

09_08/2019

12/21/2020
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 Stump

TIP PROJECT: BR-0042

CONTRACT: C204392

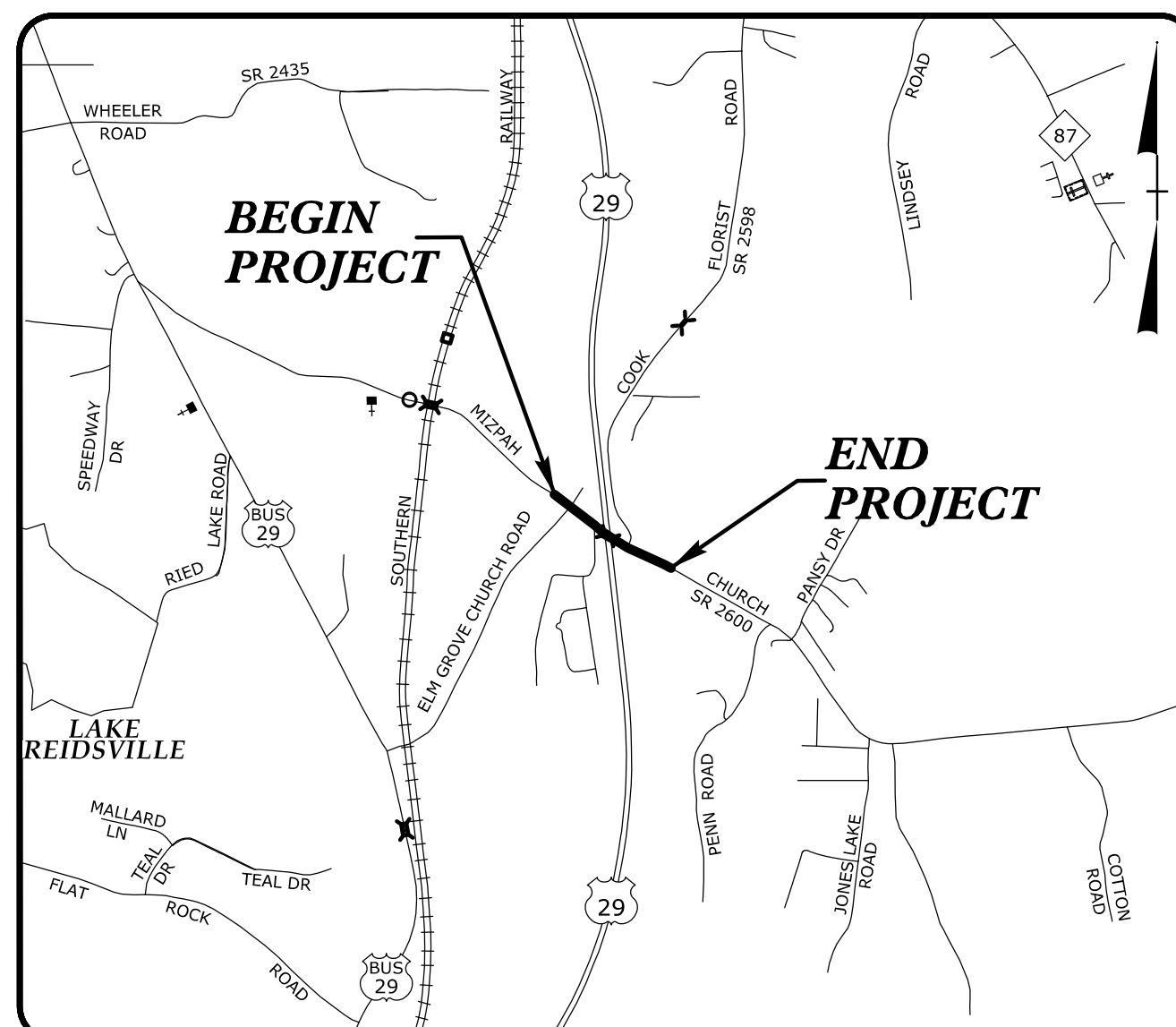
STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

ROCKINGHAM COUNTY

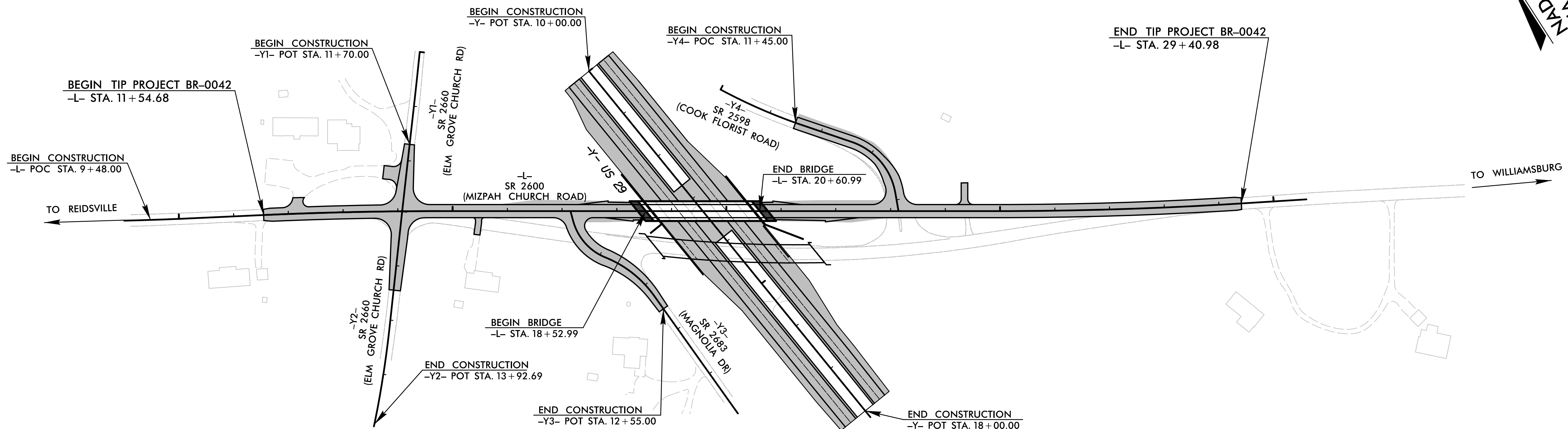
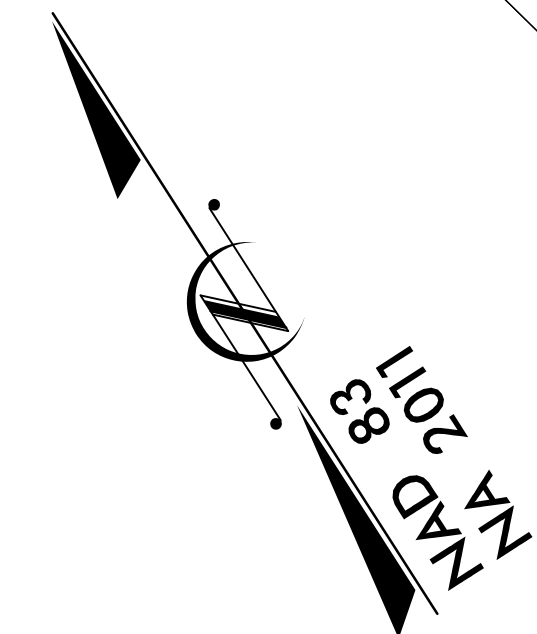
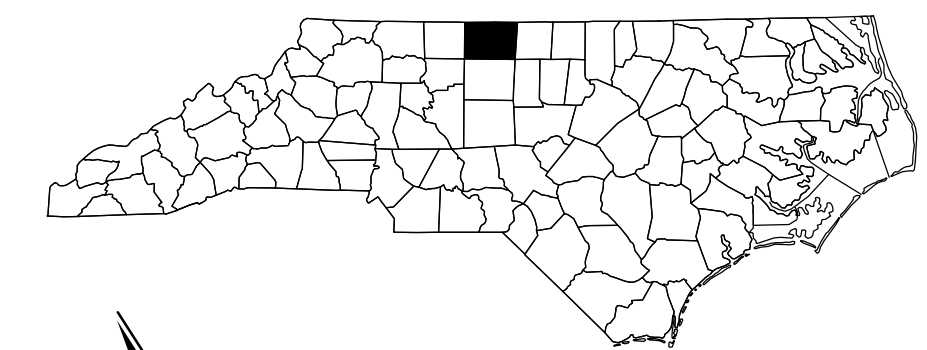
**LOCATION: BRIDGE NO. 780116 ON SR 2600 (MIZPAH CHURCH RD)
 OVER US-29**

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0042	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
49076.1.1		PE	
49076.2.1		RW & UTIL	
49076.3.1		CONSTRUCTION	



VICINITY MAP
 NOT TO SCALE



STRUCTURES

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

ADT 2020 =	1,530
ADT 2040 =	1,700
K =	8 %
D =	60 %
T =	4 %
V =	50 MPH
*(TTST = 1%+ DUAL 3%)	
FUNC CLASS = MINOR COLLECTOR	
SUB-REGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BR-0042 =	0.299 MI
LENGTH STRUCTURE TIP PROJECT BR-0042 =	0.039 MI
TOTAL LENGTH TIP PROJECT BR-0042 =	0.338 MI

AECOM
 NC FIRM LICENSE No: F-0342
 701 Corporate Center Drive, Suite 475
 Raleigh, NC 27607
 (919) 854-6200 - (919) 854-6259(FAX)

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
 JUNE 17, 2019

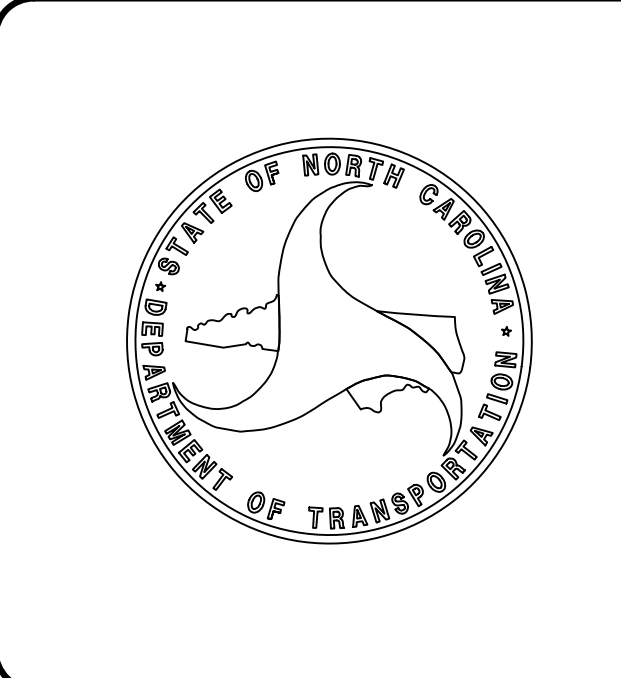
LETTING DATE:
 MARCH 16, 2021

NEIL J. DEAN, PE PROJECT ENGINEER
TIMOTHY A. KLOTZ, PE PROJECT DESIGN ENGINEER
DAVID STUTTS, PE NCDOT PROJECT MANAGER

STRUCTURE DESIGN ENGINEER

DocuSigned by:
 John C. Morrison

JOHN C. MORRISON, P.E.
 SIGNATURE:

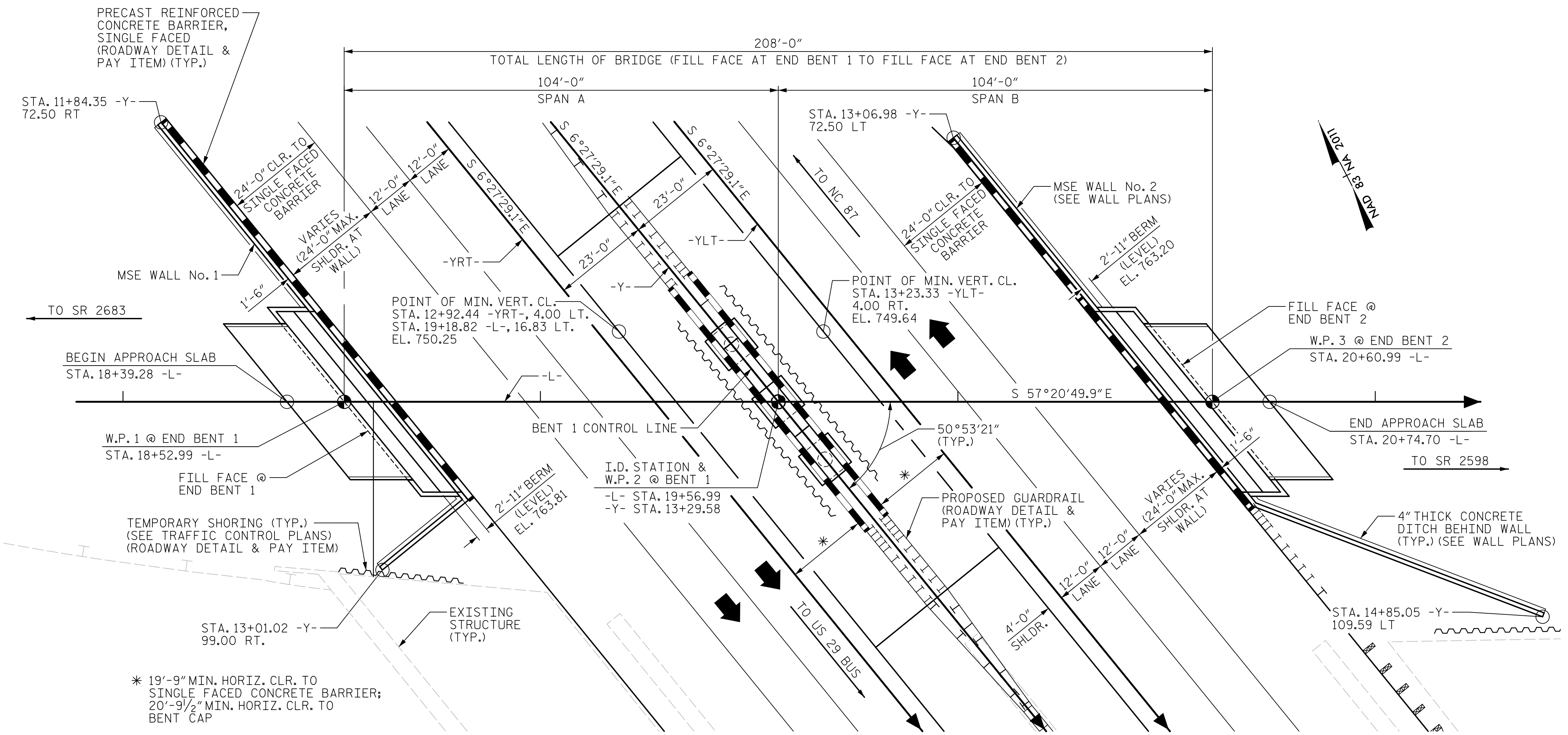
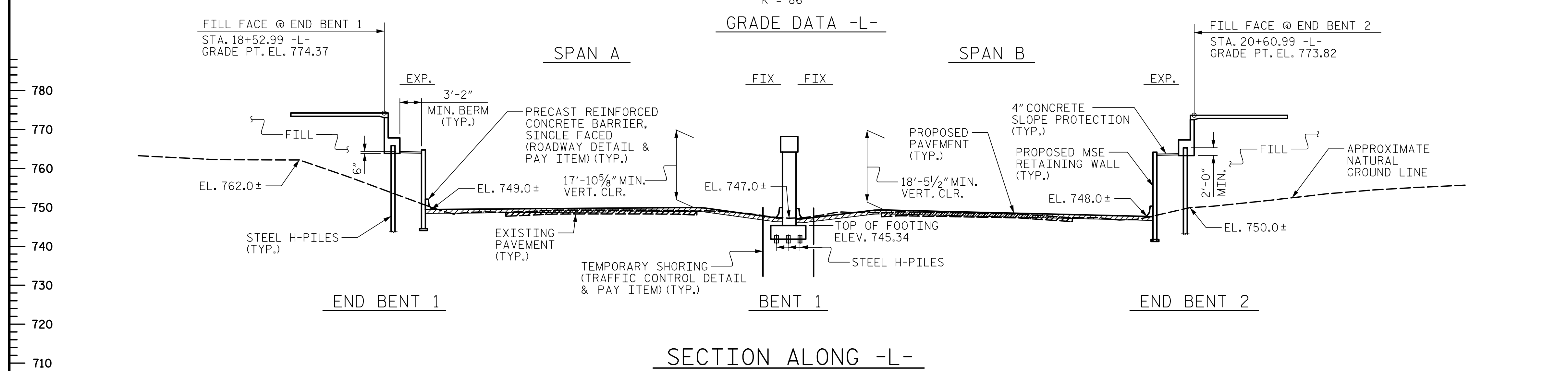


