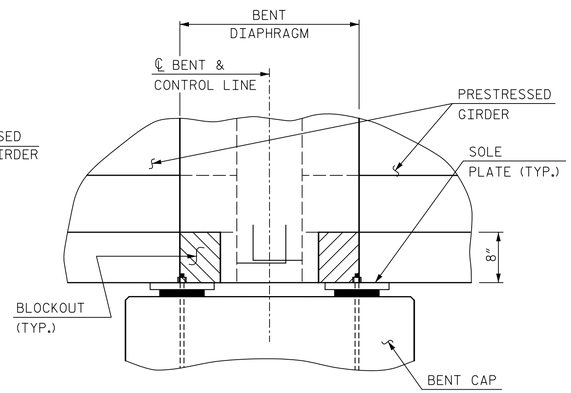
(SECTION NORMAL THRU BENT 1 & BENT 2 DIAPHRAGM)

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

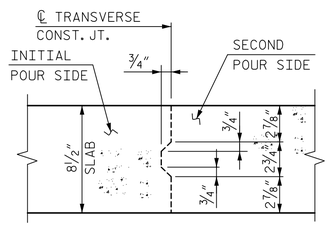


PLAN VIEW

(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

DocuSigned by: David W. Hawkins
ID:D7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

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 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 6

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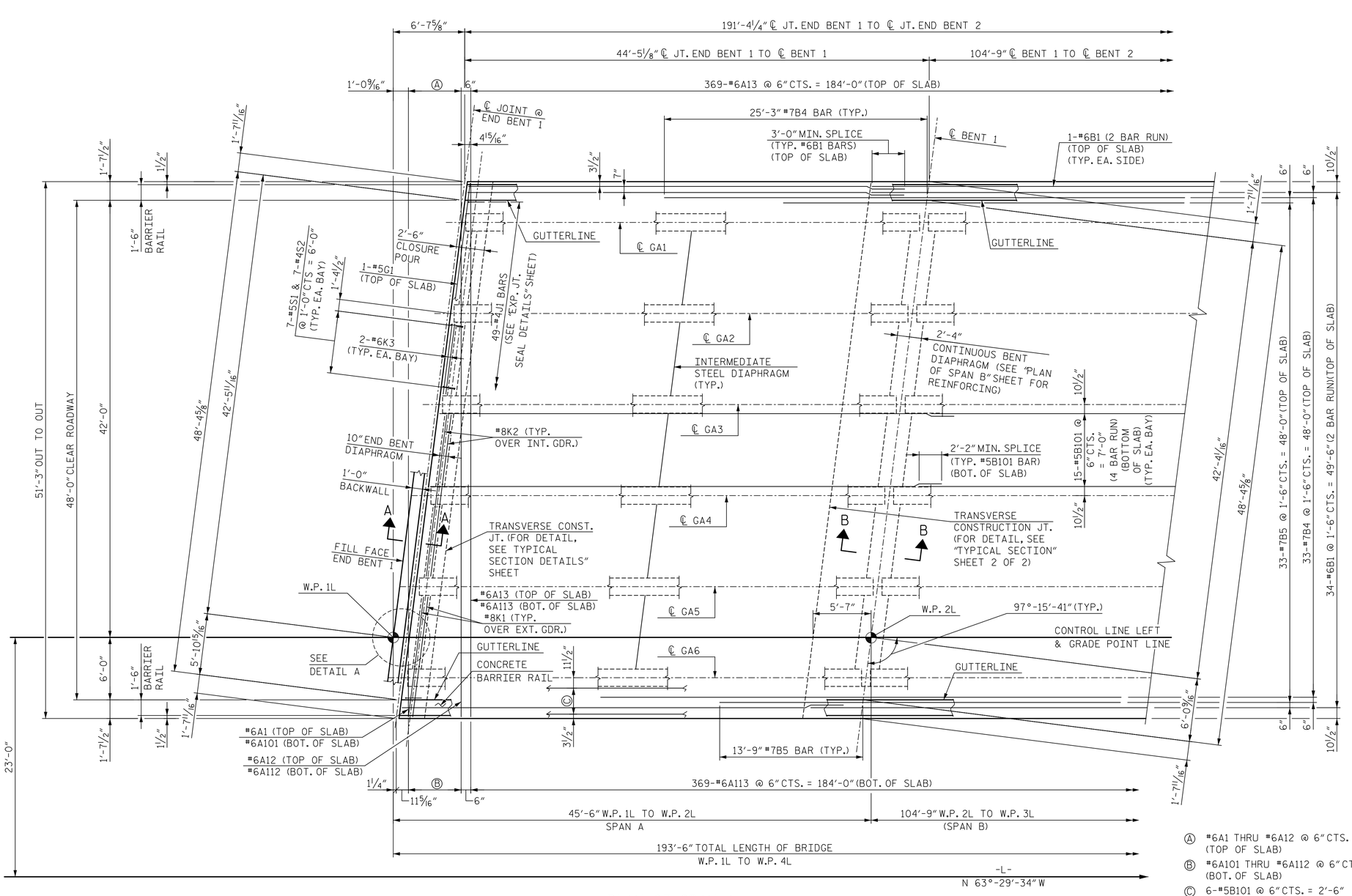
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-6
1			3			TOTAL SHEETS
2			4			35

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 PLAN" SHEET.



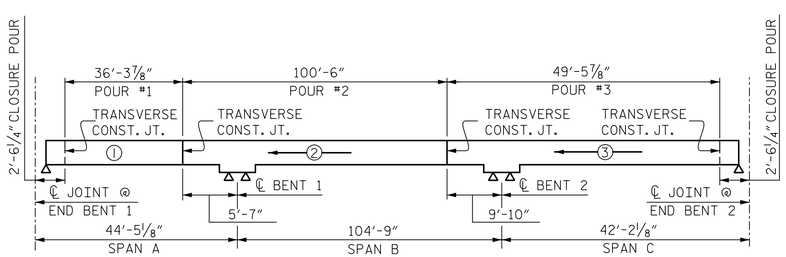
DETAIL A

Ⓐ #6A1 THRU #6A12 @ 6" CTS. (TOP OF SLAB)

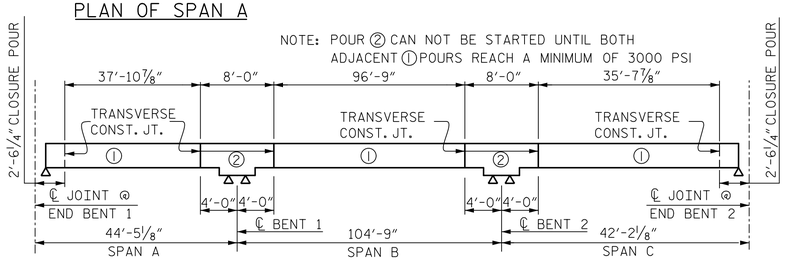
Ⓑ #6A101 THRU #6A112 @ 6" CTS. (BOT. OF SLAB)

Ⓒ 6-#5B101 @ 6" CTS. = 2'-6" (4 BAR RUN)(BOTTOM OF SLAB) (TYP. EA. SIDE)

PLAN OF SPAN A



POURING SEQUENCE



OPTIONAL POURING SEQUENCE

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

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

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9ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

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DWG. NO. 7

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 227+57.02 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

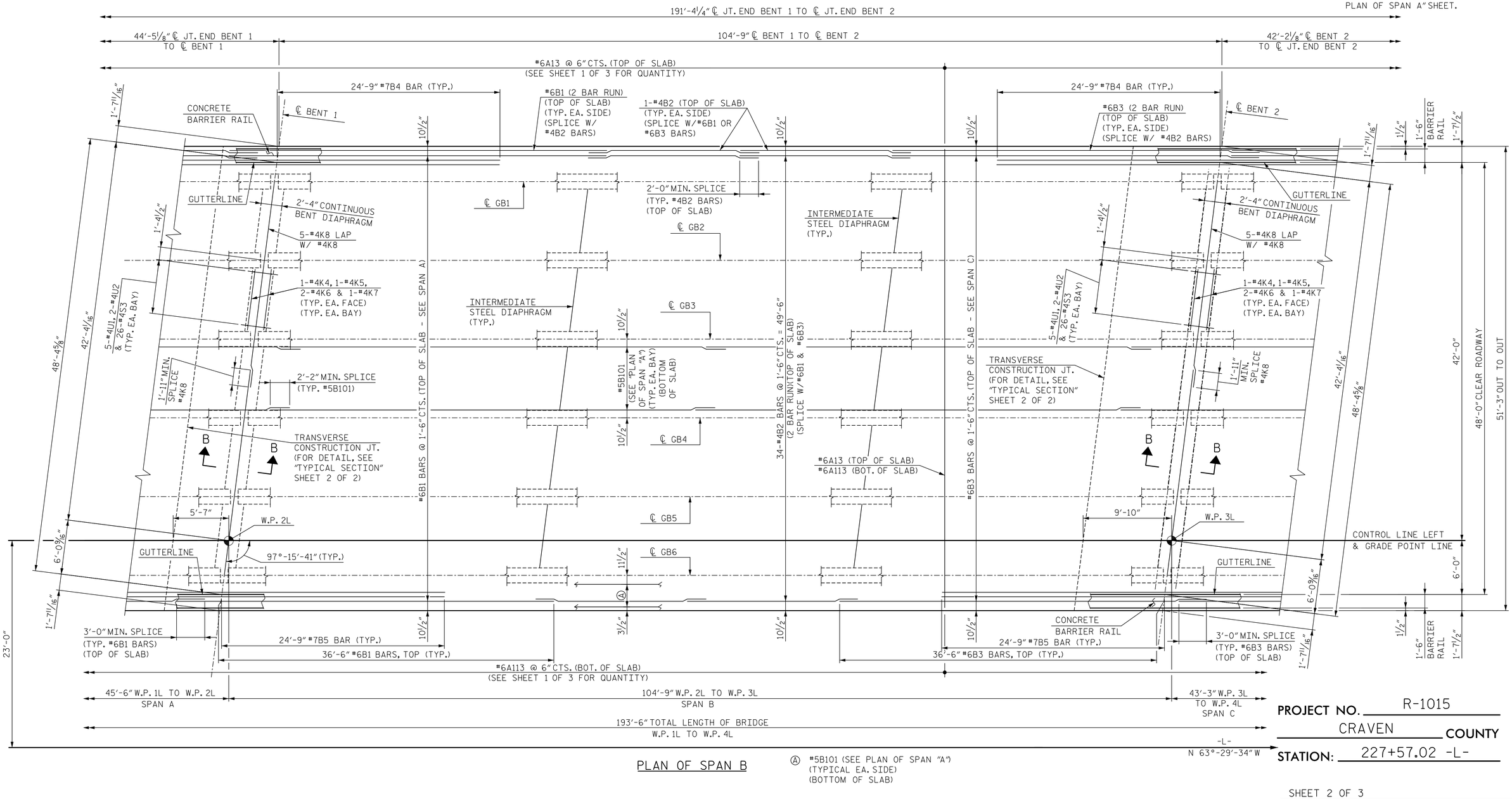
PLAN OF SPAN "A"

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-7
1			3			TOTAL SHEETS
2			4			35

NOTES:

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



PLAN OF SPAN B

Ⓐ #5B101 (SEE PLAN OF SPAN "A") (TYPICAL EA. SIDE) (BOTTOM OF SLAB)

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 3

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11/16/2018

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DWG. NO. 8

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

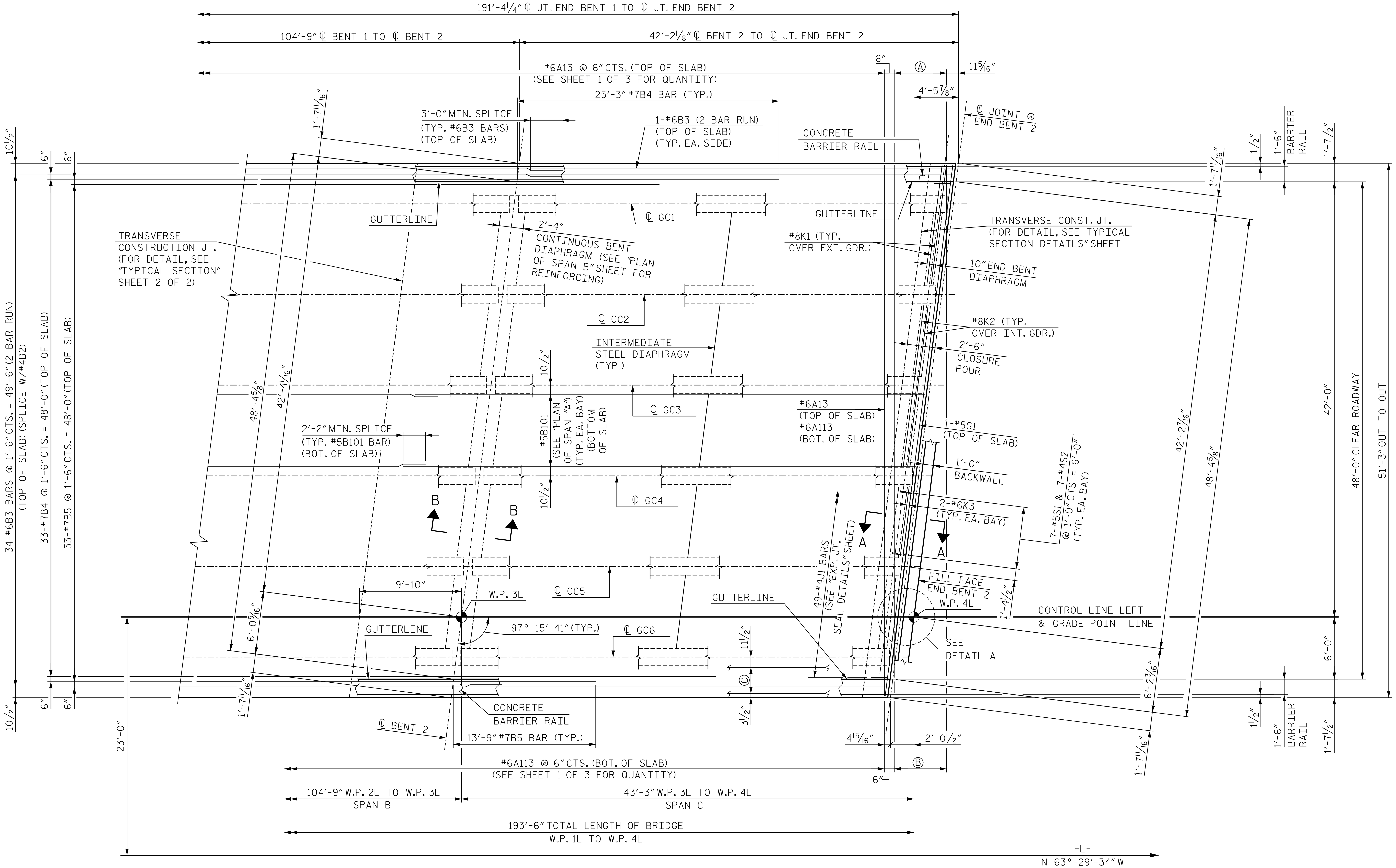
SUPERSTRUCTURE

PLAN OF SPAN "B"

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-8
1			3			TOTAL SHEETS
2			4			35

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

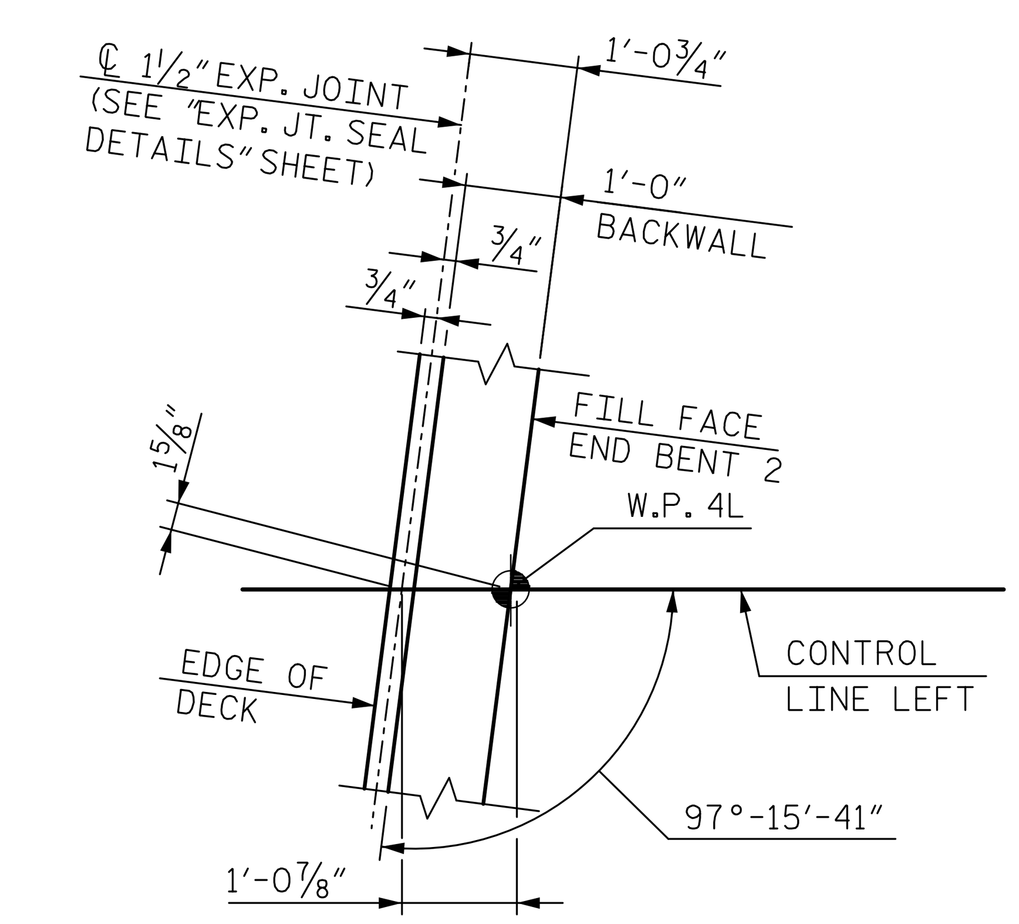


PLAN OF SPAN C

Ⓐ #6A12 THRU #6A1 @ 6" CTS.
(TOP OF SLAB)

Ⓑ #6A112 THRU #6A101 @ 6" CTS.
(BOT. OF SLAB)

Ⓒ #5B101 (SEE PLAN OF SPAN "A")
(TYPICAL EA. SIDE)
(BOTTOM OF SLAB)



DETAIL A

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN "C"

LEFT LANE

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DWG. NO. 9

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

SHEET NO. S7-9

TOTAL SHEETS 35

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".

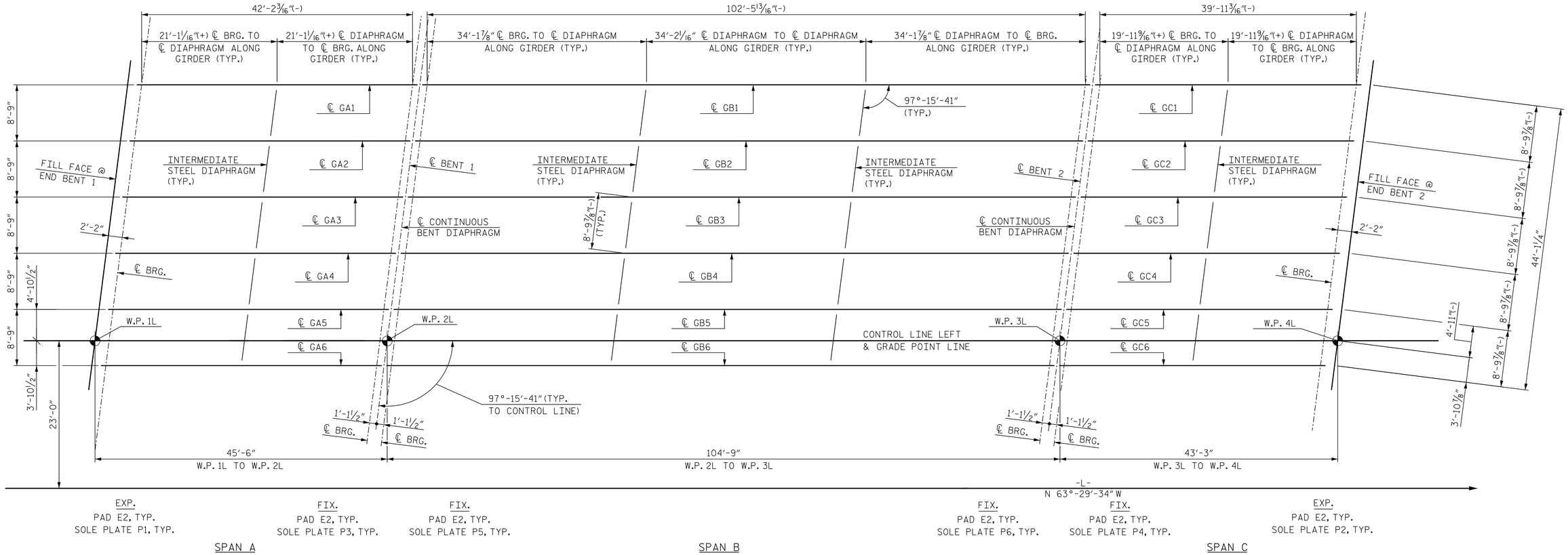
FOR GIRDER ELEVATIONS AND DETAILS, SEE PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET.

"EXP." DENOTES EXPANSION BEARING ASSEMBLY.

"FIX." DENOTES FIXED BEARING ASSEMBLY.

"E" DENOTES ELASTOMERIC BEARING PAD MARK.

"P" DENOTES STEEL SOLE PLATE MARK.



FRAMING PLAN

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

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NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

LEFT LANE

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DRAWN BY M. WRIGHT DATE 7/18
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DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 10

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-10
1			3			TOTAL SHEETS
2			4			35

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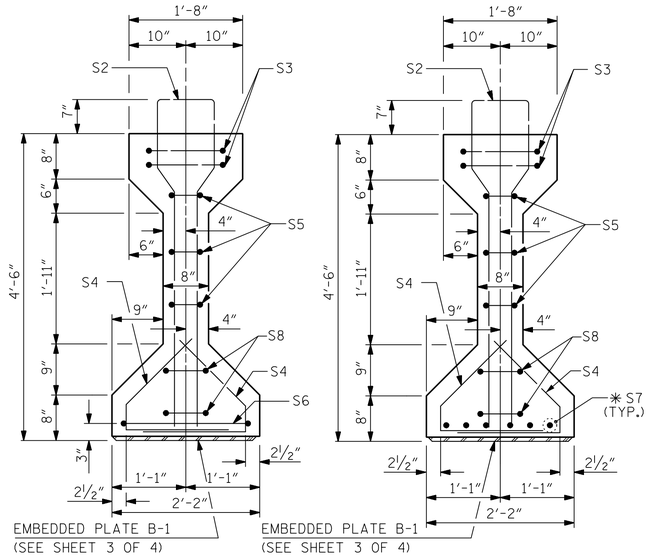


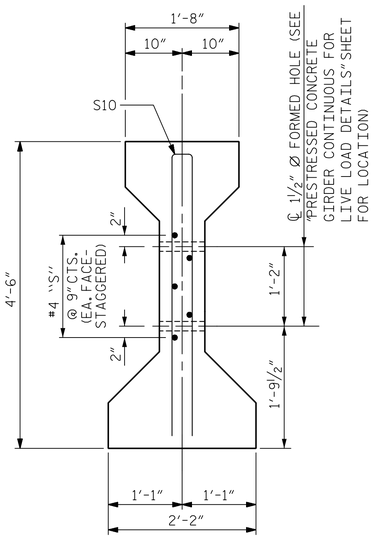
EMBEDDED PLATE B-1
(SEE SHEET 3 OF 4)

SECTION A-A

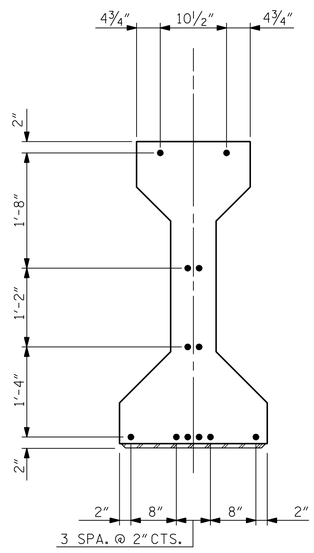
EMBEDDED PLATE B-1
(SEE SHEET 3 OF 4)

SECTION B-B

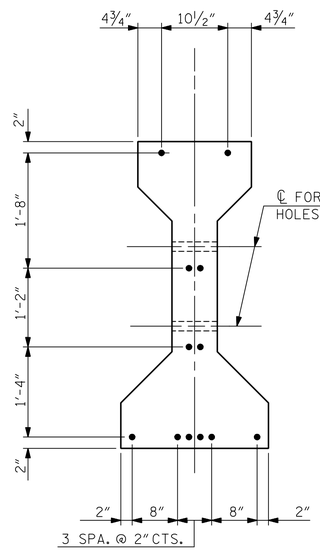
✱FOR S7 BARS, SEE DETAIL "A" OF "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET



SECTION C-C
(S1 BARS NOT SHOWN)



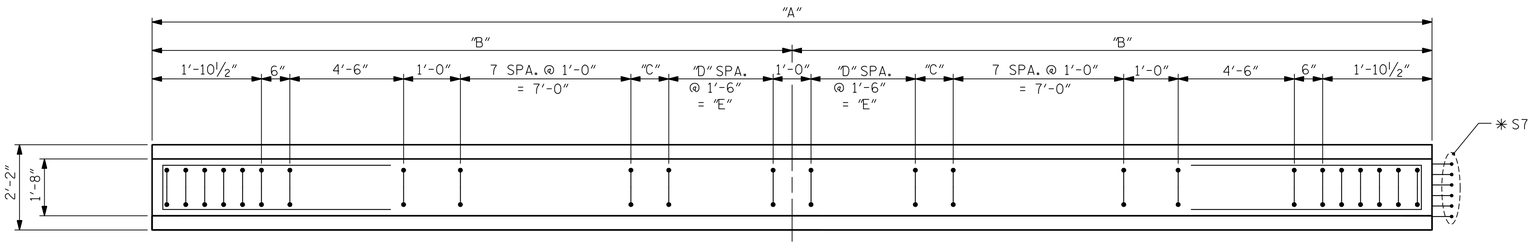
AT END OF GIRDER



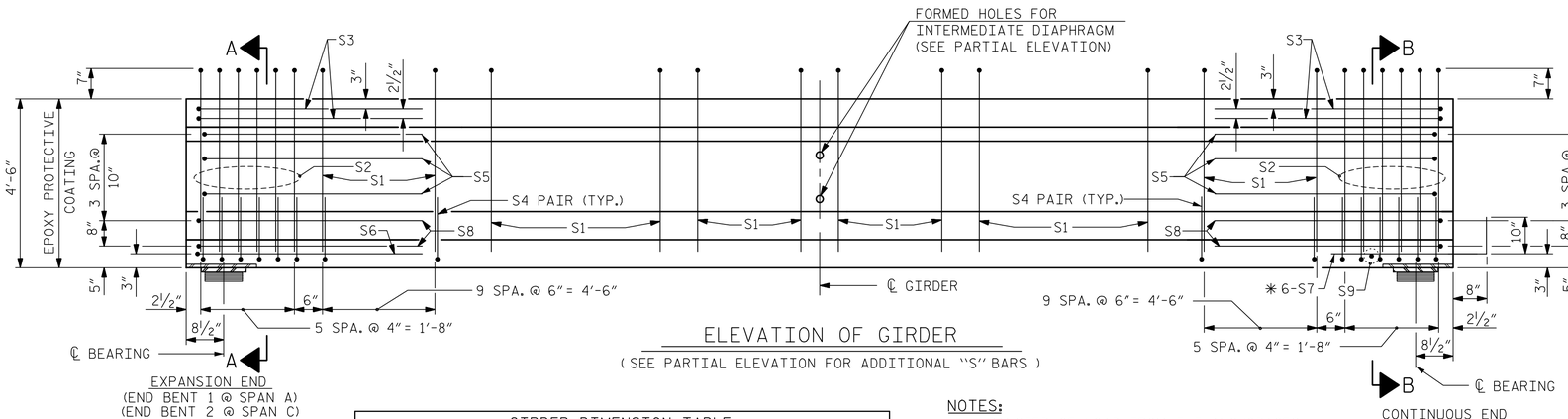
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

NOTE: ALL STRANDS SHALL BE BONDED FULL LENGTH.



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)

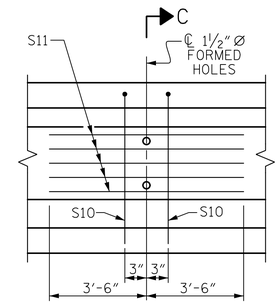
CONTINUOUS END
(BENT 1 END @ SPAN A)
(BENT 2 END @ SPAN C)

GIRDER DIMENSION TABLE					
GIRDERS	"A"	"B"	"C"	"D"	"E"
GA1 - GA6	43'-7 3/16"	21'-9 9/16" (+)	5 1/16" (+)	4	6'-0"
GC1 - GC6	41'-4 3/16"	20'-8 1/16" (+)	9 9/16" (+)	3	4'-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.



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. GA1-GA6 AND GC1-GC6

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

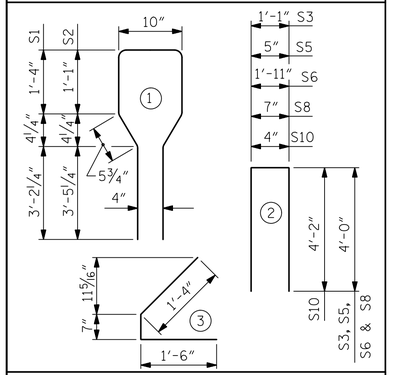
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
GA1-GA6	S1	46	#4	1	10'-10"	333
GC1-GC6	S1	44	#4	1	10'-10"	318
	S2	12	#6	1	10'-10"	195
	S3	4	#4	2	9'-1"	24
	S4	64	#4	3	3'-5"	146
	S5	6	#4	2	8'-5"	34
	S6	1	#4	2	9'-11"	7
	✱S7	6	#5	STR	3'-8"	23
	S8	4	#4	2	8'-7"	23
	S9	1	#3	STR	1'-10"	1
	S10	2	#5	2	8'-8"	18
	S11	5	#4	STR	7'-0"	23

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	5,000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
SPAN A GDR.	827	8.8	12
SPAN C GDR.	812	8.4	12

GIRDERS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
SPAN A GDR.	6	43'-7 3/16"(-)	261.59'
SPAN C GDR.	6	41'-4 3/16"(-)	248.09'

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -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
LEFT LANE

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

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NC License No. C-1554
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CHECKED BY N. SALAS ZAMUDIO DATE 8/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. II

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-11
1			3			TOTAL SHEETS
2			4			35

ASSEMBLED BY : M. WRIGHT DATE : 8/18
CHECKED BY : N. SALAS ZAMUDIO 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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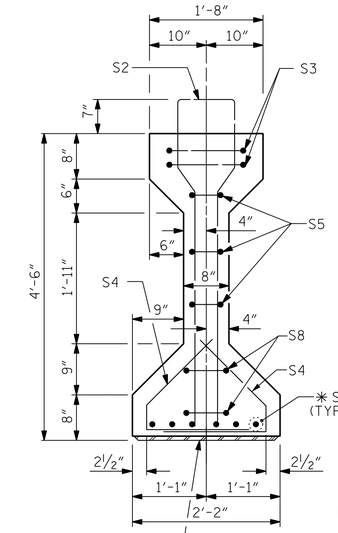
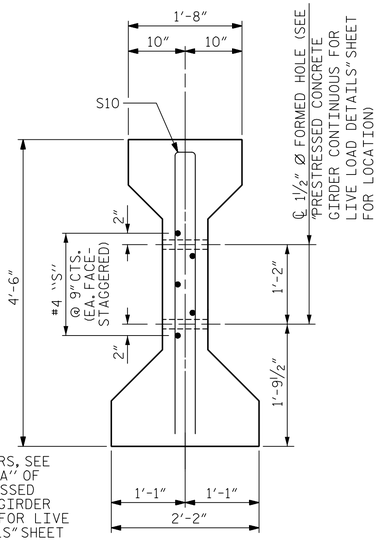
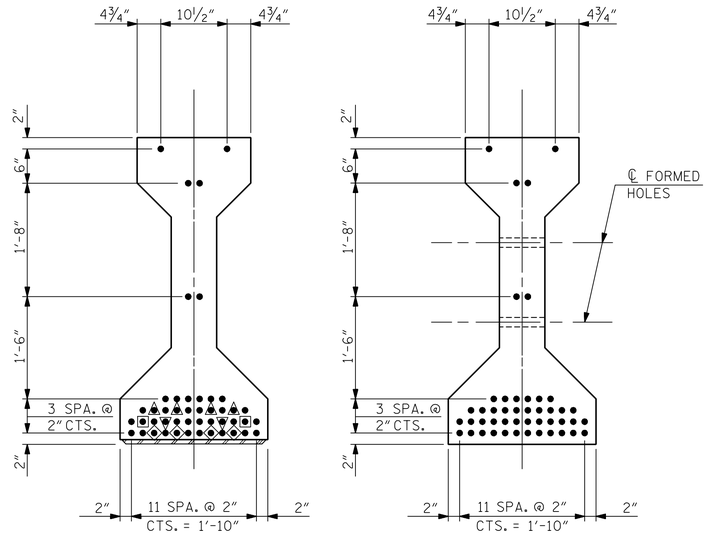
STD. NO. PCG6



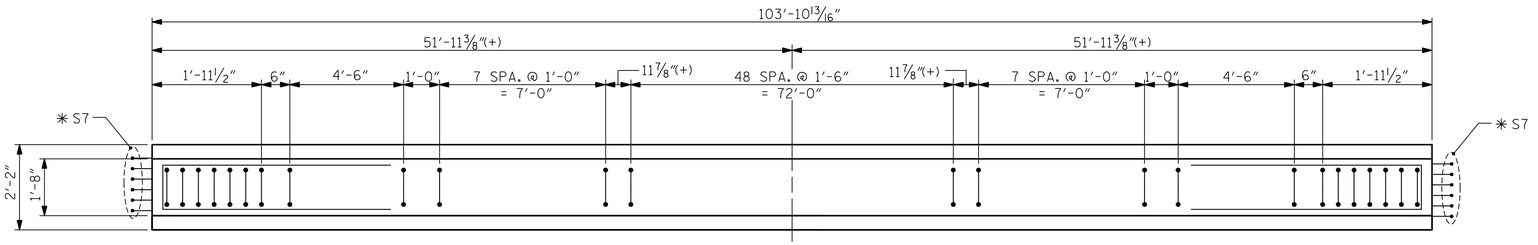
SECTION A-A



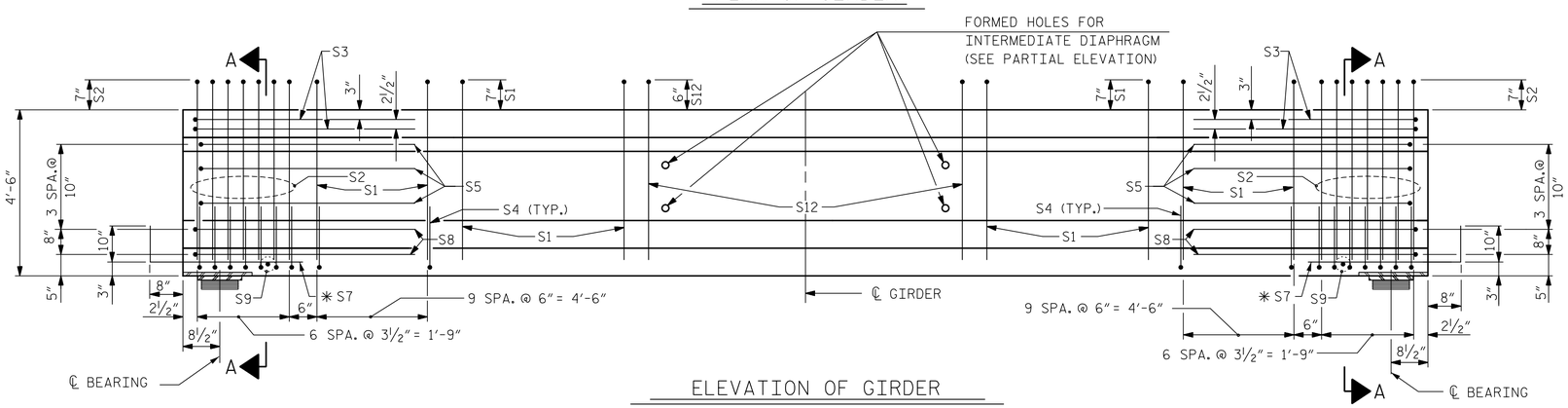
SECTION C-C
(S1 BARS NOT SHOWN)



0.6"Ø LOW RELAXATION STRAND LAYOUT



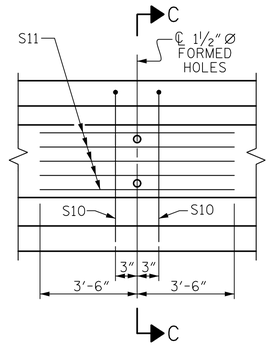
PLAN OF GIRDER



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

DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 20'-0" FROM END OF GIRDER



PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. GB1-GB6

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 6,600 PSI FOR SPAN B GIRDERS.

GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 9,000 PSI AT THE AGE OF 28 DAYS.

DocuSigned by: David W. Hawkins
11/16/2018
NORTH CAROLINA REGISTERED PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

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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

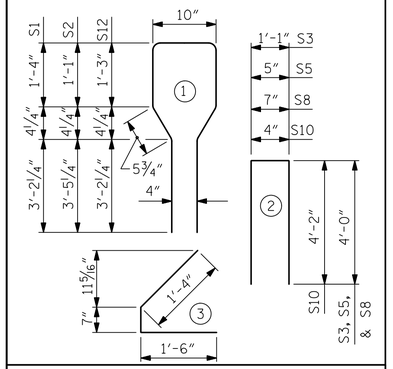
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	36	#4	1	10'-10"	261
S2	14	#6	1	10'-10"	228
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
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
S11	10	#4	STR	7'-0"	47
S12	49	#4	1	10'-8"	349

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	9,000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
SPAN B GDR.	1,204	21.1	46

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	103'-10 13/16"(~)	623.41'

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -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

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-12
1			3			TOTAL SHEETS
2			4			35

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

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. SALAS ZAMUDIO DATE 8/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 12

STD. NO. PCG6

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.

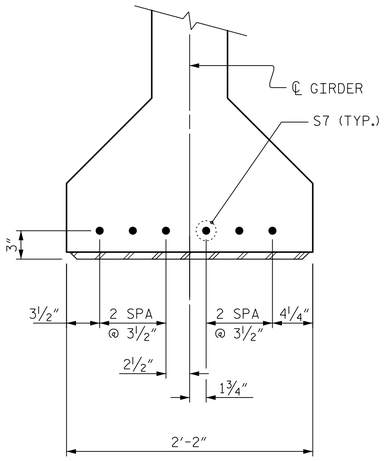
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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.

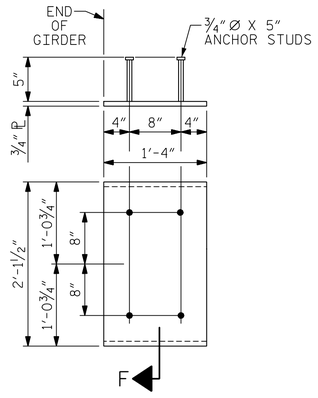
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

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.



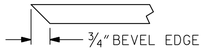
DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



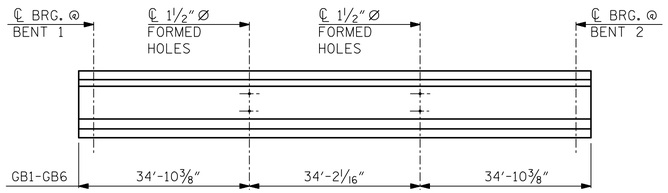
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



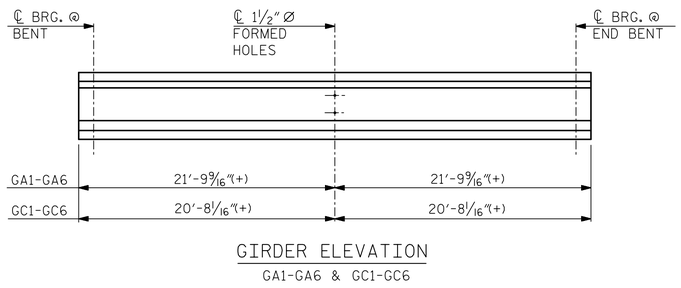
SECTION "F"

(SEE NOTES)



GIRDER ELEVATION

GB1-GB6



GIRDER ELEVATION

GA1-GA6 & GC1-GC6

1½" Ø FORMED HOLE LOCATIONS

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 3 OF 4

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NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

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	S7-13
1			3			TOTAL SHEETS
2			4			35

ASSEMBLED BY : M. WRIGHT	DATE : 8/18	
CHECKED BY : N. SALAS ZAMUDIO	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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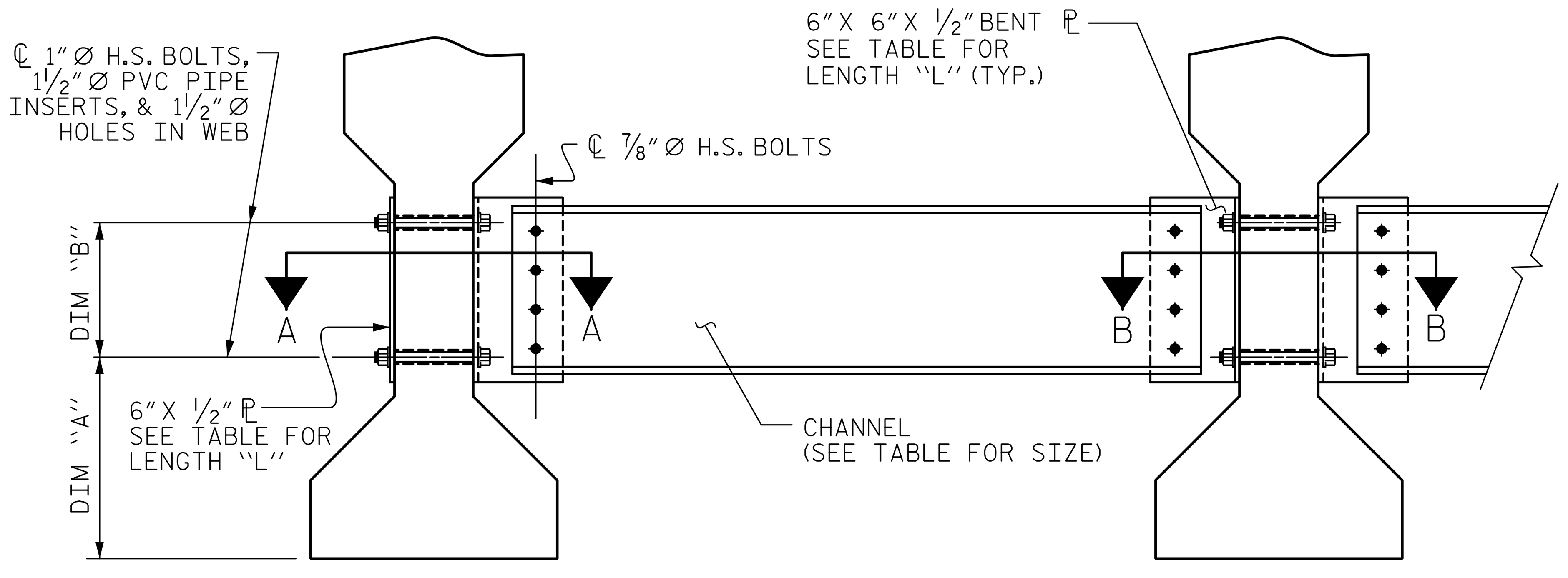
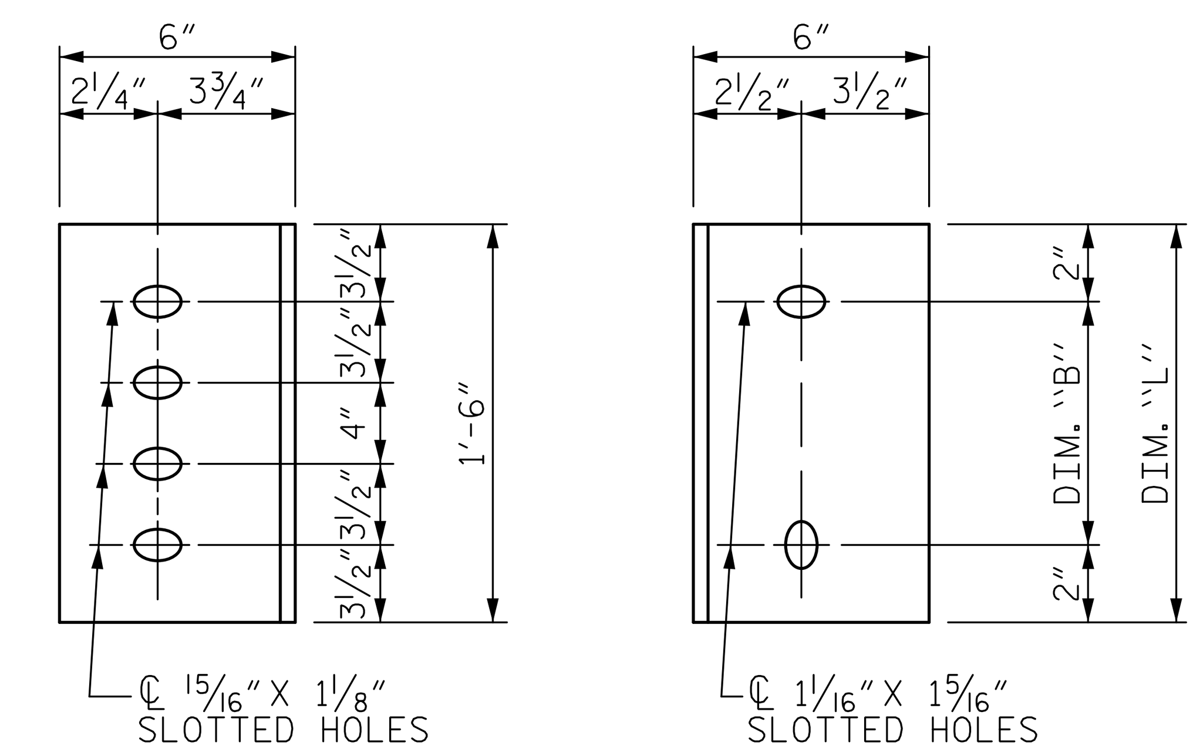
DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY N. SALAS ZAMUDIO DATE 8/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 13

STD. NO. PCG9



PART SECTION AT INTERMEDIATE DIAPHRAGM



CONNECTOR PLATE DETAILS

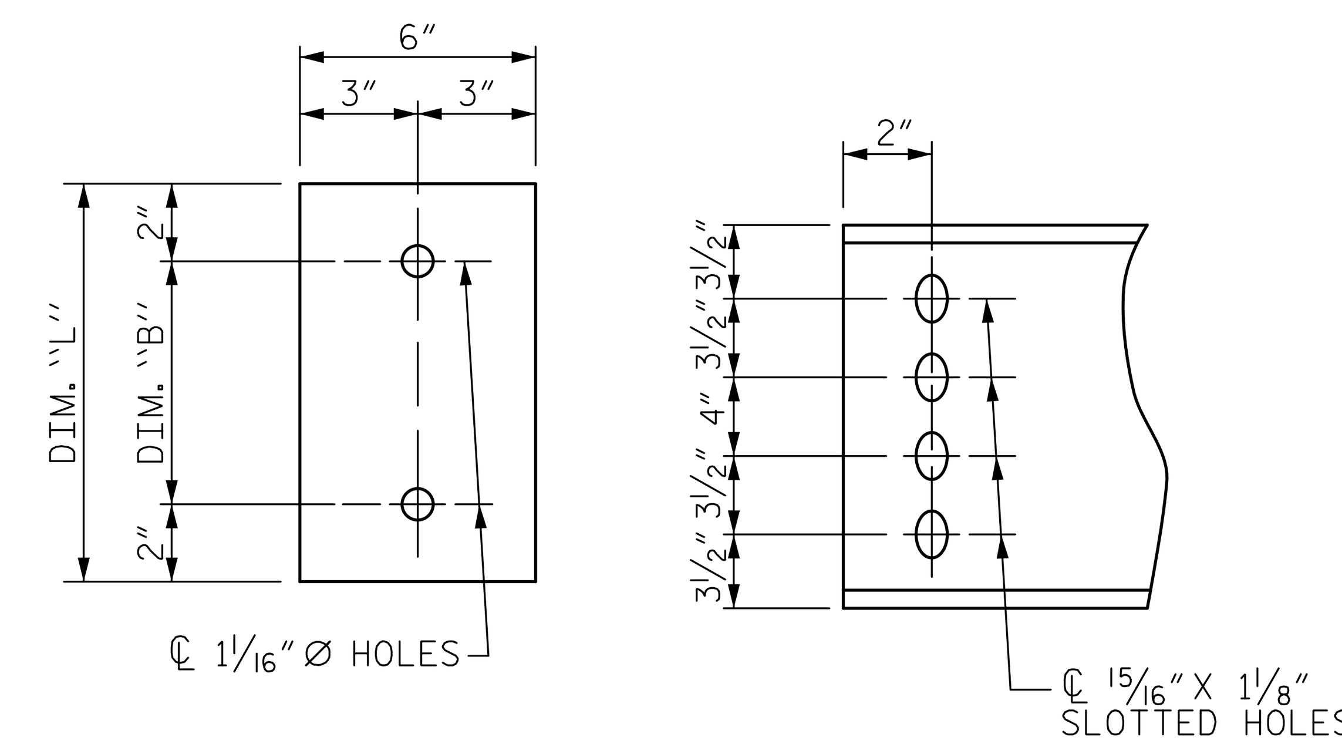


PLATE DETAILS   CHANNEL END

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 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.

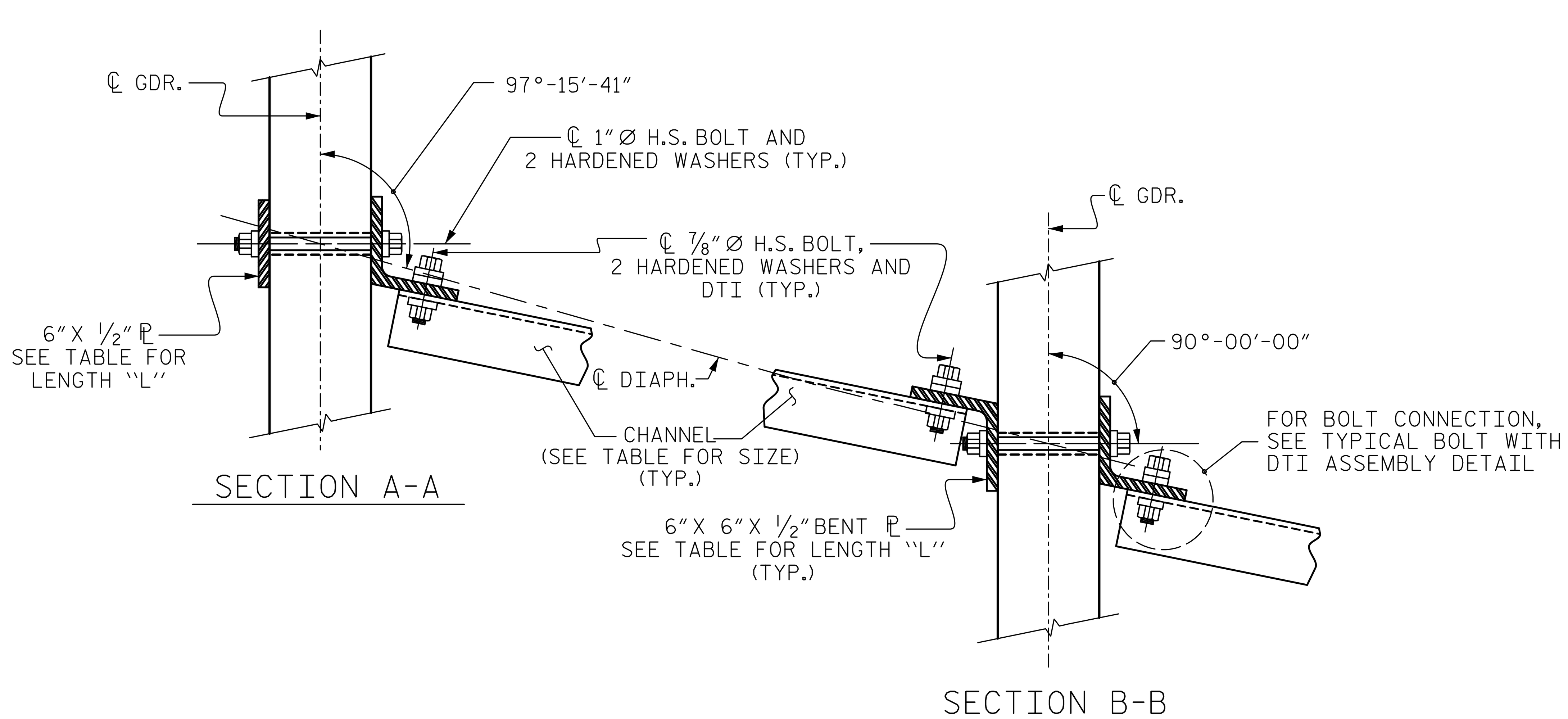
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

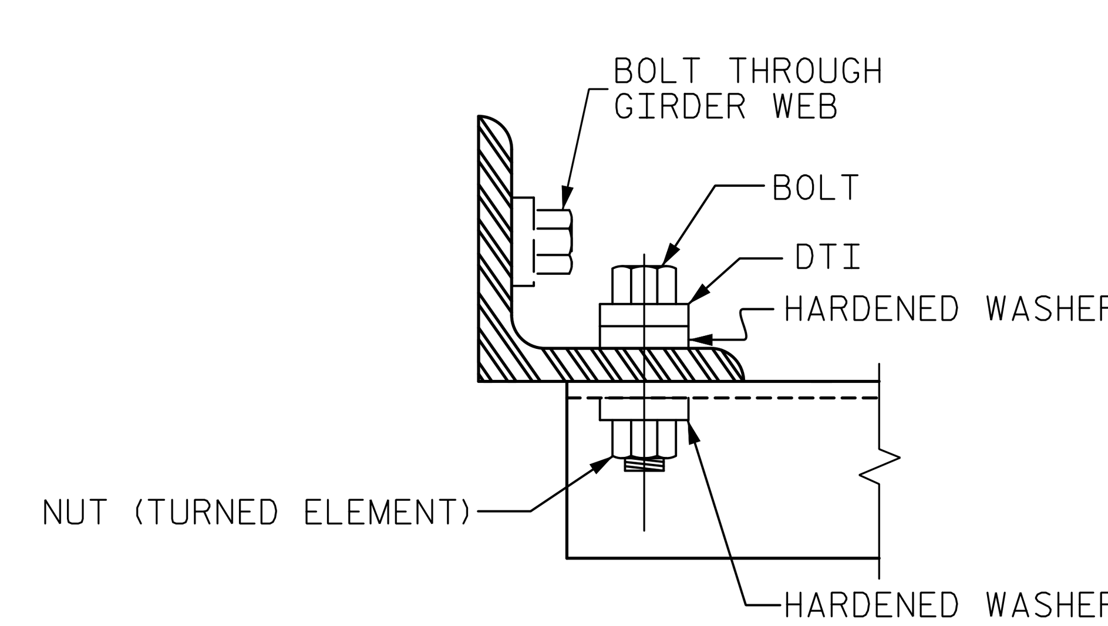
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

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



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

SHEET 4 OF 4

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS
11/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

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DRAWN BY	M. WRIGHT	DATE	7/18
CHECKED BY	N. HART	DATE	7/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 14

REVISIONS

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

SHEET NO. S7-14
TOTAL SHEETS 35

ASSEMBLED BY : M. WRIGHT   DATE : 7/18
CHECKED BY : N. HART   DATE : 7/18

DRAWN BY : TLA 6/05
CHECKED BY : VC 6/05
REV. 5/1/06RRR KMM/GM
REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC

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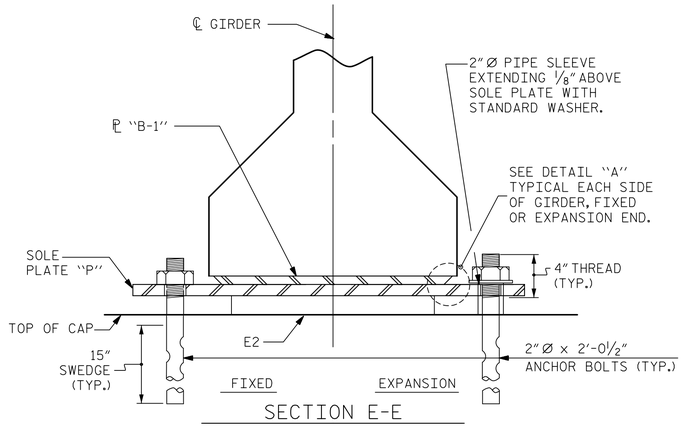
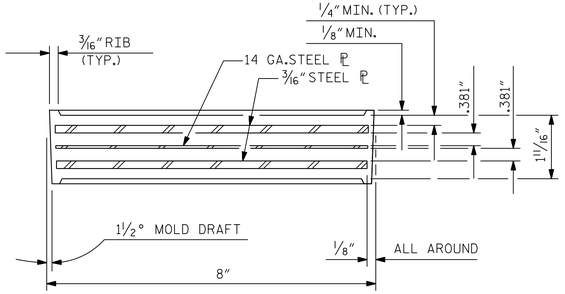
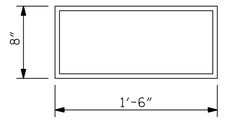
STD. NO. PCG10



SECTION E-E



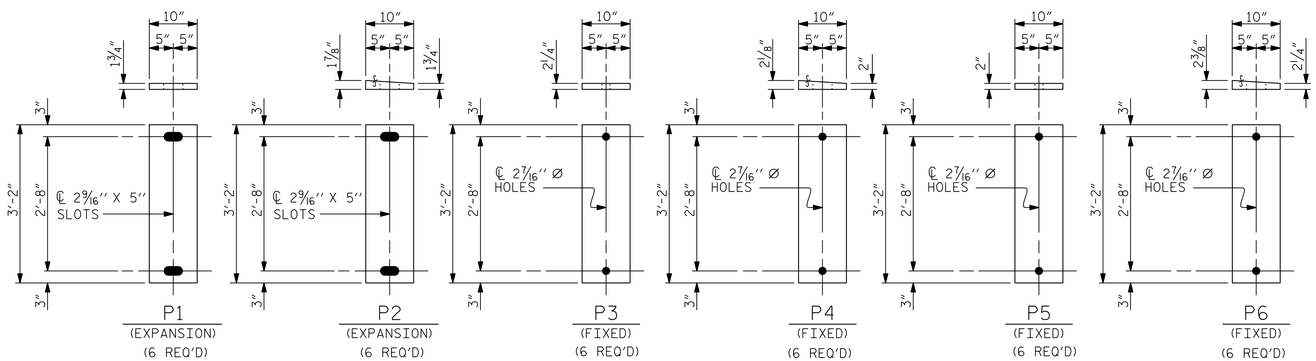
TYPICAL SECTION OF ELASTOMERIC BEARINGS



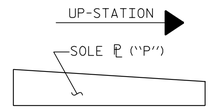
E2 (36 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

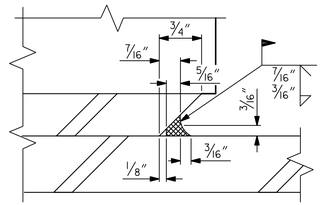
TYPE III



SOLE PLATE DETAILS ("P")



SOLE ℄ PLACEMENT DETAIL



DETAIL "A"

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.

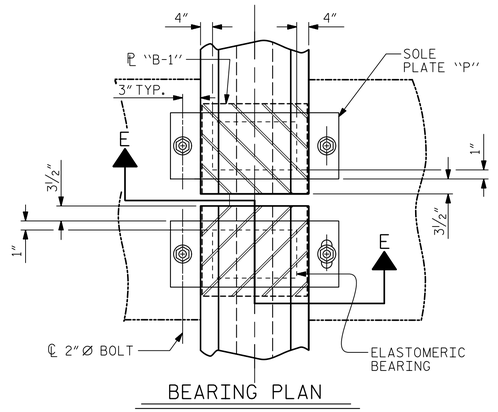
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

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.



BEARING PLAN

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

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins
9ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE
LEFT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 7/18
CHECKED BY : N. HART	DATE : 9/18

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	7/18
CHECKED BY	N. HART	DATE	9/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 15

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-15
1			3			TOTAL SHEETS
2			4			35

STD. NO. EB3

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 1 THRU 6										
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	0.002	0.004	0.005	0.006	0.006	0.006	0.005	0.004	0.002	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.002	0.004	0.005	0.006	0.006	0.006	0.005	0.004	0.002	0.000
FINAL CAMBER ↑	0	0	0	0	0	0	0	0	0	0	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 1 THRU 6																				
TENTH 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	0.042	0.082	0.121	0.156	0.187	0.214	0.235	0.250	0.260	0.263	0.260	0.250	0.235	0.214	0.187	0.156	0.121	0.082	0.042	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.027	0.054	0.081	0.106	0.128	0.147	0.162	0.173	0.180	0.182	0.180	0.173	0.162	0.147	0.128	0.106	0.081	0.054	0.027	0.000
FINAL CAMBER ↑	0	3/16	5/16	1/2	5/8	11/16	13/16	7/8	15/16	15/16	1	15/16	15/16	7/8	13/16	11/16	5/8	1/2	5/16	3/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN C

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 1 THRU 6										
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	0.002	0.004	0.005	0.006	0.006	0.006	0.005	0.004	0.002	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.001	0.003	0.004	0.005	0.005	0.005	0.004	0.003	0.001	0.000
FINAL CAMBER ↑	0	0	0	0	0	0	0	0	0	0	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: 227+57.02 -L-

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

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DRAWN BY M. WRIGHT DATE 9/18
CHECKED BY N. SALAS ZAMUDIO DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 16

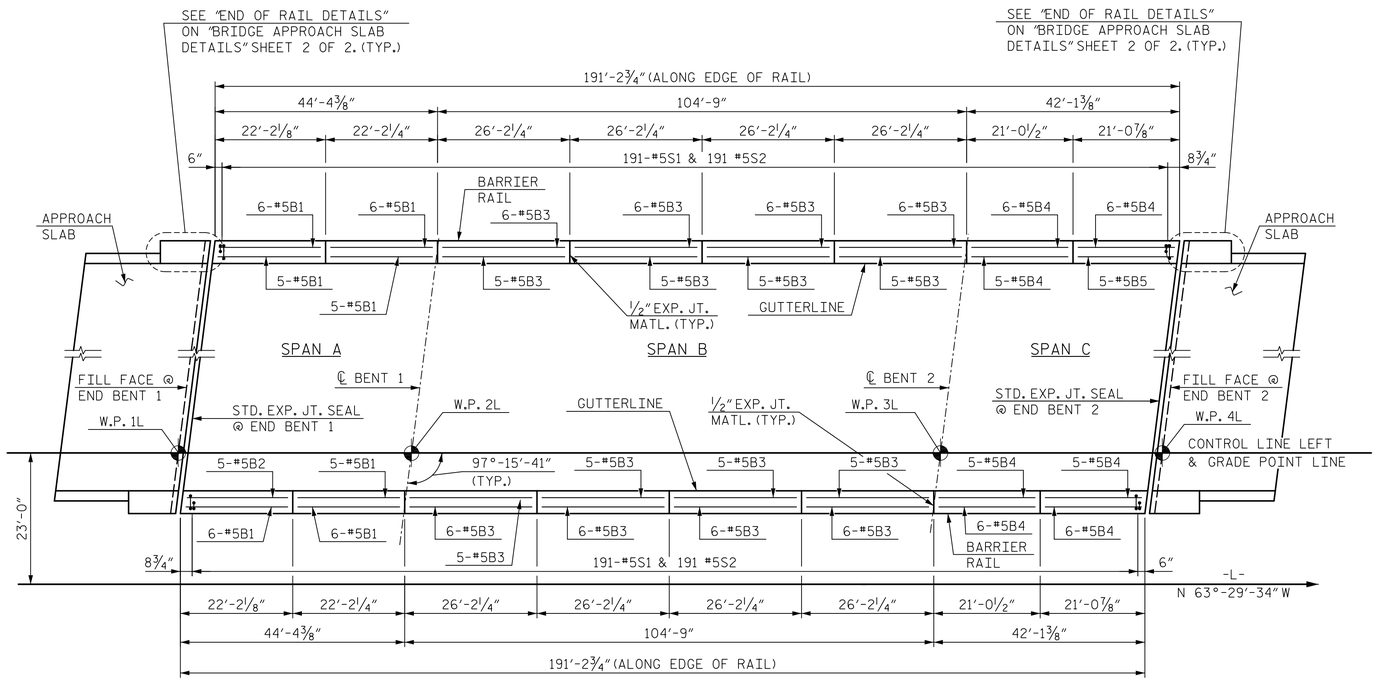
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-16
1			3			TOTAL SHEETS
2			4			35



PLAN OF BARRIER RAIL
NOTE: EDGE SLAB NOT SHOWN FOR CLARITY.

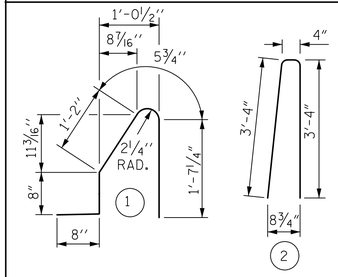
NOTES

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.

BAR TYPES



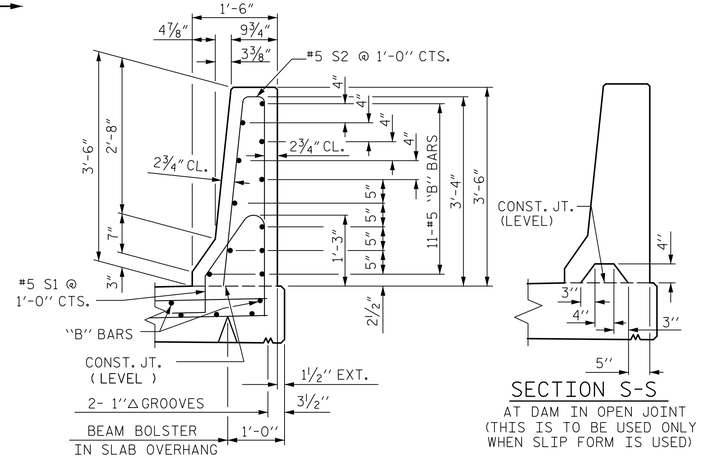
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

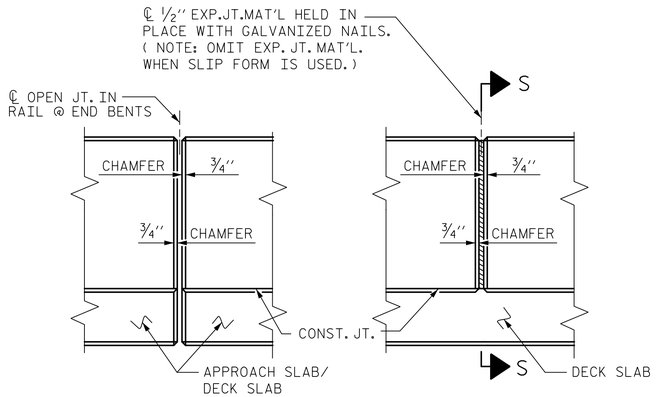
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	39	#5	STR	21'-9"	885
✳ B2	5	#5	STR	21'-8"	113
✳ B3	88	#5	STR	25'-9"	2,363
✳ B4	39	#5	STR	20'-8"	841
✳ B5	5	#5	STR	20'-6"	107
✳ S1	382	#5	1	4'-7"	1,826
✳ S2	382	#5	2	7'-0"	2,789

✳ EPOXY COATED REINFORCING STEEL	LBS. 8,924
CLASS AA CONCRETE	CU. YDS. 52.0
CONCRETE BARRIER RAIL	LIN. FT. 382.4



SECTION THRU RAIL

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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins
11/16/2018
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD CONCRETE BARRIER RAIL
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-17
1			3			TOTAL SHEETS
2			4			35

ASSEMBLED BY : M. WRIGHT	DATE : 6/18	
CHECKED BY : N. HART	DATE : 7/18	
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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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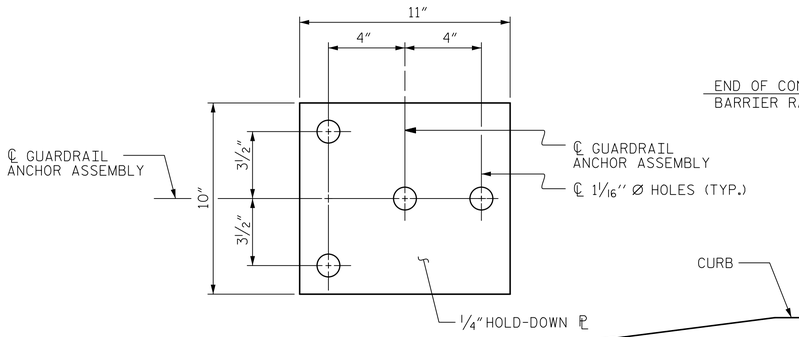
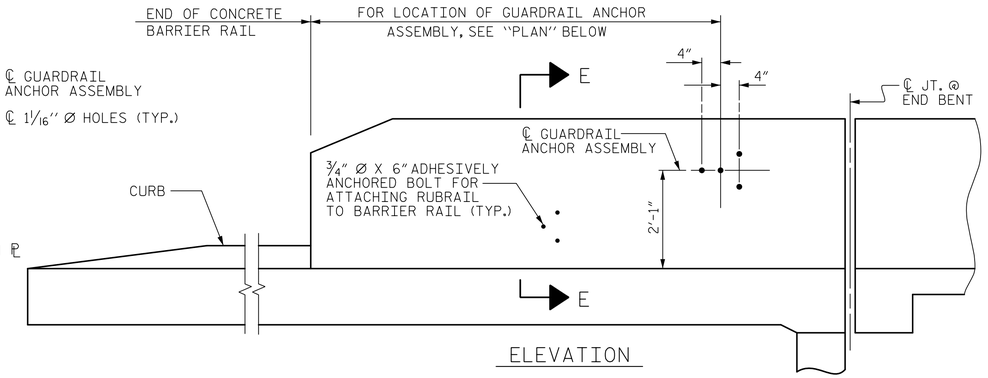
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 6/18	DWG. NO. 17
CHECKED BY	N. HART	DATE 7/18	
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 9/18	

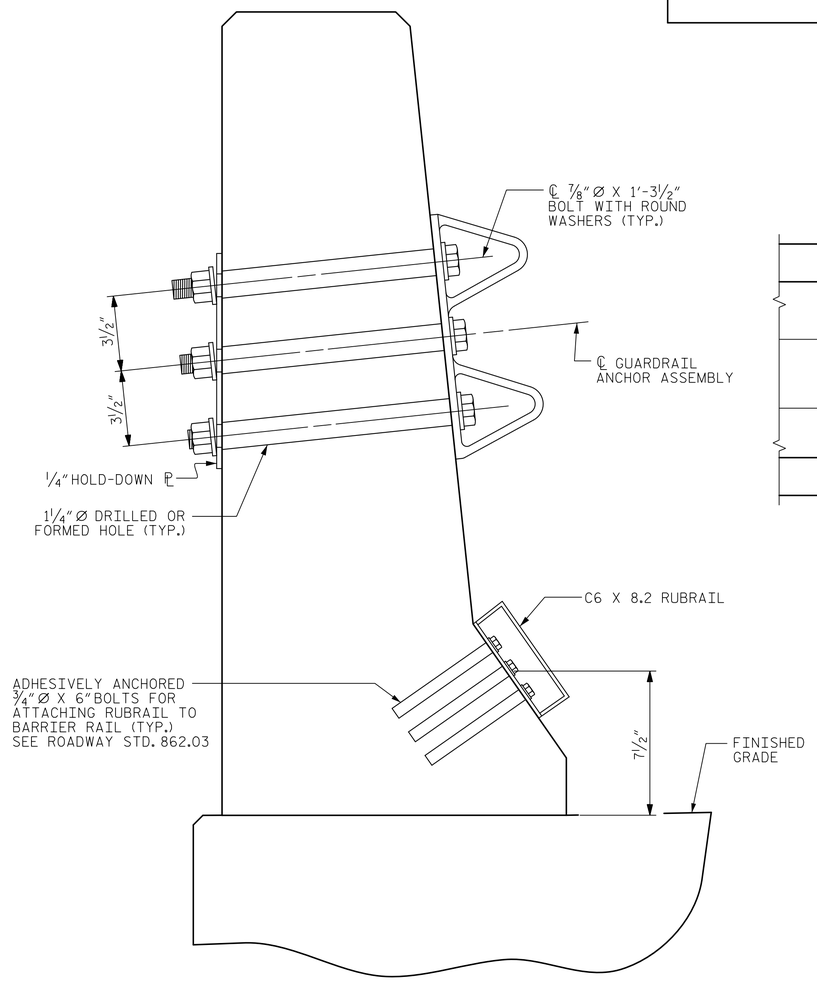
STD. NO. CBR1



PLAN

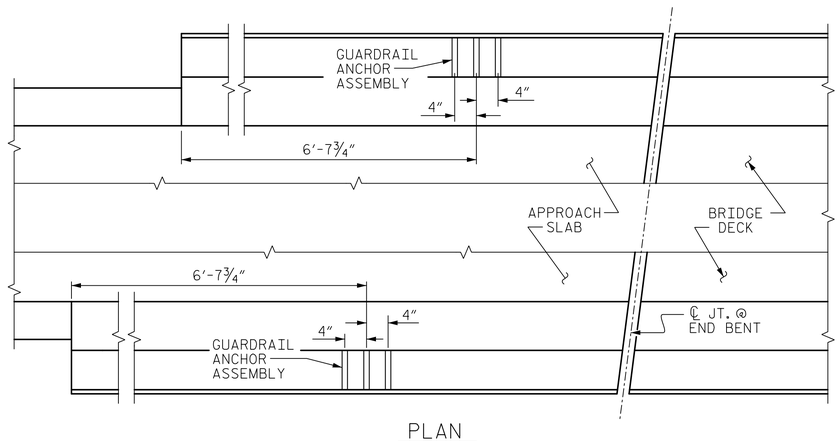


ELEVATION



SECTION E-E

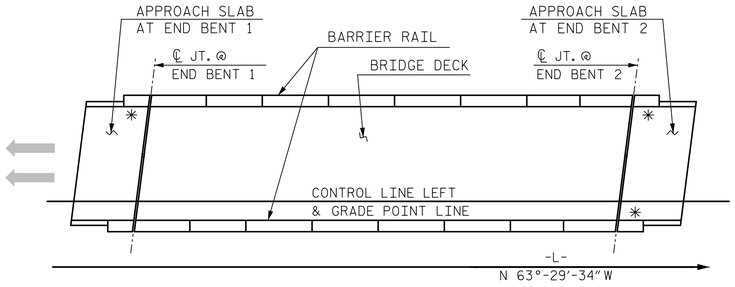
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

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.

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

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	S7-18
1			3			TOTAL SHEETS
2			4			35

ASSEMBLED BY : M. WRIGHT	DATE : 6/18	
CHECKED BY : N. HART	DATE : 7/18	
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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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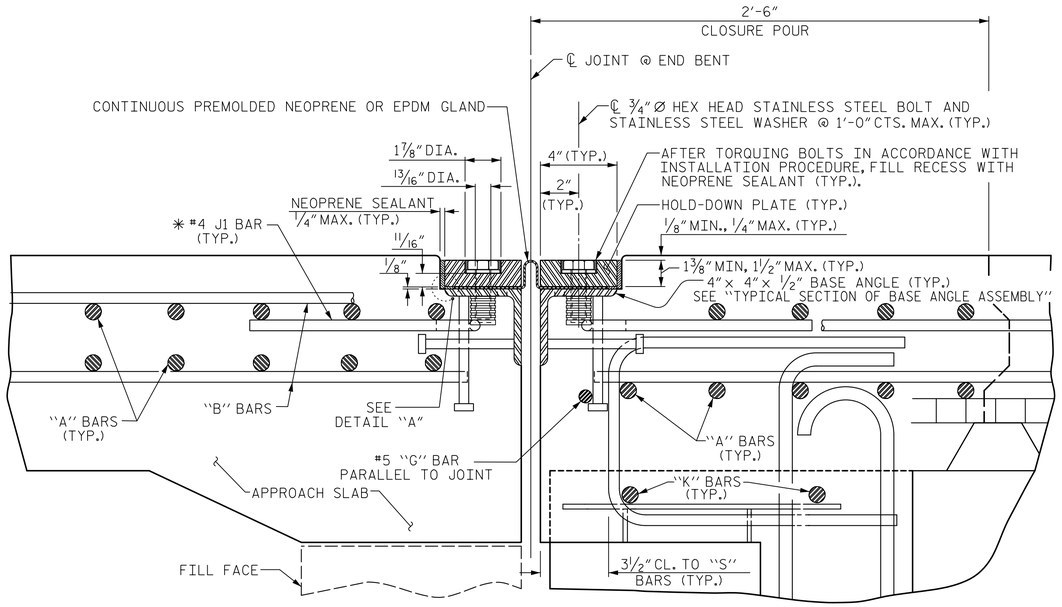
DRAWN BY	M. WRIGHT	DATE	6/18
CHECKED BY	N. HART	DATE	7/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 18

STD. NO. GRA2



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

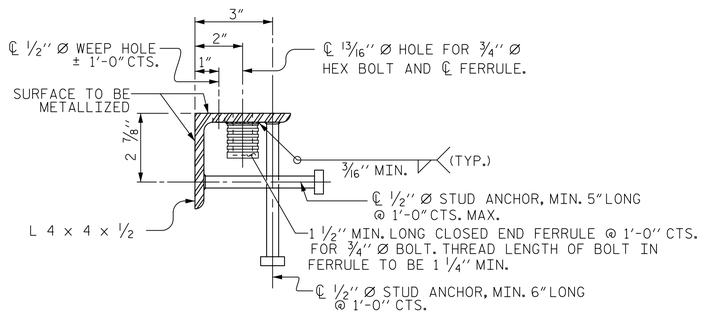
* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

INSTALLATION PROCEDURE

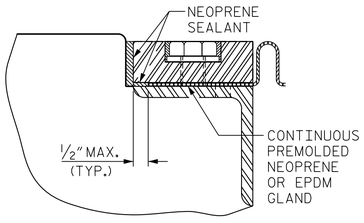
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4 1/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4"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 1/2" 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 1/8" 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

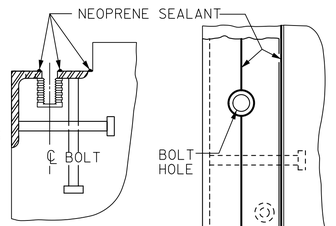
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS 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 3/4"Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE 1/2"Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.



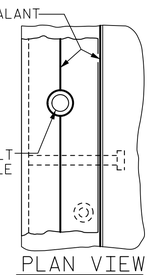
TYPICAL SECTION OF BASE ANGLE ASSEMBLY



DETAIL "A"

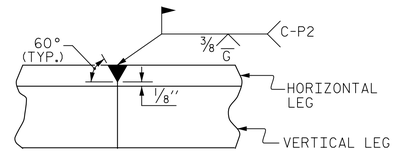


CROSS SECTION



PLAN VIEW

INSTALLATION SKETCH



DETAIL- FIELD WELD SPLICE OF BASE ANGLE

MOVEMENT AND SETTING AT JOINT					
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
E.B. 1	97°-15'-41"	13/16"	1 5/8"	1 1/2"	1 3/16"
E.B. 2	97°-15'-41"	3/4"	1 5/8"	1 1/2"	1 1/4"

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS

11/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS

LEFT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 6/18
CHECKED BY : N. HART	DATE : 7/18
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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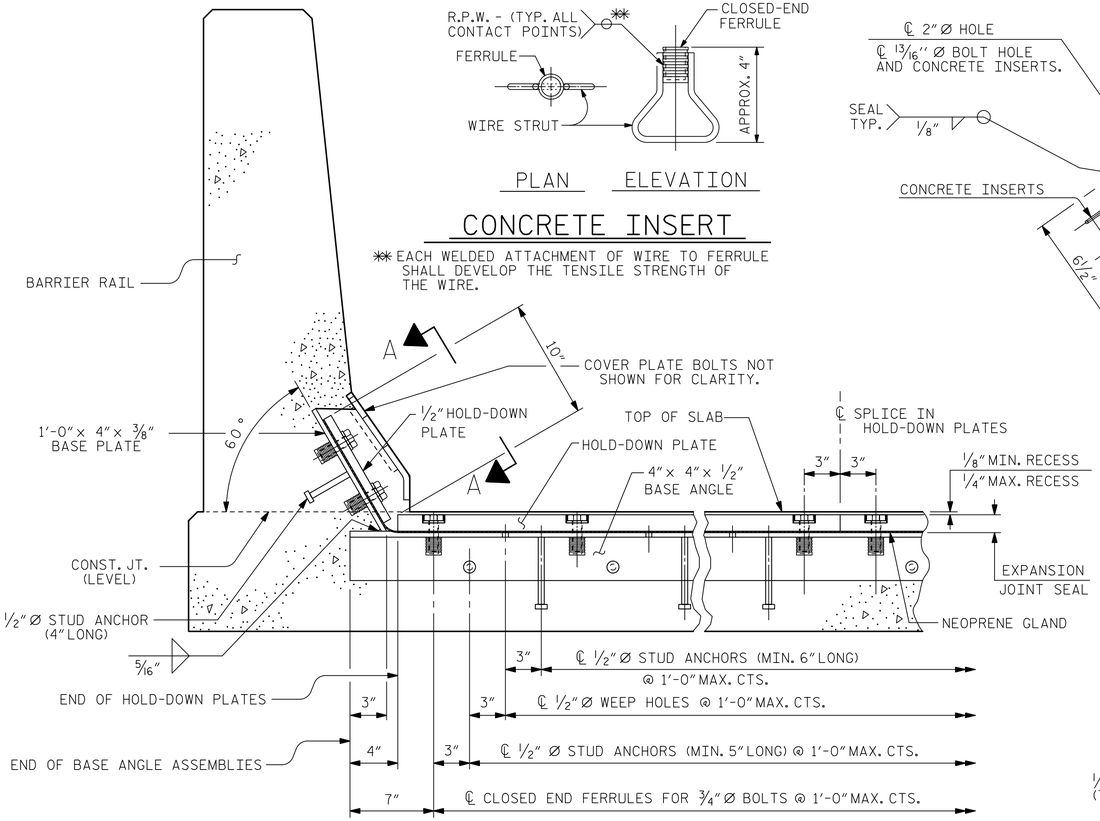
DRAWN BY	M. WRIGHT	DATE	6/18
CHECKED BY	N. HART	DATE	7/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 19

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-19
1			3			TOTAL SHEETS
2			4			35

STD. NO. EJS1

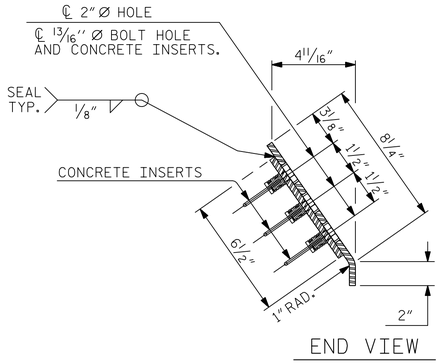


SECTION THRU RAIL NORMAL TO JOINT

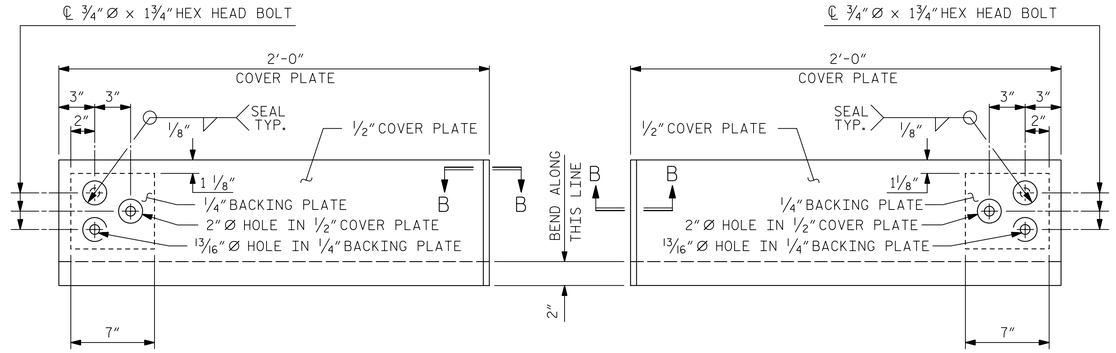
PLAN ELEVATION

CONCRETE INSERT

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



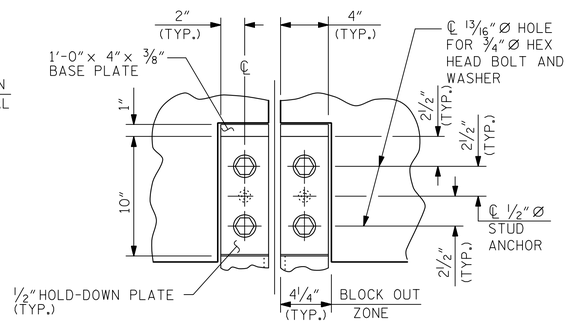
END VIEW



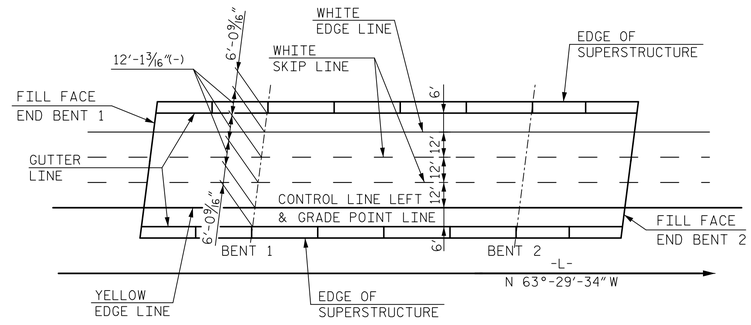
TYPE I - ELEVATION VIEW

TYPE II - ELEVATION VIEW

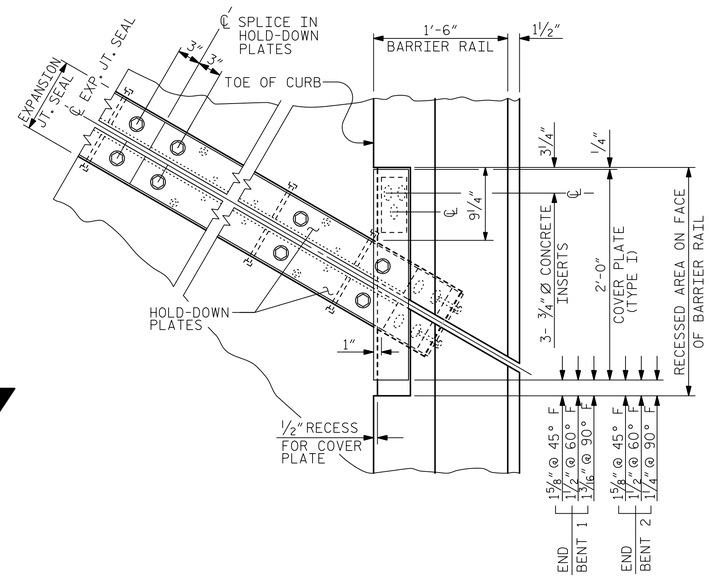
COVER PLATE DETAILS



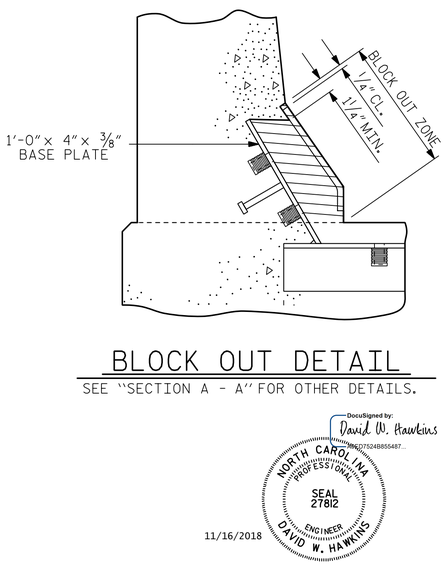
SECTION A - A



PAVEMENT MARKING ALIGNMENT

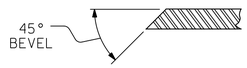


PLAN OF EXPANSION JOINT SEAL



BLOCK OUT DETAIL

SEE "SECTION A - A" FOR OTHER DETAILS.



SECTION B - B

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

LEFT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 6/18
CHECKED BY : N. HART	DATE : 7/18
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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NC License No. C-1554
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DRAWN BY M. WRIGHT DATE 6/18
CHECKED BY N. HART DATE 7/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 20

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-20
1			3			TOTAL SHEETS
2			4			35

STD. NO. EJS2

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″			

BILL OF MATERIAL

EPOXY COATED REINFORCING STEEL

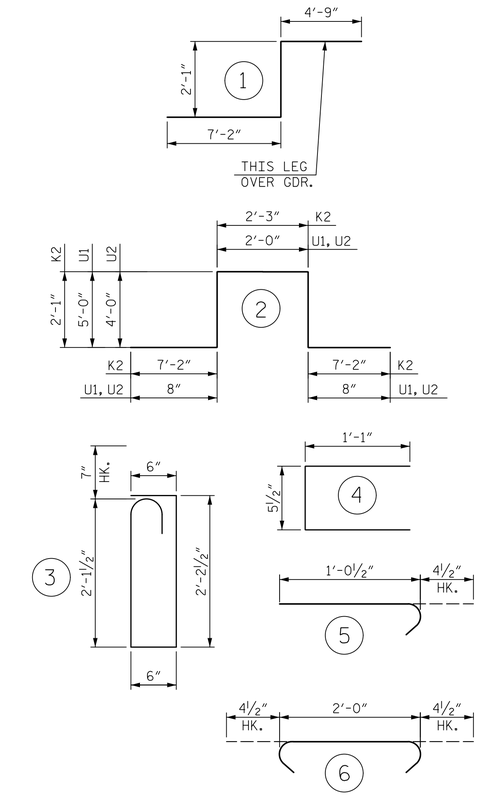
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A1	2	6	STR	5′-1″	15
A2	2	6	STR	9′-0″	27
A3	2	6	STR	12′-11″	39
A4	2	6	STR	16′-10″	51
A5	2	6	STR	20′-10″	63
A6	2	6	STR	24′-9″	74
A7	2	6	STR	28′-8″	86
A8	2	6	STR	32′-7″	98
A9	2	6	STR	36′-7″	110
A10	2	6	STR	40′-5″	121
A11	2	6	STR	44′-4″	133
A12	2	6	STR	48′-3″	145
A13	369	6	STR	50′-11″	28,220
B1	72	6	STR	41′-11″	4,533
B2	72	4	STR	18′-11″	910
B3	72	6	STR	40′-9″	4,407
B4	66	7	STR	50′-0″	6,745
B5	66	7	STR	38′-6″	5,194
G1	2	5	STR	51′-3″	107
J1	98	4	5	1′-5″	93
K1	8	8	1	14′-0″	299
K2	16	8	2	20′-9″	886
S1	70	5	3	5′-11″	432
S2	70	4	4	2′-8″	125
U1	50	4	2	13′-4″	445
U2	20	4	2	11′-4″	151
EPOXY COATED REINFORCING STEEL TOTAL:					53,509

BILL OF MATERIAL

REINFORCING STEEL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A101	2	6	STR	5′-1″	15
A102	2	6	STR	9′-0″	27
A103	2	6	STR	12′-11″	39
A104	2	6	STR	16′-10″	51
A105	2	6	STR	20′-10″	63
A106	2	6	STR	24′-9″	74
A107	2	6	STR	28′-8″	86
A108	2	6	STR	32′-7″	98
A109	2	6	STR	36′-7″	110
A110	2	6	STR	40′-5″	121
A111	2	6	STR	44′-4″	133
A112	2	6	STR	48′-3″	145
A113	369	6	STR	50′-11″	28,220
B101	348	5	STR	49′-5″	17,936
K3	20	6	STR	6′-9″	203
K4	20	4	STR	5′-3″	70
K5	20	4	STR	6′-11″	92
K6	40	4	STR	7′-9″	207
K7	20	4	STR	6′-7″	88
K8	20	4	STR	23′-3″	311
S3	260	4	6	2′-9″	478
REINFORCING STEEL TOTAL:					48,567

BAR TYPES



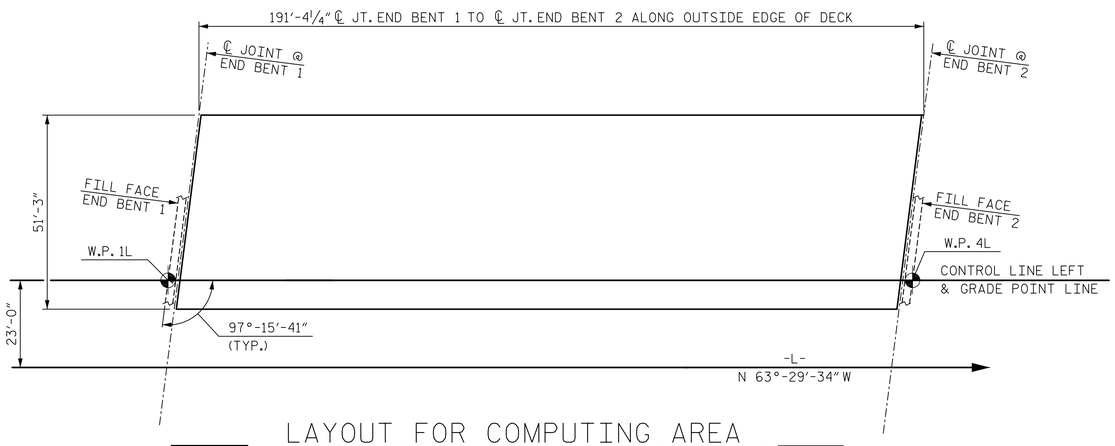
ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	65.4	48,567	53,509
POUR 2	179.7		
POUR 3	101.9		
TOTALS**	347.0	48,567	53,509

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. FOR POURING SEQUENCE, SEE SHEET "SUPERSTRUCTURE PLAN OF SPAN A".

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



LAYOUT FOR COMPUTING AREA
REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 9,807)

GROOVING BRIDGE FLOORS

APPROACH SLABS	2,158	SQ.FT.
BRIDGE DECK	8,557	SQ.FT.
TOTAL	10,715	SQ.FT.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SUPERSTRUCTURE BILL OF MATERIAL
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-21
1			3			TOTAL SHEETS
2			4			35

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 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 21

ASSEMBLED BY : M. WRIGHT DATE : 8/18
CHECKED BY : N. HART DATE : 9/18

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

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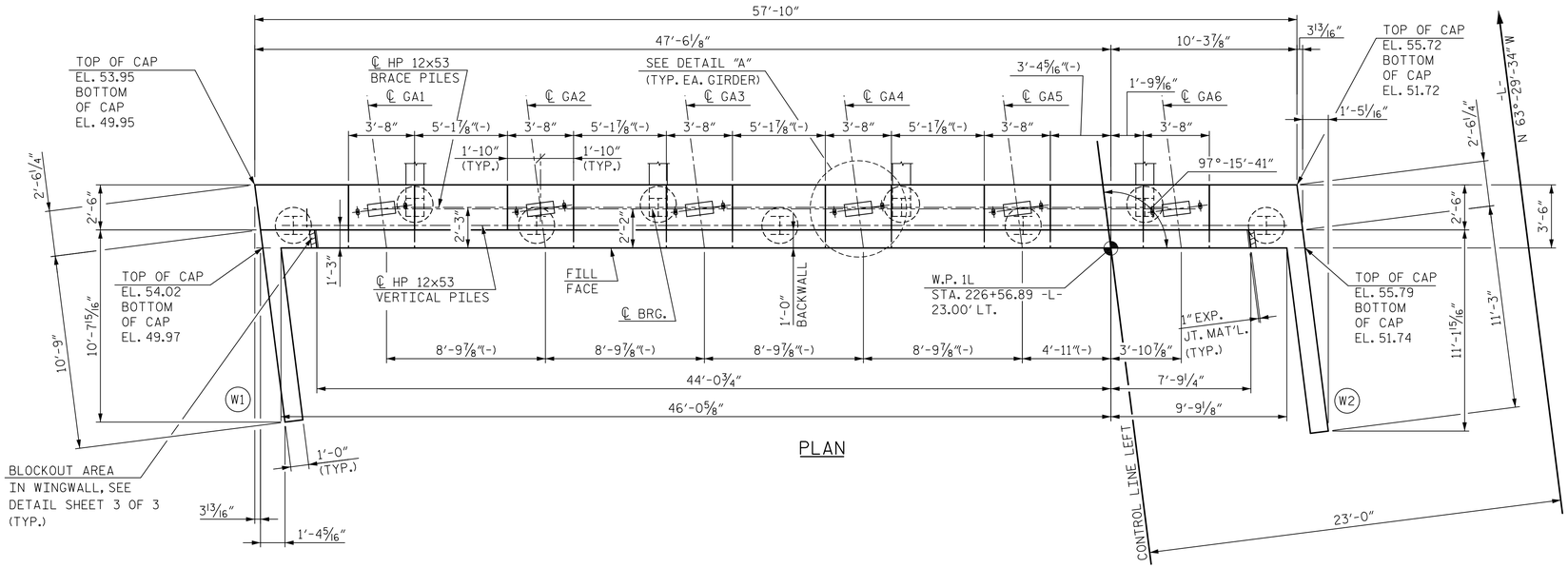
STD. NO. BOM2

NOTES:

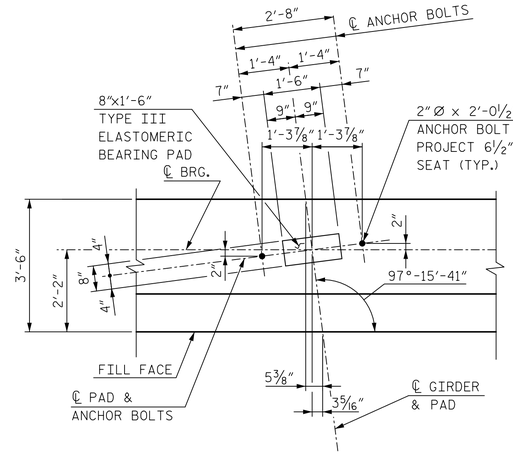
FOR NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

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

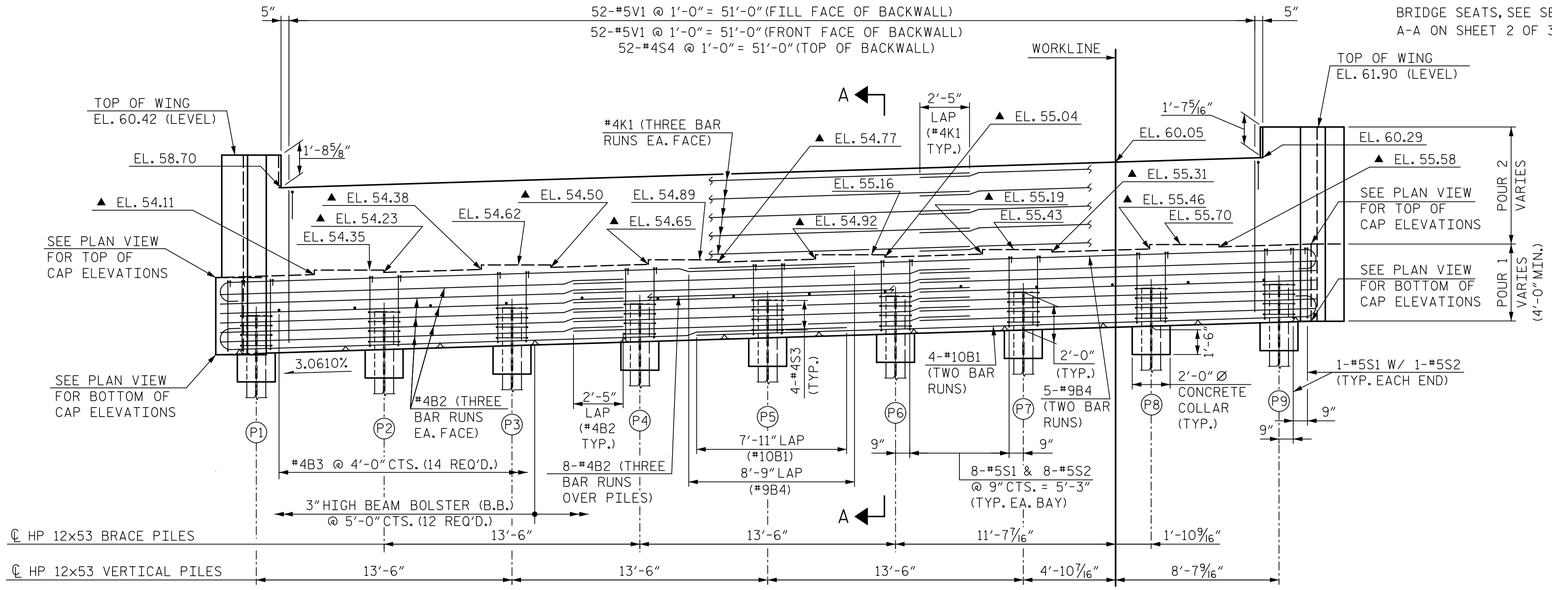
INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.



PLAN



DETAIL A



ELEVATION

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

TOP OF PILE ELEVATIONS	
P1	52.02
P2	52.23
P3	52.43
P4	52.64
P5	52.85
P6	53.05
P7	53.26
P8	53.47
P9	53.67

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 1 OF 3

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

LEFT LANE

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DRAWN BY M. WRIGHT DATE 9/18
CHECKED BY D. HAWKINS DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

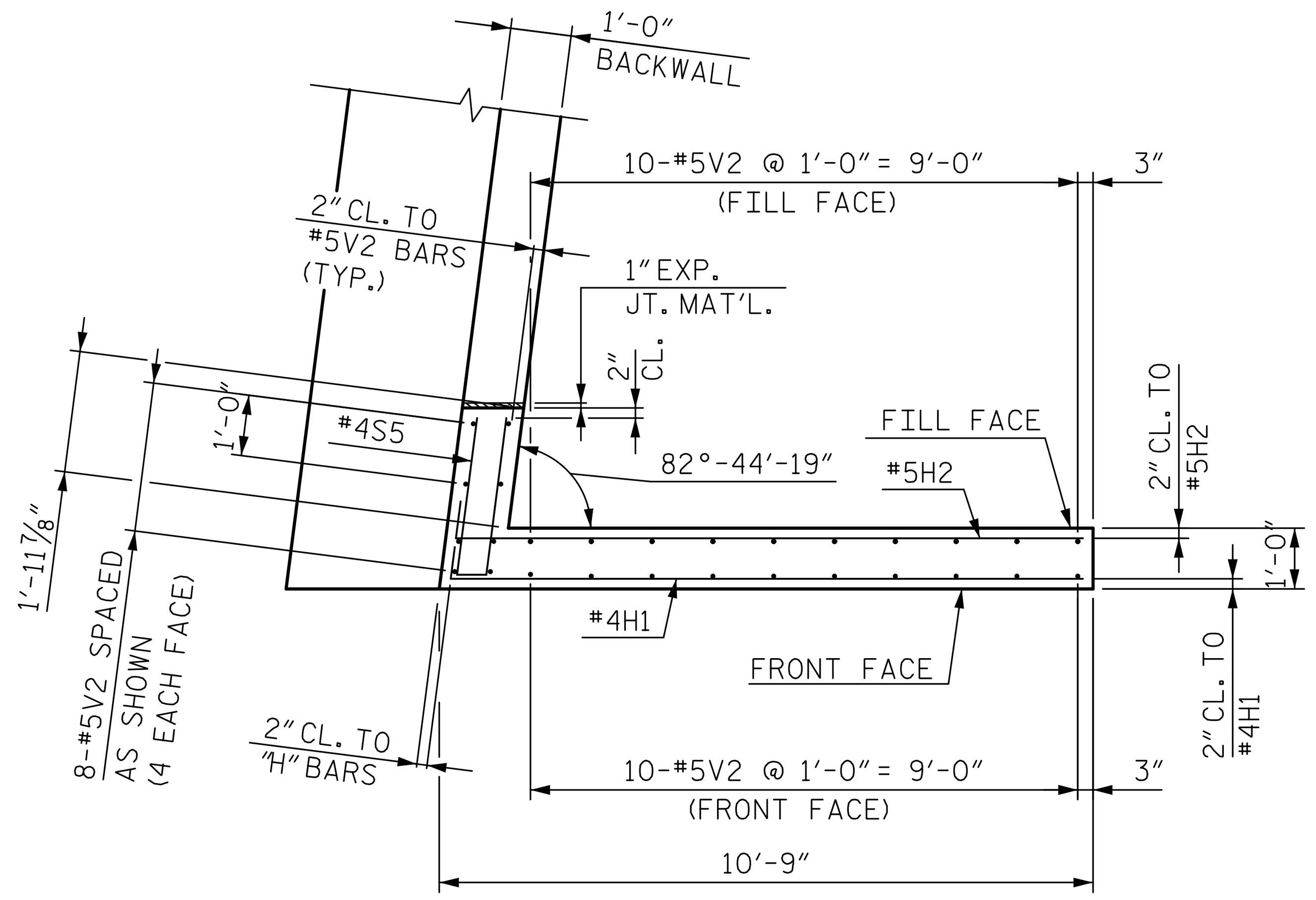
DWG. NO. 22

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-22
1			3			TOTAL SHEETS
2			4			35

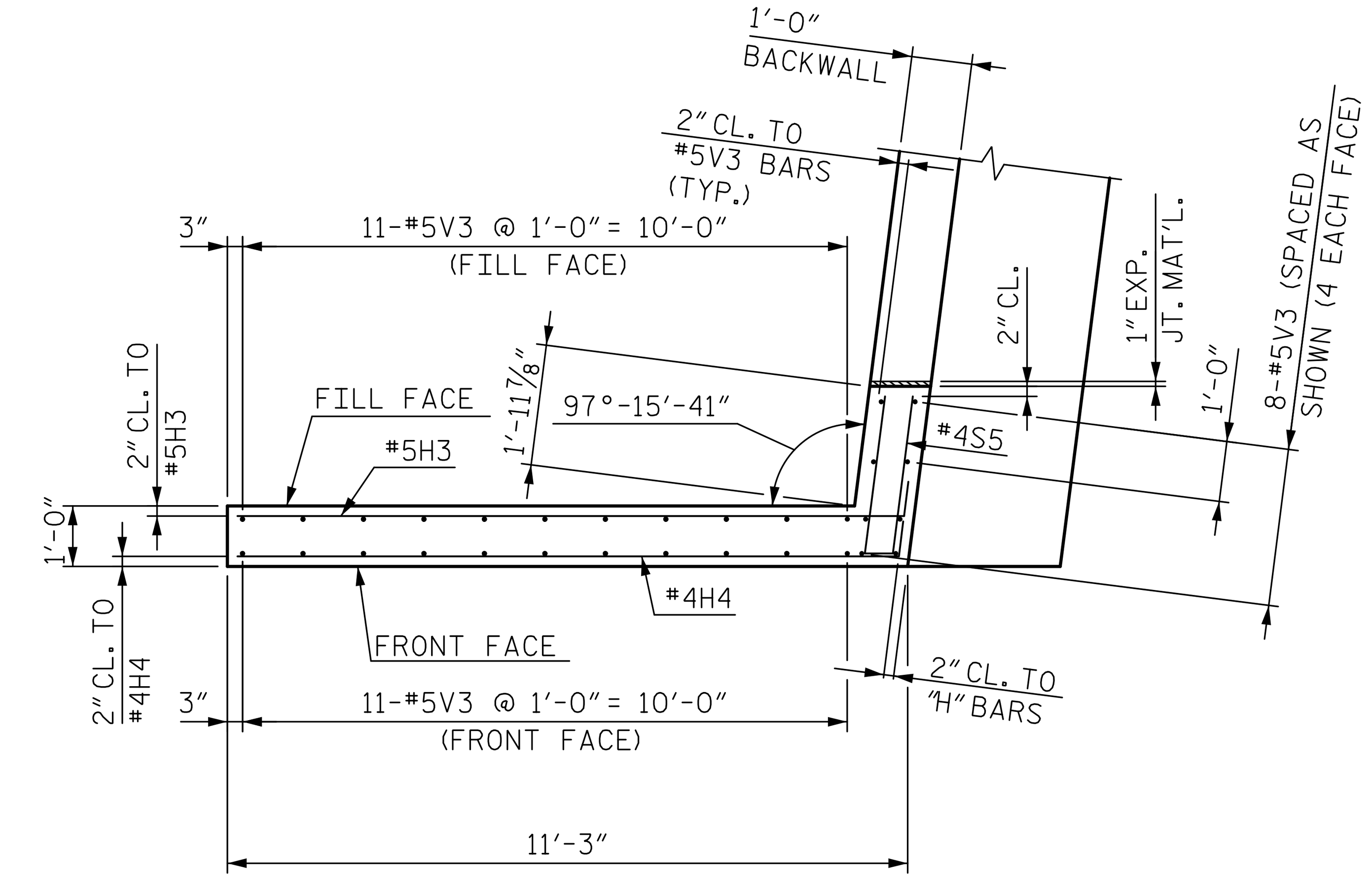
NOTES:

FOR NOTES, SEE SHEET 3 OF 3.

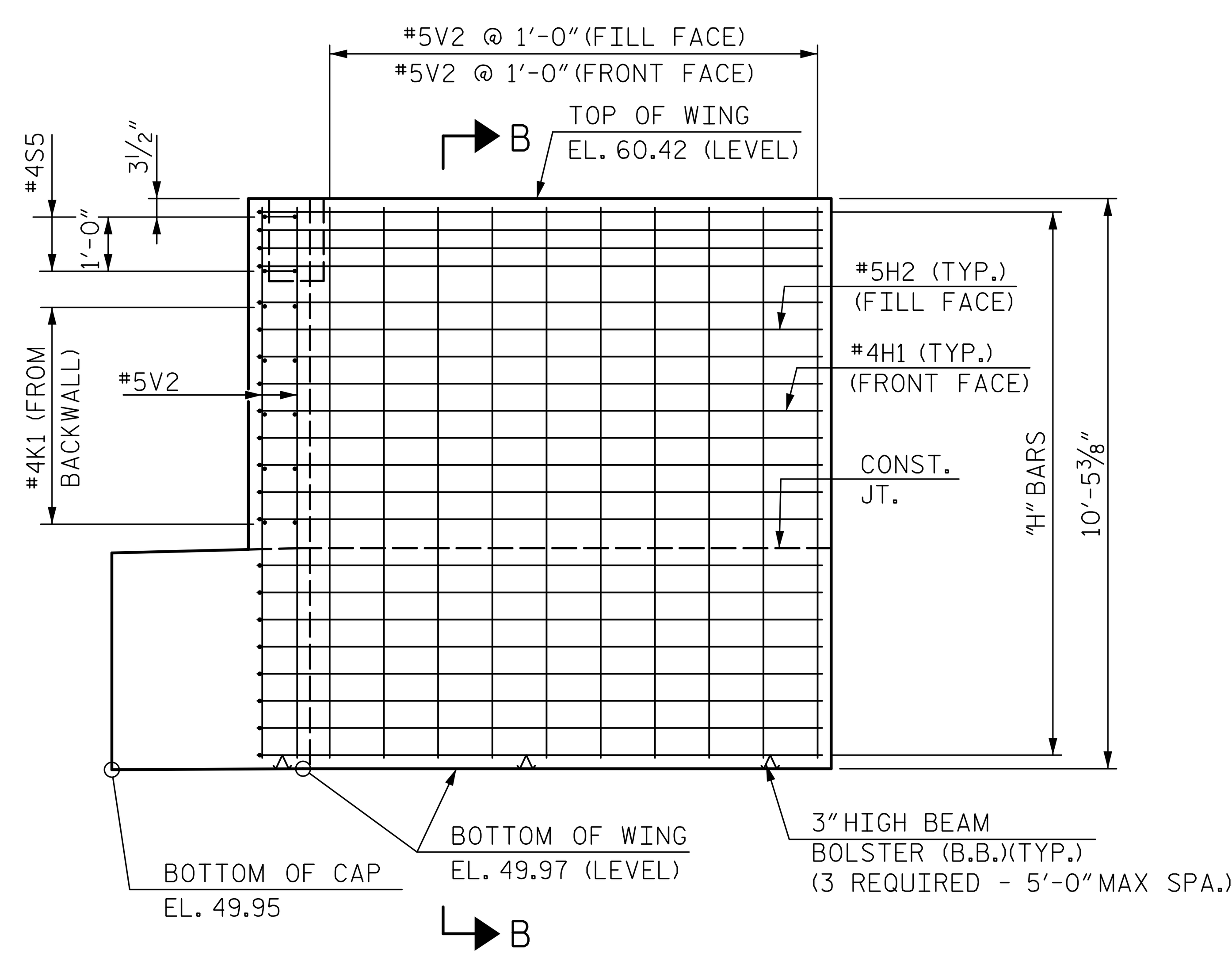
FOR BLOCKOUT IN WINGWALL, SEE SHEET 3 OF 3.



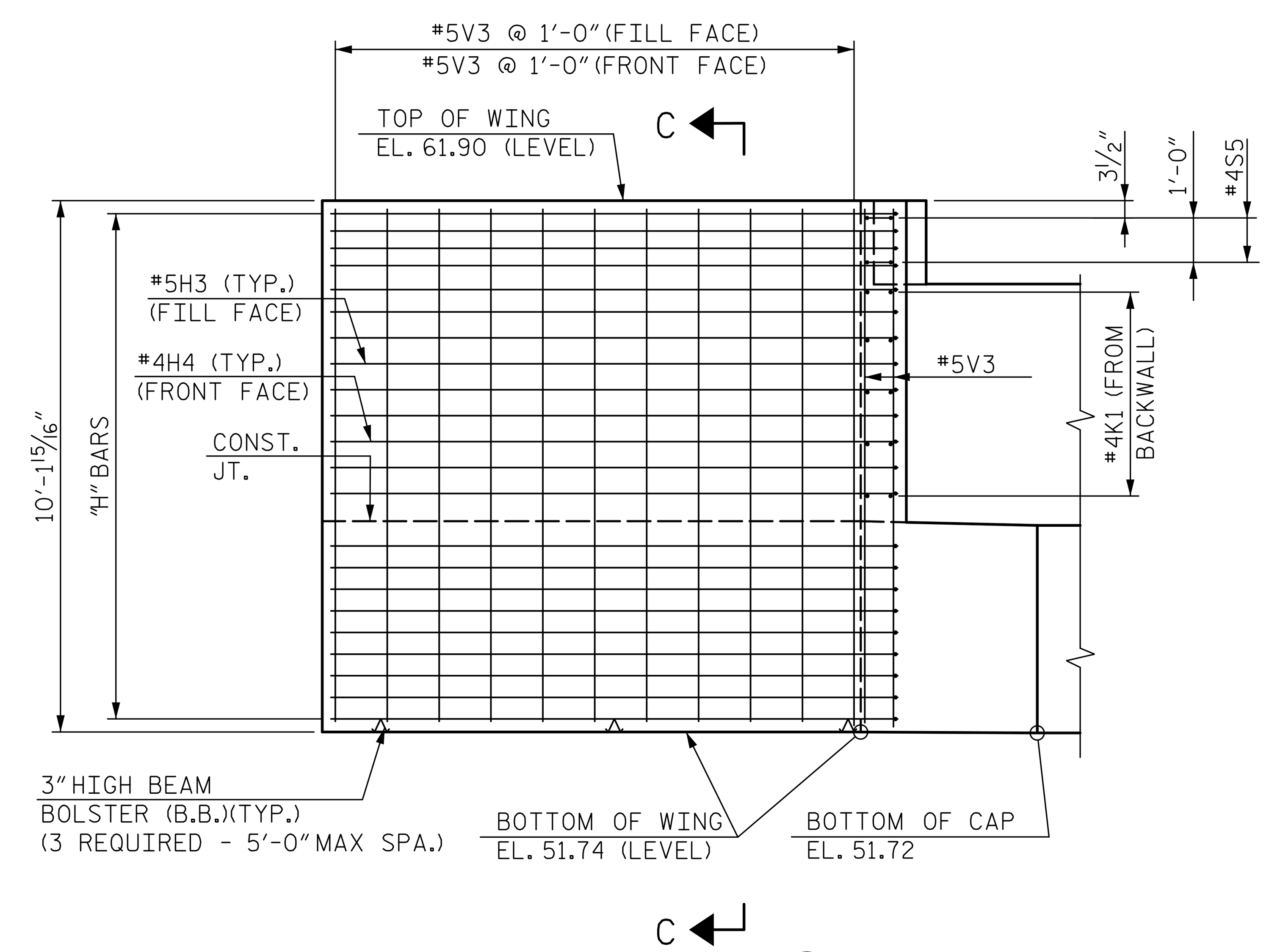
PLAN OF WING (W1)



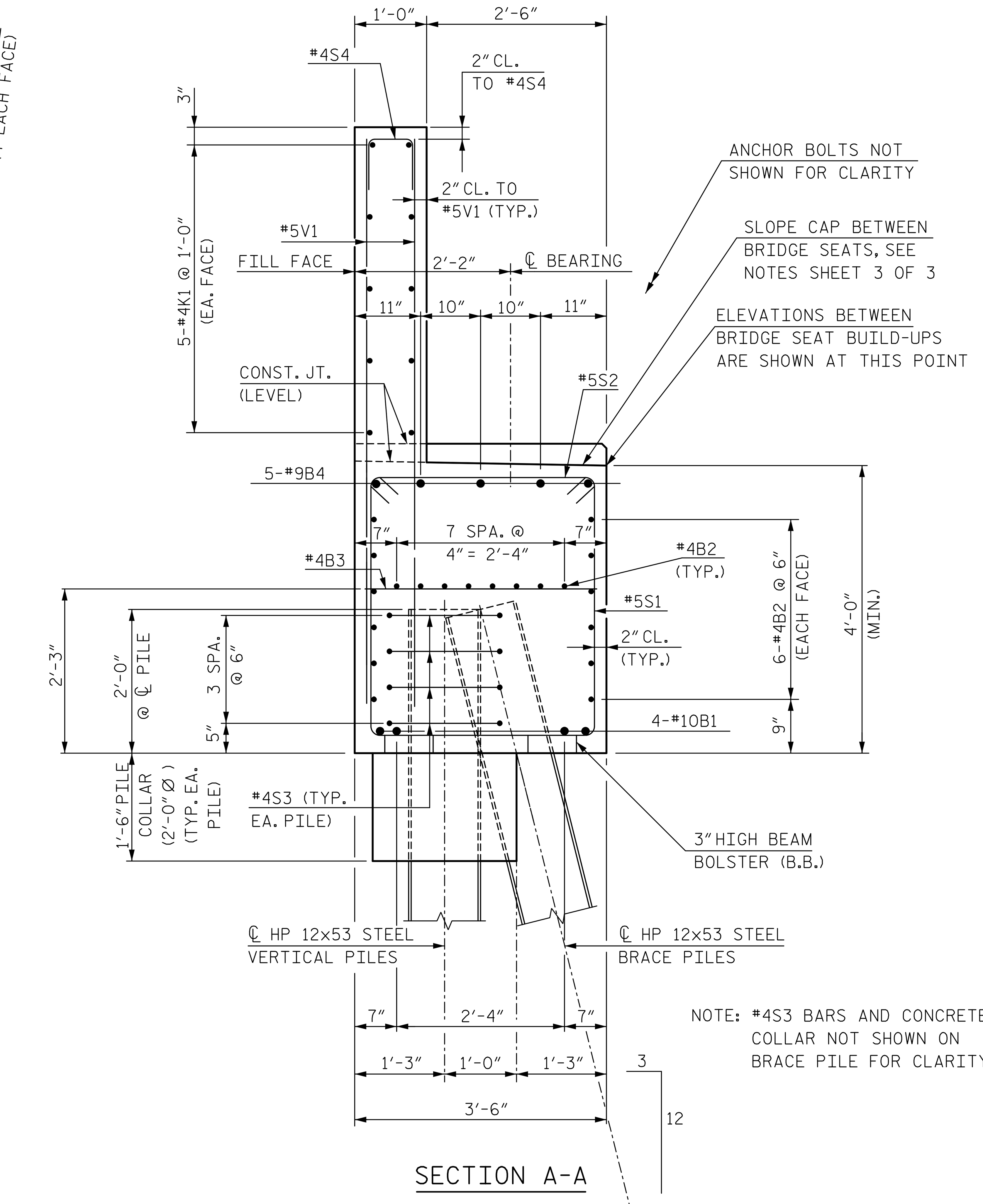
PLAN OF WING (W2)



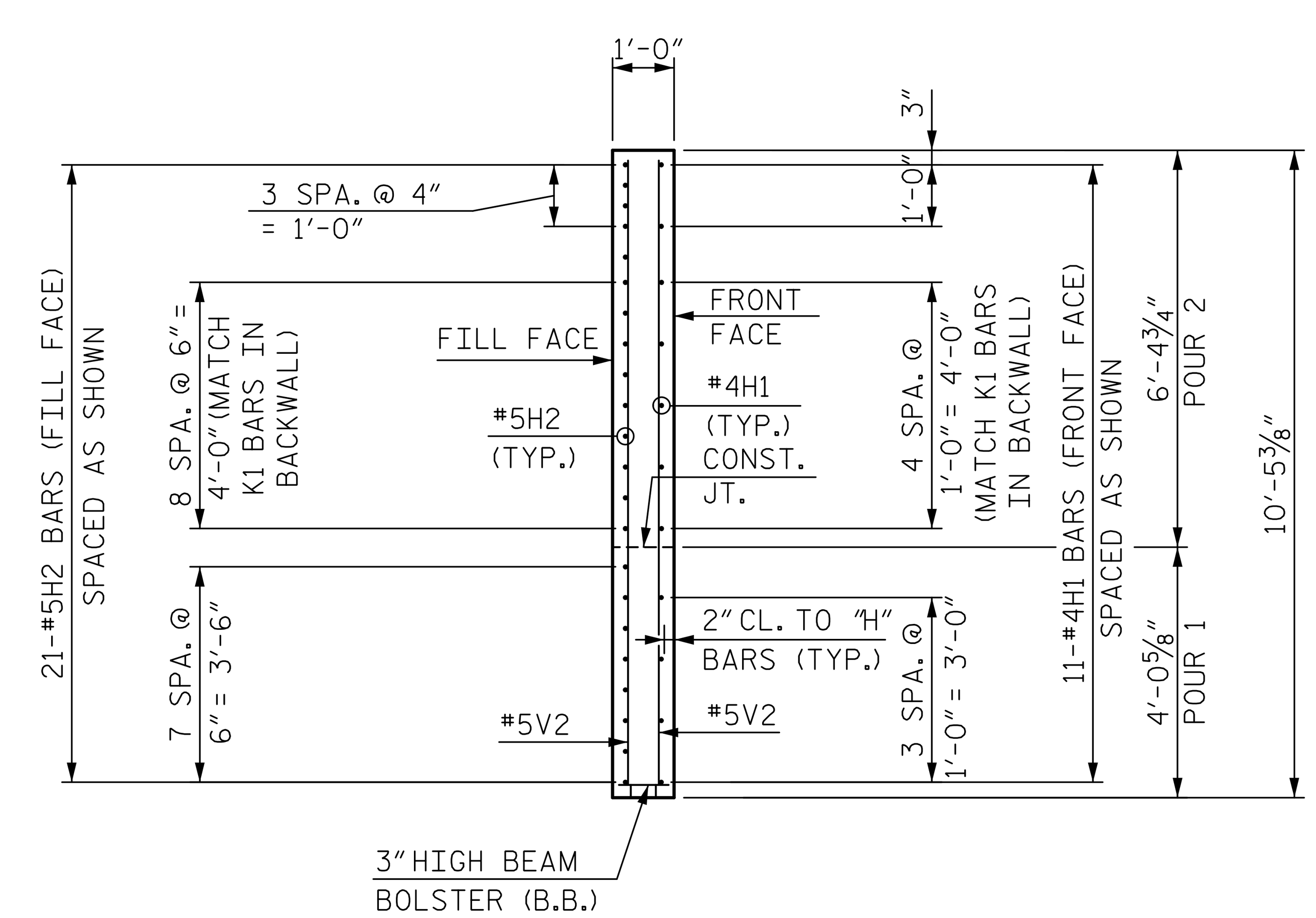
ELEVATION OF WING (W1)



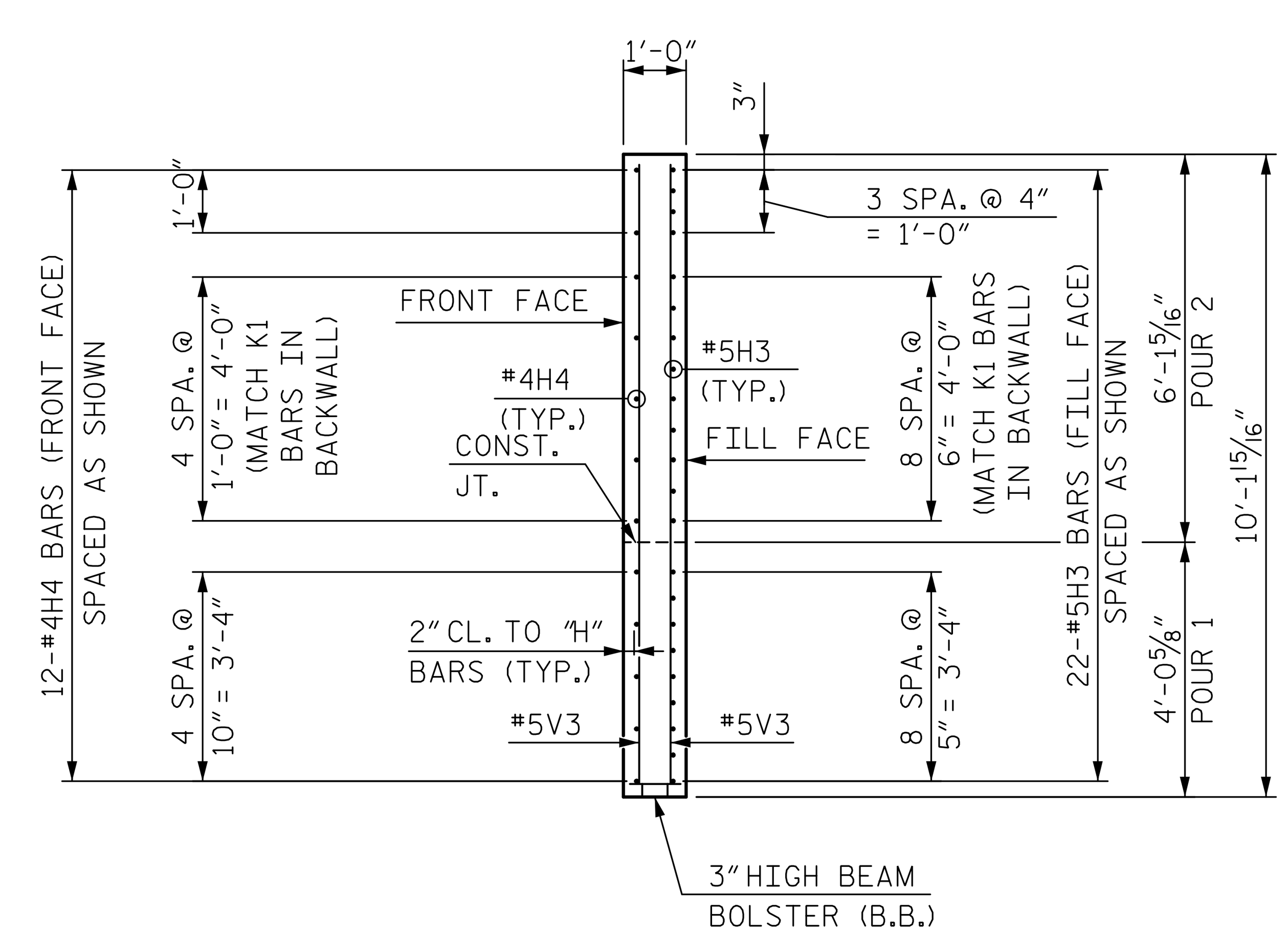
ELEVATION OF WING (W2)



SECTION A-A



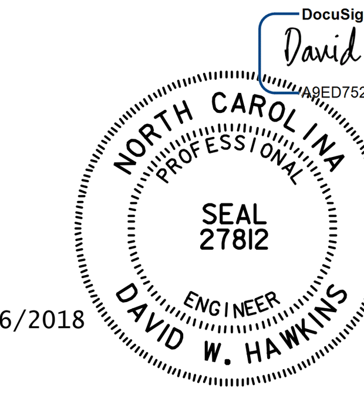
SECTION B-B



SECTION C-C

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by: David W. Hawkins



11/16/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

LEFT LANE

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

DRAWN BY	M. WRIGHT	DATE	9/18
CHECKED BY	D. HAWKINS	DATE	9/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

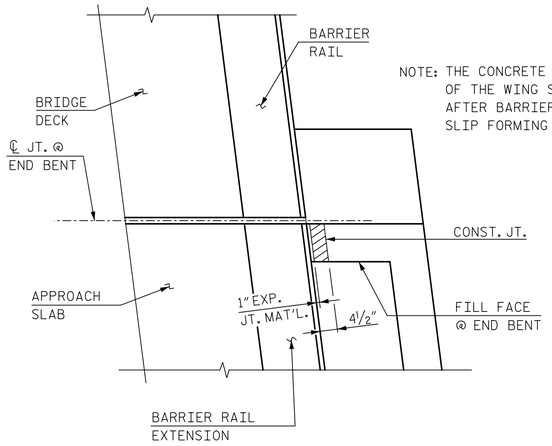
DWG. NO. 23

REVISIONS

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

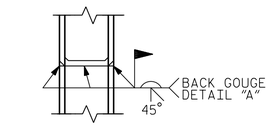
SHEET NO. S7-23

TOTAL SHEETS 35

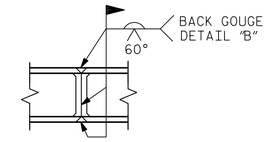


PLAN

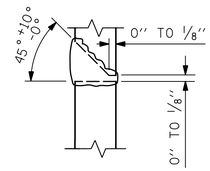
NOTE: THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.



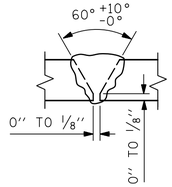
*PILE VERTICAL



*PILE HORIZONTAL OR VERTICAL



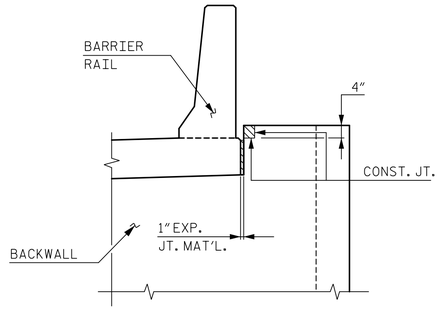
DETAIL "A"



DETAIL "B"

* POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



ELEVATION

BLOCKOUT IN WINGWALL

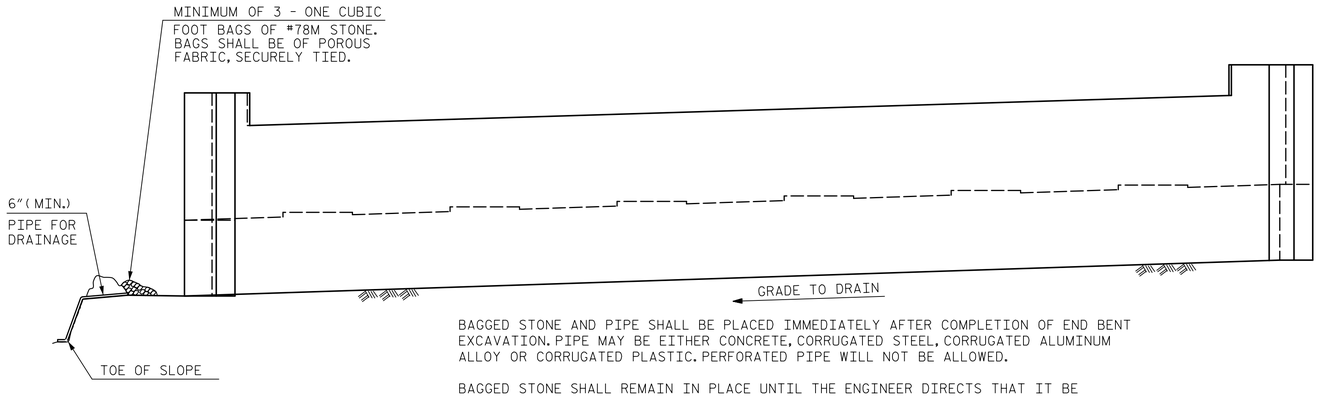
NOTES:

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%.



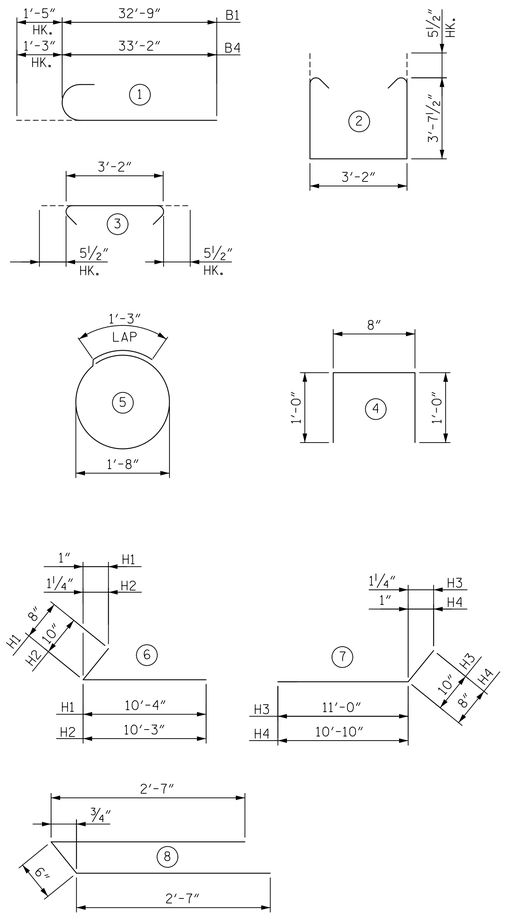
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	34'-2"	1,176
B2	60	4	STR	20'-10	835
B3	14	4	STR	3'-2"	30
B4	10	9	1	34'-5"	1,170
H1	11	4	6	11'-0"	81
H2	21	5	6	11'-1"	243
H3	22	5	7	11'-10"	272
H4	12	4	7	11'-6"	92
K1	30	4	STR	20'-10	418
S1	68	5	2	11'-4"	804
S2	68	5	3	4'-1"	290
S3	36	4	5	6'-6"	156
S4	52	4	4	2'-8"	93
S5	4	4	8	5'-8"	15
V1	104	5	STR	8'-2"	886
V2	28	5	STR	9'-11"	290
V3	30	5	STR	9'-9"	305

QUANTITIES

REINFORCING STEEL	LBS.	7,156
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP, BOT. OF WINGS & COLLARS	CU. YDS.	35.2
POUR 2 - TOP OF WINGS & BACKWALL	CU. YDS.	14.8
TOTAL	CU. YDS.	50.0
HP 12x53 STEEL PILES	NO.	9
	LIN. FT.	675
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	9
PILE REDRIVES	NO.	5

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 3 OF 3

DocuSigned by: David W. Hawkins

11/16/2018

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

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 9/18
CHECKED BY D. HAWKINS DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 24

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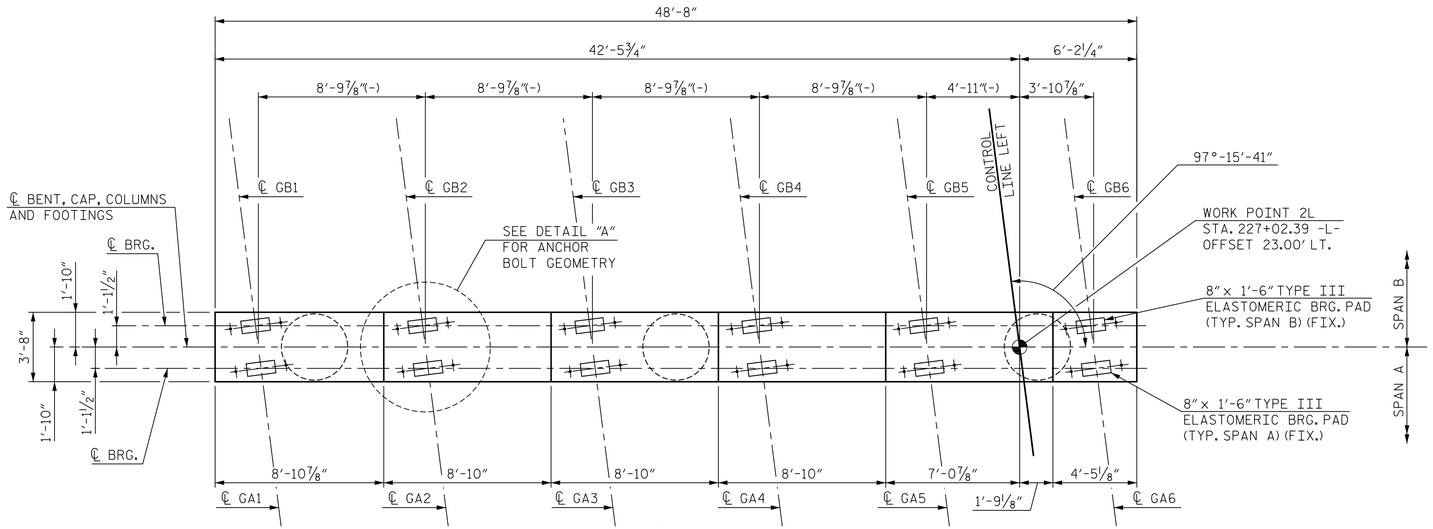
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

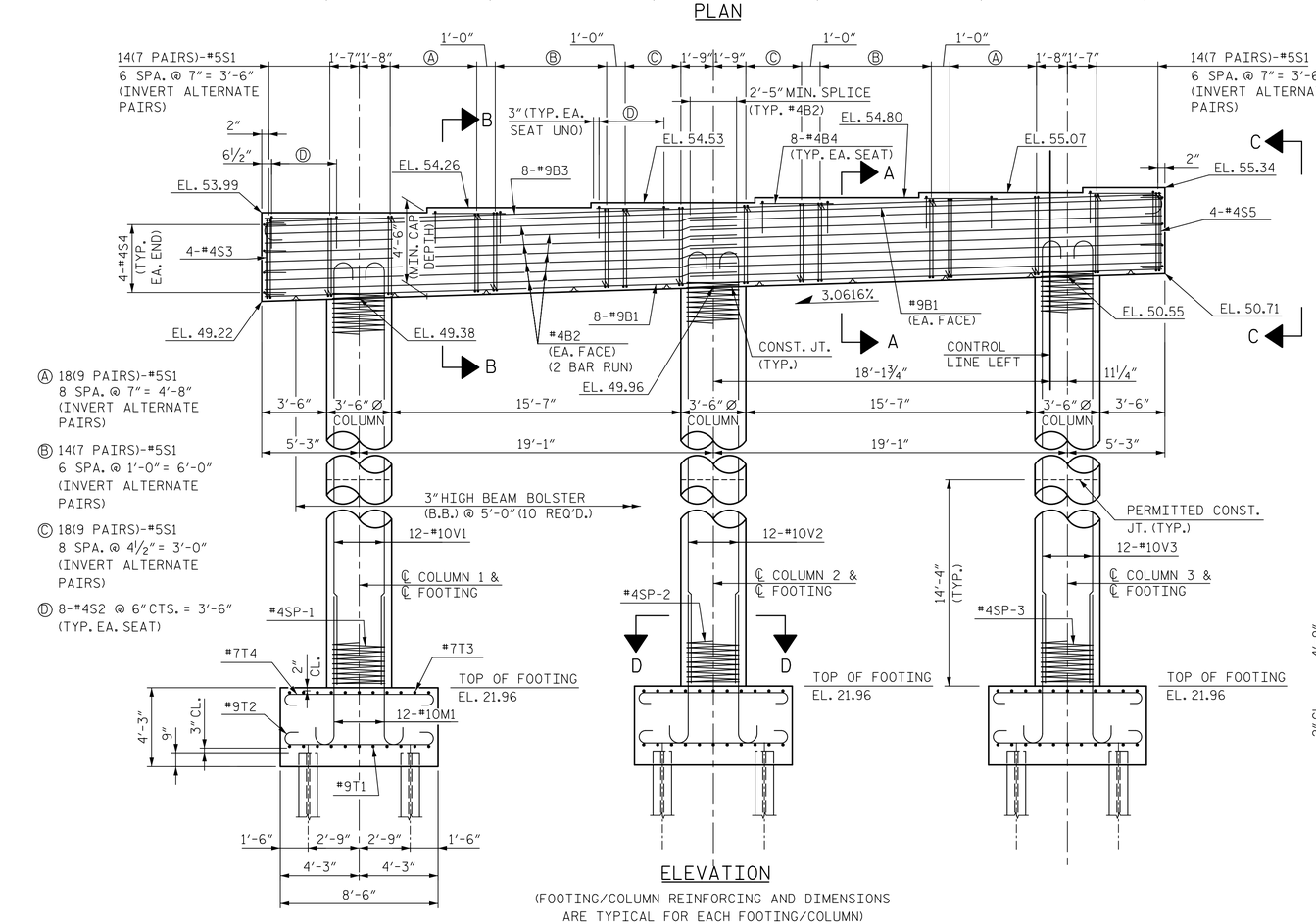
END BENT 1

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-24
1			3			TOTAL SHEETS
2			4			35



PLAN



Ⓐ 18(9 PAIRS)-#5S1
8 SPA. @ 7" = 4'-8"
(INVERT ALTERNATE PAIRS)

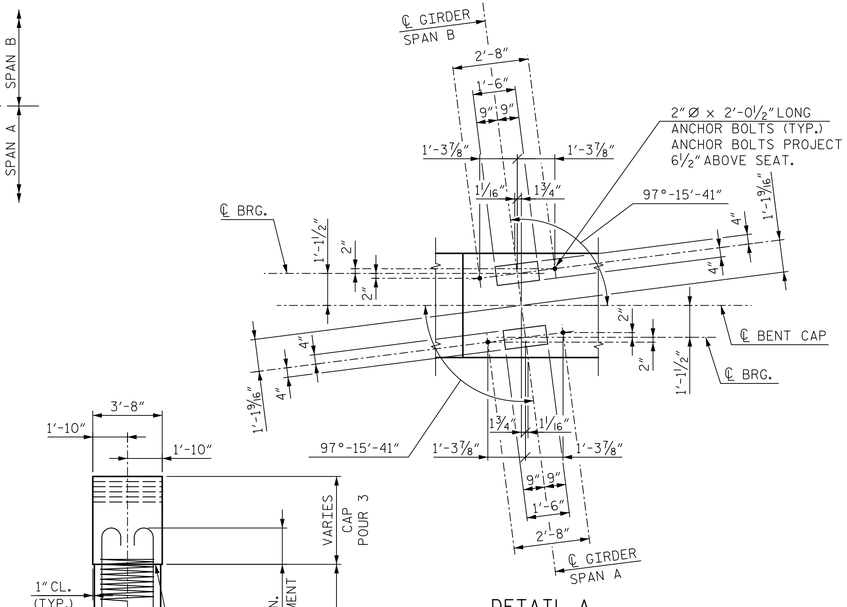
Ⓑ 14(7 PAIRS)-#5S1
6 SPA. @ 1'-0" = 6'-0"
(INVERT ALTERNATE PAIRS)

Ⓒ 18(9 PAIRS)-#5S1
8 SPA. @ 4½" = 3'-0"
(INVERT ALTERNATE PAIRS)

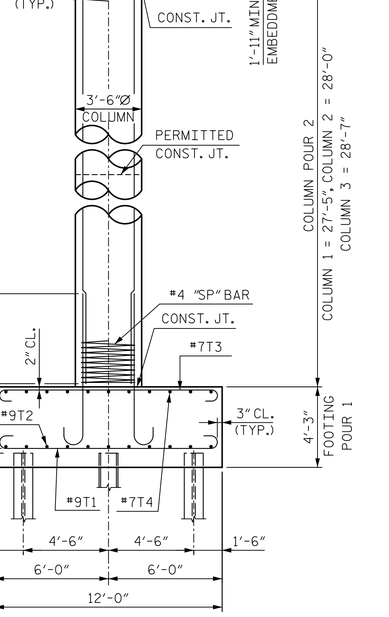
Ⓓ 8-#4S2 @ 6" CTS. = 3'-6"
(TYP. EA. SEAT)

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.

FOR PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 1" SHEET 3 OF 3.

DocuSigned by: David W. Hawkins
NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
11/16/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

LEFT LANE

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DRAWN BY	M. WRIGHT	DATE 9/18
CHECKED BY	N. HART	DATE 9/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 9/18

DWG. NO. 25

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-25
1			3			TOTAL SHEETS
2			4			35

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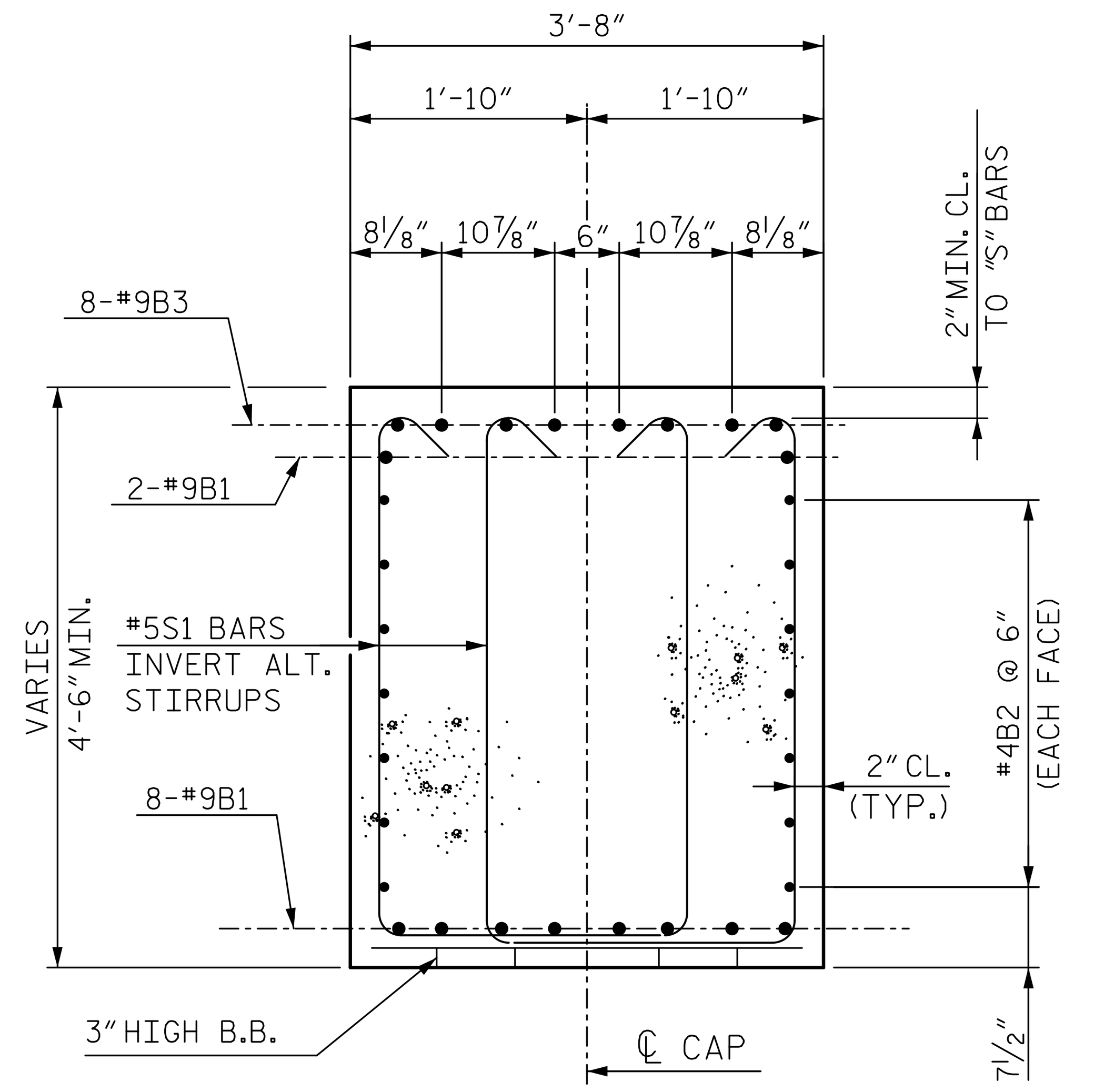
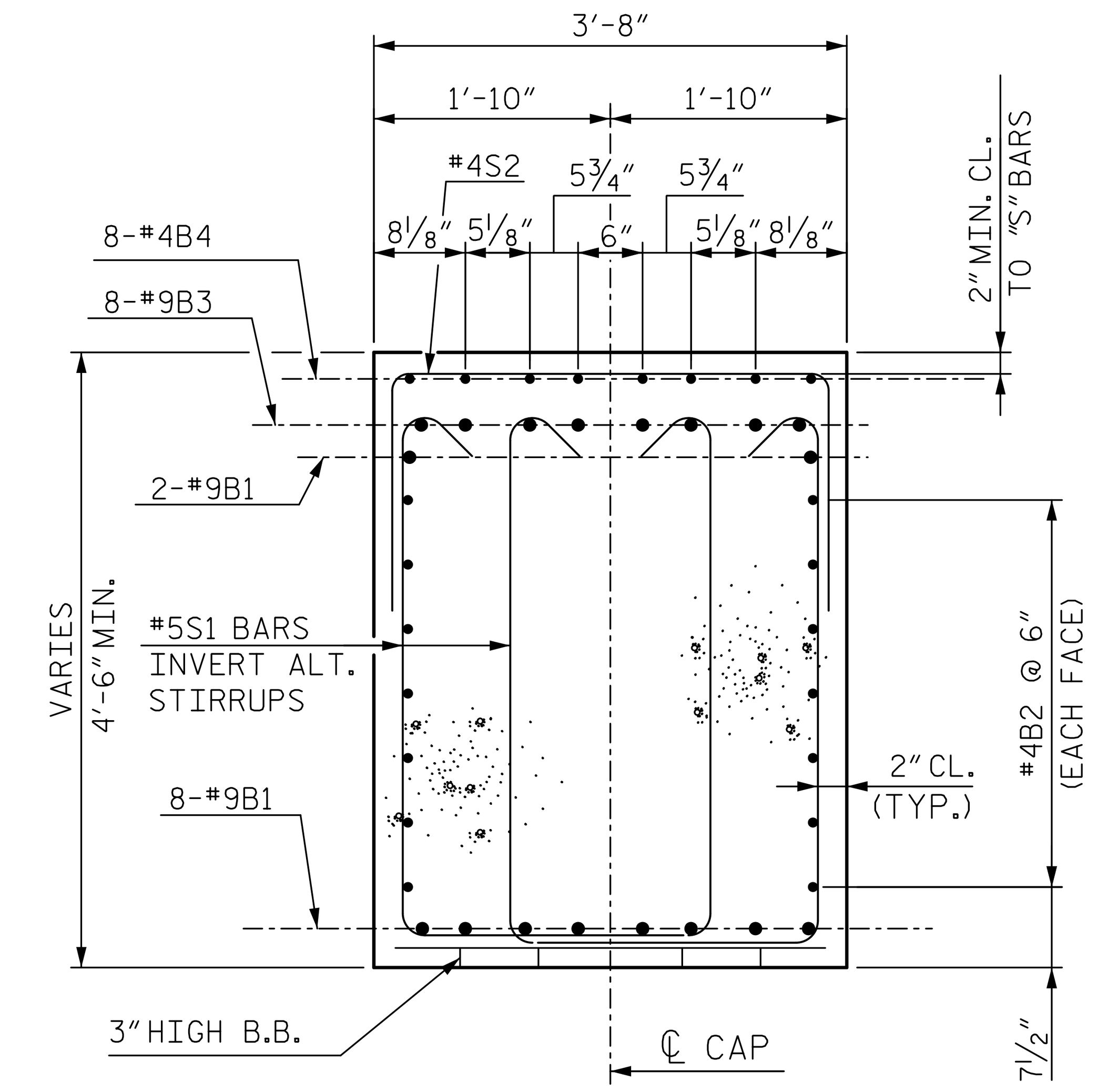
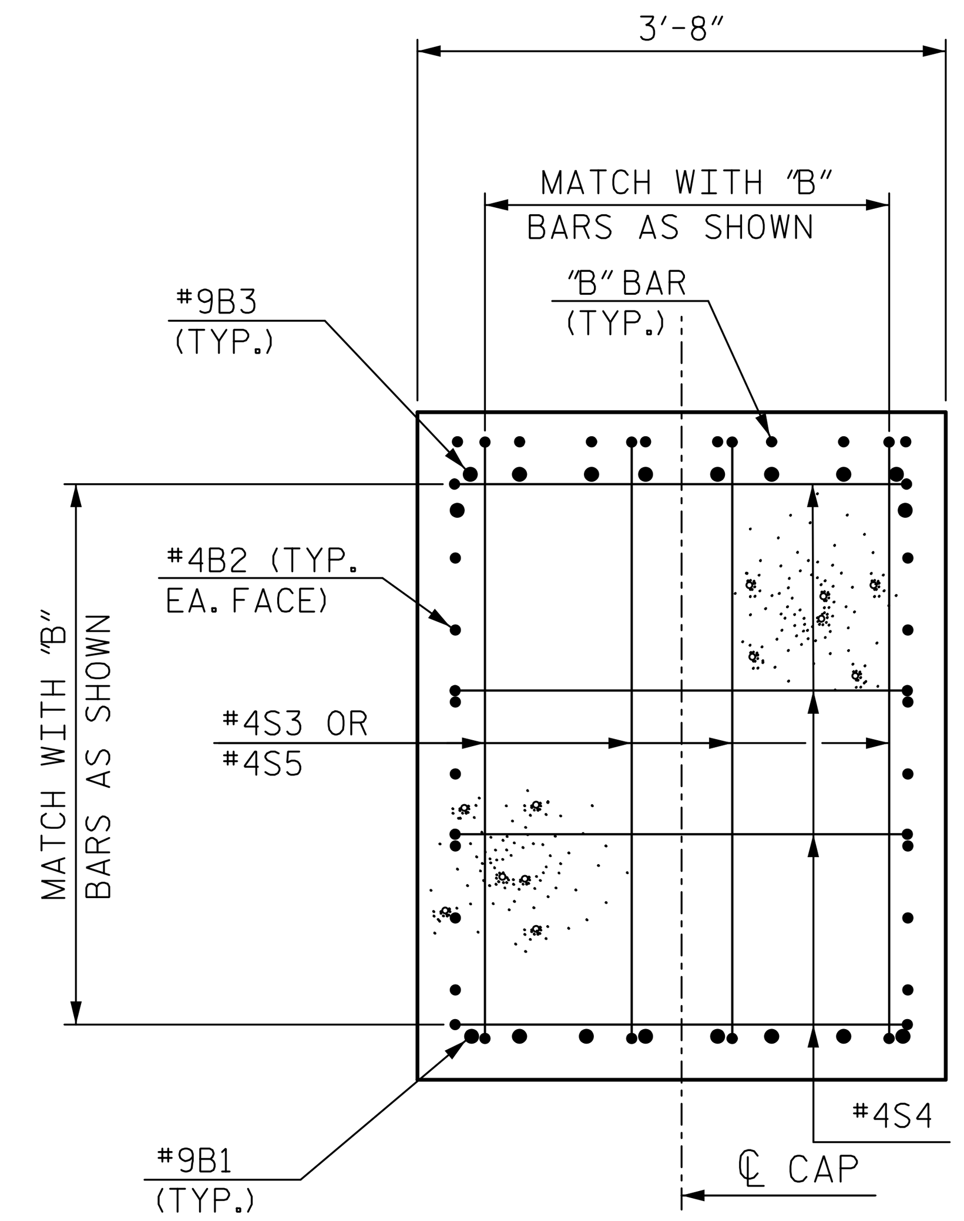


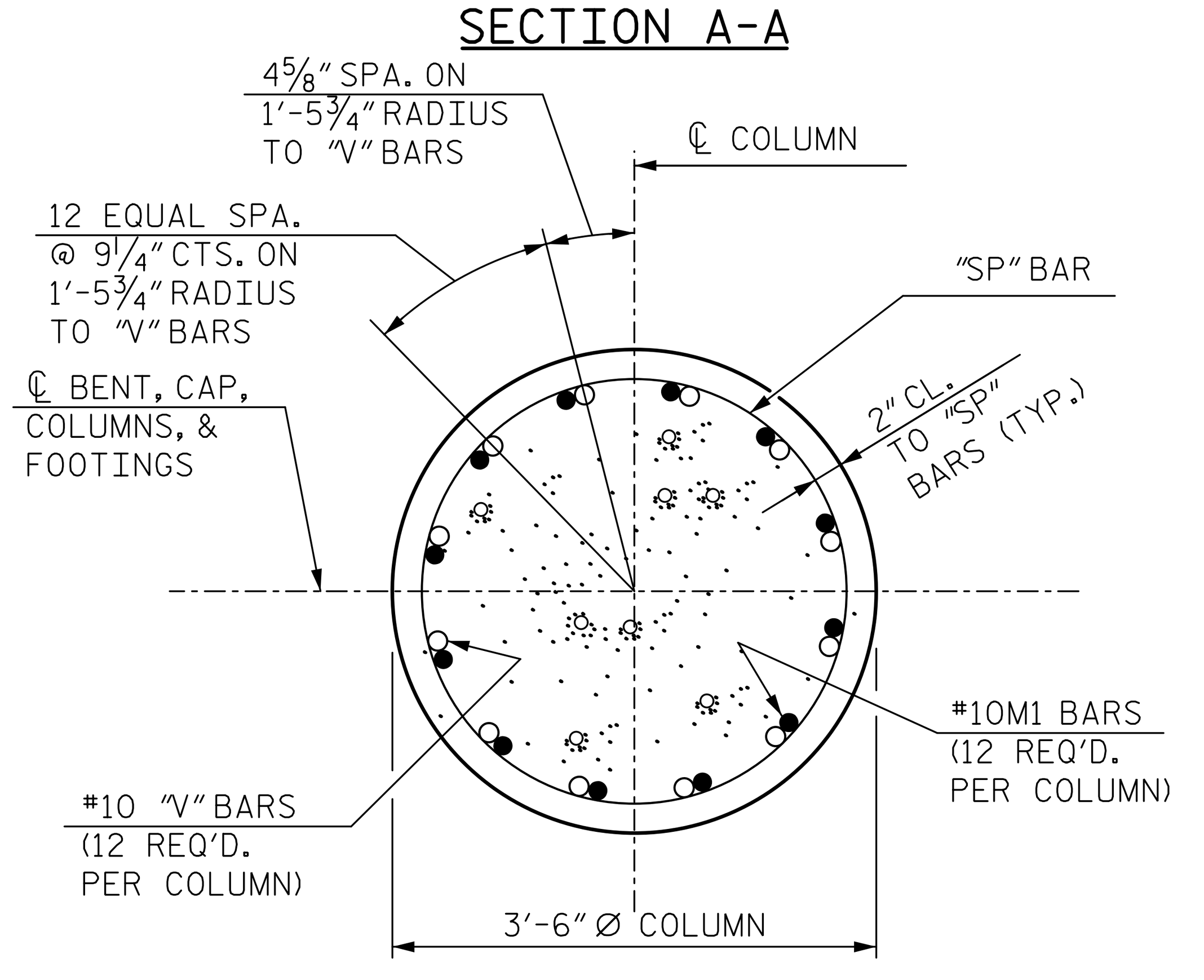
SECTION A-A



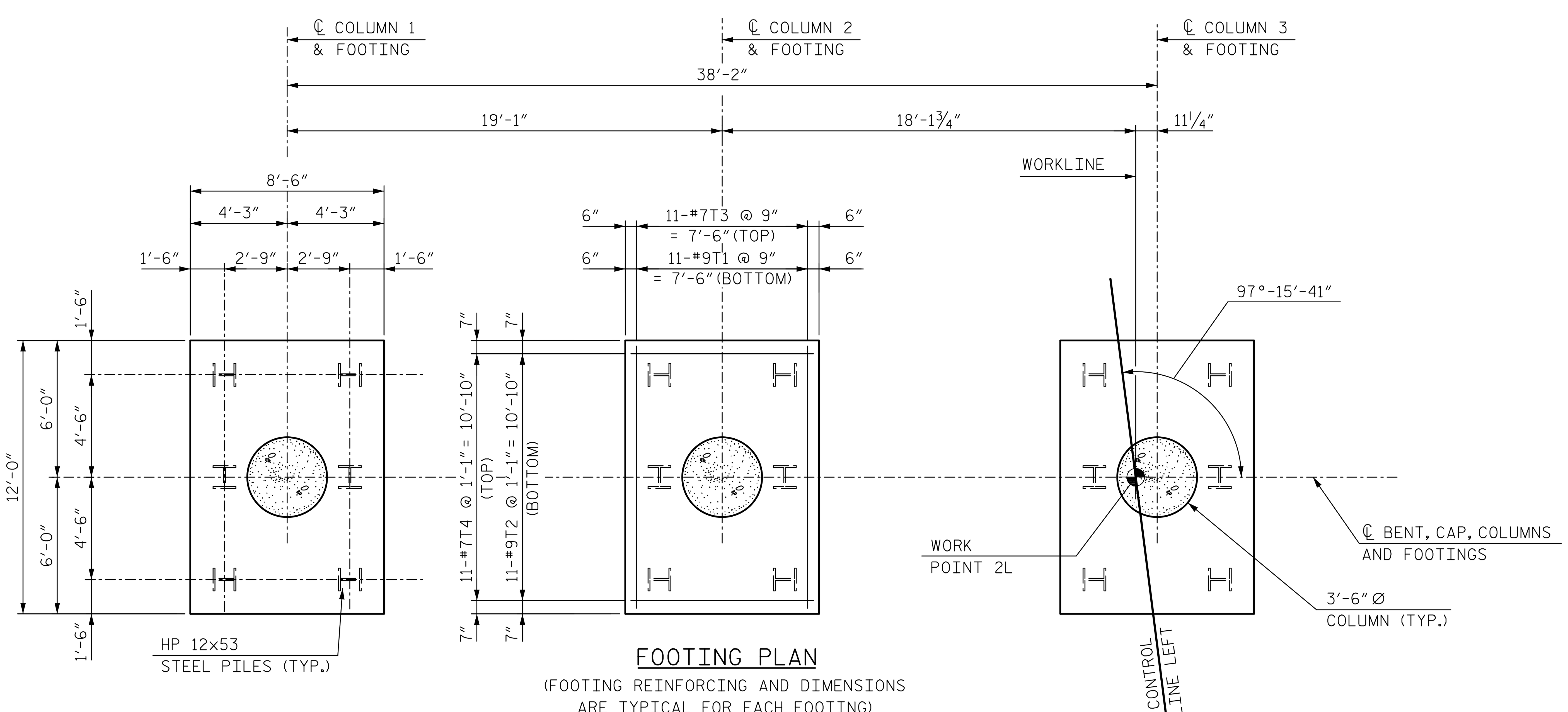
SECTION B-B



SECTION C-C



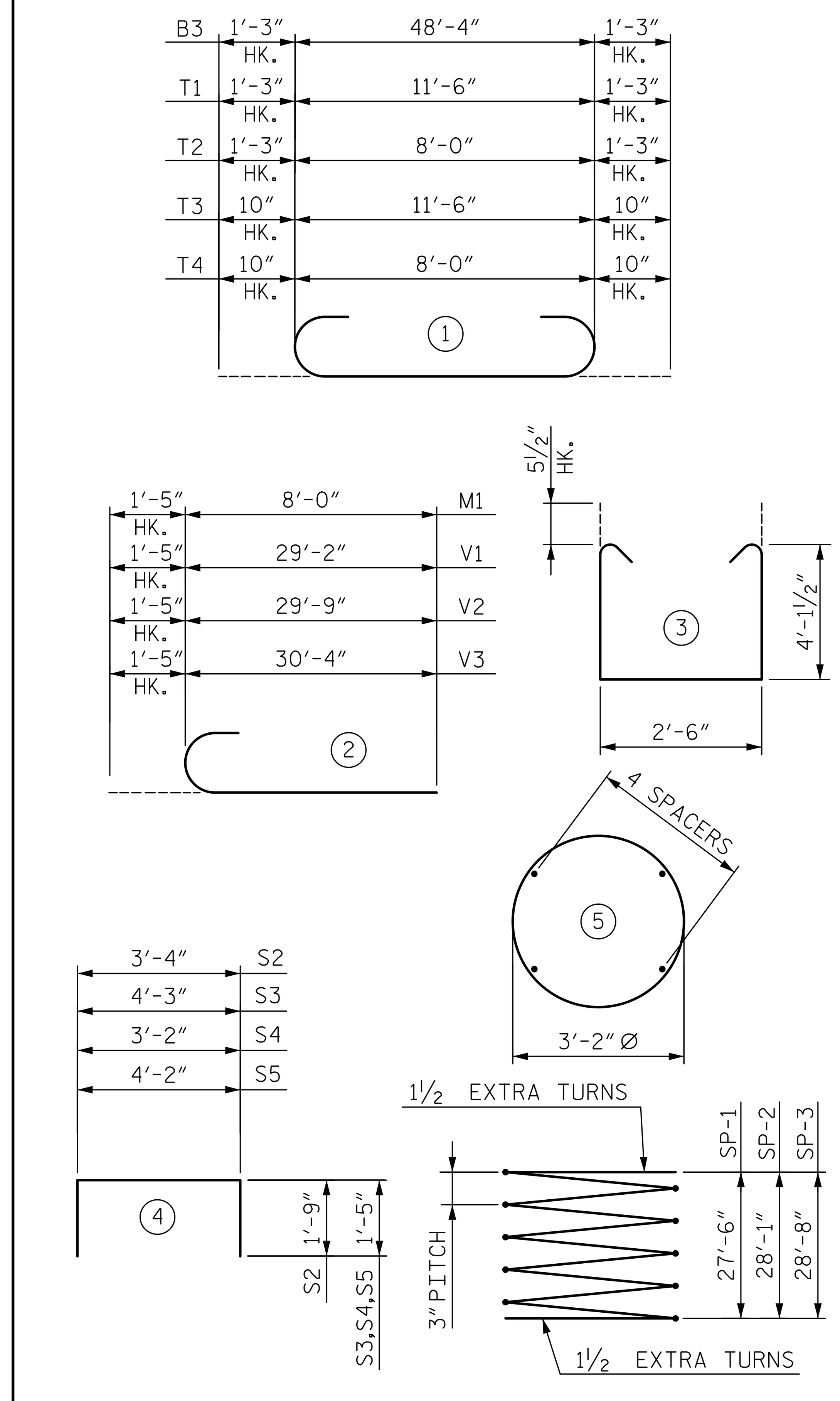
SECTION D-D



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	10	9	STR	48'-8"	1,643
B2	28	4	STR	25'-5"	475
B3	8	9	1	50'-10"	1,383
B4	48	4	STR	3'-11"	126
M1	36	10	2	9'-5"	1,459
S1	128	5	3	11'-8"	1,558
S2	48	4	4	6'-10"	219
S3	4	4	4	7'-1"	19
S4	8	4	4	6'-0"	32
S5	4	4	4	7'-0"	19
T1	33	9	1	14'-0"	1,571
T2	33	9	1	10'-6"	1,178
T3	33	7	1	13'-2"	888
T4	33	7	1	9'-8"	652
V1	12	10	2	30'-7"	1,579
V2	12	10	2	31'-2"	1,609
V3	12	10	2	31'-9"	1,639
SP-1	1	✳	5	1,109'-9"	741
SP-2	1	✳	5	1,139'-3"	761
SP-3	1	✳	5	1,158'-10"	774

QUANTITIES

REINFORCING STEEL	LBS.	16,049
SPIRAL COLUMN REINFORCING STEEL	LBS.	2,276
CLASS A CONCRETE		
FOOTING POUR 1	CU. YDS.	48.2
COLUMN POUR 2	CU. YDS.	29.9
CAP POUR 3	CU. YDS.	30.7
TOTAL	CU. YDS.	108.8
HP 12x53 STEEL PILES	NO.	18
	LIN. FT.	1,350
FOUNDATION EXCAVATION FOR BENT	LUMP SUM	LUMP SUM
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	18
PILE REDRIVES	NO.	9

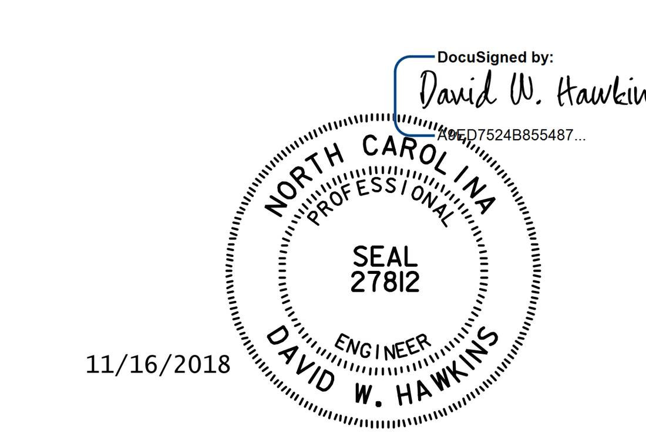
✳ THE SP SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 2



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

LEFT LANE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

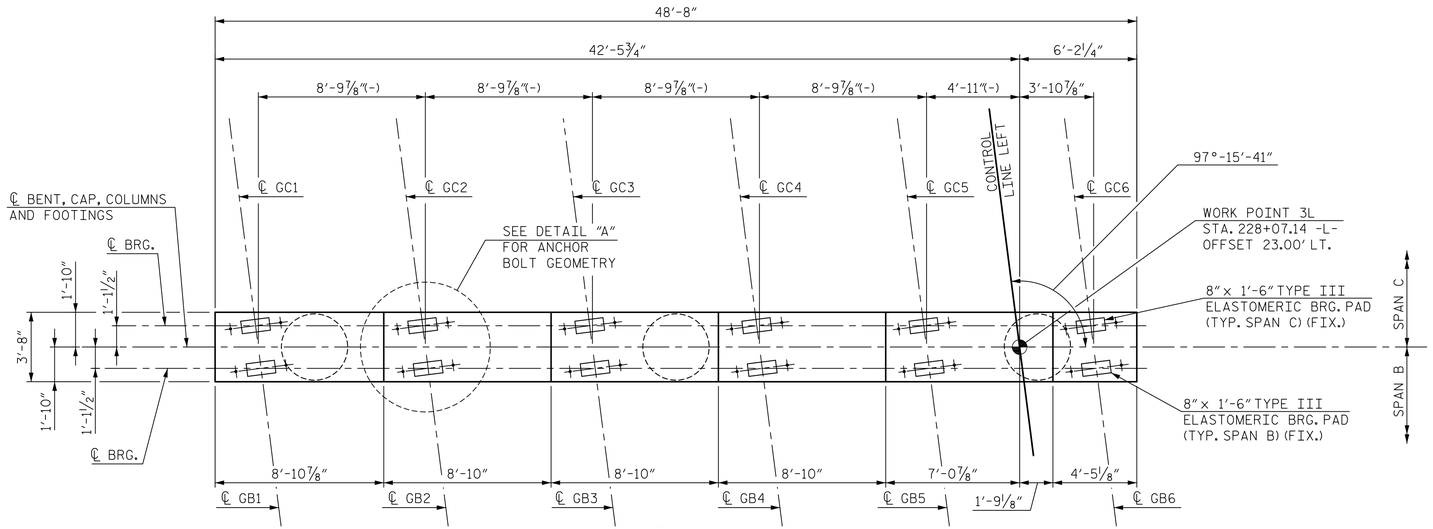
DRAWN BY M. WRIGHT DATE 9/18
CHECKED BY N. HART DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 26

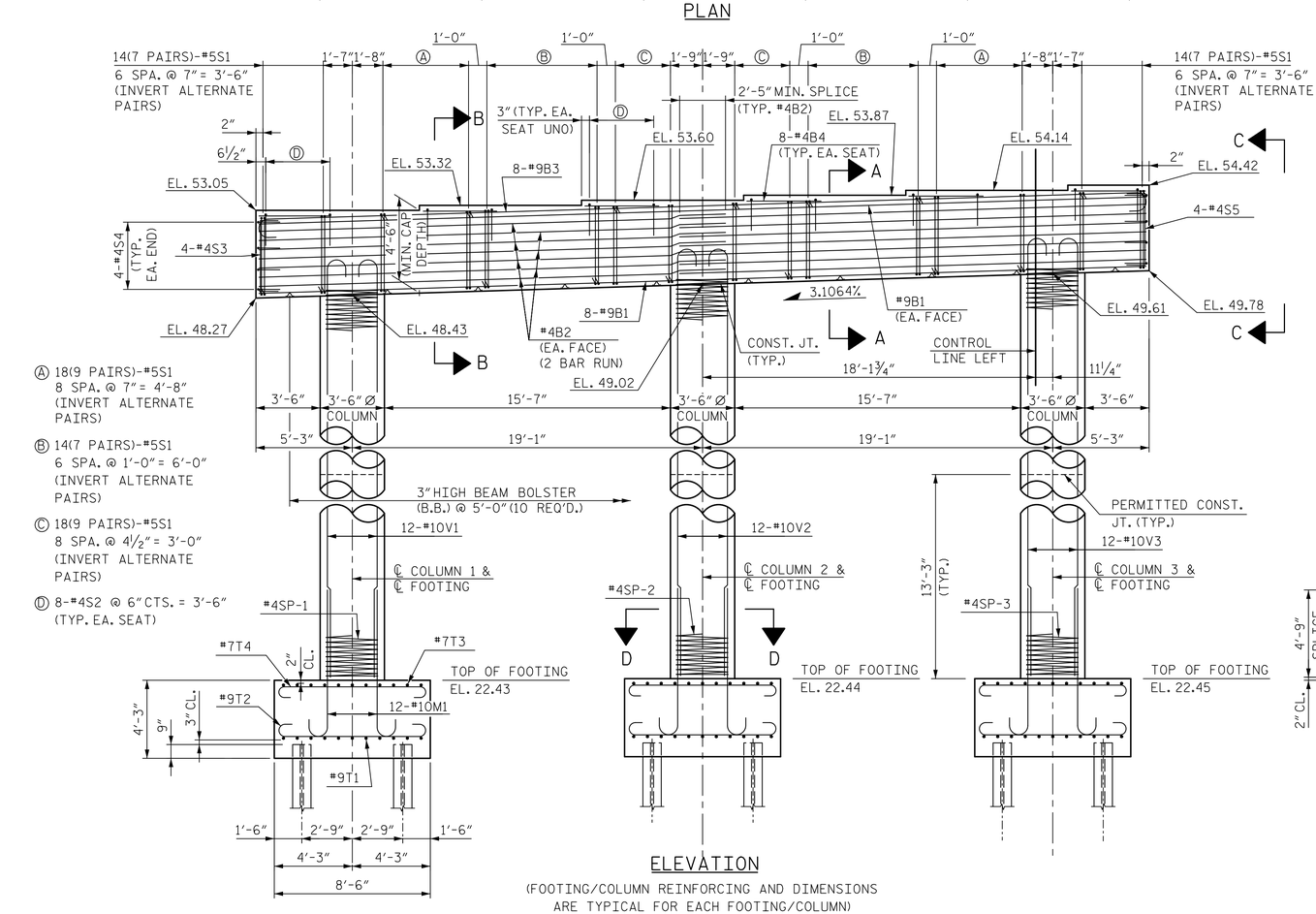
REVISIONS							
NO.	BY	DATE		NO.	BY	DATE	
1				3			
2				4			

SHEET NO. S7-26

TOTAL SHEETS 35



PLAN



ELEVATION

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

Ⓐ 18(9 PAIRS)-#5S1
8 SPA. @ 7″ = 4′-8″
(INVERT ALTERNATE PAIRS)

Ⓑ 14(7 PAIRS)-#5S1
6 SPA. @ 1′-0″ = 6′-0″
(INVERT ALTERNATE PAIRS)

Ⓒ 18(9 PAIRS)-#5S1
8 SPA. @ 4½″ = 3′-0″
(INVERT ALTERNATE PAIRS)

Ⓓ 8-#4S2 @ 6″ CTS. = 3′-6″
(TYP. EA. SEAT)

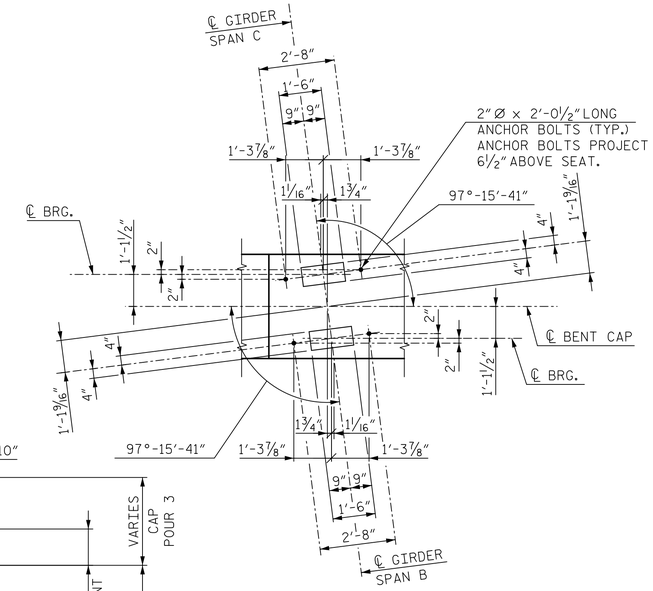
NOTES:

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

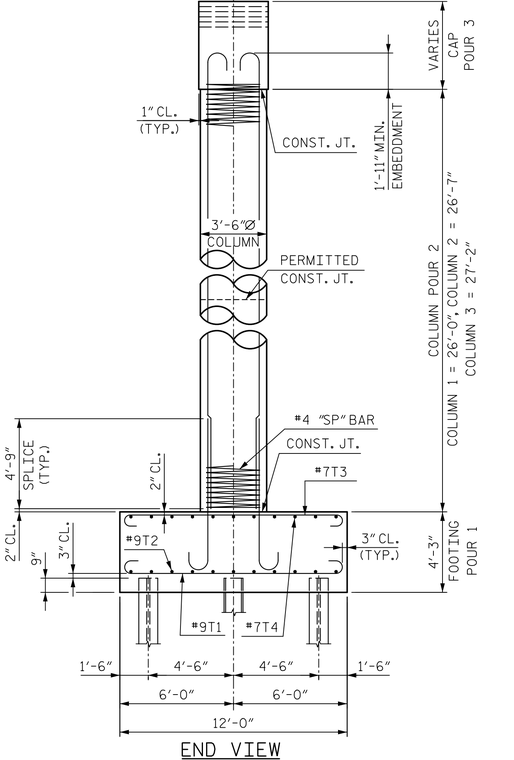
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

FOR PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 1" SHEET 3 OF 3.



DETAIL A



END VIEW

DocuSigned by: David W. Hawkins
NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
11/16/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

LEFT LANE

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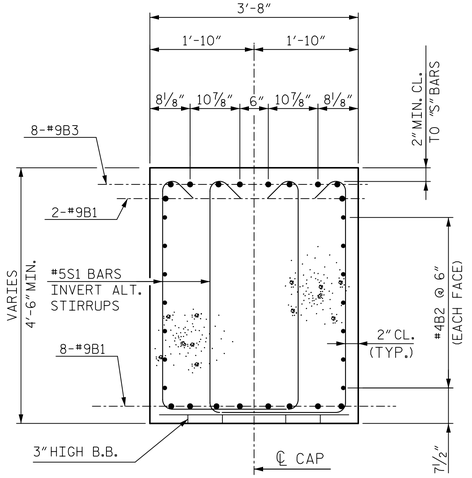
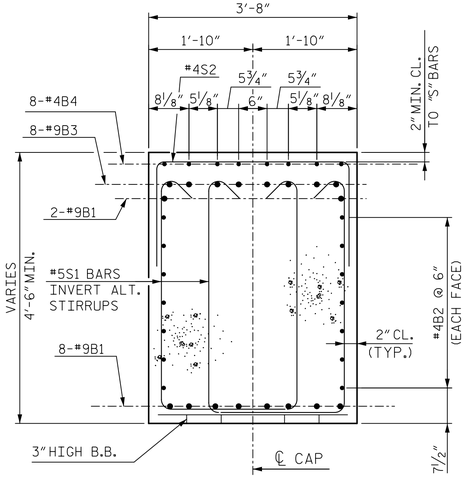
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 9/18

DWG. NO. 27

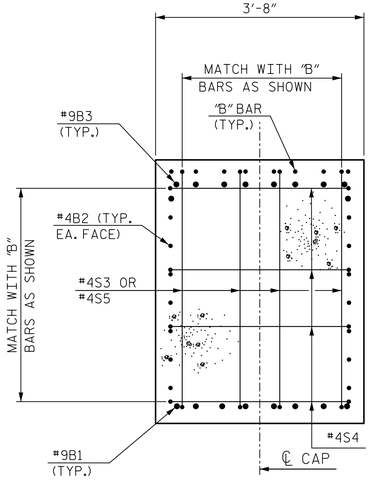
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-27
1			3			TOTAL SHEETS
2			4			35



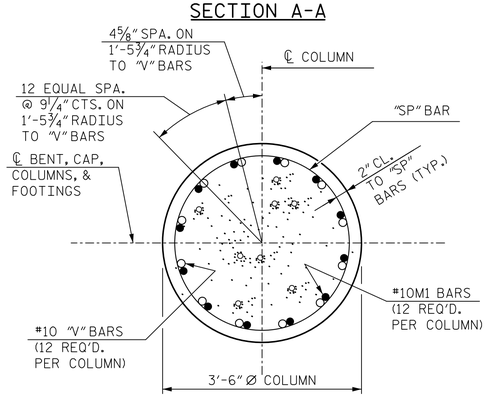
SECTION A-A



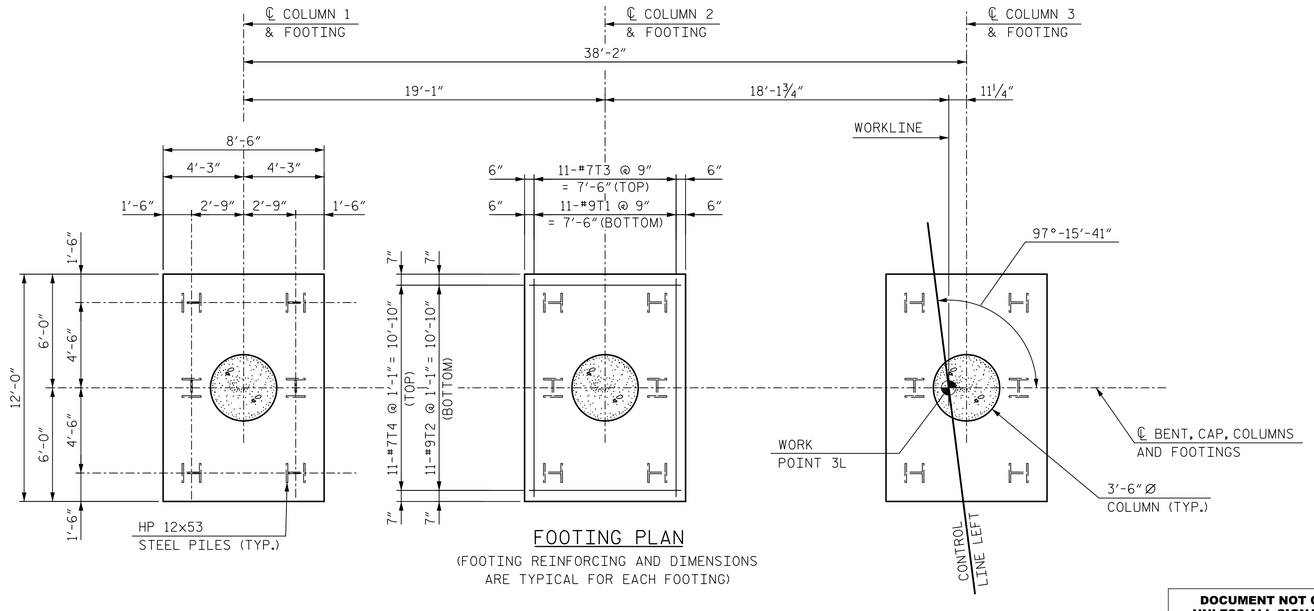
SECTION B-B



SECTION C-C



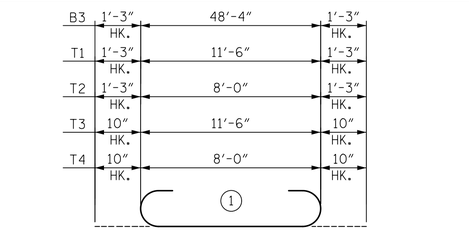
SECTION D-D

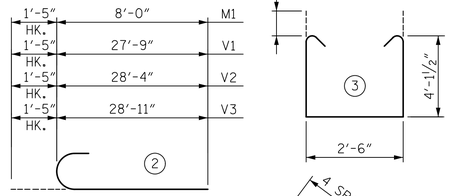


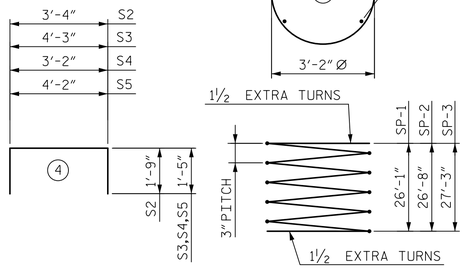
FOOTING PLAN

(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	10	9	STR	48'-8"	1,643
B2	28	4	STR	25'-5"	475
B3	8	9	1	50'-10"	1,383
B4	48	4	STR	3'-11"	126
M1	36	10	2	9'-5"	1,459
S1	128	5	3	11'-8"	1,558
S2	48	4	4	6'-10"	219
S3	4	4	4	7'-1"	19
S4	8	4	4	6'-0"	32
S5	4	4	4	7'-0"	19
T1	33	9	1	14'-0"	1,571
T2	33	9	1	10'-6"	1,178
T3	33	7	1	13'-2"	888
T4	33	7	1	9'-8"	652
V1	12	10	2	29'-2"	1,506
V2	12	10	2	29'-9"	1,536
V3	12	10	2	30'-4"	1,566
SP-1	1	✳	5	1,060'-8"	709
SP-2	1	✳	5	1,080'-4"	722
SP-3	1	✳	5	1,099'-11"	735

QUANTITIES

REINFORCING STEEL	LBS.	15,830
SPIRAL COLUMN REINFORCING STEEL	LBS.	2,166
CLASS A CONCRETE		
FOOTING POUR 1	CU. YDS.	48.2
COLUMN POUR 2	CU. YDS.	28.4
CAP POUR 3	CU. YDS.	30.7
TOTAL	CU. YDS.	107.3
HP 12x53 STEEL PILES	NO.	18
	LIN. FT.	1,350
FOUNDATION EXCAVATION FOR BENT	LUMP SUM	LUMP SUM
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	18
PILE REDRIVES	NO.	9

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

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 2

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

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 M. WRIGHT DATE 9/18
CHECKED BY N. HART DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 28

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-28
1			3			TOTAL SHEETS
2			4			35

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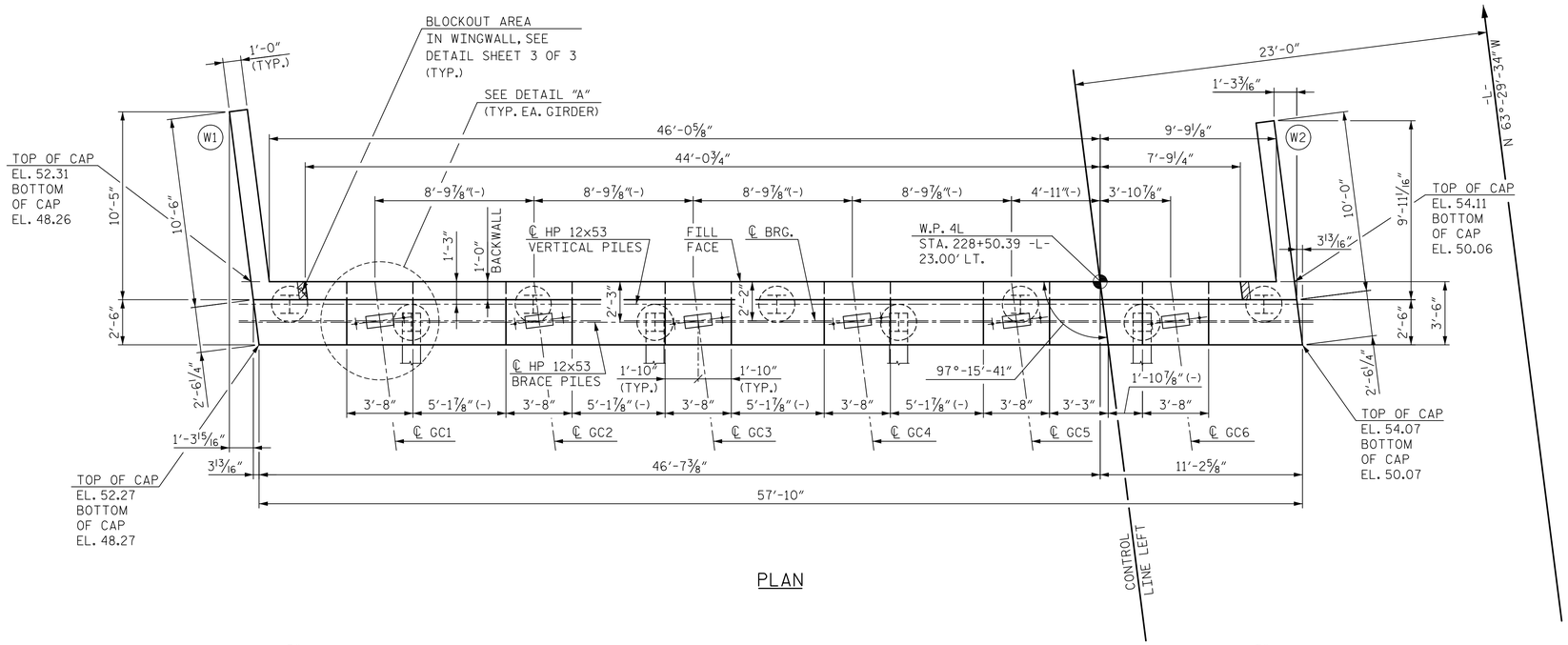
NOTES:

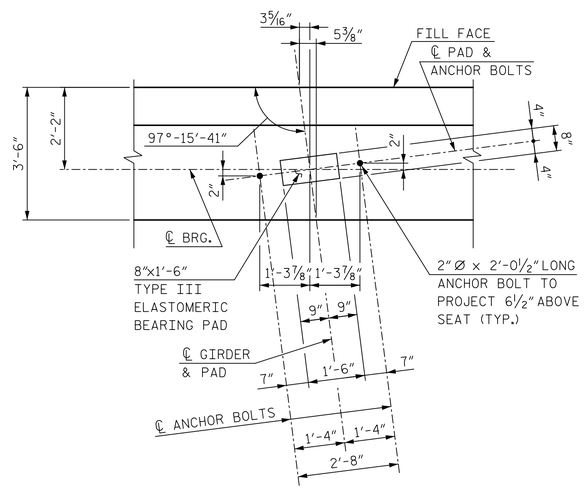
FOR NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

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

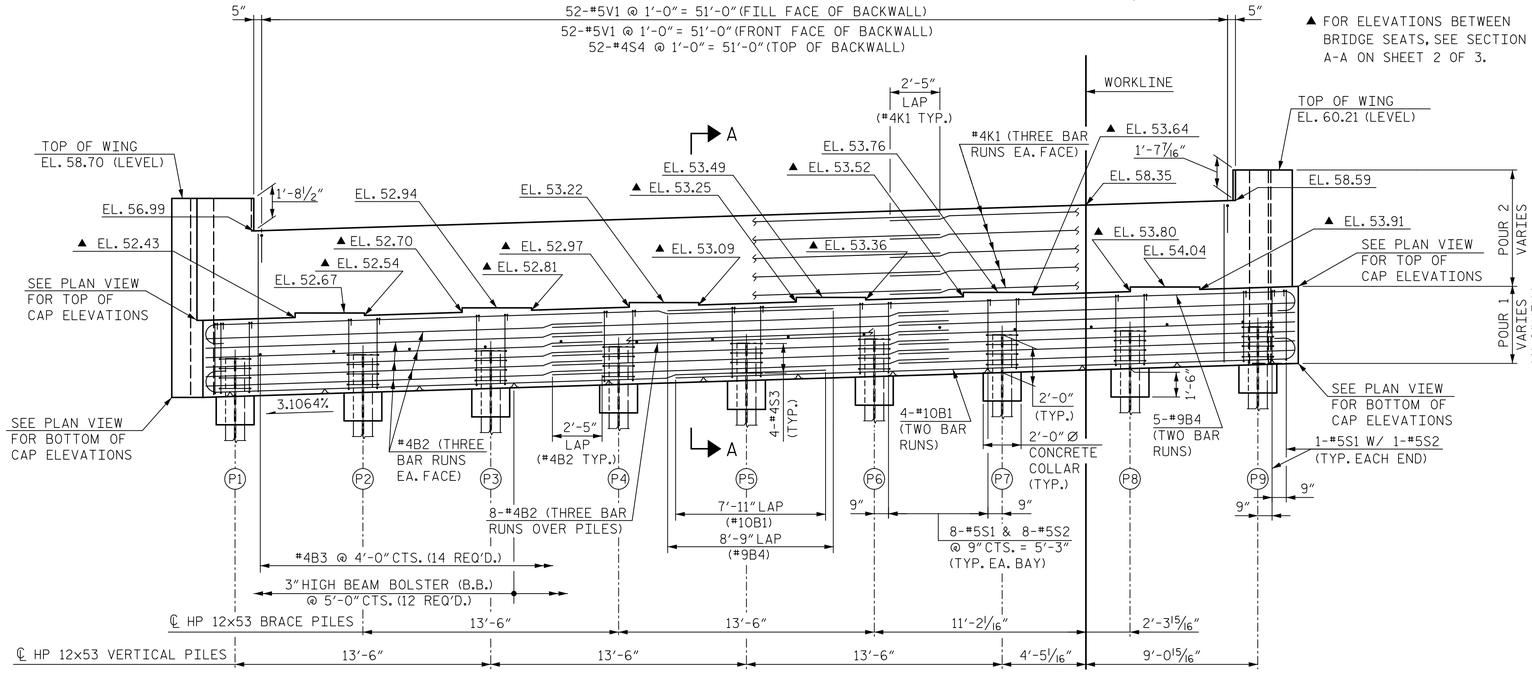
INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.