18+00 18+50 19+00 19+50 20+00 20+50 21+00 21+50

GRADE DATA -L-
(+1.6774% (-)2.2776%
PI = 19+60.00
EL = 776.40'
VC = 340'
K = 86

GRADE DATA -YLT-
(-0.3007% (-)1.4448%
PI Sta 11+60.00
EL = 751.92'
VC = 290'
K = 253

GRADE DATA -YRT-
(-0.3991% (-)1.4983%
PI Sta 12+10.00
EL = 751.47'
VC = 280'
K = 255



PLAN
(PILES NOT SHOWN FOR CLARITY)

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-
13+29.58 -Y-
SHEET 1 OF 2 REPLACES BRIDGE No. 116

AECOM
AECOM TECHNICAL SERVICES OF NC, INC.
701 CORPORATE CENTER DRIVE, SUITE 475
RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

Designed by:
John C. Morrison
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 030474
JOHN C. MORRISON
5/27/2020

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

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE ON SR 2600
(MIZPAH CHURCH RD.)
OVER US 29
BETWEEN SR 2683
AND SR 2598

SHEET NO. S-01
TOTAL SHEETS 28

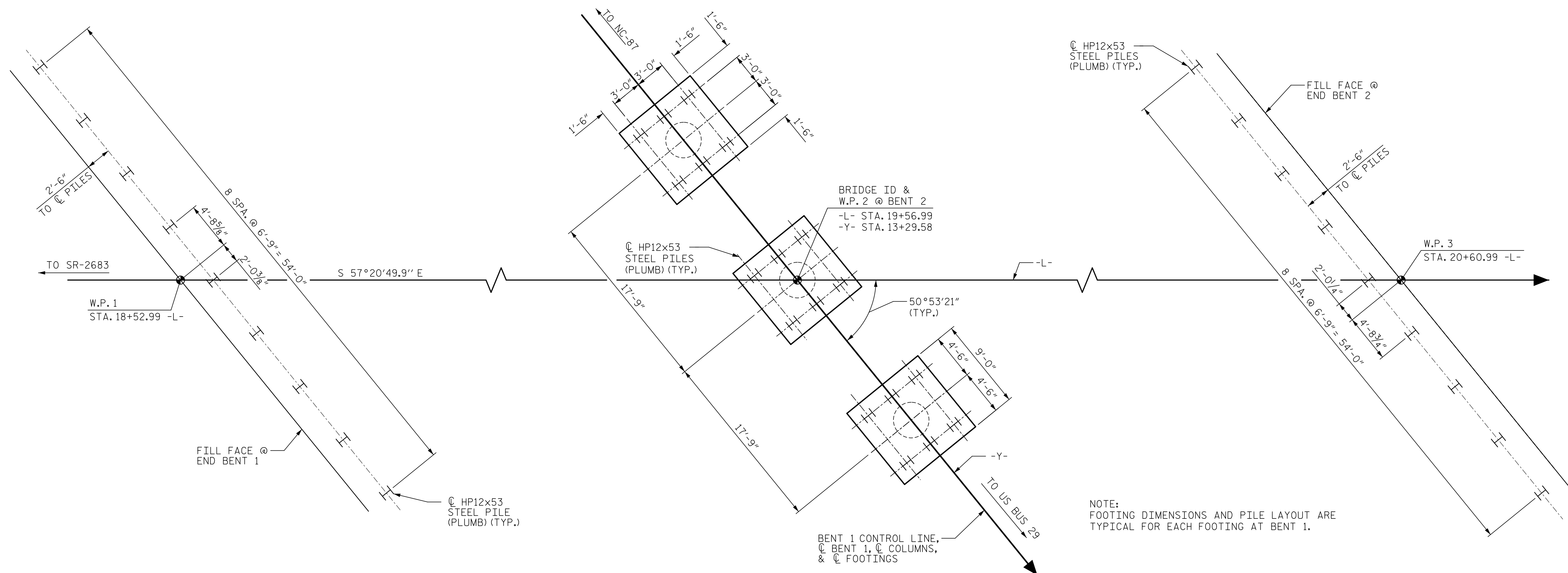
DRAWN BY : T.B. STUMP DATE : 04/2019
CHECKED BY : J.C. MORRISON DATE : 04/2019
DESIGNED BY : T.B. STUMP DATE : 04/2019
DESIGN CHECKED BY : J.C. MORRISON DATE : 04/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DATE: 5/27/2020 TIME: 12:54:41 PM
USER: jmorris\jmorris\Projects\60571086 - BR-0042\900_CAD\01\STRUCTURES\04 Drawings\001\01\SOI_BR-0042_SML.dwg

DATE: 5/27/2020
TIME: 12:54:49 PM

USERS: nusrat@p001\Users\nusrat\Projects\60571086 - BR-0042\Bridges\CAD_GIS\9100_CAD\01_S02\1\Structures\04_Drawings\000_01_S02_BR-0042_SMU_F.dgn



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO CENTERLINE OF PILES.
DIMENSIONS LOCATING FOOTINGS ARE SHOWN TO CENTERLINE OF COLUMNS AND FOOTINGS.

FOUNDATION NOTES:

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 95 TONS PER PILE.
- PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE.
- DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.
- DRIVE PILES AT BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE.
- IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1, BENT 1, AND END BENT 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(S) OF THE STANDARD SPECIFICATIONS.
- TESTING THE FIRST PRODUCTION PILE WITH PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING SEE SECTION 450 OF THE STANDARD SPECIFICATIONS AND FOR PILE DRIVING CRITERIA, SEE PILE DRIVING CRITERIA PROVISION.
- OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE MECHANICALLY STABILIZED EARTH (MSE) END BENT WALL TO WITHIN 1 FT OF THE BOTTOM OF CAP ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT 1. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTIONS 235 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
 STATION: 19+56.99 -L-

SHEET 2 OF 3

DRAWN BY : H.T. ROSEMOND	DATE : 04/2019
CHECKED BY : D. RITACCO	DATE : 04/2019
DESIGNED BY : H.T. ROSEMOND	DATE : 04/2019
DESIGN CHECKED BY : D. RITACCO	DATE : 04/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

AECOM TECHNICAL SERVICES OF NC, INC.
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RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE ON SR 2600
(MIZPAH CHURCH RD.)
OVER US 29
BETWEEN SR 2683
AND SR 2598

SHEET NO.
S-02

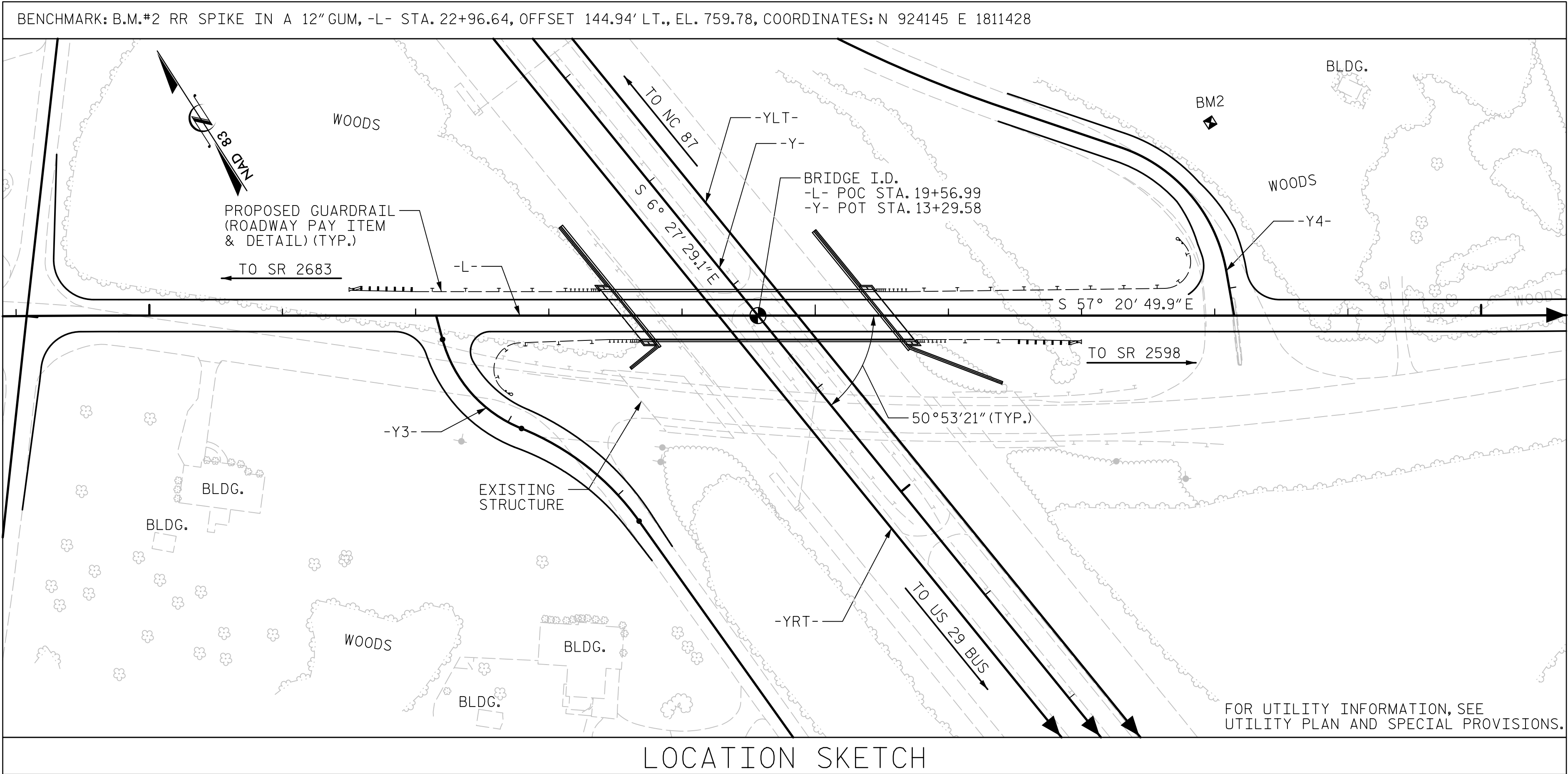
TOTAL SHEETS
28

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

DocuSigned by:
John C. Morrison
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 030474
JOHN C. MORRISON
5/27/2020

DATE: 5/27/2020
TIME: 12:54:58 PM

USER: nusrat\p001\Drawings\Projects\60571086 - BR-0042\Bridges\CAD_05\51910_CAD\VO_NCDOT_TIP\Structures\04 Drawings\000_05_503_S03_BR-0042_SMU_L00.dgn



LOCATION SKETCH

GENERAL NOTES:

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THE ELEVATIONS AND CLEARANCES SHOWN ON THE PLANS AT THE POINTS OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATIONS ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.
- FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.
- INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR REMOVAL OF EXISTING STRUCTURE AT STATION 19+56.99 -L-.
- THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.
- TEMPORARY SHORING WILL BE REQUIRED IN THE AREAS INDICATED IN THE PLAN VIEW.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.
- THE EXISTING STRUCTURE, CONSISTING OF 4 SPANS: 1 @ 63.9', 1 @ 86.5', 1 @ 83.7' & 1 @ 64.8'; 34.0' CLEAR ROADWAY WIDTH AND A 7 3/8" REINFORCED CONCRETE DECK WITH A 1" ASPHALT WEARING SURFACE ON I-BEAMS; AND END BENTS CONSISTING OF REINFORCED CONCRETE CAP WITH STEEL PILES AT END BENTS 1 AND 2, AND INTERIOR BENTS CONSISTING OF REINFORCED CONCRETE POST AND BEAM COLUMNS ON PILE FOOTINGS LOCATED SOUTH OF THE PROPOSED BRIDGE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
- THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

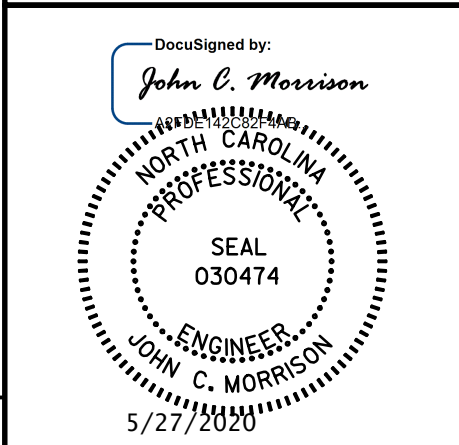
TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	FOUNDATION EXCAVATION FOR BENT 1	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 63" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP12x53 STEEL PILES	HP12x53 STEEL PILES	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	FOAM JOINT SEALS		
	LUMP SUM	LUMP SUM	LUMP SUM	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO.	LIN. FT.	EA.	NO.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE					8,058	7,754					8	808.67				410.6			
END BENT 1							57.9		7,382				9	9	630		18.1		
BENT 1							90.9		12,518	1,437			18	18	720				
END BENT 2							58.6		7,382				9	9	405		18.1		
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	1	8,058	7,754	207.4	LUMP SUM	27,282	1,437	8	808.67	36	36	1755	410.6	36.2	LUMP SUM	LUMP SUM

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
 STATION: 19+56.99 -L-

SHEET 3 OF 3

DRAWN BY : T.B. STUMP DATE : 04/2019
 CHECKED BY : J.C. MORRISON DATE : 04/2019
 DESIGNED BY : T.B. STUMP DATE : 04/2019
 DESIGN CHECKED BY : J.C. MORRISON DATE : 04/2019



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 BRIDGE ON SR 2600
 (MIZPAH CHURCH RD.)
 OVER US 29
 BETWEEN SR 2683
 AND SR 2598

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-03
1			3			TOTAL SHEETS
2			4			28

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LOAD FACTORS:

Table with 4 columns: DESIGN LOAD RATING FACTORS, LIMIT STATE, γ_{DC}, γ_{DW}. Rows include STRENGTH I and SERVICE III.

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

Main LRFR summary table with columns for LEVEL, VEHICLE, WEIGHT, CONTROLLING LOAD RATING, MINIMUM RATING FACTORS, TONS = W x RF, and columns for STRENGTH I and SERVICE III LIMIT STATES (MOMENT, SHEAR).

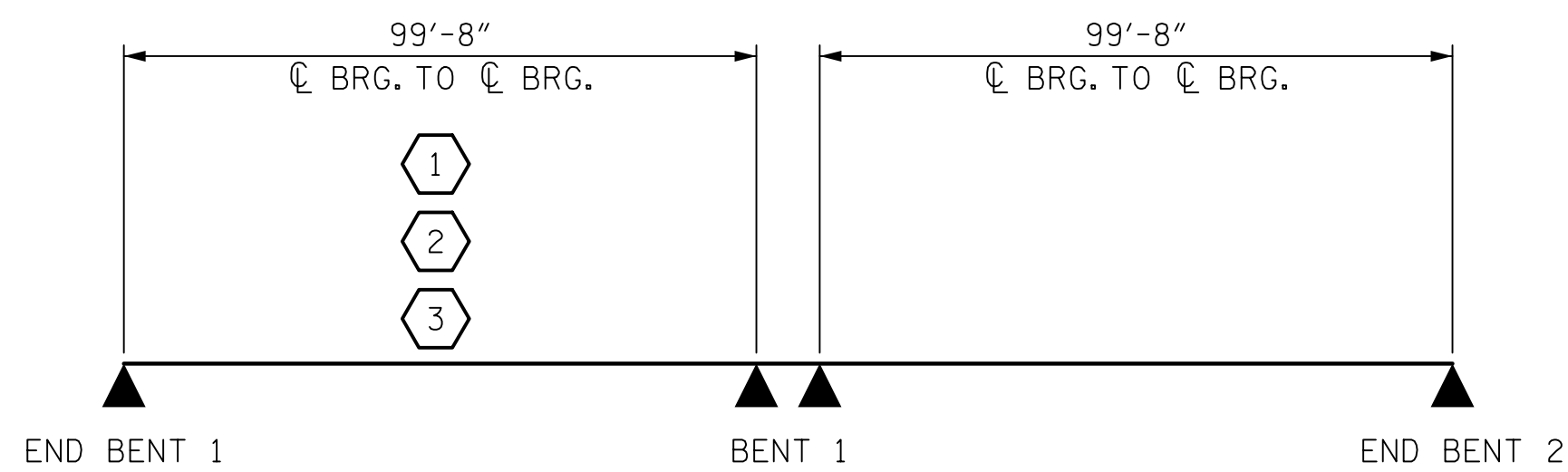
NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES. ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

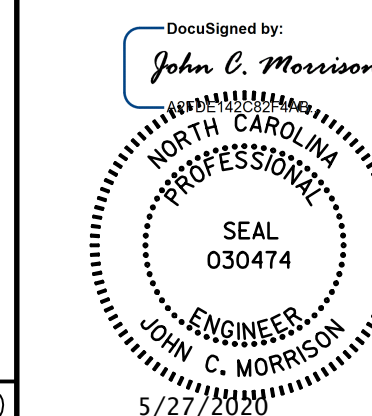
1. GIRDERS DESIGNED AS SIMPLE SPANS FOR FLEXURE. GIRDERS DESIGNED AS SIMPLE-MADE-CONTINUOUS (FOR LIVE LOAD AND SUPERIMPOSED DEAD LOAD) FOR SHEAR.