PLAN



DETAIL A



ELEVATION

TOP OF PILE ELEVATIONS	
P1	50.33
P2	50.54
P3	50.75
P4	50.96
P5	51.17
P6	51.38
P7	51.59
P8	51.79
P9	52.00

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 1 OF 3

DocuSigned by: David W. Hawkins

11/16/2018

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

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CHECKED BY N. SALAS ZAMUDIO DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 29

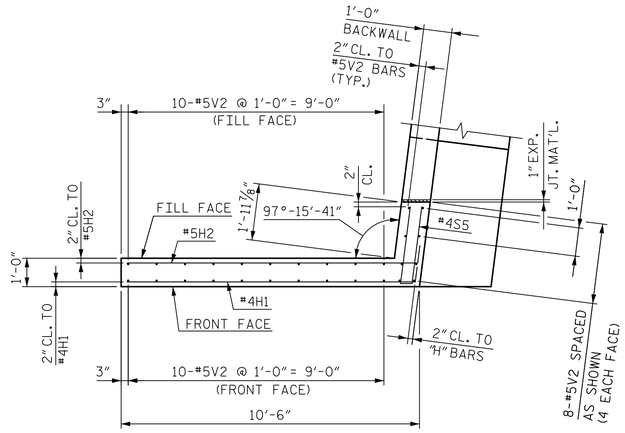
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

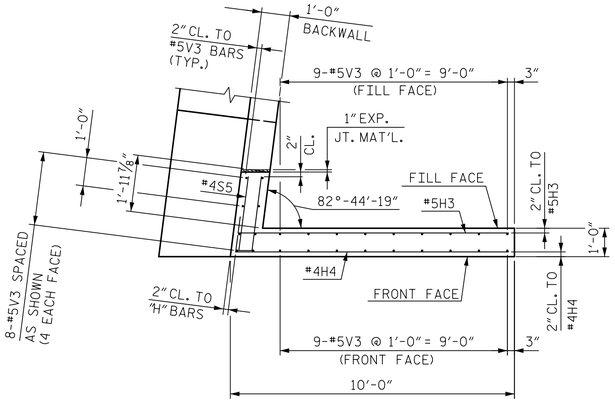
END BENT 2

LEFT LANE

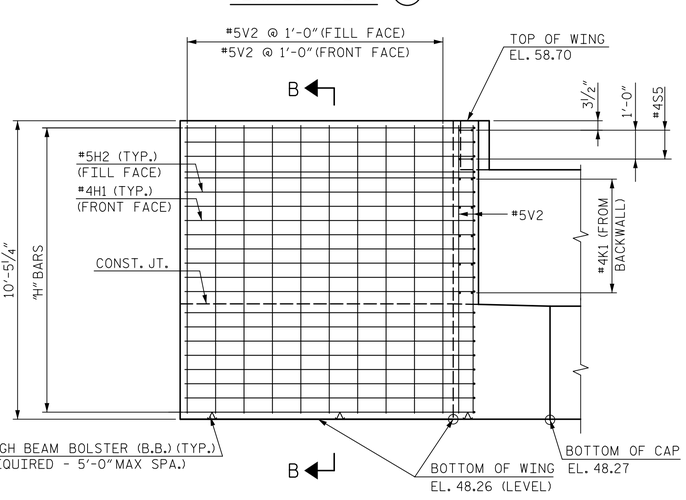
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-29
1			3			TOTAL SHEETS
2			4			35



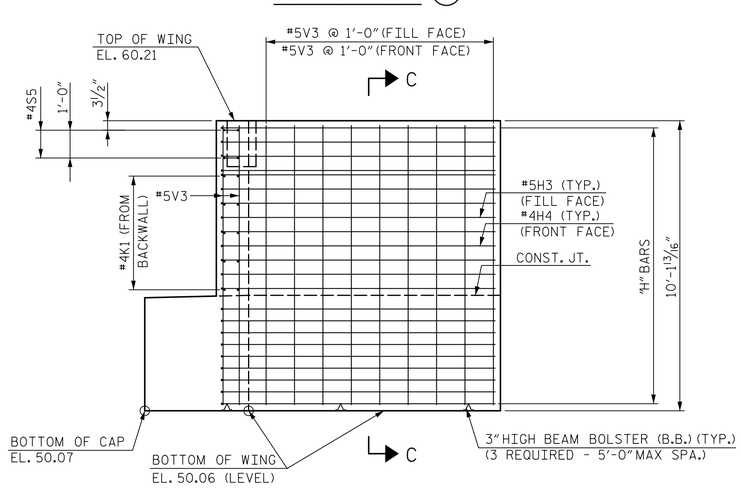
PLAN OF WING (W1)



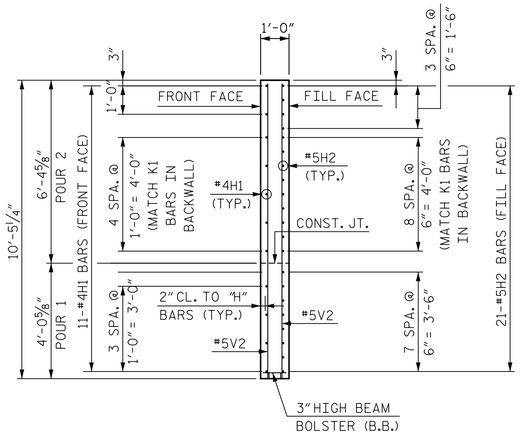
PLAN OF WING (W2)



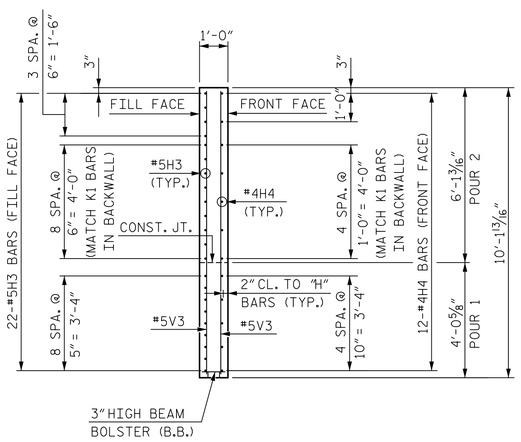
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION B-B

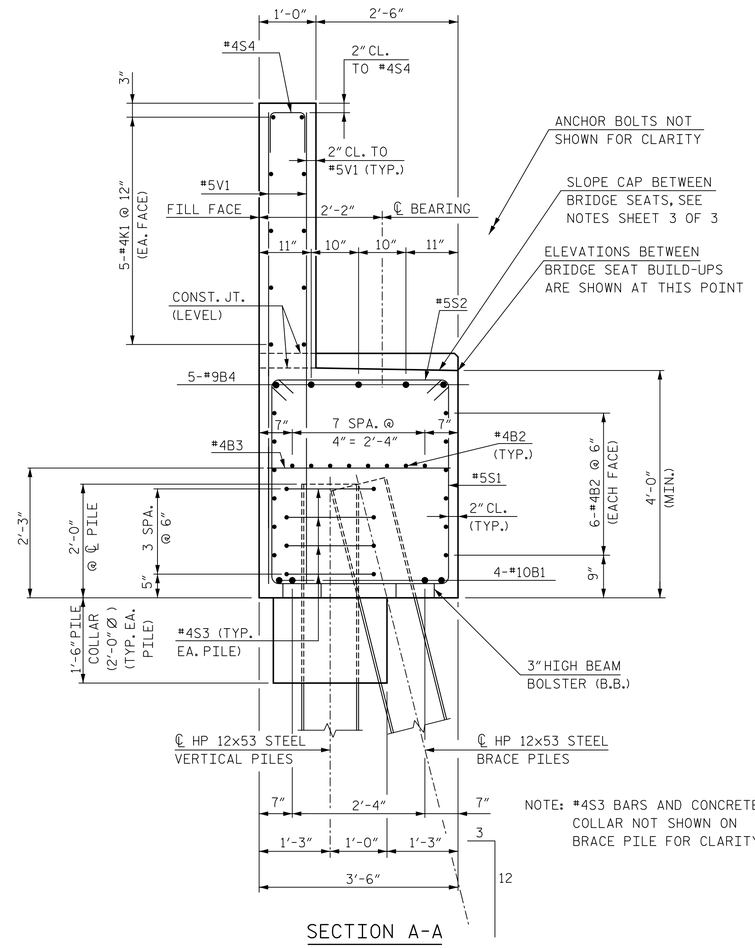


SECTION C-C

NOTES:

FOR NOTES, SEE SHEET 3 OF 3.

FOR BLOCKOUT IN WINGWALL, SEE SHEET 3 OF 3.



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

SECTION A-A

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 3

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

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 M. WRIGHT DATE 9/18
CHECKED BY N. SALAS ZAMUDIO DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 30

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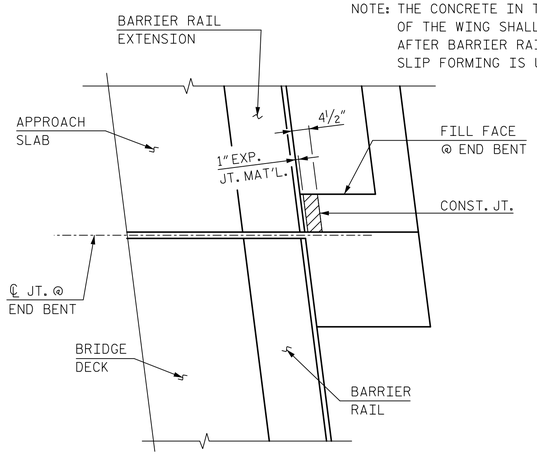
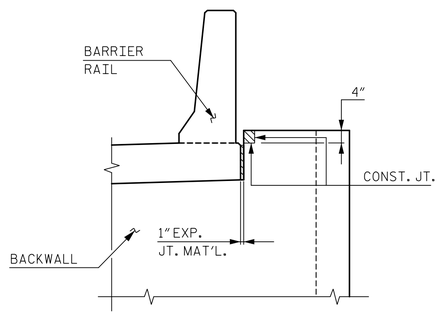
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-30
1			3			TOTAL SHEETS
2			4			35



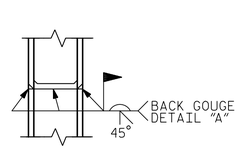
NOTE: THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

PLAN

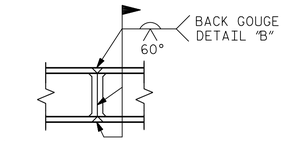


ELEVATION

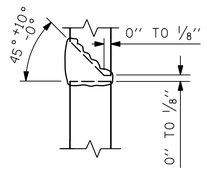
BLOCKOUT IN WINGWALL



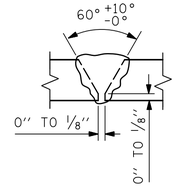
*PILE VERTICAL



*PILE HORIZONTAL OR VERTICAL



DETAIL "A"



DETAIL "B"

* POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

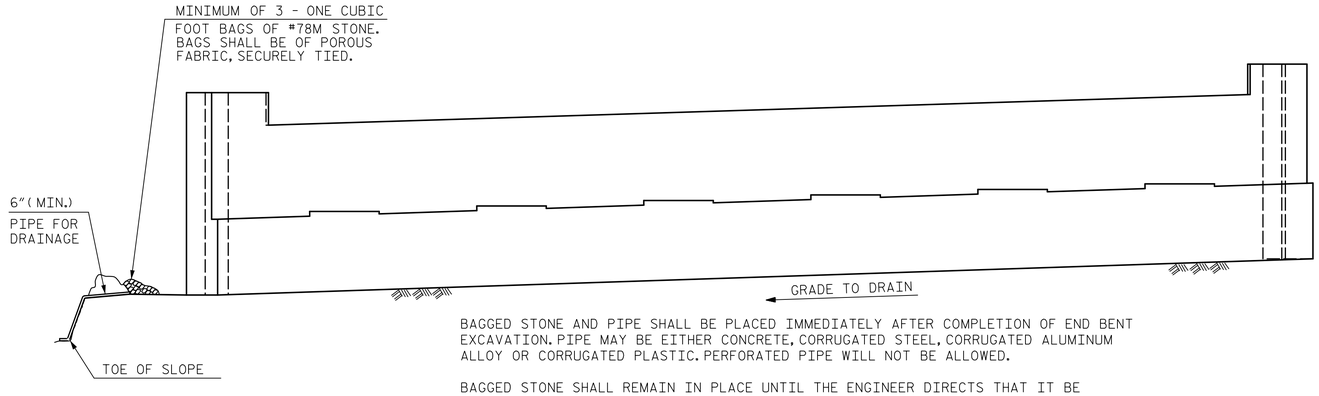
NOTES:

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%.



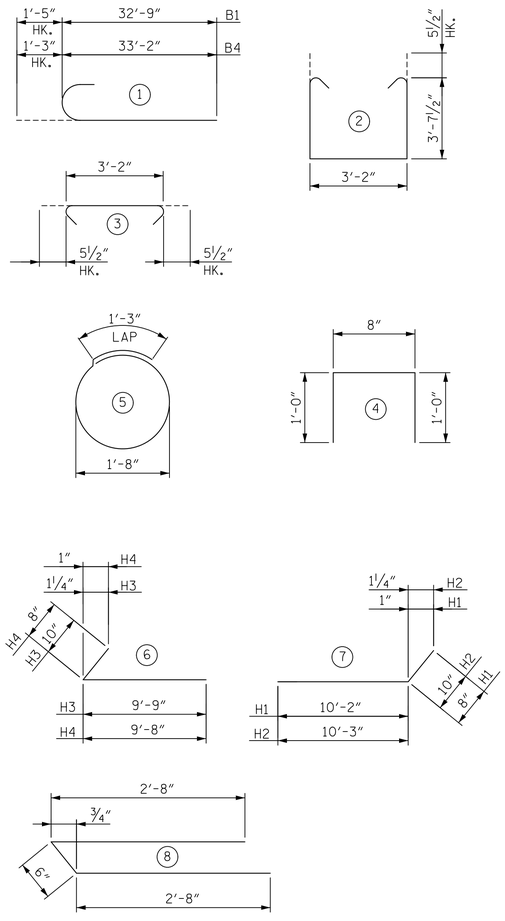
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	34'-2"	1,176
B2	60	4	STR	20'-10"	835
B3	14	4	STR	3'-2"	30
B4	10	9	1	34'-5"	1,170
H1	11	4	7	10'-10"	80
H2	21	5	7	11'-1"	243
H3	22	5	6	10'-7"	243
H4	12	4	6	10'-4"	83
K1	30	4	STR	20'-10"	418
S1	68	5	2	11'-4"	804
S2	68	5	3	4'-1"	290
S3	36	4	5	6'-6"	156
S4	52	4	4	2'-8"	93
S5	4	4	8	5'-10"	16
V1	104	5	STR	8'-0"	868
V2	28	5	STR	9'-11"	290
V3	26	5	STR	9'-8"	262

QUANTITIES

REINFORCING STEEL	LBS.	7,057
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP, BOT. OF WINGS & COLLARS	CU. YDS.	35.0
POUR 2 - TOP OF WINGS & BACKWALL	CU. YDS.	14.3
TOTAL	CU. YDS.	49.3
HP 12x53 STEEL PILES	NO.	9
	LIN. FT.	675
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	9
PILE REDRIVES	NO.	5

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 3 OF 3

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

HNTB NORTH CAROLINA, P.C.
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DRAWN BY M. WRIGHT DATE 9/18
CHECKED BY N. SALAS ZAMUDIO DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 31

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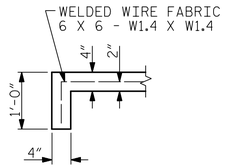
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

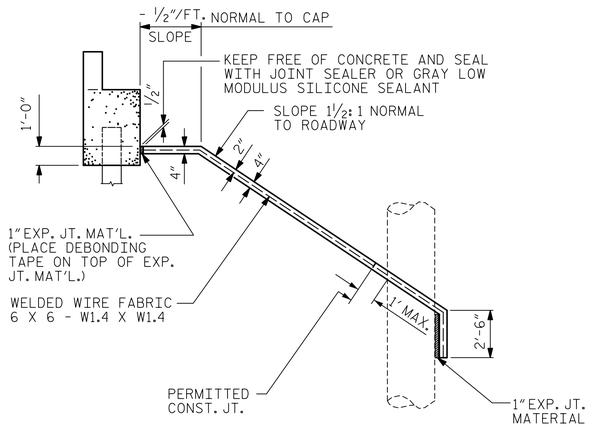
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-31
1			3			TOTAL SHEETS
2			4			35



SECTION A-A

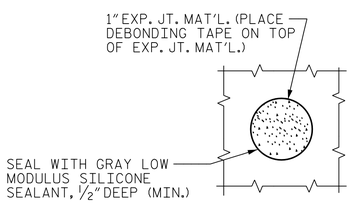
SLOPE PROTECTION SHALL CONSIST OF 4'' POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS ''B''. THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60'' WIDE. SLOPE PROTECTION 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.



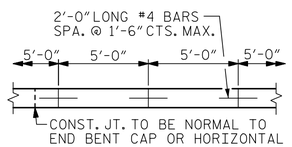
SECTION B-B

BRIDGE @ STA. 227+57.02 -L-	4 INCH SLOPE PROTECTION	✳ WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	700	1,405
END BENT 2	660	1,320

✳ QUANTITY SHOWN IS BASED ON 5' POURS.

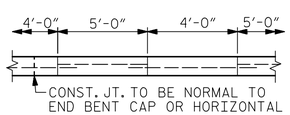


PLAN WHERE CONCRETE SLOPE PROTECTION MUST BE PLACED AROUND A BENT COLUMN



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: 227+57.02 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

LEFT LANE

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

ASSEMBLED BY : M. WRIGHT	DATE : 9/18
CHECKED BY : N. HART	DATE : 9/18
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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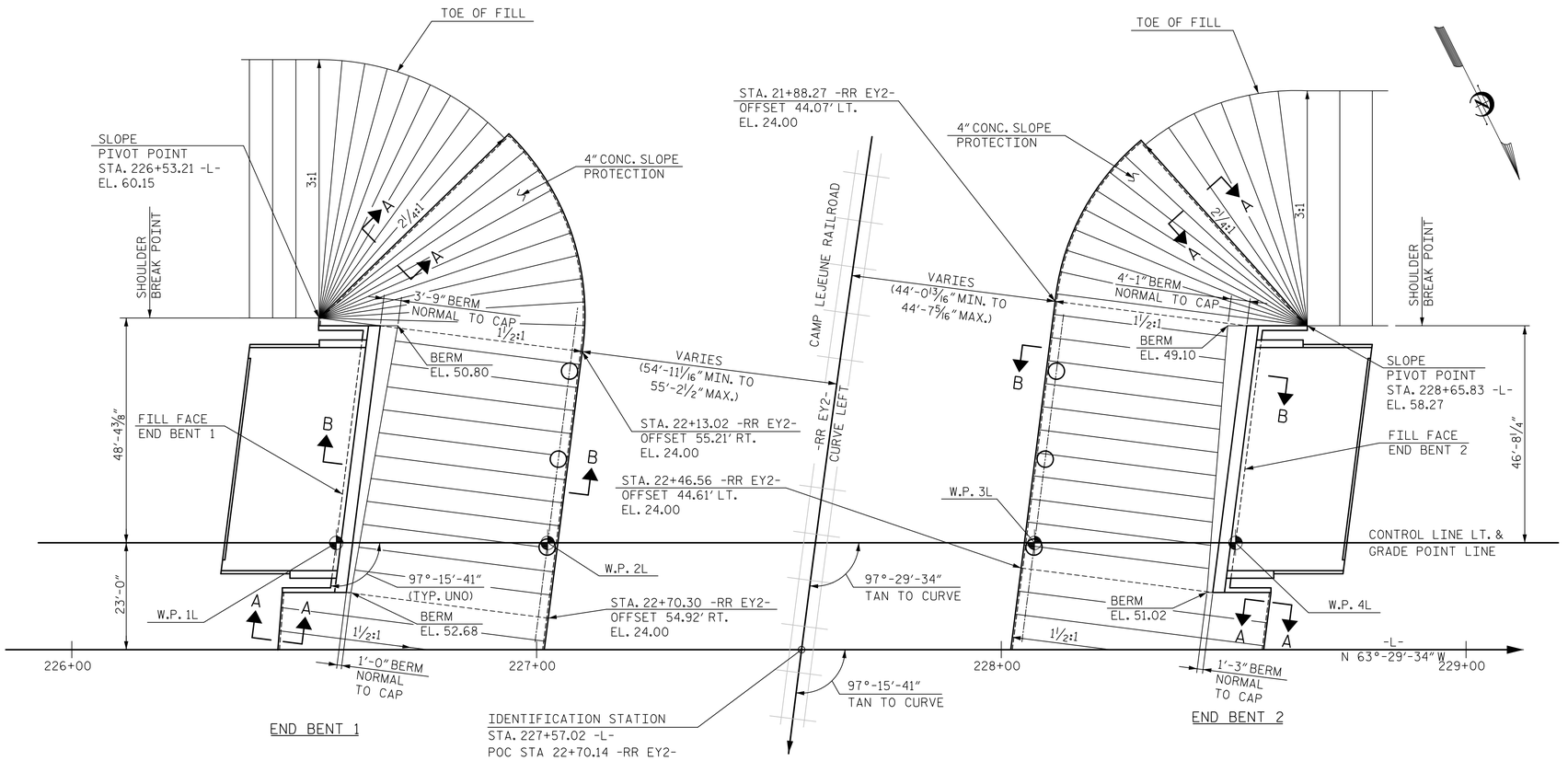
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 9/18
CHECKED BY	N. HART	DATE 9/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 9/18

DWG. NO. 32

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-32
1			3			TOTAL SHEETS
2			4			35

STD. NO. SP1



PLAN

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 2

DocuSigned by:
David W. Hawkins
[illegible]

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

LEFT LANE

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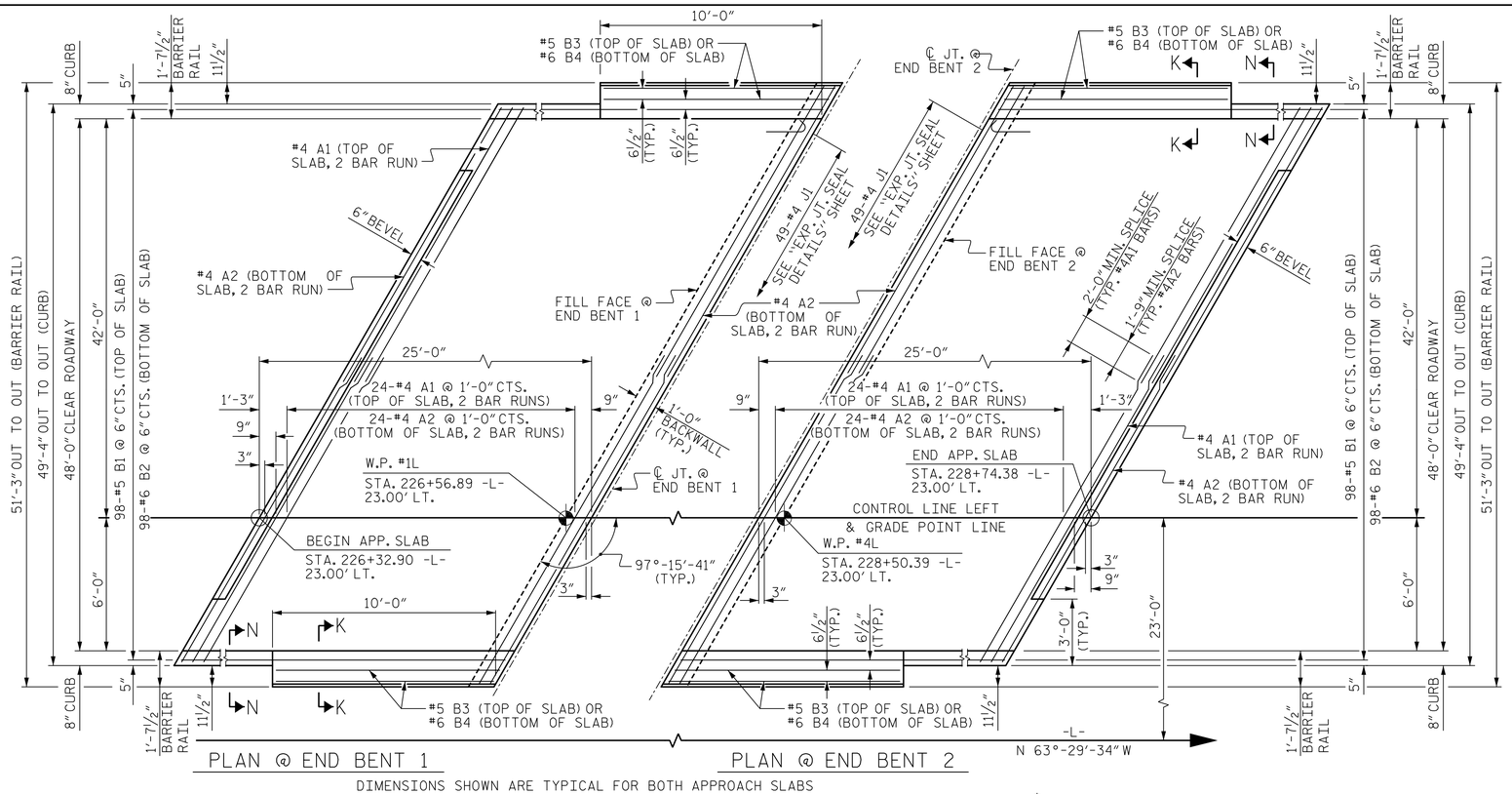
DRAWN BY	M. WRIGHT	DATE	9/18
CHECKED BY	N. HART	DATE	9/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 33

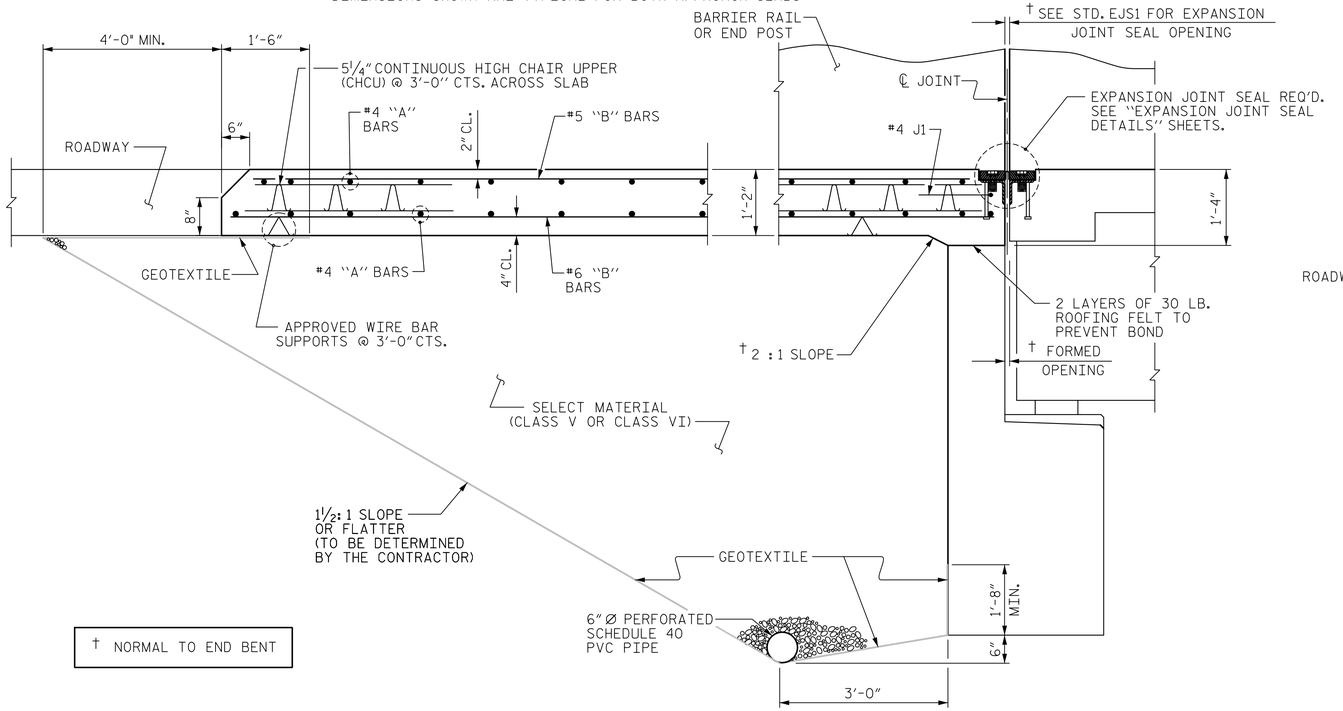
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-33
1			3			TOTAL SHEETS
2			4			35



PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

NOTES

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

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

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

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

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

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

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

FOR BARRIER RAIL REINFORCING STEEL PLACEMENT AND BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 2 OF 2.

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

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

BILL OF MATERIAL

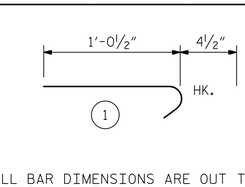
APPROACH SLAB AT EB 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	50	#4	STR	26'-8"	891
A2	52	#4	STR	26'-7"	923
✳ B1	98	#5	STR	23'-9"	2,428
B2	98	#6	STR	24'-7"	3,619
✳ B3	4	#5	STR	9'-8"	40
B4	4	#6	STR	9'-8"	58
✳ J1	49	#4	1	1'-5"	46
REINFORCING STEEL ✳✳				LBS.	4,600
✳ EPOXY COATED REINFORCING STEEL				✳✳ LBS.	3,405
CLASS AA CONCRETE ✳✳				C. Y.	54.4

APPROACH SLAB AT EB 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	50	#4	STR	26'-8"	891
A2	52	#4	STR	26'-7"	923
✳ B1	98	#5	STR	23'-9"	2,428
B2	98	#6	STR	24'-7"	3,619
✳ B3	4	#5	STR	9'-8"	40
B4	4	#6	STR	9'-8"	58
✳ J1	49	#4	1	1'-5"	46
REINFORCING STEEL ✳✳				LBS.	4,600
✳ EPOXY COATED REINFORCING STEEL				✳✳ LBS.	3,405
CLASS AA CONCRETE ✳✳				C. Y.	54.4

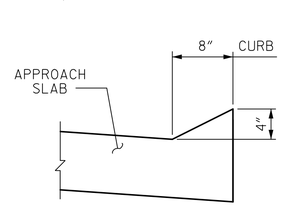
BAR TYPE



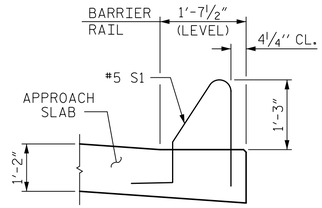
ALL BAR DIMENSIONS ARE OUT TO OUT

✳✳ QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 2.

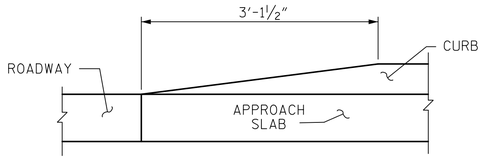
THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



SECTION N-N



SECTION K-K



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

LEFT LANE

DocuSigned by: David W. Hawkins 7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-34
1			3			TOTAL SHEETS
2			4			35

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DRAWN BY M. WRIGHT DATE 7/18
CHECKED BY N. HART DATE 7/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 34

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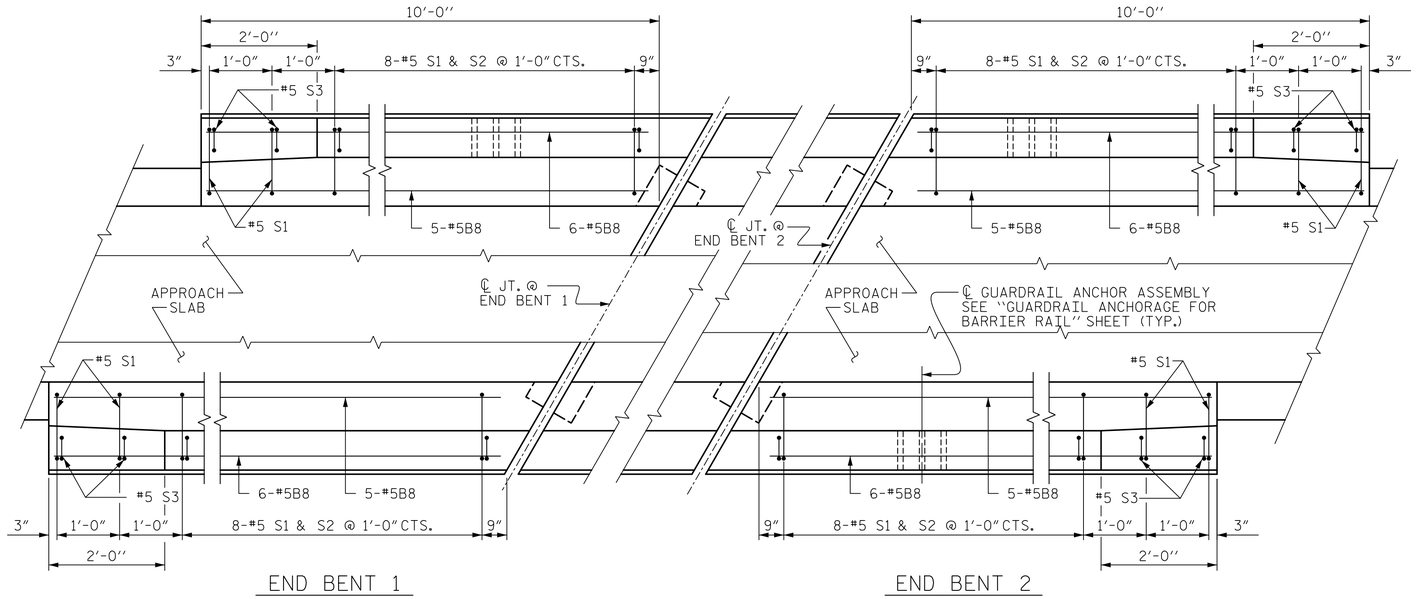
ASSEMBLED BY : M. WRIGHT	DATE : 7/18		
CHECKED BY : N. HART	DATE : 7/18		
DRAWN BY : EEM 3/95	REV. 12/21/11	MAA/GM	
CHECKED BY : VAP 3/95	REV. 6/13	MAA/GM	
	REV. 12/17	MAA/THC	

STD. NO. BAS2



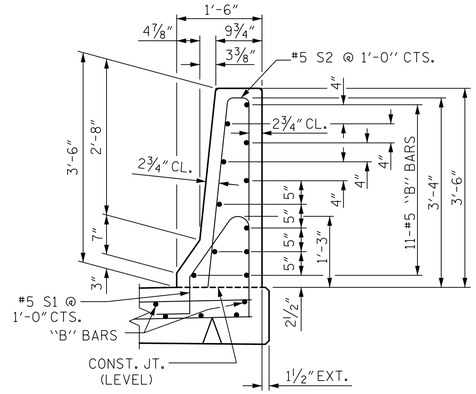
PLAN OF BARRIER RAIL

NOTES

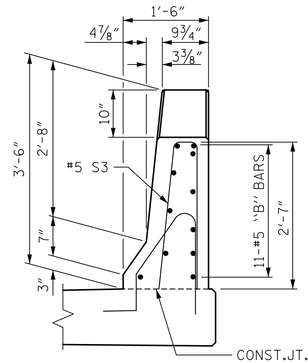
THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

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.

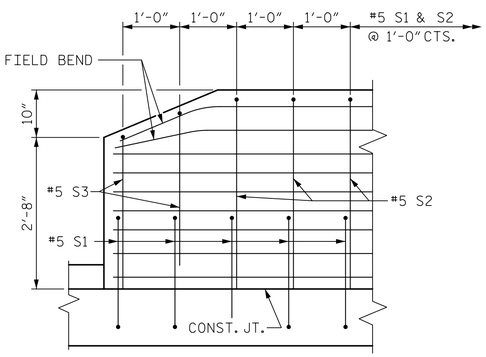
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.



SECTION THRU RAIL



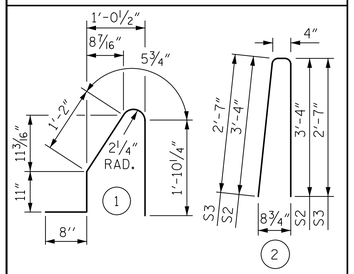
END VIEW



SIDE VIEW

END OF RAIL DETAILS

BAR TYPES

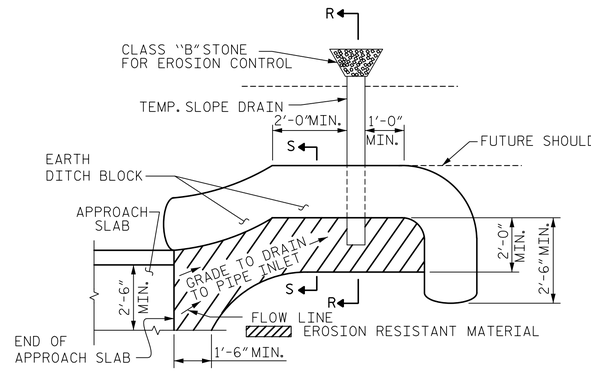


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

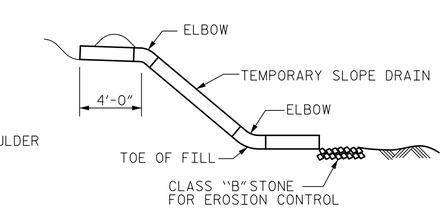
BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B8	44	#5	STR	9'-8"	444
✳S1	40	#5	1	5'-1"	212
✳S2	32	#5	2	7'-0"	234
✳S3	8	#5	2	5'-6"	46
✳EPOXY COATED REINFORCING STEEL				LBS.	936
CLASS AA CONCRETE				C.Y.	5.4
CONCRETE BARRIER RAIL				LIN.FT.	40.4

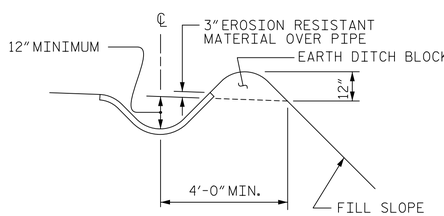


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

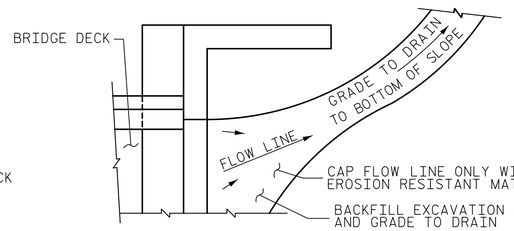
PLAN VIEW



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

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 2

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/16/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S7-35
1			3			TOTAL SHEETS
2			4			35

ASSEMBLED BY : M. WRIGHT	DATE : 7/18	
CHECKED BY : N. HART	DATE : 7/18	
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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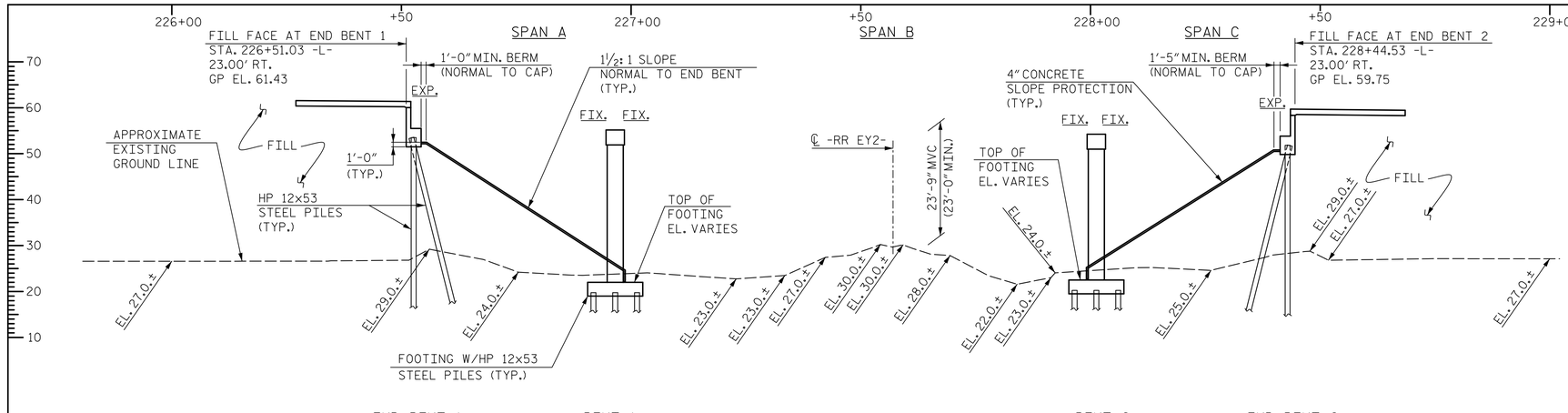
DRAWN BY	M. WRIGHT	DATE 7/18
CHECKED BY	N. HART	DATE 7/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 9/18

DWG. NO. 35

STD. NO. BAS4

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



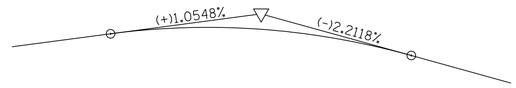
SECTION ALONG CONTROL LINE RIGHT
(SECTIONS AT BENTS AND END BENTS ARE AT RIGHT ANGLES)

NOTES:

FOR NOTES, SEE GENERAL DRAWING SHEET 3 OF 3.

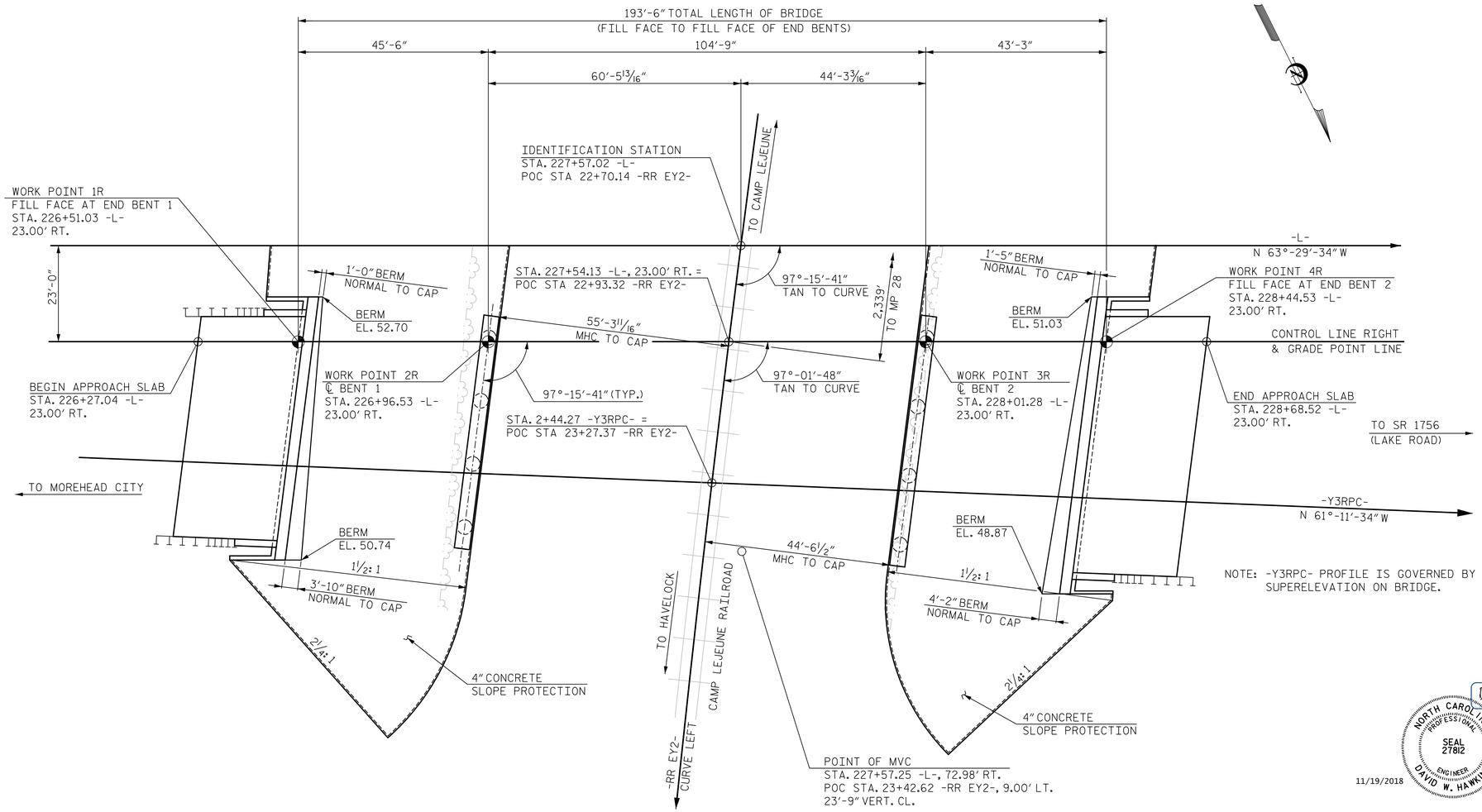
MVC = MINIMIM VERTICAL CLEARANCE
MHC = MINIMUM HORIZONTAL CLEARANCE

PI STA. = 225+72.00 -L-
ELEV = 70.04
V.C. = 1,985'



GRADE DATA -L-

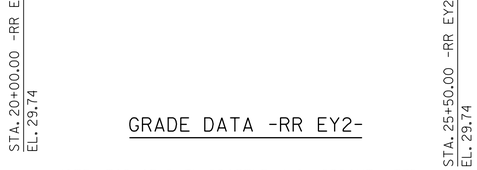
CURVE DATA -RR EY2-
PI STA. = 19+91.00 -RR EY2-
△ = 11°34'16" (LT)
D = 0°59'53"
L = 1,159.52'
T = 581.74'
R = 5,741.46'



PLAN

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

NOTE: -Y3RPC- PROFILE IS GOVERNED BY -L- SUPERELEVATION ON BRIDGE.



GRADE DATA -RR EY2-

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

DocuSigned by: David W. Hawkins
11/19/2018

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

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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	9/18
CHECKED BY	N. HART	DATE	9/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 1

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 227+57.02 -L- =
POC 22+70.14 -RR EY2-

BRIDGE NO. 279

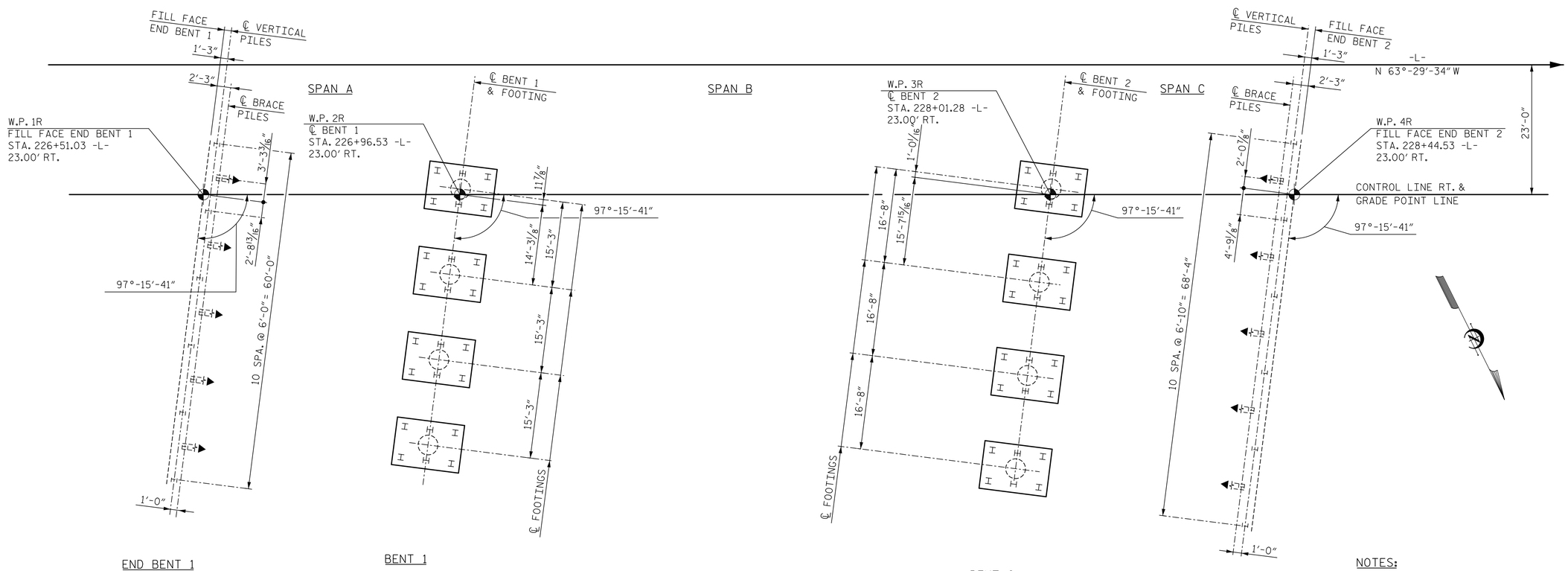
SHEET 1 OF 3 CAMP LEJEUNE RR MILEPOST # 28.44

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER CAMP LEJEUNE RR ON US-70 (HAVELOCK BYPASS) BETWEEN MOREHEAD CITY AND SR 1756

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-1
1			3			TOTAL SHEETS
2			4			36



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

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 105 TONS PER PILE.

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

PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.

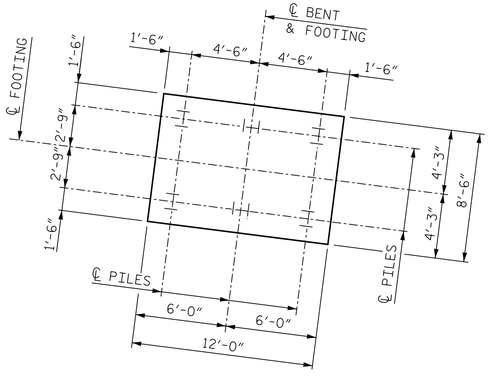
DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.

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

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

TESTING THE FIRST PRODUCTION PILES 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.

OBSERVE A ONE 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.



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 AND BENT PILES ARE HP 12x53 STEEL 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: 227+57.02 -L-

SHEET 2 OF 3

DocuSigned by: David W. Hawkins
ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

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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 9/18
CHECKED BY N. HART DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 2

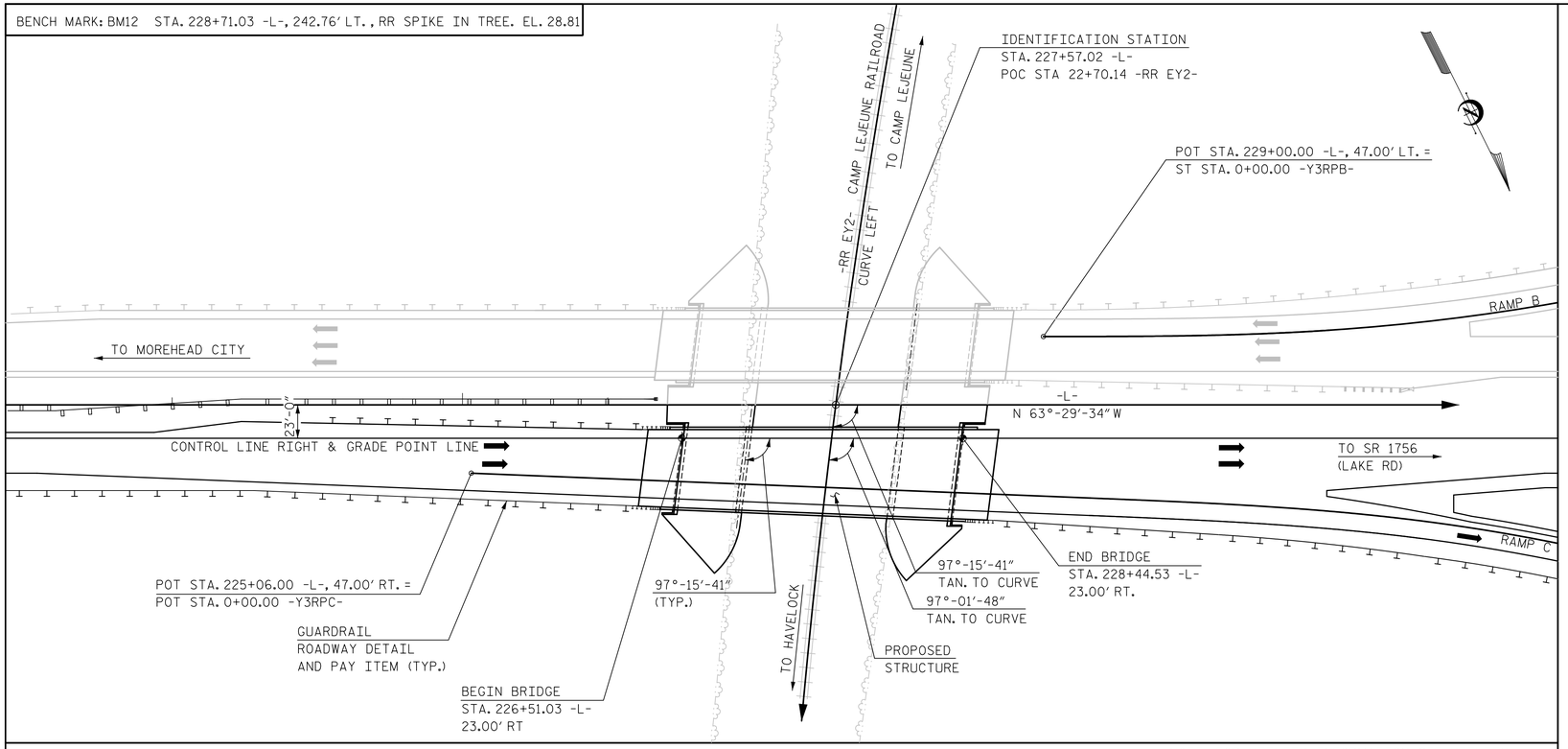
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-2
1			3			TOTAL SHEETS
2			4			36



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 227+57.02 (RIGHT LANE)	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLAB AT STATION 227+57.02 (RIGHT LANE)	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL
	LUMP SUM	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.
SUPERSTRUCTURE	———	———	11,617	12,847	———	LUMP SUM	———	———
END BENT 1	———	———	———	———	62.4	———	7,640	———
BENT 1	LUMP SUM	———	———	———	139.5	———	19,161	3,030
BENT 2	LUMP SUM	———	———	———	140.0	———	19,719	2,874
END BENT 2	———	———	———	———	69.7	———	8,186	———
TOTAL	LUMP SUM	1	11,617	12,847	411.6	LUMP SUM	54,706	5,904

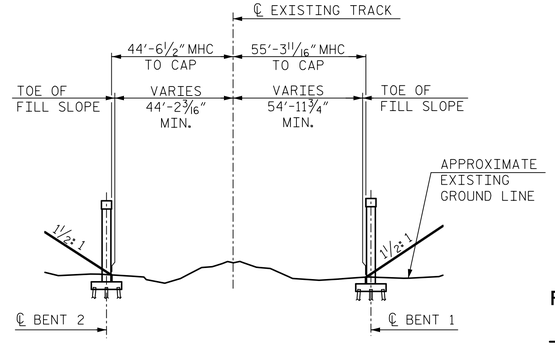
TOTAL BILL OF MATERIAL

	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	HP 12x53 STEEL PILES		PILE REDRIVES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS
	NO.	L.F.	EACH	NO.	L.F.	EACH	L.F.	SQ. YD.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	21	1,320.72	———	—	———	———	422.0	———	LUMP SUM	LUMP SUM
END BENT 1	—	———	11	11	770	6	———	740	———	———
BENT 1	—	———	24	24	1,680	12	———	———	———	———
BENT 2	—	———	24	24	1,680	12	———	———	———	———
END BENT 2	—	———	11	11	770	6	———	730	———	———
TOTAL	21	1,320.72	70	70	4,900	36	422.0	1,470	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: David W. Hawkins
NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
12/6/2018

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING LOCATION SKETCH 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 9/18
CHECKED BY N. HART DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 3

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-3
1			3			TOTAL SHEETS
2			4			36

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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	0.93	1.45	A	EL	21.1	0.95	1.39	B	I	9.7	0.80	0.84	1.01	B	EL	51.2	
		HL-93 (OPERATING)	N/A	--	1.84	--	1.35	0.93	1.89	A	EL/I	21.1	0.95	1.84	B	I	9.7	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.41	50.8	1.75	0.93	1.78	A	EL/I	21.1	0.95	1.89	B	I	20.1	0.80	0.84	1.41	B	EL	51.2	
		HS-20 (OPERATING)	36.000	--	2.31	83.2	1.35	0.93	2.31	A	EL/I	21.1	0.95	2.50	B	I	20.1	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	2.96	40.0	1.40	0.93	4.27	A	EL	21.1	0.95	6.15	B	I	9.7	0.80	0.93	2.96	A	I	21.1	
		SNGARBS2	20.000	--	2.42	48.4	1.40	0.93	3.48	A	EL	21.1	0.95	4.26	B	I	20.1	0.80	0.93	2.42	A	I	21.1	
		SNAGRIS2	22.000	--	2.27	49.9	1.40	0.93	3.39	A	EL	16.7	0.95	3.92	B	I	9.7	0.80	0.84	2.27	B	EL	51.2	
		SNCOTTS3	27.250	--	1.48	40.3	1.40	0.93	2.13	A	EL	21.1	0.95	2.97	B	I	20.1	0.80	0.93	1.48	A	I	21.1	
		SNAGGRS4	34.925	--	1.31	45.8	1.40	0.93	1.89	A	EL	21.1	0.95	2.40	B	I	20.1	0.80	0.93	1.31	A	I	21.1	
		SNS5A	35.550	--	1.28	45.5	1.40	0.93	1.84	A	EL	21.1	0.95	2.41	B	I	9.7	0.80	0.93	1.28	A	I	21.1	
		SNS6A	39.950	--	1.21	48.3	1.40	0.93	1.74	A	EL	21.1	0.95	2.17	B	I	20.1	0.80	0.93	1.21	A	I	21.1	
		SNS7B	42.000	--	1.15	48.3	1.40	0.93	1.66	A	EL/I	21.1	0.95	2.11	B	I	20.1	0.80	0.93	1.15	A	I	21.1	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.48	48.8	1.40	0.93	2.14	A	EL/I	21.1	0.95	2.63	B	I	20.1	0.80	0.84	1.48	B	EL	51.2	
		TNT4A	33.075	--	1.49	49.3	1.40	0.93	2.17	A	EL/I	21.1	0.95	2.57	B	I	20.1	0.80	0.84	1.49	B	EL	51.2	
		TNT6A	41.600	--	1.20	49.9	1.40	0.93	1.82	A	EL	21.1	0.95	2.21	B	I	9.7	0.80	0.84	1.20	B	EL	51.2	
		TNT7A	42.000	--	1.20	50.4	1.40	0.93	1.86	A	EL	21.1	0.95	2.17	B	I	9.7	0.80	0.84	1.20	B	EL	51.2	
		TNT7B	42.000	--	1.23	51.7	1.40	0.93	1.94	A	EL/I	21.1	0.95	2.07	B	I	9.7	0.80	0.84	1.23	B	EL	51.2	
		TNAGRIT4	43.000	--	1.18	50.7	1.40	0.93	1.85	A	EL/I	21.1	0.95	2.00	B	I	20.1	0.80	0.84	1.18	B	EL	51.2	
		TNAGT5A	45.000	--	1.12	50.4	1.40	0.93	1.72	A	EL/I	21.1	0.95	1.97	B	I	20.1	0.80	0.84	1.12	B	EL	51.2	
		TNAGT5B	45.000	3	1.11	50.0	1.40	0.93	1.67	A	EL	21.1	0.95	1.90	B	I	20.1	0.80	0.84	1.11	B	EL	51.2	

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:

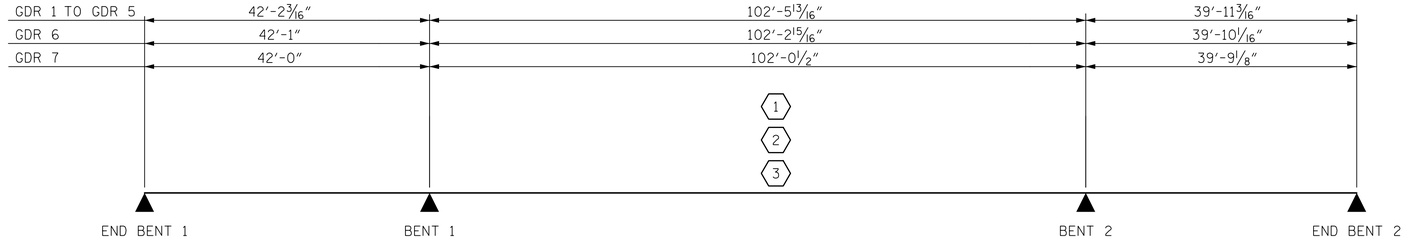
MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

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: 227+57.02 -L-

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

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	S8-4
1			3			TOTAL SHEETS
2			4			36

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NC License No. C-1554
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DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY N. HART DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 4

ASSEMBLED BY : M. WRIGHT	DATE : 8/18	
CHECKED BY : N. HART	DATE : 9/18	
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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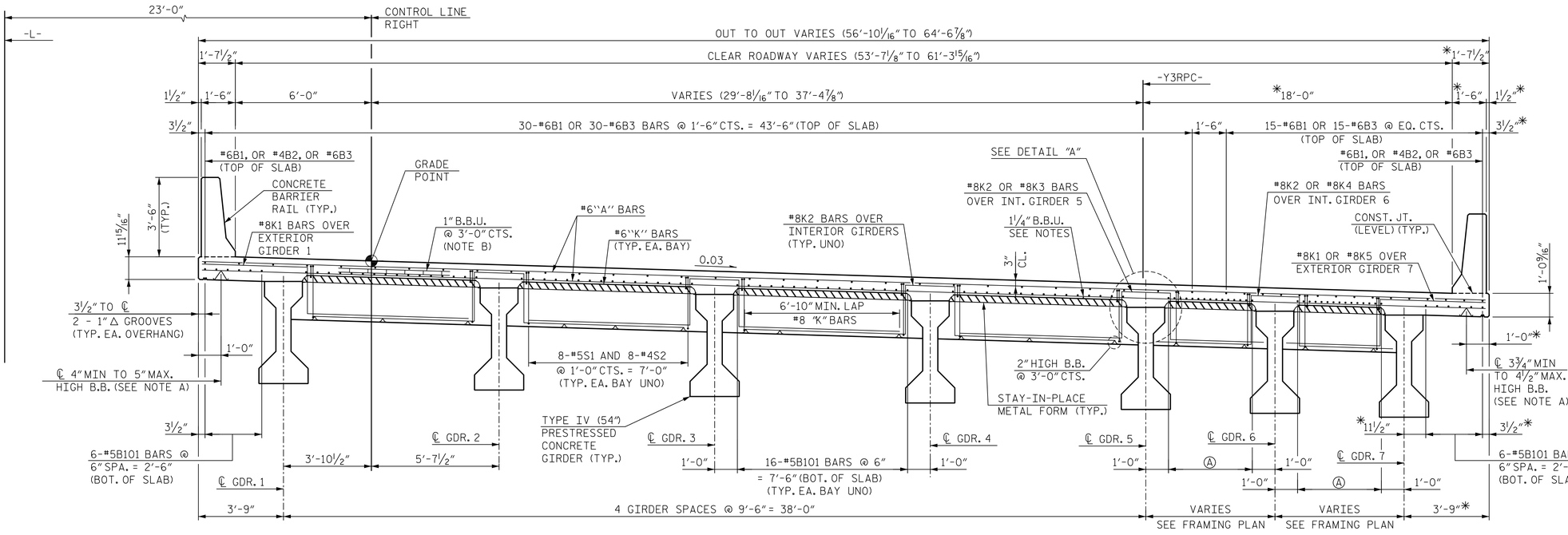
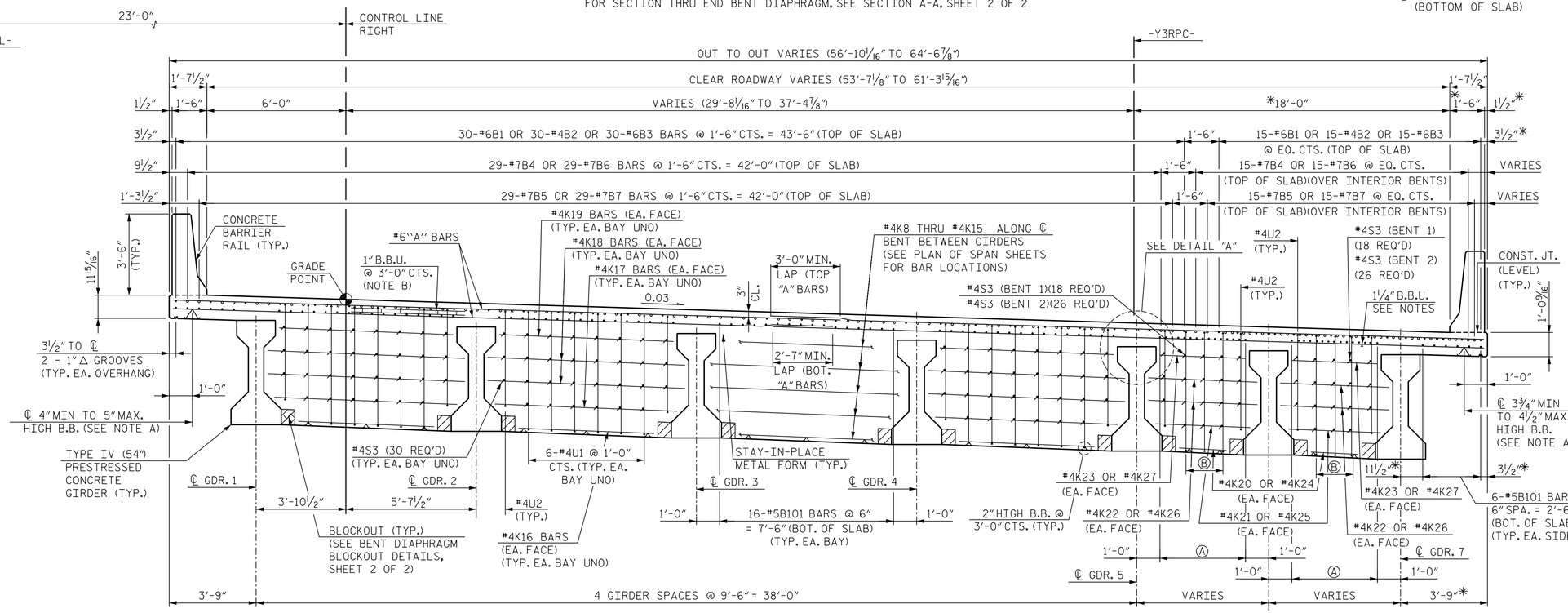
STD. NO. LRFR1



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

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 -Y3RPC-.

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 1/2″ BBU SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 "B" BARS OR #7 "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.

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS
DocuSigned by: David W. Hawkins A9ED7524B855487...
11/19/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

RIGHT LANE

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

DRAWN BY	M. WRIGHT	DATE 9/18
CHECKED BY	N. HART	DATE 9/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 9/18

DWG. NO. 5

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-5
1			3			TOTAL SHEETS
2			4			36

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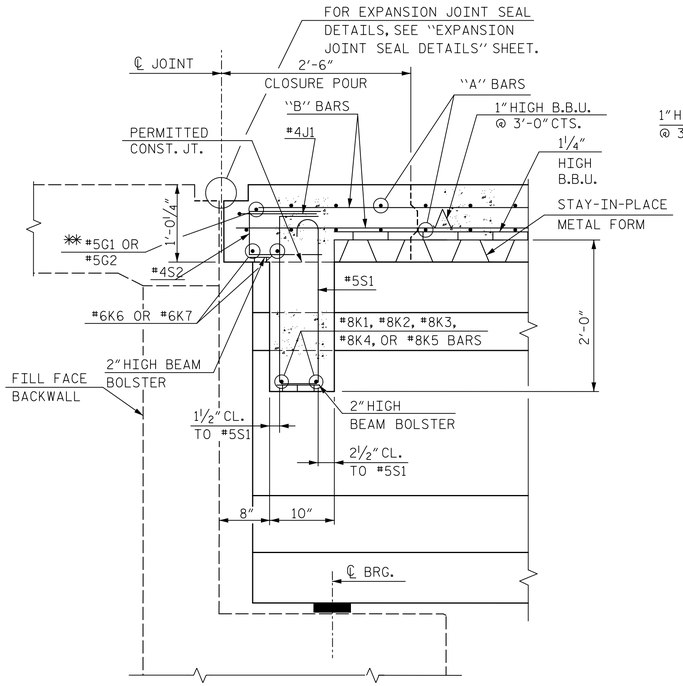
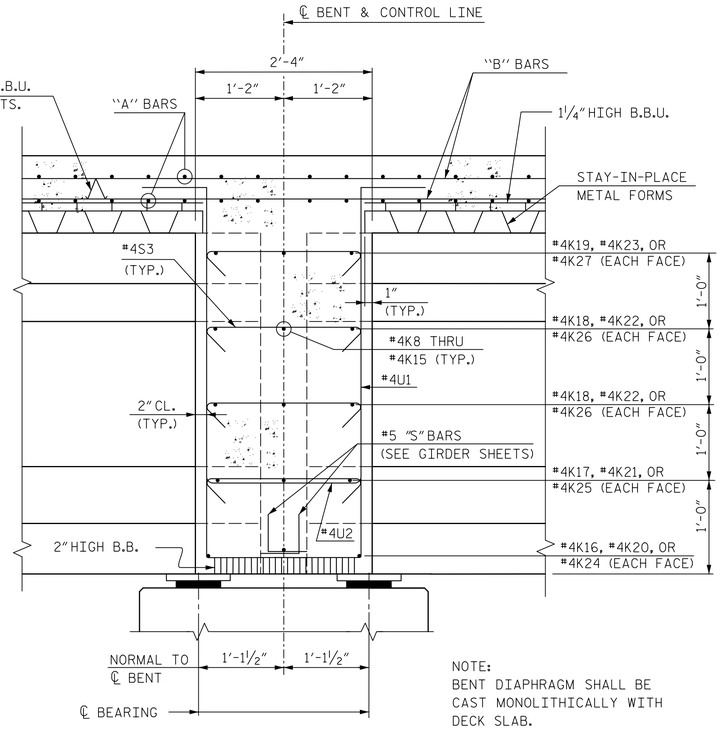


SECTION A-A

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.

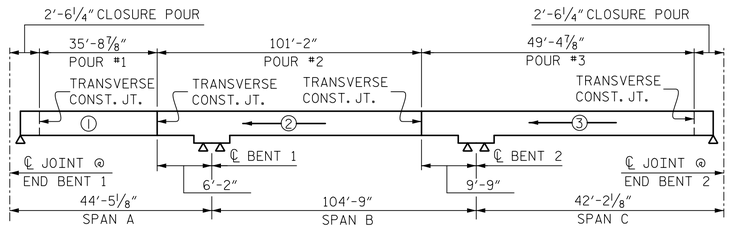


SECTION B-B

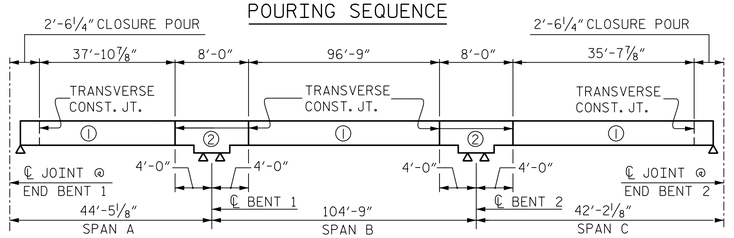
SECTION NORMAL THRU BENT 1 & BENT 2 DIAPHRAGM

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

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

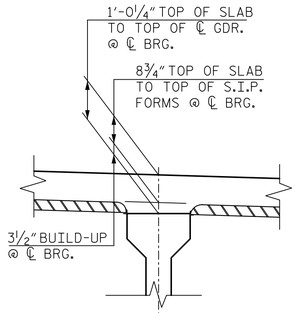


POURING SEQUENCE



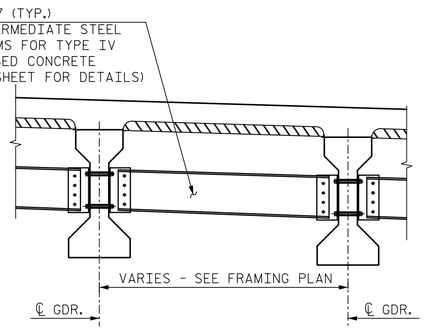
OPTIONAL POURING SEQUENCE

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



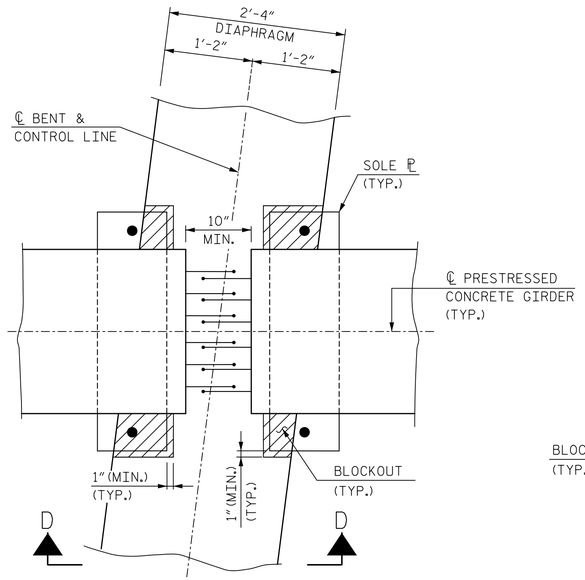
DETAIL "A"

NOTE: BUILDUP VARIES BETWEEN ℄ BEARINGS.



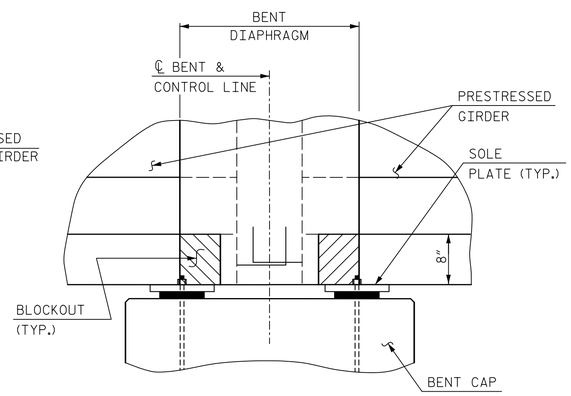
PARTIAL TYPICAL SECTION

(SHOWING INTERMEDIATE DIAPHRAGM)

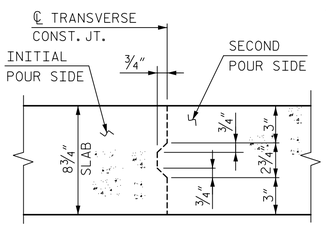


PLAN VIEW

(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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A8ED7524B855487...

11/19/2018

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

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DRAWN BY	M. WRIGHT	DATE	9/18
CHECKED BY	N. HART	DATE	9/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 6

PROJECT NO. R-1015

CRAVEN **COUNTY**

STATION: 227+57.02 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-6
1			3			TOTAL SHEETS
2			4			36

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

Ⓐ #6A1 THRU #6A14 @ 6" CTS. (TOP OF SLAB)

Ⓑ #6A101 THRU #6A114 @ 6" CTS. (BOT. OF SLAB)

Ⓒ 4-#5S1 & 4-#4S2 @ 1'-0" CTS = 3'-0"

* NORMAL TO -Y3RPC-, EDGE OF DECK OR ℄ OF GIRDER

DETAIL A

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 1 OF 3

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David W. Hawkins
A9ED7324B855487...

SEAL 27812
DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN "A"

RIGHT LANE

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DWG. NO. 7

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

SHEET NO. S8-7

TOTAL SHEETS 36

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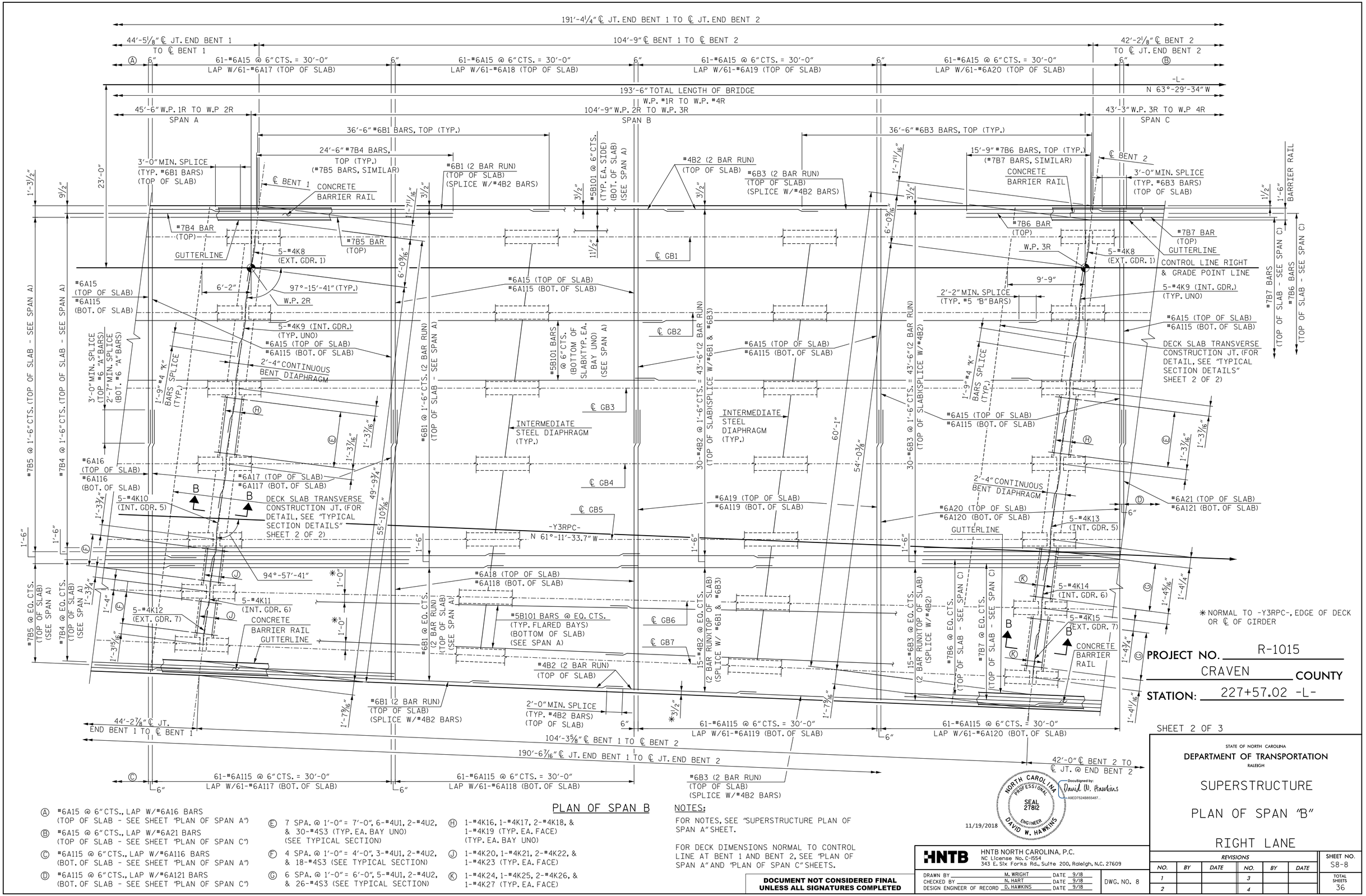

* NORMAL TO -Y3RPC-, EDGE OF DECK OR ℄ OF GIRDER

Ⓐ #6A15 @ 6" CTS., LAP W/#6A16 BARS (TOP OF SLAB - SEE SHEET "PLAN OF SPAN A")

Ⓑ #6A15 @ 6" CTS., LAP W/#6A21 BARS (TOP OF SLAB - SEE SHEET "PLAN OF SPAN C")

Ⓒ #6A115 @ 6" CTS., LAP W/#6A116 BARS (BOT. OF SLAB - SEE SHEET "PLAN OF SPAN A")

Ⓓ #6A115 @ 6" CTS., LAP W/#6A121 BARS (BOT. OF SLAB - SEE SHEET "PLAN OF SPAN C")

Ⓔ 7 SPA. @ 1'-0" = 7'-0", 6-#4U1, 2-#4U2, & 30-#4S3 (TYP. EA. BAY UNO) (SEE TYPICAL SECTION)

Ⓕ 4 SPA. @ 1'-0" = 4'-0", 3-#4U1, 2-#4U2, & 18-#4S3 (SEE TYPICAL SECTION)

Ⓖ 6 SPA. @ 1'-0" = 6'-0", 5-#4U1, 2-#4U2, & 26-#4S3 (SEE TYPICAL SECTION)

Ⓗ 1-#4K16, 1-#4K17, 2-#4K18, & 1-#4K19 (TYP. EA. FACE) (TYP. EA. BAY UNO)

Ⓙ 1-#4K20, 1-#4K21, 2-#4K22, & 1-#4K23 (TYP. EA. FACE)

Ⓚ 1-#4K24, 1-#4K25, 2-#4K26, & 1-#4K27 (TYP. EA. FACE)

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 BENT 2, SEE "PLAN OF SPAN A" AND "PLAN OF SPAN C" SHEETS.

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NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

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CHECKED BY	N. HART	DATE 9/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 9/18

DWG. NO. 8

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN "B"

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-8
1			3			TOTAL SHEETS
2			4			36

191′-4¼″ ℄ JT. END BENT 1 TO ℄ JT. END BENT 2

104′-9″ ℄ BENT 1 TO ℄ BENT 2

42′-2⅛″ ℄ BENT 2 TO ℄ JT. @ END BENT 2

#6A15 @ 6″CTS., LAP W/#6A20 BARS (TOP OF SLAB - SEE SHEET "PLAN OF SPAN B")

6″

62-#6A15 @ 6″CTS. = 30′-6″ LAP W/62-#6A21 (TOP OF SLAB)

6″ Ⓐ 9⅝″ 1¾₁₆″

104′-9″ W.P. 2R TO W.P. 3R SPAN B

43′-3″ W.P. 3R TO W.P 4R SPAN C

-L- N 63°-29′-34″ W

193′-6″ TOTAL LENGTH OF BRIDGE W.P. #1R TO W.P. #4R

23′-9″ #7B6 BARS, TOP (TYP.)

13′-3″ #7B7 BARS, TOP (TYP.)

3′-0″ MIN. SPLICE (TYP. #6B3 BARS) (TOP OF SLAB)

#7B6 BAR (TOP)

#5B101 @ 6″CTS. (TYP. EA. SIDE) (BOT. OF SLAB) (SEE SPAN A)

#6A14 (TOP OF SLAB) #6A114 (BOT. OF SLAB)

#6A1 (TOP OF SLAB) #6A101 (BOT. OF SLAB)

AT ℄ JOINT END BENT 2

BARRIER RAIL

1′-7½″ 3½″ 23′-0″ 1′-7¹¹⁄₁₆″ 6′-0⅜″ 6′-0″ 1′-3½″ 9½″ 1½″ 1′-6″ 1′-7¹¹⁄₁₆″ 1′-7½″ 6′-0″

GUTTERLINE

CONCRETE BARRIER RAIL

#7B7 BAR (TOP)

℄ GC1

11½″

CONTROL LINE RIGHT & GRADE POINT LINE

W.P. 3R

97°-15′-41″(TYP.)

W.P. 4R

GUTTERLINE

5′-10⁵⁄₁₆″

#6A15 (TOP OF SLAB) #6A115 (BOT. OF SLAB)

#6A15 (TOP OF SLAB) #6A115 (BOT. OF SLAB)

A A

61-#4J1 BARS (SEE "EXP. JT. SEAL DETAILS" SHEET)

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

9′-9″

#5B101 BARS @ 6″CTS. (BOTTOM OF SLAB) (TYP. EA. BAY UNO) (SEE SPAN A)

℄ GC2

CONCRETE BARRIER RAIL SEE DETAIL A

2-#6K6 (TYP. EA. BAY)

FILL FACE END BENT 2

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

℄ GC3

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

1-#5G2 (TOP OF SLAB)

2′-6″MIN. LAP (#5G2 BAR)

29-#7B6 @ 1′-6″CTS. = 42′-0″(TOP OF SLAB)

29-#7B6 @ 1′-6″CTS. = 42′-0″(TOP OF SLAB)

62′-10¹⁄₈″ OUT TO OUT

59′-7³⁄₁₆″ CLEAR ROADWAY

53′-7³⁄₁₆″

#6B3 @ 1′-6″CTS. (2 BAR RUN) (TOP OF SLAB - SEE SPAN B)

60′-1″

54′-0⅜″

3′-0″MIN. SPLICE (TOP #6 "A" BARS) 2′-7″MIN. SPLICE (BOT. #6 "A" BARS)

℄ GC4

2′-6″ CLOSURE POUR

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

2′-4″CONTINUOUS BENT DIAPHRAGM

℄ GC5

-Y3RPC- N 61°-11′-33.7″ W

1′-6″

94°-57′-41″

#6A21 (TOP OF SLAB) #6A121 (BOT. OF SLAB)

1-#5G2 (TOP OF SLAB)

1′-6″ 55′-10⁷⁄₁₆″ 61′-9³⁄₈″ 55′-3⁷⁄₁₆″ CLEAR ROADWAY 61′-3⁷⁄₁₆″ 64′-6³⁄₁₆″ OUT TO OUT

B B

1′-0″

#6A20 (TOP OF SLAB) #6A120 (BOT. OF SLAB)

#5B101 BARS @ EQ. CTS. (TYP. FLARED BAYS) (BOTTOM OF SLAB) (SEE SPAN A)

℄ GC6

CONCRETE BARRIER RAIL

1′-0″ GUTTERLINE CONCRETE BARRIER RAIL

℄ GC7

GUTTERLINE

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

15-#7B7 @ EQ. CTS. (TOP OF SLAB)

15-#7B6 @ EQ. CTS. (TOP OF SLAB)

#8K1 (OVER EA. EXT. GDR.)

#6B3 @ EQ. CTS. (2 BAR RUN) (TOP OF SLAB - SEE SPAN B)

1′-6″ 1′-7⁹⁄₁₆″ 3½″ 1′-7⁷⁄₁₆″ 1′-7½″ #6A19 (TOP OF SLAB) #6A119 (BOT. OF SLAB)

℄ BENT 2 94°-57′-41″

3½″ 1′-7½″ 1′-6″ BARRIER RAIL 1½″ ℄ JOINT @ END BENT 2

104′-3⅝″ ℄ BENT 1 TO ℄ BENT 2

42′-0″ ℄ BENT 2 TO ℄ JT. @ END BENT 2

190′-6⁷⁄₁₆″ ℄ JT. END BENT 1 TO ℄ JT. END BENT 2

5″ 8′-3⅞″ 1′-7⅞″

AT ℄ BENT 2

#6A115 @ 6″CTS., LAP W/#6A119 BARS (BOT. OF SLAB - SEE SHEET "PLAN OF SPAN B")

6″

#6A115 @ 6″CTS., LAP W/#6A120 BARS (BOT. OF SLAB - SEE SHEET "PLAN OF SPAN B")

6″

62-#6A115 @ 6″CTS. = 30′-6″ LAP W/ 62-#6A121 (BOT. OF SLAB)

Ⓑ 10¹³⁄₁₆″

6″

Ⓐ #6A14 THRU #6A1 @ 6″CTS. (TOP OF SLAB)

Ⓑ #6A114 THRU #6A101 @ 6″CTS. (BOT. OF SLAB)

PLAN OF SPAN C

✱ NORMAL TO -Y3RPC-, EDGE OF DECK OR ℄ GIRDER

℄ 1½″ EXP. JOINT 1′-0¾″ 1′-0″ BACKWALL ¾″ ¾″ 15⅛″ FILL FACE END BENT 2 CONTROL LINE RIGHT EDGE OF DECK W.P. 4R 97°-15′-41″ 1′-0⅞″

DETAIL A

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NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

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DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 9/18

DWG. NO. 9

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN "C"

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-9
1			3			TOTAL SHEETS
2			4			36

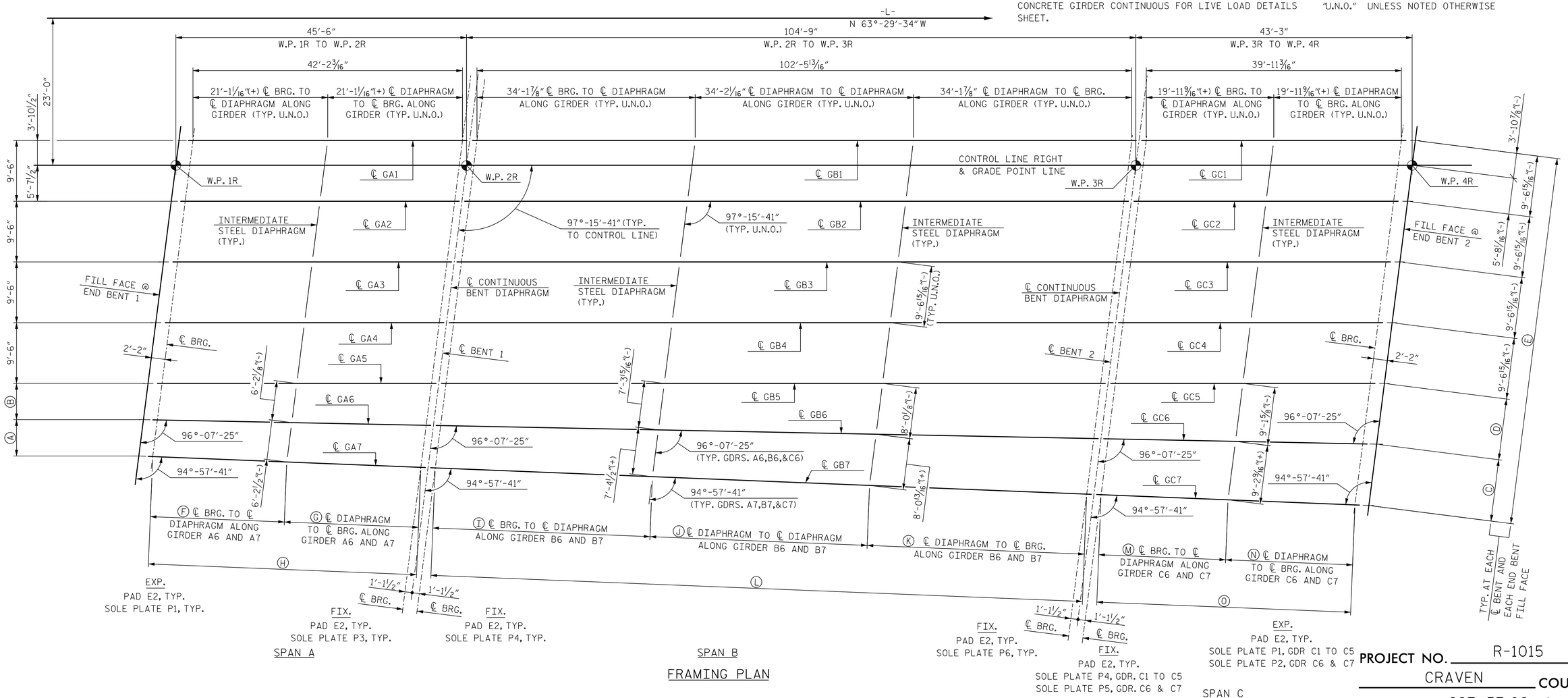
NOTES:

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.

"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



FRAMING PLAN

DIMENSION TABLE						
DIM. / LOCATION	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ
FILL FACE END BENT 1	5'-8 1/4"	5'-8"	5'-8 13/16"(+)	5'-8 9/16"(-)	49'-9 9/16"(-)
℄ BENT 1	6'-7 1/4"(+)	6'-6 13/16"	6'-7 15/16"(-)	6'-7 1/16"(+)	51'-7 1/16"(-)
℄ BENT 2	8'-8 9/16"(+)	8'-7 11/16"(+)	8'-9 7/16"(+)	8'-8 9/16"(-)	55'-9 11/16"(-)
FILL FACE END BENT 2	9'-7 1/16"(-)	9'-6"	9'-8"(-)	9'-6 15/16"(-)	57'-6 9/16"(+)

DIM. / LOCATION	Ⓕ	Ⓖ	Ⓗ	Ⓘ	Ⓙ	Ⓚ	Ⓛ	Ⓜ	Ⓝ	Ⓞ
GIRDER GA6	21'-0 1/2"	21'-0 1/2"	42'-1"	——	——	——	——	——	——	——
GIRDER GA7	21'-0"	21'-0"	42'-0"	——	——	——	——	——	——	——
GIRDER GB6	——	——	——	34'-0 15/16"	34'-1 1/16"	34'-1"	102'-2 15/16"	——	——	——
GIRDER GB7	——	——	——	34'-0 1/8"	34'-0 1/4"	34'-0 3/16"	102'-0 1/2"	——	——	——
GIRDER GC6	——	——	——	——	——	——	——	19'-11"	19'-11 1/16"	39'-10 1/16"
GIRDER GC7	——	——	——	——	——	——	——	19'-10 9/16"	19'-10 9/16"	39'-9 1/8"

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

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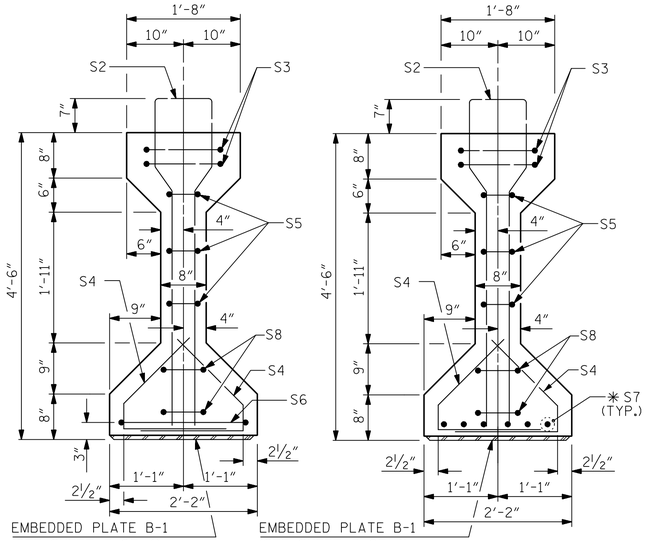
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-10
1			3			TOTAL SHEETS
2			4			36



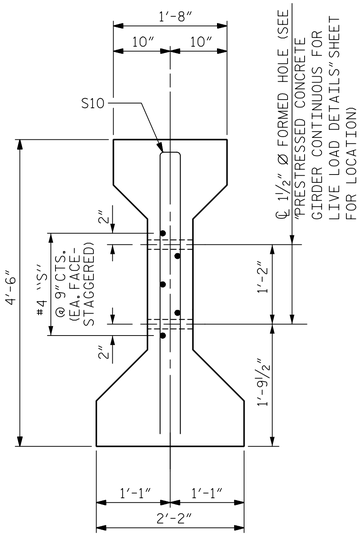
EMBEDDED PLATE B-1
(SEE SHEET 3 OF 4)

SECTION A-A

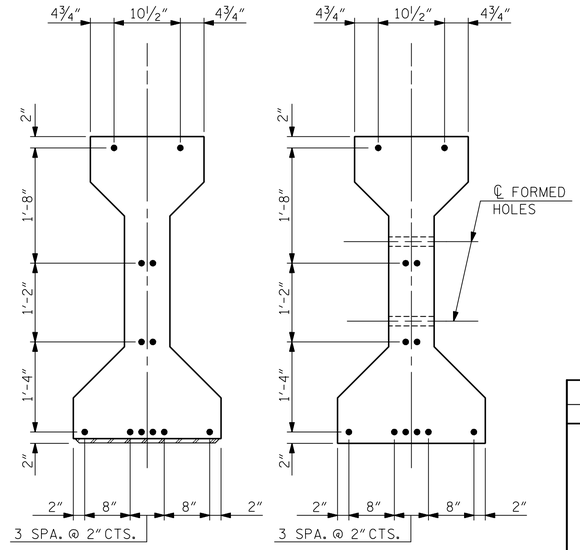
EMBEDDED PLATE B-1
(SEE SHEET 3 OF 4)

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.

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

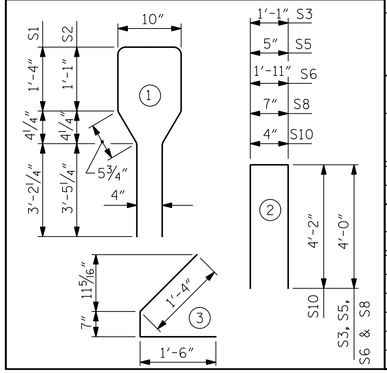
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
GA1-GA7	S1	46	#4	1	10'-10"	333
GC1-GC7	S1	44	#4	1	10'-10"	318
	S2	12	#6	1	10'-10"	195
	S3	4	#4	2	9'-1"	24
	S4	64	#4	3	3'-5"	146
	S5	6	#4	2	8'-5"	34
	S6	1	#4	2	9'-11"	7
	✱S7	6	#5	STR	3'-8"	23
	S8	4	#4	2	8'-7"	23
	S9	1	#3	STR	1'-10"	1
	S10	2	#5	2	8'-8"	18
	S11	5	#4	STR	7'-0"	23

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT

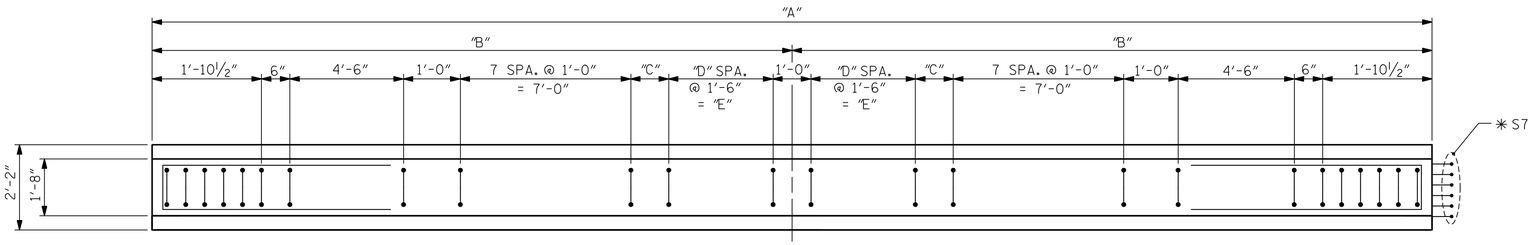


QUANTITIES FOR ONE GIRDER

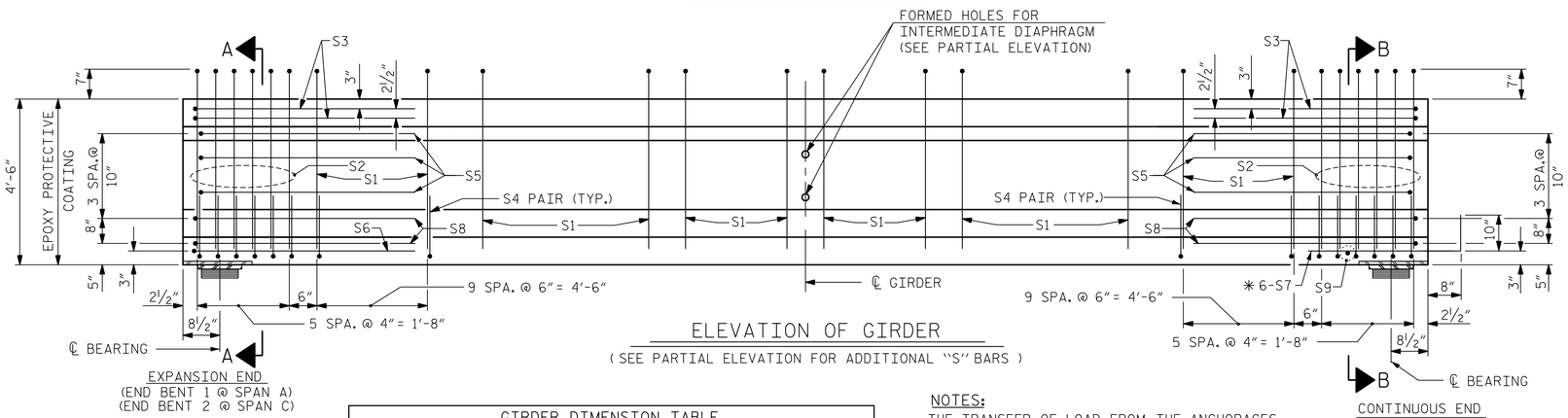
	REINFORCING STEEL LB.	5,000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
SPAN A GDR.	827	8.8	12
SPAN C GDR.	812	8.4	12

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
GA1 THRU GA5 (5 TOTAL)	43'-7⅜"	217.99'
GA6	43'-6"	43.50'
GA7	43'-5"	43.42'
GC1 THRU GC5 (5 TOTAL)	41'-4⅜"	206.74'
GC6	41'-3⅛"	41.26'
GC7	41'-2⅛"	41.18'



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)

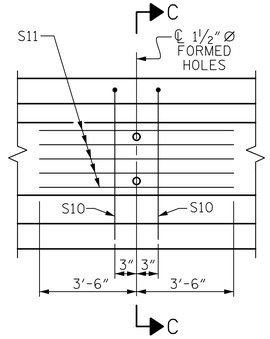
CONTINUOUS END
(BENT 1 END @ SPAN A)
(BENT 2 END @ SPAN C)

GIRDER DIMENSION TABLE					
GIRDERS	"A"	"B"	"C"	"D"	"E"
GA1-GA5	43'-7⅜"	21'-9⁹⁄₁₆"(+)	5¹⁄₁₆"(+)	4	6'-0"
GA6	43'-6"	21'-9"	4½"	4	6'-0"
GA7	43'-5"	21'-8½"	4"	4	6'-0"
GC1-GC5	41'-4⅜"	20'-8⁷⁄₁₆"(+)	9⁹⁄₁₆"(+)	3	4'-6"
GC6	41'-3⅛"	20'-7½"(+)	9"(+)	3	4'-6"
GC7	41'-2⅛"	20'-7¹⁄₁₆"	8⁹⁄₁₆"	3	4'-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.



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. GA1-GA7 AND GC1-GC7

11/19/2018

DocuSigned by: David W. Hawkins
ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -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	S8-11
1			3			TOTAL SHEETS
2			4			36

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DRAWN BY M. WRIGHT DATE 8/18
CHECKED BY N. SALAS ZAMUDIO DATE 8/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18
DWG. NO. II

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

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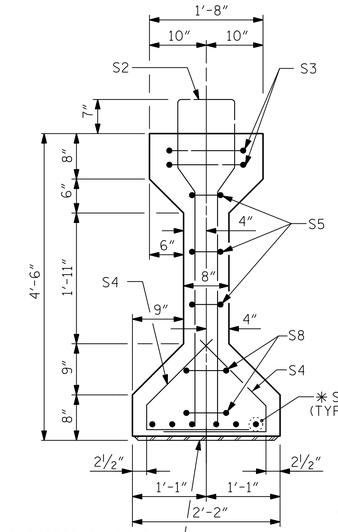
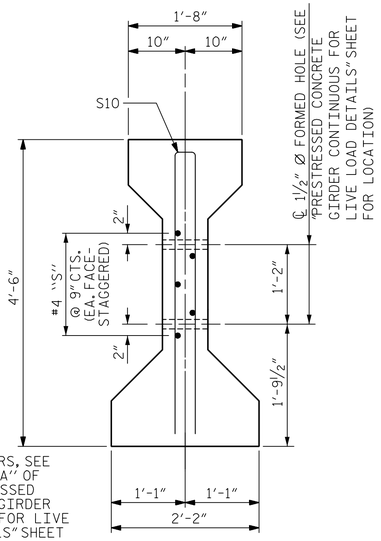
STD. NO. PCG6



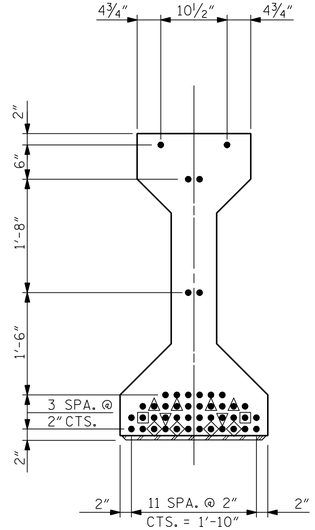
SECTION A-A



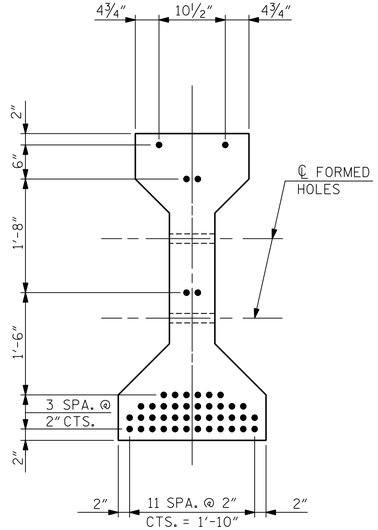
✱ FOR S7 BARS, SEE DETAIL "A" OF "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET

SECTION C-C

(S1 BARS NOT SHOWN)

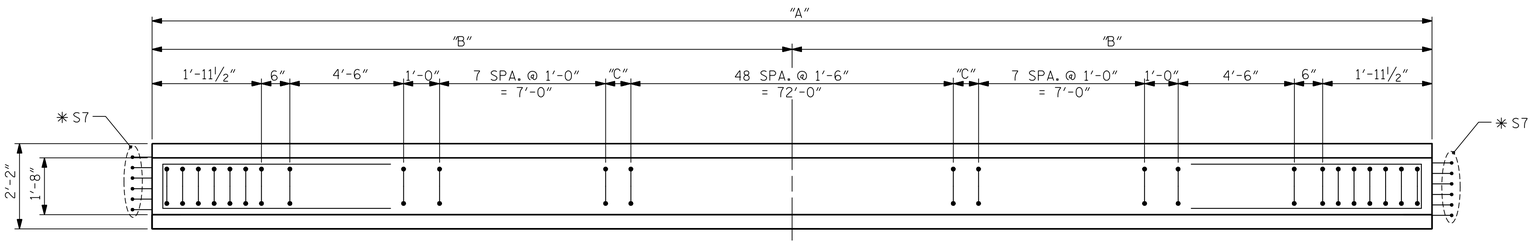


AT END OF GIRDER

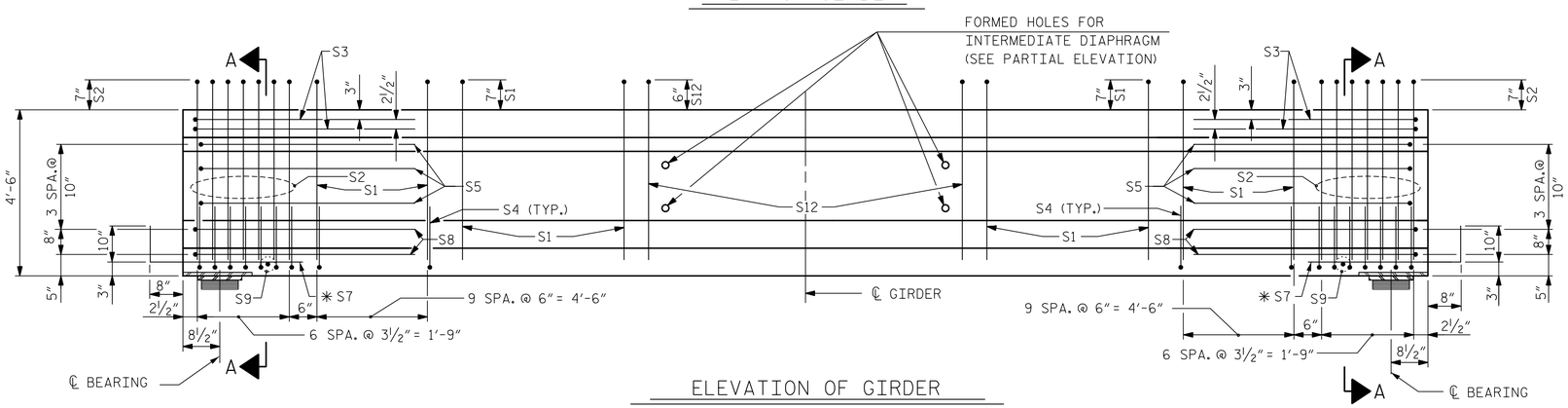


AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



CONTINUOUS END

ELEVATION OF GIRDER

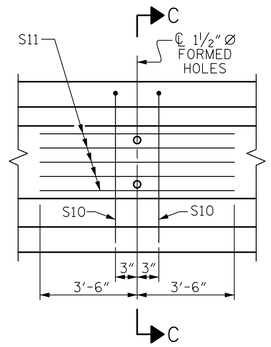
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

CONTINUOUS END

GIRDER DIMENSION TABLE			
GIRDERS	"A"	"B"	"C"
GB1-GB5	103'-10 13/16"	51'-11 3/16"(+)	11 7/8"(+)
GB6	103'-7 5/16"	51'-9 5/16"(+)	10 7/16"(+)
GB7	103'-5½"	51'-8¾"	9¼"

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ◬ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ⊡ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- ▽ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- ◈ STRANDS DEBONDED FOR 20'-0" FROM END OF GIRDER



PARTIAL ELEVATION

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

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 6,600 PSI FOR SPAN B GIRDERS.

GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 9,000 PSI AT THE AGE OF 28 DAYS.

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

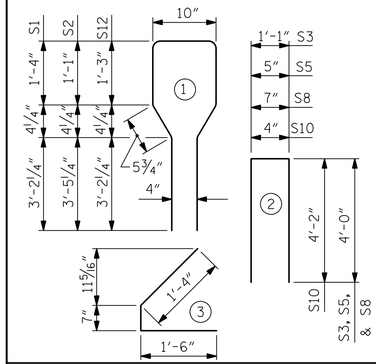
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	36	#4	1	10'-10"	261
S2	14	#6	1	10'-10"	228
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
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
S11	10	#4	STR	7'-0"	47
S12	49	#4	1	10'-8"	349

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	9,000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
GB1-GB5	1,204	21.1	46
GB6, GB7	1,204	21.0	46

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	103'-10 13/16"	519.51'
1	103'-7 5/16"	103.66'
1	103'-5½"	103.46'

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SHEET 2 OF 4

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NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

ASSEMBLED BY : M. WRIGHT DATE : 8/18	
CHECKED BY : N. SALAS ZAMUDIO DATE : 8/18	
DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
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CHECKED BY N. SALAS ZAMUDIO DATE 8/18	
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REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-12
1			3			TOTAL SHEETS
2			4			36

STD. NO. PCG6

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.

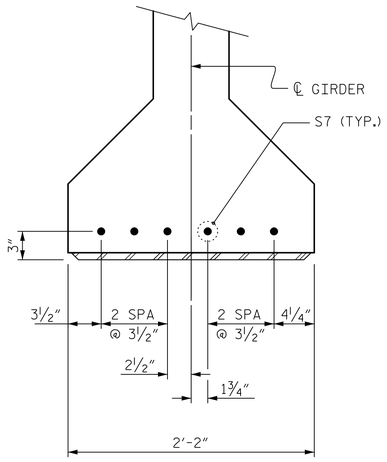
ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

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.

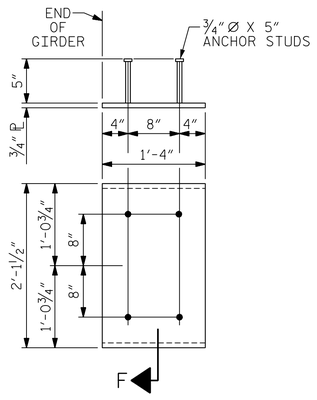
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

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.



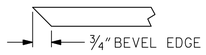
DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



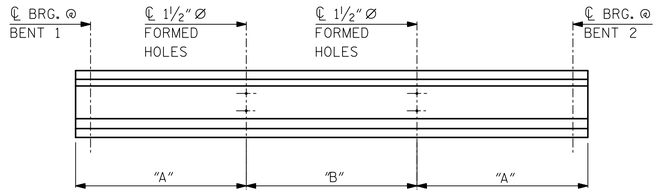
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



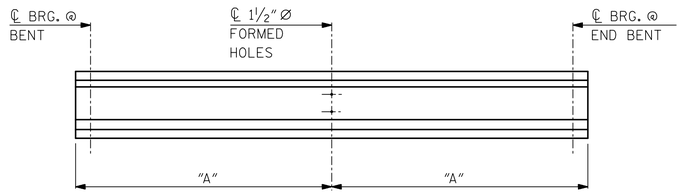
SECTION "F"

(SEE NOTES)



GIRDER ELEVATION

GB1-GB7



GIRDER ELEVATION

GA1-GA7 & GC1-GC7

GIRDER	"A"	"B"
GA1-GA5	21'-9 9/16"	———
GA6	21'-9"	———
GA7	21'-8 1/2"	———
GB1-GB5	34'-10 3/8"	34'-2 1/16"
GB6	34'-9 7/16"	34'-1 1/16"
GB7	34'-8 5/8"	34'-0 1/4"
GC1-GC5	20'-8 1/16"(+)	———
GC6	20'-7 1/2"(+)	———
GC7	20'-7 1/16"	———

1½"Ø FORMED HOLE LOCATIONS

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 3 OF 4

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NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

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	S8-13
1			3			TOTAL SHEETS
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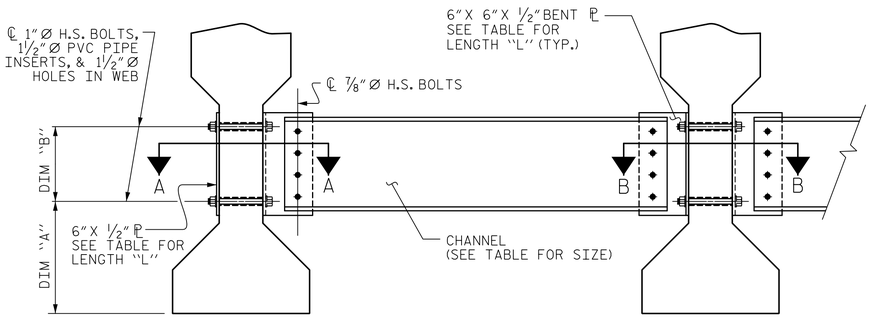
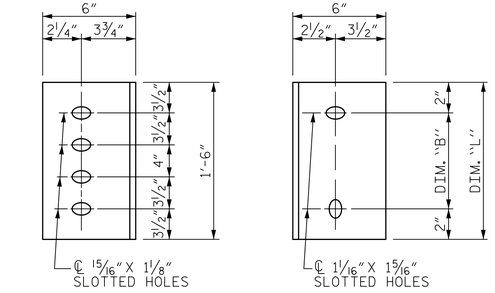


EXTERIOR GIRDER INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE WEB FACE

CONNECTOR PLATE DETAILS

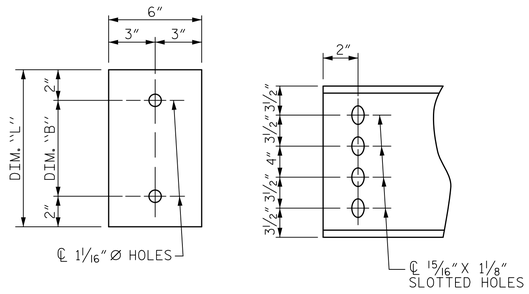


PLATE DETAILS CHANNEL END

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 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.

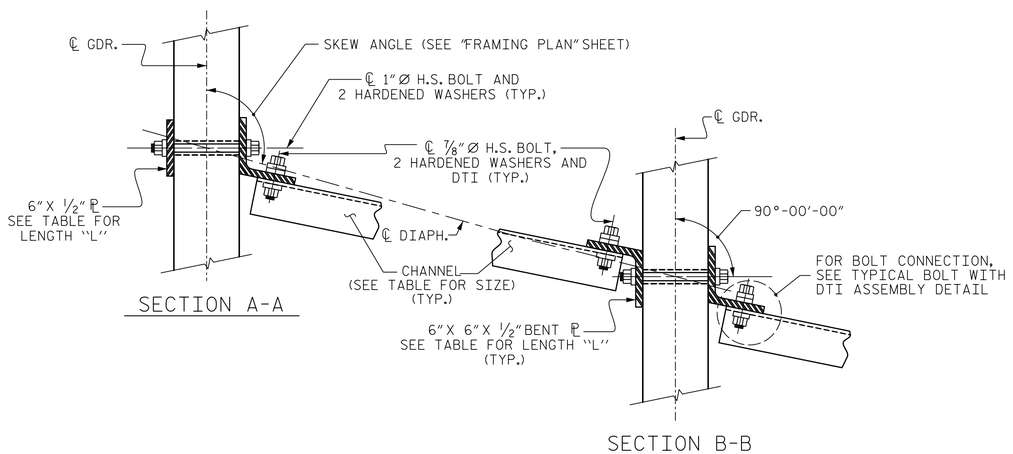
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

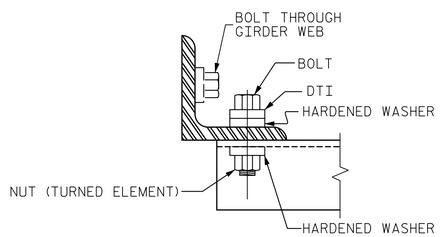
TABLE

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



SECTION A-A SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -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	S8-14
1			3			TOTAL SHEETS
2			4			36

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NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

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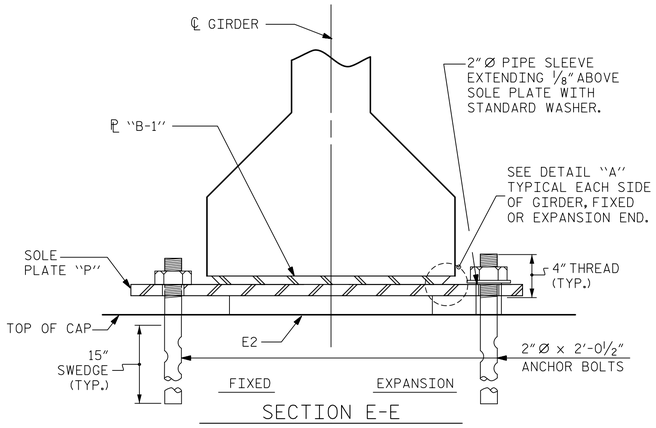
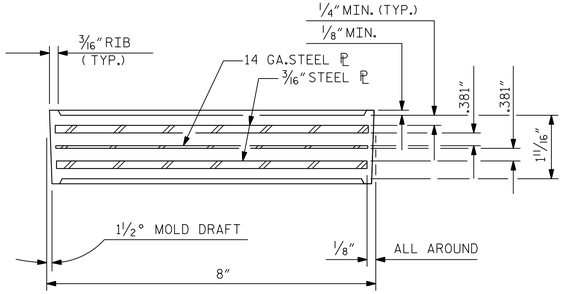
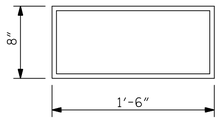
DRAWN BY : TLA 6/05	REV. 5/1/06RRR	KMM/GM
CHECKED BY : VC 6/05	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC



SECTION E-E



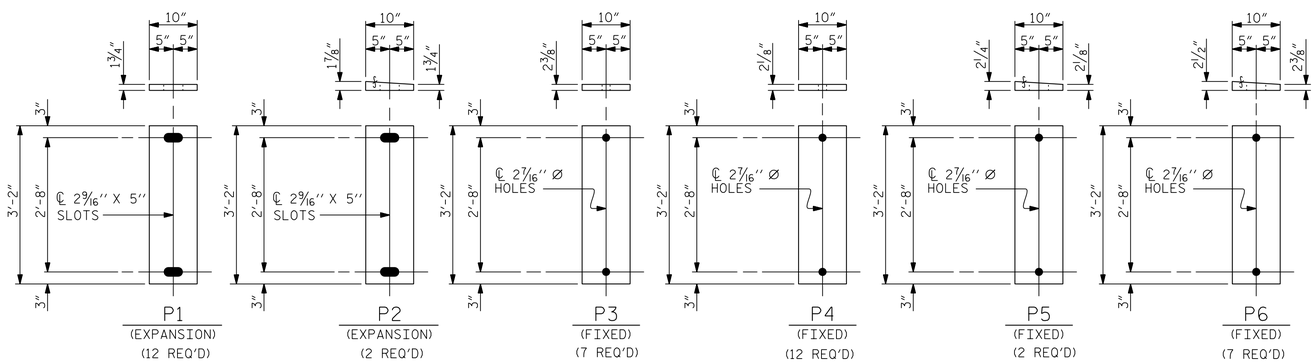
TYPICAL SECTION OF ELASTOMERIC BEARINGS



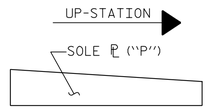
E2 (42 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

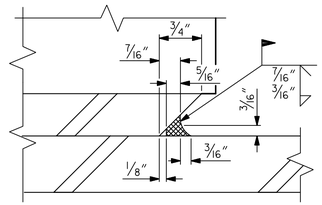
TYPE III



SOLE PLATE DETAILS ("P")



SOLE ℄ PLACEMENT DETAIL



DETAIL "A"

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.

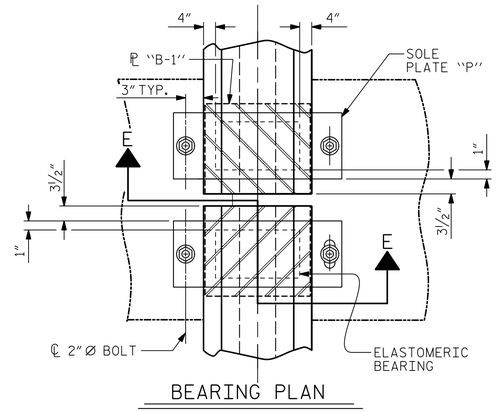
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

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.



BEARING PLAN

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

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins 9ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE
RIGHT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 7/18
CHECKED BY : N. HART	DATE : 7/18

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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DRAWN BY	M. WRIGHT	DATE 7/18
CHECKED BY	N. HART	DATE 7/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 9/18

DWG. NO. 15

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-15
1			3			TOTAL SHEETS
2			4			36

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	0.002	0.004	0.005	0.006	0.006	0.006	0.005	0.004	0.002	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.002	0.003	0.005	0.006	0.006	0.006	0.005	0.003	0.002	0.000
FINAL CAMBER ↑	0	0	0	0	0	0	0	0	0	0	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B																					
0.6"Ø LOW RELAXATION STRANDS	GIRDERS 1 THRU 4																				
TENTH 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	0.042	0.082	0.121	0.156	0.187	0.214	0.235	0.250	0.260	0.263	0.260	0.250	0.235	0.214	0.187	0.156	0.121	0.082	0.042	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.029	0.057	0.085	0.112	0.135	0.155	0.171	0.182	0.190	0.192	0.190	0.182	0.171	0.155	0.135	0.112	0.085	0.057	0.029	0.000
FINAL CAMBER ↑	0	1/8	5/16	7/16	1/2	5/8	11/16	3/4	13/16	13/16	7/8	13/16	13/16	3/4	11/16	5/8	1/2	7/16	5/16	1/8	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B																					
0.6"Ø LOW RELAXATION STRANDS	GIRDERS 5 & 7																				
TENTH 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	0.042	0.082	0.121	0.156	0.187	0.214	0.235	0.250	0.260	0.263	0.260	0.250	0.235	0.214	0.187	0.156	0.121	0.082	0.042	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.026	0.052	0.078	0.102	0.122	0.141	0.155	0.166	0.172	0.174	0.172	0.166	0.155	0.141	0.122	0.102	0.078	0.052	0.026	0.000
FINAL CAMBER ↑	0	3/16	3/8	1/2	5/8	3/4	7/8	15/16	1	1 1/16	1 1/16	1 1/16	1	15/16	7/8	3/4	5/8	1/2	3/8	3/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B																					
0.6"Ø LOW RELAXATION STRANDS	GIRDER 6																				
TENTH 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	0.042	0.082	0.121	0.156	0.187	0.213	0.234	0.250	0.259	0.262	0.259	0.250	0.234	0.213	0.187	0.156	0.121	0.082	0.042	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.024	0.047	0.070	0.092	0.110	0.127	0.140	0.150	0.156	0.157	0.156	0.150	0.140	0.127	0.110	0.092	0.070	0.047	0.023	0.000
FINAL CAMBER ↑	0	3/16	7/16	5/8	3/4	15/16	1 1/16	1 1/8	1 3/16	1 1/4	1 1/4	1 1/4	1 3/16	1 1/8	1 1/16	15/16	3/4	5/8	7/16	1/4	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	0.002	0.004	0.005	0.006	0.006	0.006	0.005	0.004	0.002	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.002	0.003	0.005	0.005	0.006	0.005	0.005	0.003	0.002	0.000
FINAL CAMBER ↑	0	0	0	0	0	0	0	0	0	0	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: 227+57.02 -L-

DocuSigned by: David W. Hawkins 7A6ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

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DRAWN BY M. WRIGHT DATE 9/18
CHECKED BY N. SALAS ZAMUDIO DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 16

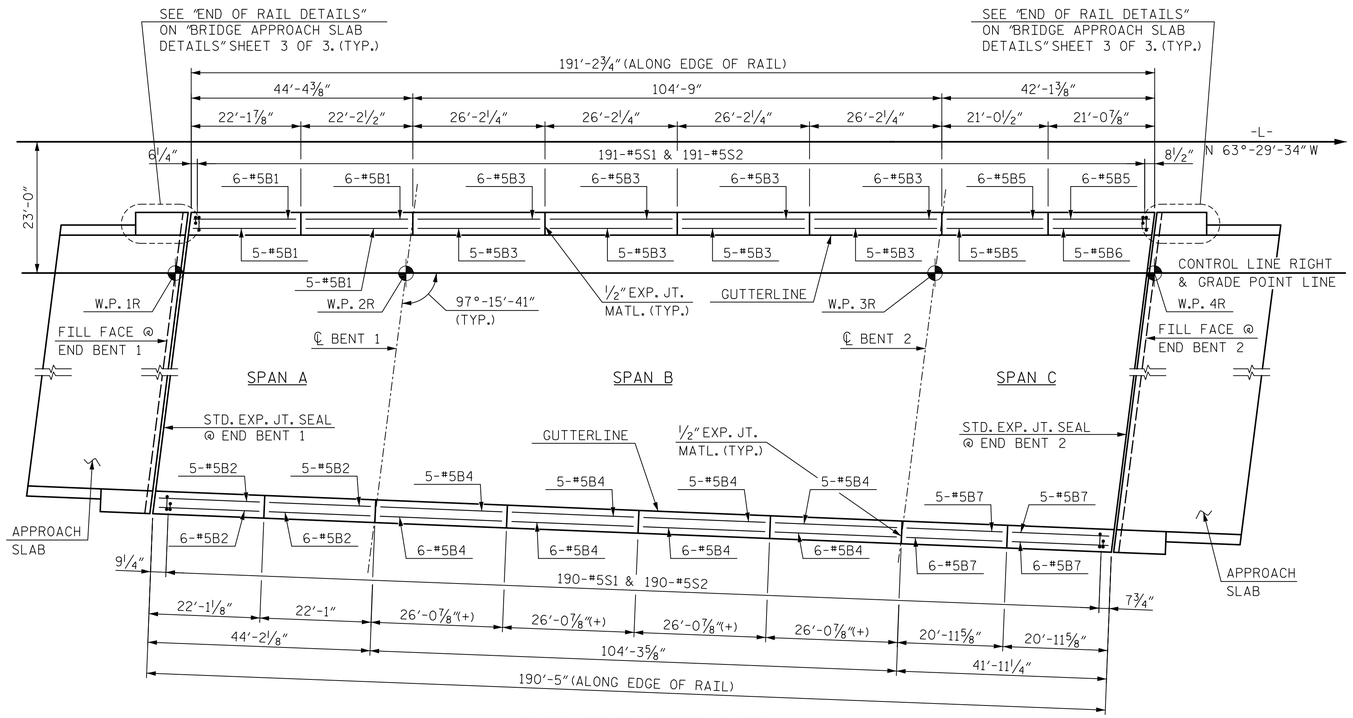
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-16
1			3			TOTAL SHEETS
2			4			36



PLAN OF BARRIER RAIL

NOTE: EDGE SLAB NOT SHOWN FOR CLARITY.

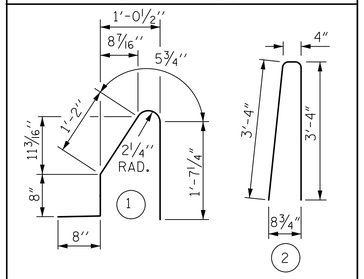
NOTES

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.

BAR TYPES



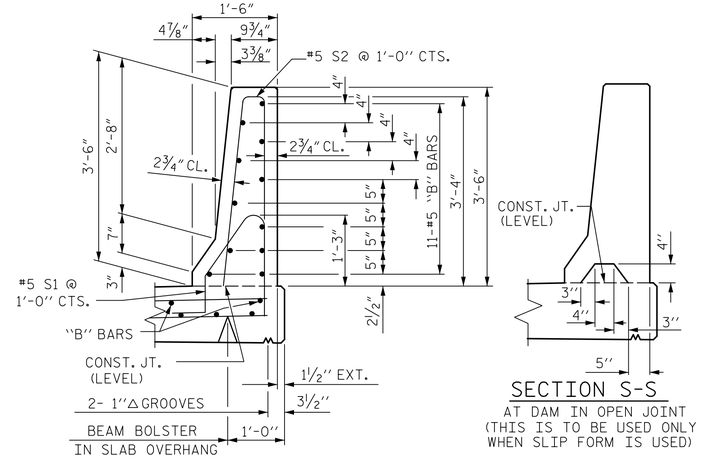
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	22	#5	STR	21'-9"	499
✳ B2	22	#5	STR	21'-7"	495
✳ B3	44	#5	STR	25'-9"	1,182
✳ B4	44	#5	STR	25'-8"	1,178
✳ B5	17	#5	STR	20'-8"	366
✳ B6	5	#5	STR	20'-6"	107
✳ B7	22	#5	STR	20'-7"	472
✳ S1	381	#5	1	4'-7"	1,821
✳ S2	381	#5	2	7'-0"	2,782

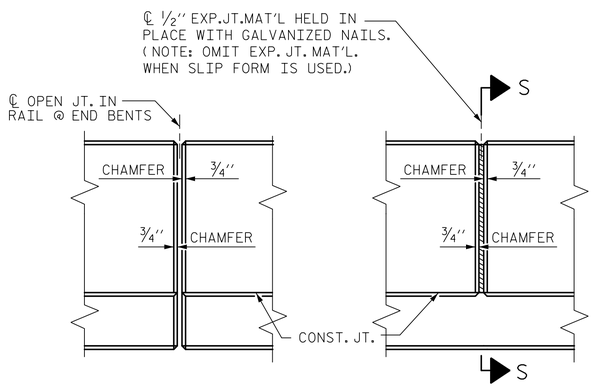
✳ EPOXY COATED REINFORCING STEEL	LBS.	8,902
CLASS AA CONCRETE	CU. YDS.	51.9
CONCRETE BARRIER RAIL	LIN. FT.	381.6



SECTION THRU RAIL

SECTION S-S

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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins
ED7524B55487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD CONCRETE BARRIER RAIL RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-17
1			3			TOTAL SHEETS
2			4			36

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DRAWN BY	M. WRIGHT	DATE	7/18
CHECKED BY	N. HART	DATE	7/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 17

ASSEMBLED BY : M. WRIGHT		DATE : 7/18	
CHECKED BY : N. HART		DATE : 7/18	
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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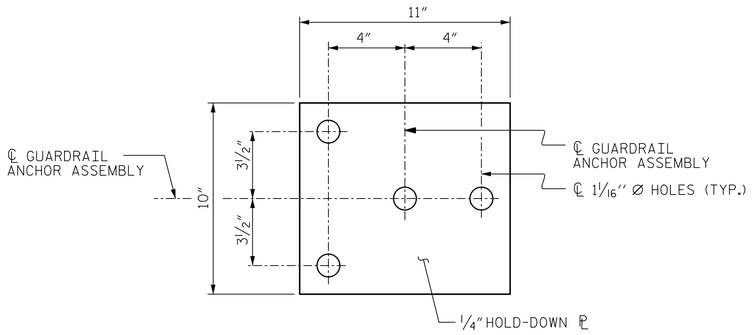
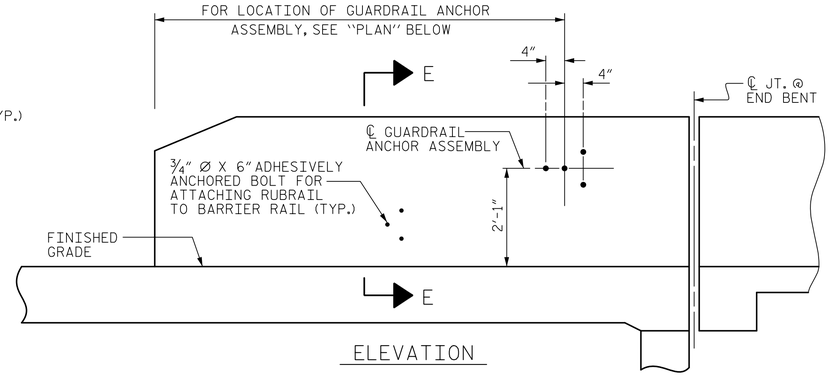
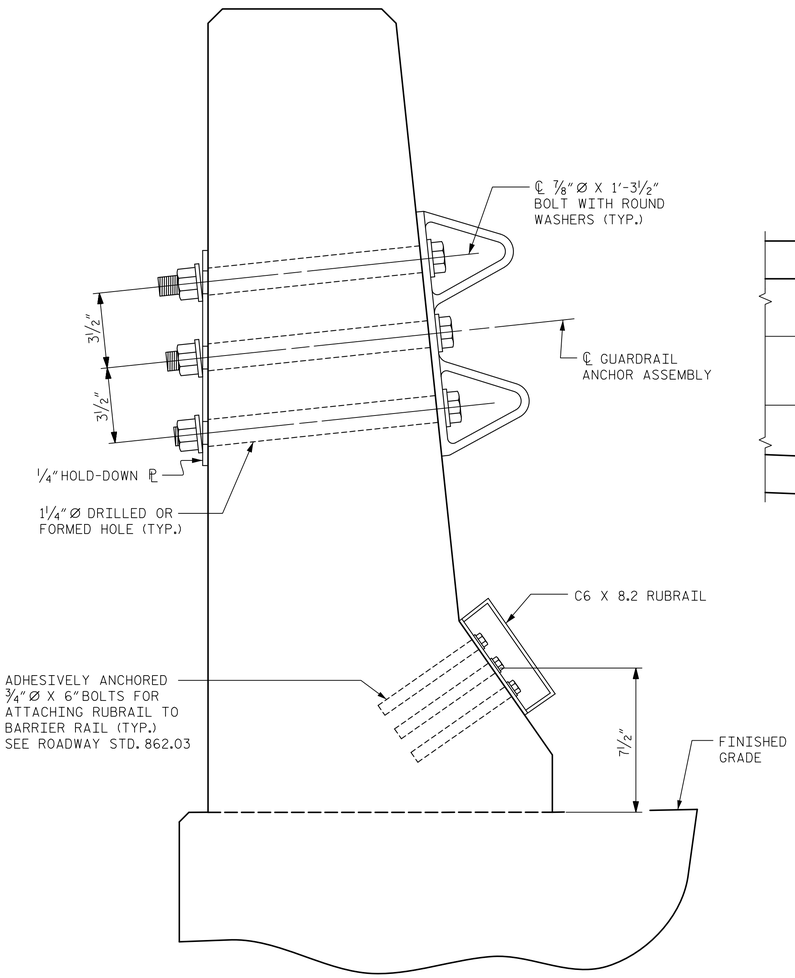
STD. NO. CBR1



PLAN

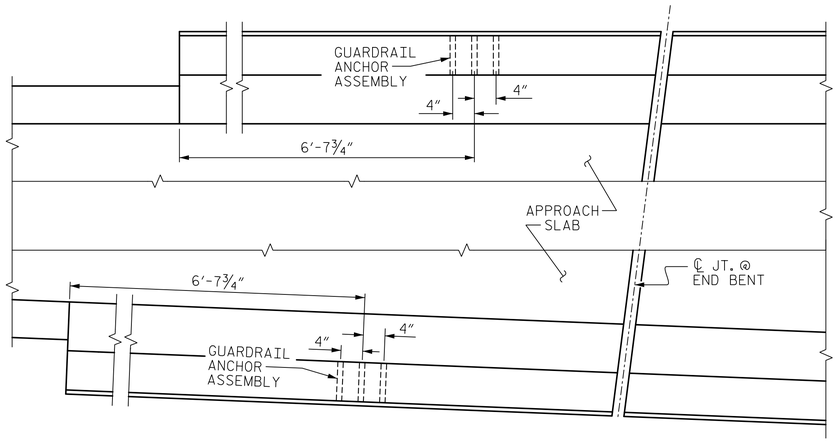


ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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

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.)

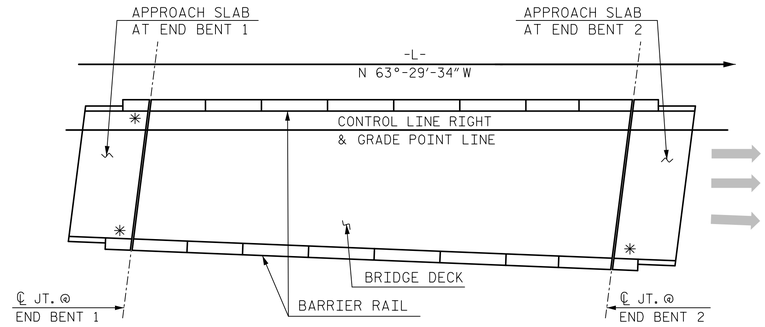
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-18
1			3			TOTAL SHEETS
2			4			36

ASSEMBLED BY : M. WRIGHT	DATE : 7/18	
CHECKED BY : N. HART	DATE : 7/18	
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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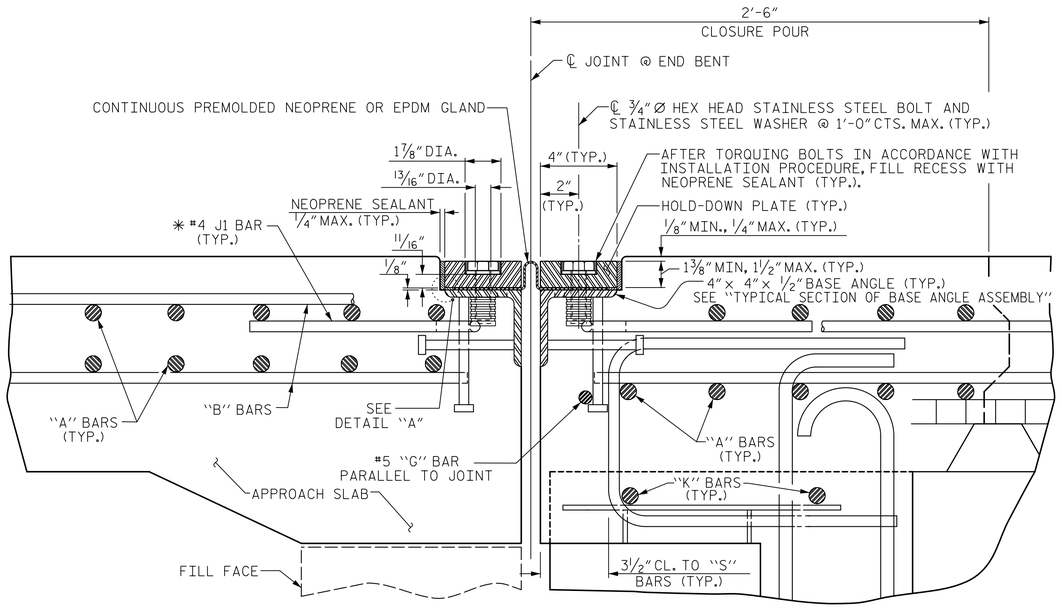
DRAWN BY	M. WRIGHT	DATE	7/18
CHECKED BY	N. HART	DATE	7/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 18

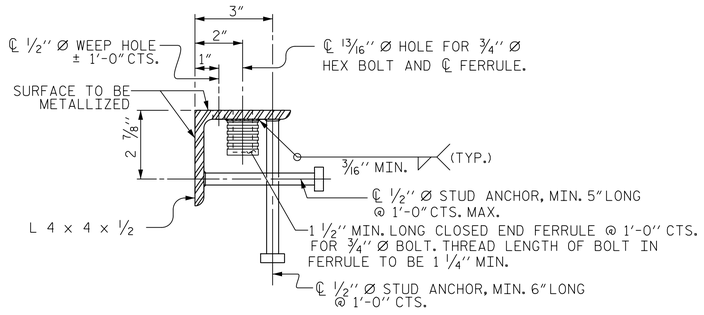
STD. NO. GRA2



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.



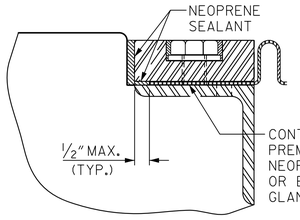
TYPICAL SECTION OF BASE ANGLE ASSEMBLY

INSTALLATION PROCEDURE

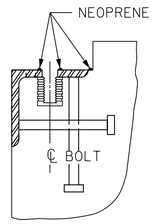
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4⅛" TO 4¼" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO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

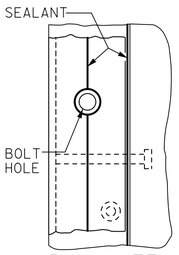
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS 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"

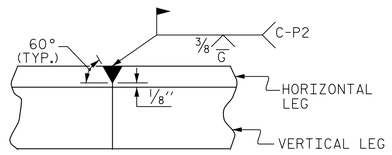


CROSS SECTION



PLAN VIEW

INSTALLATION SKETCH



DETAIL- FIELD WELD SPLICE OF BASE ANGLE

MOVEMENT AND SETTING AT JOINT					
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
E.B. 1	97°-15'-41"	13/16"	1⅝"	1½"	1 3/16"
E.B. 2	97°-15'-41"	¾"	1⅝"	1½"	1¼"

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins
ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS

RIGHT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 7/18
CHECKED BY : N. HART	DATE : 7/18
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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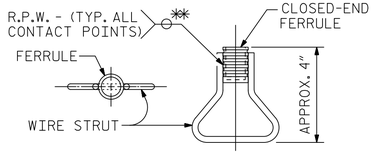
DRAWN BY	M. WRIGHT	DATE	7/18
CHECKED BY	N. HART	DATE	7/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 19

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-19
1			3			TOTAL SHEETS
2			4			36

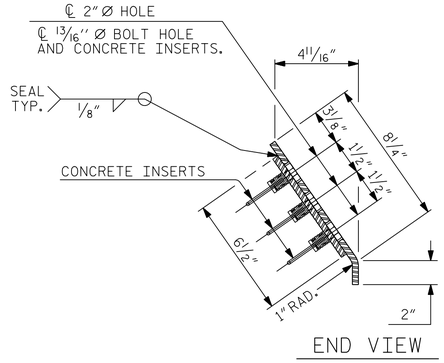
STD. NO. EJS1



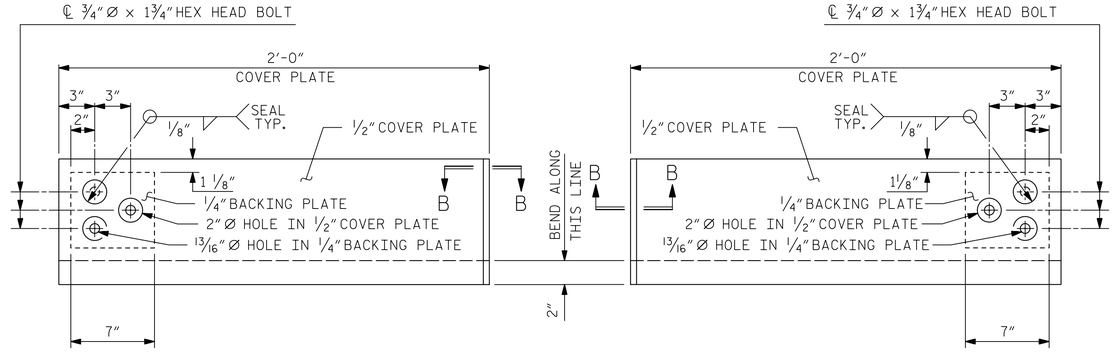
PLAN ELEVATION

CONCRETE INSERT

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



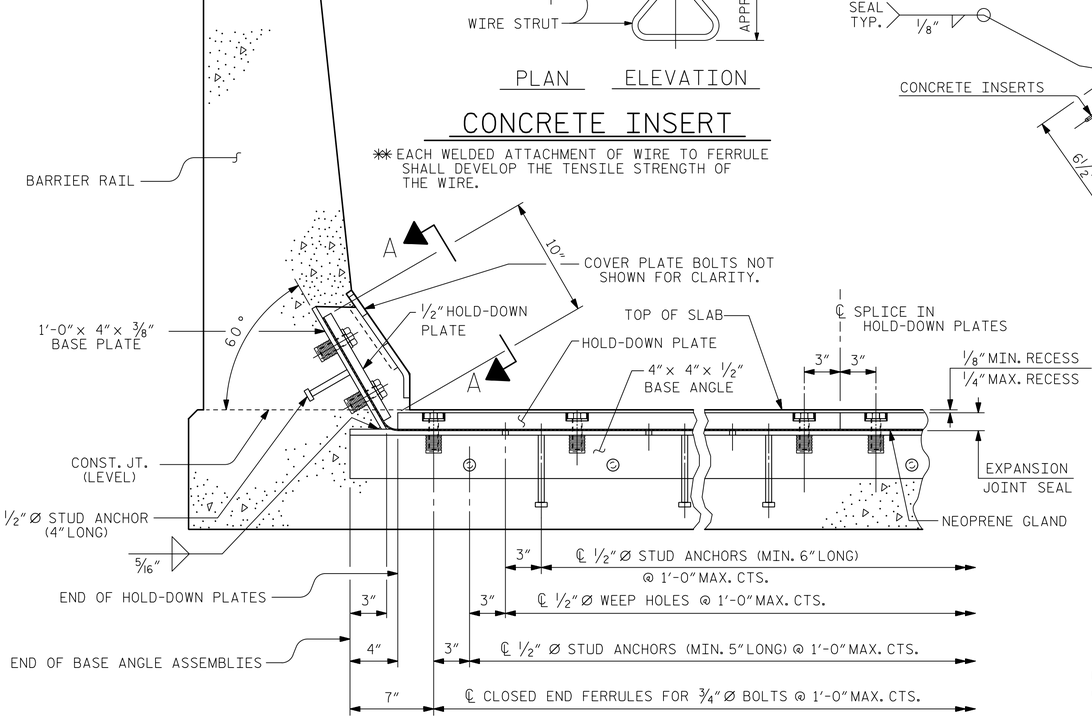
END VIEW

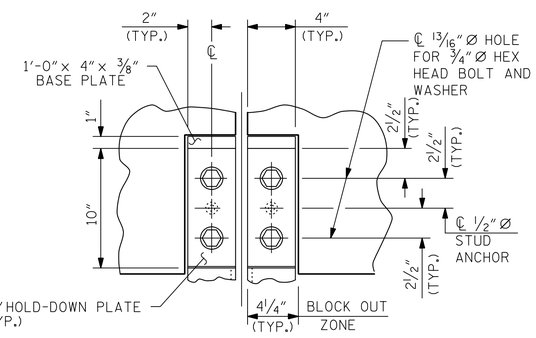


TYPE I - ELEVATION VIEW

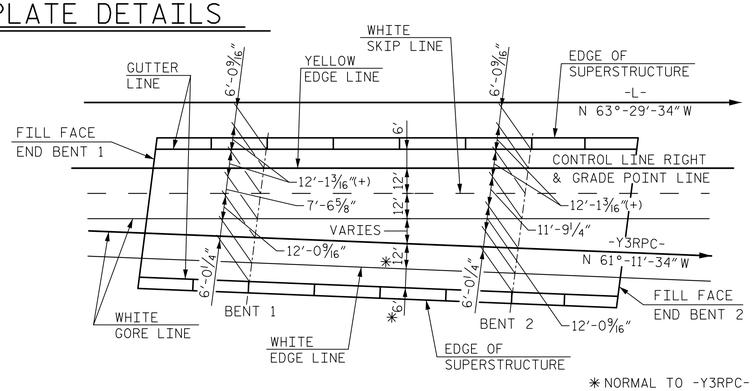
TYPE II - ELEVATION VIEW

COVER PLATE DETAILS



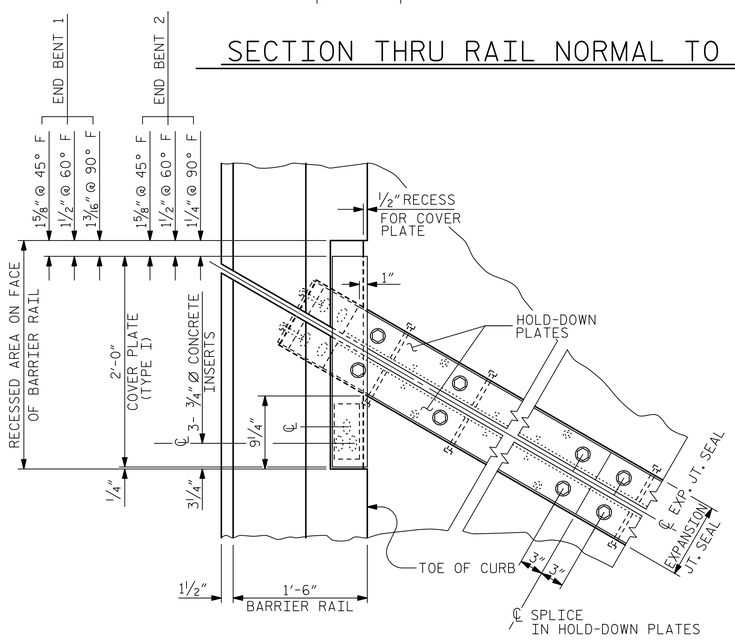


SECTION A - A



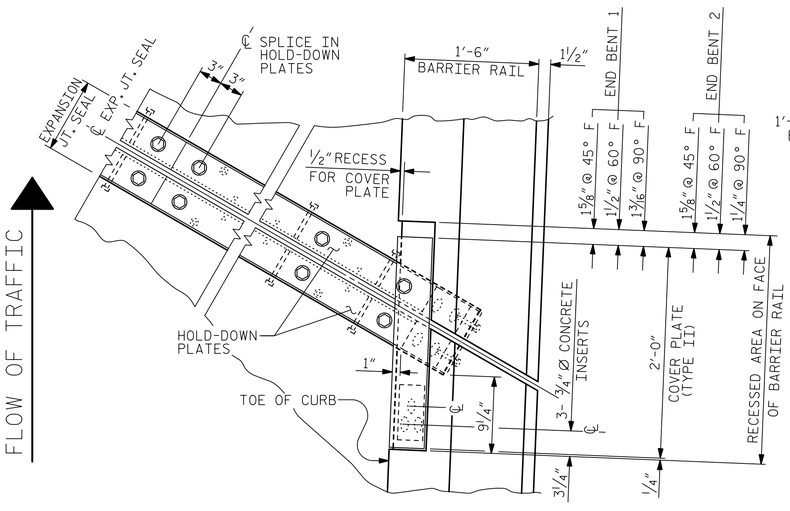
* NORMAL TO -Y3RPC-

SECTION THRU RAIL NORMAL TO JOINT

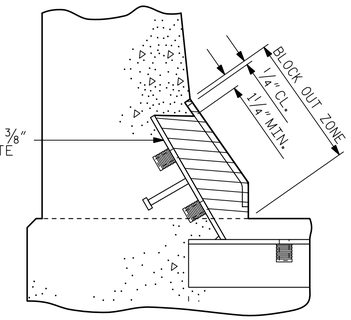


PLAN OF EXPANSION JOINT SEAL

FLOW OF TRAFFIC

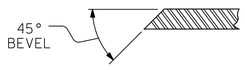


SECTION B - B



BLOCK OUT DETAIL

SEE "SECTION A - A" FOR OTHER DETAILS.



PAVEMENT MARKING ALIGNMENT

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins
A5ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

RIGHT LANE

ASSEMBLED BY : M. WRIGHT	DATE : 7/18
CHECKED BY : N. HART	DATE : 7/18
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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DRAWN BY	M. WRIGHT	DATE	7/18
CHECKED BY	N. HART	DATE	7/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 20

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-20
1			3			TOTAL SHEETS
2			4			36

STD. NO. EJS2

BILL OF MATERIAL

EPOXY COATED

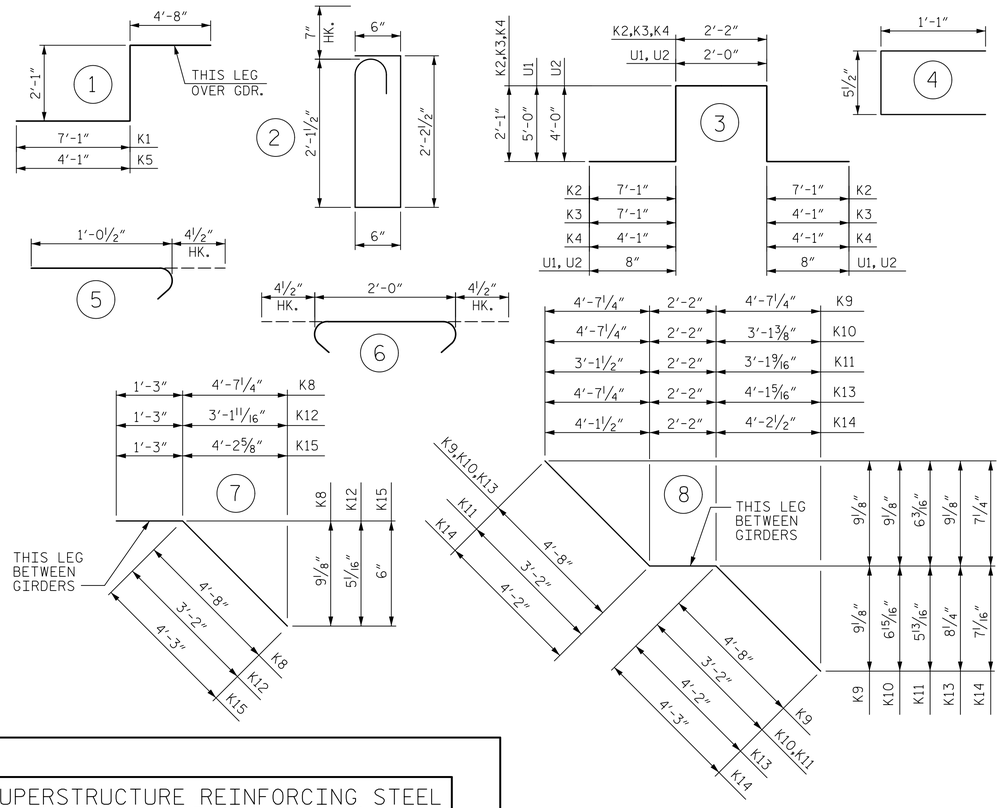
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A1	2	6	STR	4′-4″	13
A2	2	6	STR	8′-3″	25
A3	2	6	STR	12′-2″	37
A4	2	6	STR	16′-2″	49
A5	2	6	STR	20′-1″	60
A6	2	6	STR	24′-0″	72
A7	2	6	STR	28′-0″	84
A8	2	6	STR	31′-11″	96
A9	2	6	STR	35′-10″	108
A10	2	6	STR	39′-10″	120
A11	2	6	STR	43′-9″	131
A12	2	6	STR	47′-8″	143
A13	2	6	STR	51′-8″	155
A14	2	6	STR	55′-7″	167
A15	367	6	STR	29′-6″	16,261
A16	61	6	STR	31′-7″	2,894
A17	61	6	STR	32′-10″	3,008
A18	61	6	STR	34′-1″	3,123
A19	61	6	STR	35′-3″	3,230
A20	61	6	STR	36′-6″	3,344
A21	62	6	STR	37′-9″	3,515
B1	90	6	STR	41′-11″	5,666
B2	90	4	STR	18′-11″	1,137
B3	90	6	STR	40′-9″	5,509
B4	44	7	STR	49′-0″	4,407
B5	44	7	STR	37′-9″	3,395
B6	44	7	STR	39′-6″	3,552
B7	44	7	STR	29′-0″	2,608
G1	2	5	STR	29′-10	62
G2	2	5	STR	33′-8″	70
J1	114	4	5	1′-5″	108
K1	6	8	1	13′-10″	222
K2	16	8	3	20′-6″	876
K3	2	8	3	17′-6″	93
K4	2	8	3	14′-6″	77
K5	2	8	1	10′-10″	58
S1	88	5	2	5′-11″	543
S2	88	4	4	2′-8″	157
U1	64	4	3	13′-4″	570
U2	24	4	3	11′-4″	182
EPOXY COATED REINFORCING STEEL TOTAL:					65,927

BILL OF MATERIAL

UNCOATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A101	2	6	STR	4′-4″	13
A102	2	6	STR	8′-3″	25
A103	2	6	STR	12′-2″	37
A104	2	6	STR	16′-2″	49
A105	2	6	STR	20′-1″	60
A106	2	6	STR	24′-0″	72
A107	2	6	STR	28′-0″	84
A108	2	6	STR	31′-11″	96
A109	2	6	STR	35′-10″	108
A110	2	6	STR	39′-10″	120
A111	2	6	STR	43′-9″	131
A112	2	6	STR	47′-8″	143
A113	2	6	STR	51′-8″	155
A114	2	6	STR	55′-7″	167
A115	367	6	STR	29′-6″	16,261
A116	61	6	STR	31′-2″	2,856
A117	61	6	STR	32′-5″	2,970
A118	61	6	STR	33′-8″	3,085
A119	61	6	STR	34′-10″	3,191
A120	61	6	STR	36′-1″	3,306
A121	62	6	STR	37′-4″	3,477
B101	424	5	STR	49′-5″	21,854
K6	20	6	STR	7′-6″	225
K7	4	6	STR	3′-8″	22
K8	10	4	7	5′-11″	40
K9	30	4	8	11′-6″	230
K10	5	4	8	10′-0″	33
K11	5	4	8	8′-6″	28
K12	5	4	7	4′-5″	15
K13	5	4	8	11′-0″	37
K14	5	4	8	10′-7″	35
K15	5	4	7	5′-6″	18
K16	16	4	STR	5′-11″	63
K17	16	4	STR	7′-8″	82
K18	32	4	STR	8′-6″	182
K19	16	4	STR	7′-6″	80
K20	4	4	STR	2′-11″	8
K21	4	4	STR	4′-9″	13
K22	8	4	STR	5′-7″	30
K23	4	4	STR	4′-7″	12
K24	4	4	STR	5′-0″	13
K25	4	4	STR	6′-10″	18
K26	8	4	STR	7′-8″	41
K27	4	4	STR	6′-8″	18
S3	328	4	6	2′-9″	603
REINFORCING STEEL TOTAL:					60,106

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″			

SUPERSTRUCTURE BILL OF MATERIAL

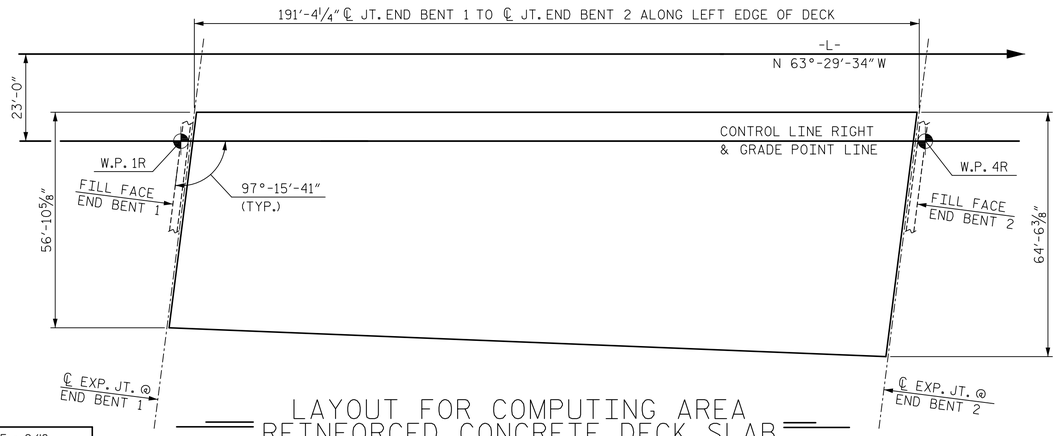
	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	74.2	60,106	65,927
POUR 2	208.4		
POUR 3	122.4		
TOTALS**	405.0	60,106	65,927

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE TYPICAL SECTION" SHEET 2 OF 2.

GROOVING BRIDGE FLOORS

APPROACH SLABS	2,611	SQ.FT.
BRIDGE DECK	10,236	SQ.FT.
TOTAL	12,847	SQ.FT.

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



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 11,617)

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SUPERSTRUCTURE BILL OF MATERIAL
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-21
1			3			TOTAL SHEETS
2			4			36

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DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 21

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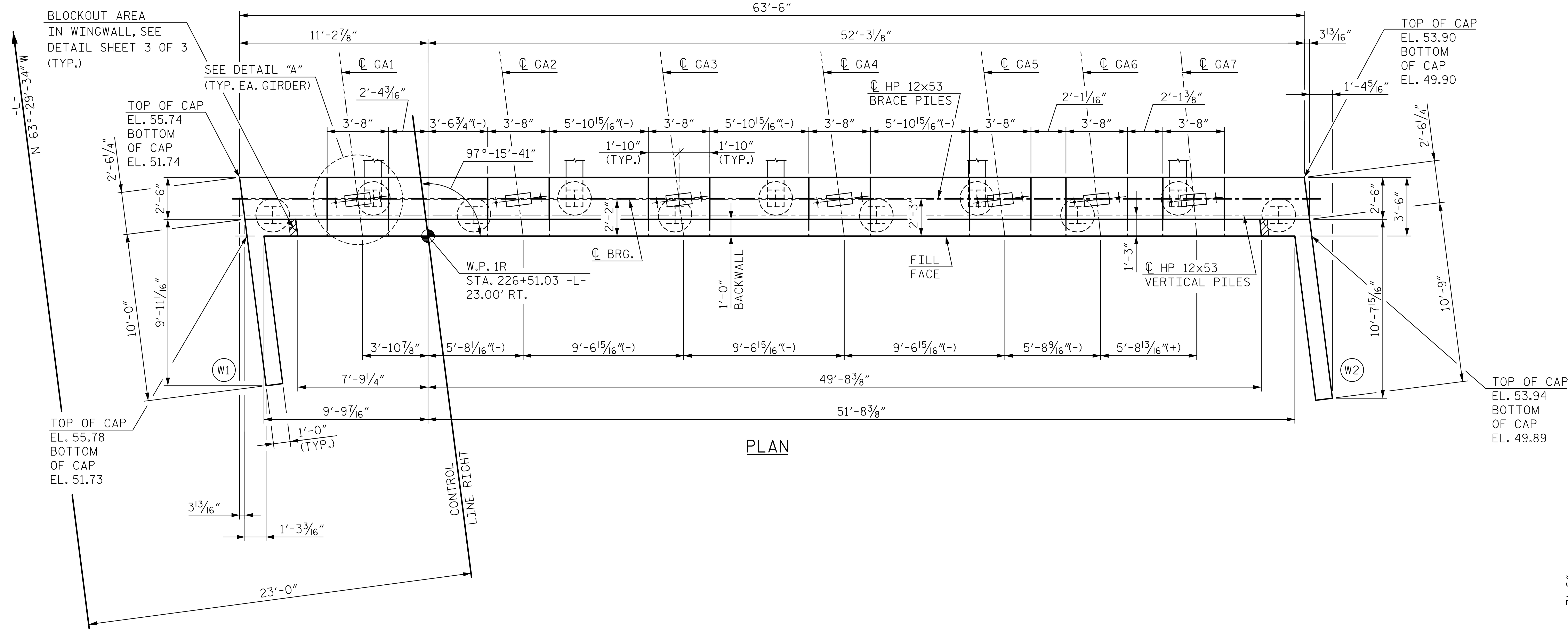
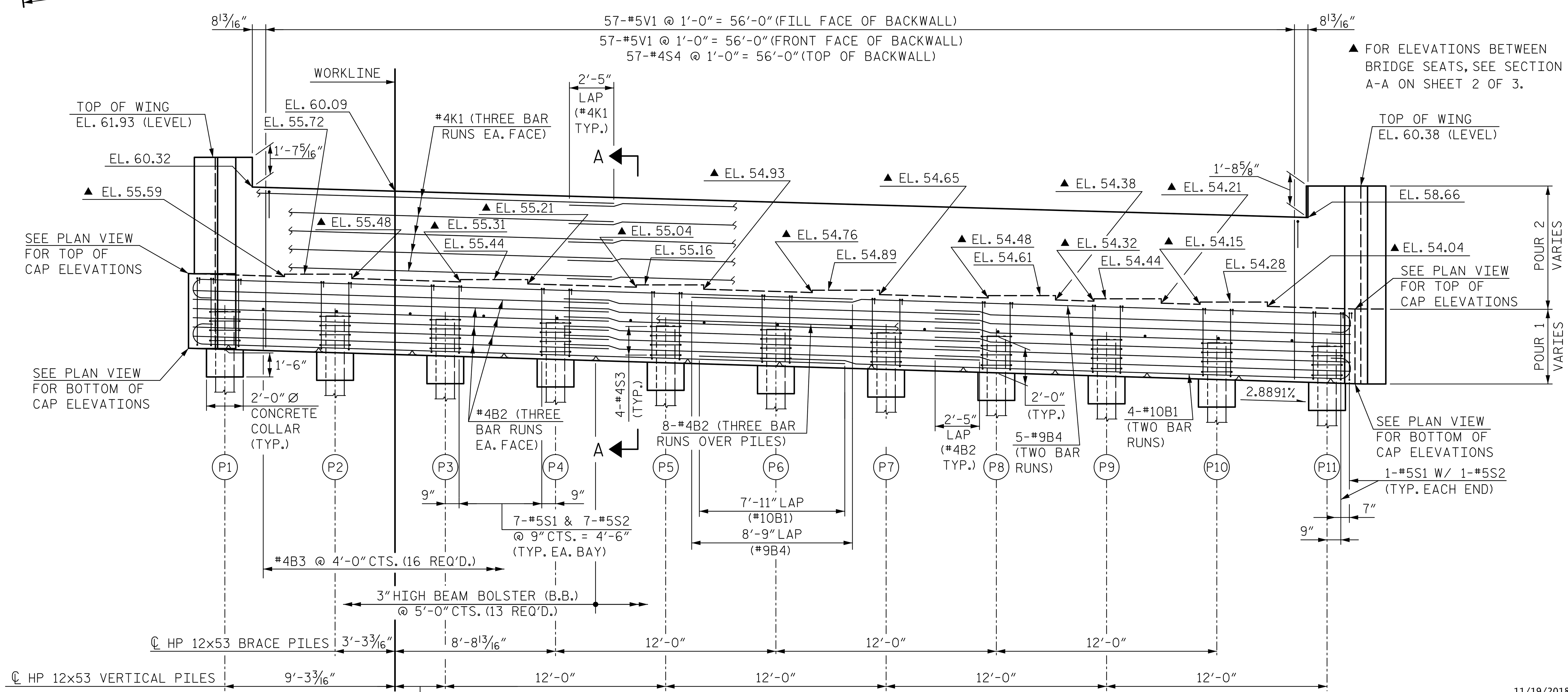
ASSEMBLED BY : M. WRIGHT	DATE : 9/18	
CHECKED BY : N. HART	DATE : 9/18	
DRAWN BY : JMB 5/87	REV. 5/1/06	TLA/GM
CHECKED BY : SJD 9/87	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC

STD. NO. BOM2



PLAN



ELEVATION

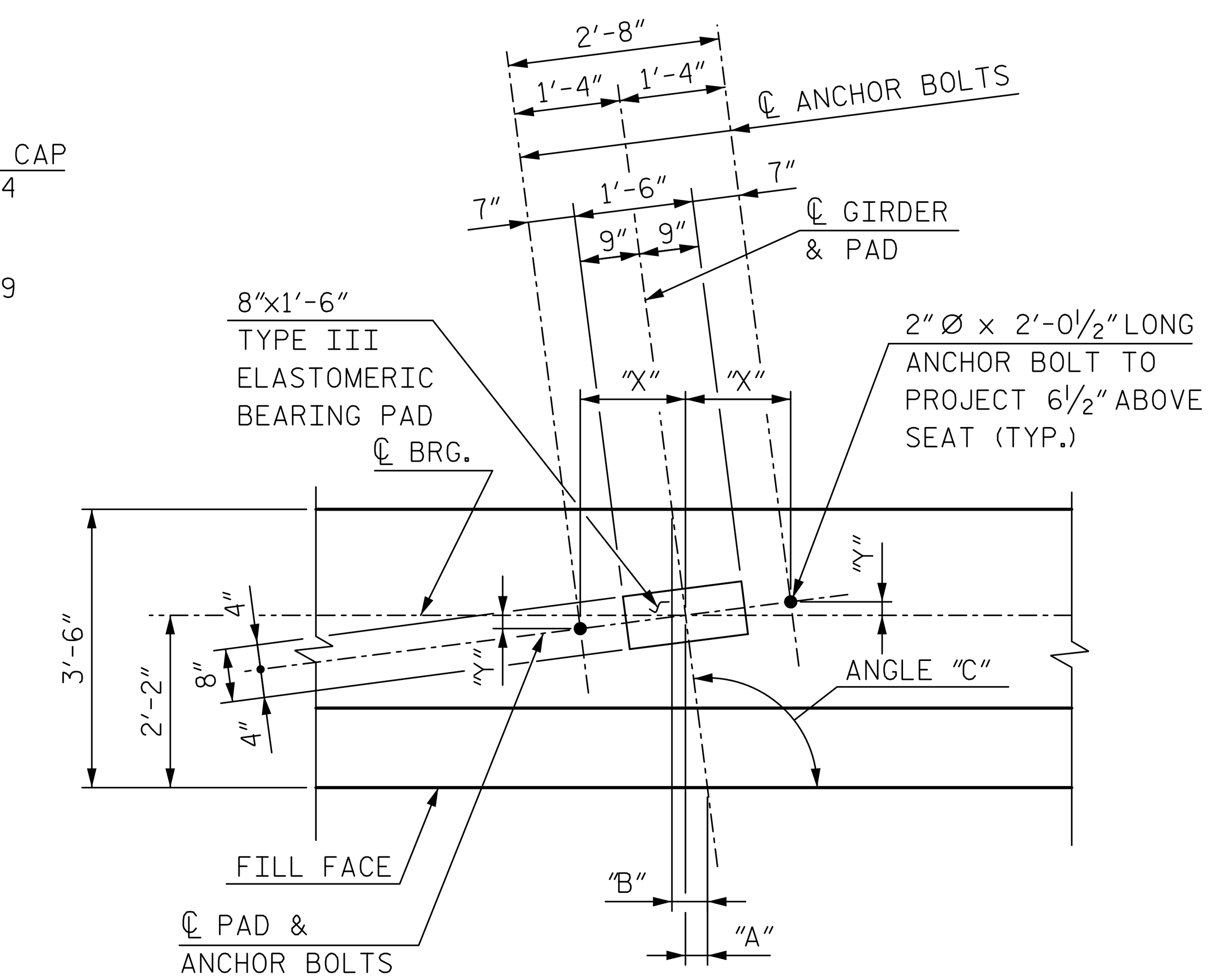
NOTES:

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.

GIRDER	"A"	"B"	ANGLE "C"	"X"	"Y"
GA1	3 5/16"	5 3/8"	97°-15'-41"	1'-3 7/8"	2"
GA2	3 5/16"	5 3/8"	97°-15'-41"	1'-3 7/8"	2"
GA3	3 5/16"	5 3/8"	97°-15'-41"	1'-3 7/8"	2"
GA4	3 5/16"	5 3/8"	97°-15'-41"	1'-3 7/8"	2"
GA5	3 5/16"	5 3/8"	97°-15'-41"	1'-3 7/8"	2"
GA6	2 13/16"	4 1/2"	96°-07'-25"	1'-3 15/16"	1 11/16"
GA7	2 1/4"	3 5/8"	94°-57'-41"	1'-3 15/16"	1 3/8"



DETAIL A

TOP OF PILE ELEVATIONS	
P1	53.68
P2	53.51
P3	53.34
P4	53.16
P5	52.99
P6	52.82
P7	52.64
P8	52.47
P9	52.30
P10	52.12
P11	51.95

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 1 OF 3

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27812 DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

RIGHT LANE

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DRAWN BY C. GERDING DATE 9/18
CHECKED BY N. SALAS ZAMUDIO DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 22

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

SHEET NO. S8-22

TOTAL SHEETS 36

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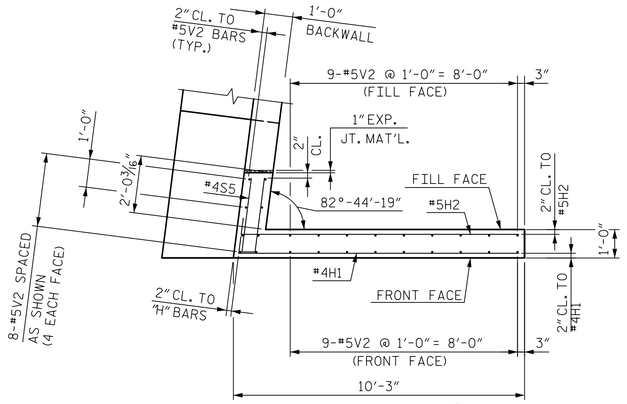
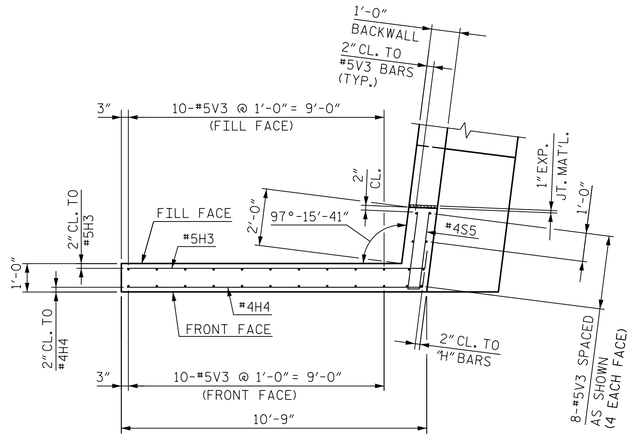


PLAN OF WING (W1)

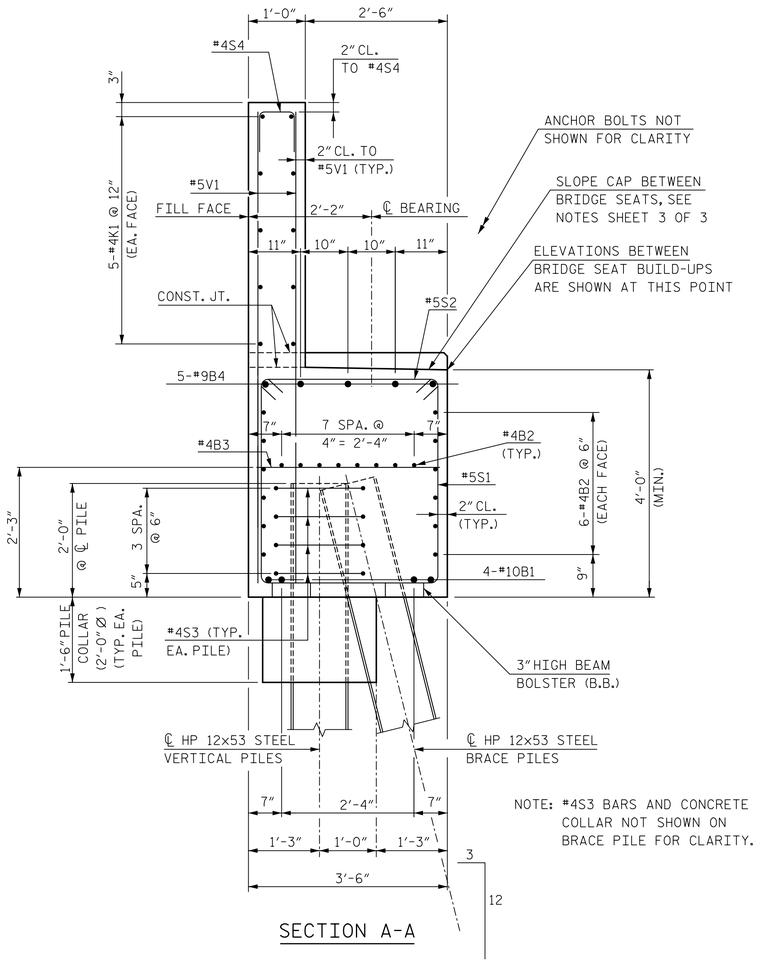


PLAN OF WING (W2)

NOTES:

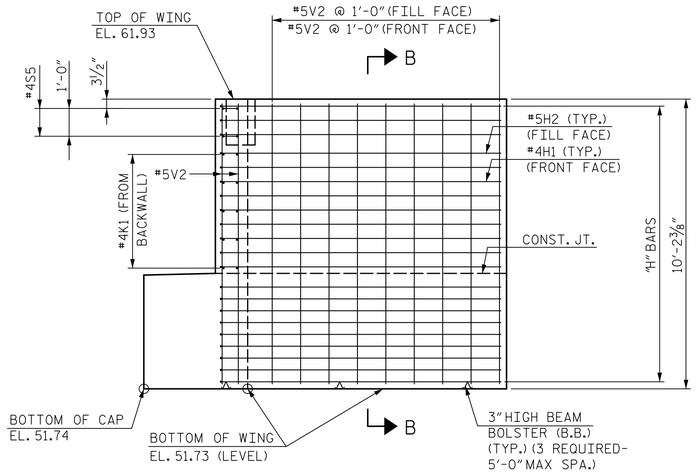
FOR NOTES, SEE SHEET 3 OF 3.

FOR BLOCKOUT IN WINGWALL, SEE SHEET 3 OF 3.

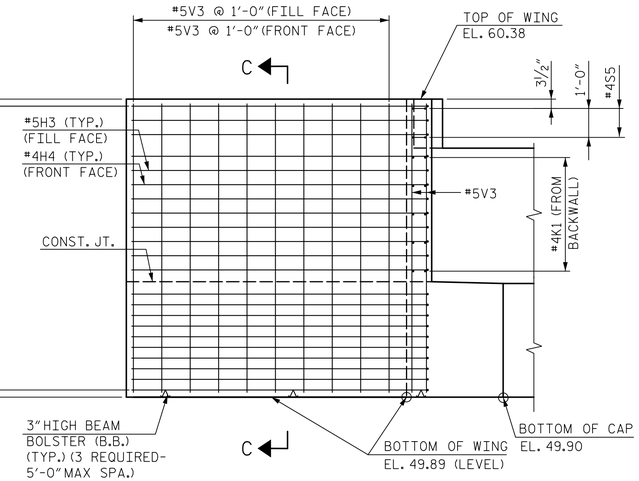


NOTE: #4S3 BARS AND CONCRETE COLLAR NOT SHOWN ON BRACE PILE FOR CLARITY.