Legend table for symbols: # 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, E - EXTERIOR GIRDER).



LRFR SUMMARY

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

Table for REVISIONS and SHEET NO. (S-04, TOTAL SHEETS 28).

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TIME: 12:55:06 PM

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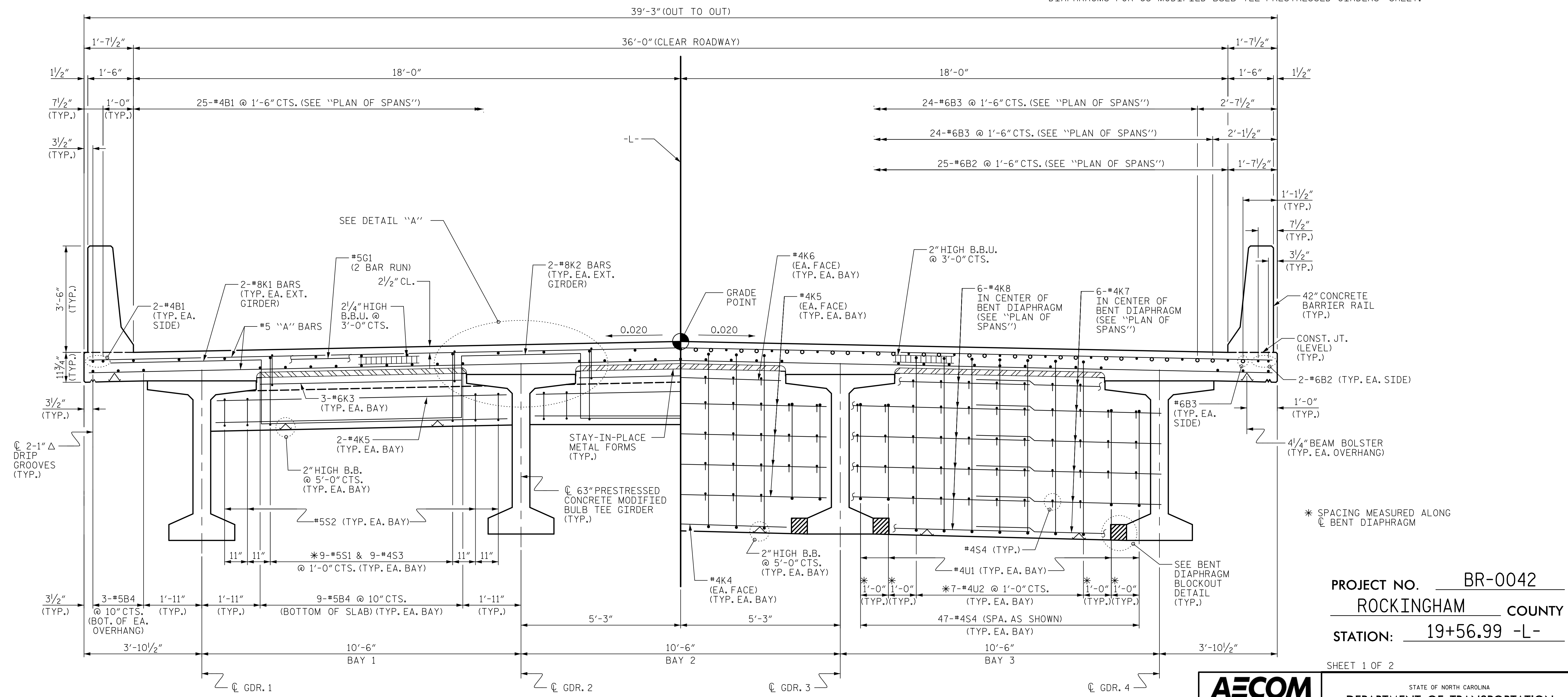
ASSEMBLED BY: H.T. ROSEMOND DATE: 06/2019
CHECKED BY: J.C. MORRISON DATE: 06/2019
DRAWN BY: MAA 1/08 REV. 11/12/08RR MAA/GM
CHECKED BY: GM/DI 2/08 REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC

DATE: 5/27/2019
TIME: 12:55:44 PM

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NOTES:

- PROVIDE 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.
- 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.
- BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
- FOR CONCRETE BARRIER RAIL REINFORCING AND DETAILS, SEE "CONCRETE BARRIER RAIL" SHEET.
- FOR INTERMEDIATE STEEL DIAPHRAGMS SEE "FRAMING PLAN" SHEET AND "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED GIRDERS" SHEET.



* SPACING MEASURED ALONG
CL BENT DIAPHRAGM

PARTIAL TYPICAL SECTION
(SHOWING END BENT DIAPHRAGM)

PARTIAL TYPICAL SECTION
(SHOWING CONTINUOUS FOR LIVE LOAD BENT DIAPHRAGM)

TYPICAL SECTION

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 1 OF 2

DRAWN BY : T.B. STUMP	DATE : 05/2019
CHECKED BY : J.C. MORRISON	DATE : 05/2019
DESIGNED BY : T.B. STUMP	DATE : 05/2019
DESIGN CHECKED BY : J.C. MORRISON	DATE : 05/2019

DOCUMENT NOT CONSIDERED
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SIGNATURES COMPLETED

AECOM
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RALEIGH, NC 27607
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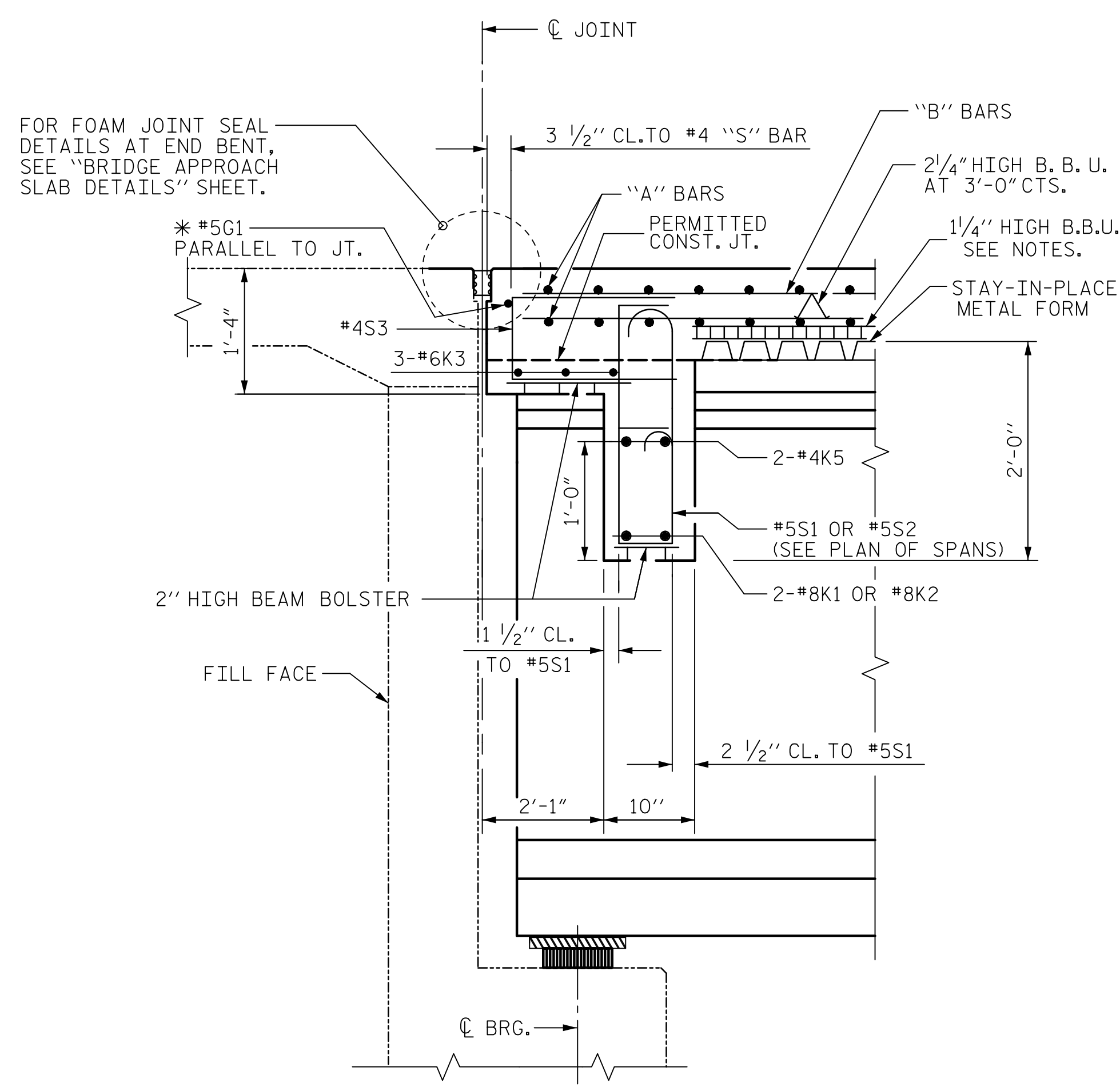
Designed by:
John C. Morrison

NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
030474
JOHN C. MORRISON
5/27/2019

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE					
TYPICAL SECTION					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-05
TOTAL SHEETS					28

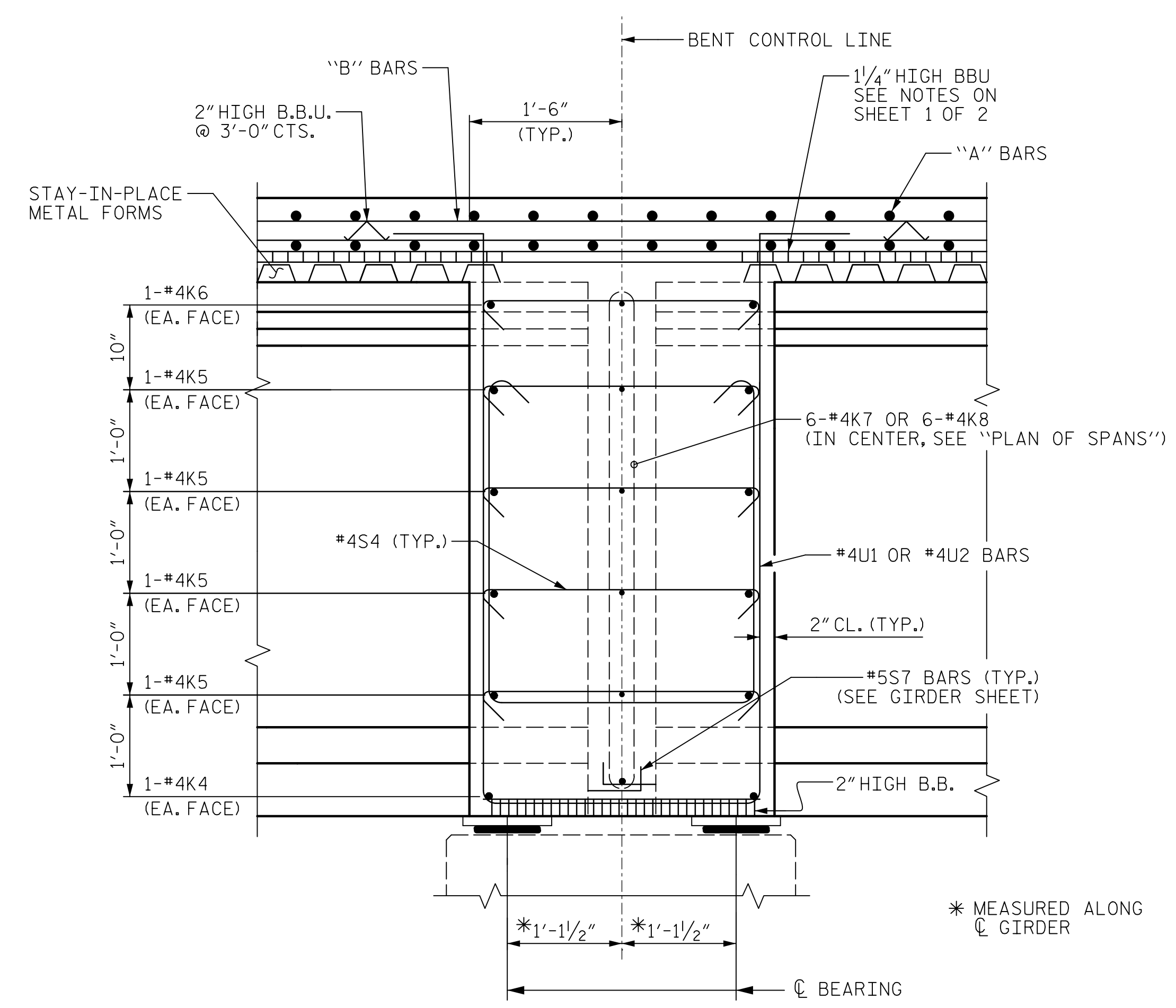
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SECTION THRU END BENT DIAPHRAGMS

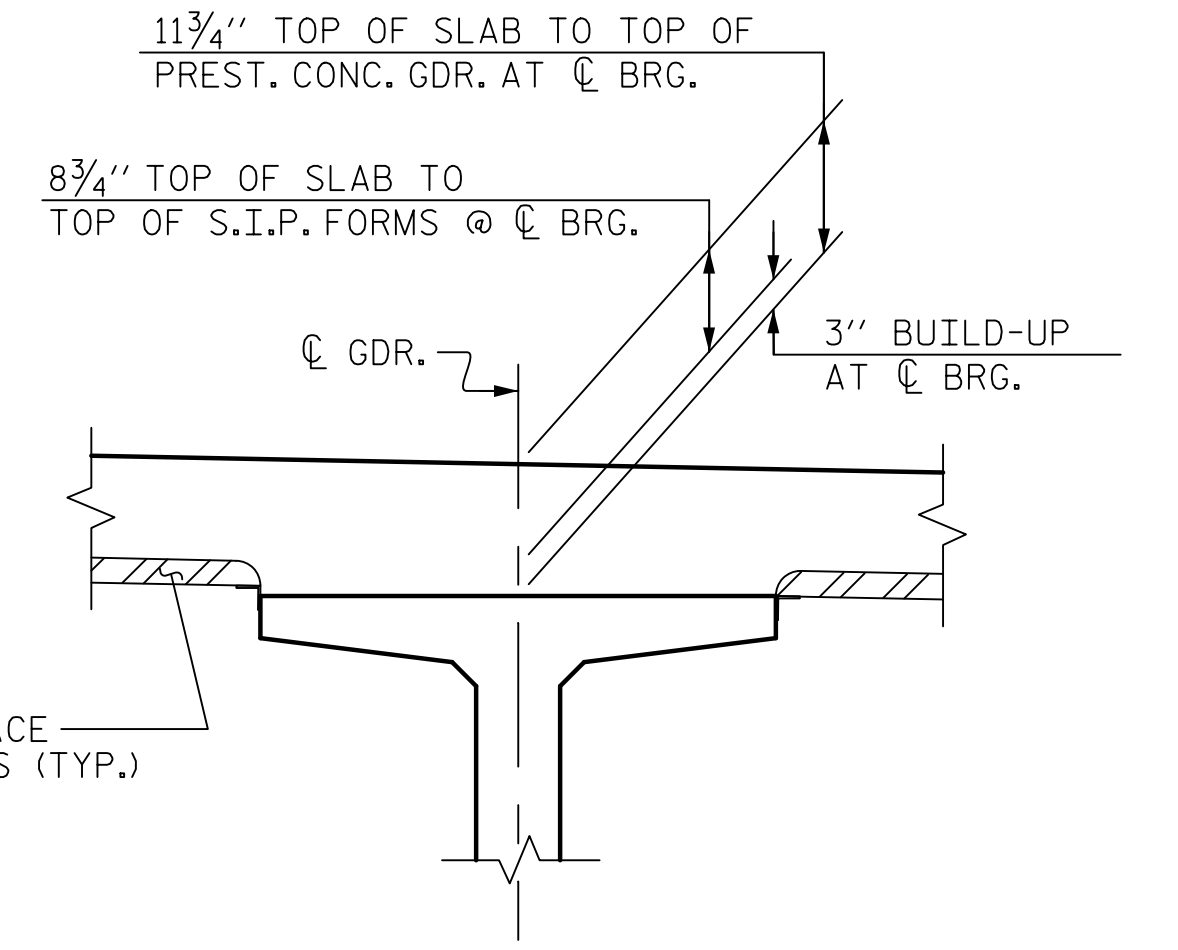
* #5G1 MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL AND STIRRUPS.