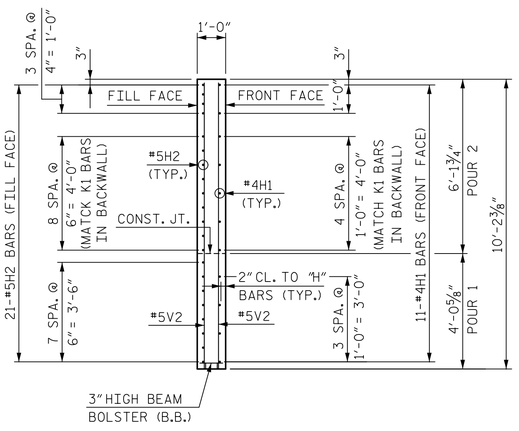
SECTION A-A



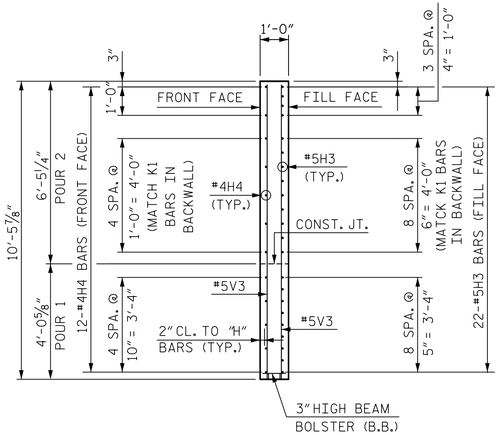
ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION B-B



SECTION C-C

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11/19/2018

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

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

DRAWN BY C. GERDING DATE 9/18
CHECKED BY N. SALAS ZAMUDIO DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 23

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 3

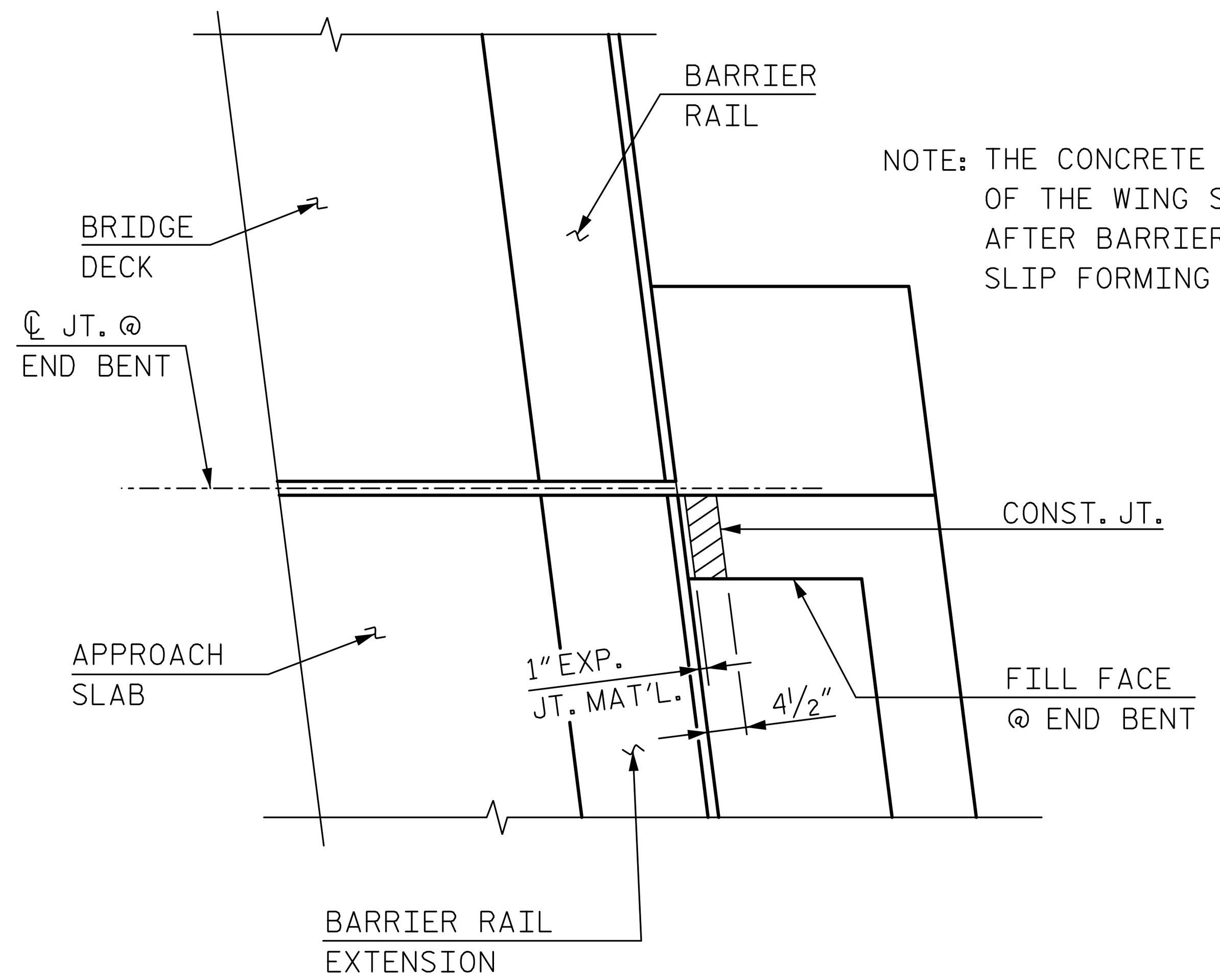
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

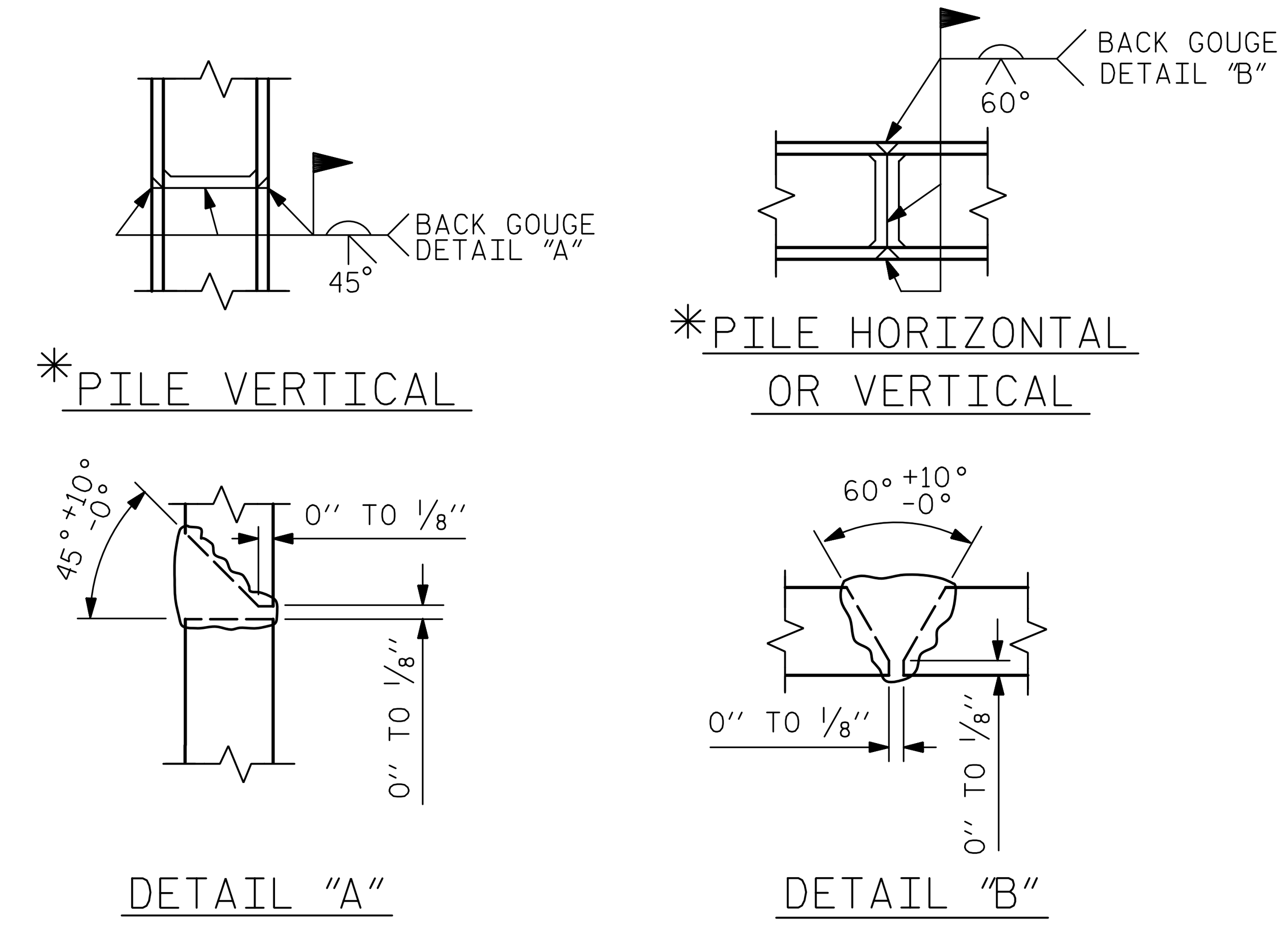
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-23
1			3			TOTAL SHEETS
2			4			36



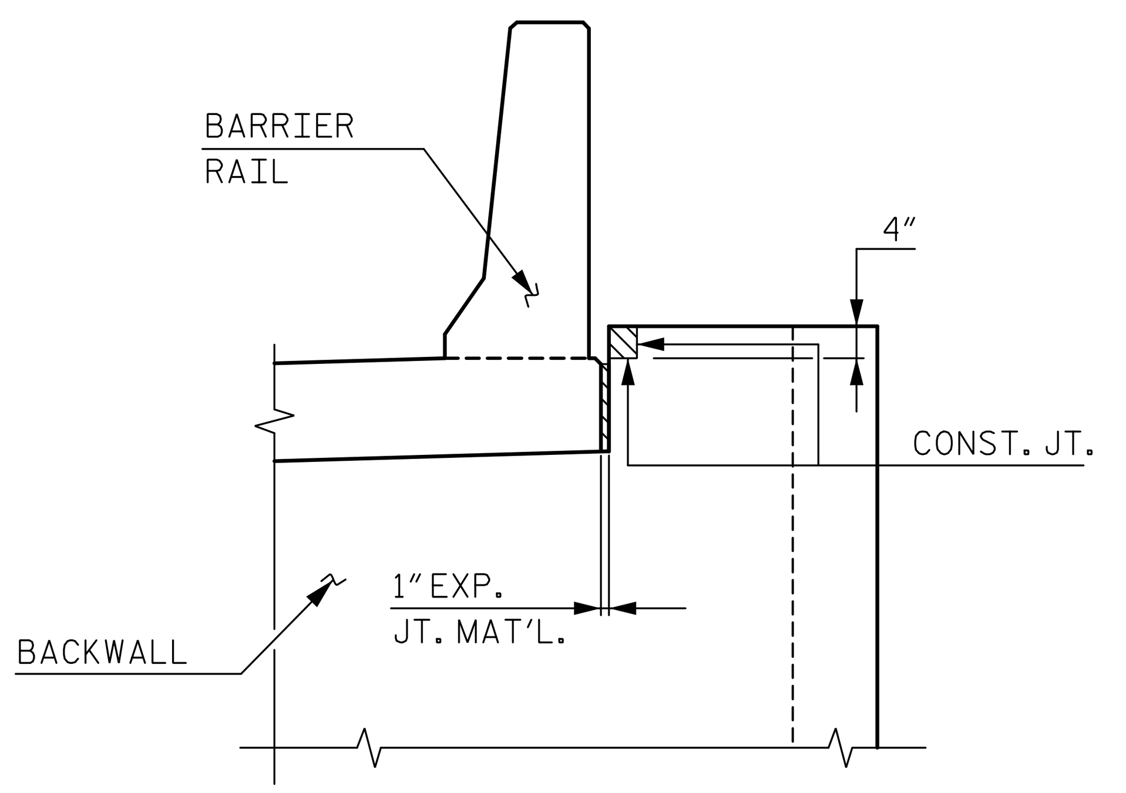
PLAN

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



* POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



ELEVATION

BLOCKOUT IN WINGWALL

NOTES:

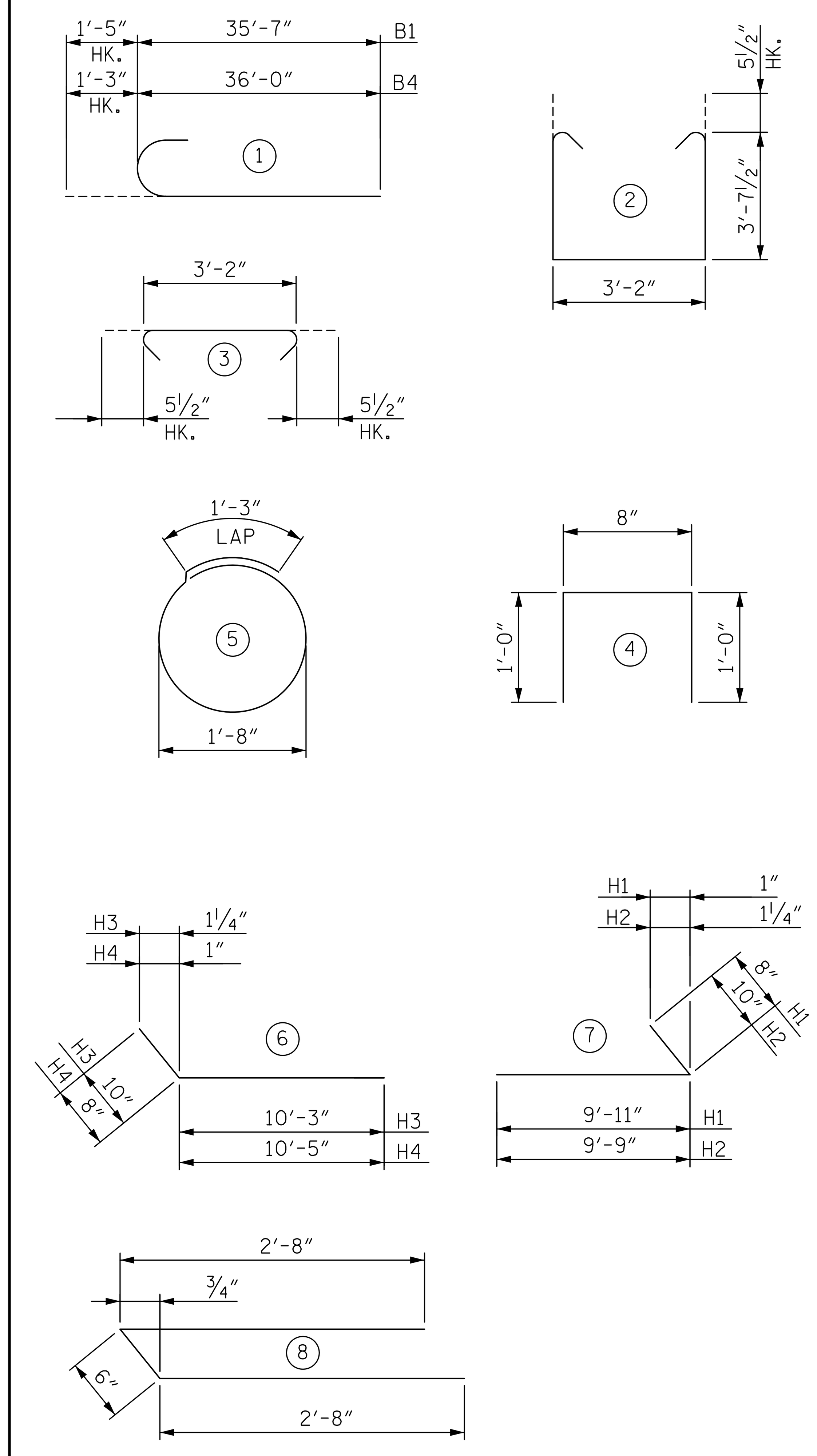
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

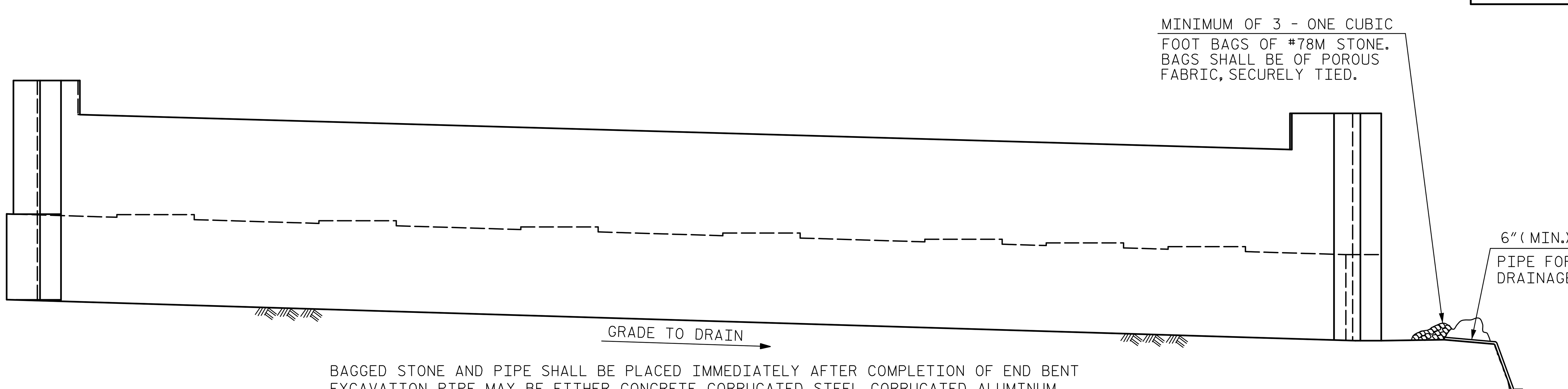
BILL OF REINFORCING

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	37'-0"	1,274
B2	60	4	STR	22'-9"	912
B3	16	4	STR	3'-2"	34
B4	10	9	1	37'-3"	1,267
H1	11	4	7	10'-7"	78
H2	21	5	7	10'-7"	232
H3	22	5	6	11'-1"	254
H4	12	4	6	11'-1"	89
K1	30	4	STR	22'-9"	456
S1	74	5	2	11'-4"	875
S2	74	5	3	4'-1"	315
S3	44	4	5	6'-6"	191
S4	57	4	4	2'-8"	102
S5	4	4	8	5'-10"	16
V1	114	5	STR	8'-4"	991
V2	26	5	STR	9'-9"	264
V3	28	5	STR	9'-11"	290

QUANTITIES

REINFORCING STEEL	LBS.	7,640
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP, BOT. OF WINGS & COLLARS	CU. YDS.	38.4
POUR 2 - TOP OF WINGS & BACKWALL	CU. YDS.	24.0
TOTAL	CU. YDS.	62.4
HP 12x53 STEEL PILES	NO.	11
	LIN. FT.	770
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

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 3 OF 3

DocuSigned by: David W. Hawkins

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

RIGHT LANE

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
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DWG. NO. 24

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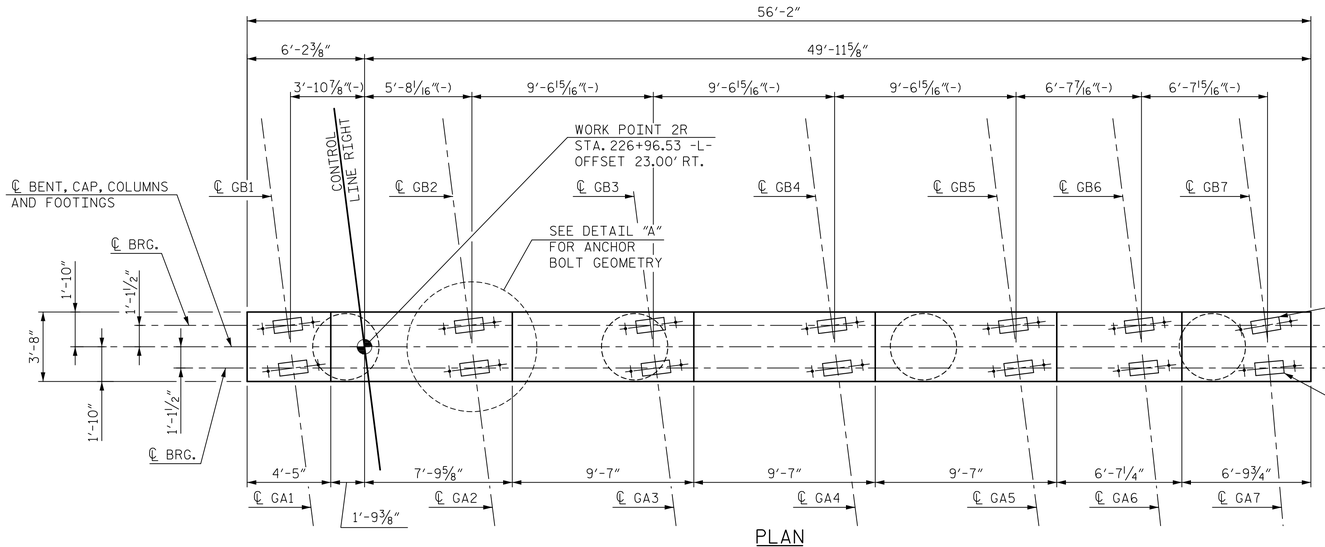
REVISIONS

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

SHEET NO. S8-24

TOTAL SHEETS 36



PLAN

DETAIL A DIMENSION TABLE						
	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ
GDR 1 THRU 5	97°-15'-41"	2"	1'-3 3/8"	1 1/16"	1 11/16"	1'-1 5/8"
GDR 6	96°-07'-25"	1 11/16"	1'-3 15/16"	1 5/16"	1 7/16"	1'-1 9/16"
GDR 7	94°-57'-41"	1 3/8"	1'-3 15/16"	3/4"	1 3/16"	1'-1 9/16"

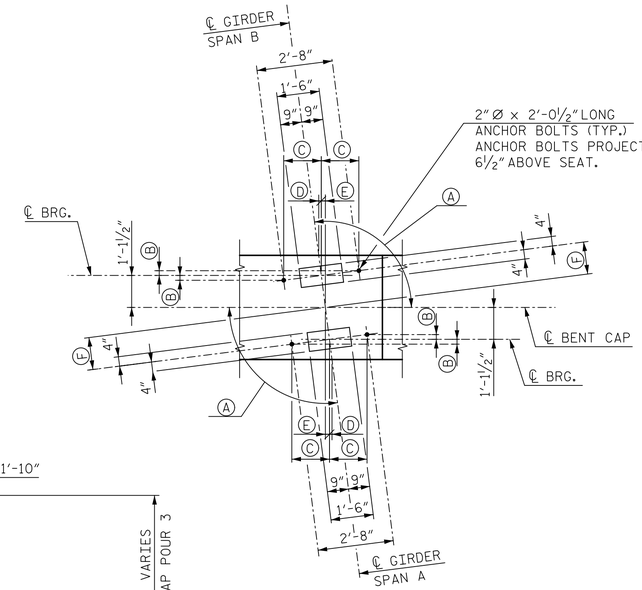
NOTES:

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

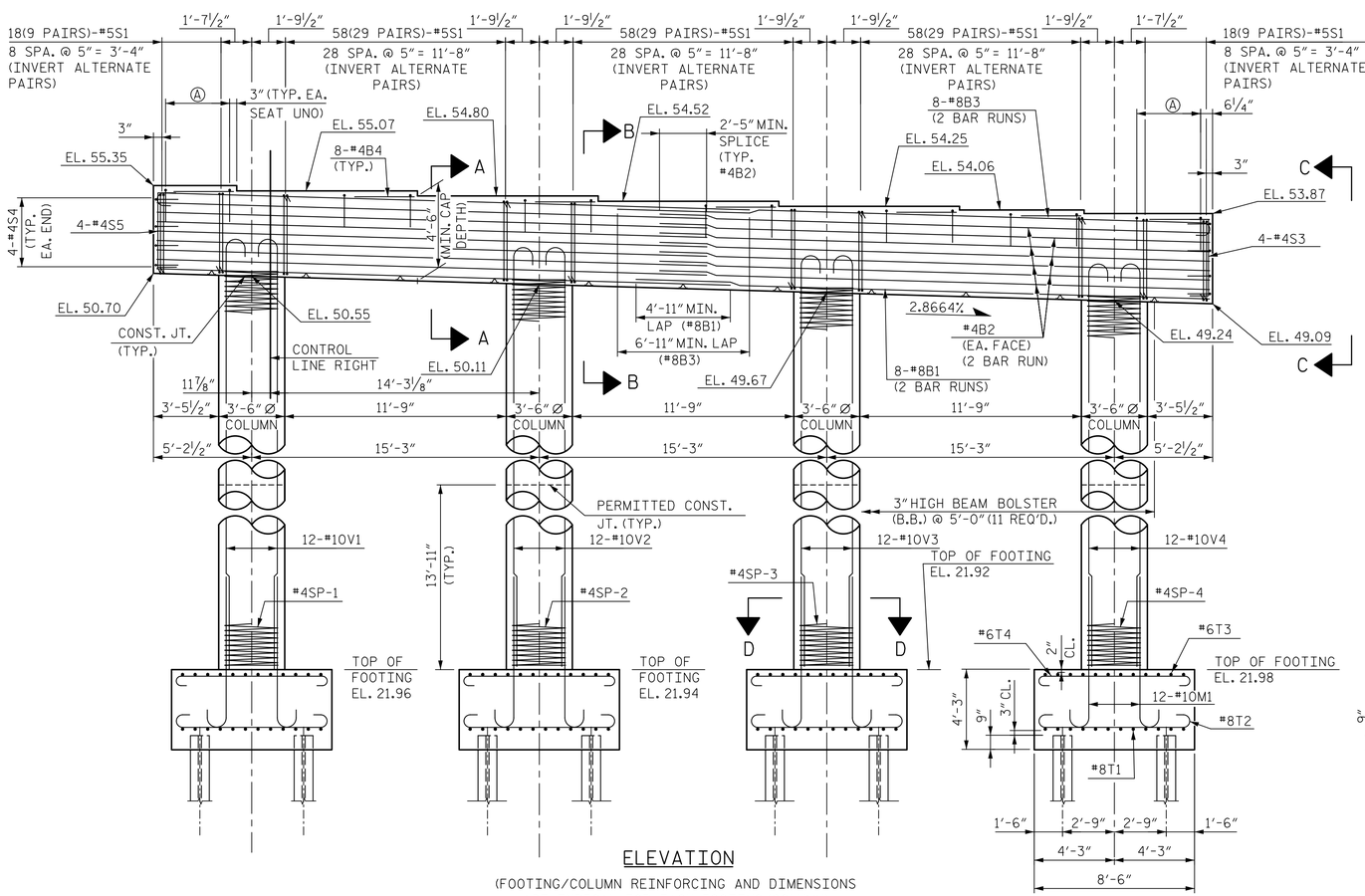
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

FOR PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 1" SHEET 3 OF 3.

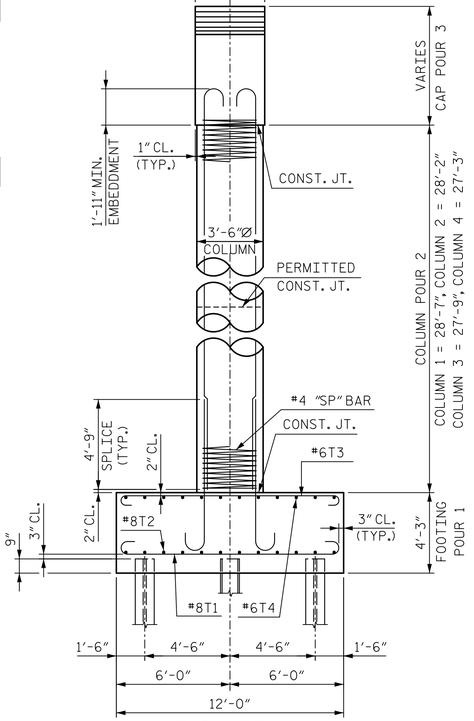


DETAIL A



ELEVATION

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



END VIEW

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8ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

RIGHT LANE

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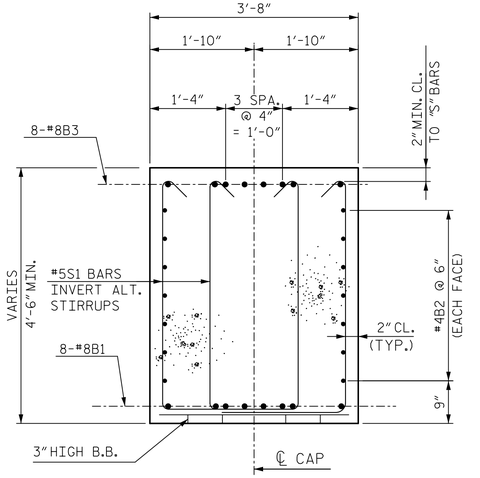
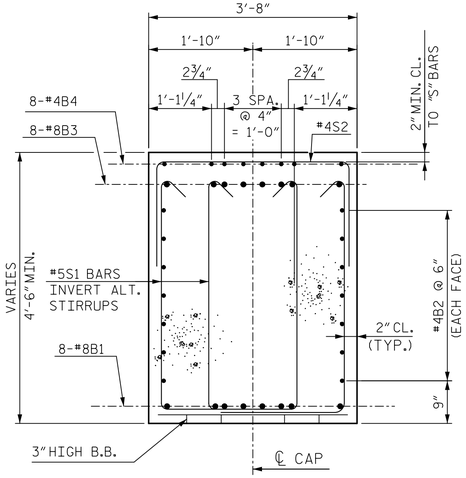
CHECKED BY	N. HART	DATE	9/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

DWG. NO. 25

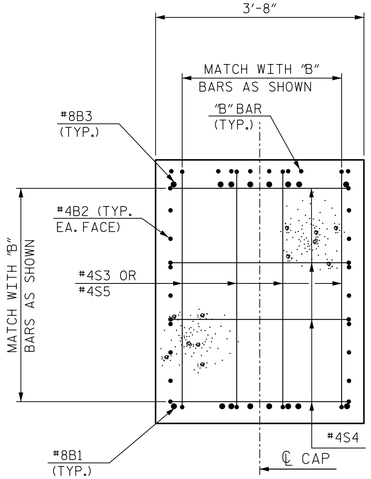
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-25
1			3			TOTAL SHEETS
2			4			36



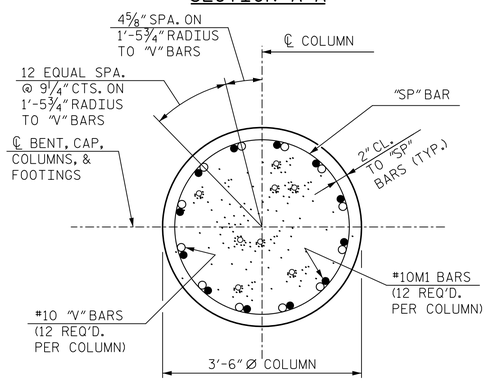
SECTION A-A



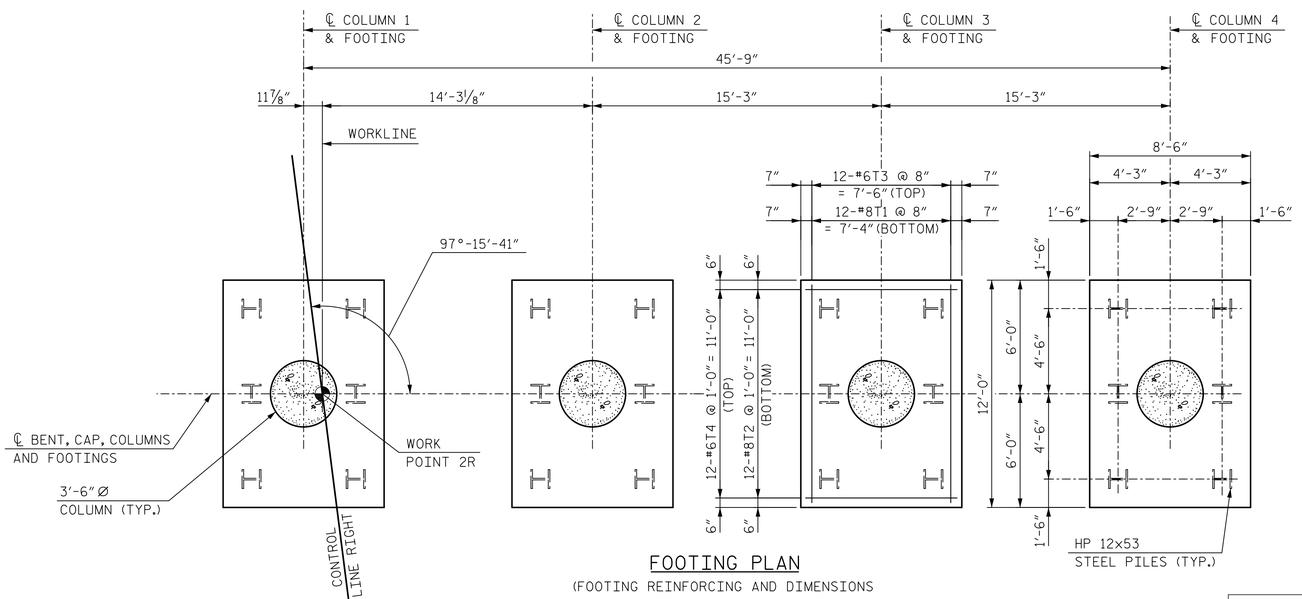
SECTION B-B



SECTION C-C



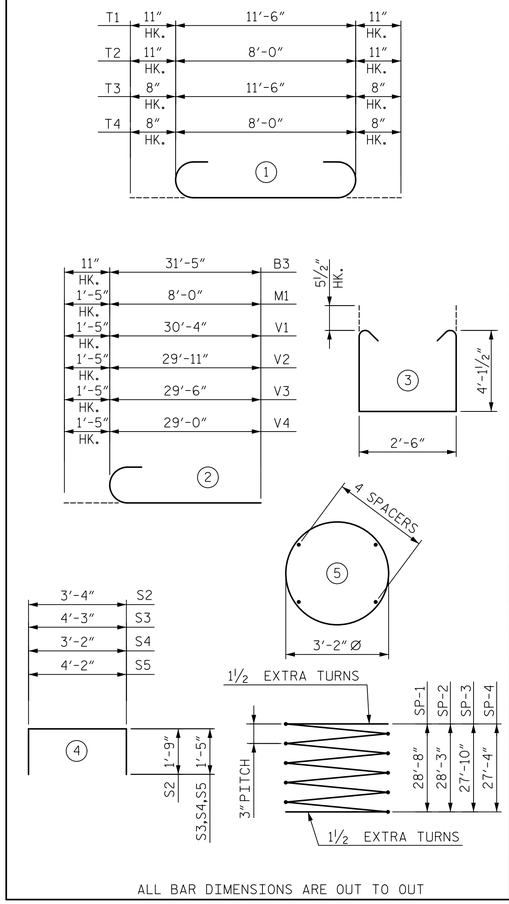
SECTION D-D



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	16	8	STR	30′-5″	1,299
B2	28	4	STR	29′-2″	546
B3	16	8	2	32′-4″	1,381
B4	56	4	STR	3′-2″	118
M1	48	10	2	9′-5″	1,945
S1	210	5	3	11′-8″	2,555
S2	56	4	4	6′-10″	256
S3	4	4	4	7′-1″	19
S4	8	4	4	6′-0″	32
S5	4	4	4	7′-0″	19
T1	48	8	1	13′-4″	1,709
T2	48	8	1	9′-10″	1,260
T3	48	6	1	12′-10″	925
T4	48	6	1	9′-4″	673
V1	12	10	2	31′-9″	1,639
V2	12	10	2	31′-4″	1,618
V3	12	10	2	30′-11″	1,596
V4	12	10	2	30′-5″	1,571
SP-1	1	*	5	1,158′-10″	774
SP-2	1	*	5	1,139′-2″	761
SP-3	1	*	5	1,129′-5″	754
SP-4	1	*	5	1,109′-9″	741

QUANTITIES

REINFORCING STEEL	LBS.	19,161
SPIRAL COLUMN REINFORCING STEEL	LBS.	3,030
CLASS A CONCRETE		
FOOTING POUR 1	CU. YDS.	64.2
COLUMN POUR 2	CU. YDS.	39.8
CAP POUR 3	CU. YDS.	35.5
TOTAL	CU. YDS.	139.5
HP 12x53 STEEL PILES	NO.	24
	LIN. FT.	1,680
FOUNDATION EXCAVATION FOR BENT	LUMP SUM	LUMP SUM
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	24
PILE REDRIVES	NO.	12

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

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 2

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NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

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DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 26

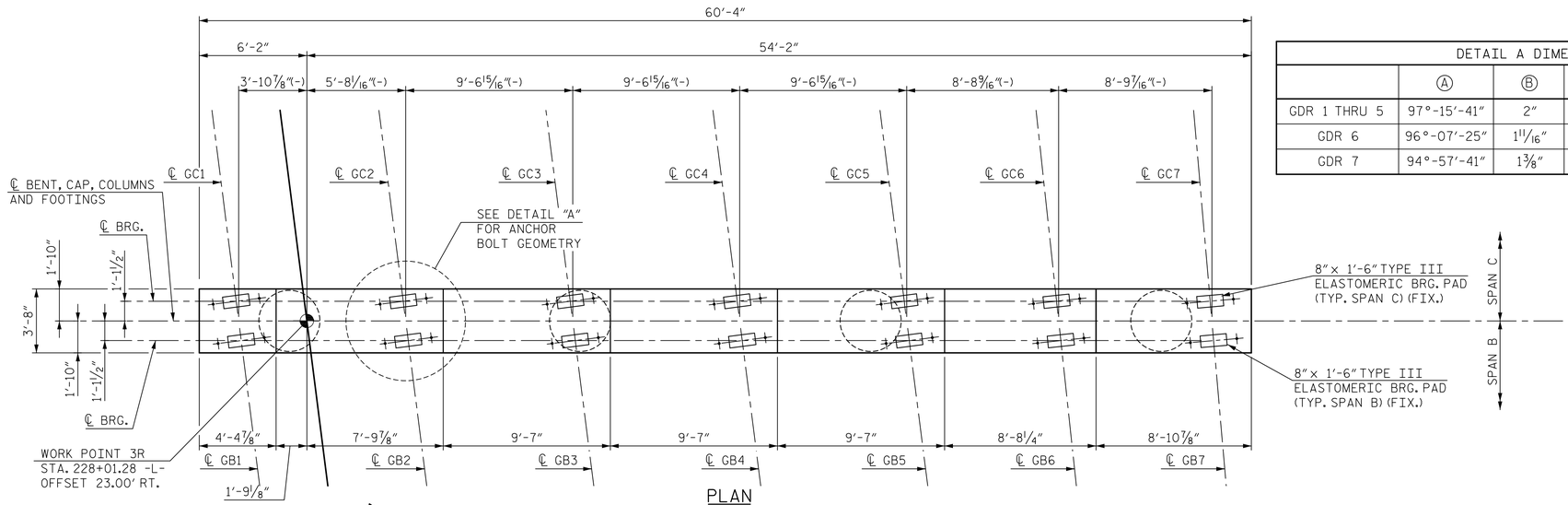
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

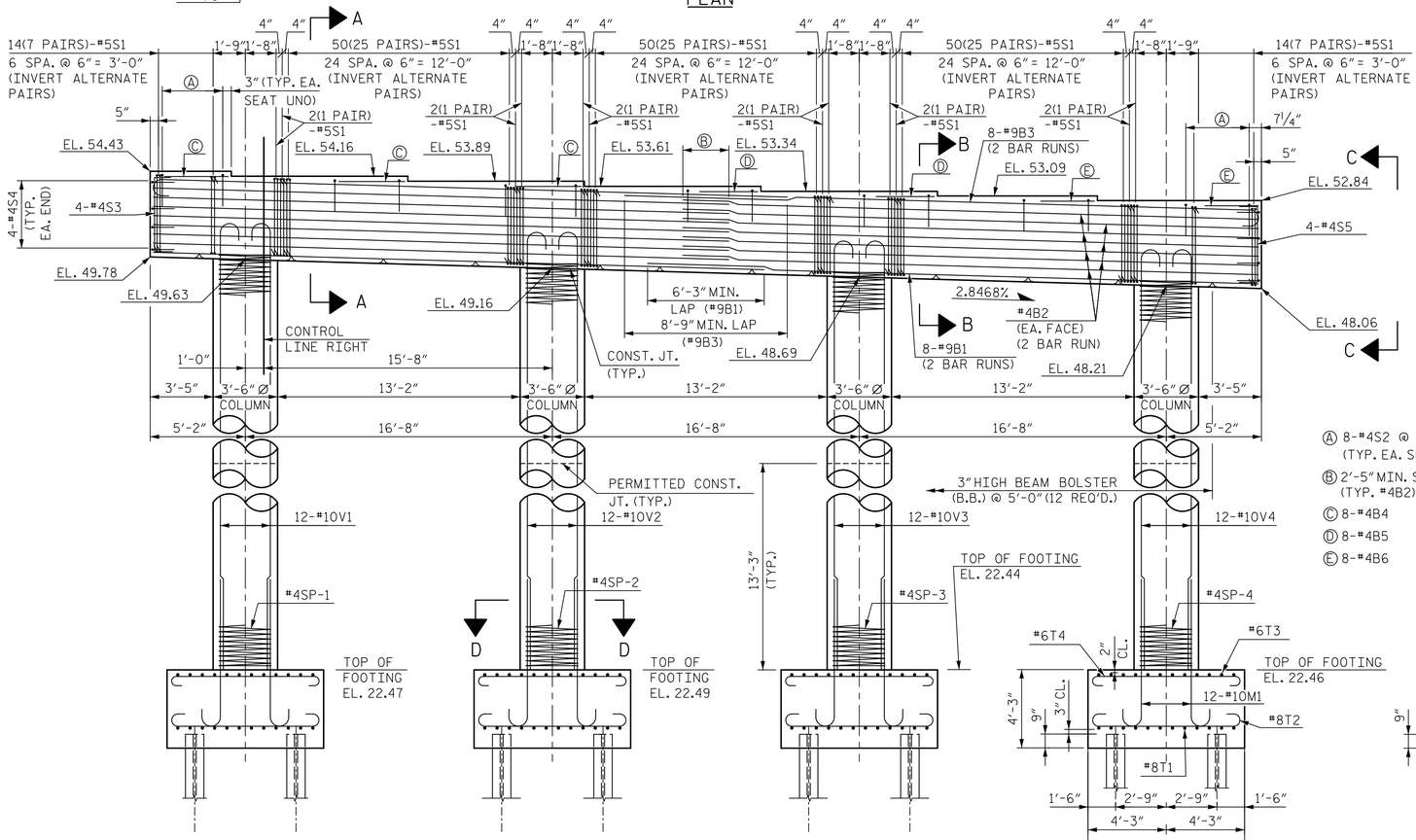
BENT 1

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-26
1			3			TOTAL SHEETS
2			4			36



PLAN

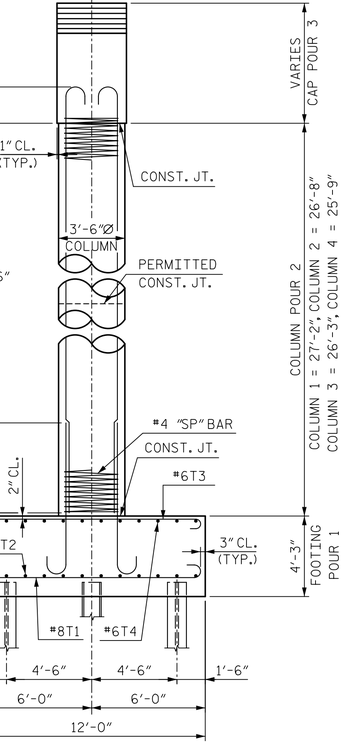


ELEVATION

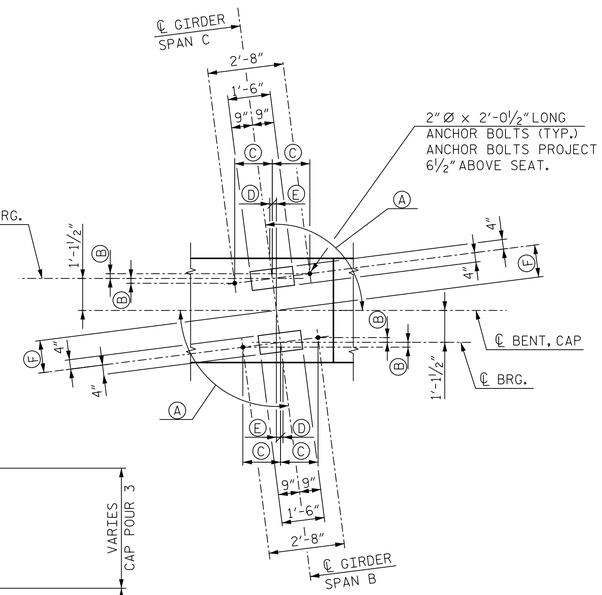
(FOOTING/COLUMN REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING/COLUMN)

DETAIL A DIMENSION TABLE						
	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ
GDR 1 THRU 5	97°-15'-41"	2"	1'-3 7/8"	1 1/16"	1 11/16"	1'-1 5/8"
GDR 6	96°-07'-25"	1 11/16"	1'-3 15/16"	15/16"	1 7/16"	1'-1 9/16"
GDR 7	94°-57'-41"	1 3/8"	1'-3 15/16"	3/4"	1 3/16"	1'-1 9/16"

Ⓐ 8-#4S2 @ 6" CTS. = 3'-6" (TYP. EA. SEAT UNO)
Ⓑ 2'-5" MIN. SPLICE (TYP. #4B2)
Ⓒ 8-#4B4
Ⓓ 8-#4B5
Ⓔ 8-#4B6



END VIEW



DETAIL A

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 PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 1" SHEET 3 OF 3.

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NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-27
1			3			TOTAL SHEETS
2			4			36

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DWG. NO. 27

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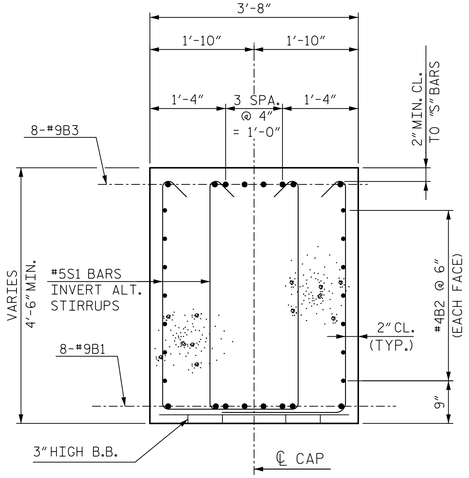
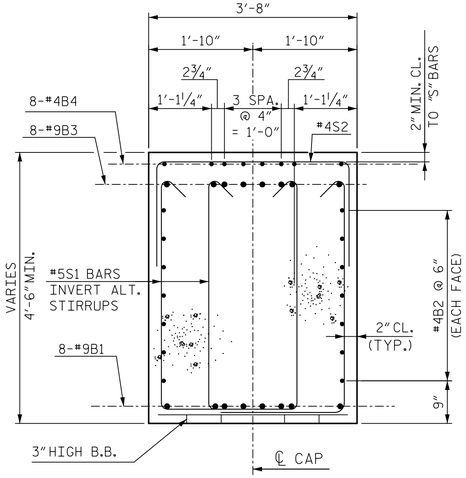
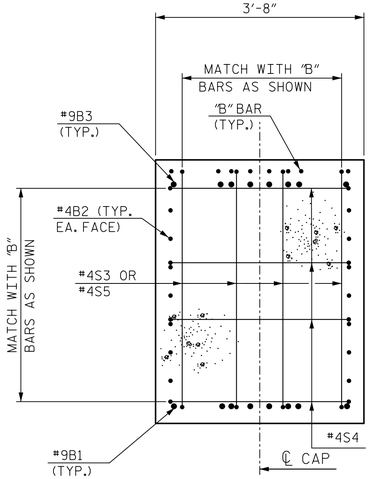


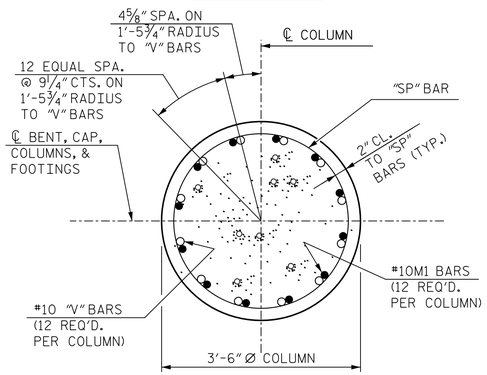
SECTION A-A



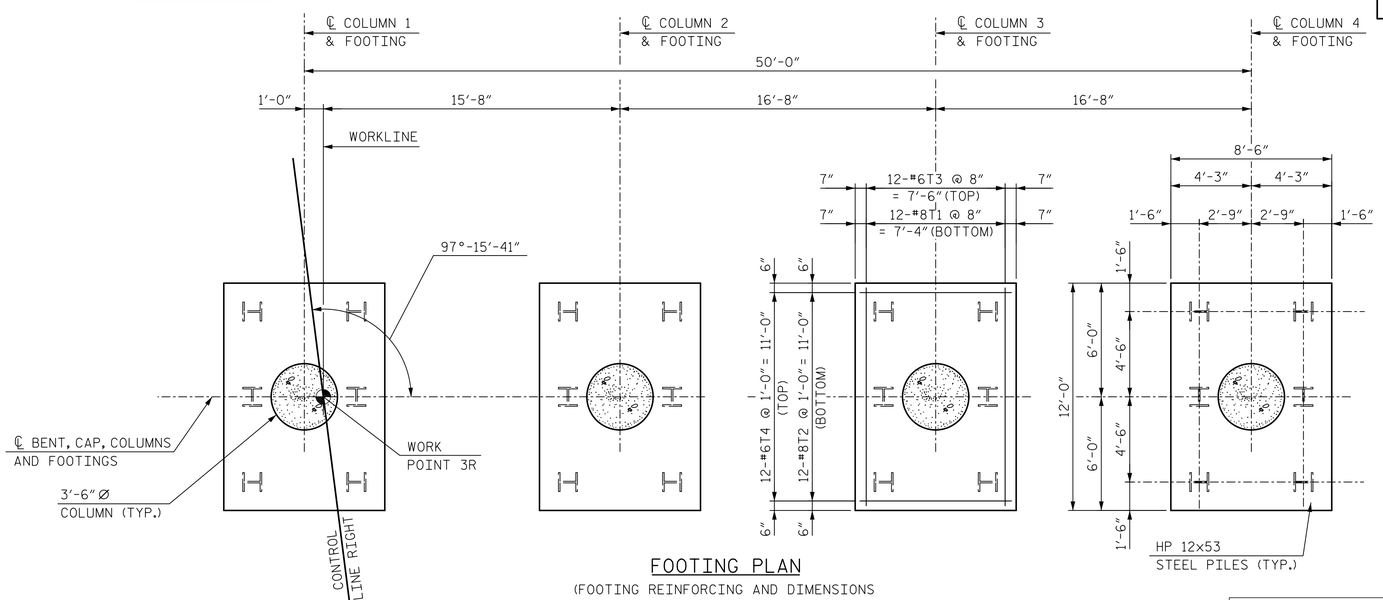
SECTION B-B



SECTION C-C



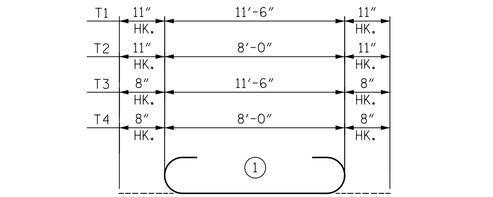
SECTION D-D

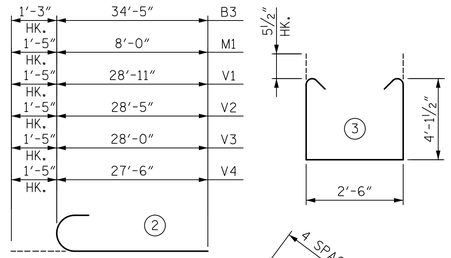


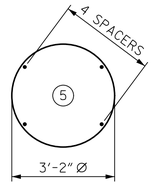
FOOTING PLAN

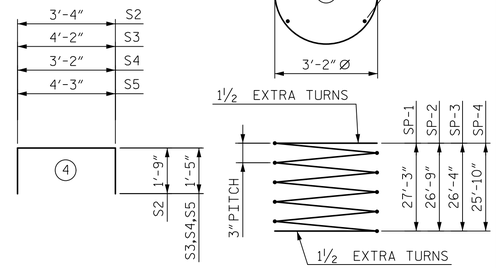
(FOOTING REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING)

BAR TYPES









ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	9	STR	33′-2″	1,804
B2	28	4	STR	31′-3″	585
B3	16	9	2	35′-8″	1,940
B4	24	4	STR	3′-7″	57
B5	16	4	STR	3′-2″	34
B6	16	4	STR	2′-11″	31
M1	48	10	2	9′-5″	1,945
S1	190	5	3	11′-8″	2,312
S2	56	4	4	6′-10″	256
S3	4	4	4	7′-0″	19
S4	8	4	4	6′-0″	32
S5	4	4	4	7′-1″	19
T1	48	8	1	13′-4″	1,709
T2	48	8	1	9′-10″	1,260
T3	48	6	1	12′-10″	925
T4	48	6	1	9′-4″	673
V1	12	10	2	30′-4″	1,566
V2	12	10	2	29′-10″	1,540
V3	12	10	2	29′-5″	1,519
V4	12	10	2	28′-11″	1,493
SP-1	1	✳	5	1,099′-11″	735
SP-2	1	✳	5	1,080′-3″	722
SP-3	1	✳	5	1,070′-5″	715
SP-4	1	✳	5	1,050′-10″	702

QUANTITIES

REINFORCING STEEL	LBS.	19,719
SPIRAL COLUMN REINFORCING STEEL	LBS.	2,874
CLASS A CONCRETE		
FOOTING POUR 1	CU. YDS.	64.2
COLUMN POUR 2	CU. YDS.	37.7
CAP POUR 3	CU. YDS.	38.1
TOTAL	CU. YDS.	140.0
HP 12x53 STEEL PILES	NO.	24
	LIN. FT.	1,680
FOUNDATION EXCAVATION FOR BENT	LUMP SUM	LUMP SUM
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	24
PILE REDRIVES	NO.	12

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

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 2

DocuSigned by: David W. Hawkins

11/19/2018

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

HNTB NORTH CAROLINA, P.C.
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DRAWN BY M. WRIGHT DATE 9/18
CHECKED BY N. HART DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 28

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

RIGHT LANE

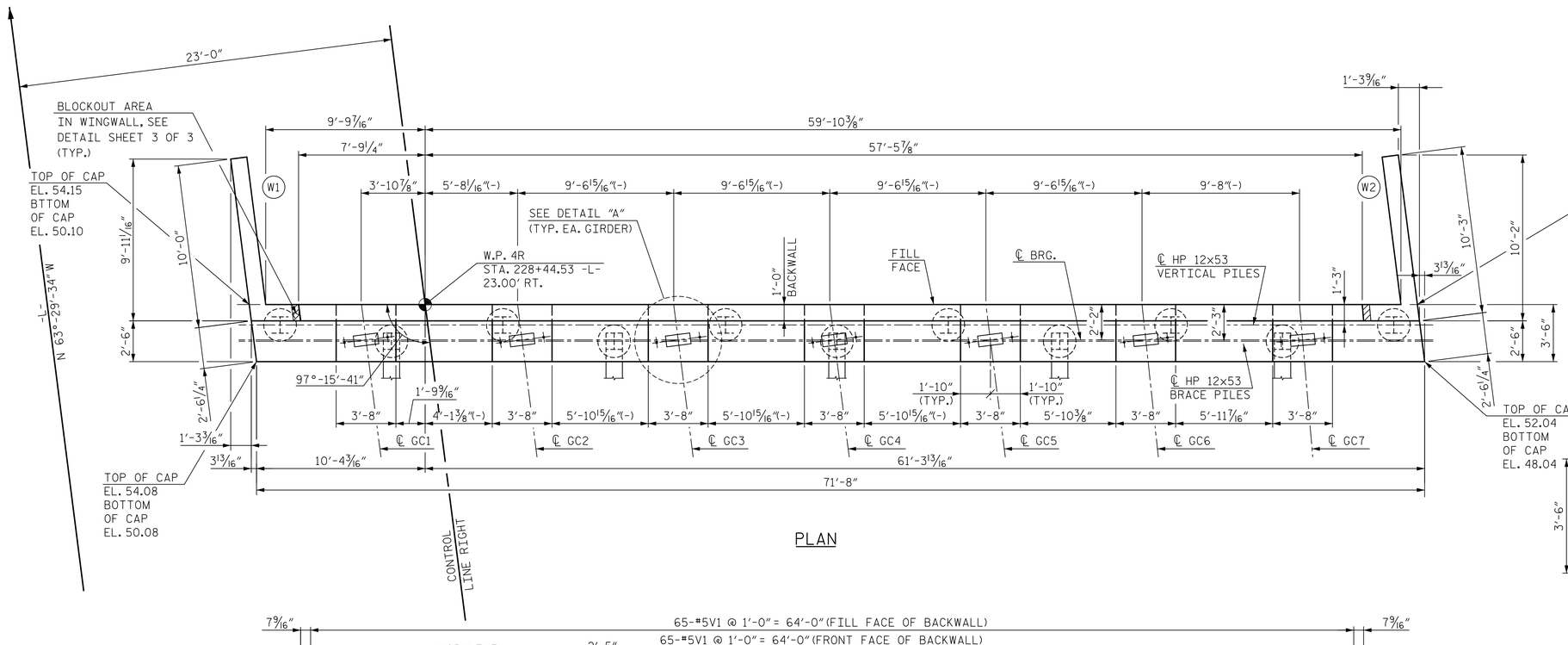
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-28
1			3			TOTAL SHEETS
2			4			36

NOTES:

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

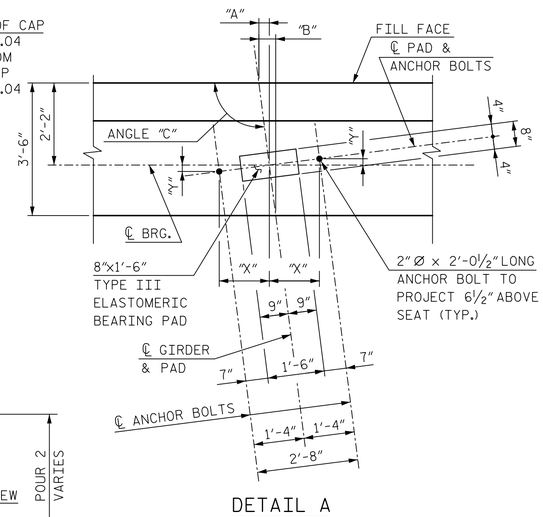
FOR WINGWALL DETAILS AND SECTION A-A, SEE SHEET 2 OF 3.

INDICATES 3:12 PILE BATTER IN DIRECTION SHOWN.



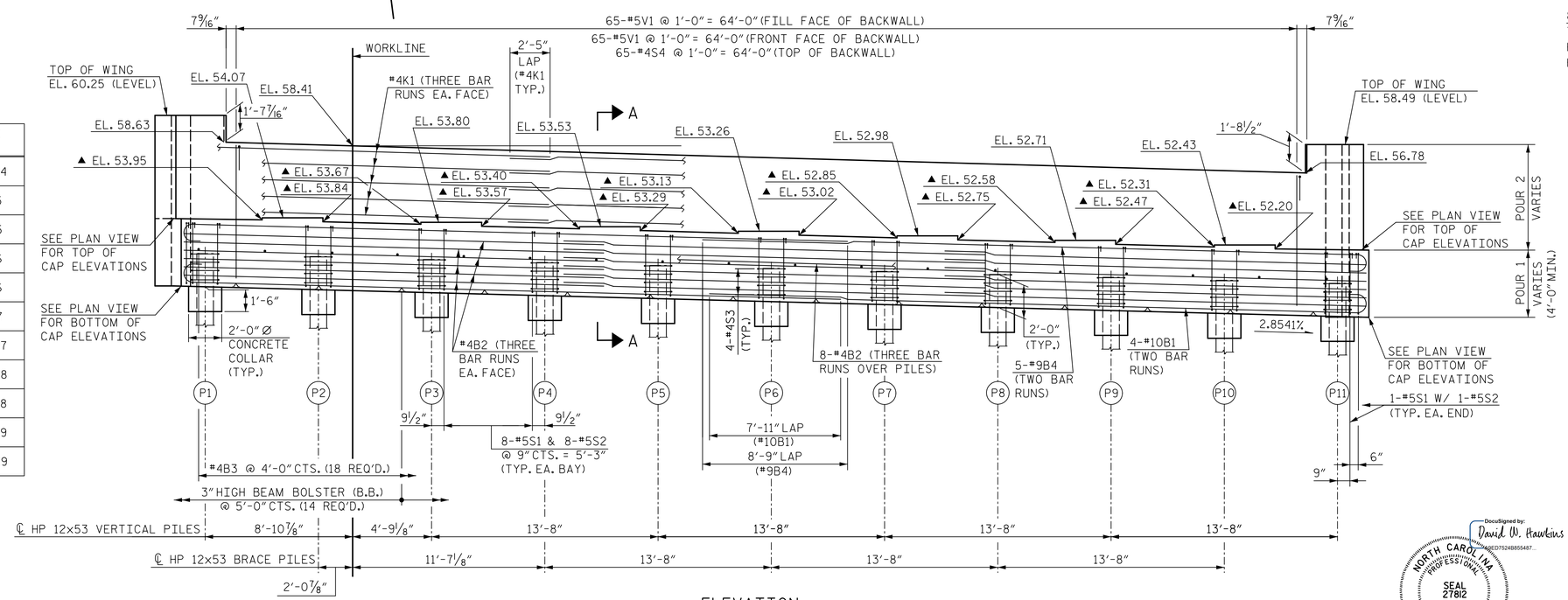
PLAN

GIRDER	"A"	"B"	ANGLE "C"	"X"	"Y"
GC1	3 5/16"	5 3/8"	97°-15'-41"	1'-3 7/8"	2"
GC2	3 5/16"	5 3/8"	97°-15'-41"	1'-3 7/8"	2"
GC3	3 5/16"	5 3/8"	97°-15'-41"	1'-3 7/8"	2"
GC4	3 5/16"	5 3/8"	97°-15'-41"	1'-3 7/8"	2"
GC5	3 5/16"	5 3/8"	97°-15'-41"	1'-3 7/8"	2"
GC6	2 13/16"	4 1/2"	96°-07'-25"	1'-3 15/16"	1 11/16"
GC7	2 1/4"	3 3/8"	94°-57'-41"	1'-3 15/16"	1 3/8"



DETAIL A

TOP OF PILE ELEVATIONS	
P1	52.04
P2	51.85
P3	51.65
P4	51.46
P5	51.26
P6	51.07
P7	50.87
P8	50.68
P9	50.48
P10	50.29
P11	50.09



ELEVATION

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11/19/2018

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

RIGHT LANE

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DRAWN BY M. WRIGHT DATE 7/18
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DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 29

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-29
1			3			TOTAL SHEETS
2			4			36

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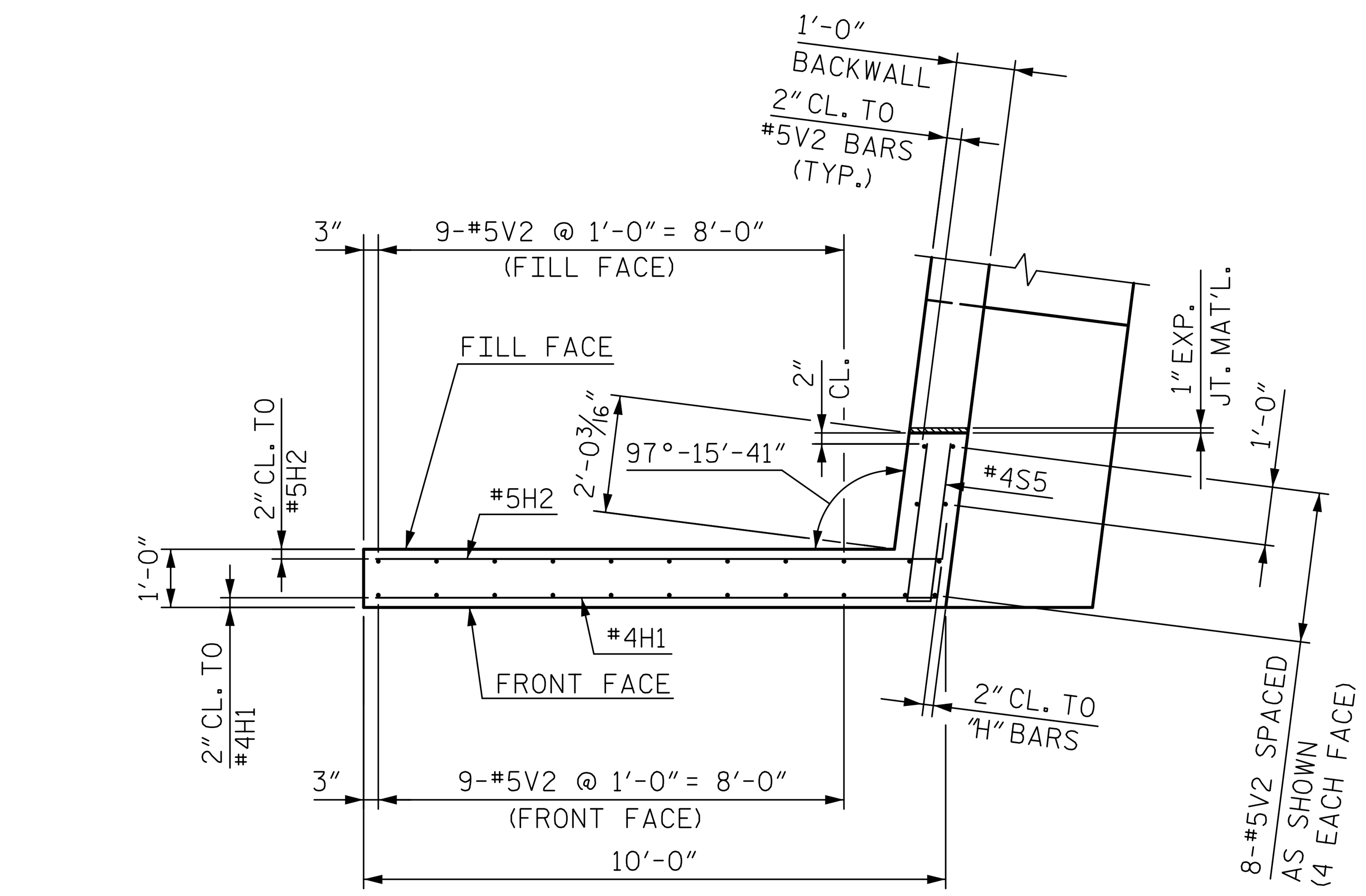
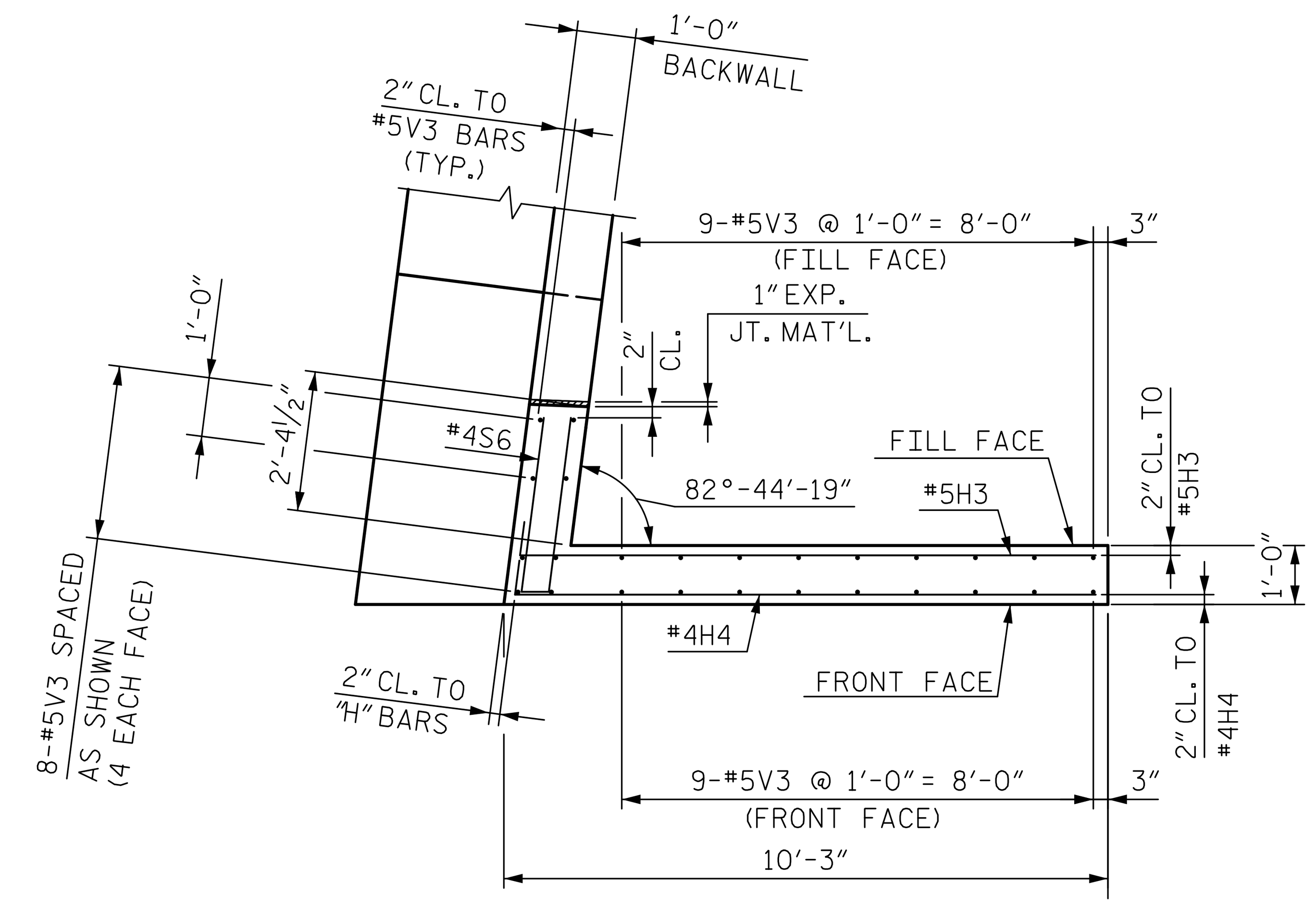
NOTES:

FOR NOTES, SEE SHEET 3 OF 3.

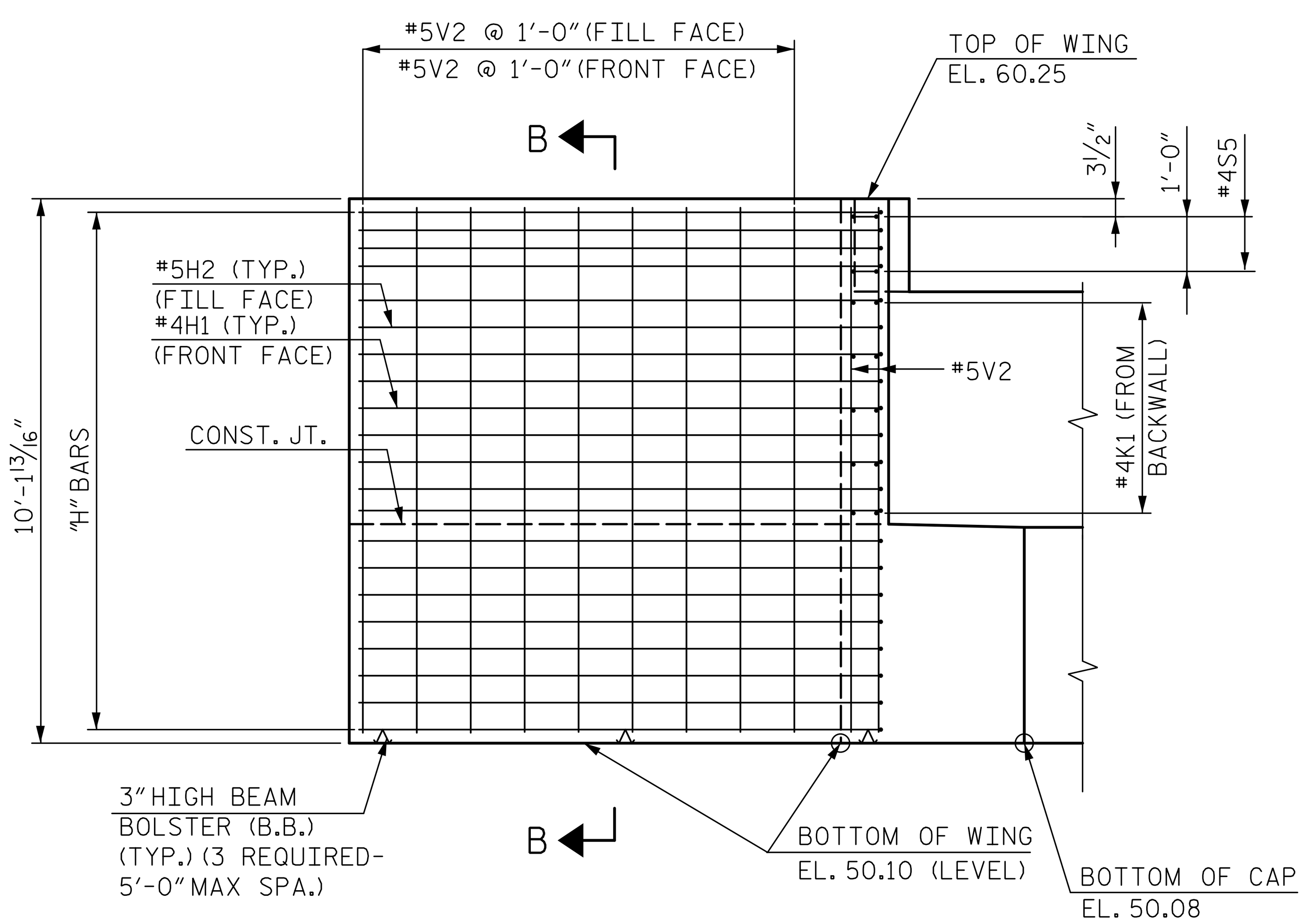
FOR BLOCKOUT IN WINGWALL, SEE SHEET 3 OF 3.



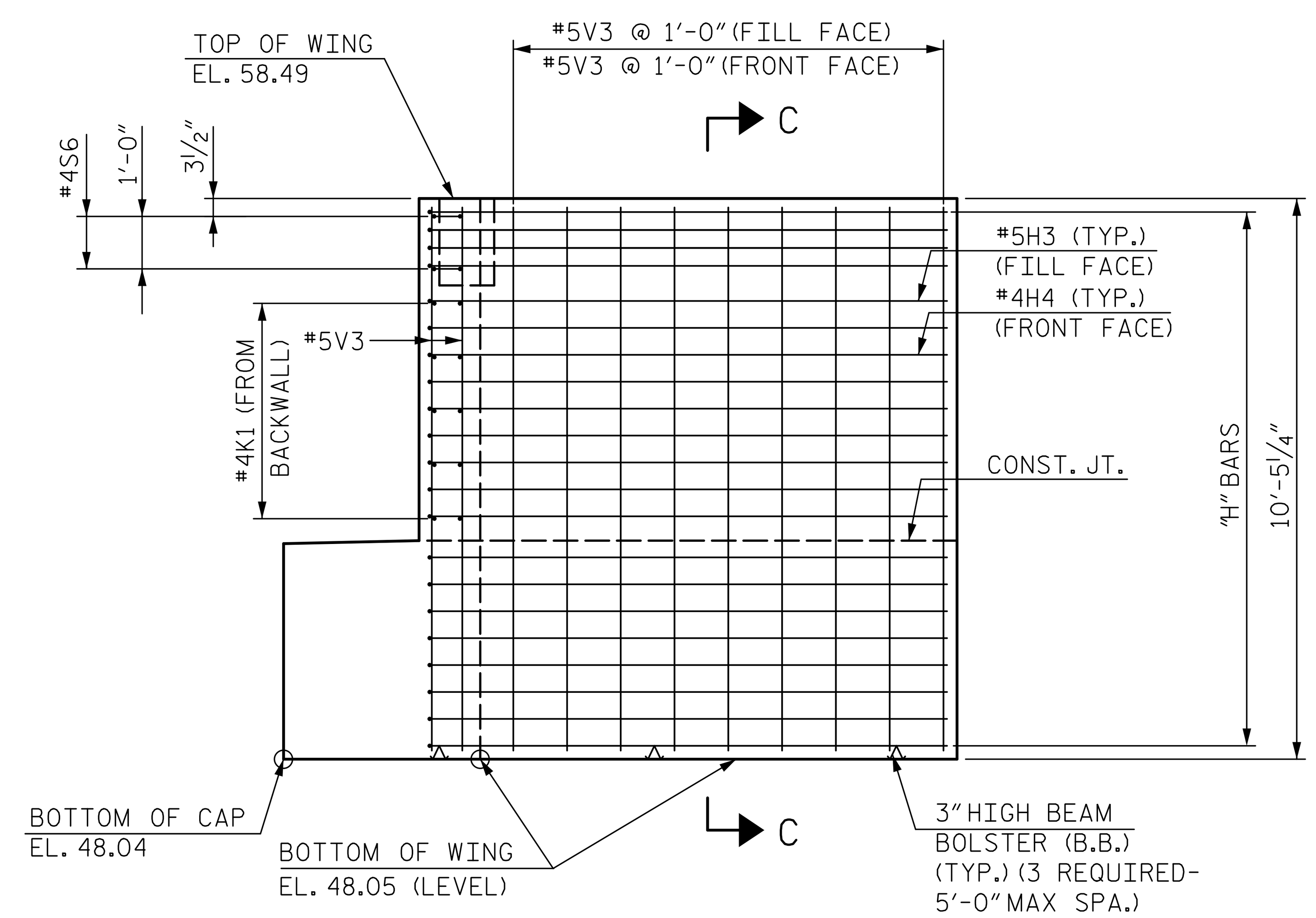
PLAN OF WING (W1)



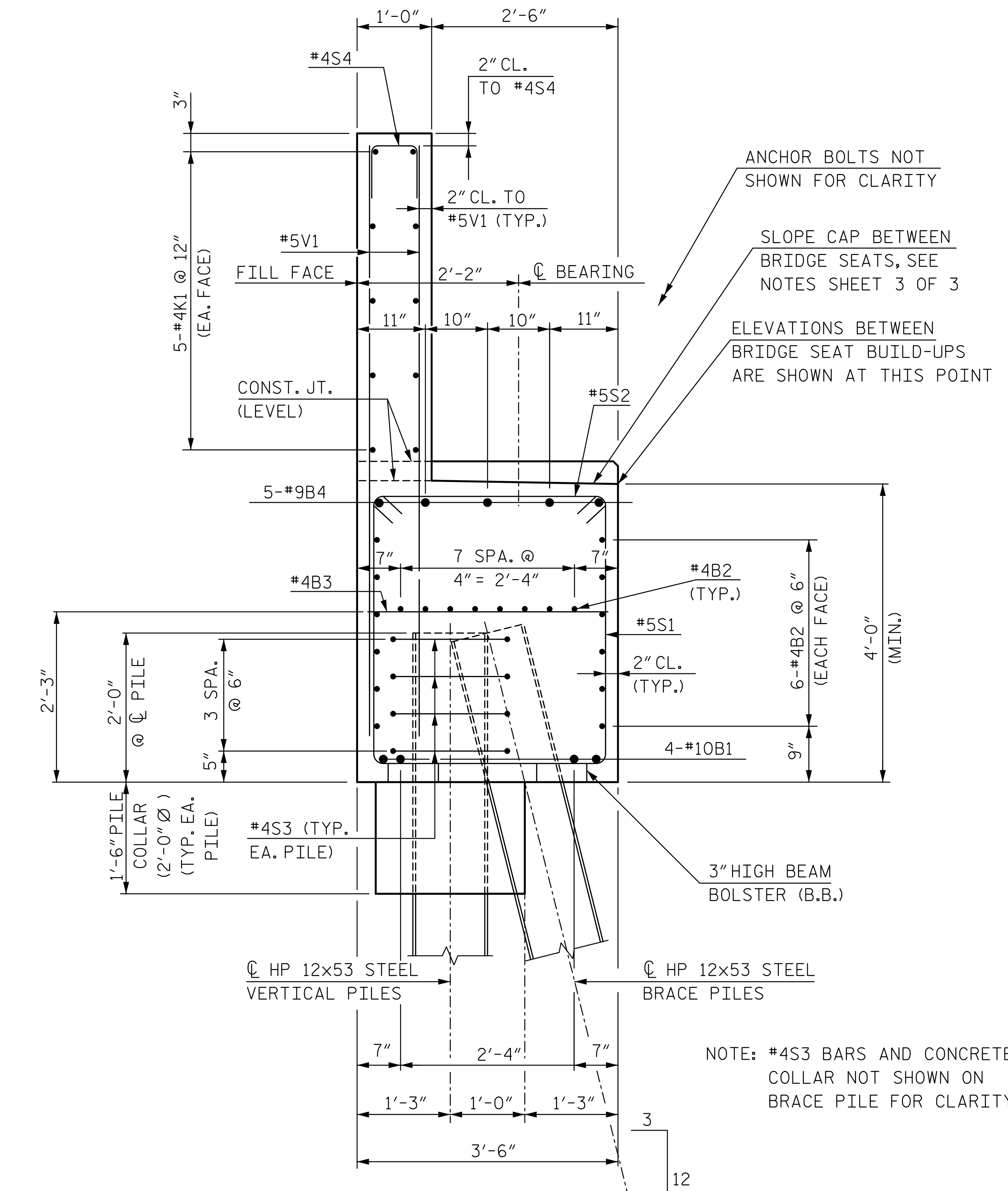
PLAN OF WING (W2)



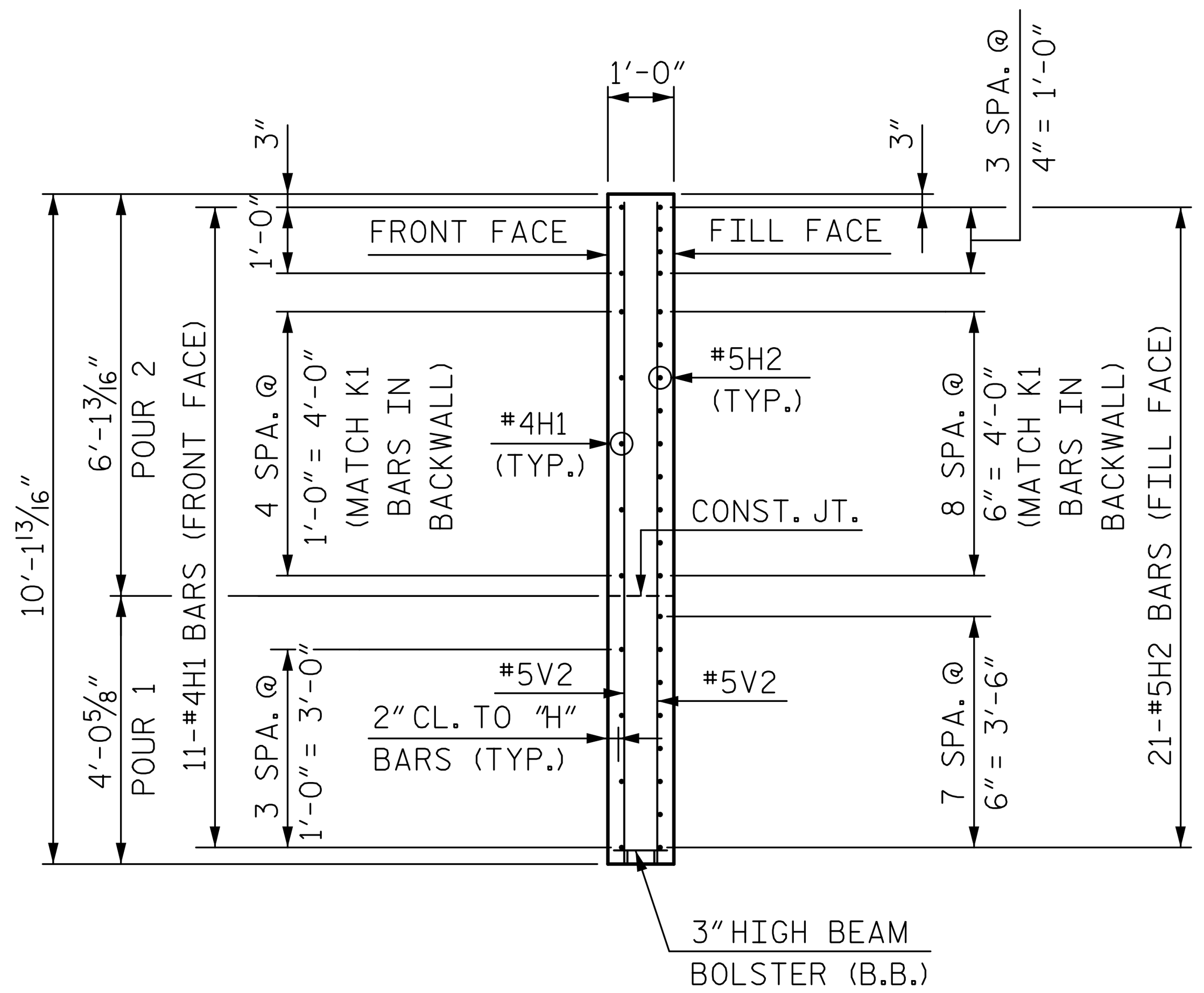
ELEVATION OF WING (W1)



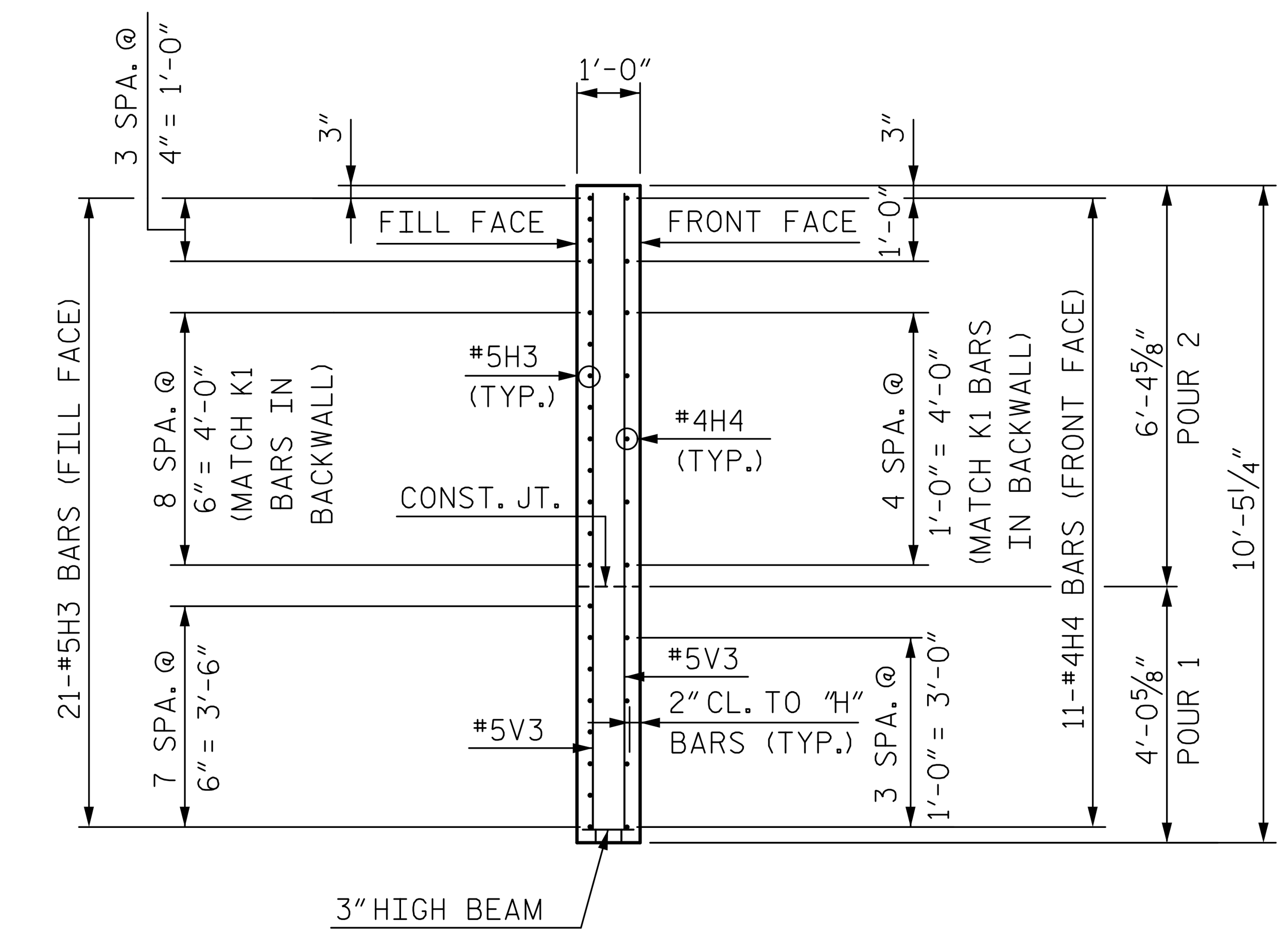
ELEVATION OF WING (W2)



SECTION A-A



SECTION B-B



SECTION C-C

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 3

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NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

RIGHT LANE

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DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE	9/18

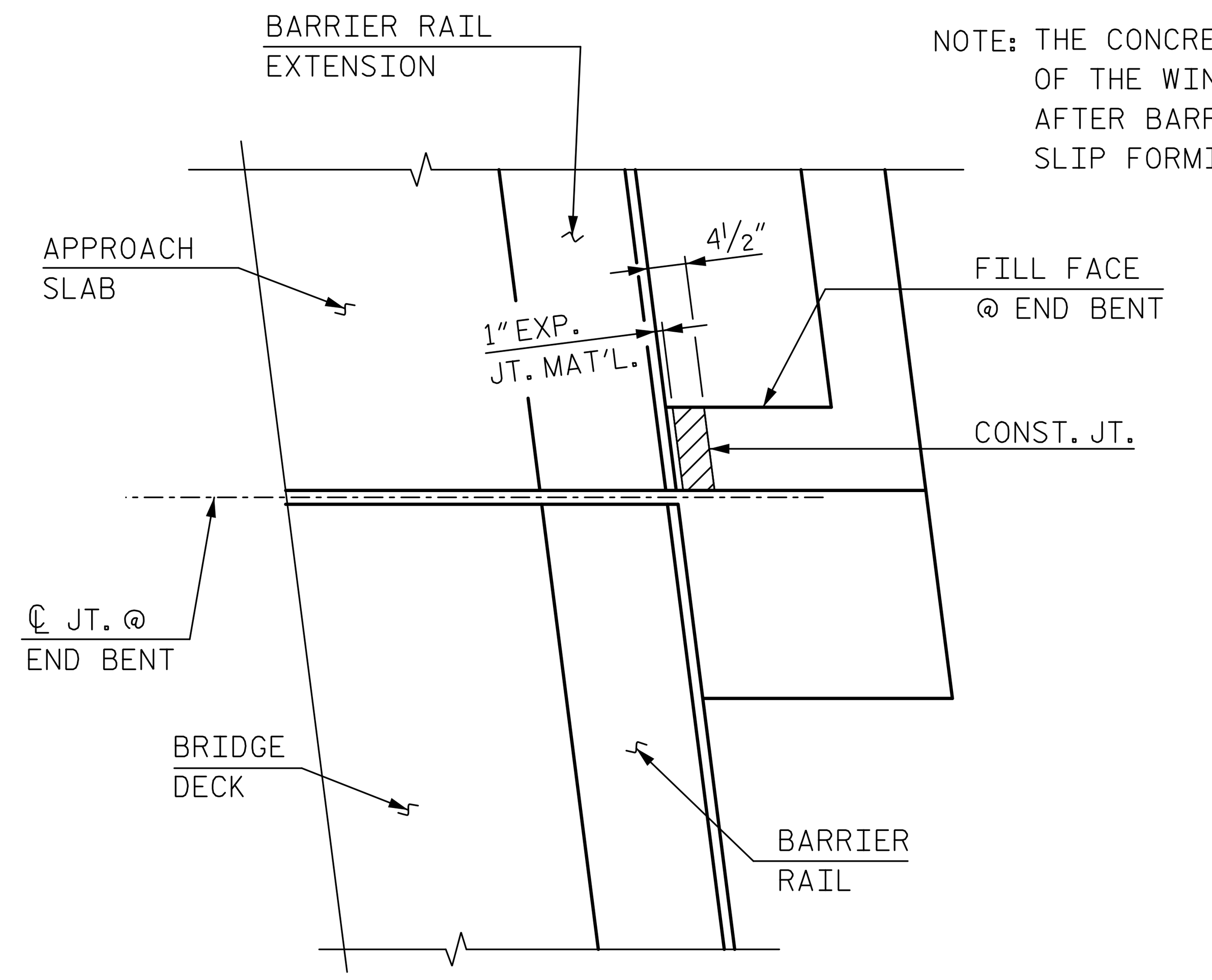
DWG. NO. 30

REVISIONS

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

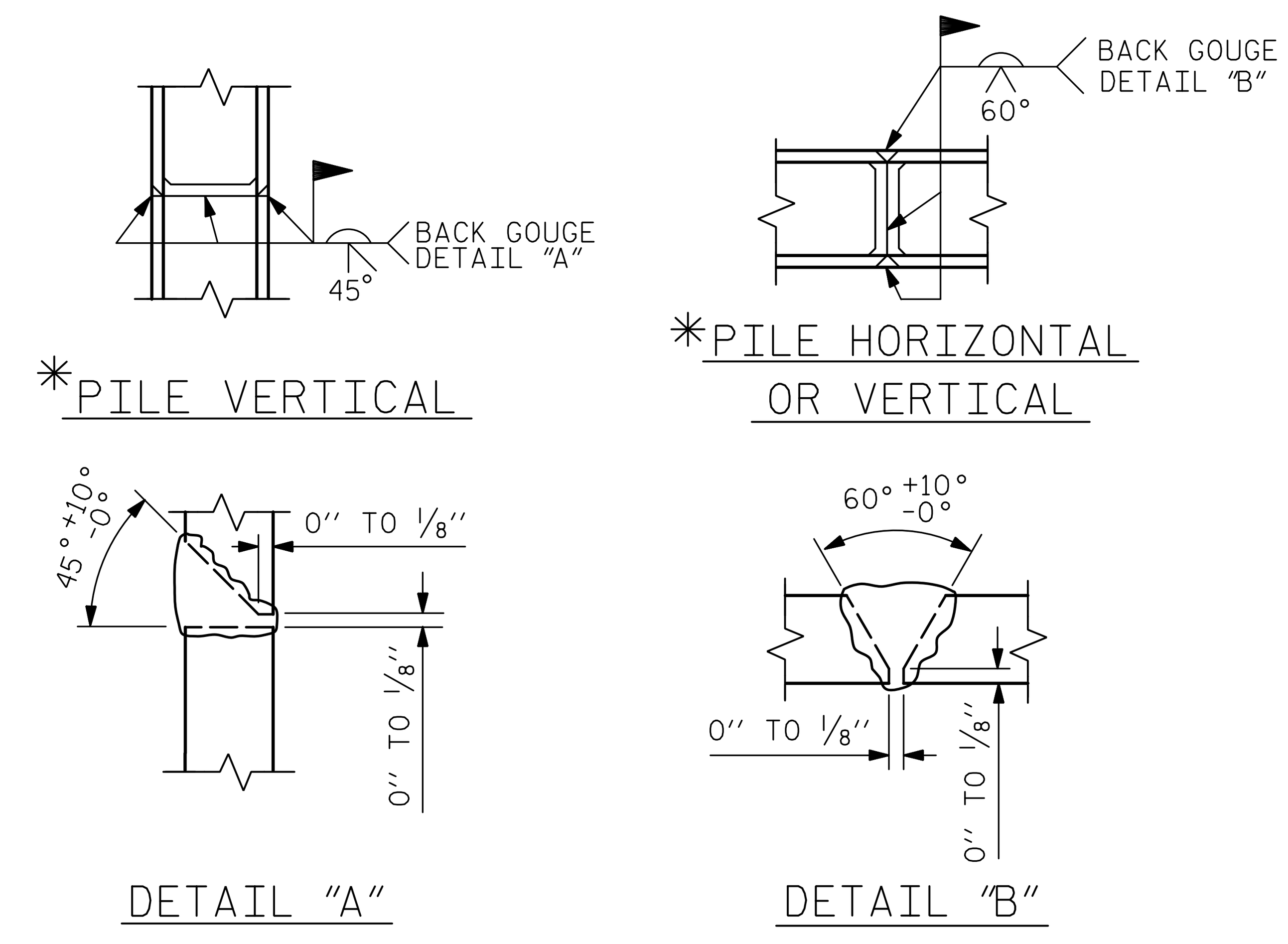
SHEET NO. S8-30

TOTAL SHEETS 36



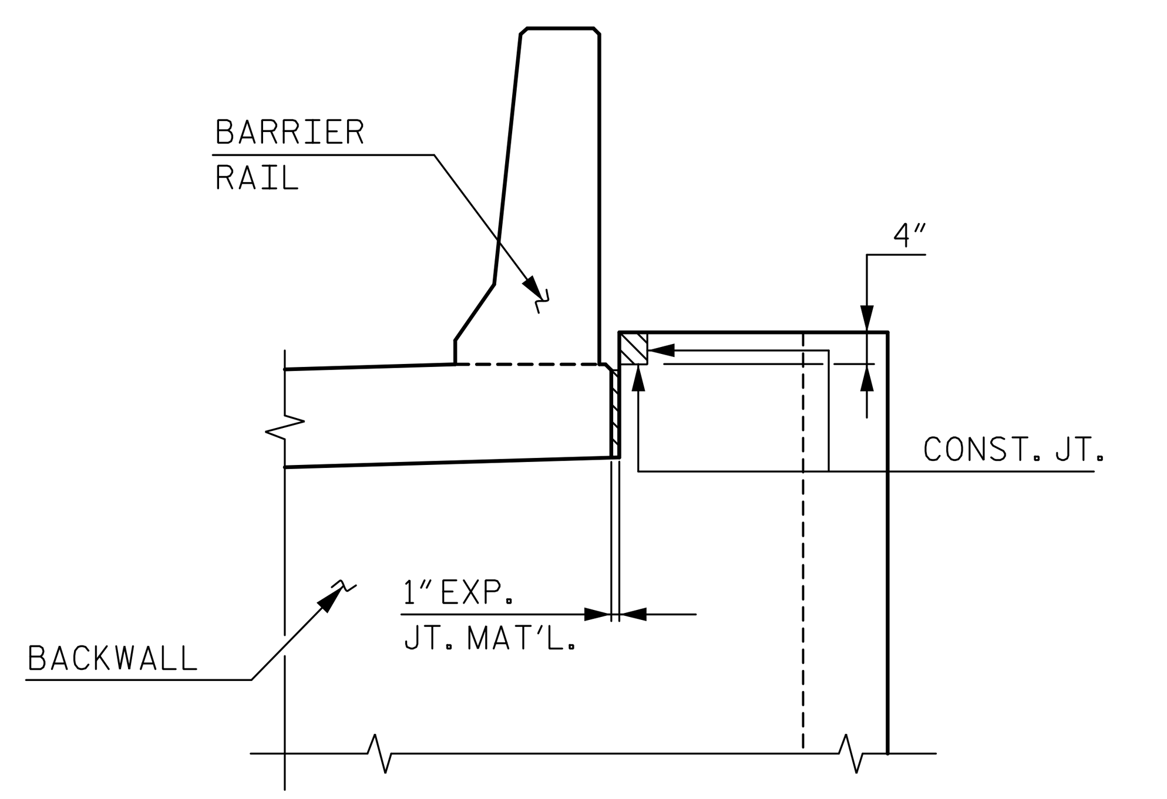
PLAN

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



* POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



ELEVATION

BLOCKOUT IN WINGWALL

NOTES:

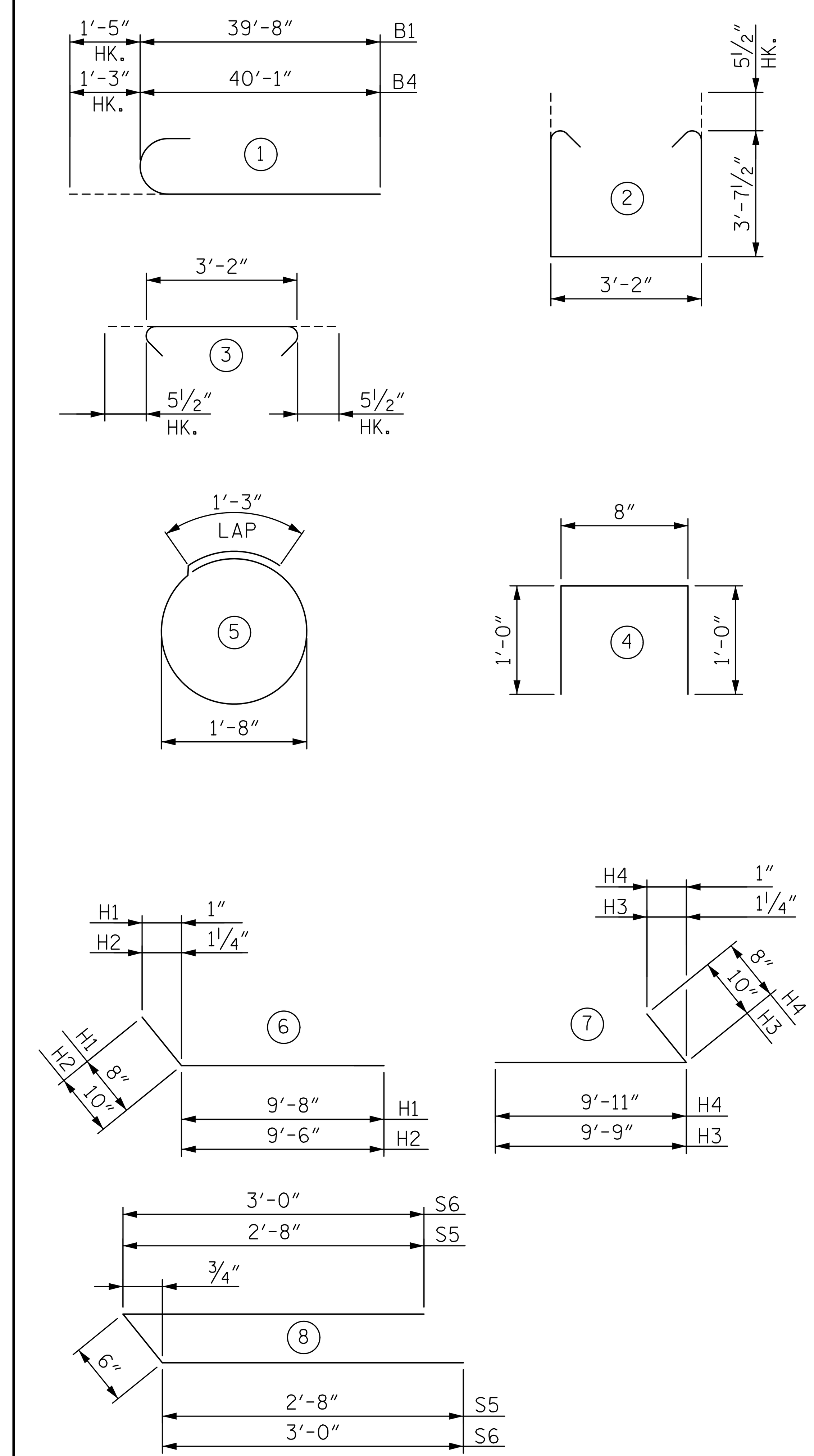
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

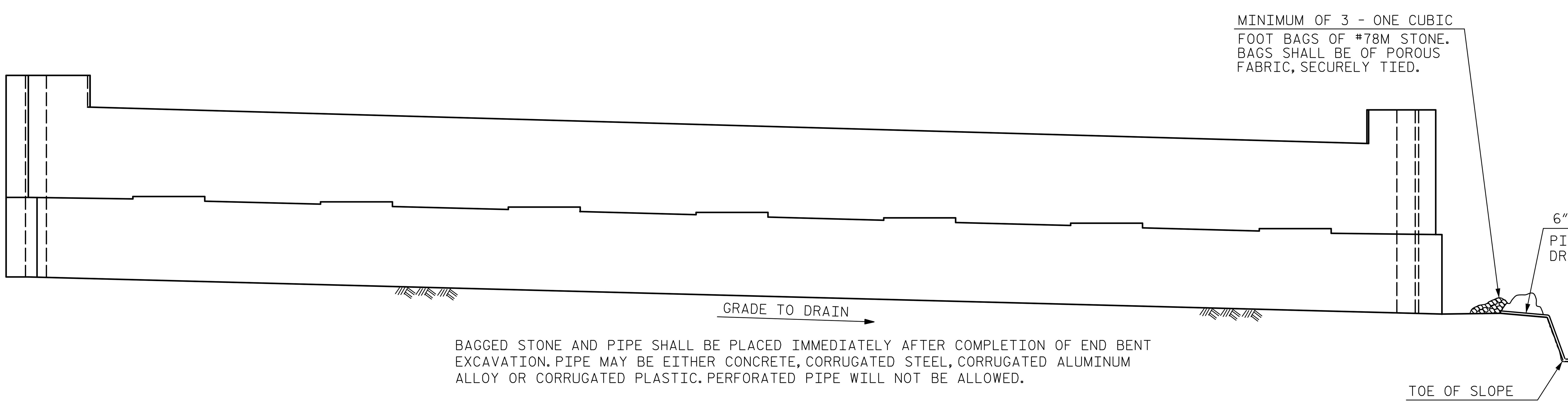
BILL OF REINFORCING

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	41-1"	1,414
B2	60	4	STR	25'-5"	1,019
B3	18	4	STR	3'-2"	38
B4	10	9	1	41'-4"	1,405
H1	11	4	6	10'-4"	76
H2	21	5	6	10'-4"	226
H3	21	5	7	10'-7"	232
H4	11	4	7	10'-7"	78
K1	30	4	STR	25'-5"	509
S1	84	5	2	11'-4"	993
S2	84	5	3	4'-1"	358
S3	44	4	5	6'-6"	191
S4	65	4	4	2'-8"	116
S5	2	4	8	5'-10"	8
S6	2	4	8	6'-6"	9
V1	130	5	STR	7-3"	983
V2	26	5	STR	9'-7"	260
V3	26	5	STR	10'-0"	271

QUANTITIES

REINFORCING STEEL	LBS.	8,186
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP, BOT. OF WINGS & COLLARS	CU. YDS.	42.6
POUR 2 - TOP OF WINGS & BACKWALL	CU. YDS.	27.1
TOTAL	CU. YDS.	69.7
HP 12x53 STEEL PILES	NO.	11
	LIN. FT.	770
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.

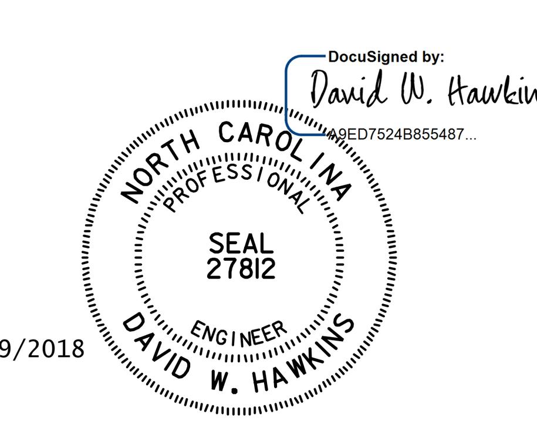
TEMPORARY DRAINAGE AT END BENT 2

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 3 OF 3



11/19/2018

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 9/18
CHECKED BY N. SALAS ZAMUDIO DATE 9/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 31

REVISIONS

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

SHEET NO. S8-31

TOTAL SHEETS 36

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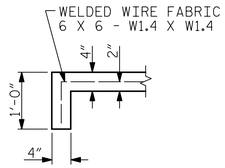
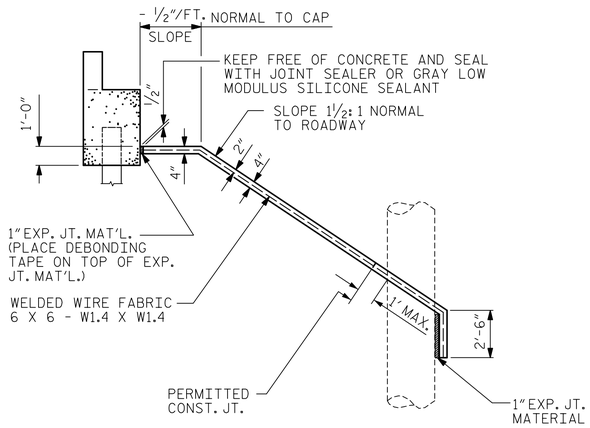


SECTION A-A

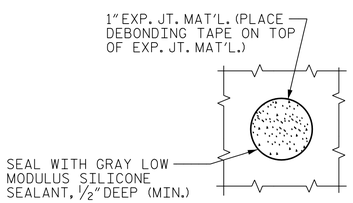
SLOPE PROTECTION SHALL CONSIST OF 4'' POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS ''B''. THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60'' WIDE. SLOPE PROTECTION 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.



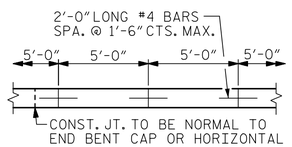
SECTION B-B

BRIDGE @ STA. 227+57.02 -L-	4 INCH SLOPE PROTECTION	✳ WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	740	1,485
END BENT 2	730	1,465

✳ QUANTITY SHOWN IS BASED ON 5' POURS.

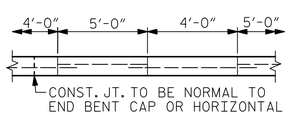


PLAN WHERE CONCRETE SLOPE PROTECTION MUST BE PLACED AROUND A BENT COLUMN



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: 227+57.02 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

RIGHT LANE

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ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

ASSEMBLED BY : M. WRIGHT	DATE : 9/18
CHECKED BY : N. HART	DATE : 9/18
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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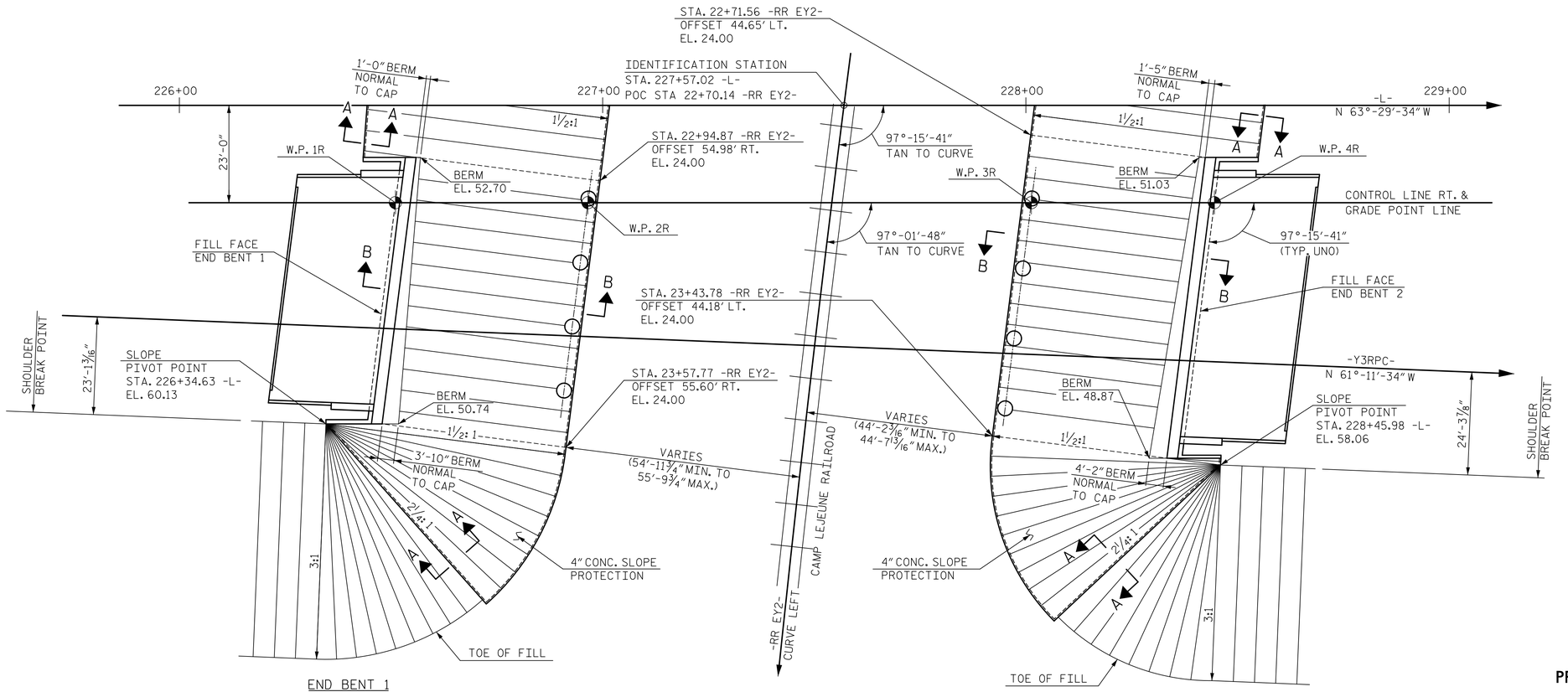
DWG. NO. 32

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-32
1			3			TOTAL SHEETS
2			4			36

STD. NO. SP1



PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 2

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STATE OF NORTH CAROLINA
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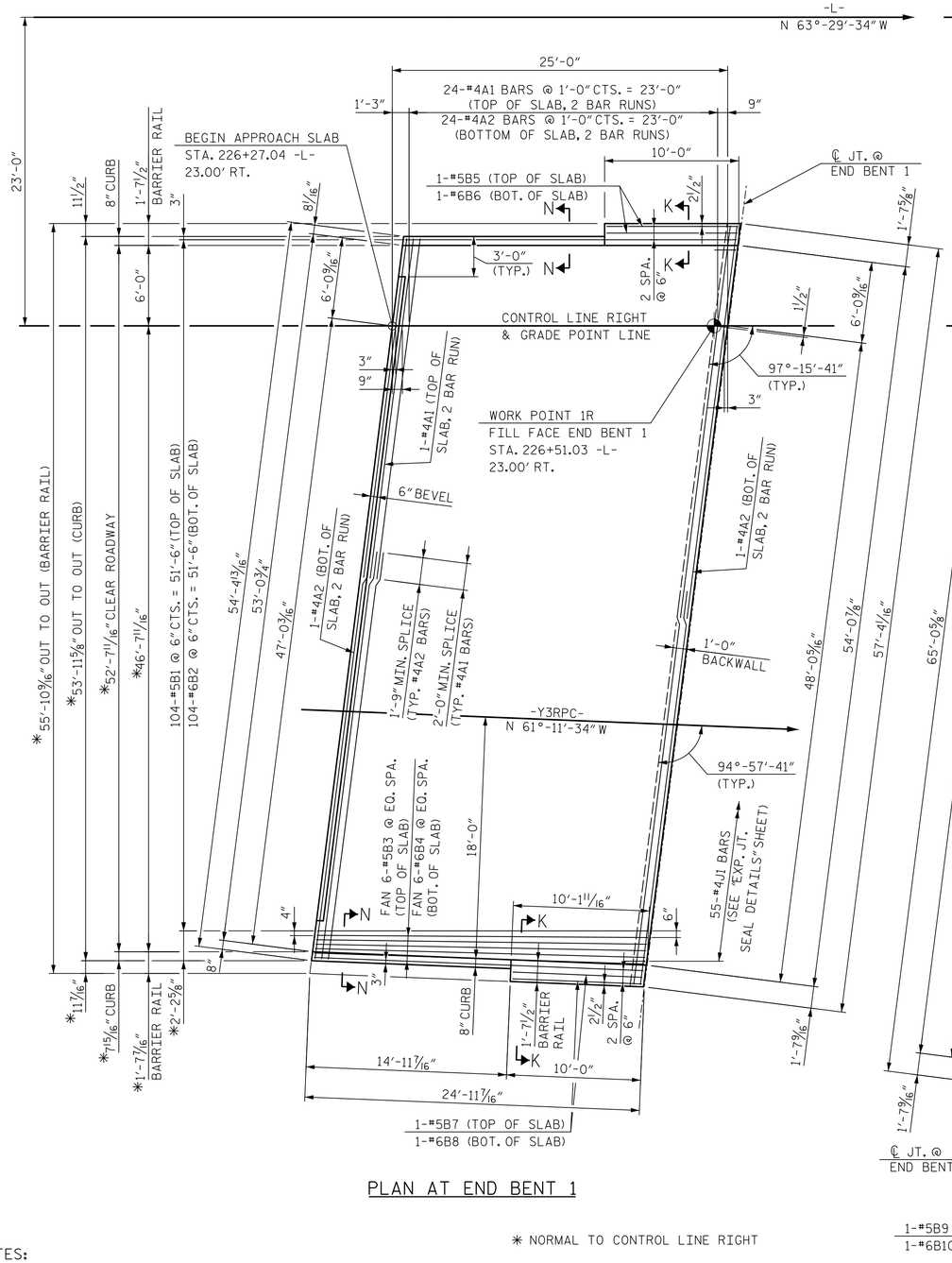
RALEIGH

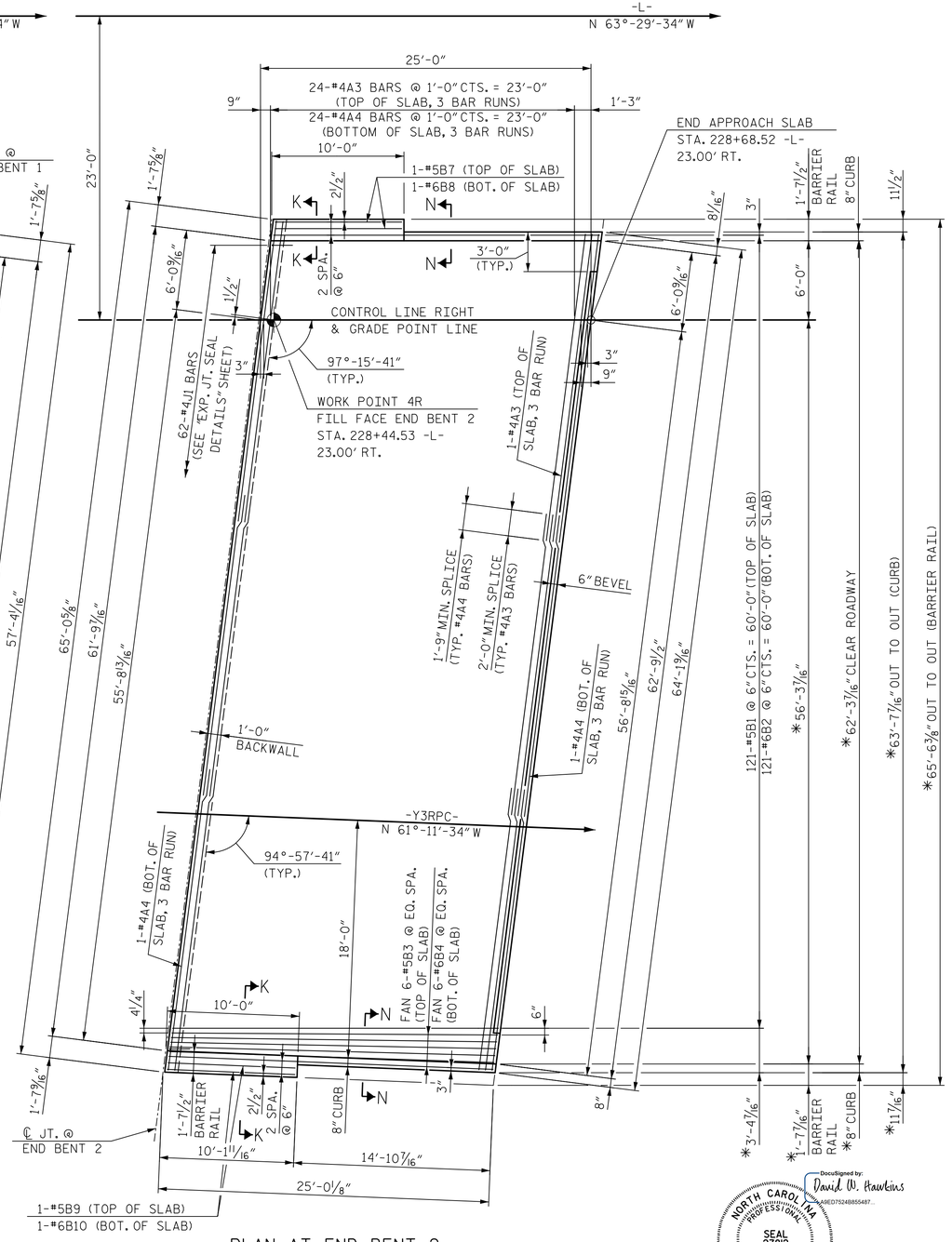
SLOPE PROTECTION DETAILS

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-33
1			3			TOTAL SHEETS
2			4			36



PLAN AT END BENT 1



PLAN AT END BENT 2

✱ NORMAL TO CONTROL LINE RIGHT

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.

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A9ED7524B855487...

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DWG. NO. 34

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 227+57.02 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-34
1			3			TOTAL SHEETS
2			4			36

STD. NO. BAS2

NOTES

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

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

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

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

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

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

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

FOR 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.

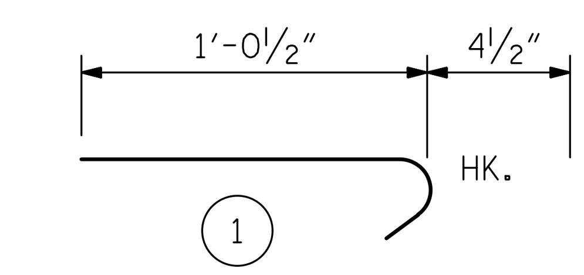
BILL OF MATERIAL — APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	50	#4	STR	29'-6"	985
A2	52	#4	STR	29'-5"	1,022
✱ B1	104	#5	STR	23'-9"	2,576
B2	104	#6	STR	24'-7"	3,840
✱ B3	6	#5	STR	23'-8"	148
B4	6	#6	STR	24'-6"	221
✱ B5	2	#5	STR	9'-3"	19
B6	2	#6	STR	9'-8"	29
✱ B7	2	#5	STR	9'-1"	19
B8	2	#6	STR	9'-6"	29
✱ J1	55	#4	1	1'-5"	52
REINFORCING STEEL			✱✱ LBS.		5,141
✱ EPOXY COATED REINFORCING STEEL			✱✱ LBS.		3,799
CLASS AA CONCRETE			✱✱ C.Y.		60.0

BILL OF MATERIAL — APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A3	75	#4	STR	22'-11"	1,148
A4	78	#4	STR	22'-9"	1,185
✱ B1	121	#5	STR	23'-9"	2,997
B2	121	#6	STR	24'-7"	4,468
✱ B3	6	#5	STR	23'-8"	148
B4	6	#6	STR	24'-6"	221
✱ B7	2	#5	STR	9'-1"	19
B8	2	#6	STR	9'-6"	29
✱ B9	2	#5	STR	9'-2"	19
B10	2	#6	STR	9'-7"	29
✱ J1	62	#4	1	1'-5"	59
REINFORCING STEEL			✱✱ LBS.		5,932
✱ EPOXY COATED REINFORCING STEEL			✱✱ LBS.		4,390
CLASS AA CONCRETE			✱✱ C.Y.		69.9

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

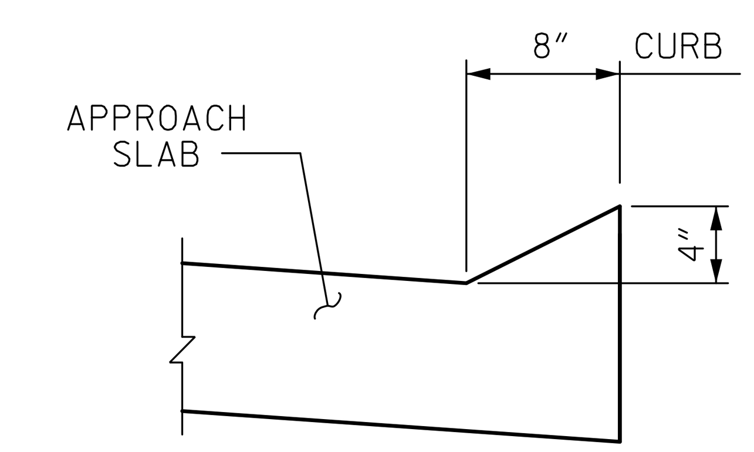
✱✱ QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 3 OF 3.

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.

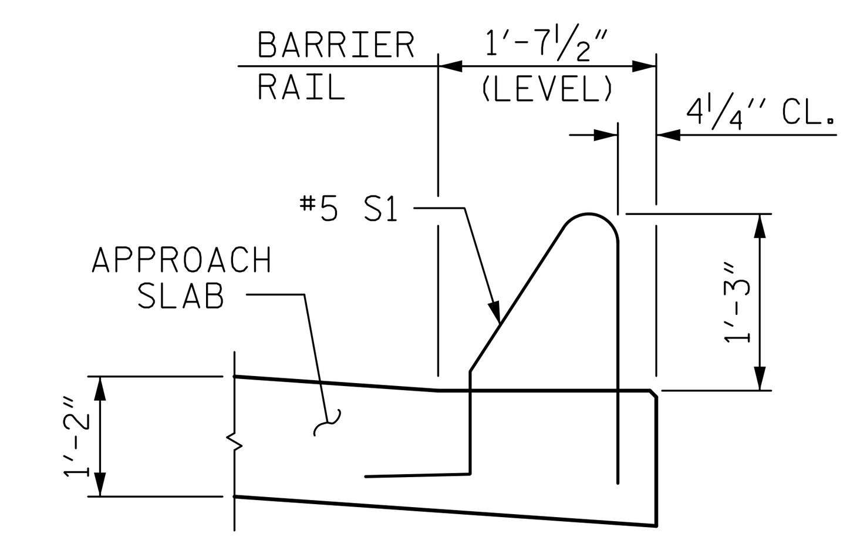
SPLICE LENGTHS

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

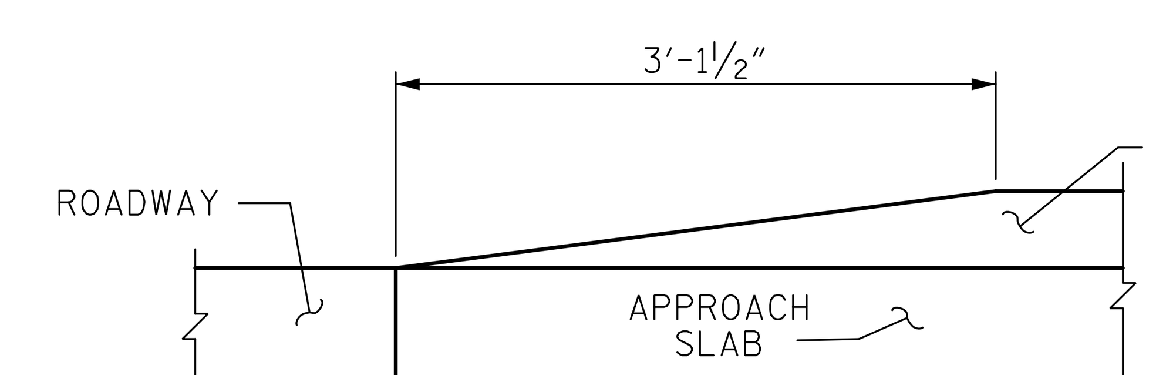
FOR PLAN VIEW OF APPROACH SLABS AT END BENT 1 AND END BENT 2, SEE SHEET 1 OF 3.



SECTION N-N

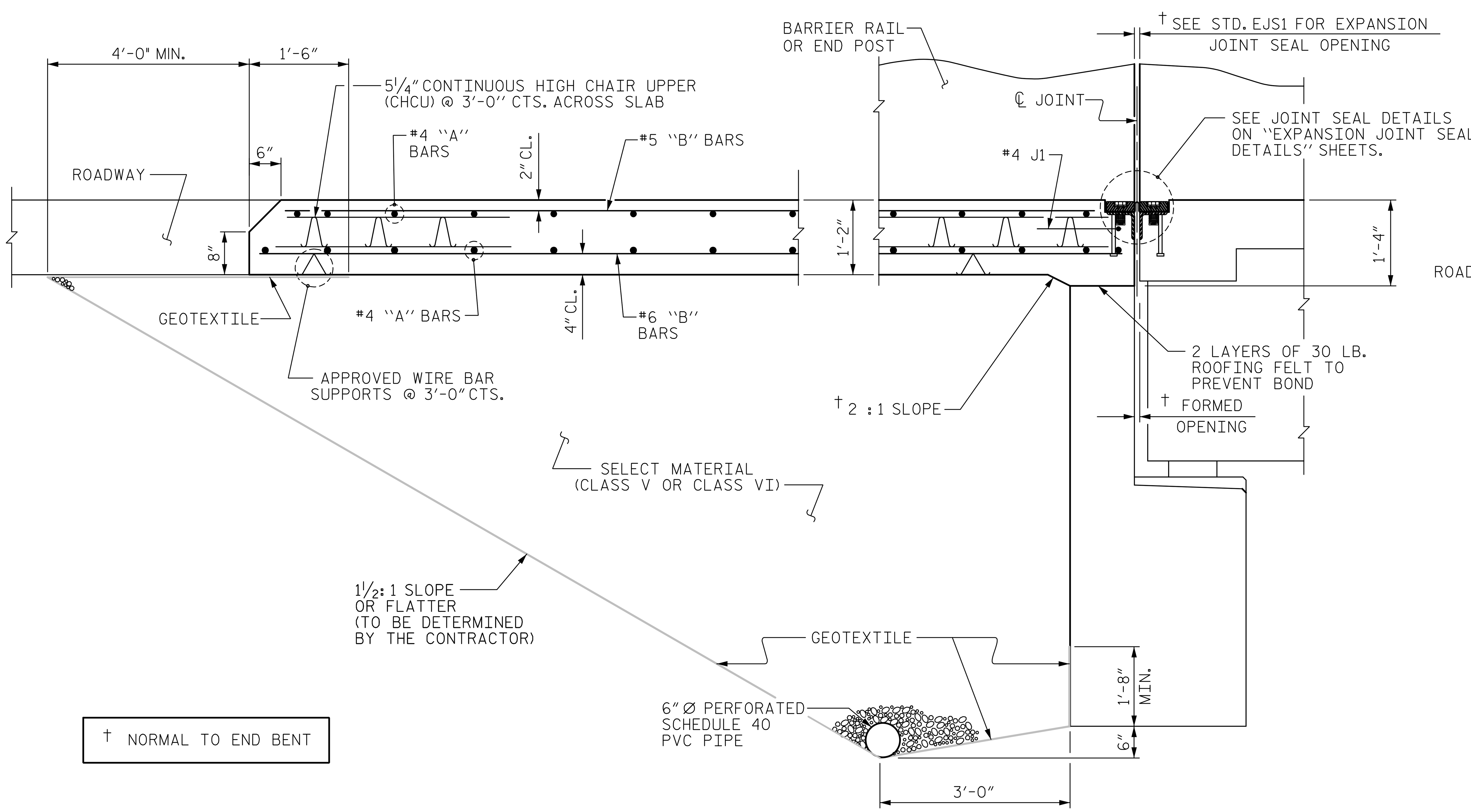


SECTION K-K



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

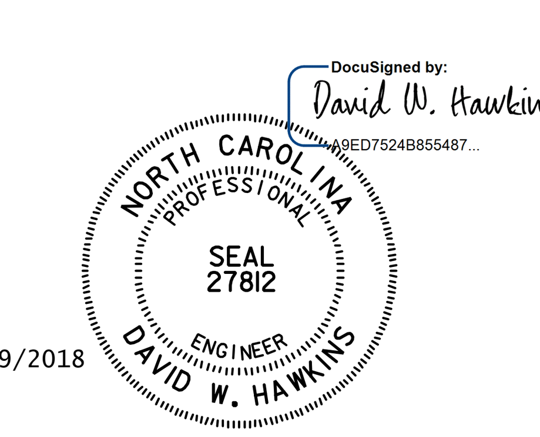
PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 2 OF 3

DocuSigned by: David W. Hawkins



11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

RIGHT LANE

REVISIONS								SHEET NO.
NO.	BY	DATE	NO.	BY	DATE			S8-35
1			3					TOTAL SHEETS
2			4					36

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DRAWN BY M. WRIGHT DATE 7/18
CHECKED BY N. HART DATE 7/18
DESIGN ENGINEER OF RECORD D. HAWKINS DATE 9/18

DWG. NO. 35

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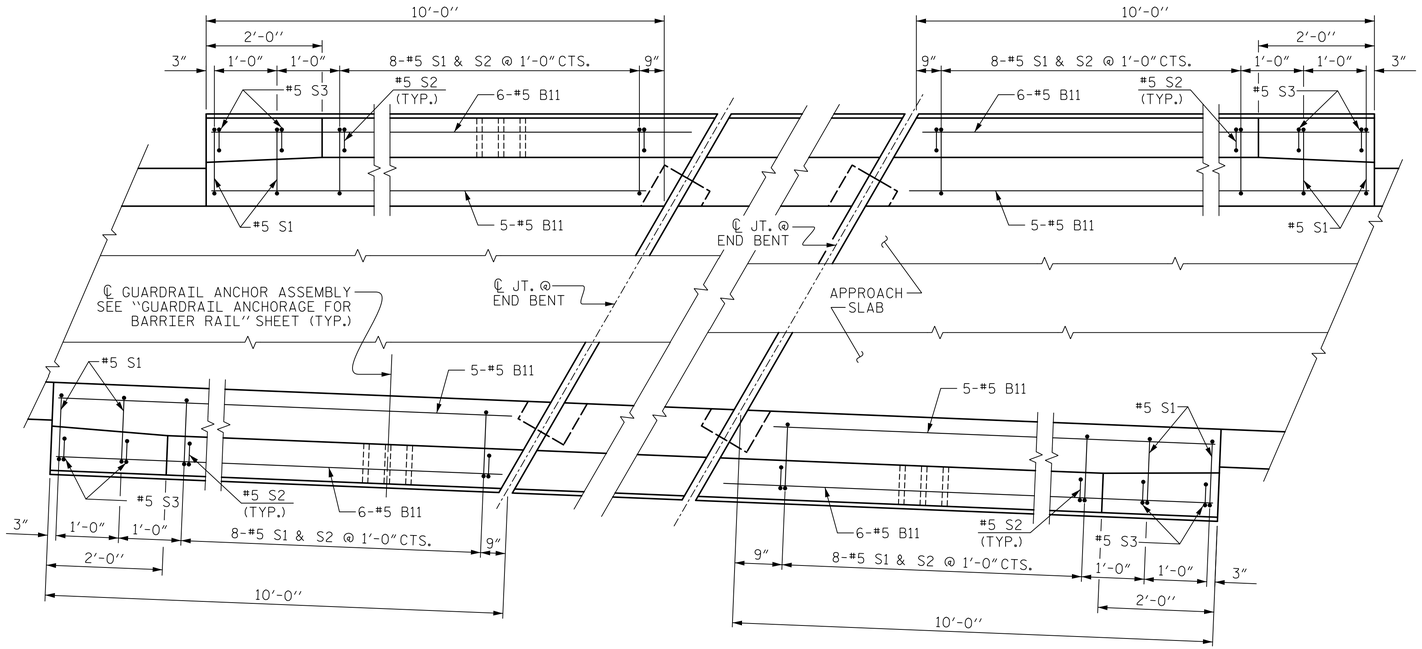
ASSEMBLED BY : M. WRIGHT	DATE : 7/18		
CHECKED BY : N. HART	DATE : 7/18		
DRAWN BY : EEM 3/95		REV. 12/21/11	MAA/GM
CHECKED BY : VAP 3/95		REV. 6/13	MAA/GM
		REV. 12/17	MAA/THC

STD. NO. BAS2



END BENT 1 END BENT 2

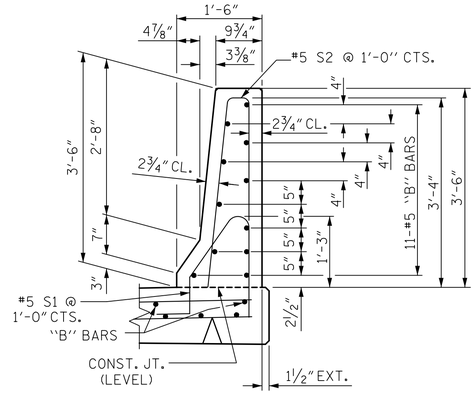
PLAN OF BARRIER RAIL

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".

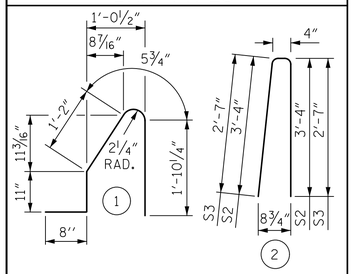
THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.



SECTION THRU RAIL

BAR TYPES

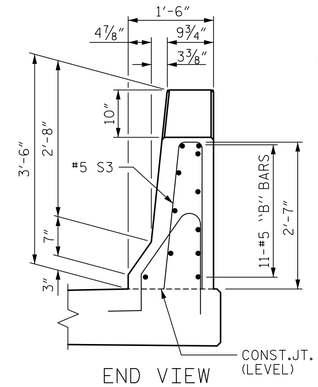


ALL BAR DIMENSIONS ARE OUT TO OUT

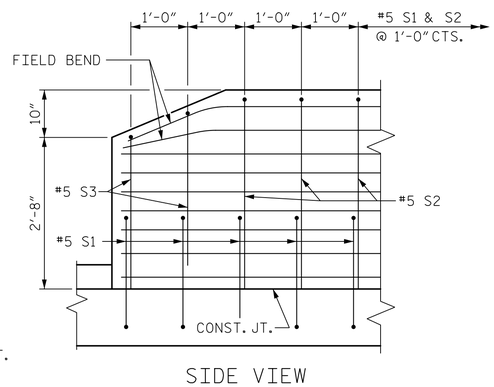
BILL OF MATERIAL

BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B11	44	#5	STR	9'-8"	444
✳S1	40	#5	1	5'-1"	212
✳S2	32	#5	2	7'-0"	234
✳S3	8	#5	2	5'-6"	46
✳EPOXY COATED REINFORCING STEEL				LBS.	936
CLASS AA CONCRETE				C. Y.	5.3
CONCRETE BARRIER RAIL				LIN. FT.	40.4

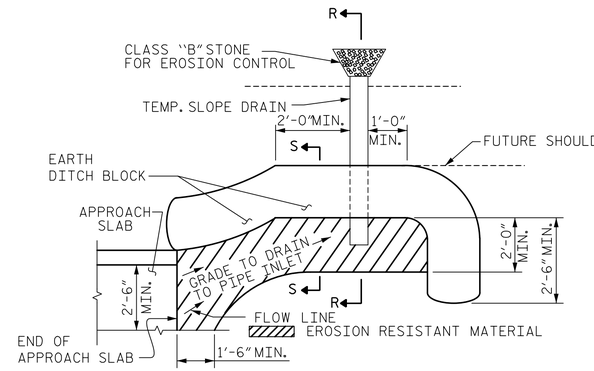


END VIEW



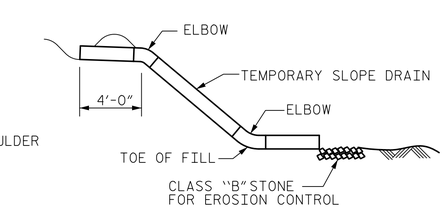
SIDE VIEW

END OF RAIL DETAILS

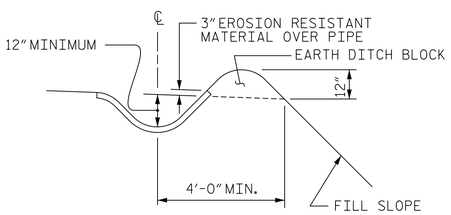


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

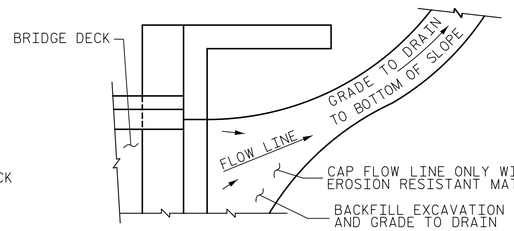
PLAN VIEW



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

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 227+57.02 -L-

SHEET 3 OF 3

DocuSigned by: David W. Hawkins 8ED7524B855487...

NORTH CAROLINA PROFESSIONAL SEAL 27812 ENGINEER DAVID W. HAWKINS

11/19/2018

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S8-36
1			3			TOTAL SHEETS
2			4			36

STD. NO. BAS4

ASSEMBLED BY : M. WRIGHT	DATE : 7/18	
CHECKED BY : N. HART	DATE : 7/18	
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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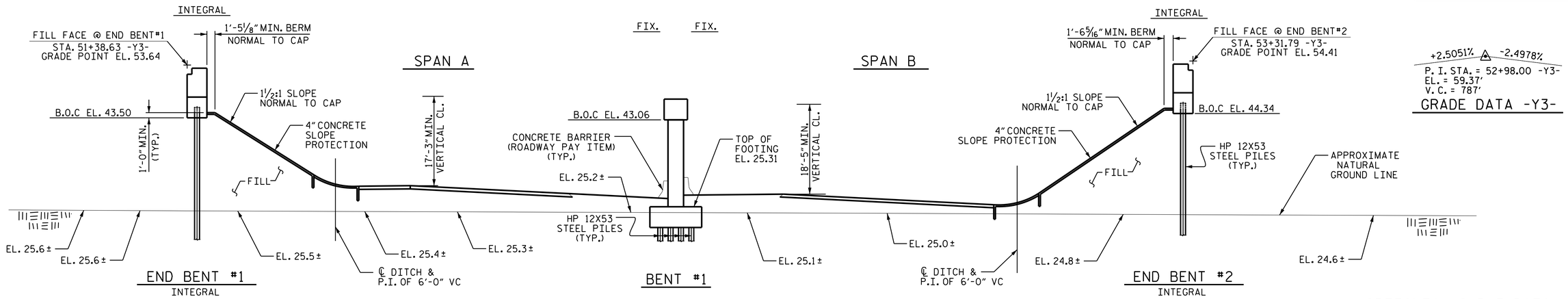
CHECKED BY	N. HART	DATE 7/18
DESIGN ENGINEER OF RECORD	D. HAWKINS	DATE 9/18

DWG. NO. 36

F.A. PROJECT: NHF-70(49)

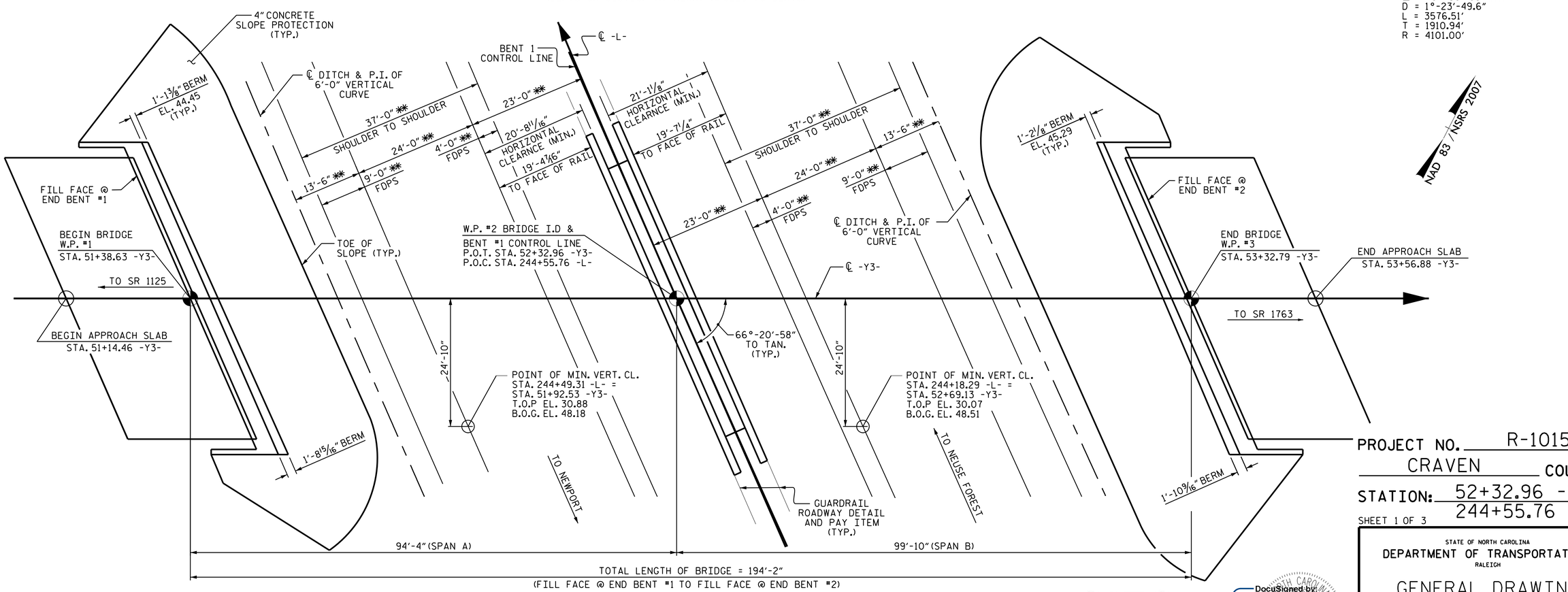


SECTION ALONG SURVEY LINE -Y3-

(BENTS ON SECTION AT RIGHT ANGLES TO BENTS)

HORIZONTAL CURVE DATA

PI. STA. 256+33.26 -L-
Δ = 49°-58'-05"(RT)
D = 1°-23'-49.6"
L = 3576.51'
T = 1910.94'
R = 4101.00'



NAD 83 / NSRS 2007

PLAN

(PILES NOT SHOWN FOR CLARITY)
** DENOTES RADIAL DIMENSION

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 52+32.96 -Y3-
244+55.76 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER US 70 BYPASS ON SR 1756 BETWEEN SR 1125 AND NC 1763

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-1
1			3			TOTAL SHEETS
2			4			31

DRAWN BY : J. B. W. DATE : 02/20/18
CHECKED BY : T. L. B. DATE : 02/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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A&O PROJECT NO. 2015.042

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 44536 TED L. BARTELL
2/28/2018

REFERENCE NO. 9-1

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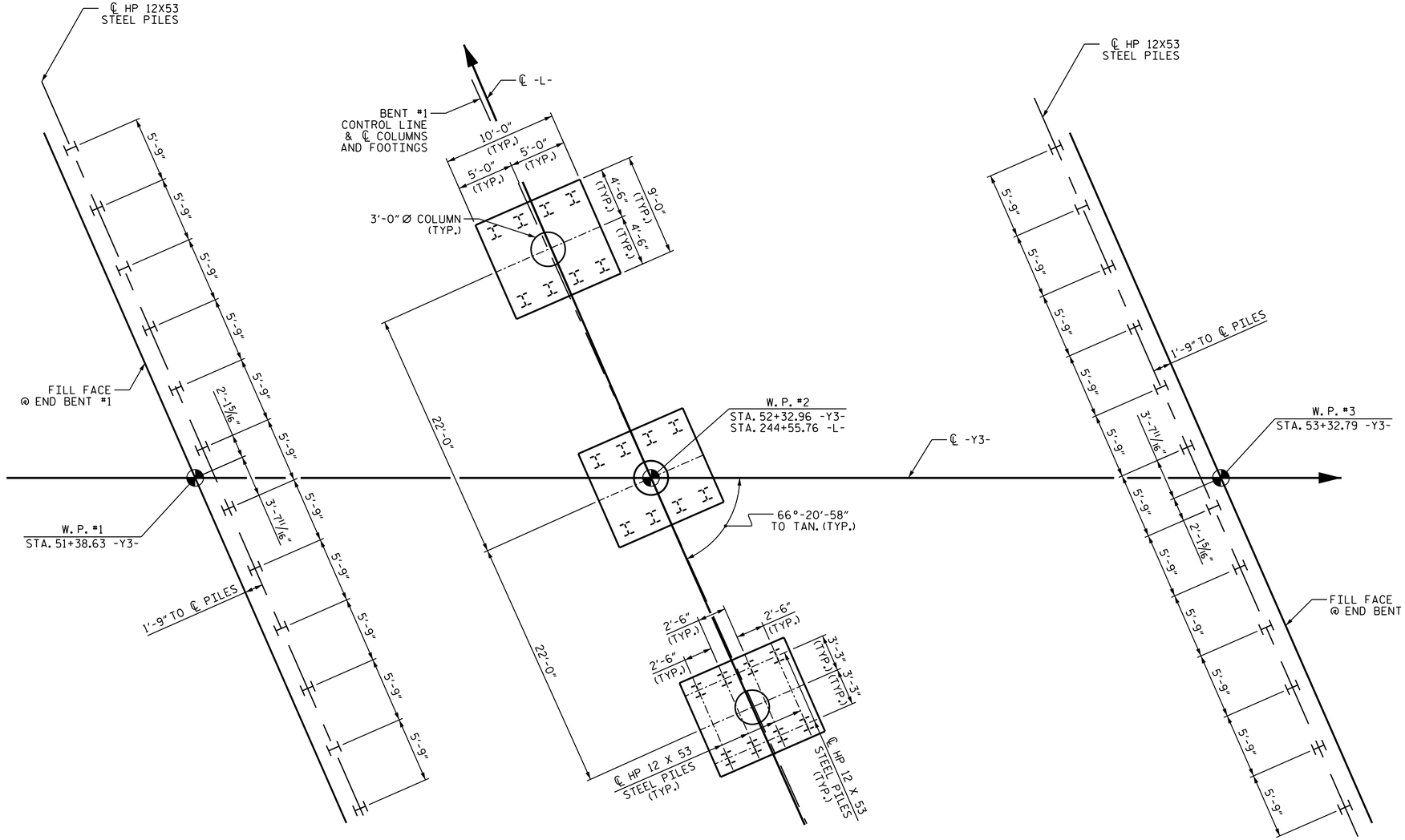
$$$$USERNAME$$$$



INTEGRAL END BENT #1

BENT #1

INTEGRAL END BENT #2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE.

NOTES

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT #1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT #1 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.

PILES AT BENT #1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 140 TONS PER PILE.

DRIVE PILES AT BENT #1 TO A REQUIRED DRIVING RESISTANCE OF 190 TONS PER PILE.

PILES AT END BENT #2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT #2 TO A REQUIRED DRIVING RESISTANCE OF 160 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 AND BENT NO. 1. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A ONE MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO THE BOTTOM OF THE CAP ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 1 AND END BENT NO. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER US 70 BYPASS ON SR 1756 BETWEEN SR 1125 AND NC 1763

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-2
1			3			TOTAL SHEETS
2			4			31

DRAWN BY : J. B. W. DATE : 02/20/18
CHECKED BY : T. L. B. DATE : 02/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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A&O PROJECT NO. 2015.042

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2/28/2018

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19445 T. L. BARTLETT

REFERENCE NO. 9-2

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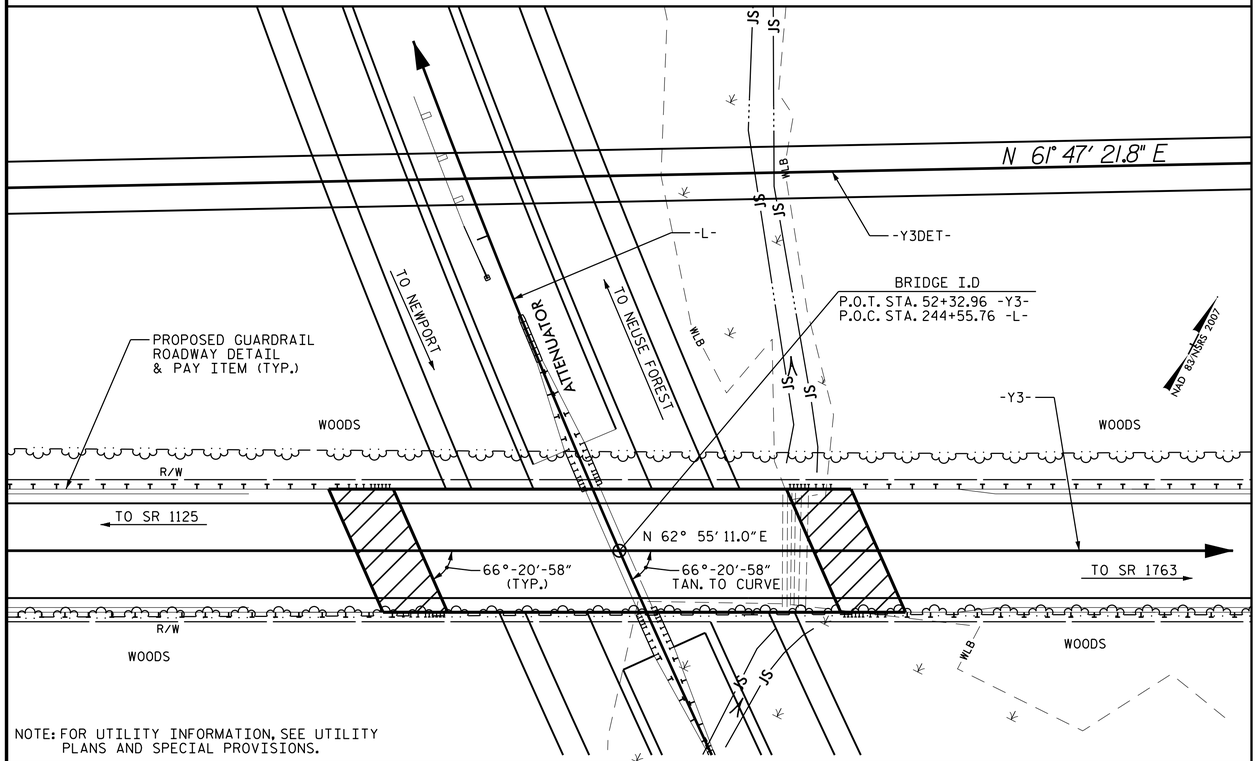
$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

BM 12 RR SPIKE IN TREE AT STA. 228+71.00 -L- 243' LEFT, ELEVATION = 28.81



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

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN (9-34).

FOR SUBMITTAL OF WORKING DRAWINGS, 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 BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF 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 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.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

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 LENGTH BASED ON 30' SAMPLE LENGTH) PLUS TWO SPLICE LENGHTS AND FY = 60ksi.

BILL OF MATERIAL

	FOUNDATION EXCAVATION BENT #1 STA. 52+32.96 -Y3-	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES		PILE REDRIVES	TWO BAR METAL RAIL	1'-2" X 2'-6" CONCRETE PARAPET	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	LUMP SUM	EACH	SQ.FT.	SQ.FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	EACH	NO.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE			10598	11778					12	1143					368.7	384.7		
END BENT No. 1		1			47.4		5247				12	12	840	6			385	
BENT No. 1	LUMP SUM	1			103.7		18145	1165			24	24	2160	12				
END BENT No. 2					46.2		5187				12	12	840	6			555	
TOTAL	LUMP SUM	2	10598	11778	197.3	LUMP SUM	28579	1165	12	1143	48	48	3840	24	368.7	384.7	940	LUMP SUM

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER US 70 BYPASS ON SR 1756
BETWEEN
SR 1125 AND NC 1763

DocuSigned by:
D794597C456A4F7...
12/7/2018

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14430 TROY L. BARFIELD

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A&O PROJECT NO. 2015.042

REFERENCE NO. 9-3

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REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S9-3
1			3				TOTAL SHEETS
2			4				32

DRAWN BY : J. B. W. DATE : 04/11/18
CHECKED BY : T. L. B. DATE : 02/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT					
							LIVELOAD FACTORS	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)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	⟨1⟩	1.05	--	1.75	0.762	1.30	A	I	47.17	0.996	1.43	B	I	89.85	0.80	0.762	1.05	A	I	47.17	
		HL-93(Opr)	N/A	--	1.68	--	1.35	0.762	1.68	A	I	47.17	0.996	1.88	B	I	89.85	N/A	0.762	N/A	N/A	N/A	N/A	
		HS-20(Inv)	36.000	⟨2⟩	1.45	52.200	1.75	0.762	1.79	A	I	47.17	0.996	1.95	B	I	89.85	0.80	0.762	1.45	A	I	47.17	
		HS-20(Opr)	36.000	--	2.32	83.520	1.35	0.762	2.32	A	I	47.17	0.996	2.56	B	I	89.85	N/A	0.762	N/A	N/A	N/A	N/A	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.43	46.305	1.40	0.762	5.30	A	I	47.17	0.996	6.19	A	I	84.90	0.80	0.762	3.43	A	I	47.17	
		SNGARBS2	20.000	--	2.48	49.600	1.40	0.762	3.83	A	I	47.17	0.996	4.32	A	I	84.90	0.80	0.762	2.48	A	I	47.17	
		SNAGRIS2	22.000	--	2.31	50.820	1.40	0.762	3.57	A	I	47.17	0.996	3.98	A	I	84.90	0.80	0.762	2.31	A	I	47.17	
		SNCOTTS3	27.250	--	1.69	46.053	1.40	0.762	2.61	A	I	47.17	0.996	3.03	A	I	84.90	0.80	0.762	1.69	A	I	47.17	
		SNAGGRS4	34.925	--	1.39	48.546	1.40	0.762	2.15	A	I	47.17	0.996	2.46	A	I	84.90	0.80	0.762	1.39	A	I	47.17	
		SNS5A	35.550	--	1.36	48.348	1.40	0.762	2.10	A	I	47.17	0.996	2.47	A	I	84.90	0.80	0.762	1.36	A	I	47.17	
		SNS6A	39.950	--	1.24	49.538	1.40	0.762	1.92	A	I	47.17	0.996	2.23	A	I	84.90	0.80	0.762	1.24	A	I	47.17	
		SNS7B	42.000	--	1.18	49.560	1.40	0.762	1.82	A	I	47.17	0.996	2.13	B	I	89.85	0.80	0.762	1.18	A	I	47.17	
	TTST	TNAGRIT3	33.000	--	1.51	49.830	1.40	0.762	2.33	A	I	47.17	0.996	2.65	B	I	89.85	0.80	0.762	1.51	A	I	47.17	
		TNT4A	33.075	--	1.51	49.943	1.40	0.762	2.34	A	I	47.17	0.996	2.63	A	I	84.90	0.80	0.762	1.51	A	I	47.17	
		TNT6A	41.600	--	1.22	50.752	1.40	0.762	1.89	A	I	47.17	0.996	2.28	B	I	89.85	0.80	0.762	1.22	A	I	47.17	
		TNT7A	42.000	--	1.23	51.660	1.40	0.762	1.90	A	I	47.17	0.996	2.24	A	I	84.90	0.80	0.762	1.23	A	I	47.17	
		TNT7B	42.000	--	1.25	52.500	1.40	0.762	1.94	A	I	47.17	0.996	2.13	A	I	84.90	0.80	0.762	1.25	A	I	47.17	
		TNAGRIT4	43.000	--	1.20	51.600	1.40	0.762	1.86	A	I	47.17	0.996	2.07	A	I	84.90	0.80	0.762	1.20	A	I	47.17	
		TNAGT5A	45.000	--	1.14	51.300	1.40	0.762	1.76	A	I	47.17	0.996	2.00	B	I	89.85	0.80	0.762	1.14	A	I	47.17	
		TNAGT5B	45.000	⟨3⟩	1.13	50.850	1.40	0.762	1.75	A	I	47.17	0.996	1.96	A	I	84.90	0.80	0.762	1.13	A	I	47.17	

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)

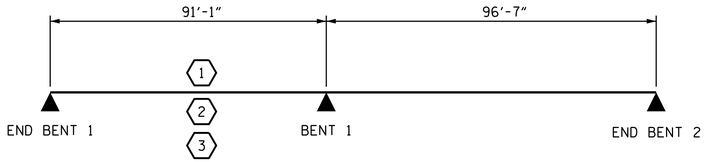
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

1998 2018
ALPHA & OMEGA GROUP
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NORTH CAROLINA PROFESSIONAL SEAL 14685 ENGINEER TED L. BARTELT
2/28/2018

REFERENCE NO. 9-4

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2			4			31

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DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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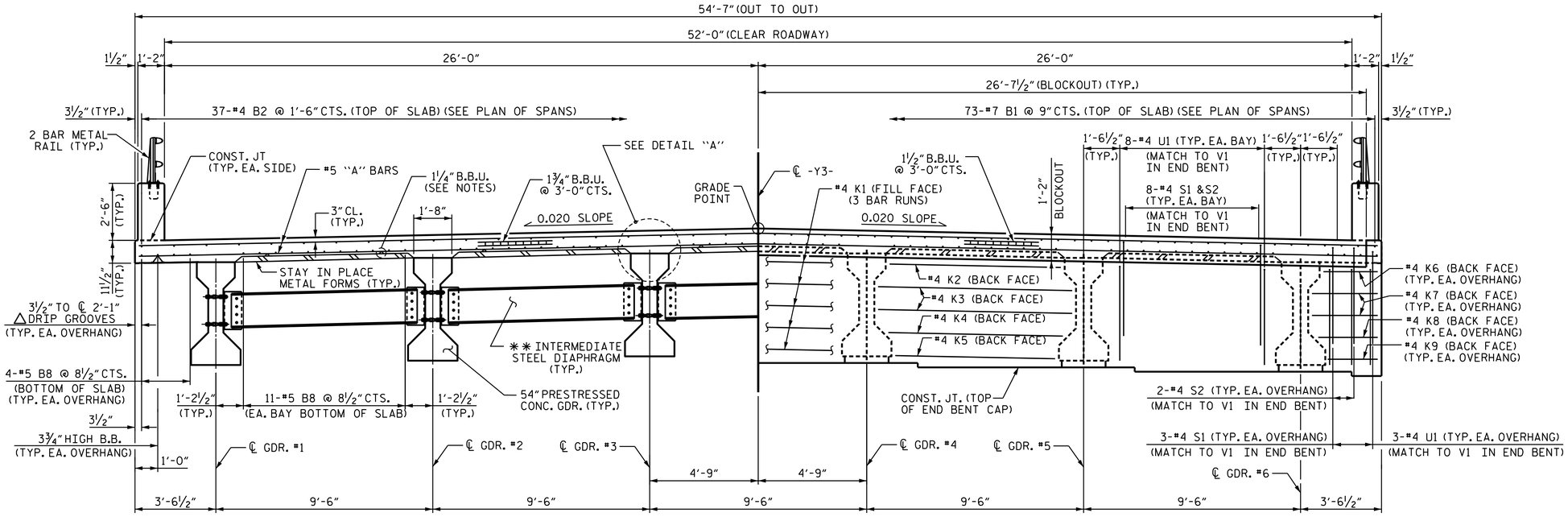
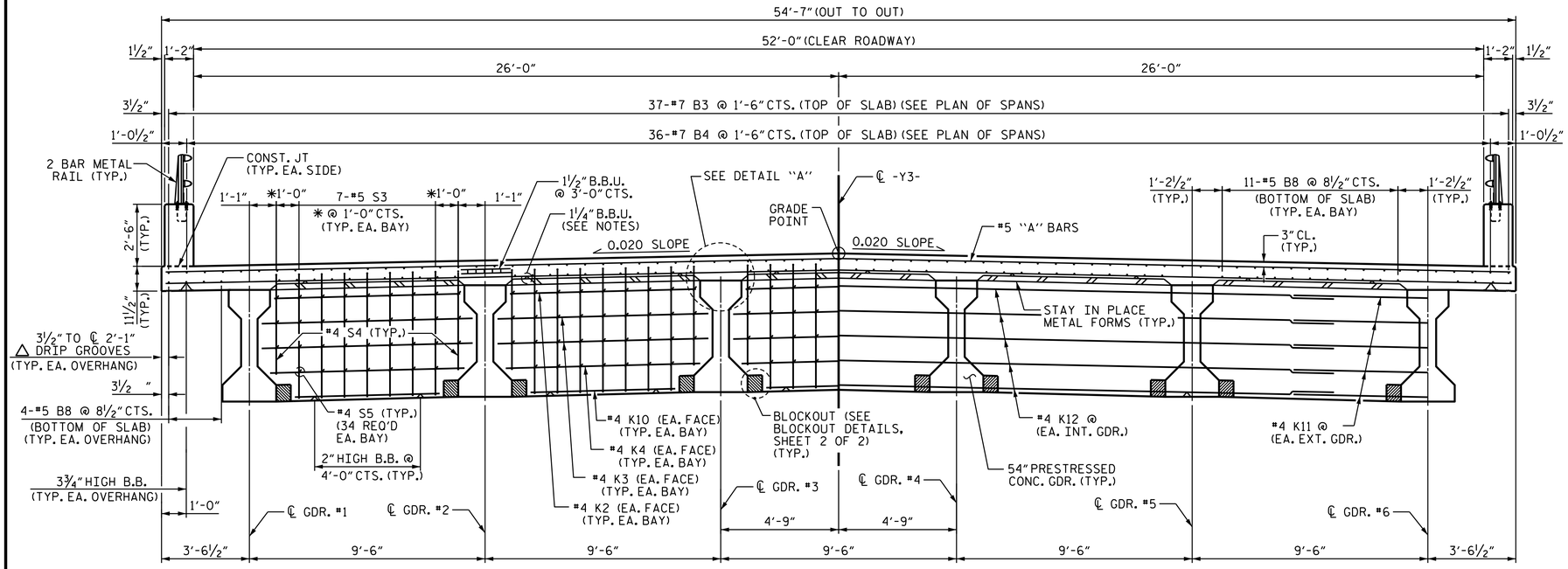


TYPICAL HALF SECTION AT INTERMEDIATE DIAPHRAGMS

TYPICAL HALF SECTION AT INTEGRAL END BENT



* DIMENSION MEASURED ALONG SKEW

TYPICAL SECTION AT BENT DIAPHRAGMS

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.

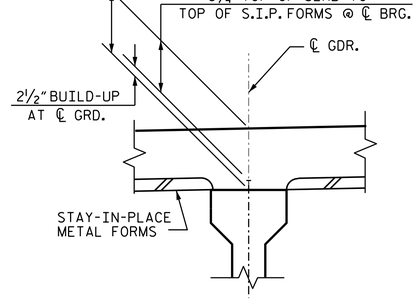
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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.

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

ALL BAR SUPPORTS USED IN THE CONCRETE PARAPET, DECK, AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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



DETAIL "A"

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-5
1			3			TOTAL SHEETS
2			4			31

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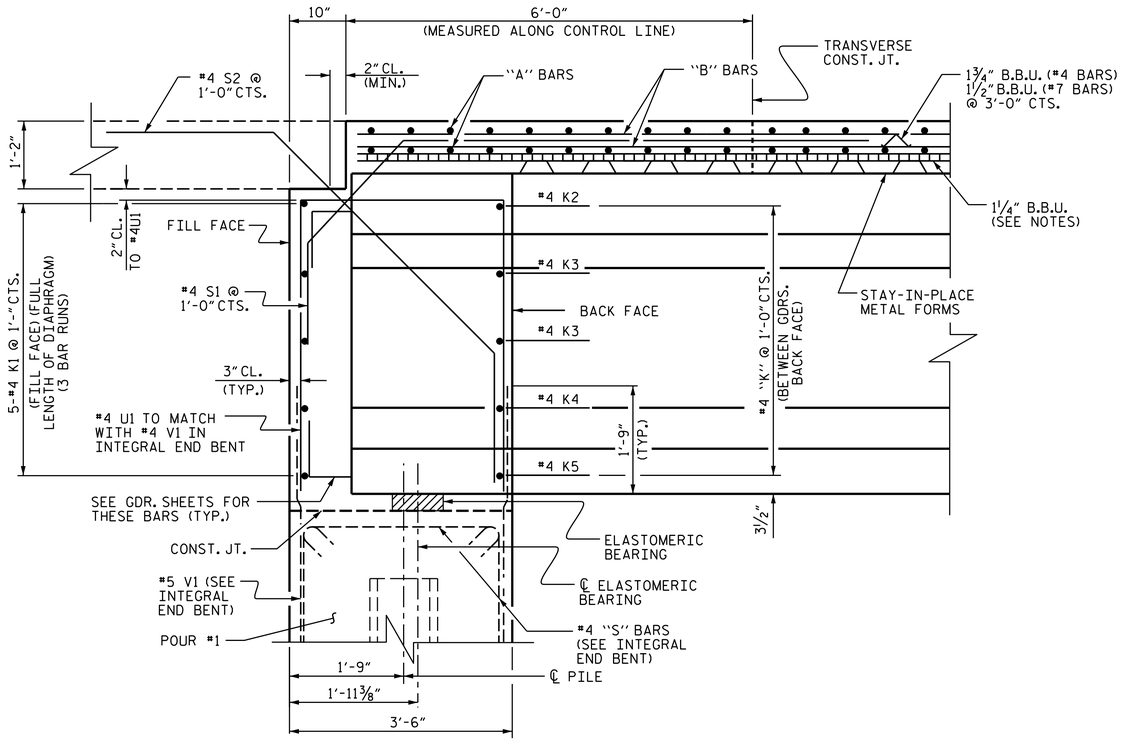
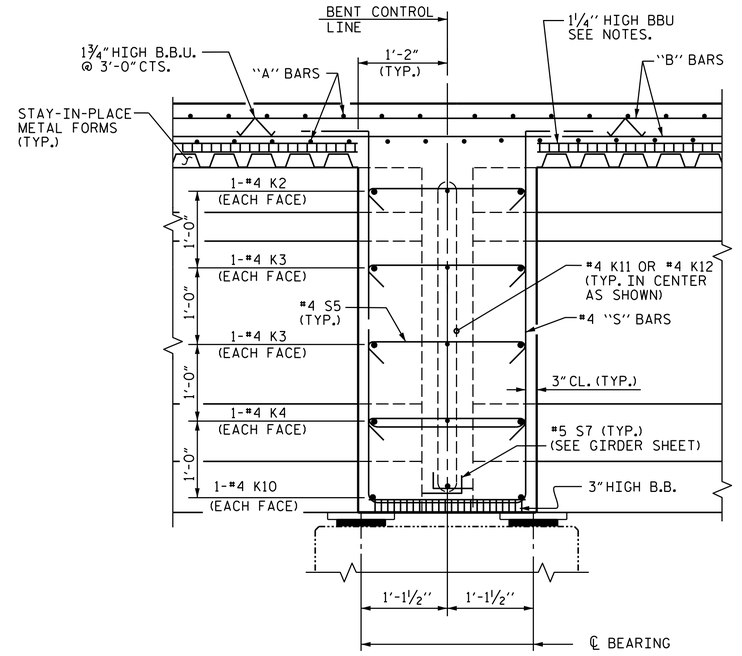
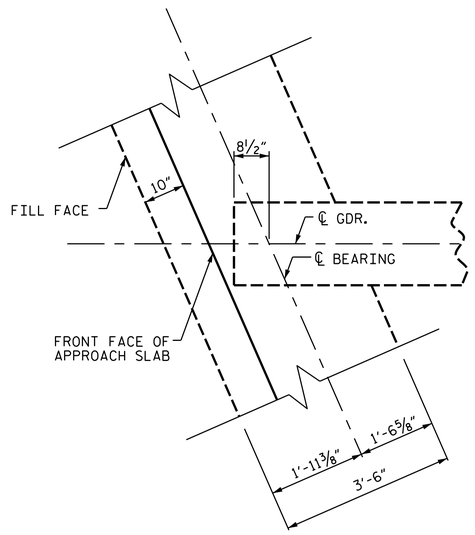


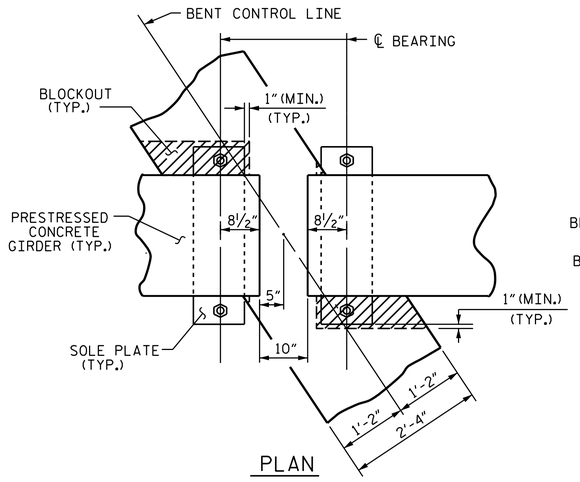
SECTION THRU INTEGRAL END BENT



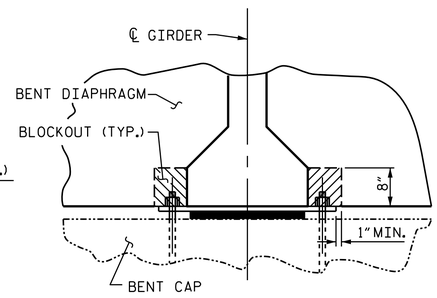
SECTION THRU BENT DIAPHRAGM



PLAN OF GIRDER AT INTEGRAL END BENT



PLAN



SECTION

BENT DIAPHRAGM BLOCK-OUT DETAIL

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-6
1			3			TOTAL SHEETS
2			4			31

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19453 T. L. D. L. BARTLETT

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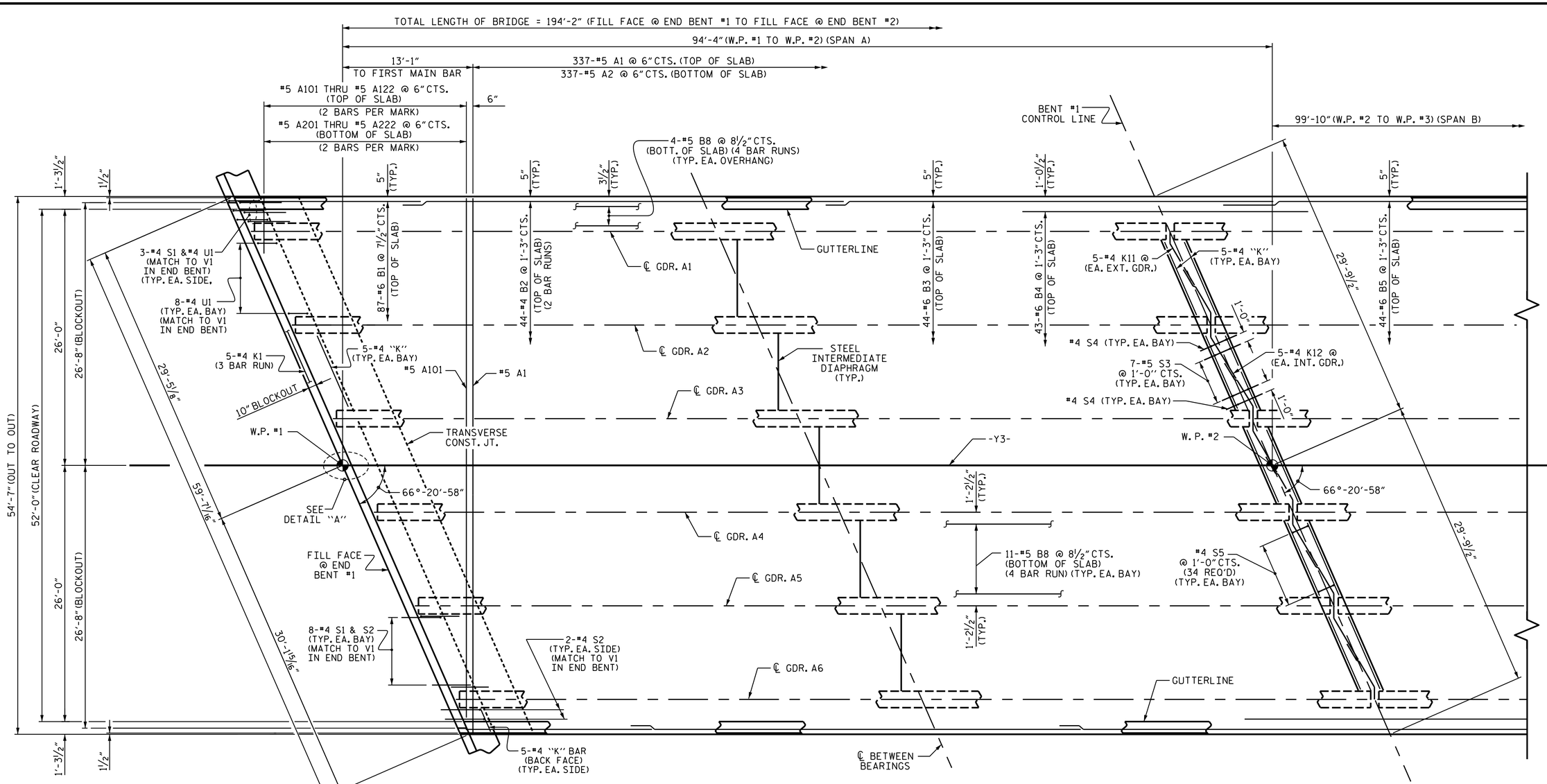
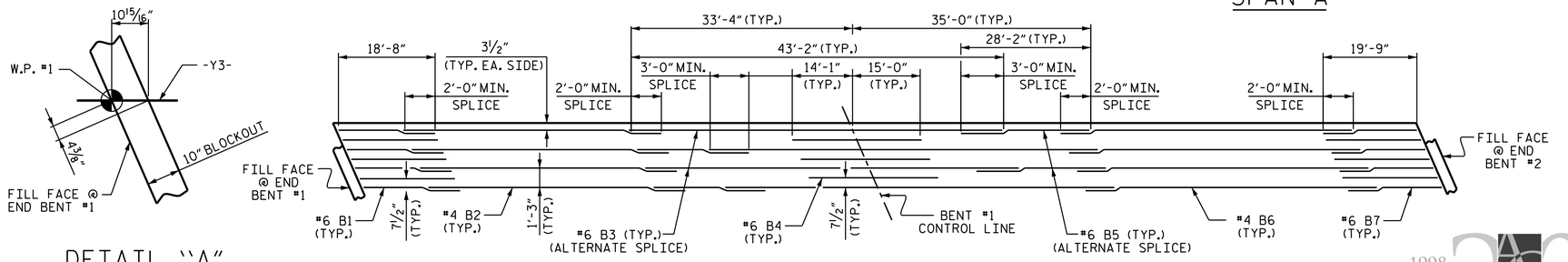


SPAN A



DETAIL "A"

TOP OF SLAB REINFORCING STEEL LAYOUT

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-7
1			3			TOTAL SHEETS
2			4			32

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12/7/2018

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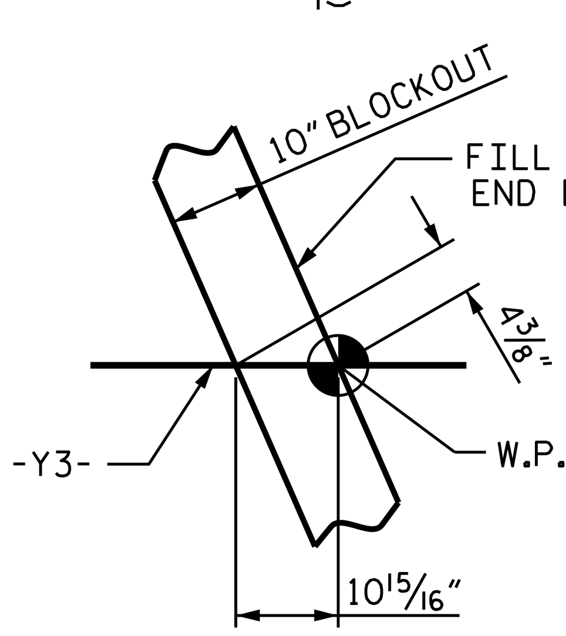
NOTES

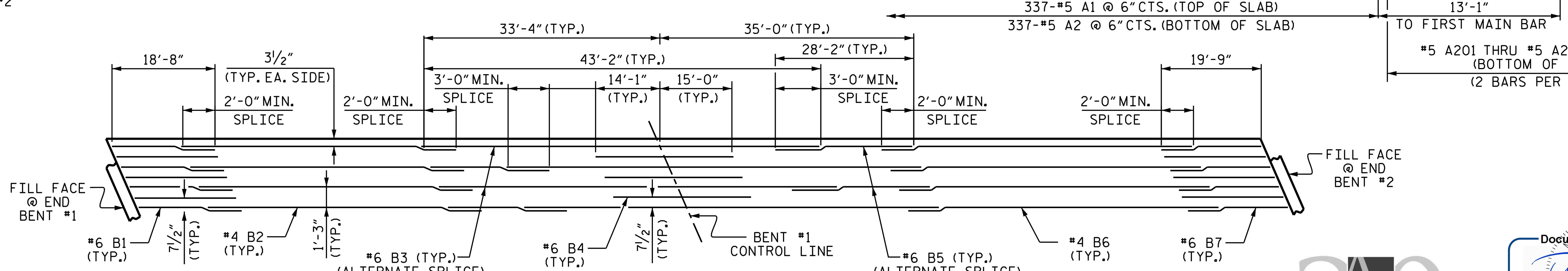
FOR LOCATION OF INTERMEDIATE DIAPHRAGMS, SEE "GIRDER LAYOUT" SHEETS. FOR DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.

FOR END BENT DIAKPHRAGM BARS AND BENT DIAPHRAGM BARS, SEE TYPICAL SECTION AND DETAILS.

SPAN B



DETAIL "B"



TOP OF SLAB REINFORCING STEEL LAYOUT

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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SUPERSTRUCTURE

PLAN OF SPAN B

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NO.	BY:	DATE:	NO.	BY:	DATE:	S9-8
1			3			TOTAL SHEETS
2			4			32

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GIRDER LAYOUT

SOLE PLATE LOCATION TABLE @ BENT #1			
SPAN A		SPAN B	
GIRDER	PLATE	GIRDER	PLATE
A1	P1	B1	P1
A2	P1	B2	P1
A3	P1	B3	P1
A4	P2	B4	P2
A5	P1	B5	P1
A6	P1	B6	P1

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 52+32.96 -Y3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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SUPERSTRUCTURE
GIRDER LAYOUT

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

SHEET NO. S9-9
TOTAL SHEETS 32

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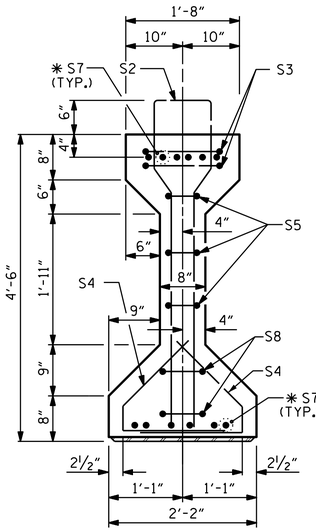
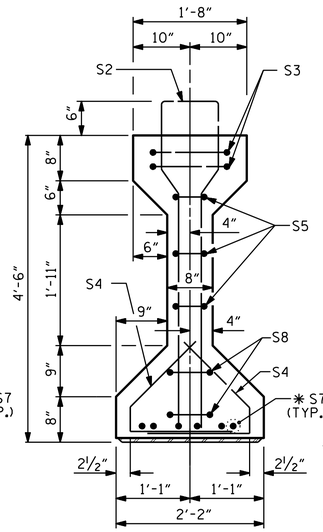
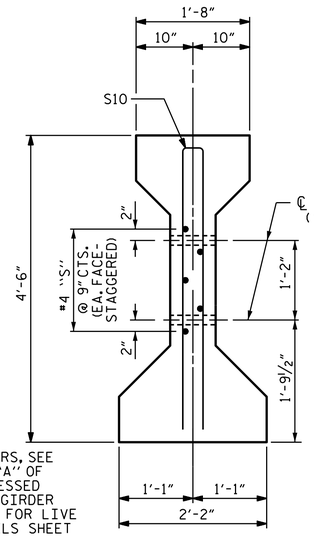


SECTION A-A



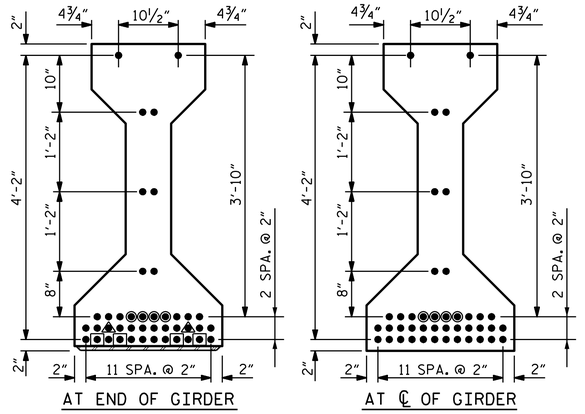
SECTION B-B



SECTION C-C

(S1 BARS NOT SHOWN)

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



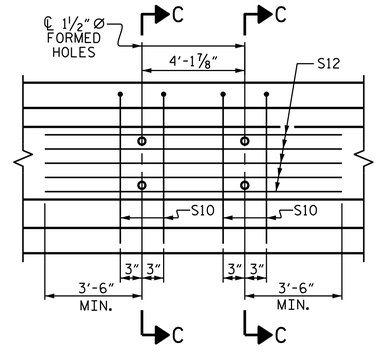
0.6"Ø LOW RELAXATION STRAND LAYOUT

▲ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER

■ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

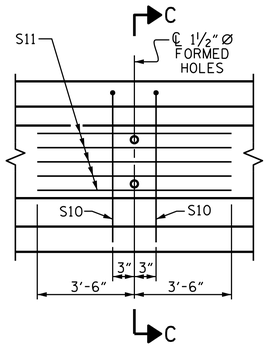
● OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND



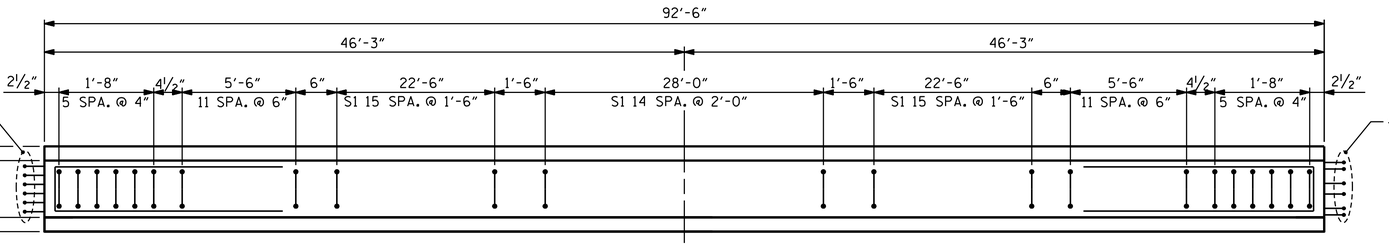
PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR INTERIOR GIRDERS.