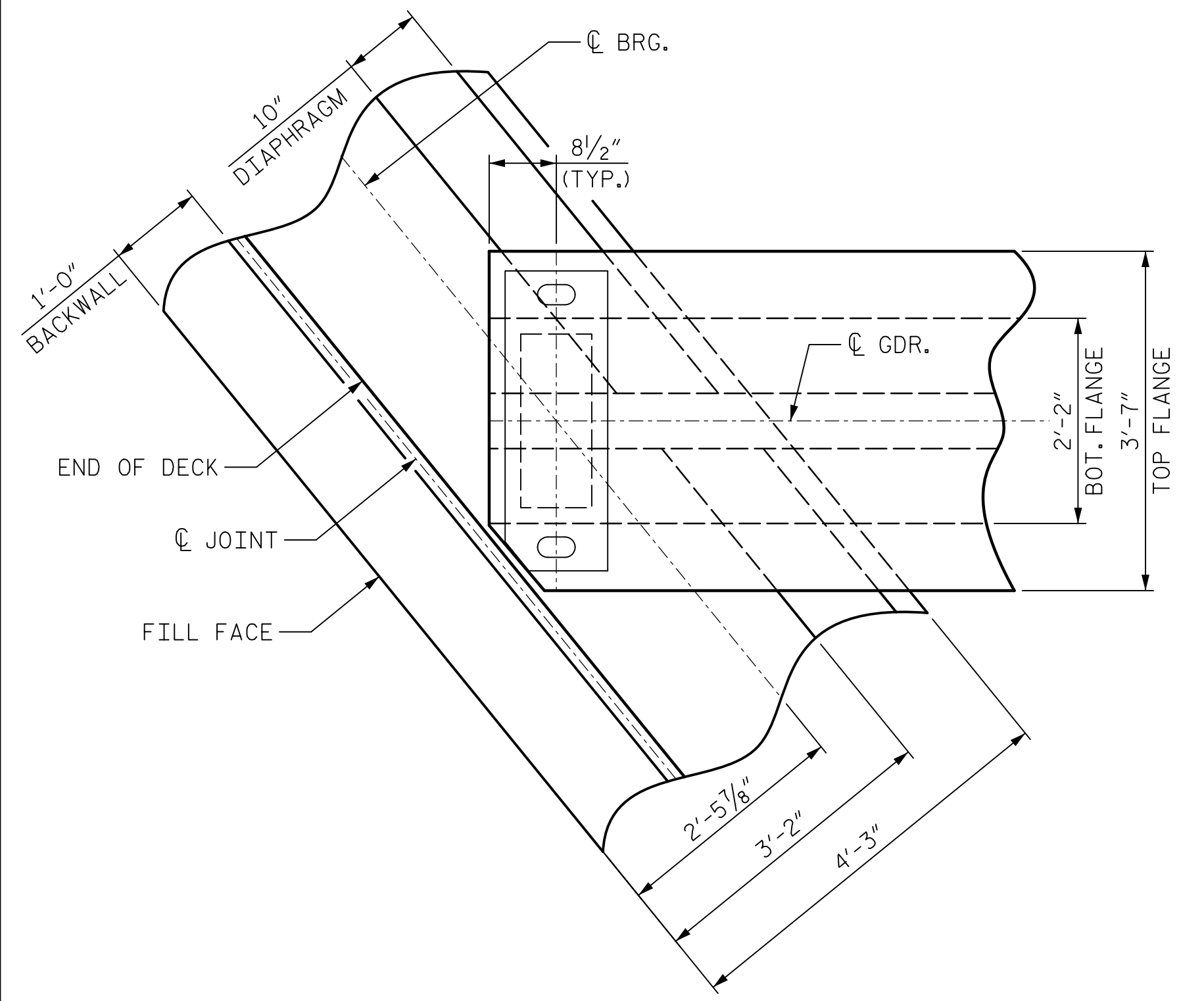
SECTION THRU BENT DIAPHRAGM

(SECTION NORMAL TO BENT DIAPHRAGM)

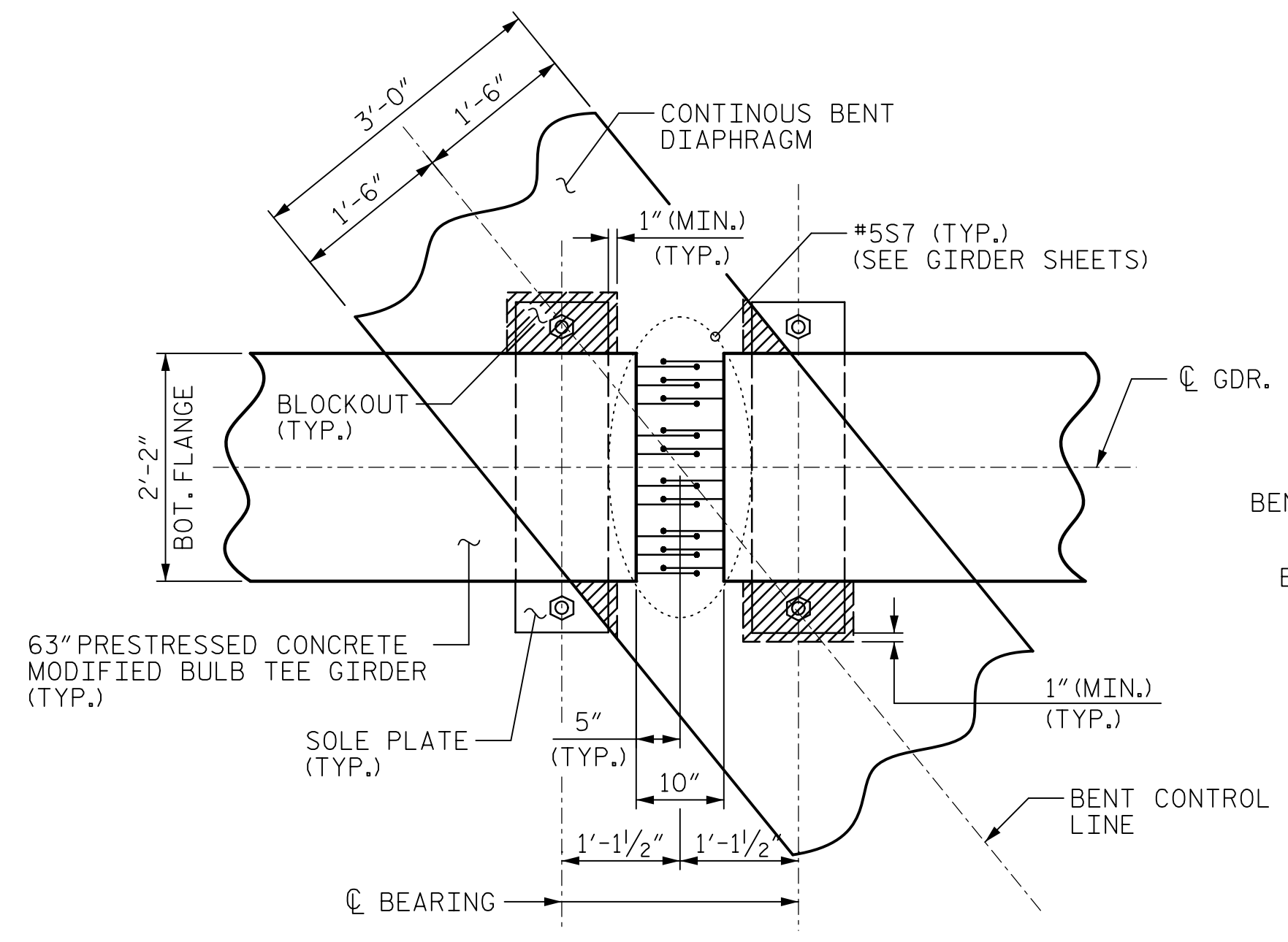
* MEASURED ALONG CL. GIRDER



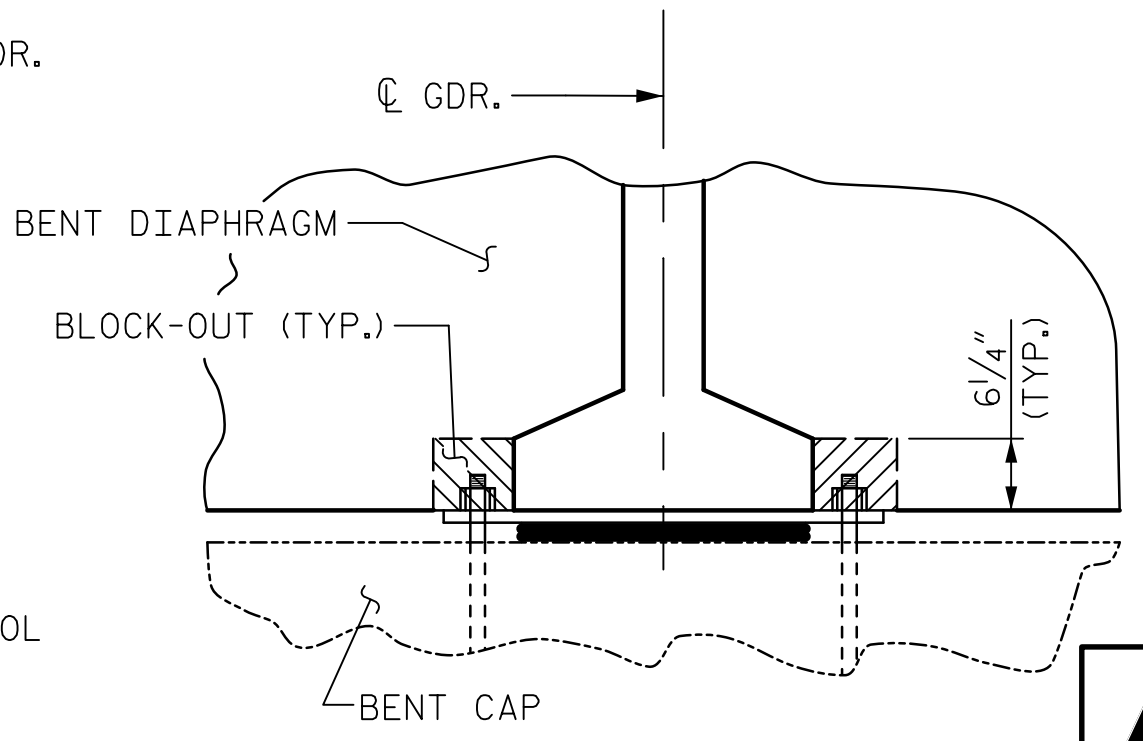
DETAIL "A"
(TYP. EA. GIRDER)



PLAN OF GIRDER AT END BENT DIAPHRAGM



PLAN

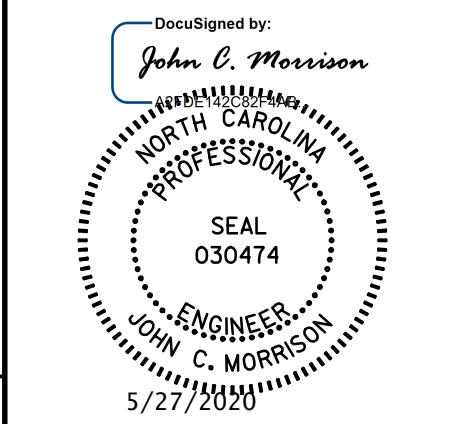


SECTION

BENT DIAPHRAGM BLOCK-OUT DETAIL

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
 STATION: 19+56.99 -L-

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:	S-06
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2			4			28

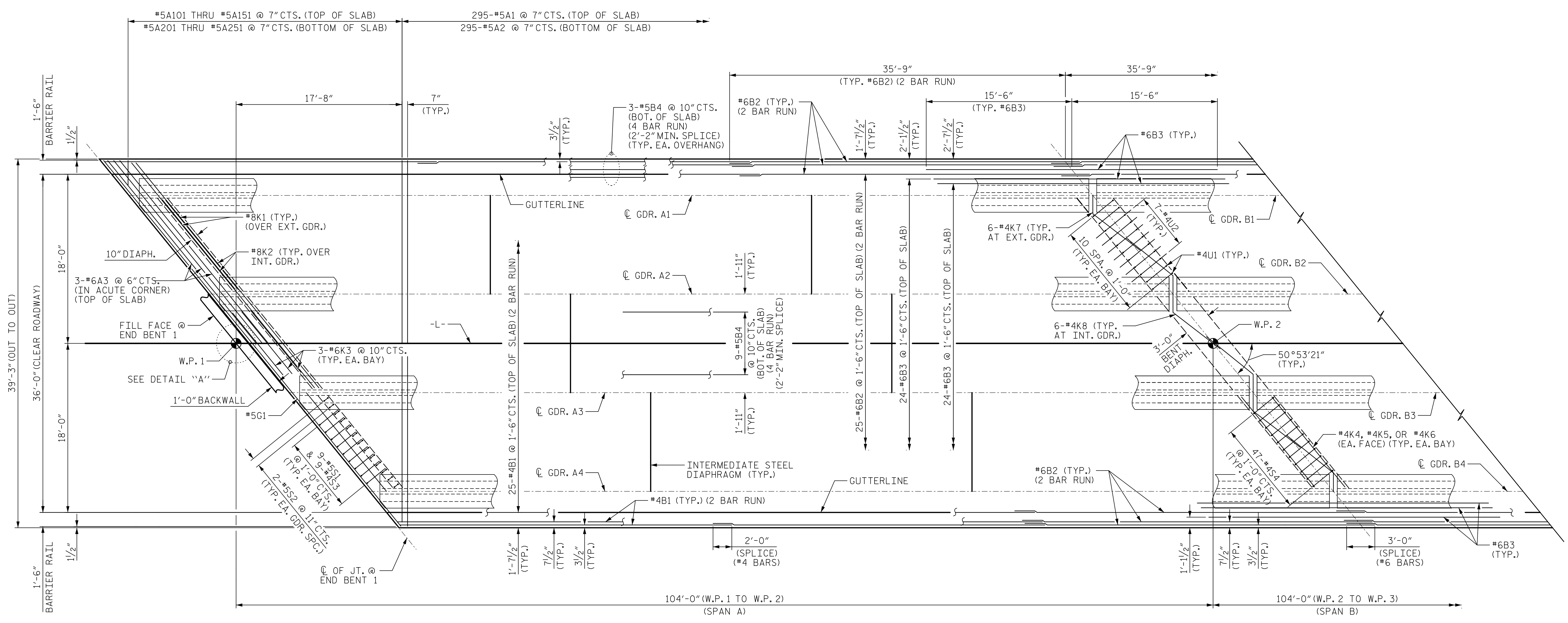
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 DESIGNED BY : T.B. STUMP DATE : 05/2019
 DESIGN CHECKED BY : J.C. MORRISON DATE : 05/2019