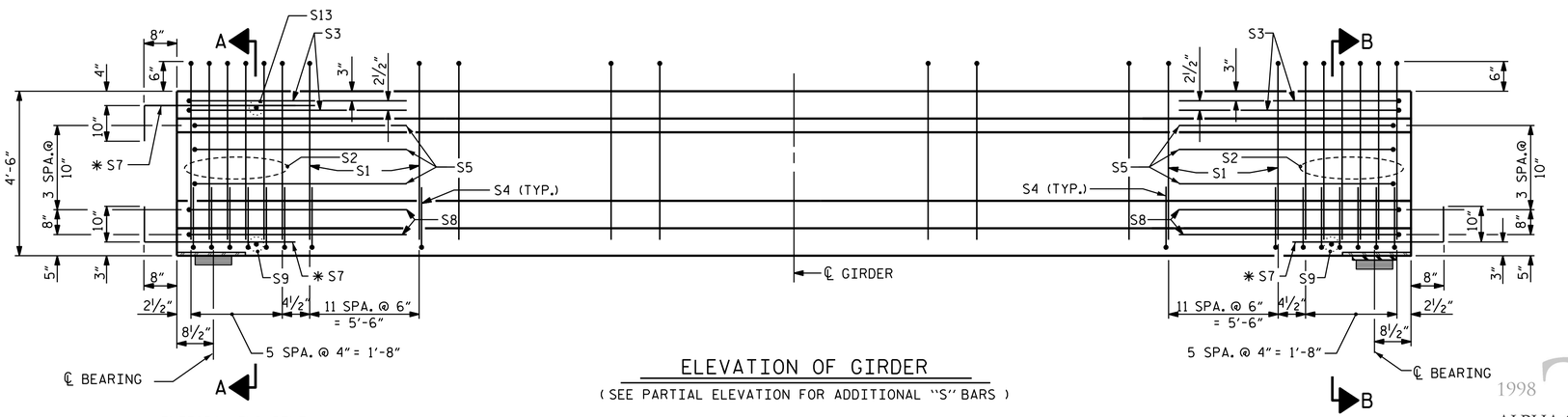


PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR EXTERIOR



PLAN OF GIRDER



INTEGRAL END BENT

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

FIX

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

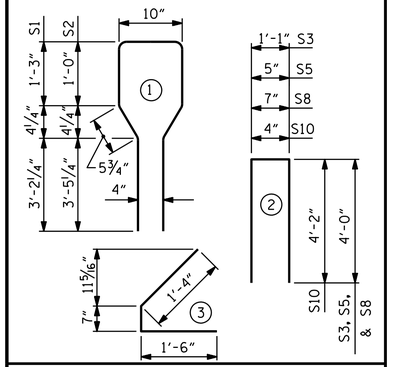
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
EXTERIOR GDR.	S1	71	#5	1	10'-8"	790
INTERIOR GDR.	S1	71	#5	1	10'-8"	790
	S2	12	#6	1	10'-8"	192
	S3	4	#4	2	9'-1"	24
	S4	72	#4	3	3'-5"	164
	S5	6	#4	2	8'-5"	34
	✱S7	18	#5	STR	3'-8"	69
	S8	4	#4	2	8'-7"	23
	S9	2	#3	STR	1'-10"	1
EXTERIOR GDR.	S10	2	#5	2	8'-8"	18
INTERIOR GDR.	S10	4	#5	2	8'-8"	36
EXTERIOR GDR.	S11	5	#4	STR	7'-0"	23
INTERIOR GDR.	S12	5	#4	STR	11'-2"	37
	S13	1	#3	STR	1'-4"	1

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL LB.	8000 PSI CONCRETE C.Y.	0.6"Ø L.R. STRANDS No.
EXTERIOR GIRDER	1339	18.8	42
INTERIOR GIRDER	1371	18.8	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	92'-6"	555'-0"

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

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

DRAWN BY : J. B. W. DATE : 02/20/18
CHECKED BY : T. L. B. DATE : 02/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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A&O PROJECT NO. 2015.042

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NORTH CAROLINA PROFESSIONAL SEAL 19855 ENGINEER TED L. BARTELT
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10/11/2018 3:33:39 PM EDT

REFERENCE NO. 9-10

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2			4		

SHEET NO. S9-10

TOTAL SHEETS 32

STD. NO. PCG6 (Sht. 2)

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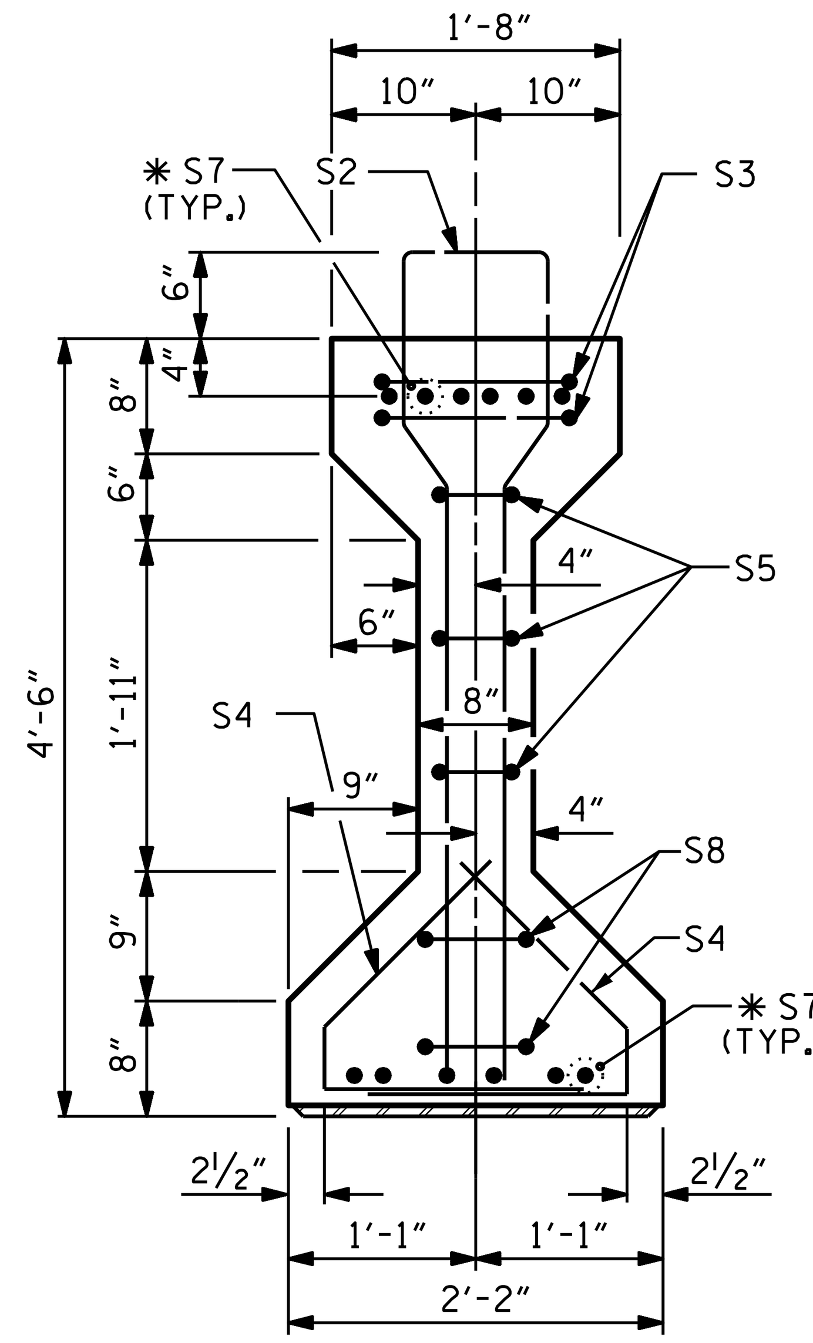
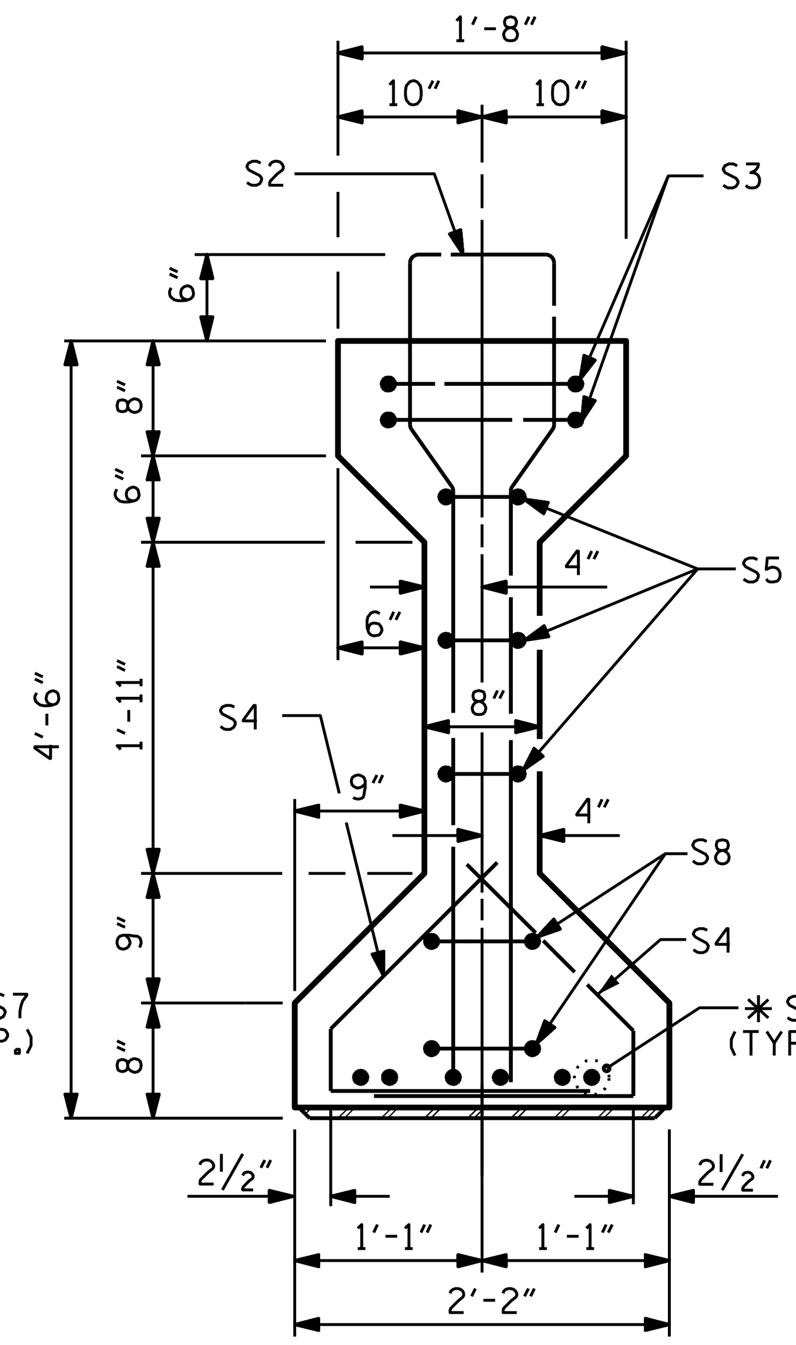
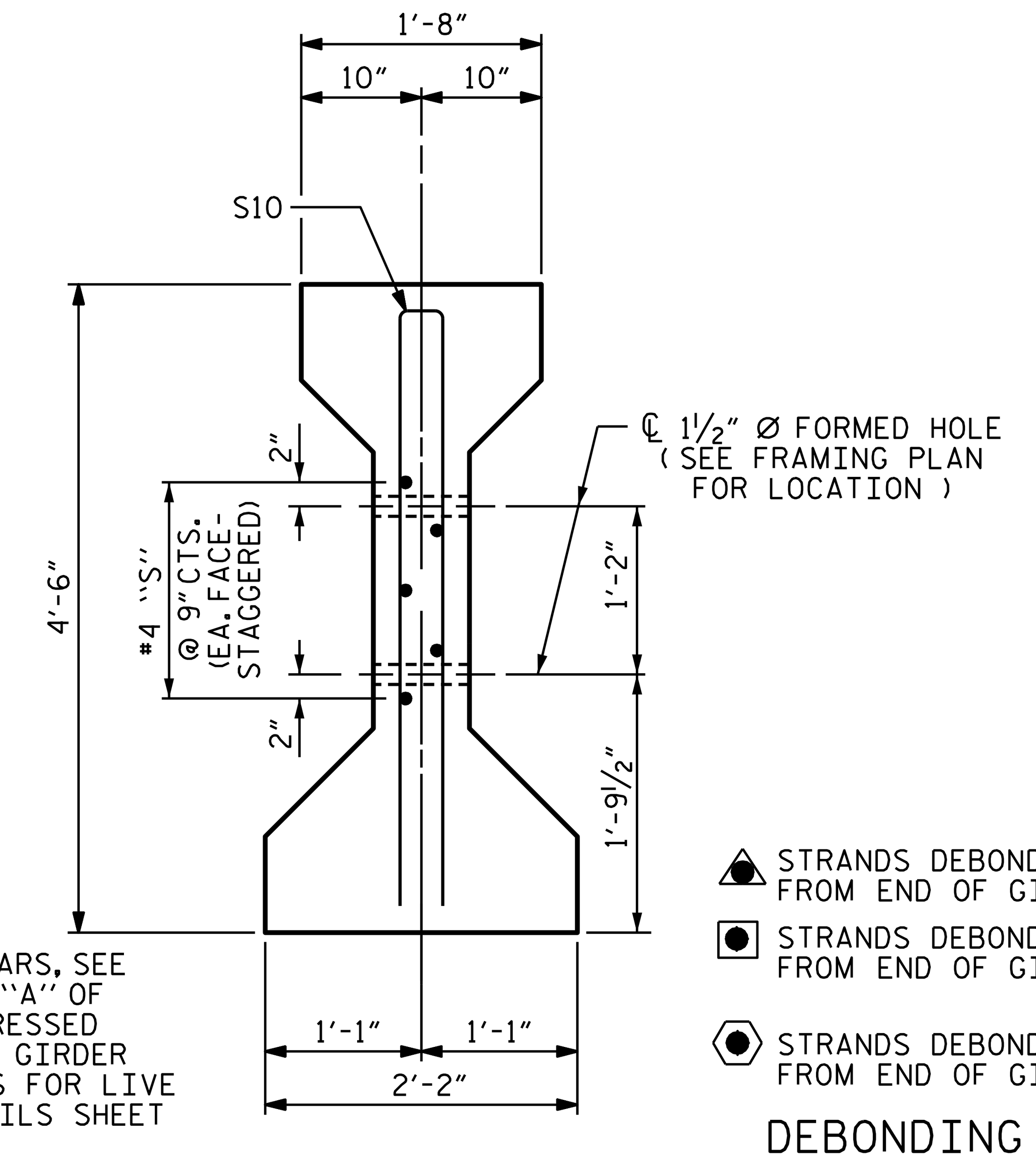


SECTION A-A



SECTION B-B

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



SECTION C-C

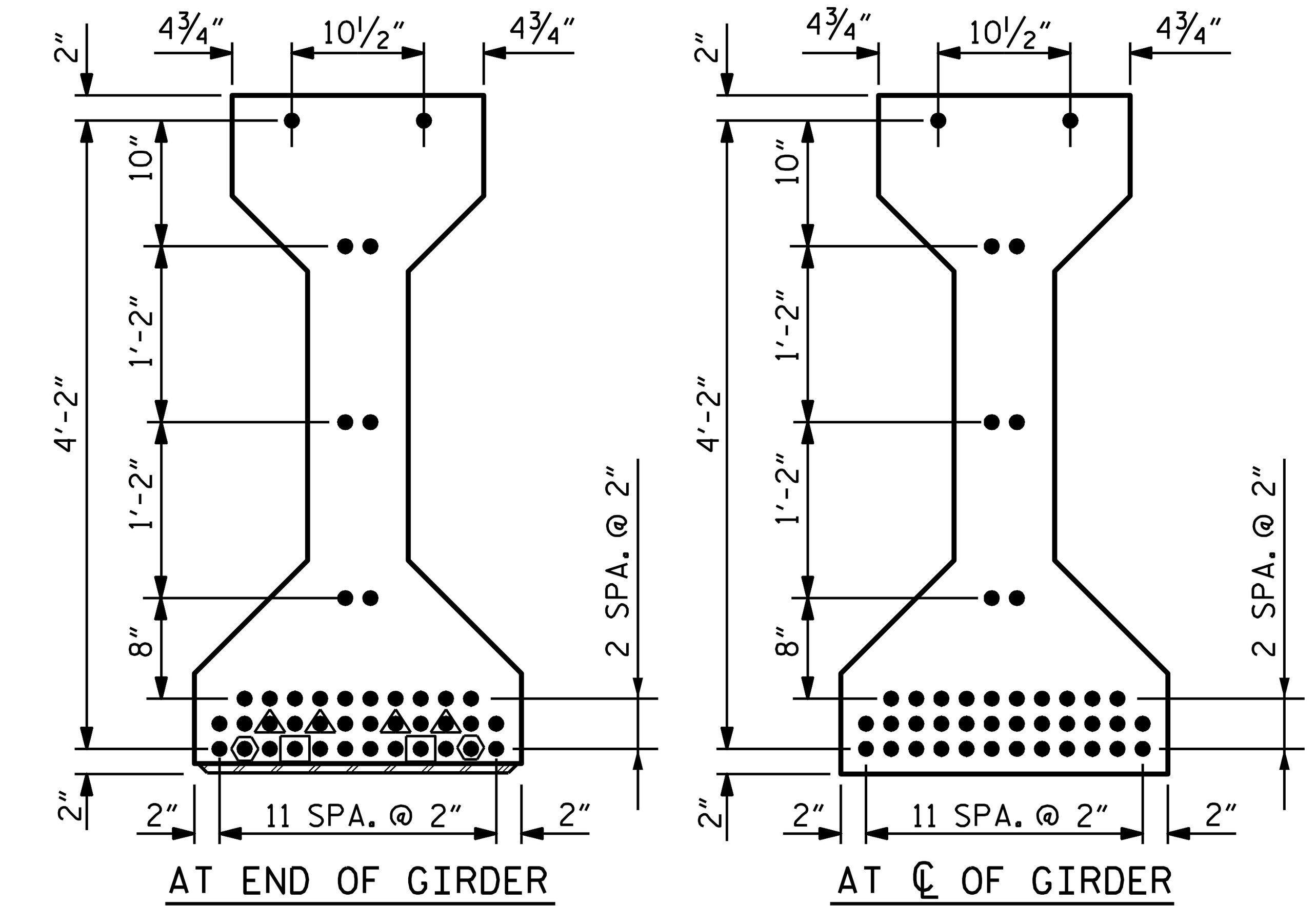
(S1 BARS NOT SHOWN)

▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER

■ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

⬢ STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER

DEBONDING LEGEND



0.6" Ø LOW RELAXATION STRAND LAYOUT

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

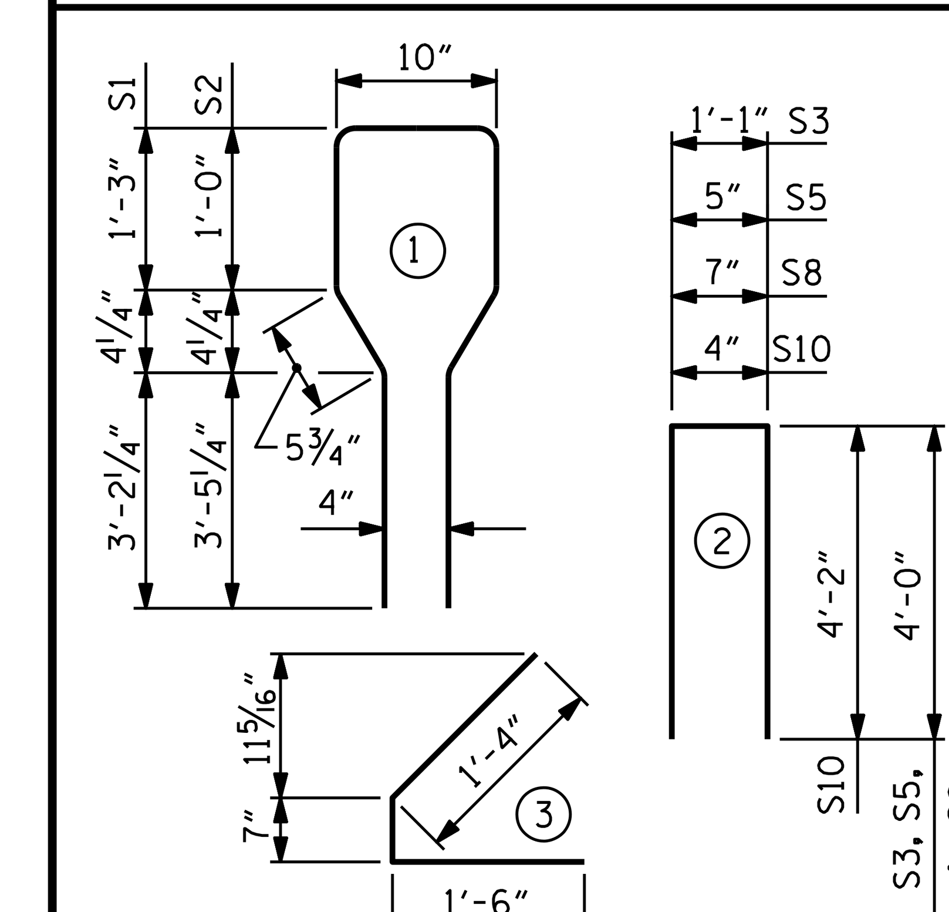
REINFORCING STEEL FOR ONE GIRDER

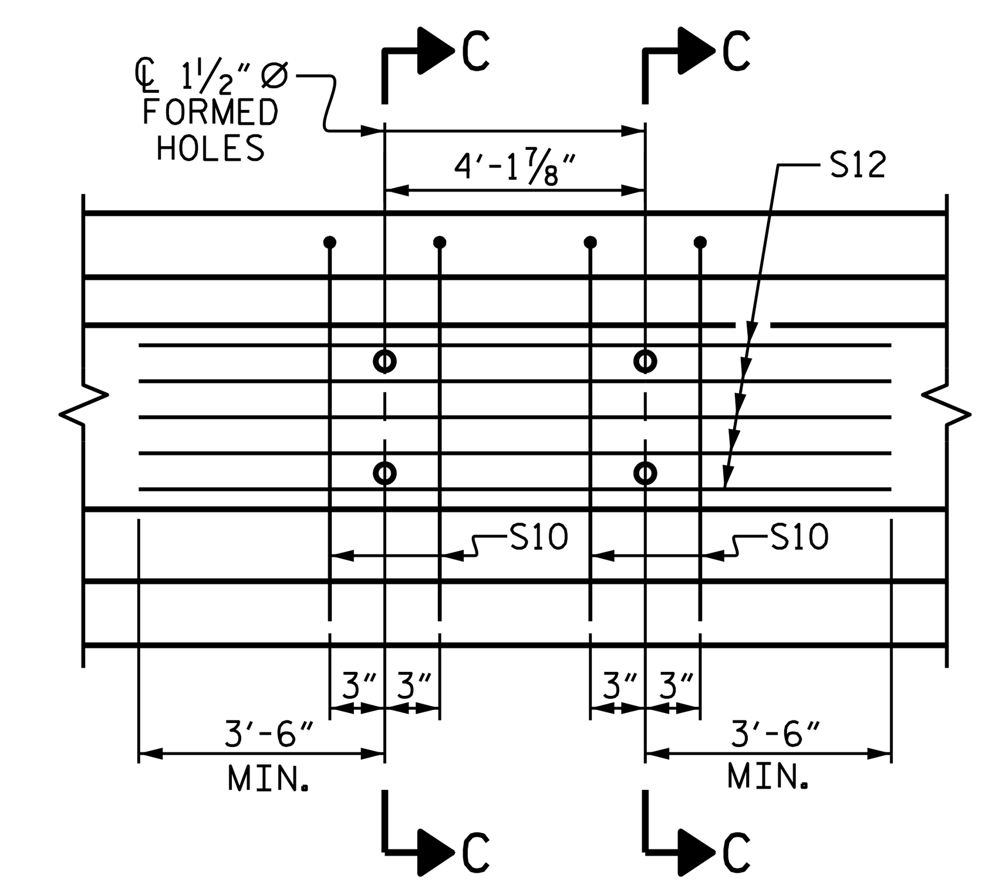
	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
EXTERIOR GDR.	S1	73	#5	1	10'-8"	812
INTERIOR GDR.	S1	73	#5	1	10'-8"	812
	S2	12	#6	1	10'-8"	192
	S3	4	#4	2	9'-1"	24
	S4	72	#4	3	3'-5"	164
	S5	6	#4	2	8'-5"	34
	* S7	18	#5	STR	3'-8"	69
	S8	4	#4	2	8'-7"	23
	S9	2	#3	STR	1'-10"	1
EXTERIOR GDR.	S10	2	#5	2	8'-8"	18
INTERIOR GDR.	S10	4	#5	2	8'-8"	36
EXTERIOR GDR.	S11	5	#4	STR	7'-0"	23
INTERIOR GDR.	S12	5	#4	STR	11'-2"	37
	S13	1	#3	STR	1'-4"	1

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

BAR TYPES

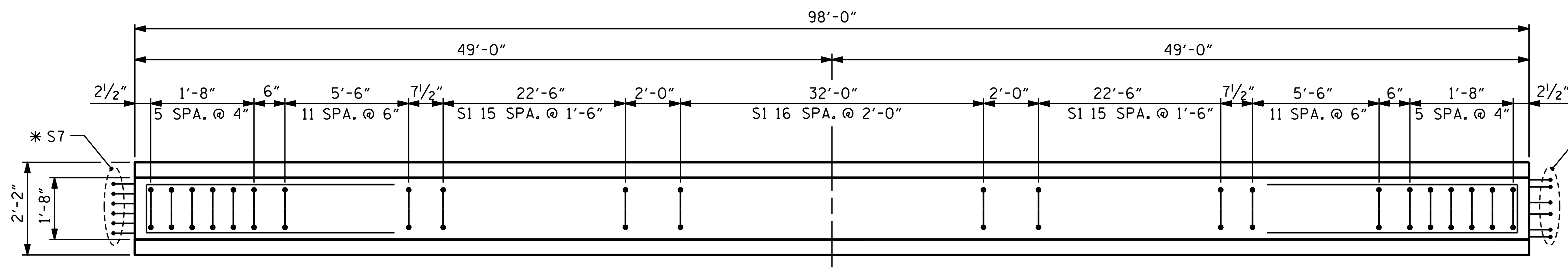
ALL BAR DIMENSIONS ARE OUT-TO-OUT



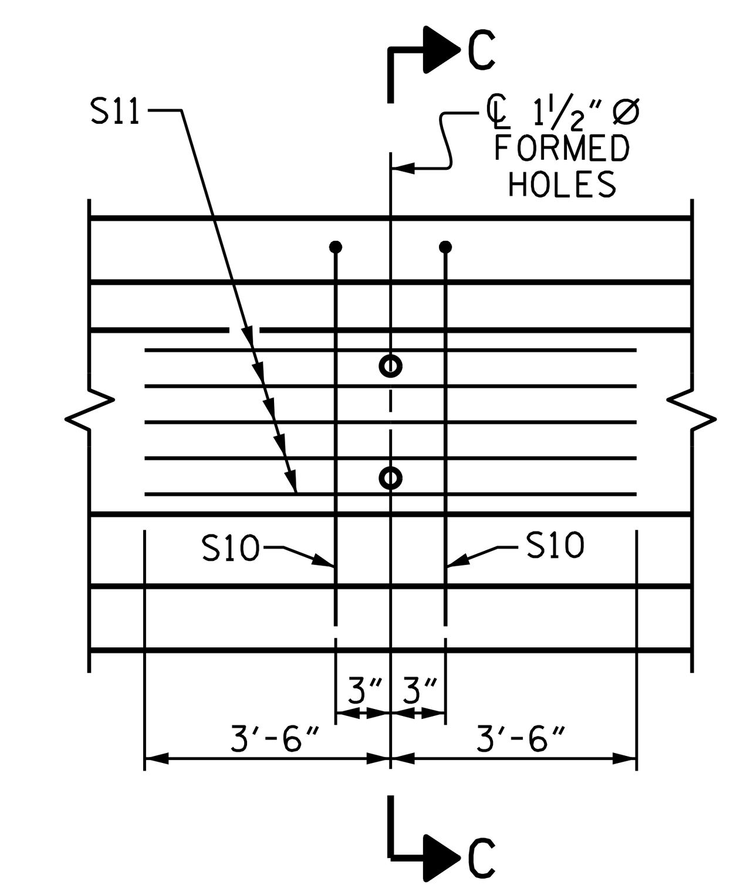


PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS.



PLAN OF GIRDER

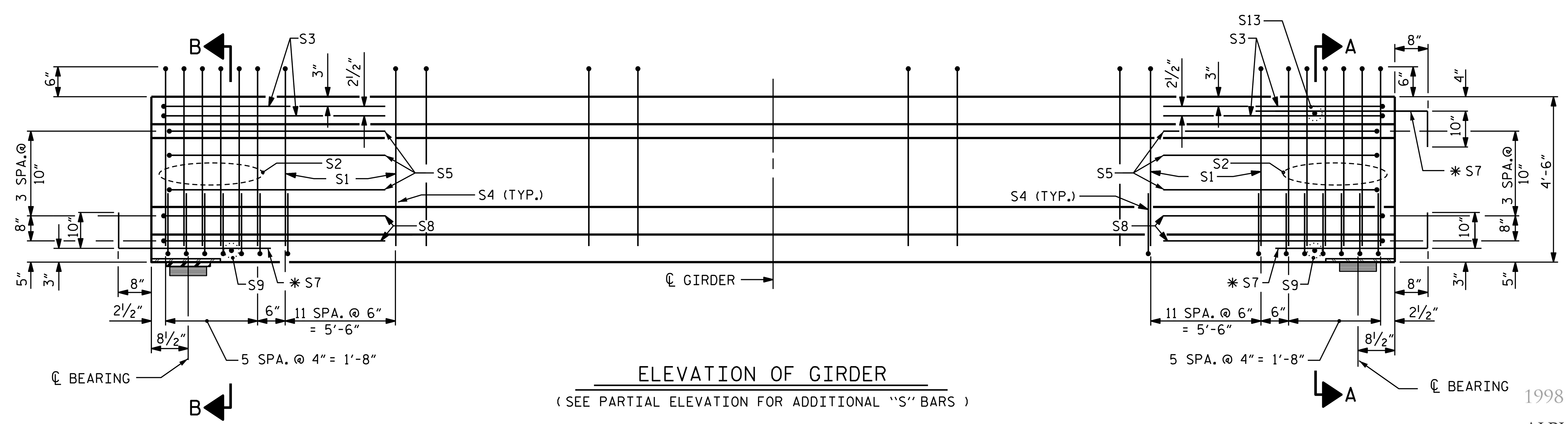


PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR EXTERIOR GIRDERS

QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL	8000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXTERIOR GIRDER	1361	19.9	42
INTERIOR GIRDER	1393	19.9	42

GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
6	98'-0"	588'-0"



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 2 OF 4

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTELT
12/7/2018

REFERENCE NO. 9-11

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S9-11
1			3				TOTAL SHEETS
2			4				32

DRAWN BY : J. B. W. DATE : 02/20/18
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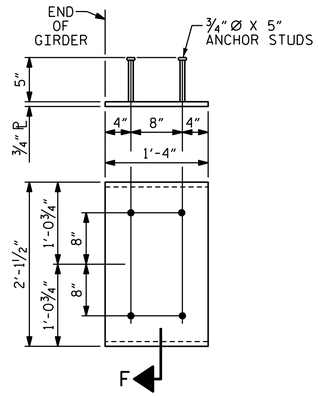
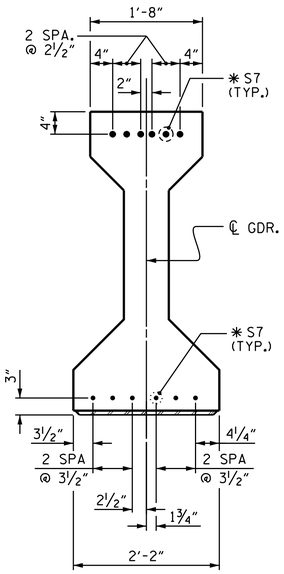
STD. NO. PCG6 (Sht. 2)



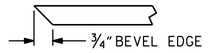
EMBEDDED PLATE "B-1" DETAILS

(2 REQ'D PER GIRDER)



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



SECTION "F"

(SEE NOTES)

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6" Ø LOW RELAXATION		INTERIOR GIRDER										
TENTH POINTS		0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE)	↑	0.0	0.057	0.107	0.147	0.172	0.180	0.172	0.147	0.107	0.057	0.0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.0	0.038	0.075	0.104	0.122	0.128	0.122	0.104	0.075	0.038	0.0
FINAL CAMBER	↑	0.0	¼"	⅜"	½"	⅝"	⅝"	⅝"	½"	⅜"	¼"	0.0

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6" Ø LOW RELAXATION		EXTERIOR GIRDER										
TENTH POINTS		0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE)	↑	0.0	0.057	0.107	0.147	0.172	0.180	0.172	0.147	0.107	0.057	0.0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.0	0.032	0.063	0.087	0.103	0.108	0.103	0.087	0.063	0.032	0.0
FINAL CAMBER	↑	0.0	5/16"	½"	11/16"	13/16"	⅞"	13/16"	11/16"	½"	5/16"	0.0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6" Ø LOW RELAXATION		INTERIOR GIRDER										
TENTH POINTS		0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE)	↑	0.0	0.072	0.136	0.186	0.218	0.229	0.218	0.186	0.136	0.072	0.0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.0	0.051	0.100	0.138	0.162	0.171	0.162	0.138	0.100	0.051	0.0
FINAL CAMBER	↑	0.0	¼"	7/16"	9/16"	11/16"	11/16"	11/16"	9/16"	7/16"	¼"	0.0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6" Ø LOW RELAXATION		EXTERIOR GIRDER										
TENTH POINTS		0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
CAMBER (GIRDER ALONE IN PLACE)	↑	0.0	0.072	0.136	0.186	0.218	0.229	0.218	0.186	0.136	0.072	0.0
✱ DEFLECTION DUE TO SUPERIMPOSED D.L.	↓	0.0	0.043	0.084	0.116	0.137	0.144	0.137	0.116	0.084	0.043	0.0
FINAL CAMBER	↑	0.0	5/16"	⅝"	13/16"	1"	1"	1"	13/16"	⅝"	5/16"	0.0

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

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6000 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".

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: 52+32.96 -Y3-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-12
1			3			TOTAL SHEETS
2			4			32

REFERENCE NO. 9-12

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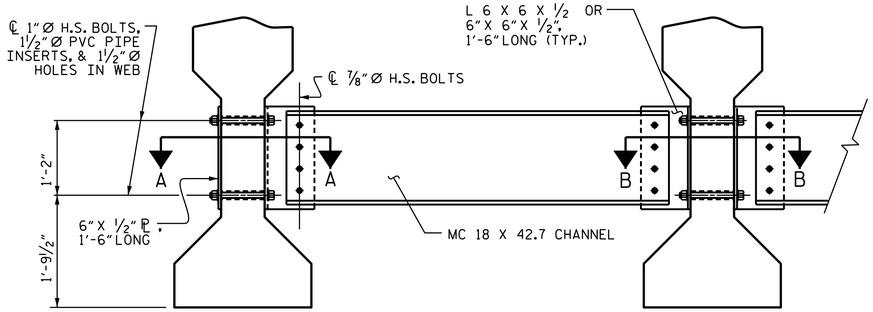
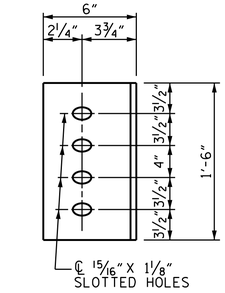
STD. NO. PCG9 (Sht. 3a)

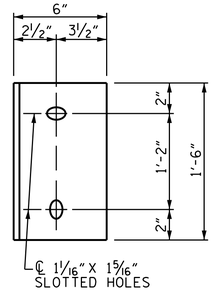


EXTERIOR GIRDER INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE



WEB FACE

CONNECTOR PLATE DETAILS

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.

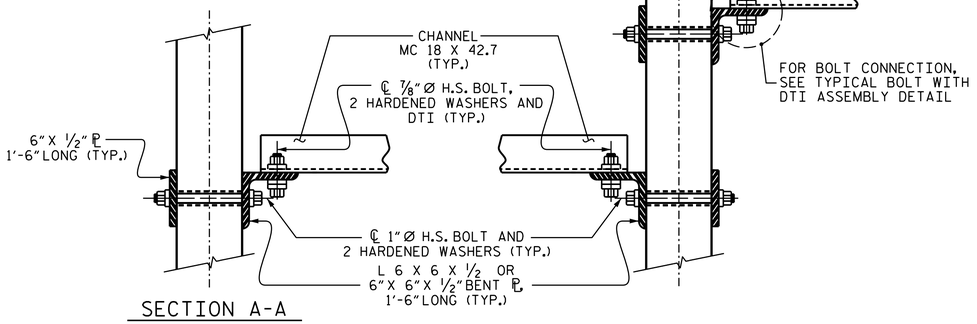
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼"PROJECTION BEYOND THE NUT.

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.



SECTION A-A

SECTION B-B

CONNECTION DETAILS

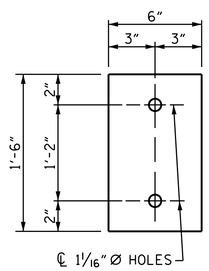
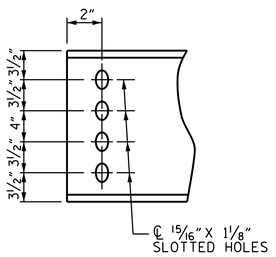
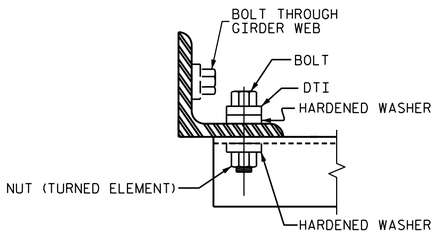


PLATE DETAILS



CHANNEL END



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

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:	S9-13
1			3			TOTAL SHEETS
2			4			31

REFERENCE NO. 9-13

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NORTH CAROLINA 14450 ENGINEER T. L. BARTLETT

12/7/2018

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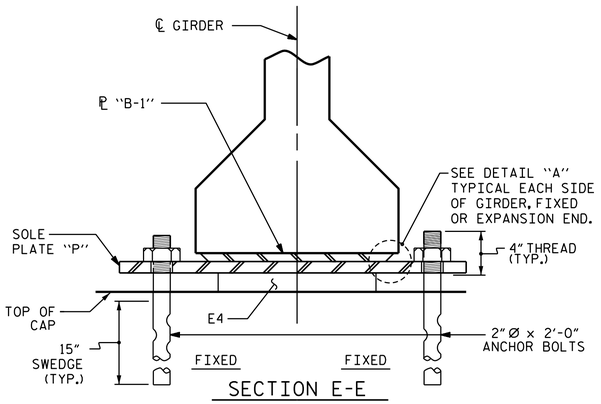
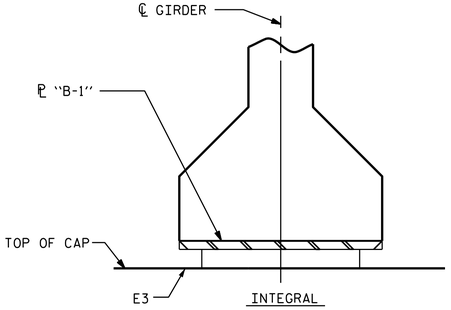
STD. NO. PCG10 (SHT 1)

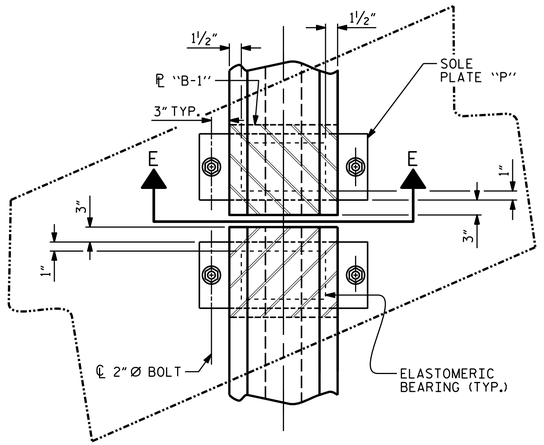


SECTION E-E



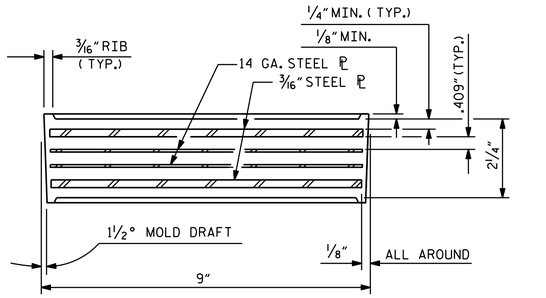
SECTION F-F

AT INTEGRAL END BENTS

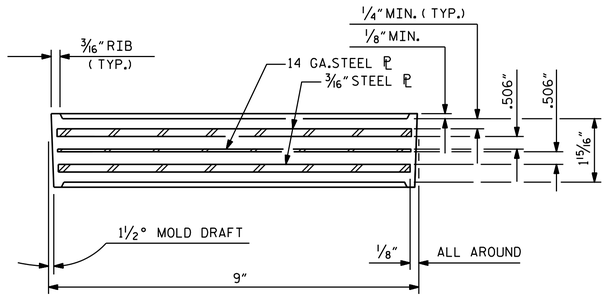


TYPICAL PLAN

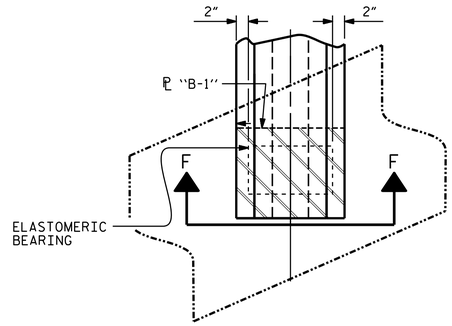
(SHOWING CONTINUOUS BENT)



TYPICAL SECTION OF ELASTOMERIC BEARINGS



TYPICAL SECTION OF ELASTOMERIC BEARINGS



TYPICAL PLAN

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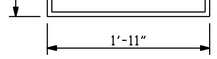
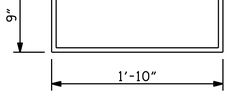


E4 (12 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

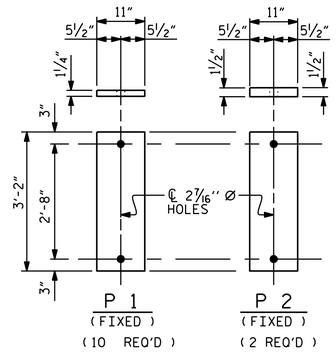
TYPE V



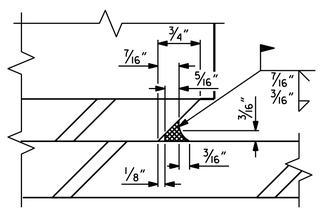
E3 (12 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV



SOLE PLATE DETAILS ("P")



DETAIL "A"

NOTES

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

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

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

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

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

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

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k
TYPE V	365 k

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

DRAWN BY : J. B. W. DATE : 02/20/18

CHECKED BY : T. L. B. DATE : 02/20/18

DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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A&O PROJECT NO. 2015.042

NORTH CAROLINA PROFESSIONAL SEAL 19436 ENGINEER T. L. BARTELL

Docusigned by: D7945976456A4F7...

12/7/2018

REFERENCE NO. 9-14

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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:	S9-14
1			3			TOTAL SHEETS
2			4			32

STD. NO. EB4

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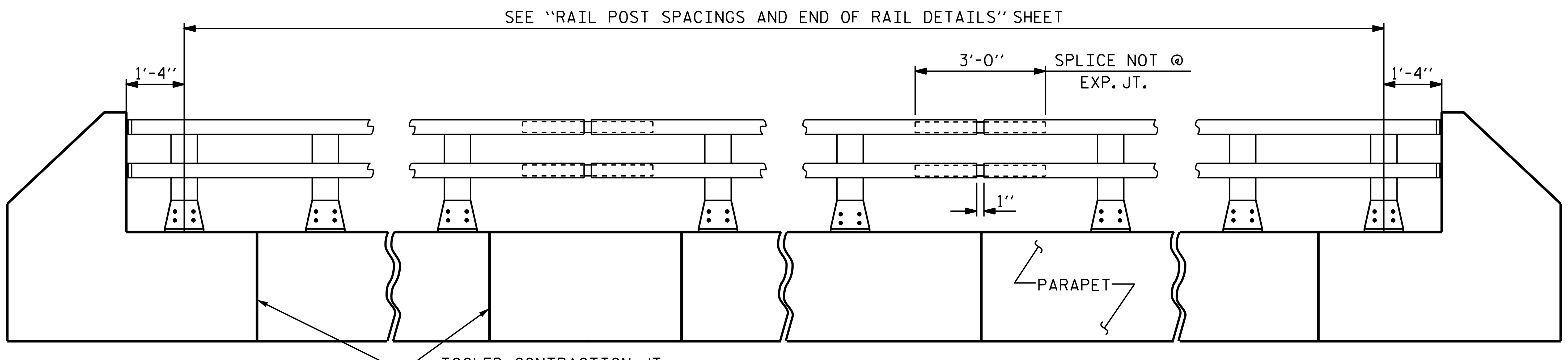
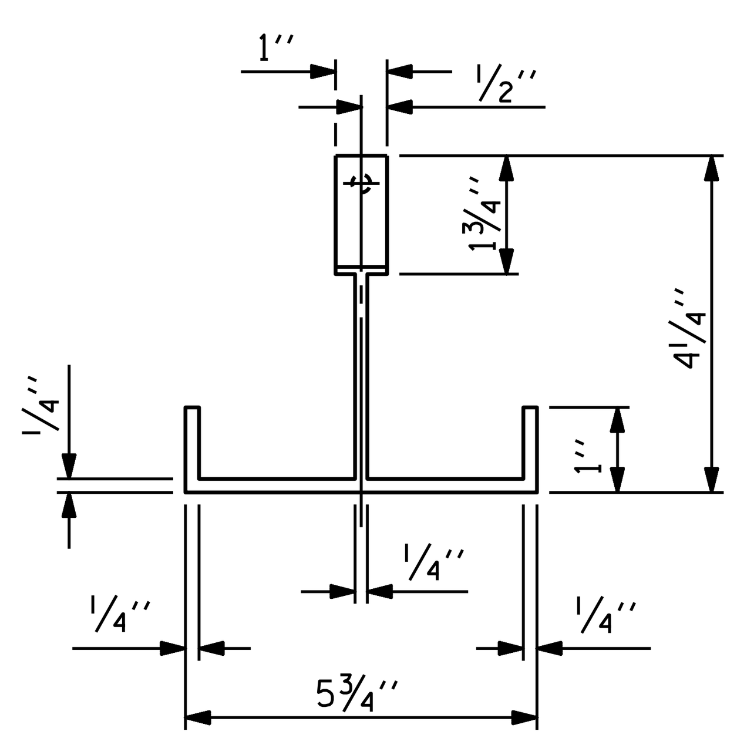
$$$$USERNAME$$$$

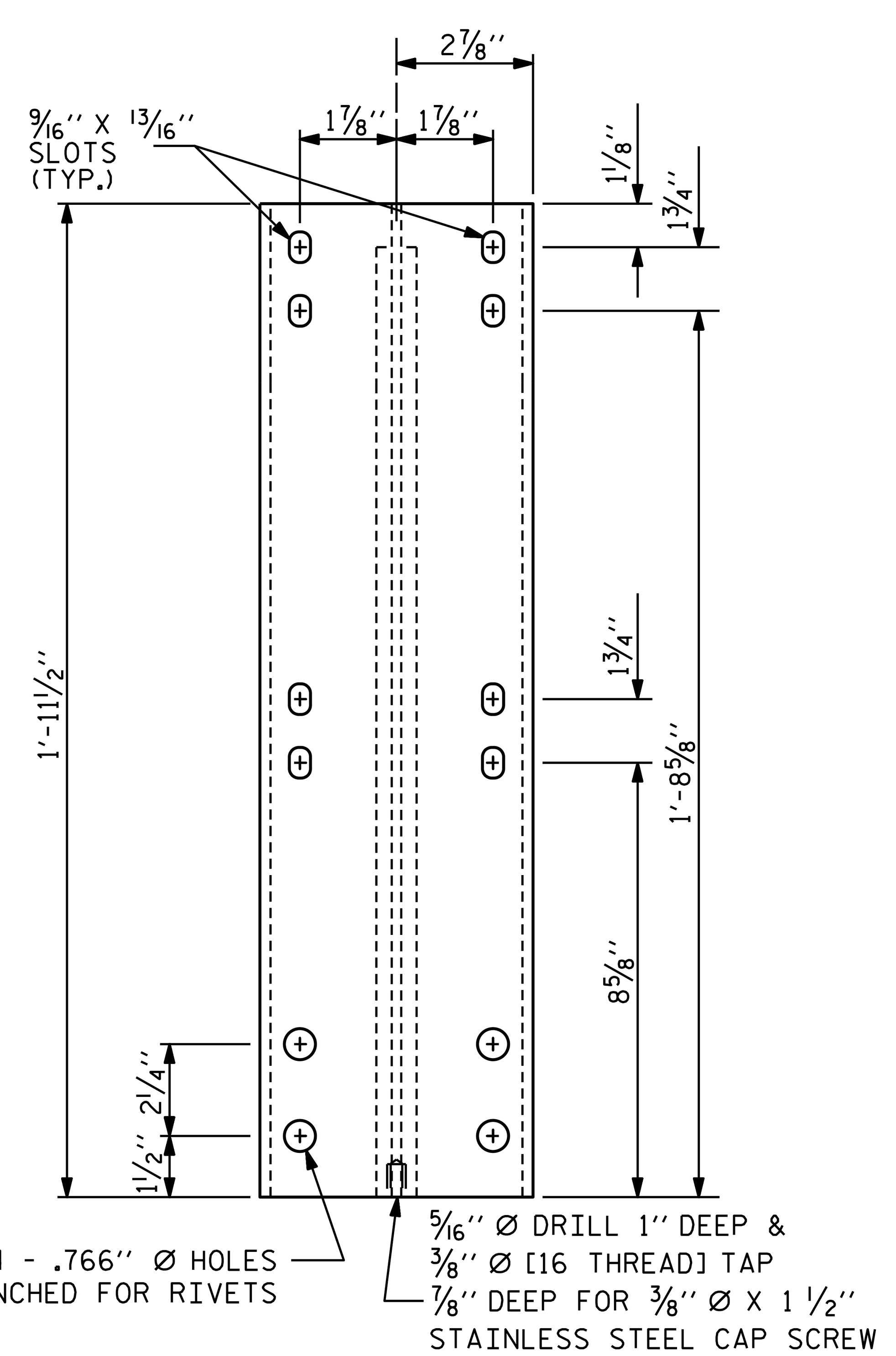


ELEVATION

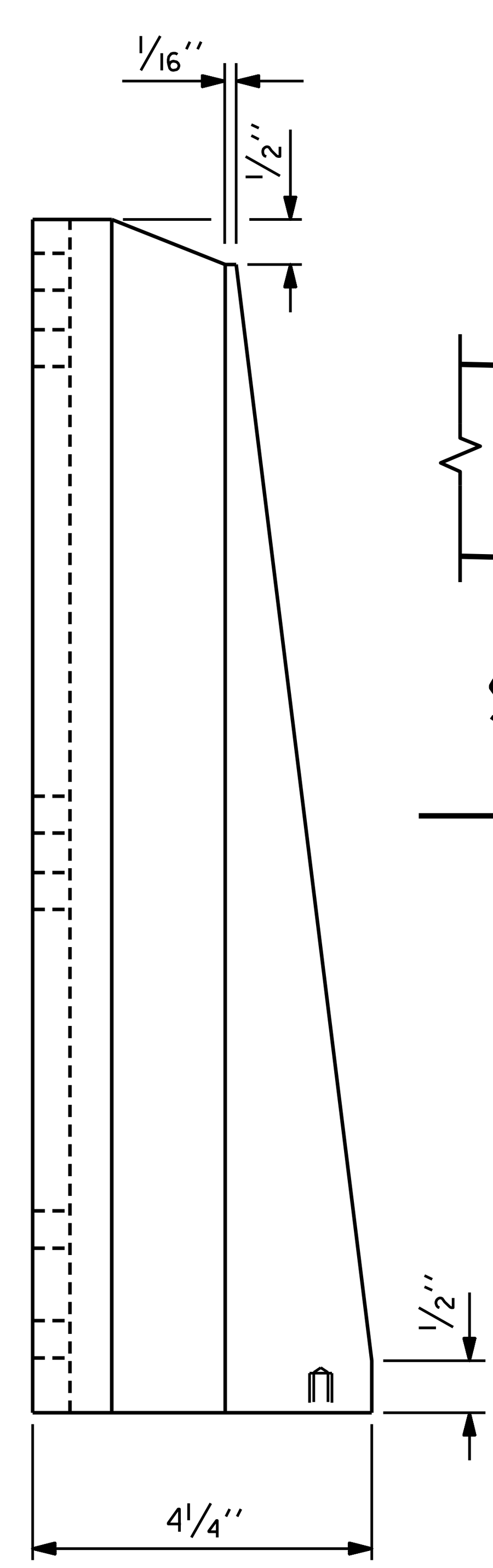
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



PLAN

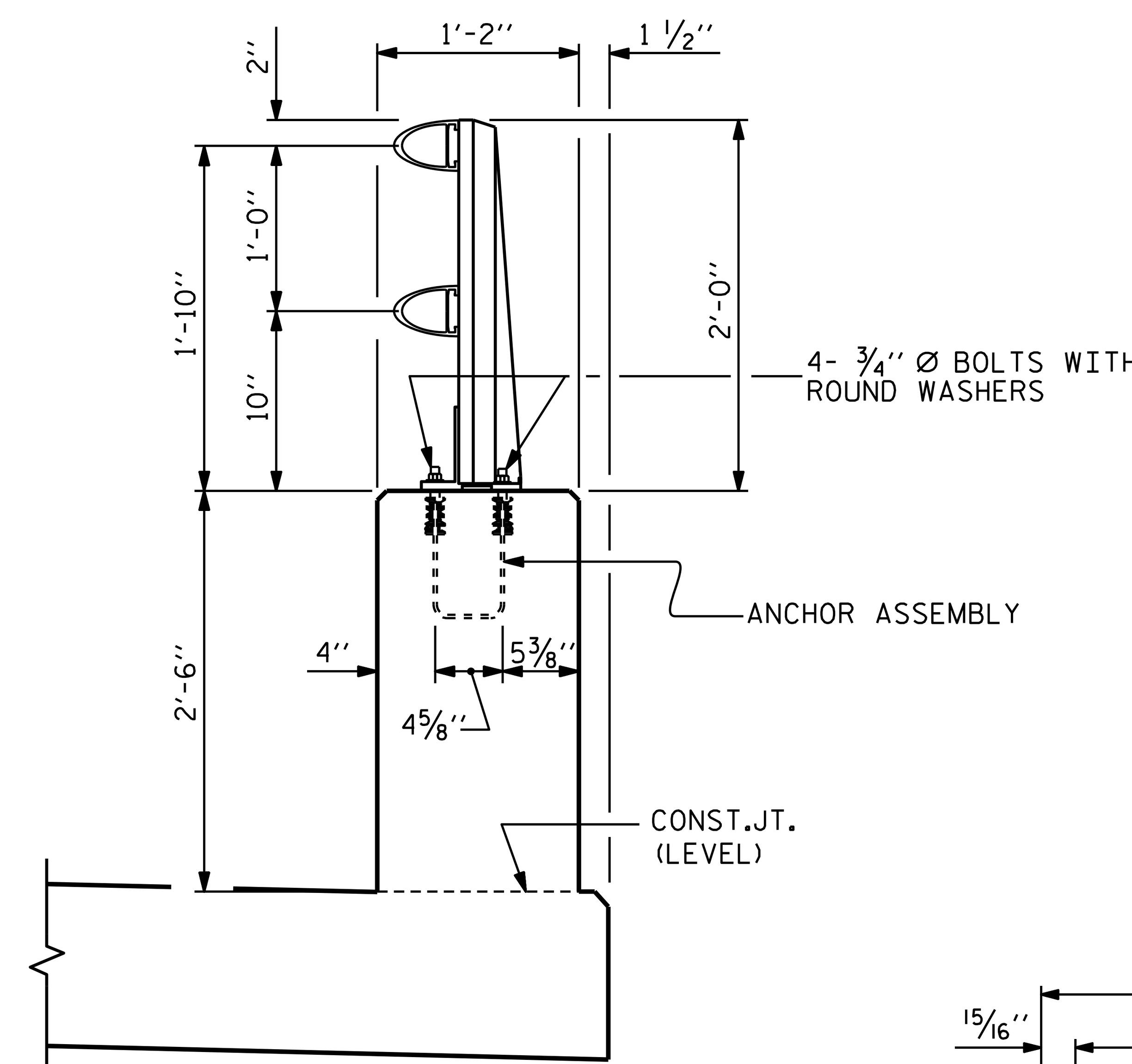


FRONT ELEVATION

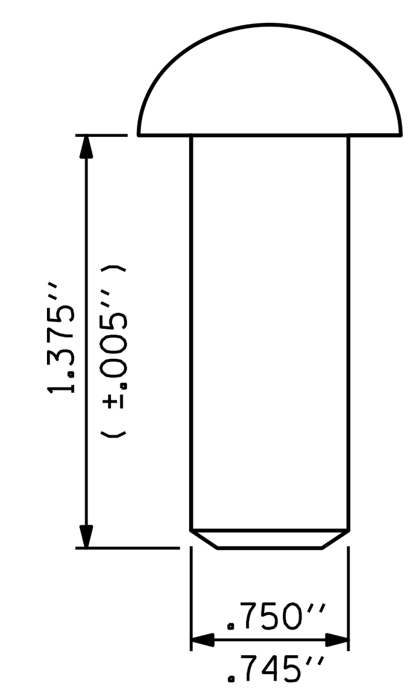


SIDE ELEVATION

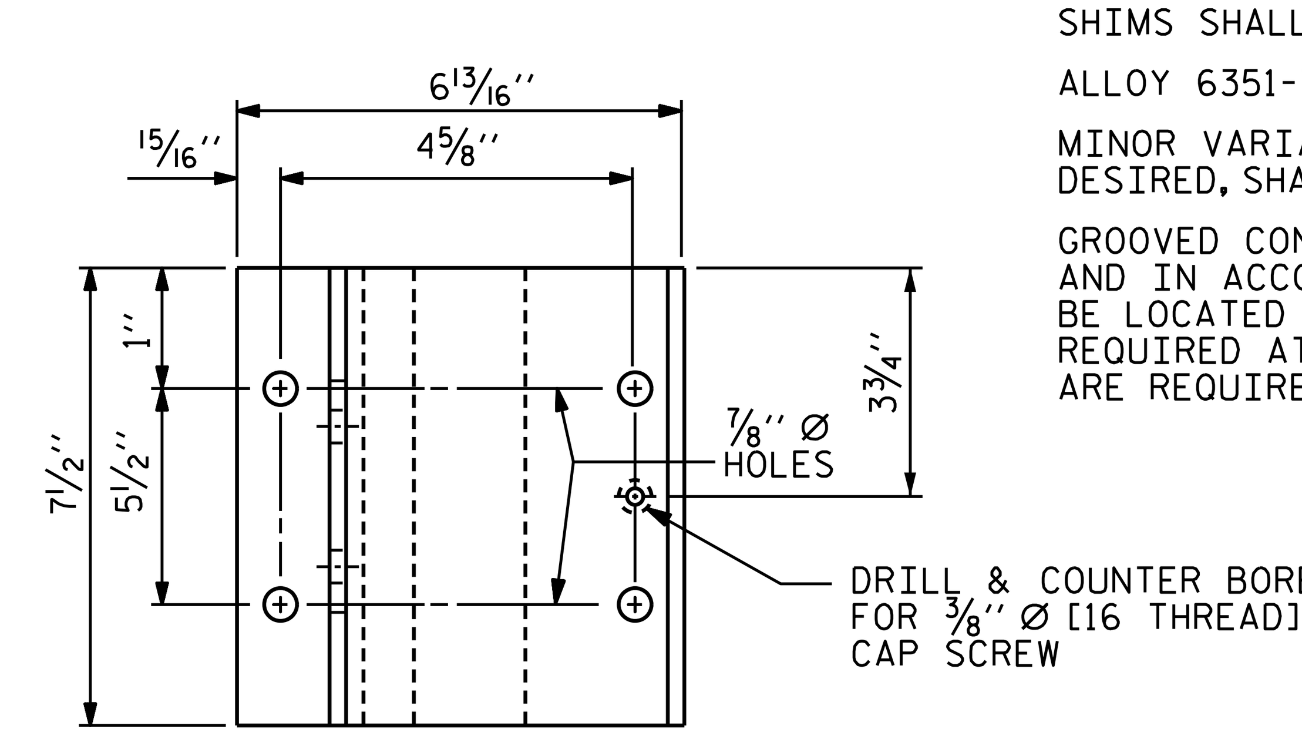
DETAILS OF POST



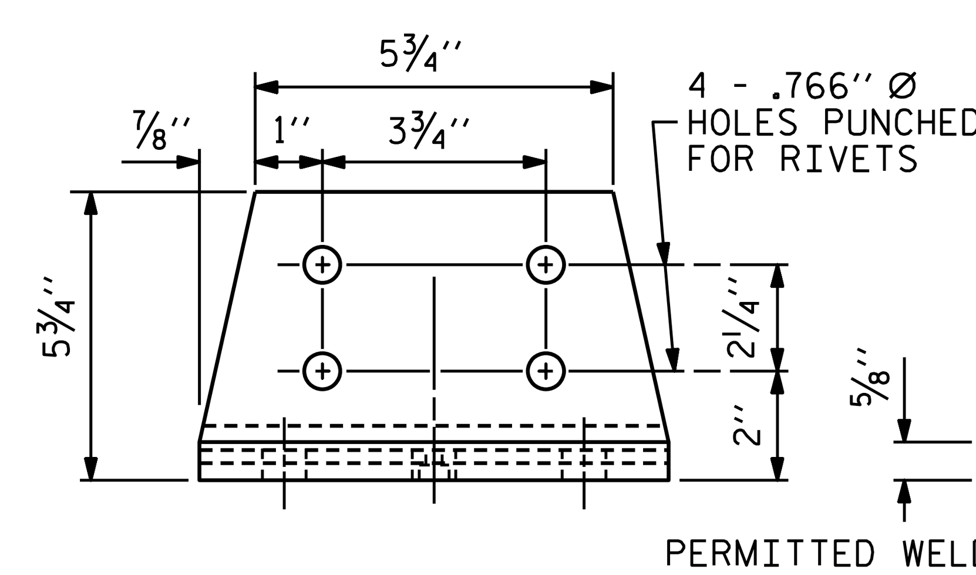
SECTION THRU PARAPET AND RAIL



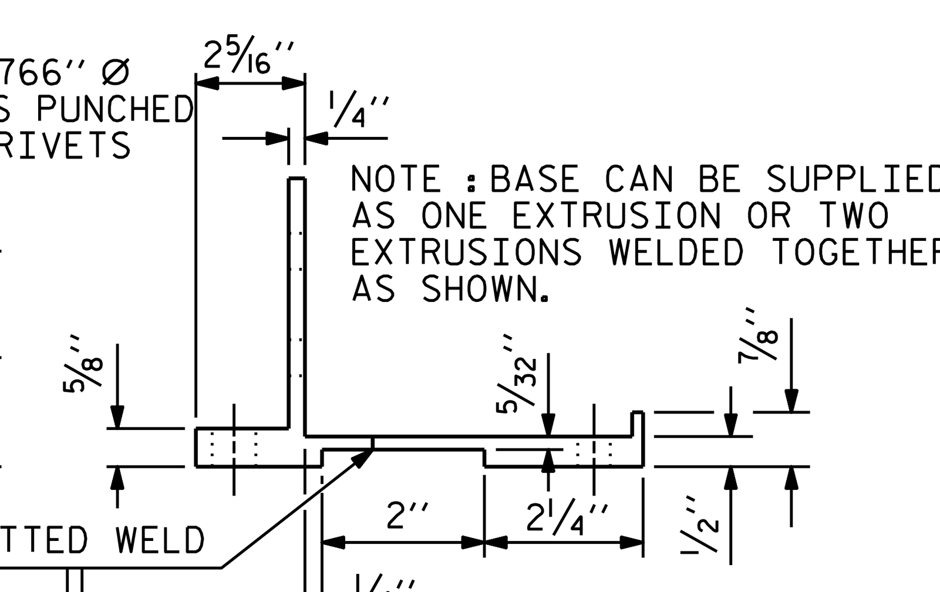
RIVET DETAIL



PLAN



FRONT ELEVATION



SIDE ELEVATION

POST BASE DETAILS

NOTES

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

ALUMINUM RAILS

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

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS. THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

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

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

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

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

PAY LENGTH = 368.7 LIN. FT.

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 52+32.96 -Y3-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

DocuSigned by:
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SEAL 14455
10/5/2018 8:04:11 AM EDT

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REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S9-15
1			3					TOTAL SHEETS
2			4					32

DRAWN BY :	J. B. W.	DATE :	2/20/18
CHECKED BY :	T. L. B.	DATE :	2/20/18
DESIGN ENGINEER OF RECORD:	T. L. B.	DATE :	2/20/18

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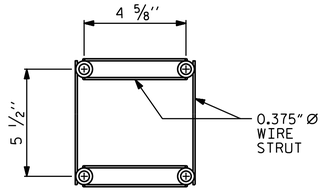
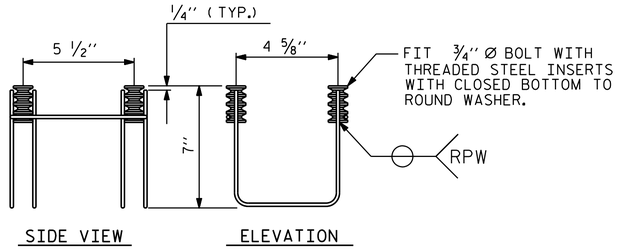
STD. NO. BMR3



PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(80 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

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

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

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

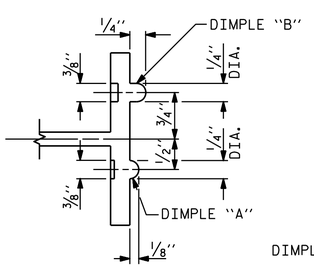
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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

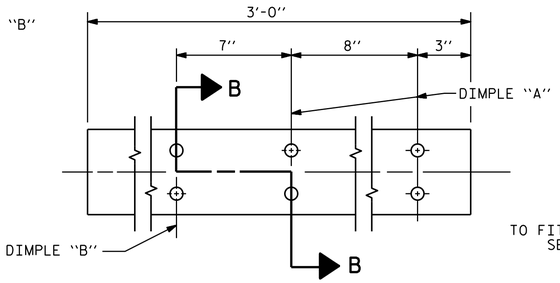
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

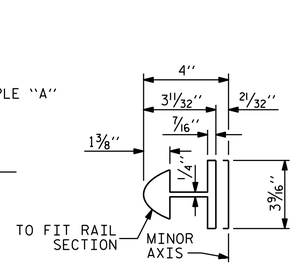
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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



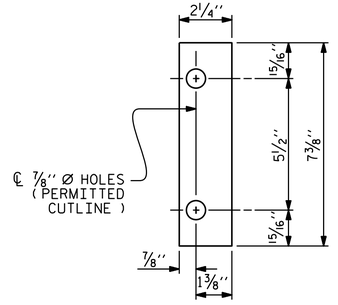
SECTION B - B



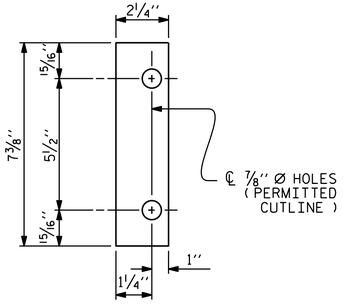


BAR SECTION

EXPANSION BAR DETAILS



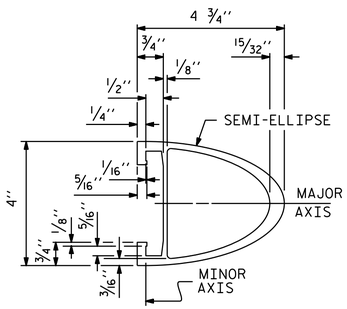
FRONT PLATE



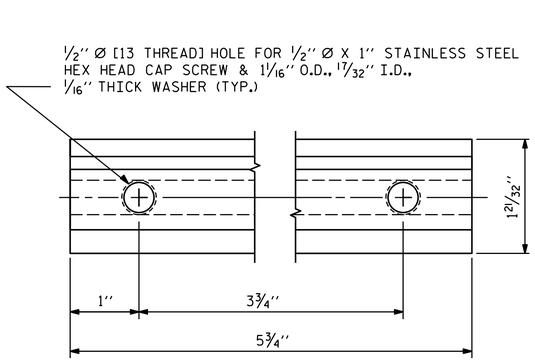
REAR PLATE

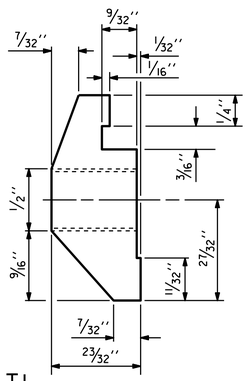
SHIM DETAILS

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



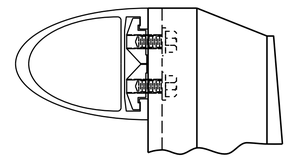
RAIL SECTION



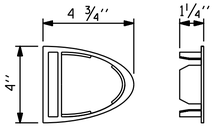


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-16
1			3			TOTAL SHEETS
2			4			31

STD. NO. BMR4

DRAWN BY : J. B. W. DATE : 2/20/18
CHECKED BY : T. L. B. DATE : 2/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 2/20/18

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DocuSigned by:
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SEAL
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ENGINEER
TED L. BARTELL
D794697C456A4F7...
2/28/2018

REFERENCE NO. 9-16

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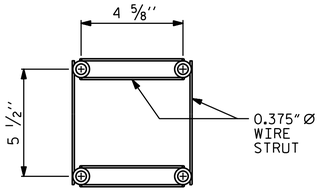
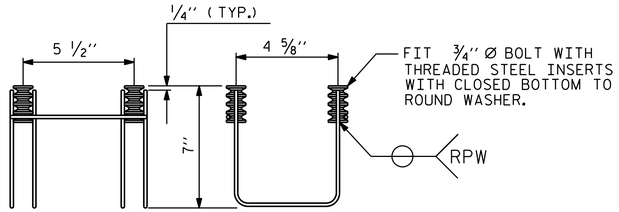


PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(78 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

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

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

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

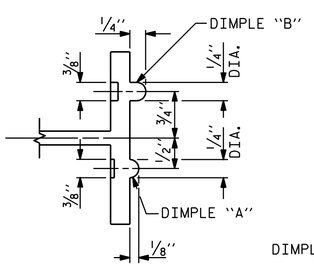
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE GALVANIZED.

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

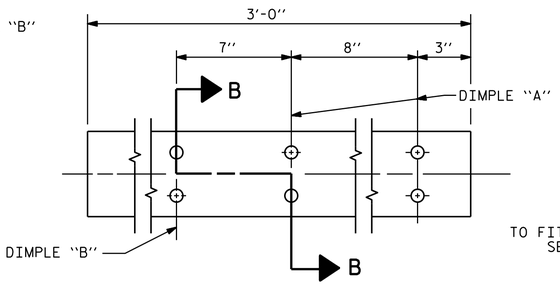
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

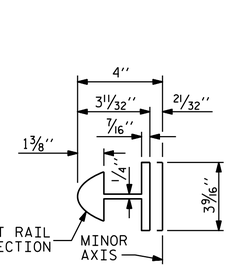
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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



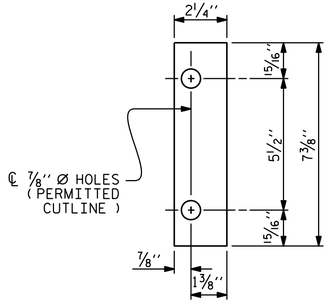
SECTION B - B



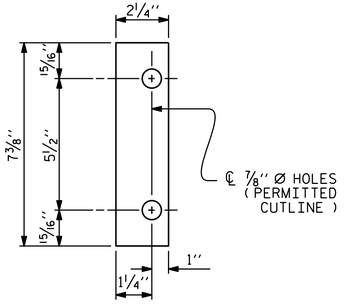


BAR SECTION

EXPANSION BAR DETAILS



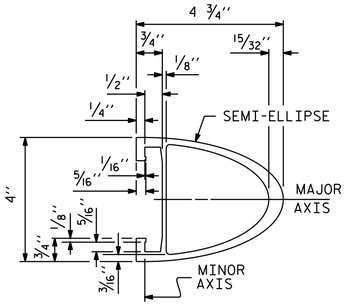
FRONT PLATE



REAR PLATE

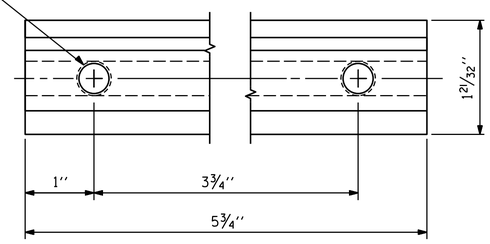
SHIM DETAILS

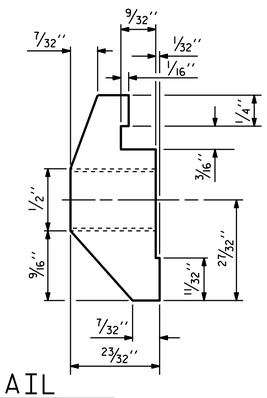
NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



RAIL SECTION

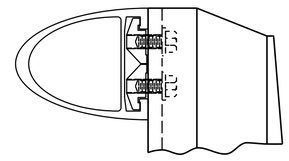
1/2'' Ø [13 THREAD] HOLE FOR 1/2'' Ø X 1'' STAINLESS STEEL HEX HEAD CAP SCREW & 1 1/16'' O.D., 17/32'' I.D., 1/16'' THICK WASHER (TYP.)



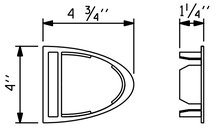


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

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A&O PROJECT NO. 2015.042

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NORTH CAROLINA SEAL 14456 ENGINEER TED L. BARTELL
D794597C456A4F7...
10/5/2018 8:04:11 AM EDT

REFERENCE NO. 9-16

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1			3			TOTAL SHEETS
2			4			32

STD. NO. BMR4

DRAWN BY : J. B. W. DATE : 2/20/18
CHECKED BY : T. L. B. DATE : 2/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 2/20/18

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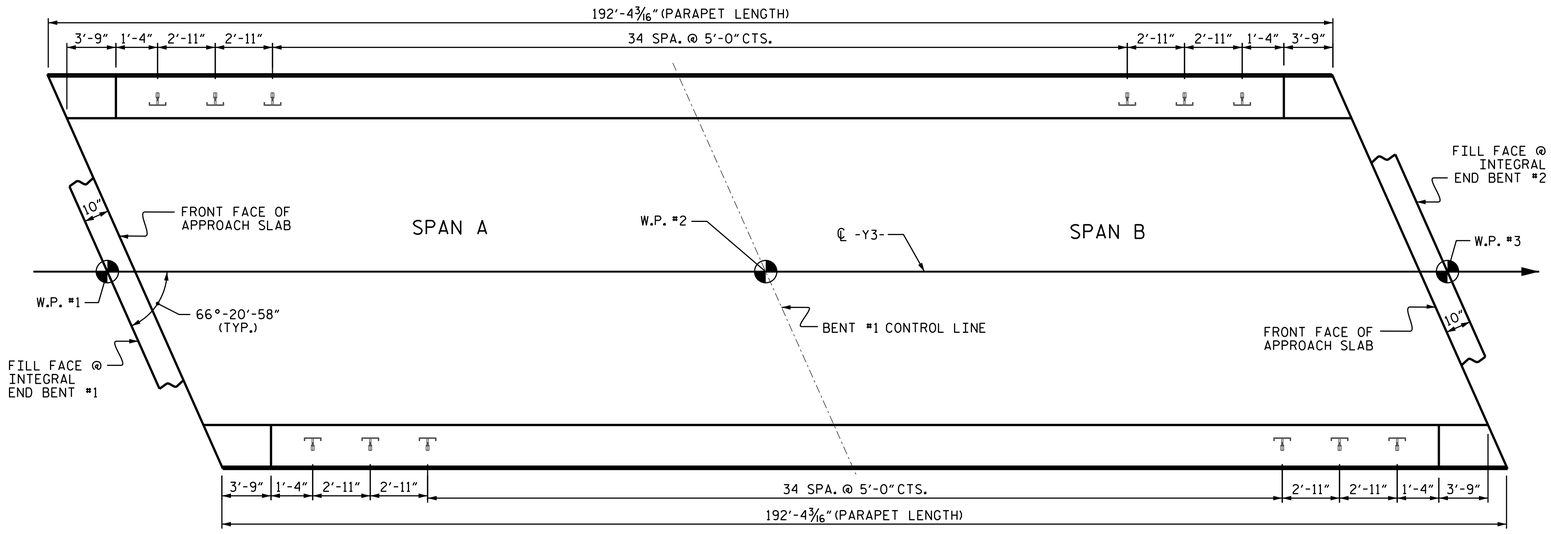


PLAN OF RAIL POST SPACINGS

NOTES

STRUCTURAL CONCRETE INSERT

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

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

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

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

NOTES

METAL RAIL TO END POST CONNECTION

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

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

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

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

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

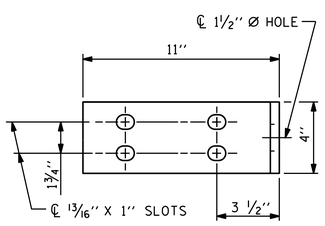
E. ½'' Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

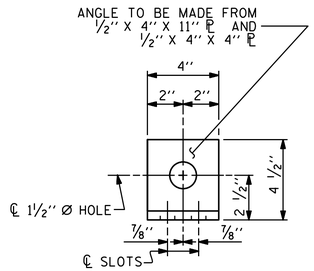
THE ¾'' STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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

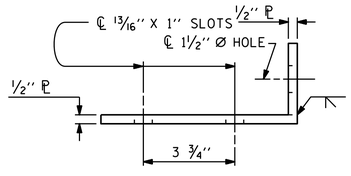
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾'' Ø X 1⅝'' BOLT WITH WASHER SHALL BE REPLACED WITH A ¾''Ø X 6½'' BOLT AND 2'' O.D. WASHER. ALL SPECIFICATIONS THAT APPLY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



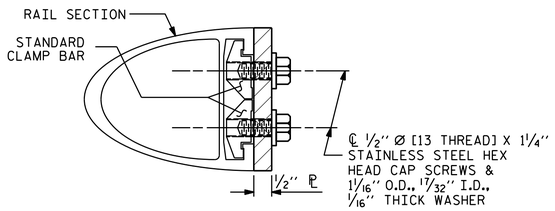
ELEVATION



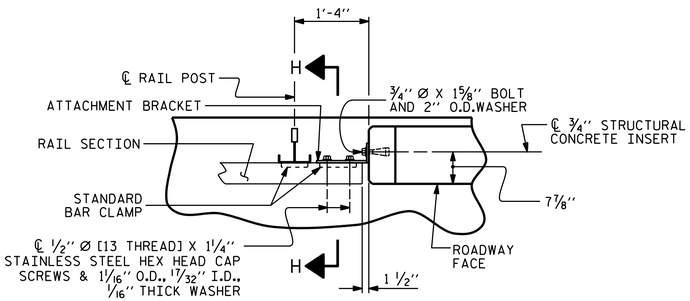
END VIEW



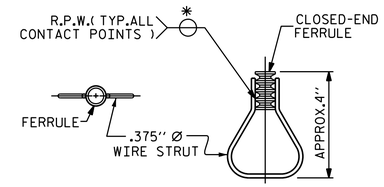
TOP VIEW



SECTION H-H



PLAN - RAIL AND END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS
TWO BAR METAL RAILS

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			32

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CHECKED BY : T. L. B. DATE : 02/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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STD. NO. BMR2

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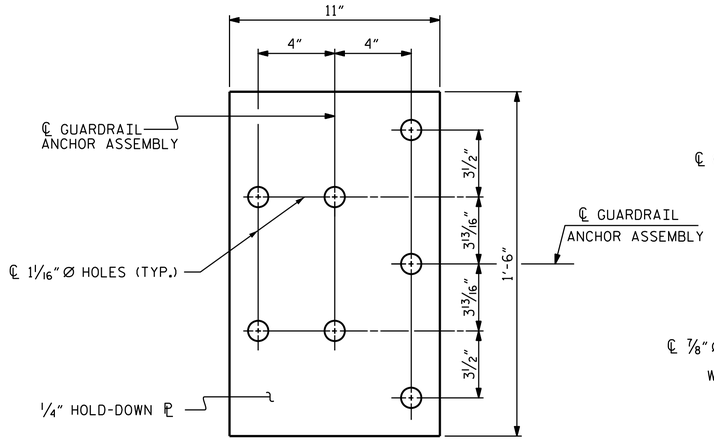
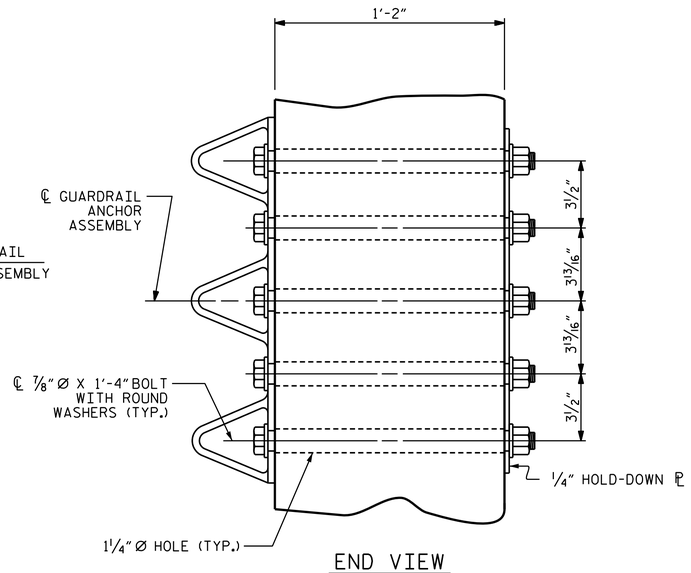


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE GALVANIZED.

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

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

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

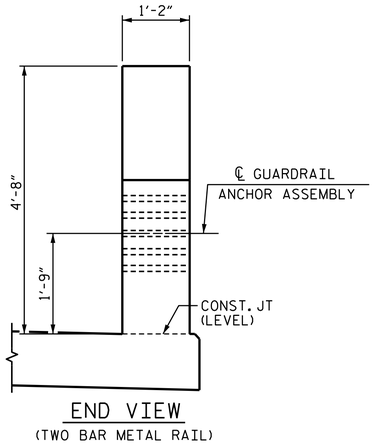
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

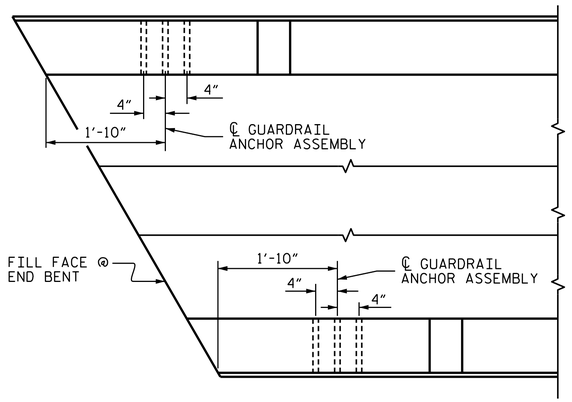
THE 1 1/4″ Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

SKETCH SHOWING POINTS OF ATTACHMENT

✳ LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(TWO BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 52+32.96 -Y3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-19
1			3			TOTAL SHEETS
2			4			32

STD. NO. GRA3

DRAWN BY : J. B. W. DATE : 02/20/18
CHECKED BY : T. L. B. DATE : 02/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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NORTH CAROLINA SEAL 14453 ENGINEER T. L. BARTLETT
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SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

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

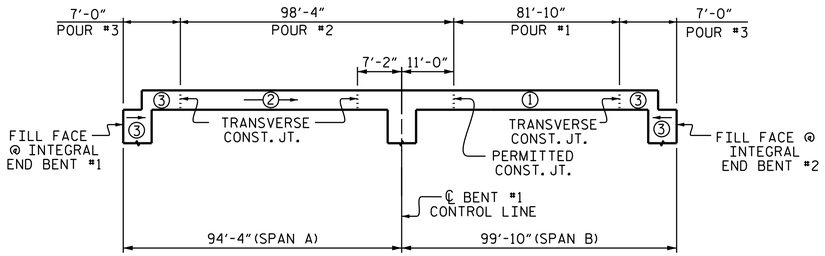
SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU.YDS.)	(LBS.)
POUR #1	140.3	36047
POUR #2	188.3	
POUR #3	88.6	
TOTALS **	417.2	36047

**QUANTITIES FOR CONCRETE PARAPET ARE NOT INCLUDED.

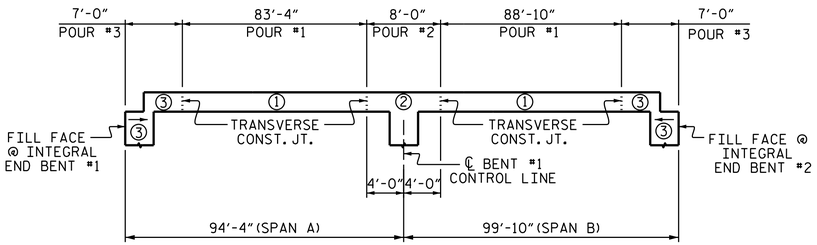
GROOVING BRIDGE FLOORS

APPROACH SLABS	2365	SQ.FT.
BRIDGE DECK	9413	SQ.FT.
TOTAL	11778	SQ.FT.



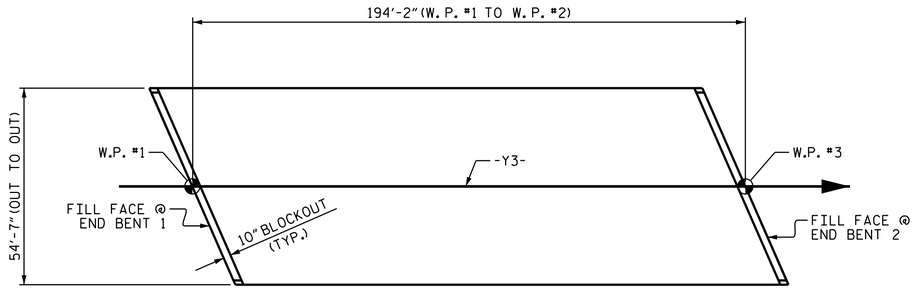
POURING SEQUENCE

(#) = INDICATES POUR NUMBER AND DIRECTION OF POUR

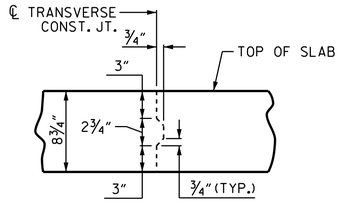


OPTIONAL POURING SEQUENCE

POUR (2) CAN NOT BE STARTED UNTIL BOTH ADACENT (1) POURS REACH A MINIMUM OF 3000 PSI.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ.FT. = 10598)



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

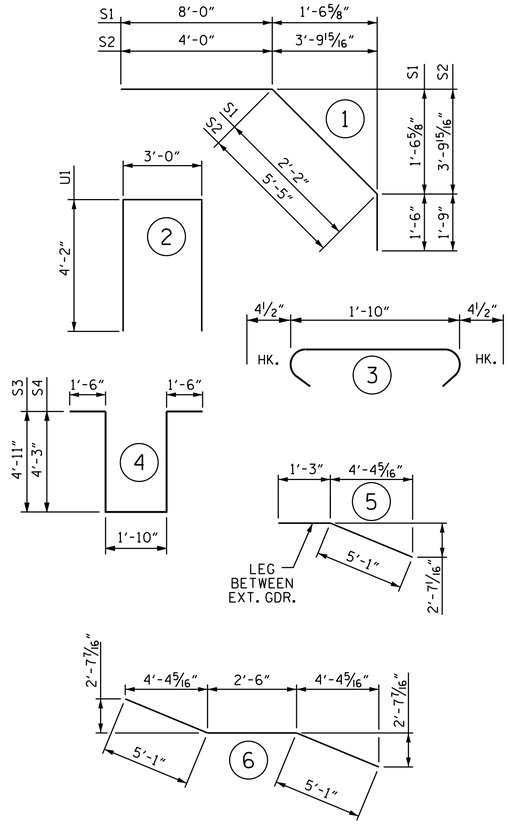
BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	337	#5	STR	54'-1"	19010
* A101	2	#5	STR	51'-11"	108
* A102	2	#5	STR	49'-7"	103
* A103	2	#5	STR	47'-4"	99
* A104	2	#5	STR	45'-1"	94
* A105	2	#5	STR	42'-9"	89
* A106	2	#5	STR	40'-6"	84
* A107	2	#5	STR	38'-2"	80
* A108	2	#5	STR	35'-11"	75
* A109	2	#5	STR	33'-8"	70
* A110	2	#5	STR	31'-4"	65
* A111	2	#5	STR	29'-1"	61
* A112	2	#5	STR	26'-9"	56
* A113	2	#5	STR	24'-6"	51
* A114	2	#5	STR	22'-3"	46
* A115	2	#5	STR	19'-11"	42
* A116	2	#5	STR	17'-8"	37
* A117	2	#5	STR	15'-4"	32
* A118	2	#5	STR	13'-1"	27
* A119	2	#5	STR	10'-10"	23
* A120	2	#5	STR	8'-6"	18
* A121	2	#5	STR	6'-3"	13
* A122	2	#5	STR	3'-11"	8
* B1	87	#6	STR	18'-6"	2417
* B2	88	#4	STR	23'-6"	1381
* B3	44	#6	STR	43'-2"	2853
* B4	43	#6	STR	29'-1"	1878
* B5	44	#6	STR	28'-2"	1861
* B6	88	#4	STR	24'-9"	1455
* B7	87	#6	STR	19'-9"	2581
* S3	35	#4	4	14'-8"	343
* S4	10	#4	4	13'-4"	89
* EPOXY COATED REINFORCING STEEL					36047 LBS.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A2	337	#5	STR	54'-1"	19010
A201	2	#5	STR	51'-11"	108
A202	2	#5	STR	49'-7"	103
A203	2	#5	STR	47'-4"	99
A204	2	#5	STR	45'-1"	94
A205	2	#5	STR	42'-9"	89
A206	2	#5	STR	40'-6"	84
A207	2	#5	STR	38'-2"	80
A208	2	#5	STR	35'-11"	75
A209	2	#5	STR	33'-8"	70
A210	2	#5	STR	31'-4"	65
A211	2	#5	STR	29'-1"	61
A212	2	#5	STR	26'-9"	56
A213	2	#5	STR	24'-6"	51
A214	2	#5	STR	22'-3"	46
A215	2	#5	STR	19'-11"	42
A216	2	#5	STR	17'-8"	37
A217	2	#5	STR	15'-4"	32
A218	2	#5	STR	13'-1"	27
A219	2	#5	STR	10'-10"	23
A220	2	#5	STR	8'-6"	18
A221	2	#5	STR	6'-3"	13
A222	2	#5	STR	3'-11"	8
B8	252	#5	STR	49'-10"	13098
K1	30	#4	STR	21'-1"	423
K2	20	#4	STR	8'-2"	109
K3	40	#4	STR	9'-3"	247
K4	20	#4	STR	8'-6"	111
K5	10	#4	STR	7'-7"	51
K6	4	#4	STR	2'-7"	7
K7	8	#4	STR	3'-1"	16
K8	4	#4	STR	2'-8"	7
K9	4	#4	STR	2'-4"	6
K10	10	#4	STR	6'-4"	42
K11	10	#4	5	6'-4"	42
K12	20	#4	6	12'-8"	169
S1	92	#4	1	11'-8"	717
S2	88	#4	1	11'-2"	656
S5	170	#4	3	2'-7"	293
U1	92	#4	2	11'-4"	697
REINFORCING STEEL					36041 LBS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

STANDARD

SUPERSTRUCTURE

BILL OF MATERIAL

DRAWN BY : J. B. W. DATE : 2/20/18
CHECKED BY : T. L. B. DATE : 2/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 2/20/18

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A&O PROJECT NO. 2015.042

REFERENCE NO. 9-20

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-20
1			3			TOTAL SHEETS
2			4			32

STD. NO. BOM1

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

NOTES

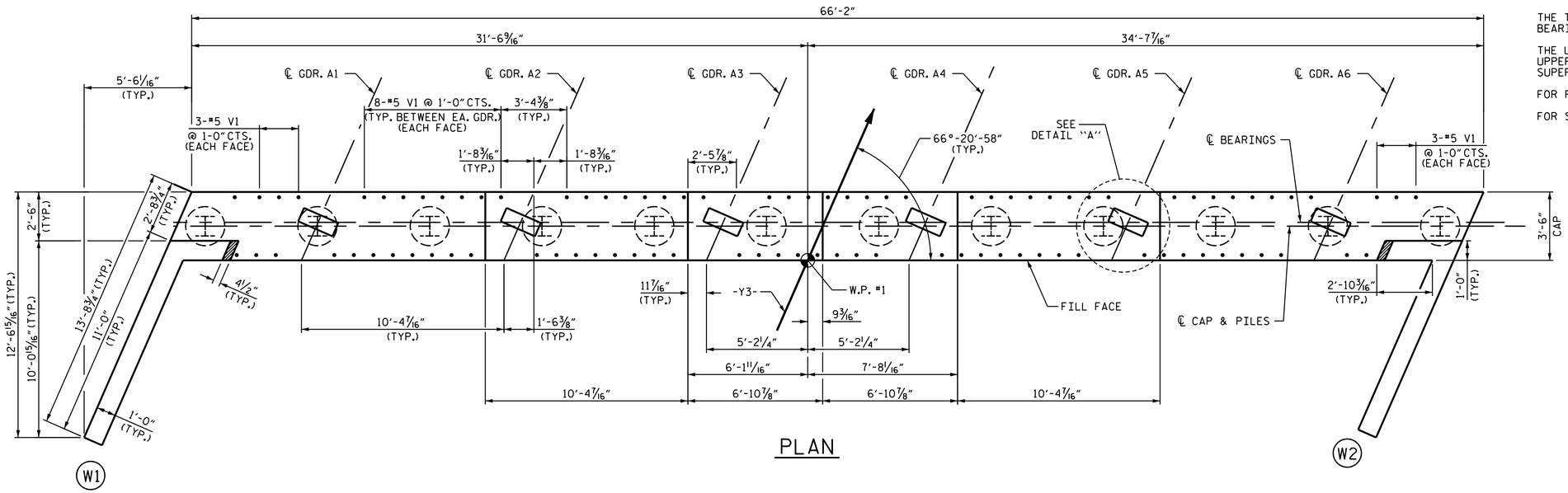
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

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

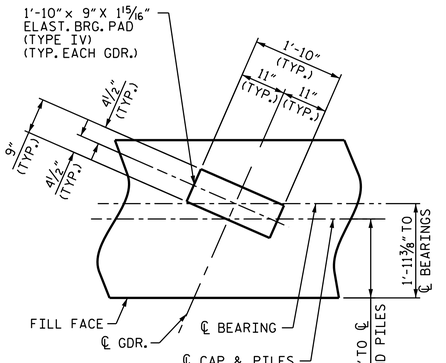
THE UPPER PORTION OF THE INTEGRAL END BENT CAP AND THE UPPER PORTION OF THE WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE. SEE SUPERSTRUCTURE PLANS.

FOR PILE SPLICE DETAIL, SEE SHEET 3 OF 3.

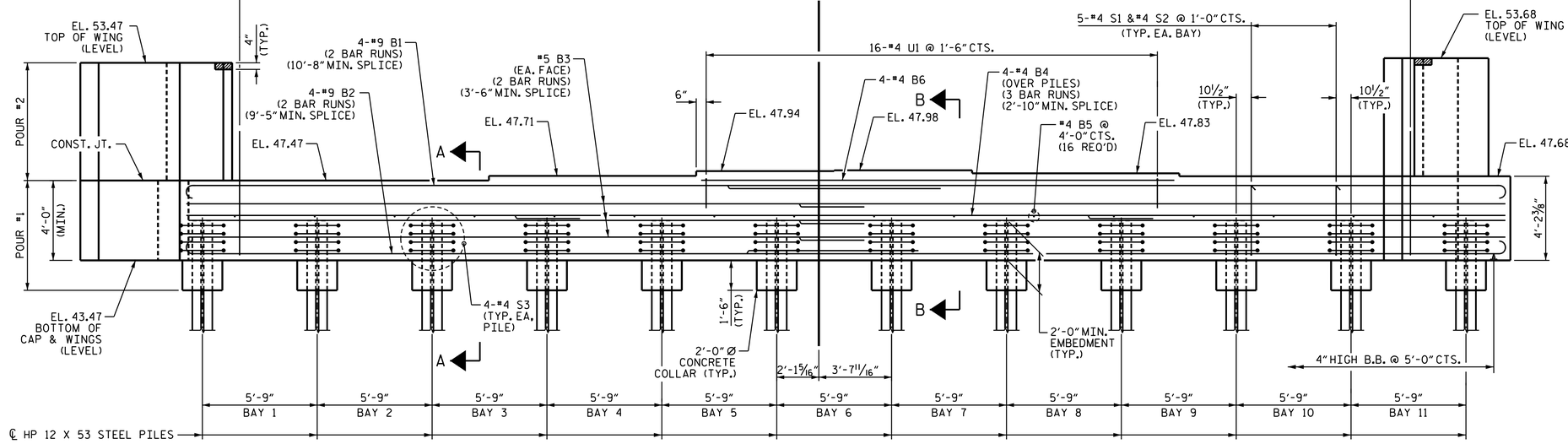
FOR SECTION A-A SEE SHEET 3 OF 3.