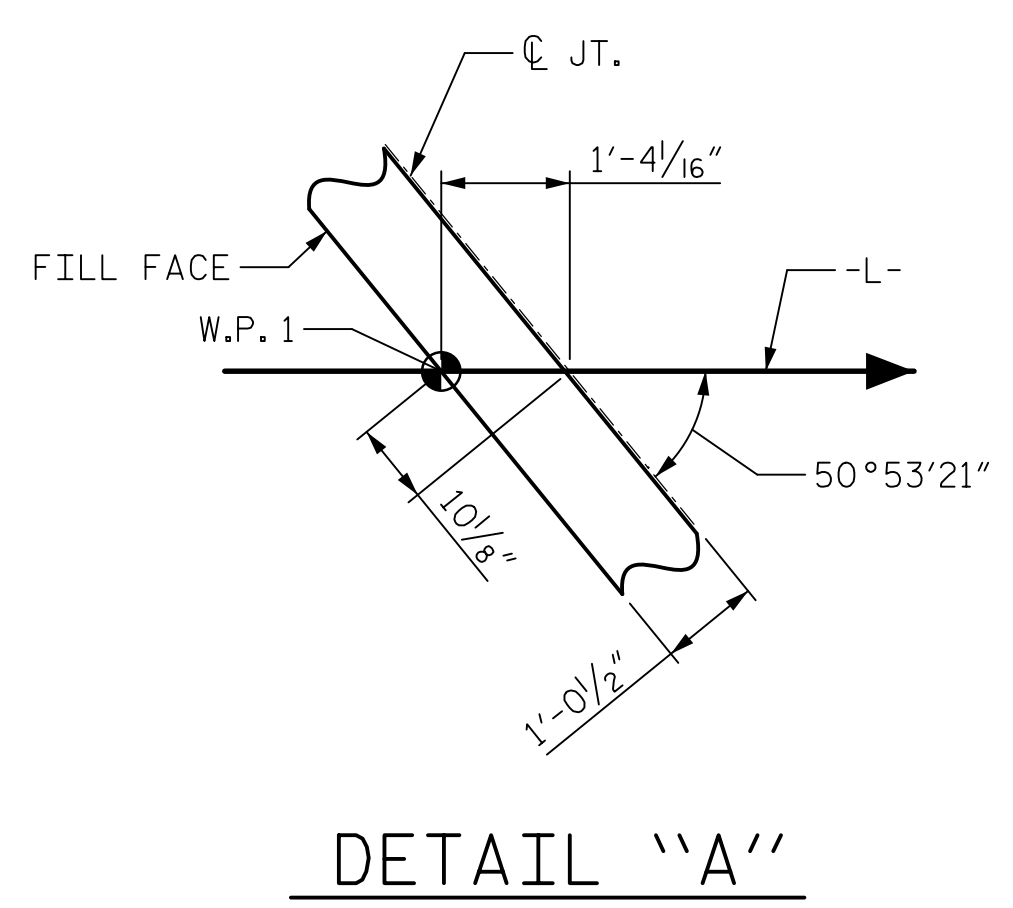
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NOTES:
FOR CONCRETE BARRIER RAIL DETAILS, SEE "CONCRETE BARRIER RAIL" SHEET.
FOR DETAILS OF INTERMEDIATE DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.



PLAN OF SPAN A



DETAIL "A"

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 1 OF 2

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AECOM TECHNICAL SERVICES OF NC, INC.
701 CORPORATE CENTER DRIVE, SUITE 475
RALEIGH, NC 27607
(919) 854-6200 www.aecom.com
AECOM License No. F-0342

Designed by:
John C. Morrison
NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
030474
JOHN C. MORRISON
5/27/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS

REVISIONS					
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1			3		
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SHEET NO. S-07
TOTAL SHEETS 28

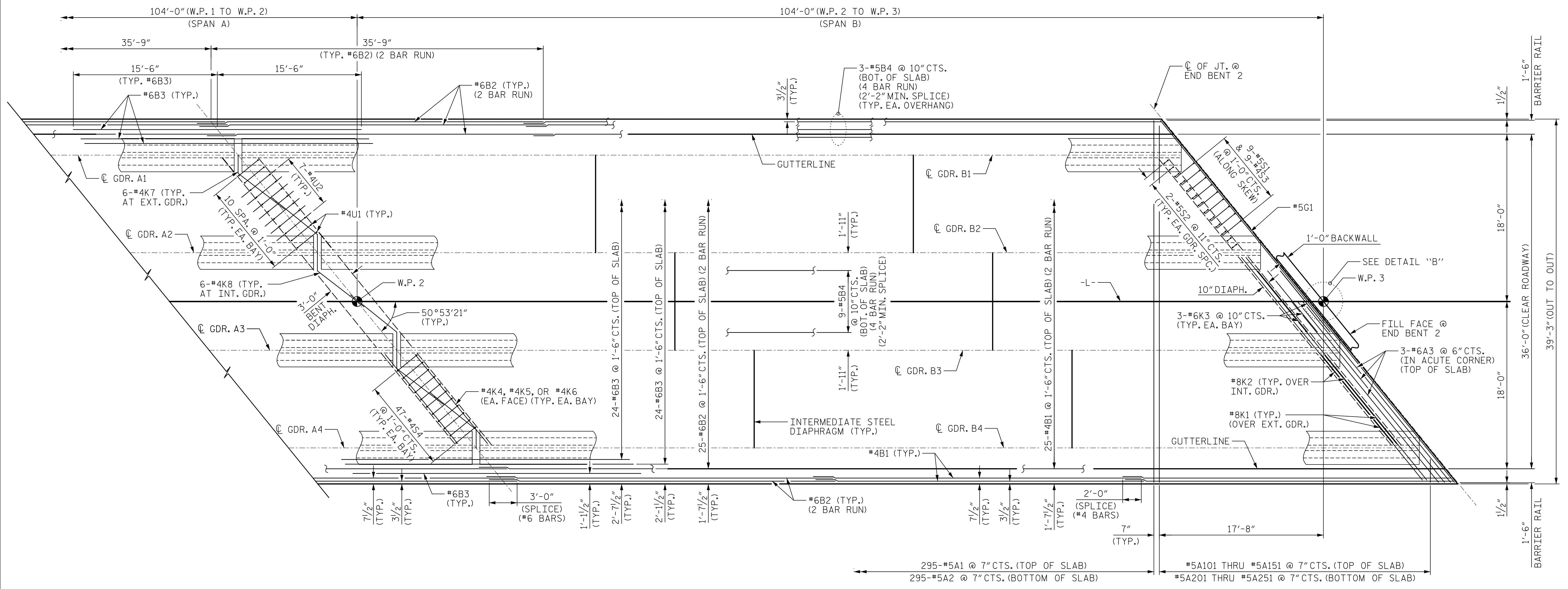
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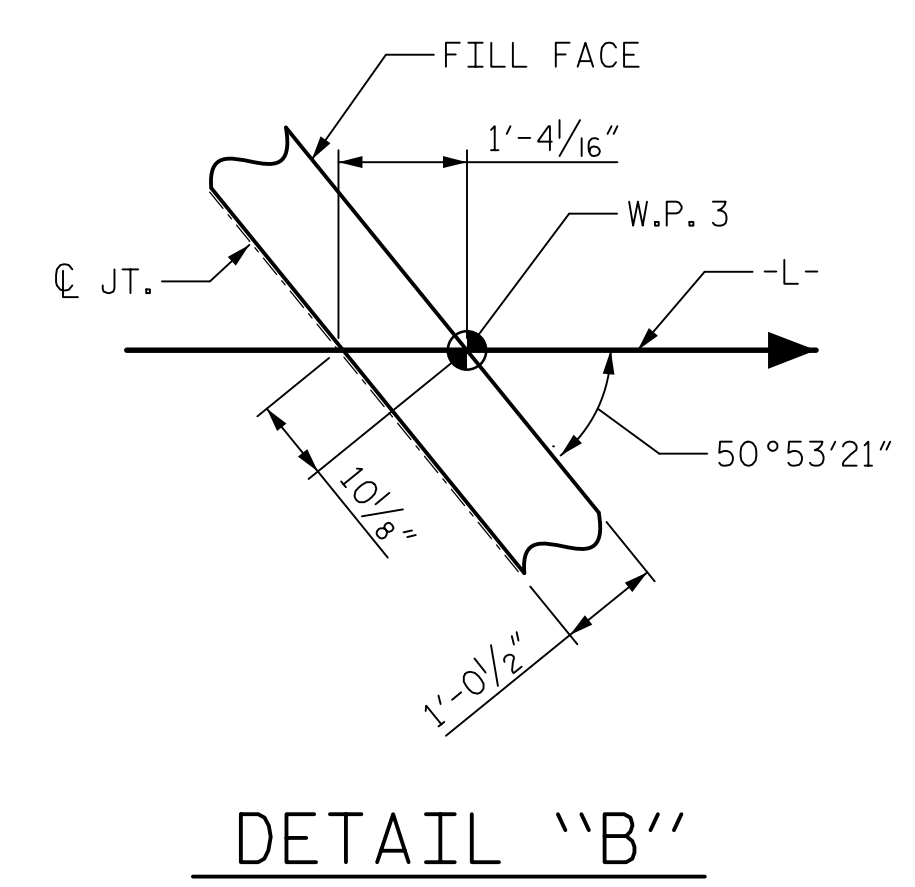
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PLAN OF SPAN B



DETAIL "B"

PROJECT NO. BR-0042
 ROCKINGHAM COUNTY
 STATION: 19+56.99 -L-

SHEET 2 OF 2

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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
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 SUPERSTRUCTURE
 PLAN OF SPANS

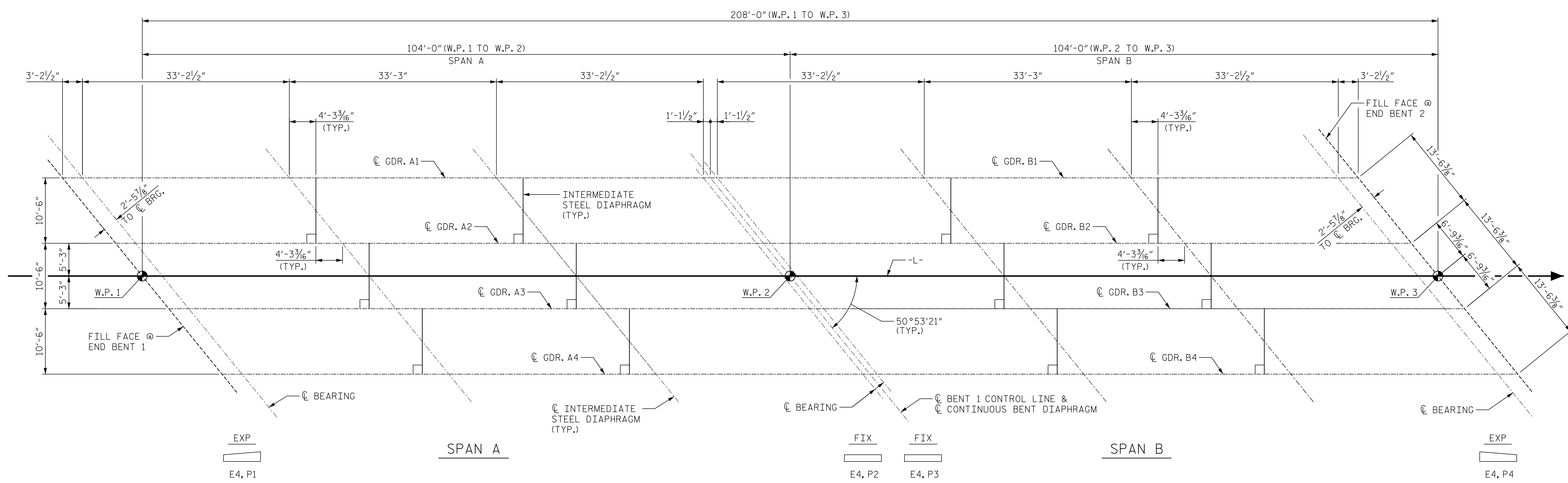
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FRAMING PLAN
(END BENT AND BENT DIAPHRAGMS OMITTED FOR CLARITY)

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
 STATION: 19+56.99 -L-
13+29.58 -Y-

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 5/27/2020

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 FRAMING PLAN

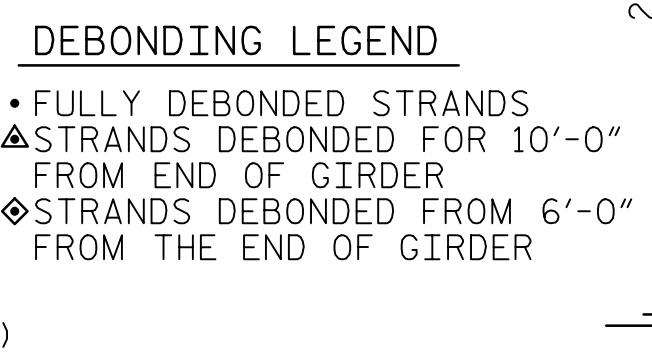
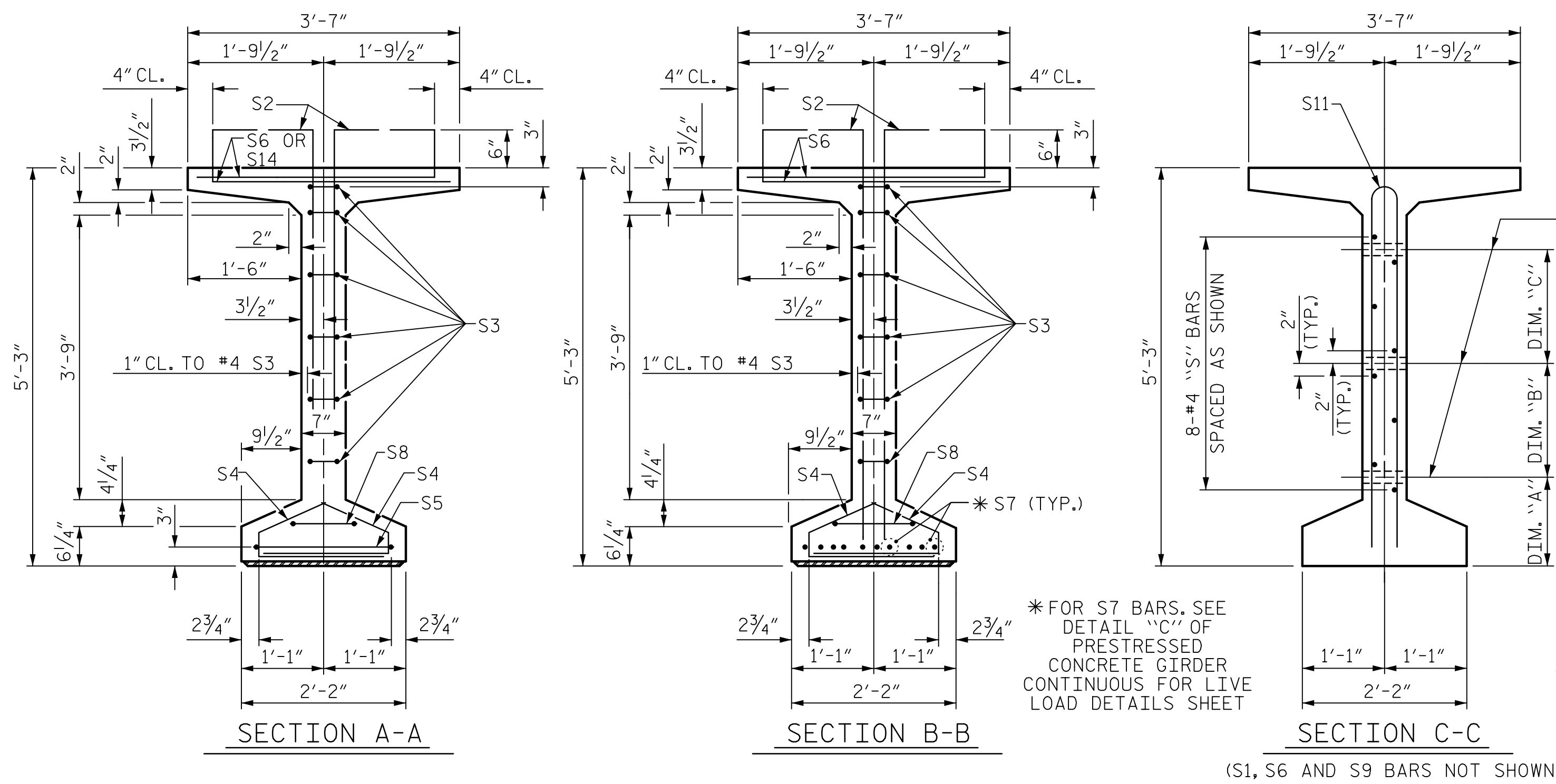
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 DESIGNED BY : T.B. STUMP DATE : 04/2019
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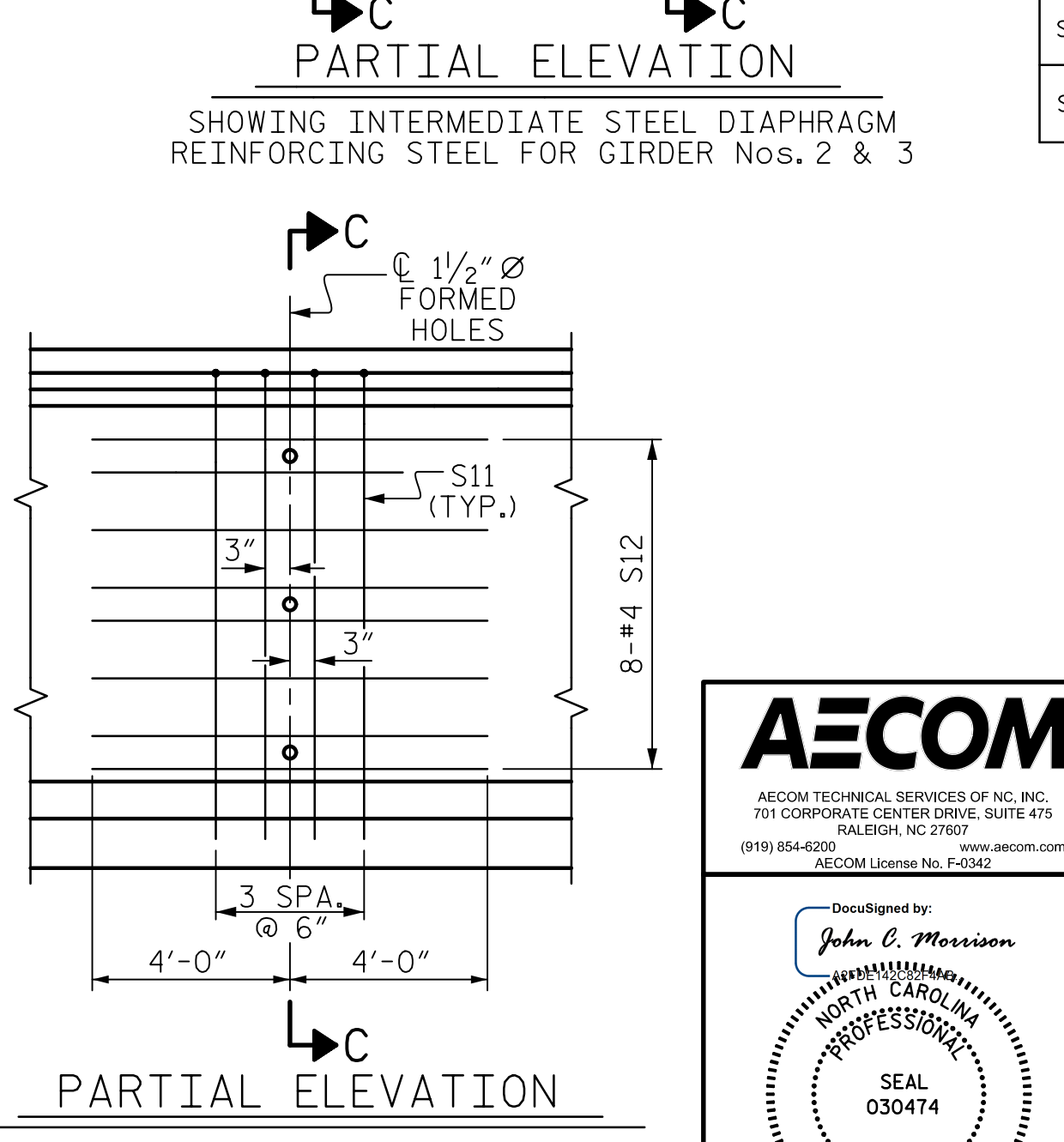
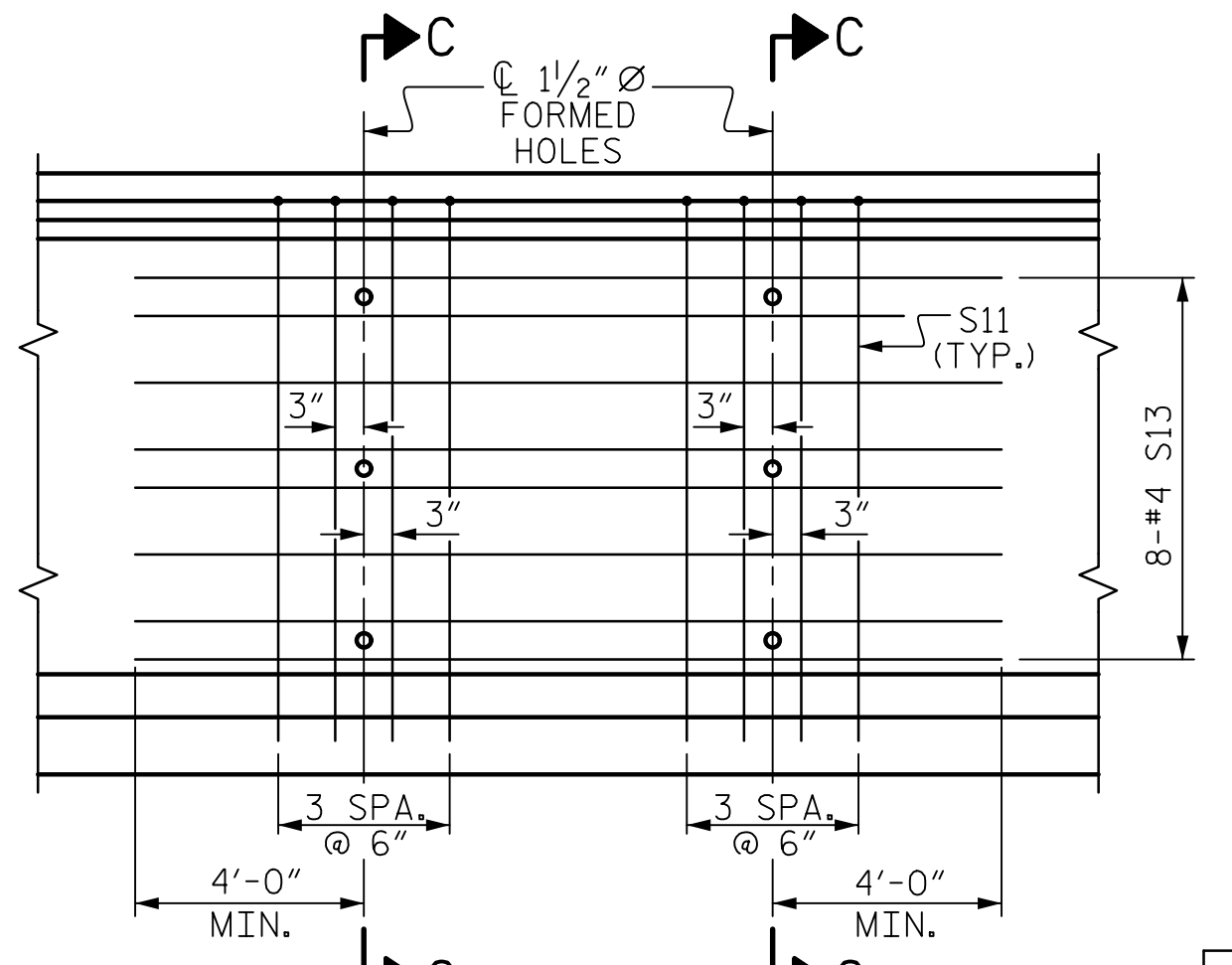
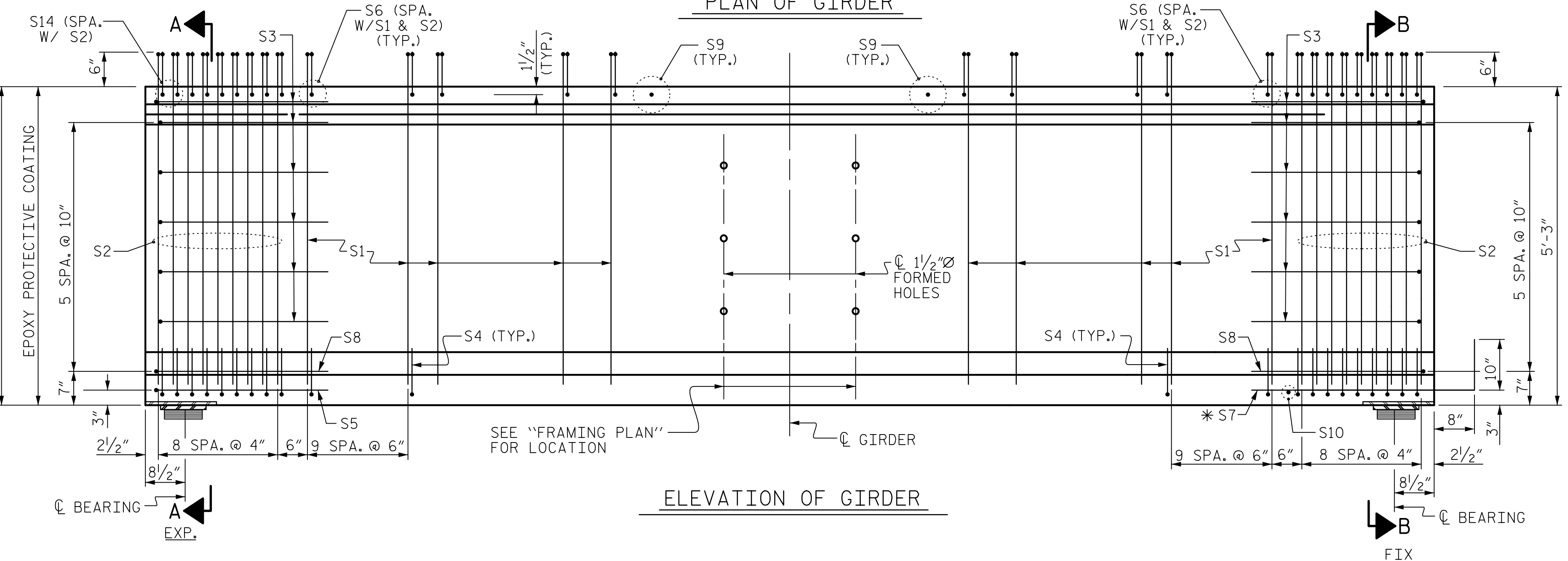
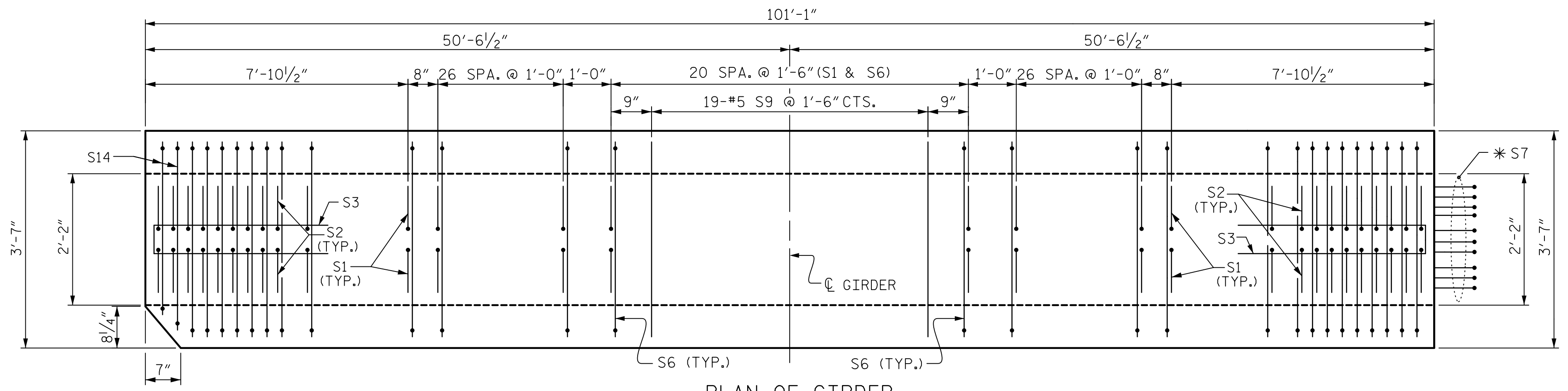
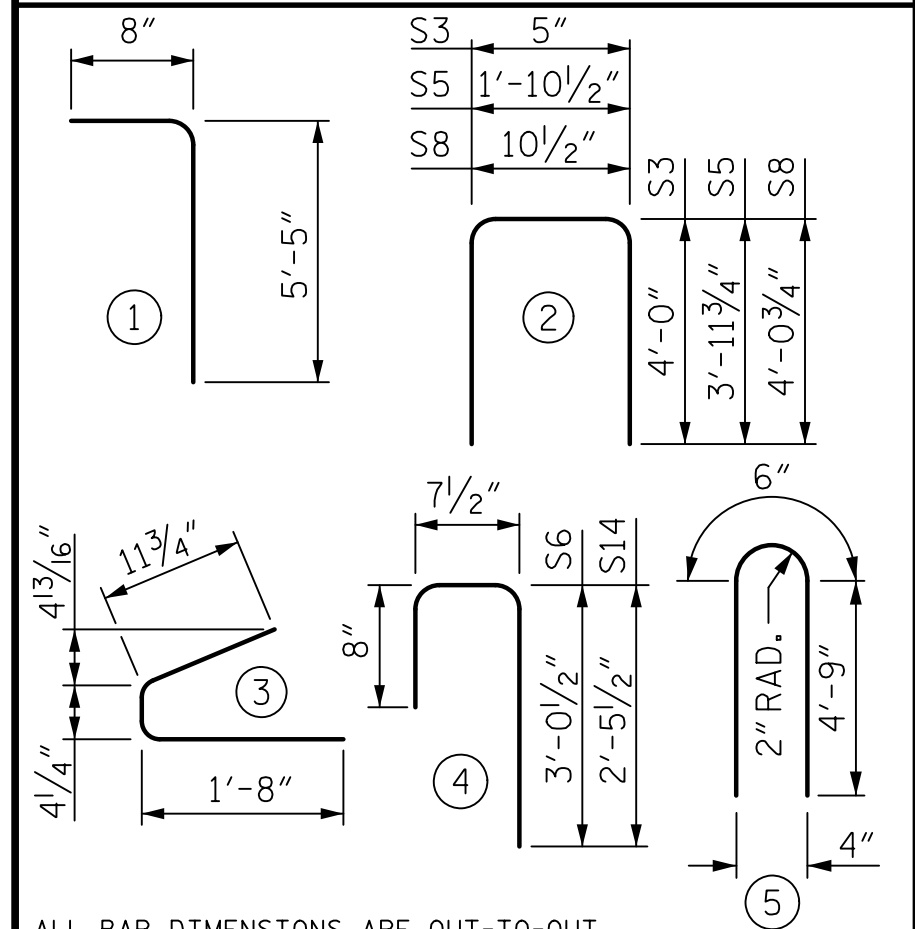
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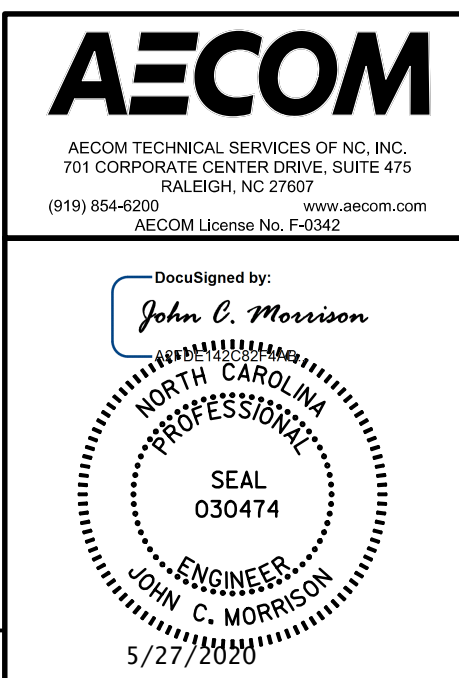
0.6" Ø L. R. GRADE 270 STRANDS						
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)				
0.217	58,600	43,950				
REINFORCING STEEL FOR ONE GDR						
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	190	#4	1	6'-1"	772	
S2	36	#5	1	6'-1"	228	
S3	12	#4	2	8'-5"	67	
S4	76	#4	3	3'-0"	152	
S5	1	#5	2	9'-10"	10	
S6	222	#5	4	4'-4"	1003	
* S7	10	#5	STR	3'-8"	38	
S8	2	#5	2	9'-0"	19	
S9	19	#5	STR	3'-3"	64	
S10	1	#3	STR	1'-10"	1	
S11	8	#5	5	10'-0"	83	
INTERIOR GDR.	S11	16	#5	STR	10'-0"	134
EXTERIOR GDR.	S12	16	#4	STR	8'-0"	86
INTERIOR GDR.	S13	16	#4	STR	4'-0"	177
S14	4	#5	4	3'-9"	16	