PLAN



DETAIL "A"



ELEVATION

FOR SECTION A-A AND PARTIAL SECTION B-B, SEE SHEET 3 OF 3.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT #1 (INTEGRAL)

DRAWN BY : J. B. W. DATE : 02/20/18
CHECKED BY : T. L. B. DATE : 02/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14450 TED L. BARTELL

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REVISIONS						SHEET NO.
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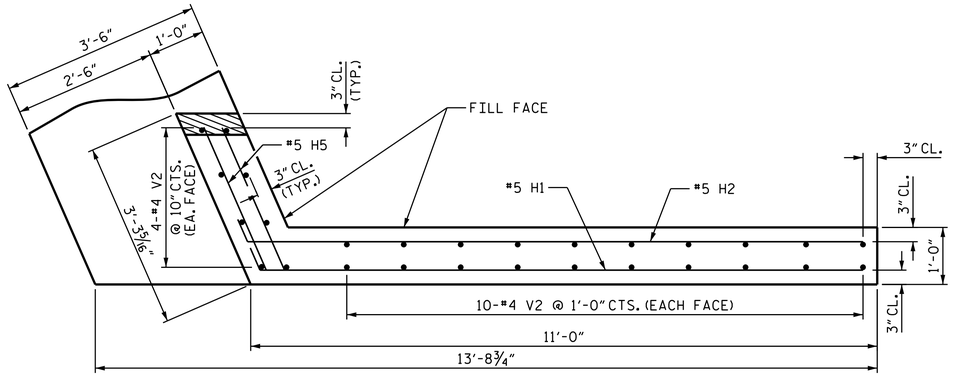
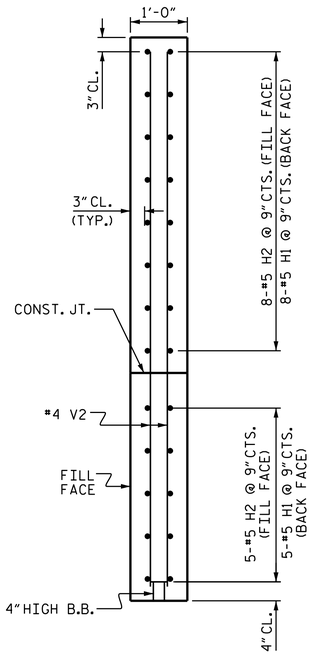
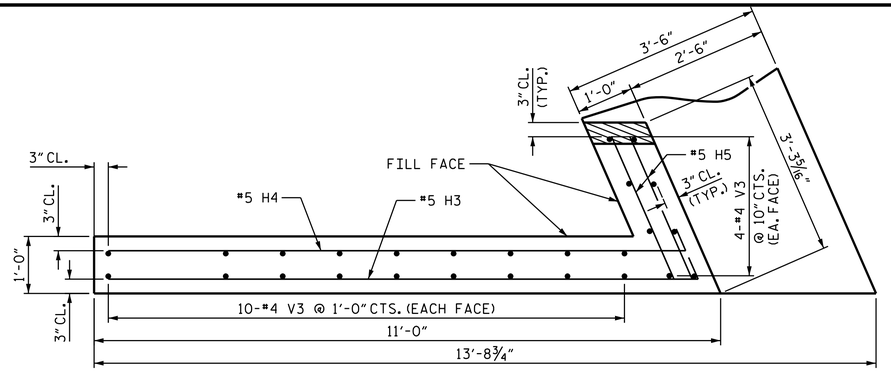
1			3			TOTAL SHEETS
2			4			32



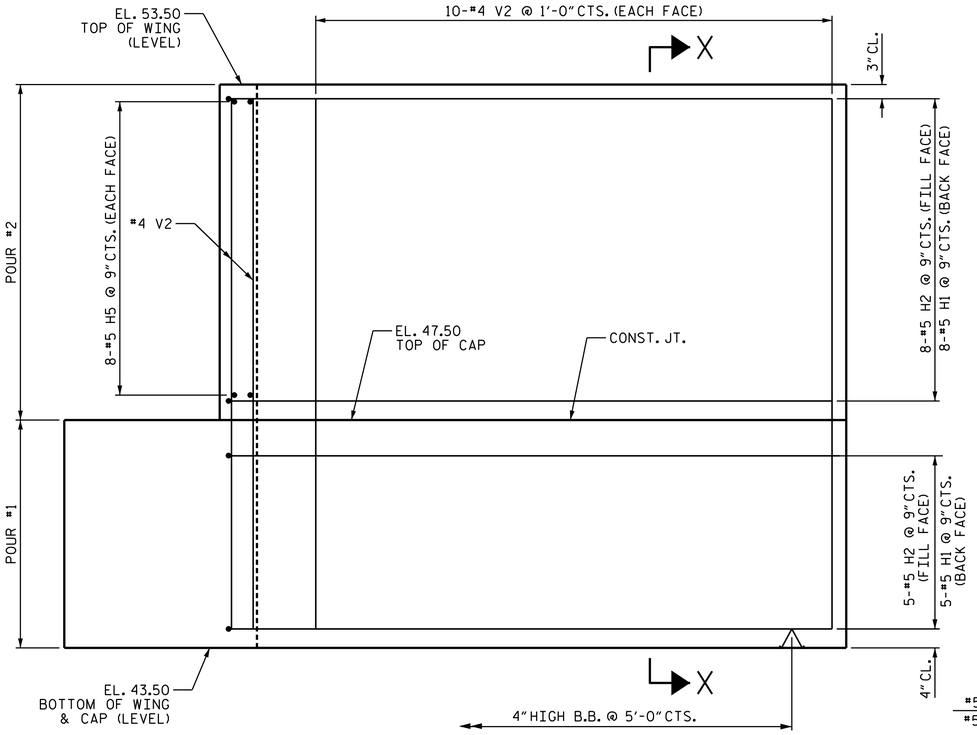
PLAN OF WING W1



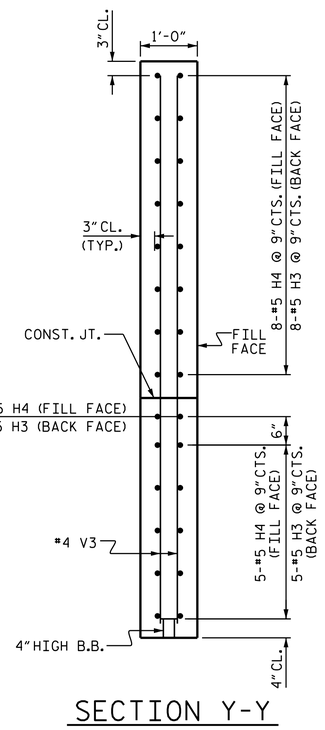
SECTION X-X



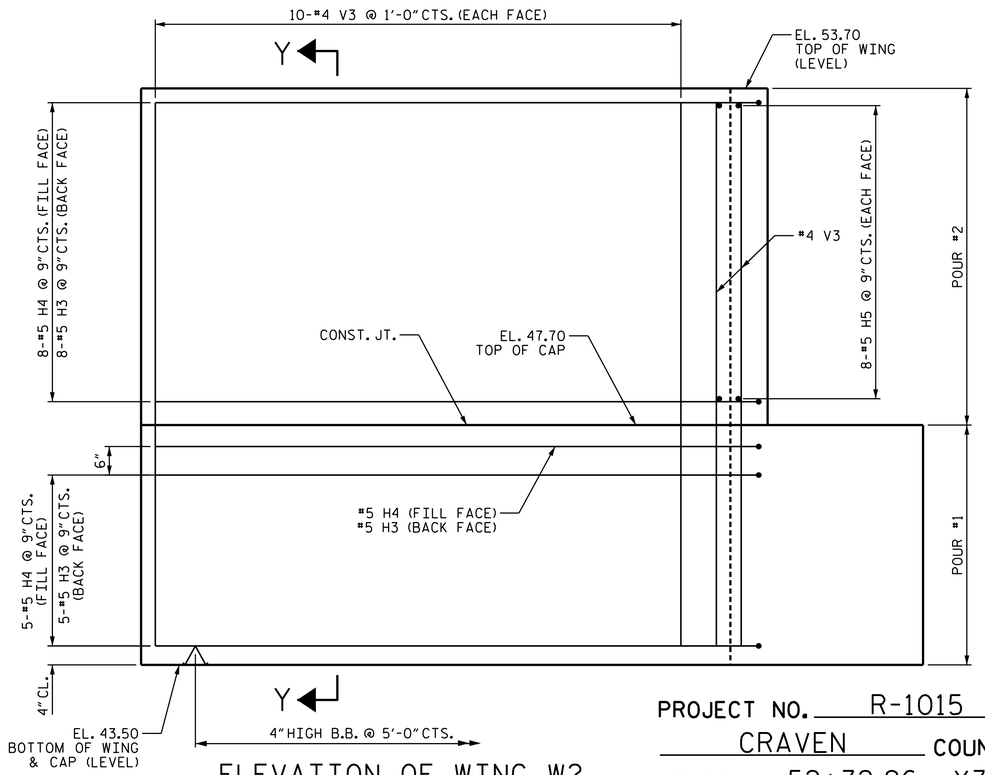
PLAN OF WING W2



ELEVATION OF WING W1



SECTION Y-Y



ELEVATION OF WING W2

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT #1
(INTEGRAL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-22
1			3			TOTAL SHEETS
2			4			31

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DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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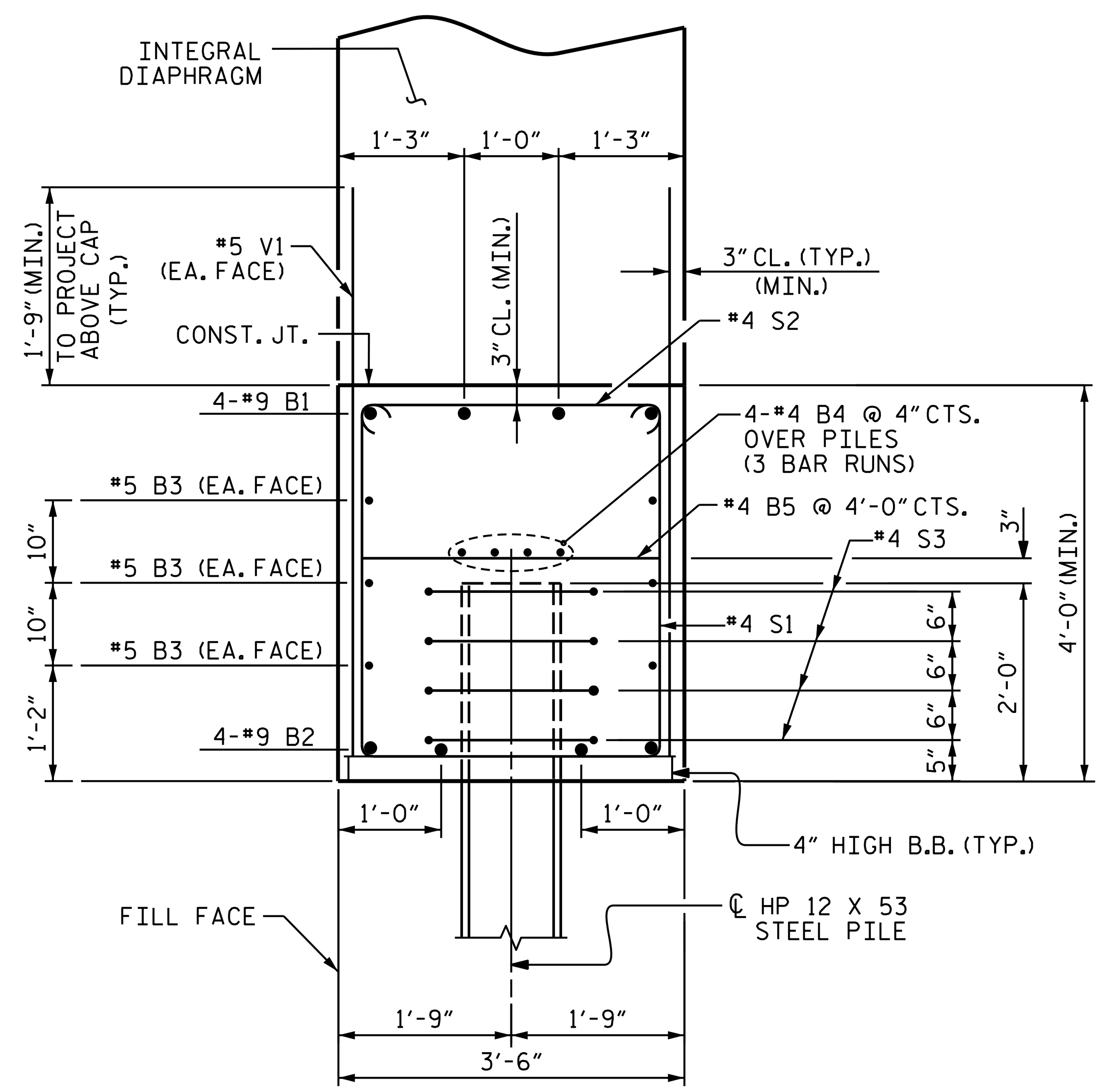
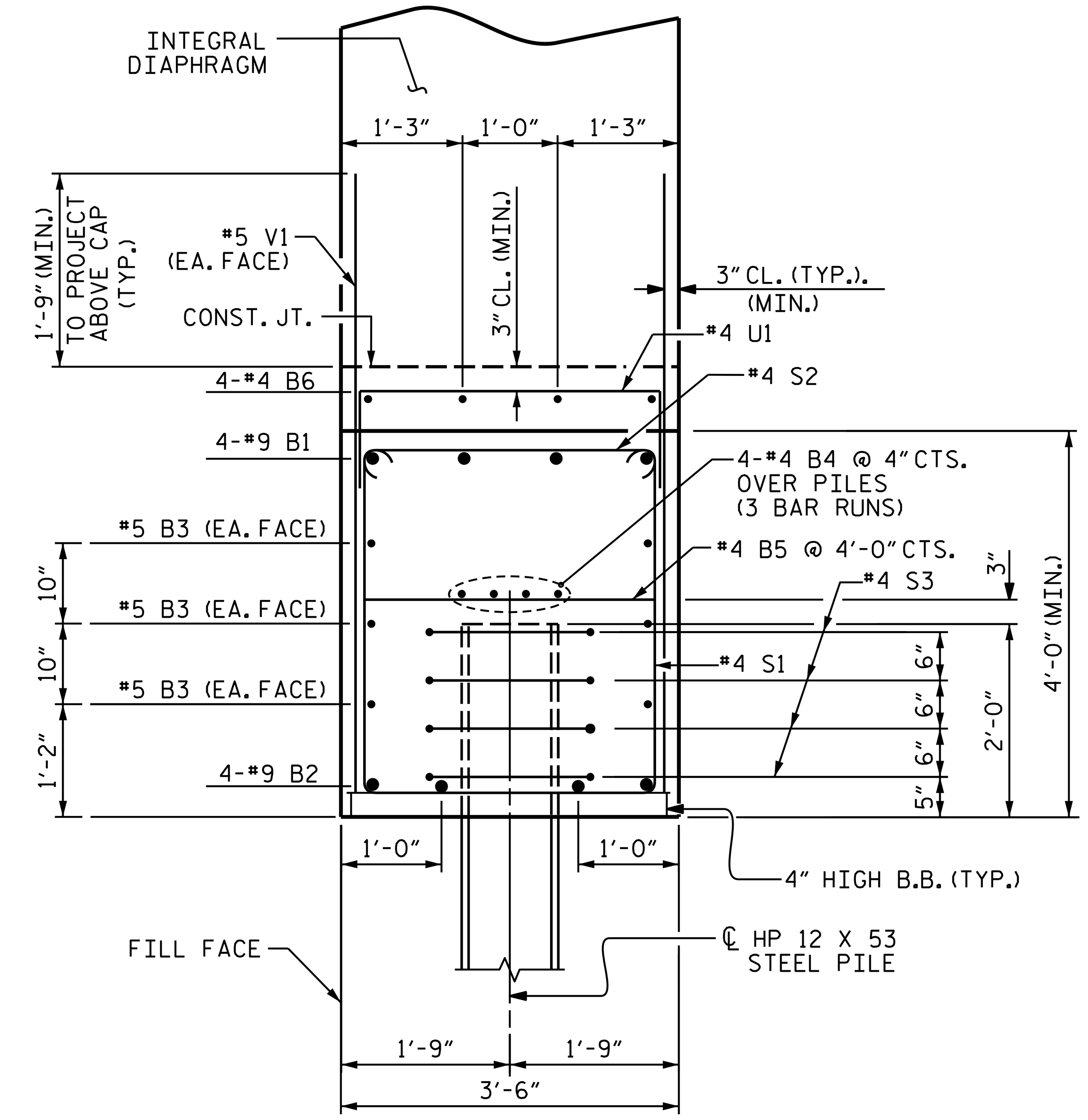


SECTION A-A

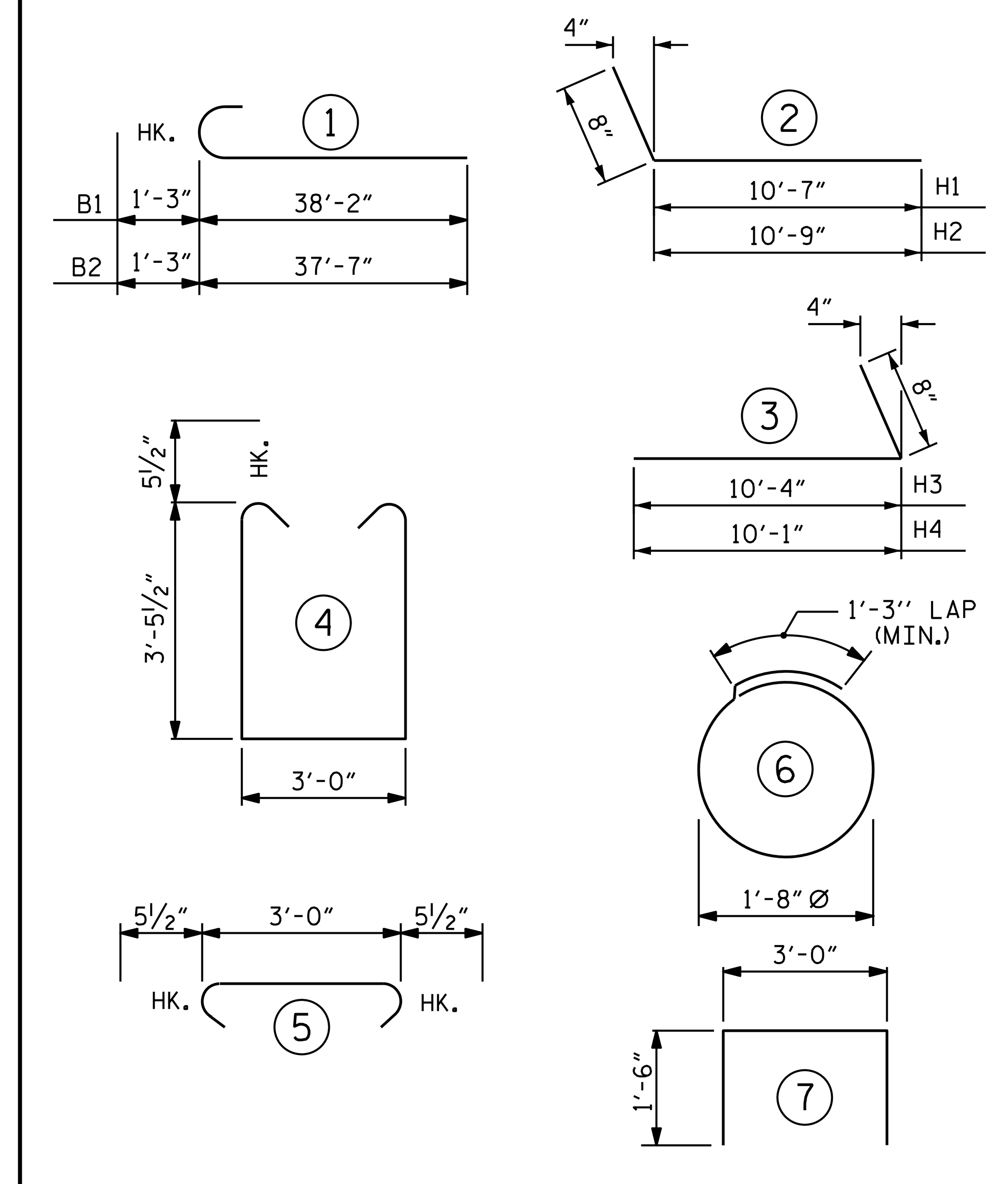
(CONCRETE COLLAR NOT SHOWN FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



SECTION B-B

(CONCRETE COLLAR NOT SHOWN FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

INTEGRAL END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	39'-5"	1072
B2	8	#9	1	38'-10"	1056
B3	12	#5	STR	34'-7"	433
B4	12	#4	STR	23'-9"	190
B5	16	#4	STR	3'-0"	32
B6	4	#4	STR	23'-8"	63
H1	14	#5	2	11'-3"	164
H2	14	#5	2	11'-5"	167
H3	14	#5	3	11'-0"	161
H4	14	#5	3	10'-9"	157
H5	32	#5	STR	3'-5"	114
S1	55	#4	4	10'-10"	398
S2	55	#4	5	3'-11"	144
S3	48	#4	6	6'-6"	208
U1	16	#4	7	6'-0"	64
V1	91	#4	STR	5'-5"	329
V2	40	#4	STR	9'-5"	252
V3	38	#4	STR	9'-7"	243

REINFORCING STEEL 5247 LBS.

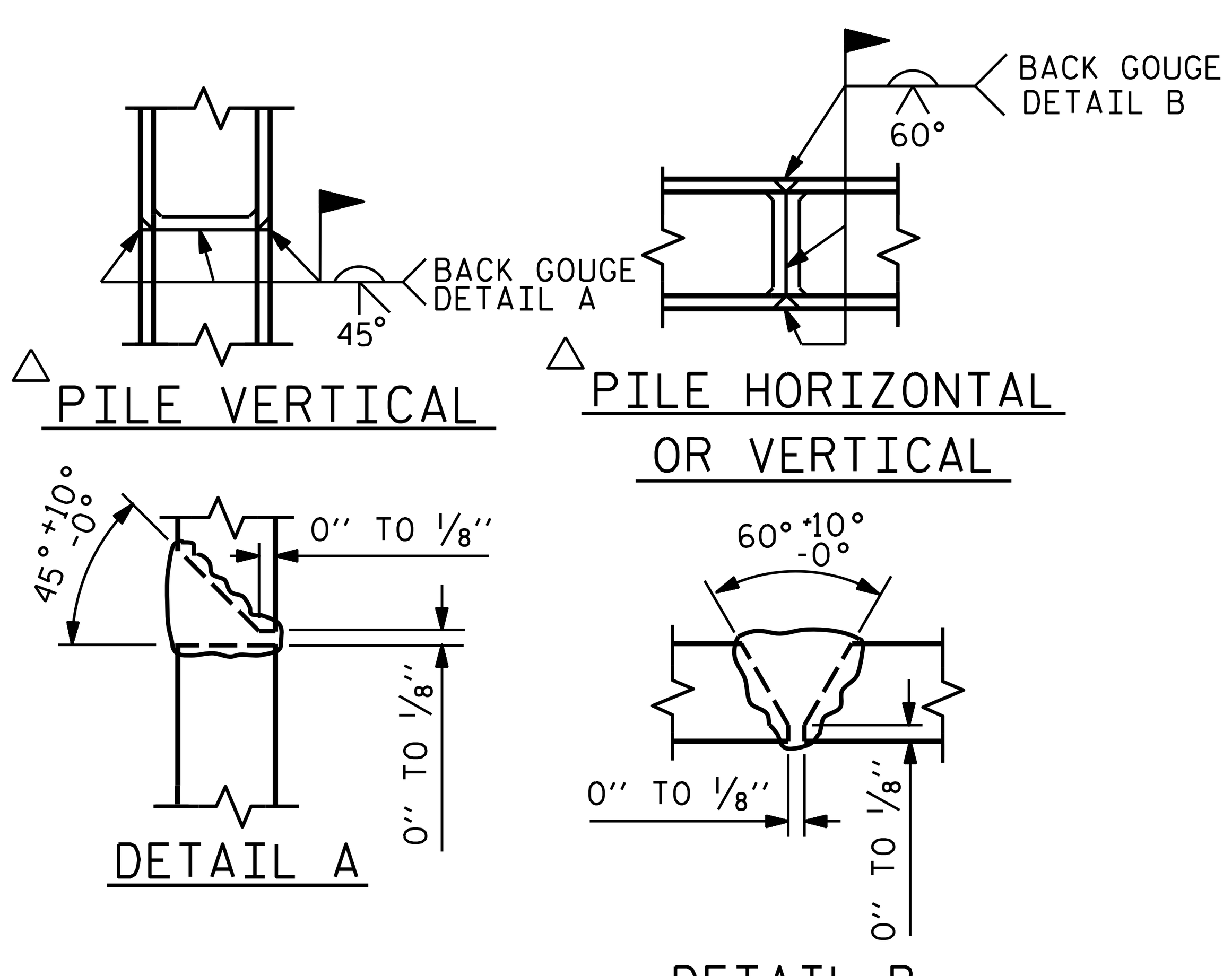
CLASS A CONCRETE

POUR #1 : CAP & LOWER WINGS 39.4 CU.Y.
POUR #2 : UPPER PART OF WINGS 5.9 CU.Y.
CONCRETE COLLARS 2.1 CU.Y.

TOTAL CONCRETE 47.4 CU.Y.

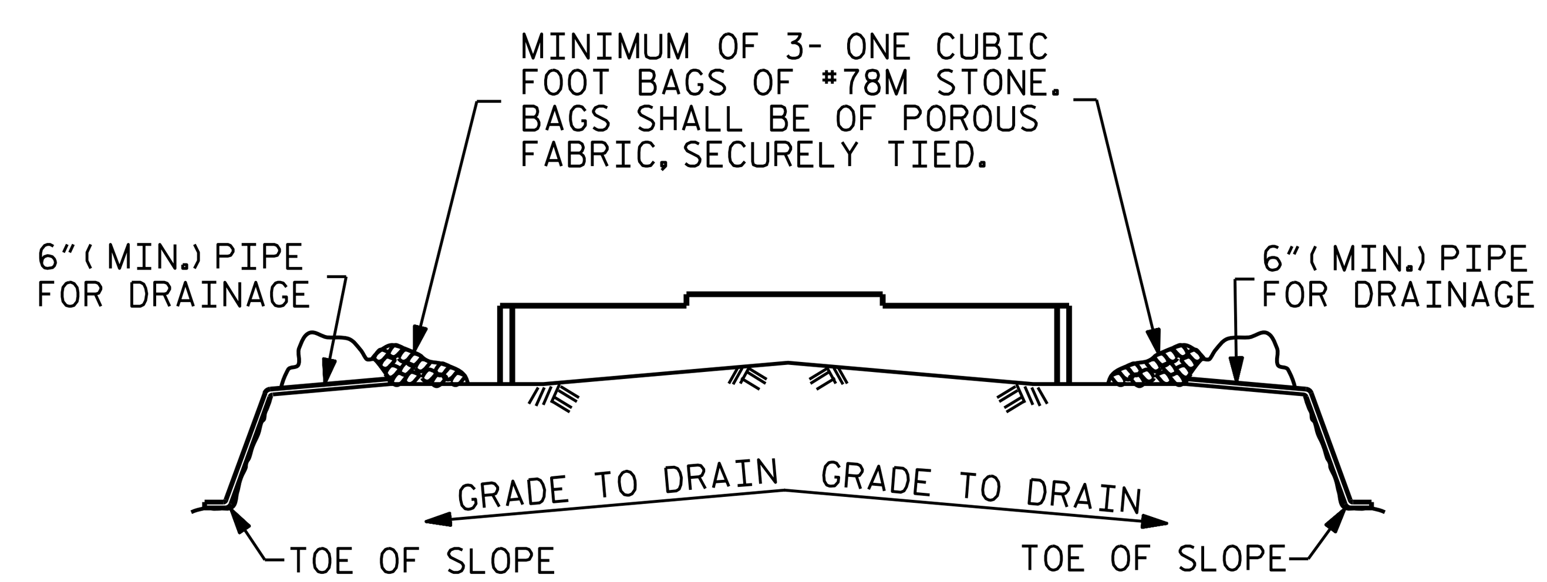
HP 12X53 STEEL PILES NO. 12 840 LIN. FT.
PILE REDRIVES 6 EACH

PILE DRIVING EQUIPMENT SETUP
FOR HP 12 X 53 STEEL PILES 12 EACH



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

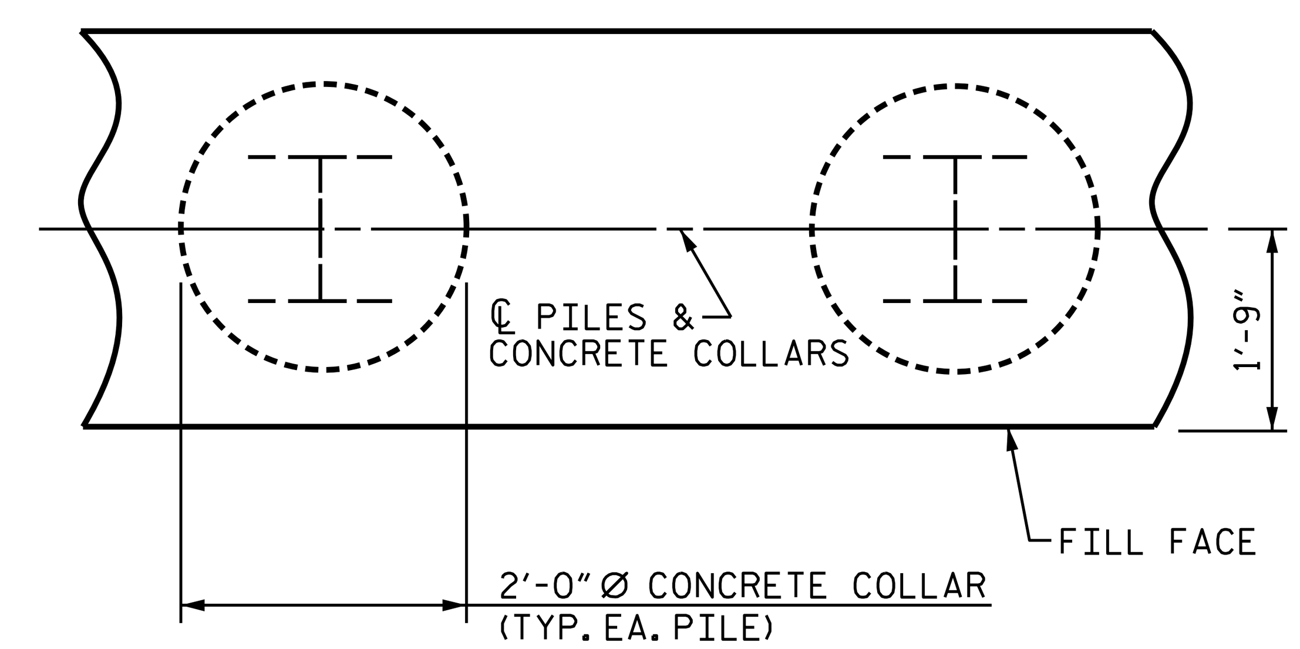


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

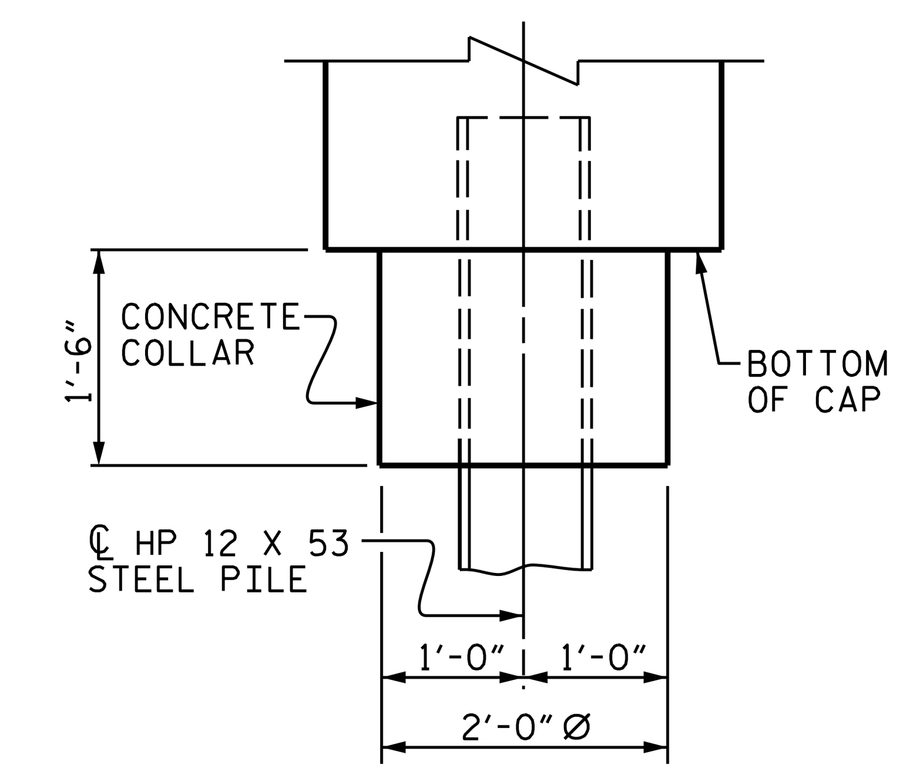
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT



PLAN



ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 52+32.96 -Y3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT #1
(INTEGRAL)

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2			4		

SHEET NO. S9-23
TOTAL SHEETS 32

DRAWN BY : J. B. W. DATE : 02/20/18
CHECKED BY : T.L.B. DATE : 02/20/18
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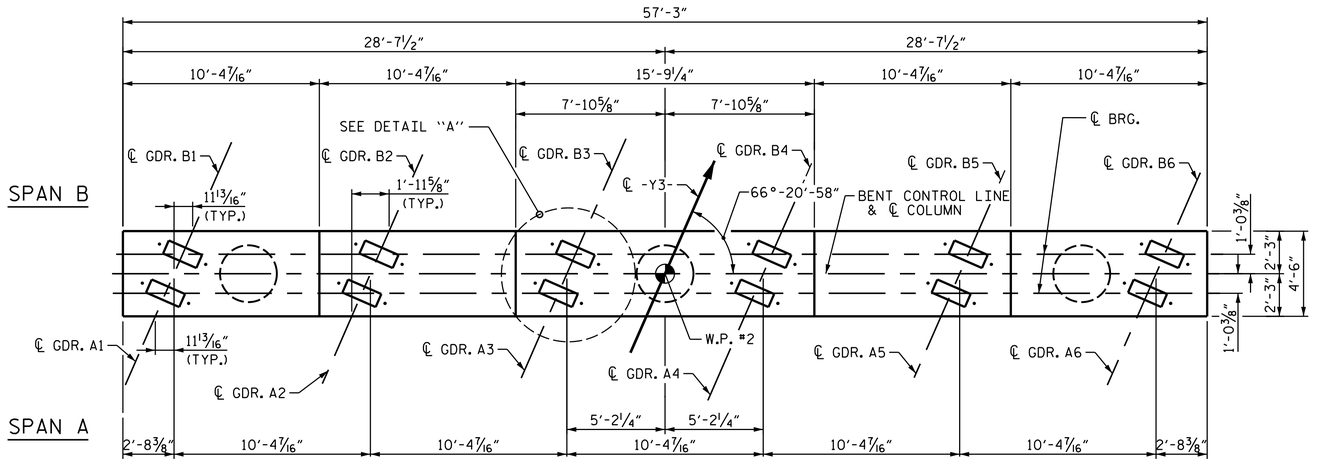
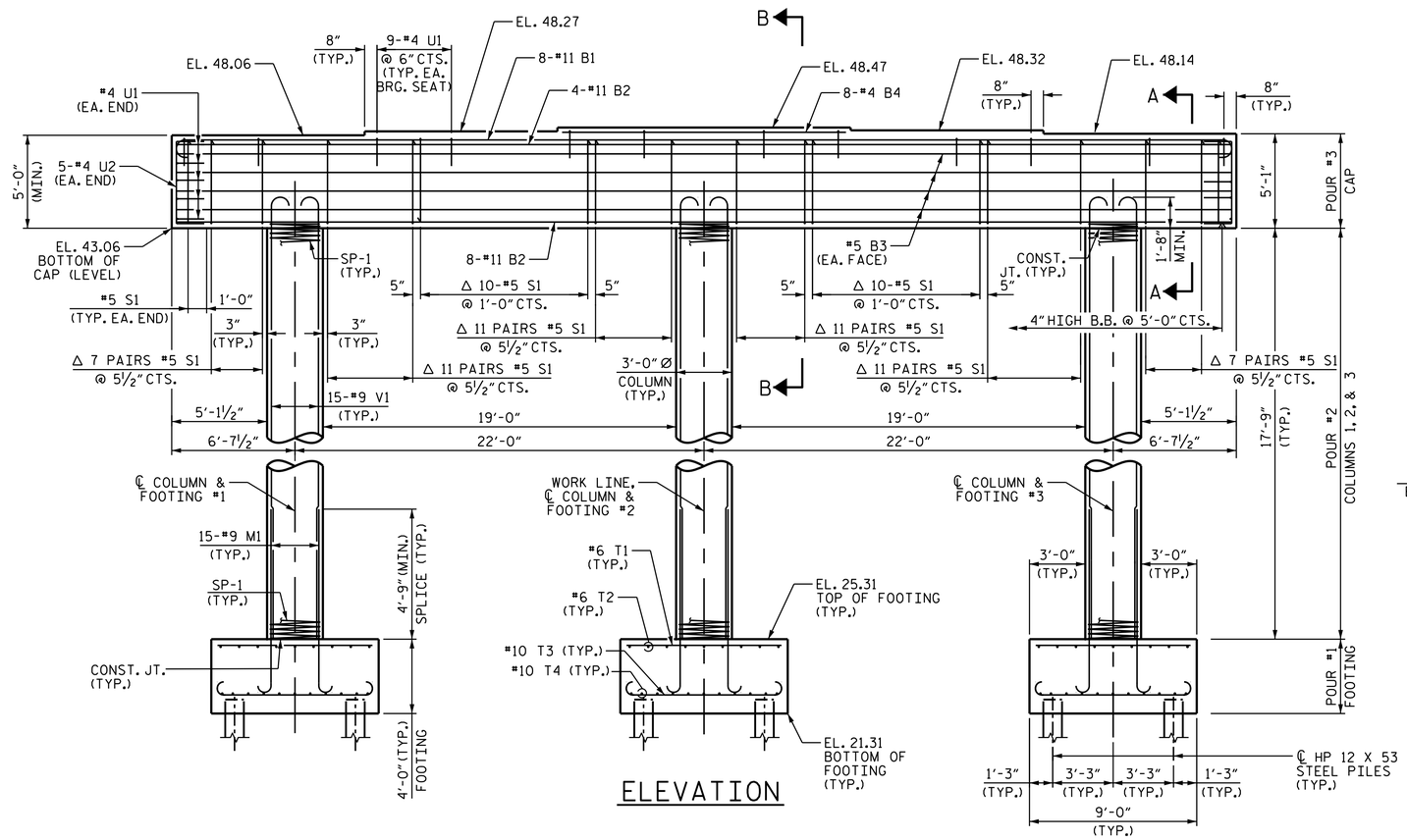


PLAN



ELEVATION

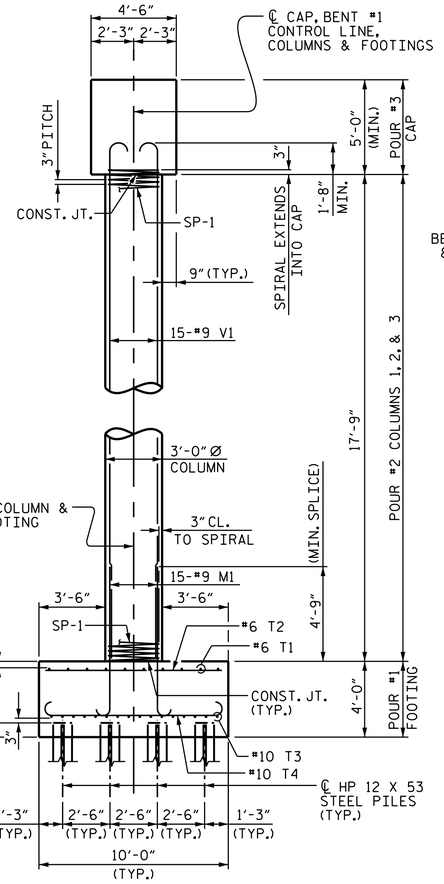
NOTES:

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

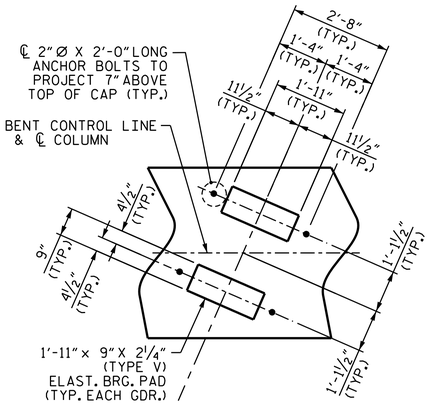
HOOKS ON V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

Δ INVERT ALTERNATE STIRRUPS.

FOR DIMENSIONS AND SPACING OF FOOTING REINFORCING STEEL AND SPACING OF HP 12 X 53 PILES SEE "PLAN OF FOOTING" SHEET 2 OF 2.



END ELEVATION



DETAIL "A"

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT #1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-24
1			3			TOTAL SHEETS
2			4			32

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DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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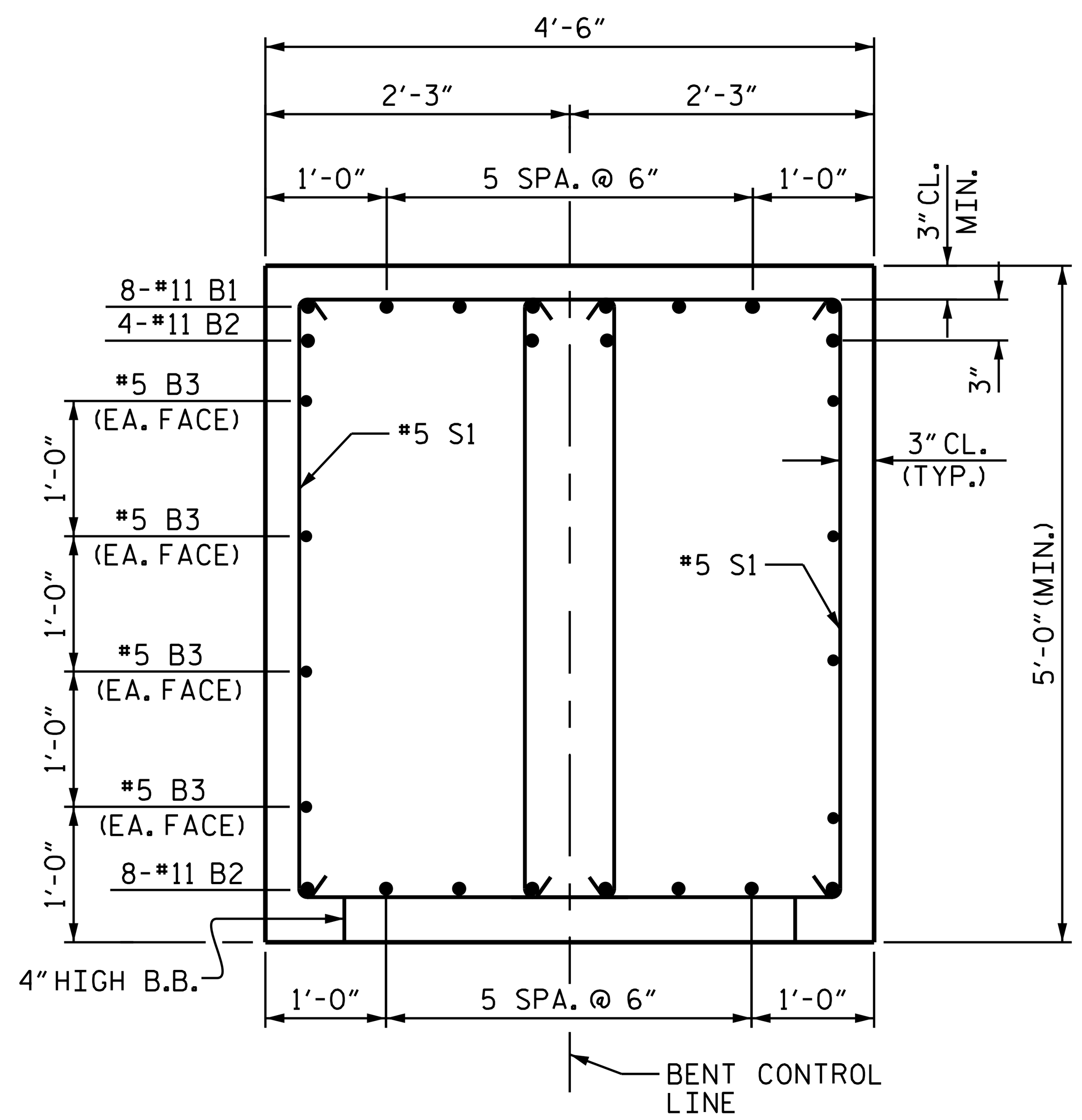
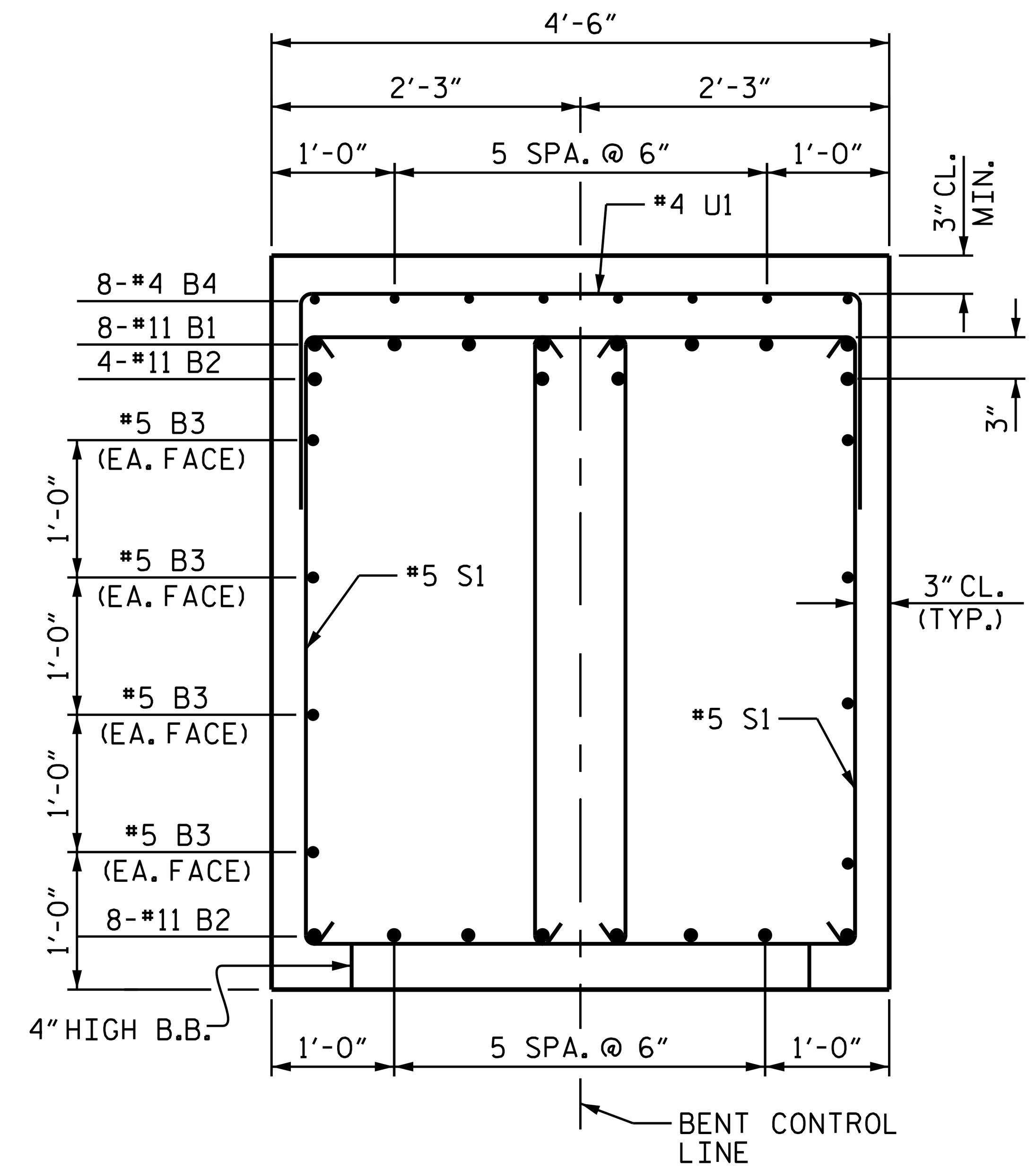
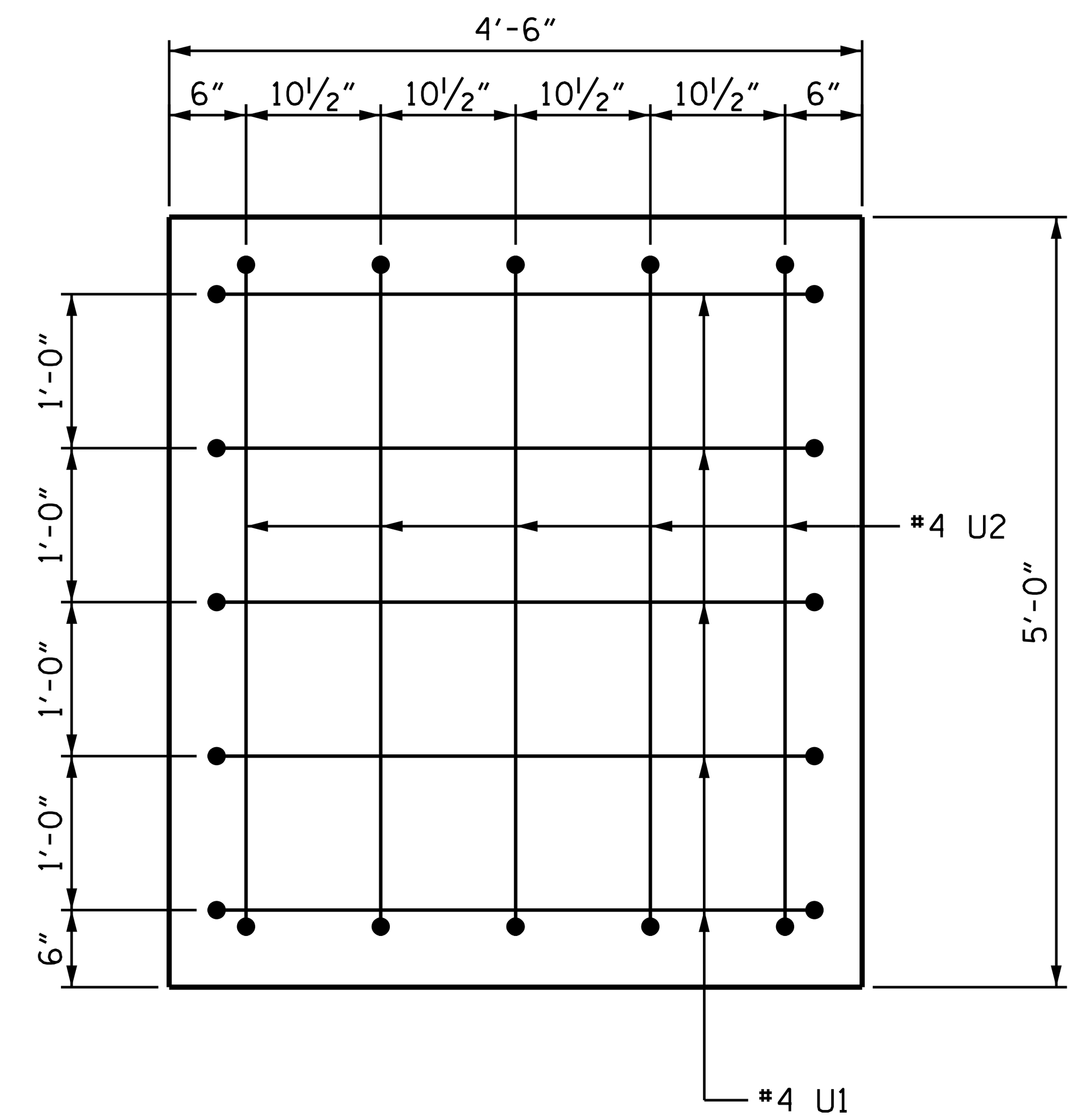


SECTION A-A



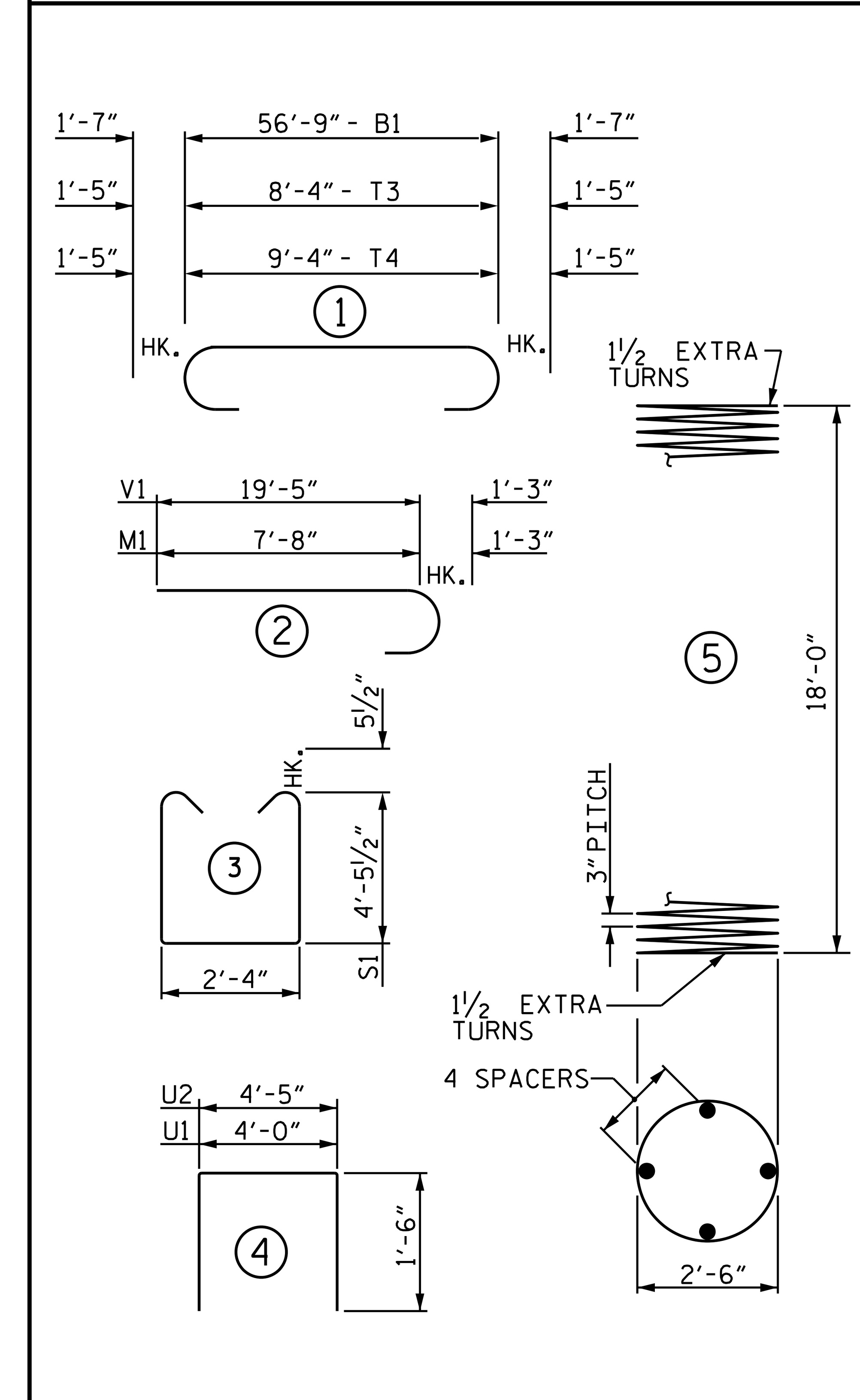
SECTION B-B



END OF CAP VIEW

LEFT END SHOWN,
RIGHT END SIMILAR

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT #1

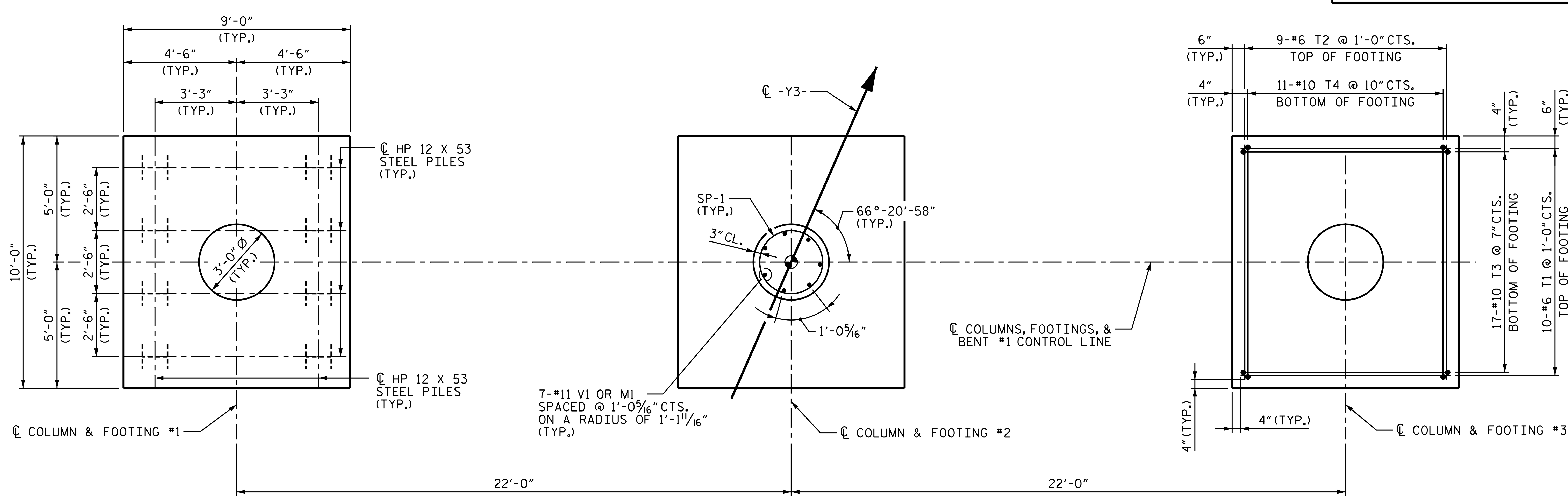
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	1	59'-11"	2547
B2	12	#11	STR	56'-9"	3618
B3	8	#5	STR	56'-9"	474
B4	8	#4	STR	15'-3"	81
M1	21	#11	2	12'-0"	1339
S1	176	#5	3	12'-2"	2233
T1	30	#6	STR	8'-4"	376
T2	27	#6	STR	9'-4"	379
T3	51	#10	1	11'-8"	2560
T4	33	#10	1	12'-9"	1799
U1	64	#4	4	7'-0"	299
U2	10	#4	4	7'-5"	50
V1	21	#11	2	21'-5"	2390
REINFORCING STEEL					18145 LBS.
SP-1	3	★	5	581'-6"	1165

SPIRAL COLUMN REINFORCING STEEL 1165 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 FOOTINGS	40.0 CU.YDS.
POUR #2 COLUMNS	13.9 CU.YDS.
POUR #3 CAP	49.8 CU.YDS.
TOTAL CLASS A CONCRETE	103.7 CU.YDS.
HP 12 x 53 STEEL PILES NO. 24	2160 LIN. FT.
PILE REDRIVES	12 EACH
PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES	12 EACH

★ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



PLAN OF FOOTING

PILE PLACEMENT, DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT #1

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A&O PROJECT NO. 2015.042

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14455 TED L. BARTELT
12/7/2018

REFERENCE NO. 9-25

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2			4			32

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CHECKED BY : T. L. B. DATE : 02/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

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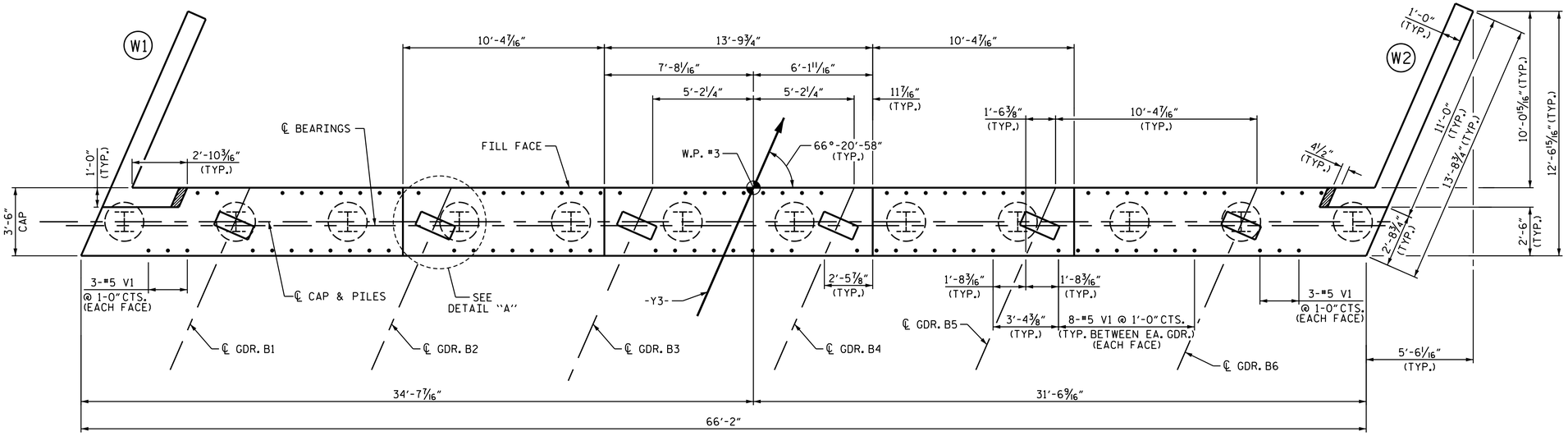
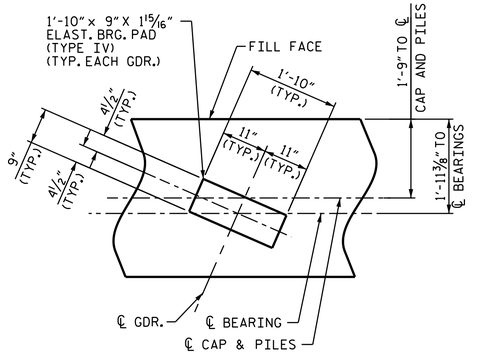
$$$$USERNAME$$$$



PLAN

ELEVATION

FOR SECTION A-A AND PARTIAL SECTION B-B, SEE SHEET 3 OF 3.



DETAIL "A"

NOTES:

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

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

THE UPPER PORTION OF THE INTEGRAL END BENT CAP AND THE UPPER PORTION OF THE WINGS SHALL BE POURED WITH THE SUPERSTRUCTURE. SEE SUPERSTRUCTURE PLANS.

FOR PILE SPLICE DETAIL, SEE SHEET 3 OF 3.

FOR SECTION A-A SEE SHEET 3 OF 3.

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT #2 (INTEGRAL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-26
1			3			TOTAL SHEETS
2			4			32

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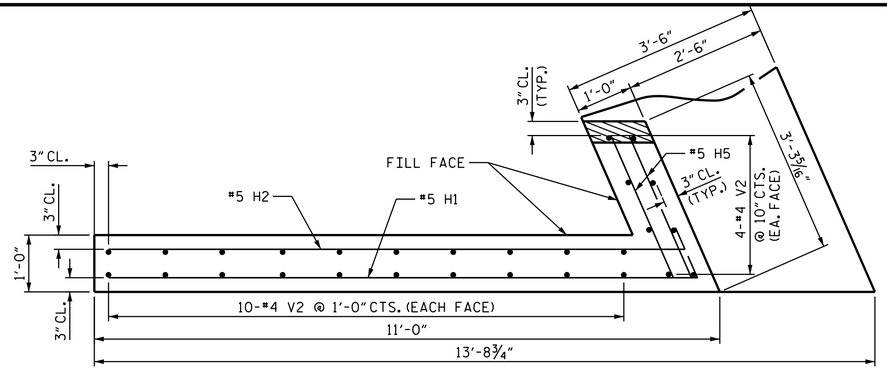
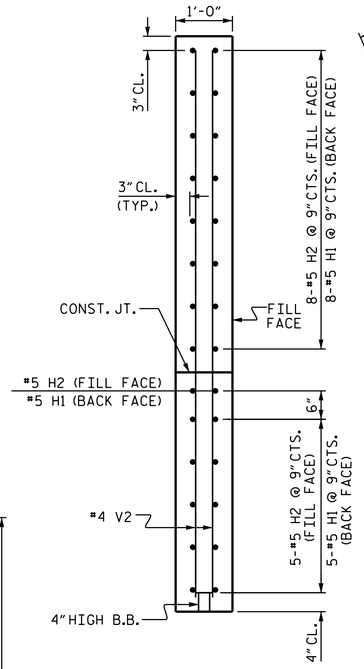
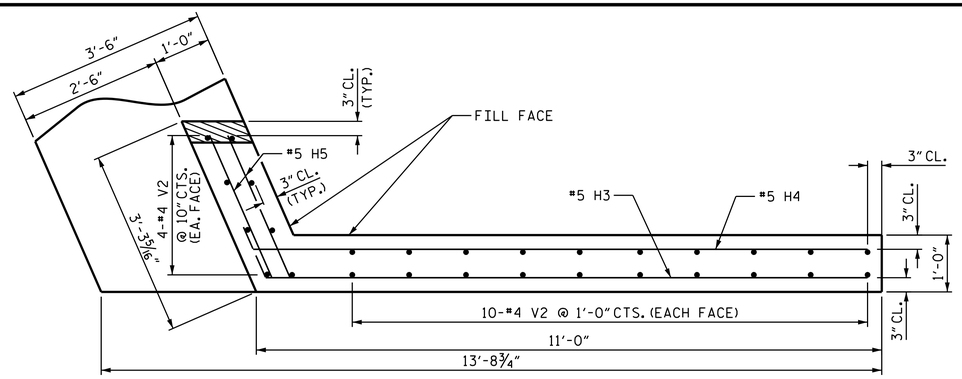


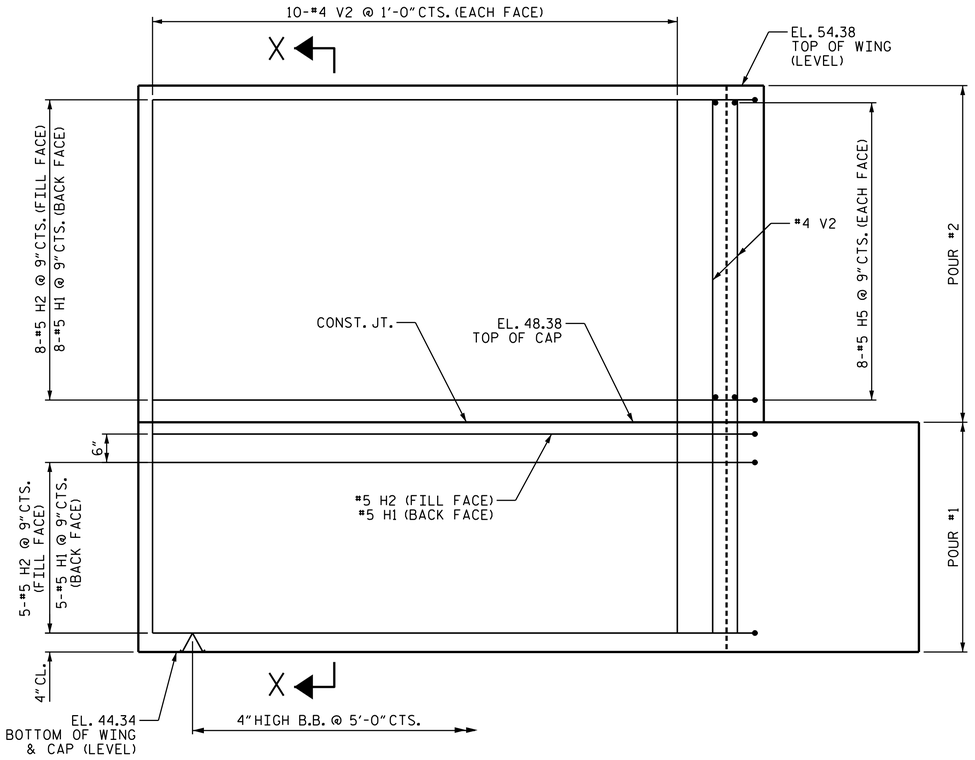
PLAN OF WING W1



SECTION X-X

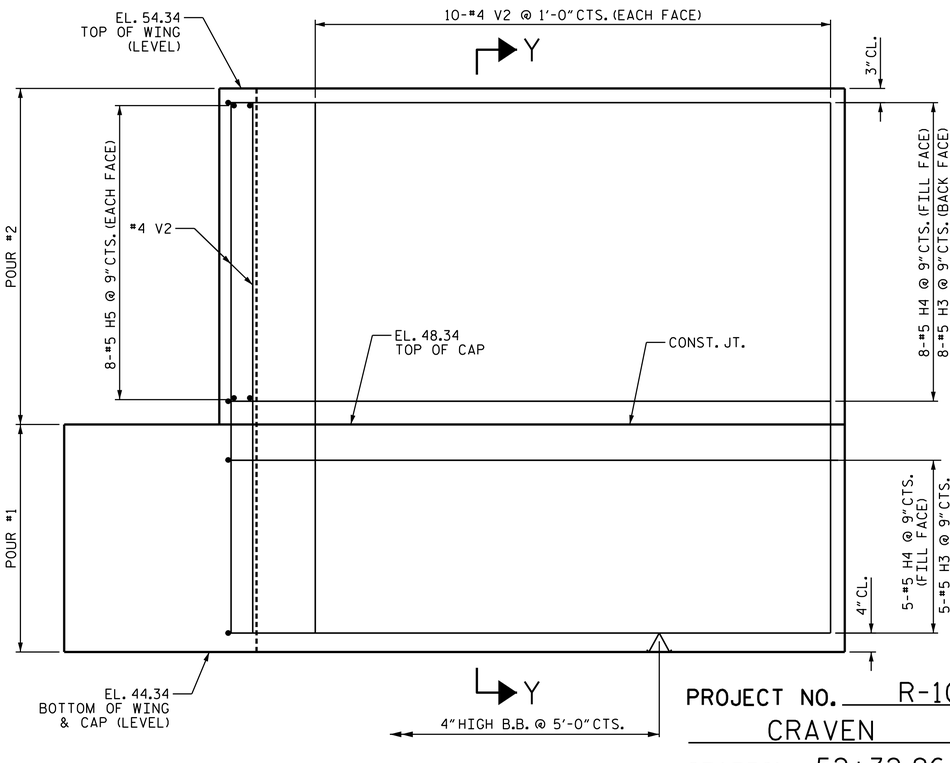


PLAN OF WING W2



ELEVATION OF WING W1

SECTION Y-Y



ELEVATION OF WING W2

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT #2
(INTEGRAL)

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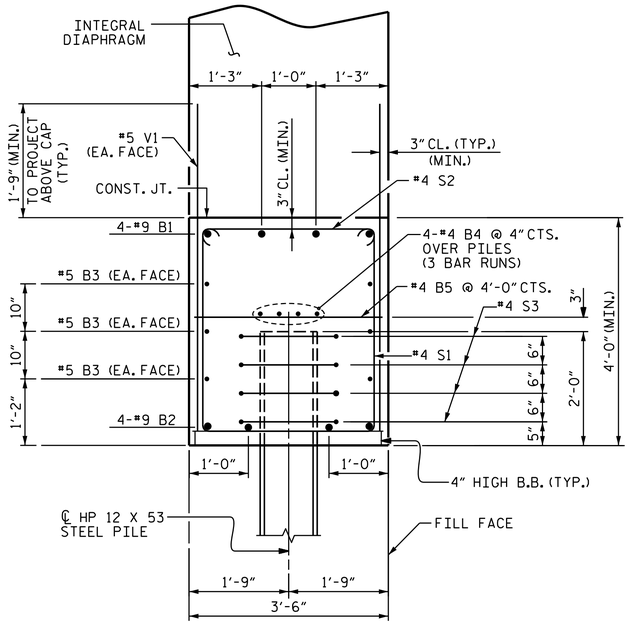
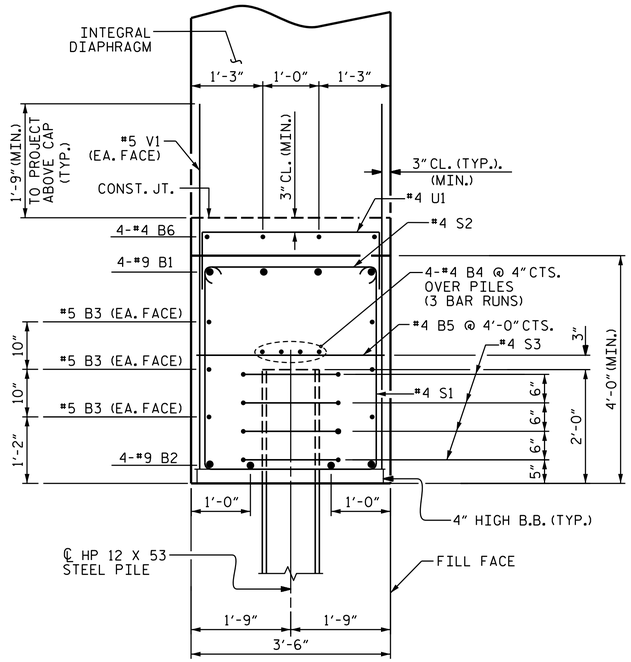


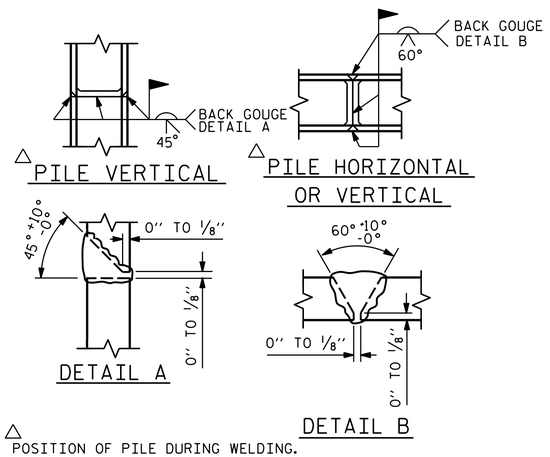
SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



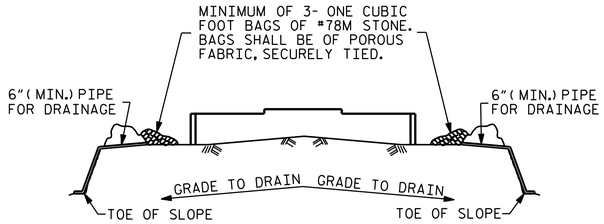
SECTION B-B

(CONCRETE COLLAR NOT SHOWN FOR CLARITY.
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



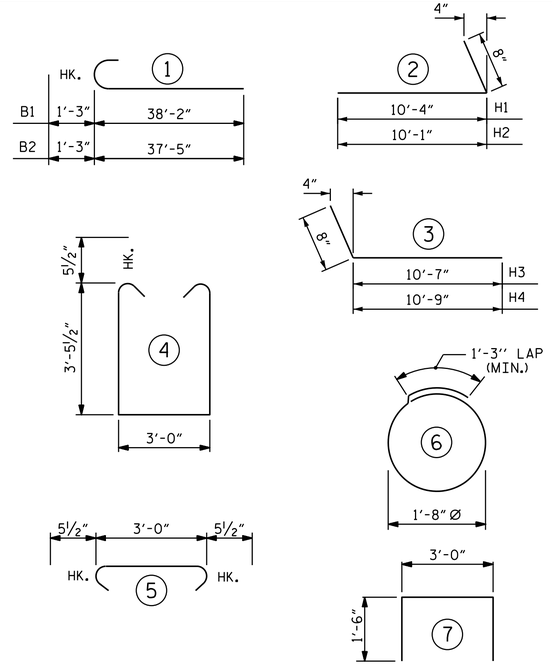
BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

INTEGRAL END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	39'-5"	1072
B2	8	#9	1	38'-10"	1056
B3	12	#5	STR	34'-7"	433
B4	12	#4	STR	23'-9"	190
B5	16	#4	STR	3'-0"	32
B6	4	#4	STR	13'-3"	35
H1	14	#5	2	11'-0"	161
H2	14	#5	2	10'-9"	157
H3	14	#5	3	11'-3"	164
H4	14	#5	3	11'-5"	167
H5	32	#5	STR	3'-5"	114
S1	55	#4	4	10'-10"	398
S2	55	#4	5	3'-11"	144
S3	48	#4	6	6'-6"	208
U1	9	#4	7	6'-0"	36
V1	91	#4	STR	5'-5"	329
V2	78	#4	STR	9'-5"	491

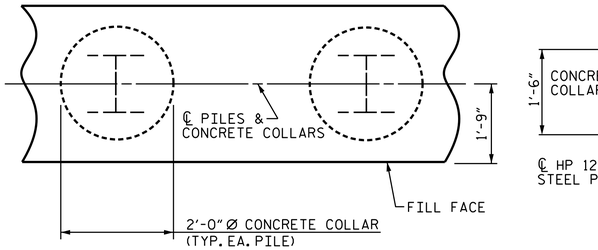
REINFORCING STEEL 5187 LBS.

CLASS A CONCRETE

POUR #1 : CAP & LOWER WINGS	38.7 CU.Y.
POUR #2 : UPPER PART OF WINGS	5.5 CU.Y.
CONCRETE COLLARS	2.1 CU.Y.
TOTAL CONCRETE	46.2 CU.Y.

HP 12X53 STEEL PILES NO.12 840 LIN. FT.
PILE REDRIVES 6 EACH

PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES 12 EACH



CORROSION PROTECTION FOR STEEL PILES DETAIL

PROJECT NO. R-1015
CRAVEN COUNTY
STATION: 52+32.96 -Y3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT #2 (INTEGRAL)

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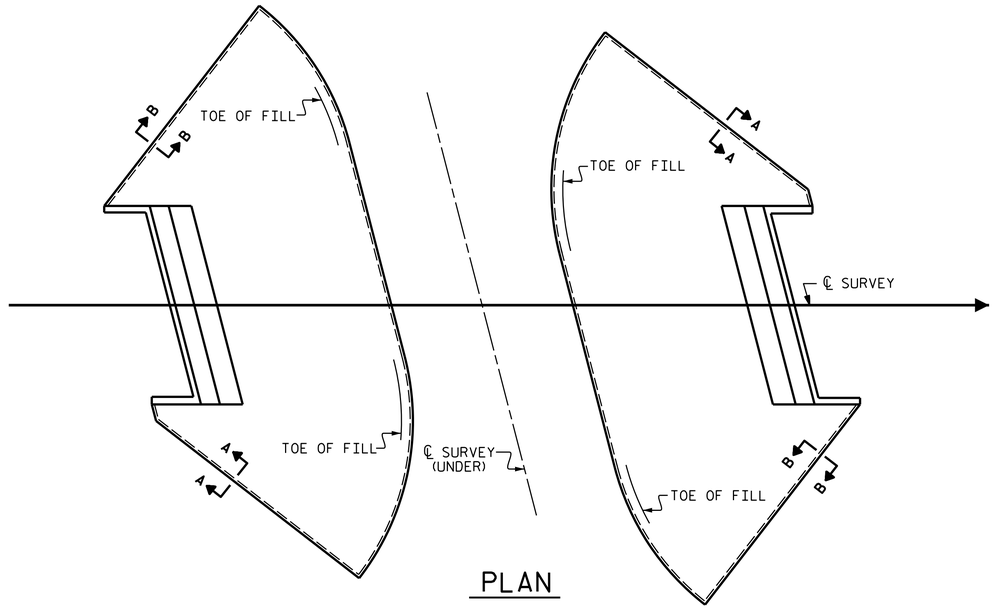


PLAN

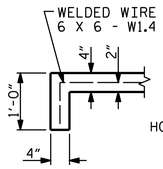
SECTION ALONG ℄ SURVEY WHEN FILL CATCHES IN DITCH

GENERAL NOTES

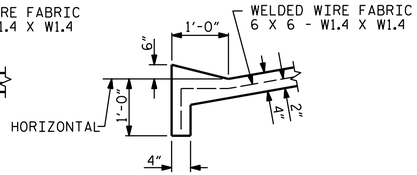
STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING. SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

BRIDGE @ STA. 52+32.96 -Y3-	4 INCH SLOPE PROTECTION	✳ WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	385	770
END BENT 2	555	1110

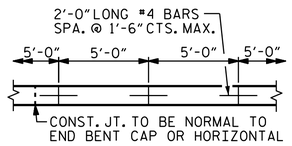
✳ QUANTITY SHOWN IS BASED ON 5' POURS.



SECTION A-A

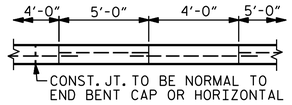


SECTION B-B



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: 52+32.96 -Y3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

NORTH CAROLINA ENGINEERING SEAL 14455 TED L. BARTELL

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12/7/2018

ASSEMBLED BY : J. B. W.	DATE : 5/22/18
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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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2			4			32

STD. NO. SP1 (SHT 5)

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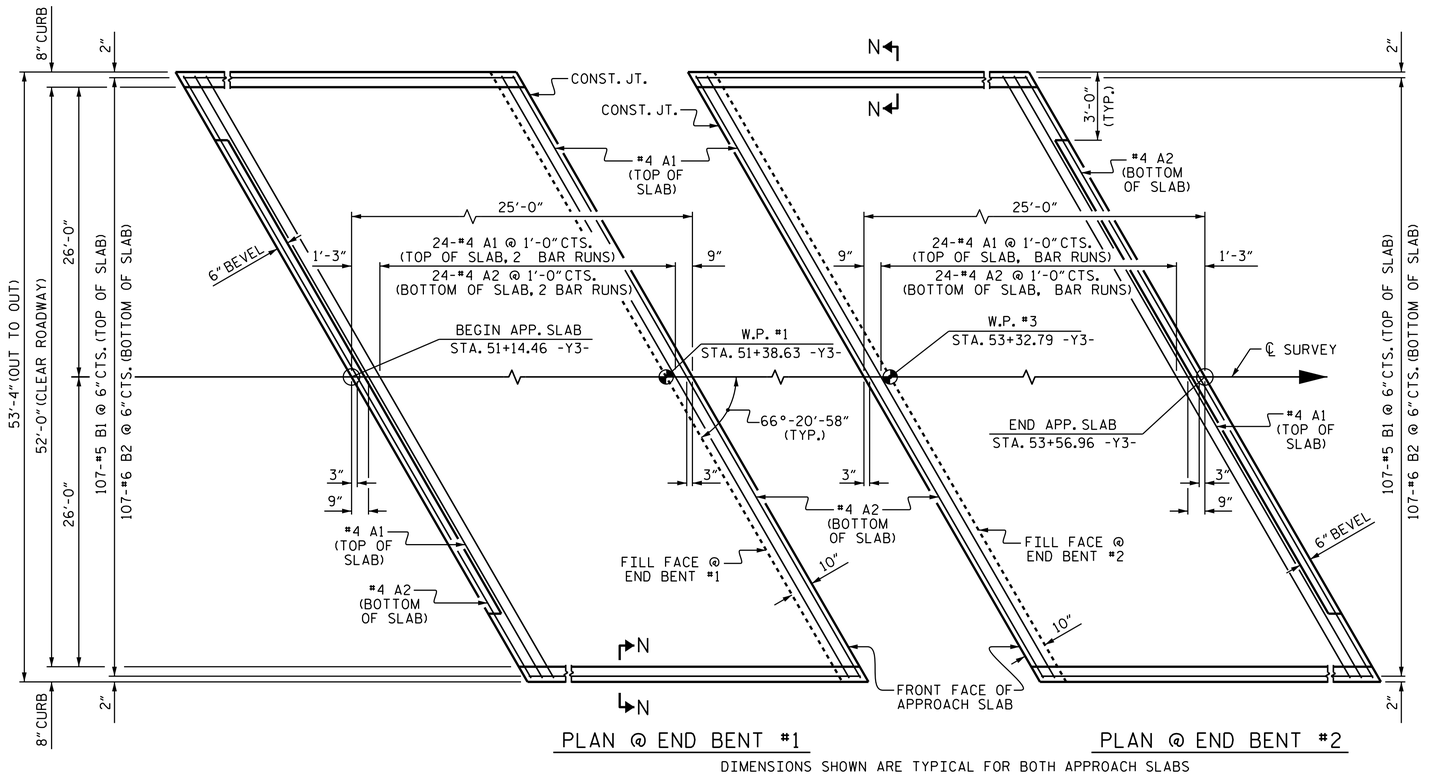
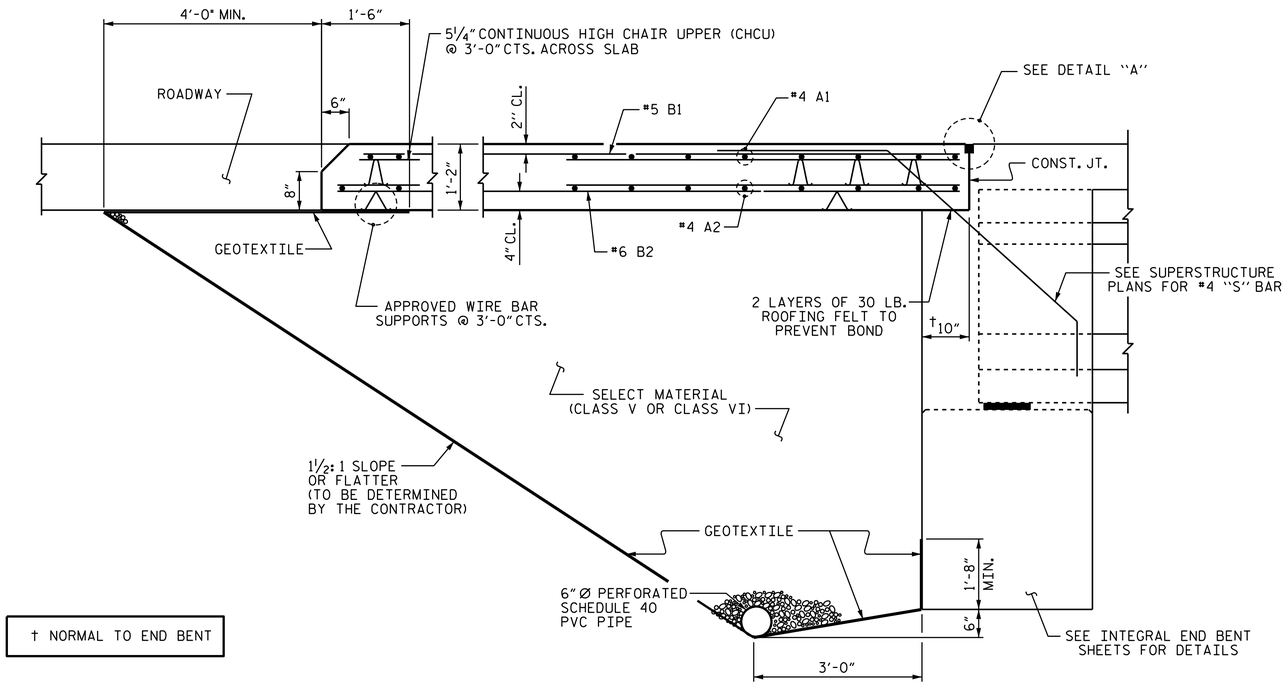


DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

NOTES

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

FOR REINFORCED BRIDGE APPROACH FILL FABRIC WALL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

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

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

BILL OF MATERIAL

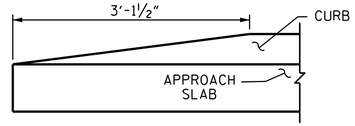
FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	52	#4	STR	29'-11"	1039
✱ A2	52	#4	STR	29'-11"	1039
✱ B1	107	#5	STR	24'-2"	2697
✱ B2	107	#6	STR	24'-8"	3964

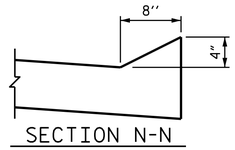
✱ EPOXY COATED REINFORCING STEEL 8739 LBS.

CLASS AA CONCRETE 57.8 C.Y.

DETAIL "A"



END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION N-N

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-30
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2/28/2018

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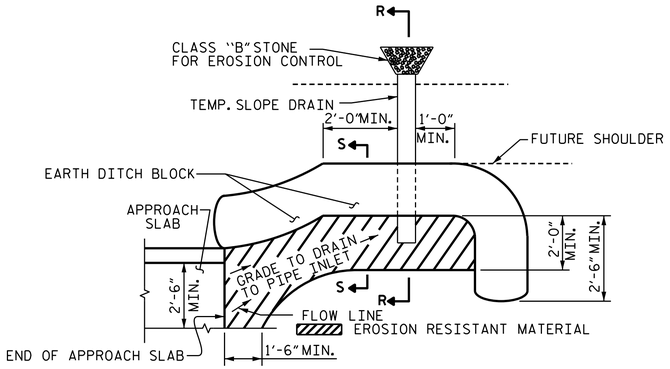
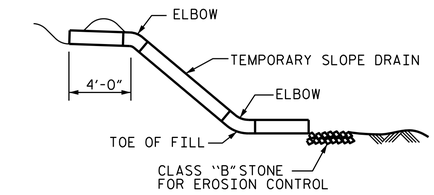
STD. NO. BAS5 (SHT 2a)

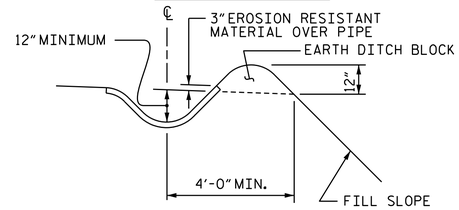


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



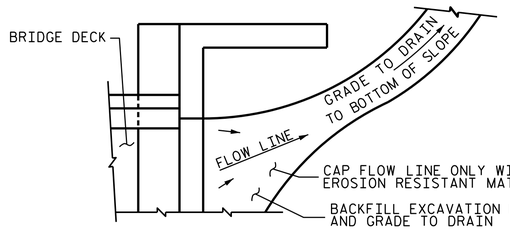
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

TEMPORARY DRAINAGE DETAIL

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 52+32.96 -Y3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S9-31
1			3			TOTAL SHEETS
2			4			31

STD. NO. BAS4

DRAWN BY : J. B. W. DATE : 02/20/18
CHECKED BY : T. L. B. DATE : 02/20/18
DESIGN ENGINEER OF RECORD: T. L. B. DATE : 02/20/18

1998 20 2018
ALPHA & OMEGA GROUP
CIVIL | STRUCTURAL | WATER RESOURCES
4601 Lake Boone Trail Suite 3C Raleigh, NC 27607
Phone 919 981 0310 Fax 919 981 0451
www.aogroup.com Firm License No. C-1684

A&O PROJECT NO. 2015.042

DocuSigned by:
D794597C456A4F7...
2/28/2018

REFERENCE NO. 9-31

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

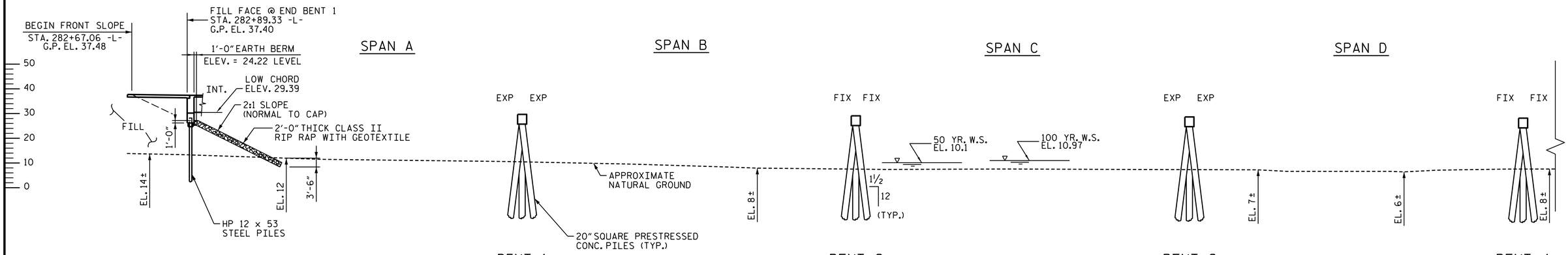
F.A. PROJ. NO. NHF-70(49)

283+00 | 284+00 | 285+00 | 286+00 | 287+00

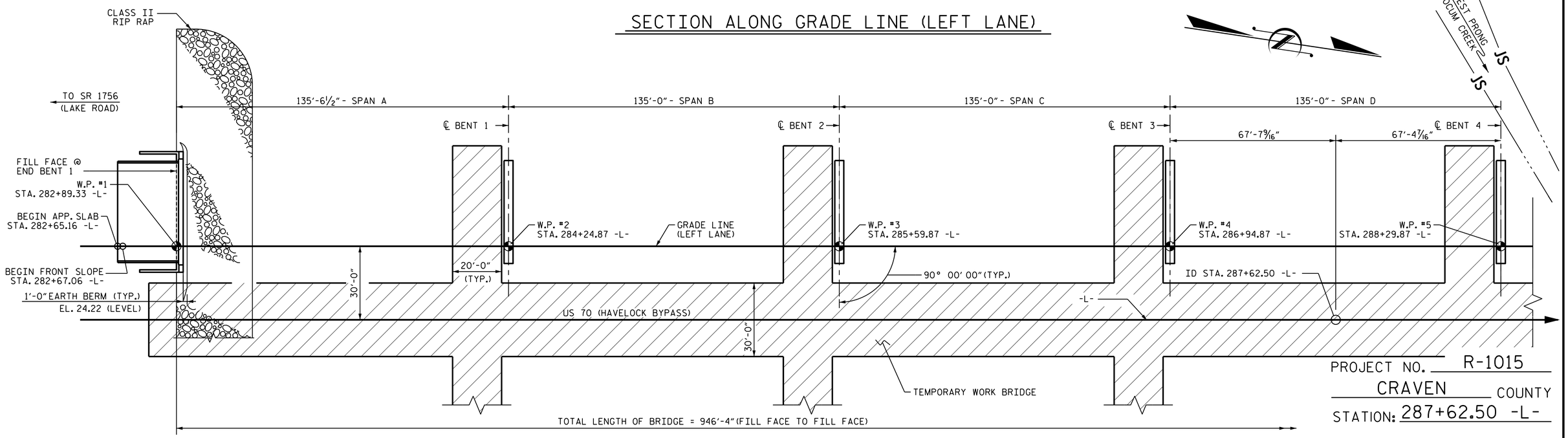
(+)0.3466% (-)0.3813%

PI STA. = 278+87.00 -L-
EL. = 38.93
VC = 200'

GRADE DATA -L-



SECTION ALONG GRADE LINE (LEFT LANE)



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2000 CFS
DESIGN FREQUENCY	= 50 YR.
DESIGN HW ELEV.	= 10.1 FT.
DRAINAGE AREA	= 22 SQ. MI.
BASE DISCHARGE	= 2658 CFS
BASE FREQUENCY	= 100 YR.
BASE HW ELEV.	= 10.97 FT
OVERTOPPING DISCHARGE	= N/A*
OVERTOPPING FREQUENCY	= N/A*
OVERTOPPING ELEV.	= N/A*

*OVERTOPPING FREQUENCY EXCEEDS 500 YR.

PLAN

(PILES NOT SHOWN IN PLAN VIEW)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

DocuSigned by: DB3C8E45B06D4... 12/7/2018

NORTH CAROLINA PROFESSIONAL SEAL 14114 ENGINEER ROBERT C. LARSON

PROJECT NO. R-1015

CRAVEN COUNTY

STATION: 287+62.50 -L-

SHEET 1 OF 6 BRIDGE NO.281

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON US 70
(HAVELOCK BYPASS) OVER
SW PRONG OF SLOCUM CREEK
BETWEEN SR 1756 AND SR 1747

LEFT LANE

DESIGN ENGINEER OF RECORD: DocuSigned by: DB3C8E45B06D4... DATE: 12/7/2018
DRAWN BY: R.J. FLORY DATE: 10/30/15
CHECKED BY: R.C. LARSON DATE: 11/01/15

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ENGINEERS • PLANNERS • ECOLOGISTS LICENSE NUMBER: C-0764
KCI Associates of North Carolina, P.A.
SUITE 220, LANDMARK CENTER II 4601 SIX FORKS RD. RALEIGH, N.C. 27609-5260 (919) 783-9214

DWG. REF. NO. 1 OF 44

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S10-1
1			3			TOTAL SHEETS
2			4			44

STR-#10

KCI JOB NO: 25146789.11