QUANTITIES FOR ONE GIRDER				
	REINFORCING STEEL	8,500 PSI CONCRETE	0.6" Ø L.R. STRANDS	
		LB.	C.Y.	No.
SPAN A	EXTERIOR GDR.	2,531	20.0	30
	INTERIOR GDR.	2,673	20.0	30
SPAN B	EXTERIOR GDR.	2,531	20.0	30
	INTERIOR GDR.	2,673	20.0	30

GIRDERS REQUIRED			
	No.	LENGTH	TOTAL LENGTH
SPAN A	4	101'-1"	404'-4"
SPAN B	4	101'-1"	404'-4"

PROJECT NO. BR-0042
 ROCKINGHAM COUNTY
 STATION: 19+56.99 -L-
 SHEET 1 OF 3



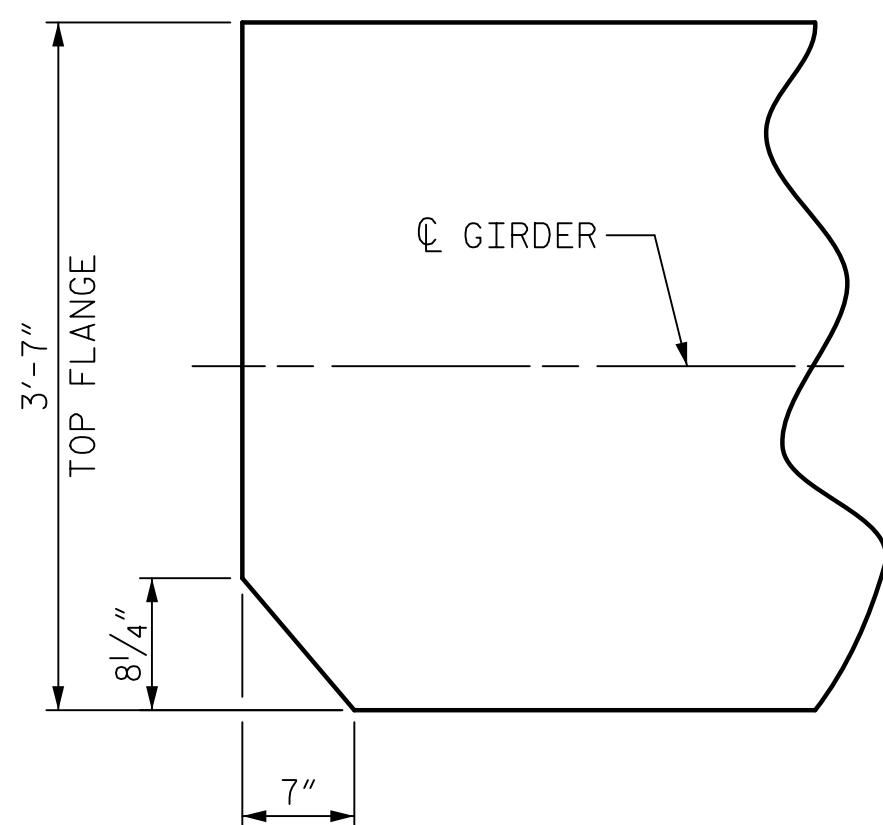
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ASSEMBLED BY: H.T. ROSEMOND DATE: 6/2019
 CHECKED BY: D. RITACCO DATE: 6/2019
 DRAWN BY: EEM 2/6/97 REV. 6/13 MAA/GM
 CHECKED BY: VAP 2/6/97 REV. 1/15 MAA/TMG
 REV. 12/17 MAA/THC

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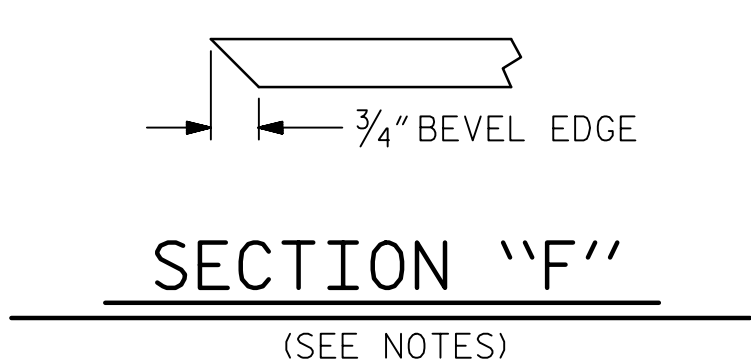
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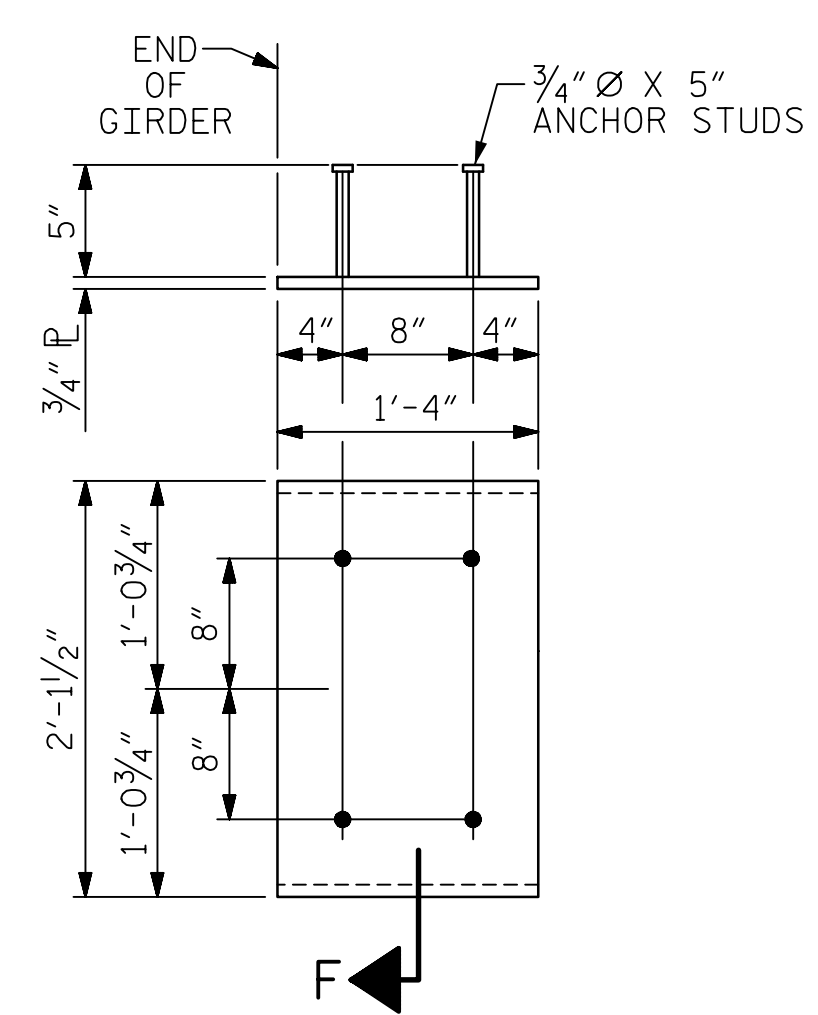
TOP FLANGE CLIP DETAIL

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION, TYP. AT END AT EXP. JTS.)



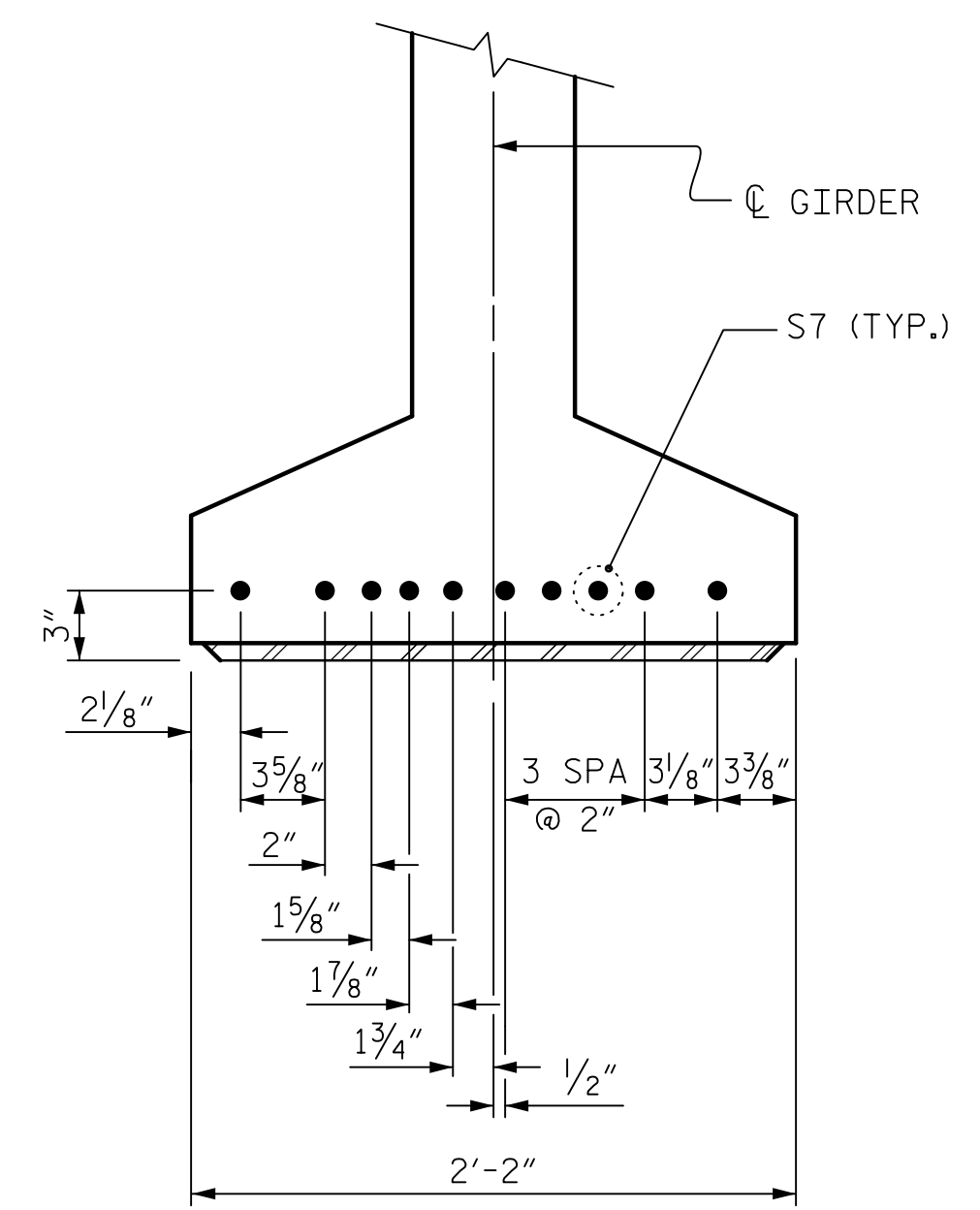
SECTION "F"

(SEE NOTES)



EMBEDDED PLATE "B-1" DETAILS

(2 REQ'D PER GIRDER)



DETAIL "C"

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 6800 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 1/4".

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" AND 72" MODIFIED BULB TEES ONLY.

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.

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPANS A & B																					
0.6" DIA. LOW-RELAXATION STRANDS		GIRDERS 1 & 4																			
TENTH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10	0.05	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.030	0.060	0.088	0.113	0.136	0.155	0.171	0.182	0.189	0.191	0.189	0.182	0.171	0.155	0.136	0.113	0.088	0.060	0.030	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.019	0.039	0.057	0.075	0.089	0.103	0.112	0.121	0.124	0.127	0.124	0.121	0.112	0.103	0.089	0.075	0.057	0.039	0.019	0.000
FINAL CAMBER ↑	0	1/8"	1/4"	3/8"	1/2"	5/8"	3/4"	11/16"	3/4"	3/4"	3/4"	3/4"	3/4"	11/16"	5/8"	9/16"	7/16"	3/8"	1/4"	1/8"	0
GIRDERS 2 & 3																					
TENTH POINTS	BRG.	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.45	0.40	0.35	0.30	0.25	0.20	0.15	0.10	0.05	BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.030	0.060	0.088	0.113	0.136	0.155	0.171	0.182	0.189	0.191	0.189	0.182	0.171	0.155	0.136	0.113	0.088	0.060	0.030	0.000
* DEFLECTION DUE TO SUPERIMPOSED DL ↓	0.000	0.021	0.042	0.061	0.081	0.096	0.112	0.121	0.131	0.135	0.135	0.135	0.131	0.121	0.112	0.096	0.081	0.061	0.042	0.021	0.000
FINAL CAMBER ↑	0	1/16"	1/4"	5/16"	3/8"	1/2"	1/2"	9/16"	5/8"	5/8"	5/8"	5/8"	5/8"	9/16"	1/2"	1/2"	3/8"	5/16"	1/4"	1/16"	0

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

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 2 OF 3

ASSEMBLED BY : H.T. ROSEMOND	DATE : 6/2019
CHECKED BY : D. RITACCO	DATE : 6/2019
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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DESIGNED BY:
John C. Morrison
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 030474
JOHN C. MORRISON
5/27/2020

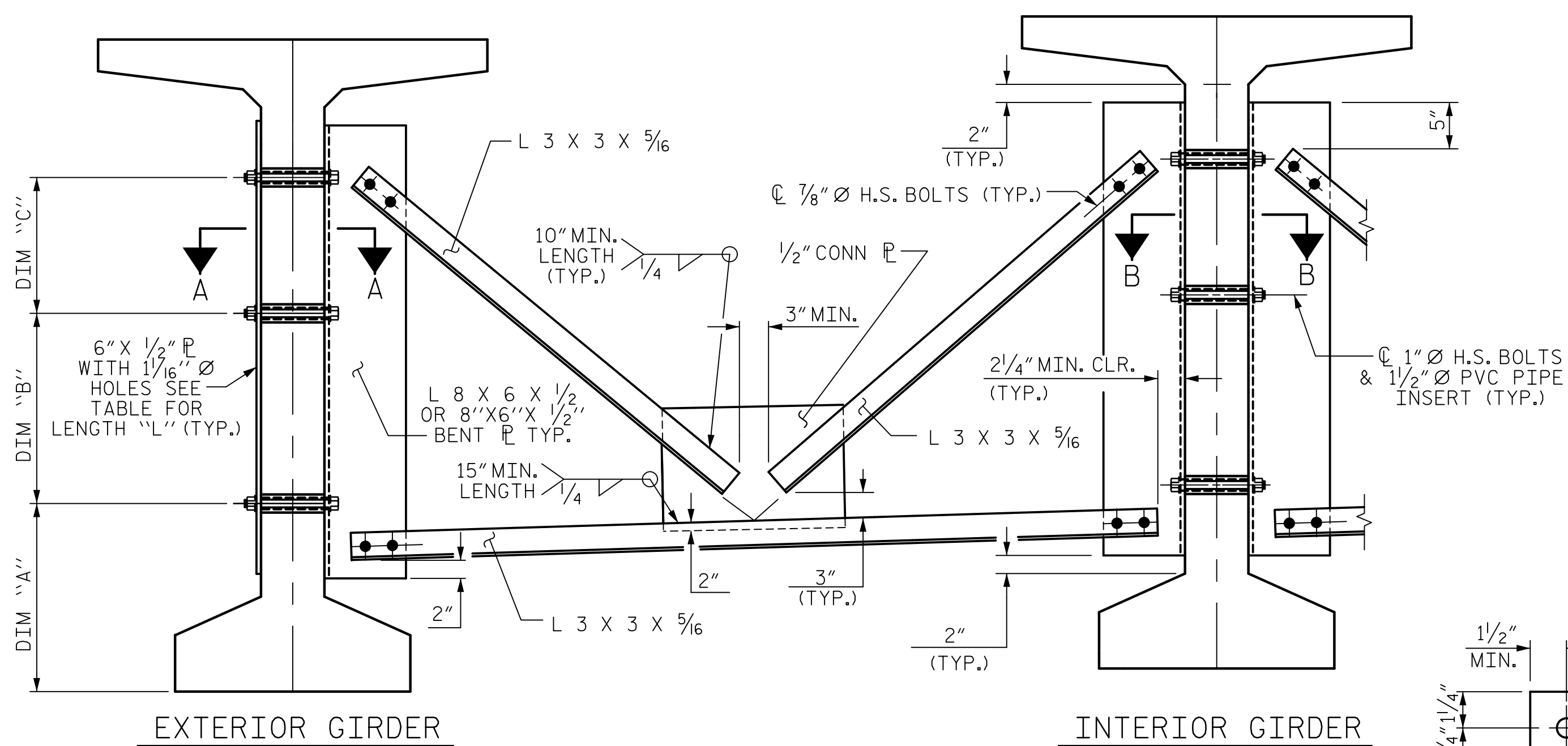
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
DETAILS
SPANS A AND B

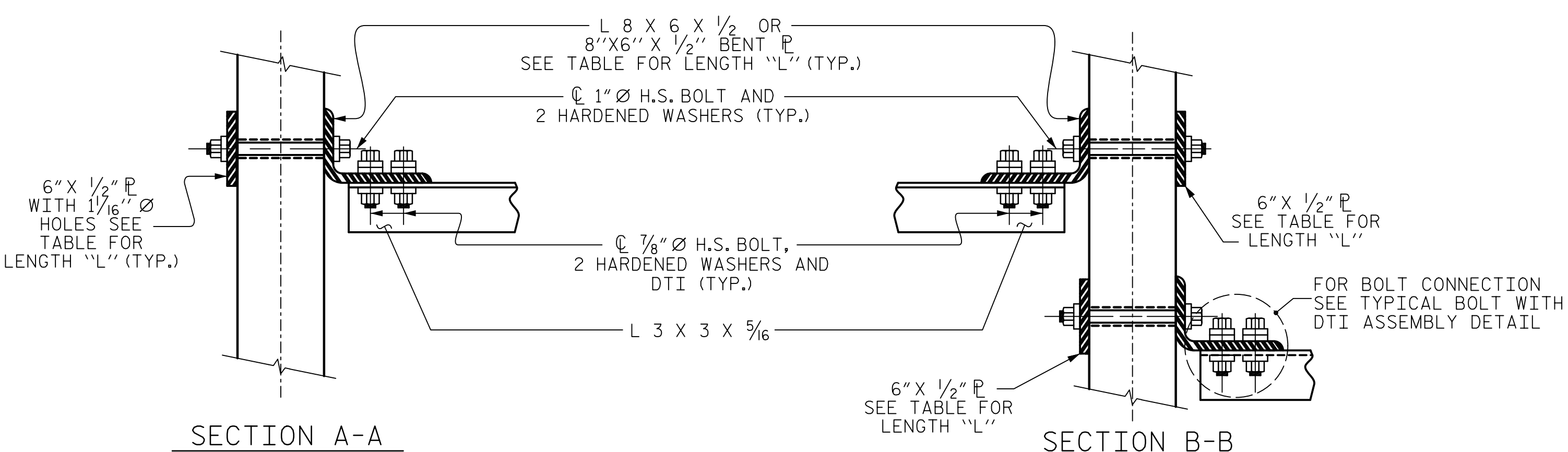
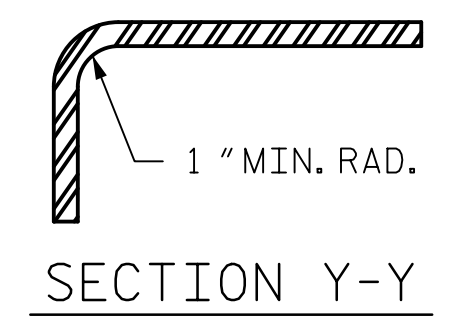
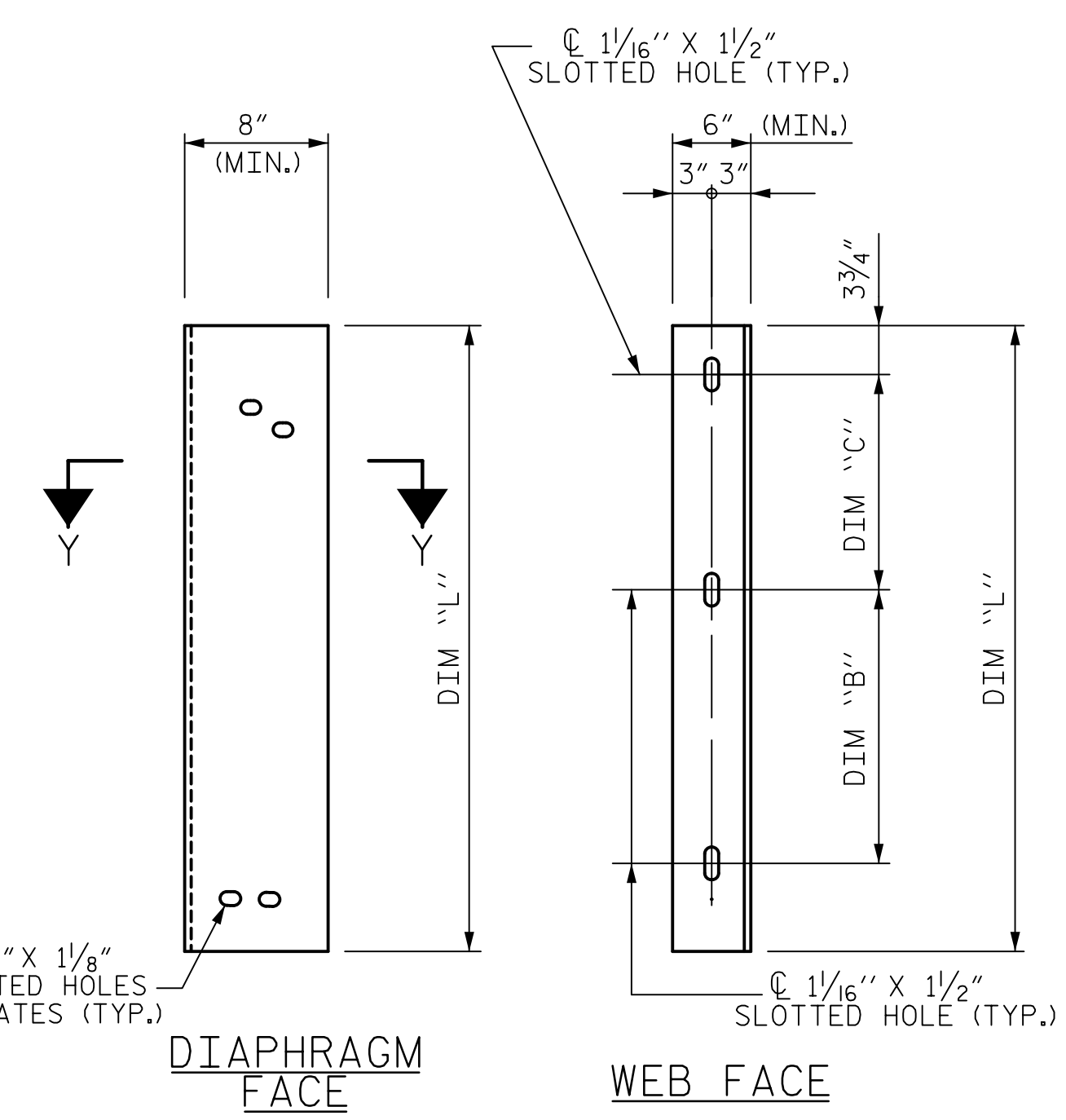
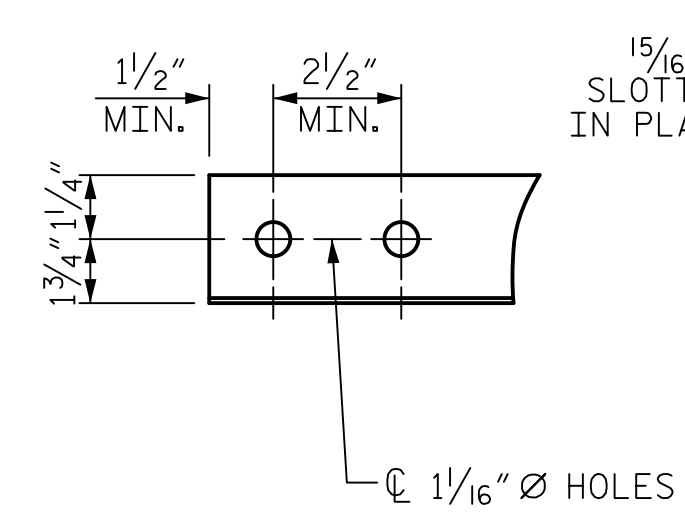
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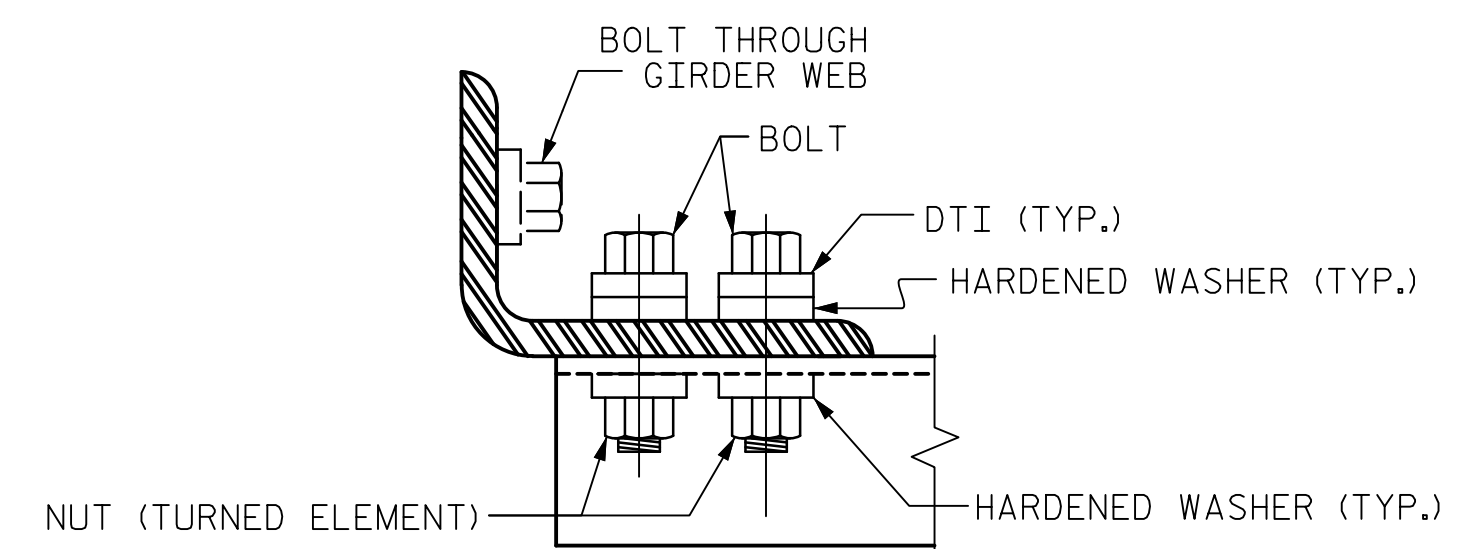
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PART SECTION AT INTERMEDIATE DIAPHRAGM



CONNECTION 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 ANGLE MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

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

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

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

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

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

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

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

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

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
63" BULB TEE	1'-4 1/2"	1'-5 1/2"	1'-3 1/2"	3'-5"

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 3 OF 3

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030474
JOHN C. MORRISON
5/27/2020

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
INTERMEDIATE
STEEL DIAPHRAGMS FOR
63" MODIFIED BULB TEE
PRESTRESSED CONCRETE
GIRDERS

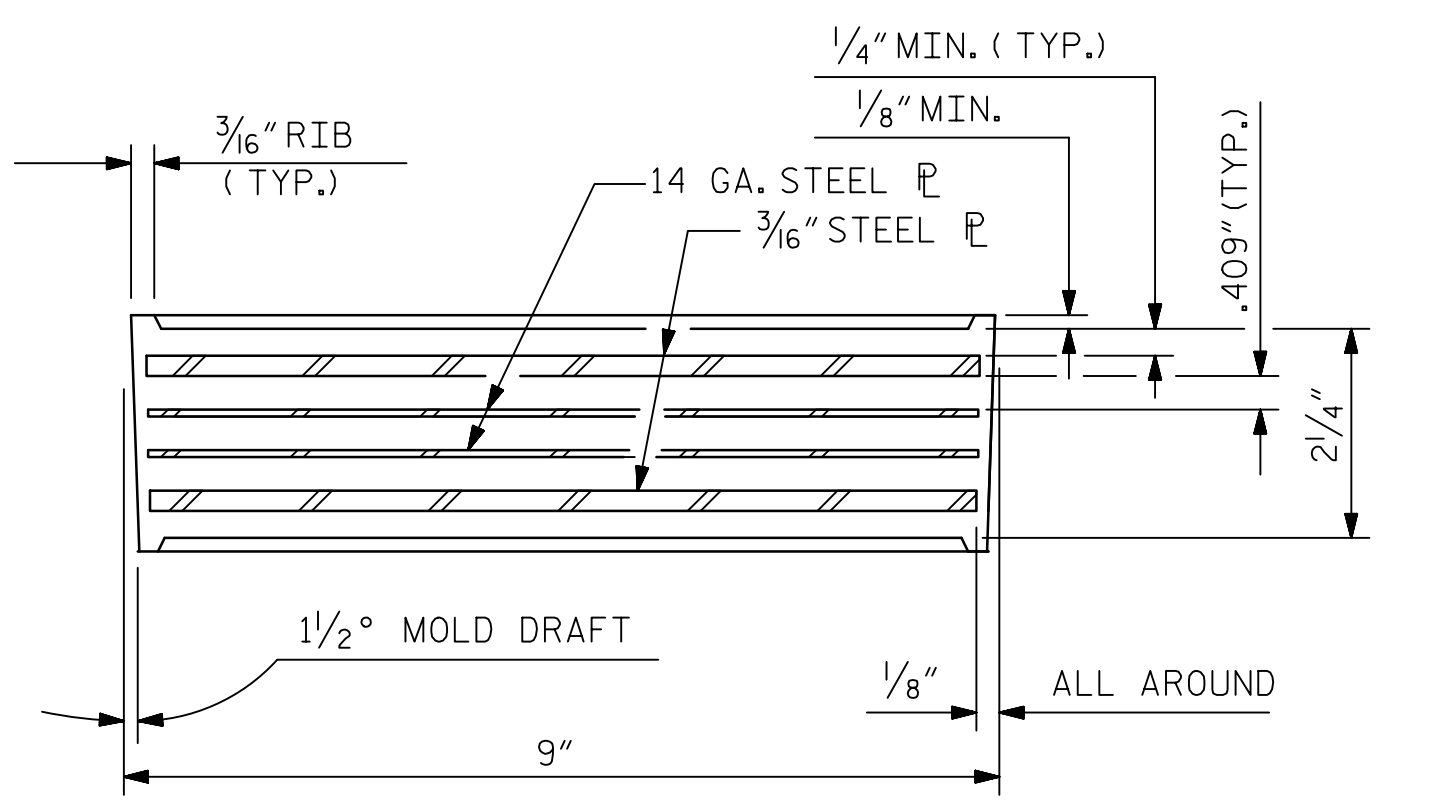
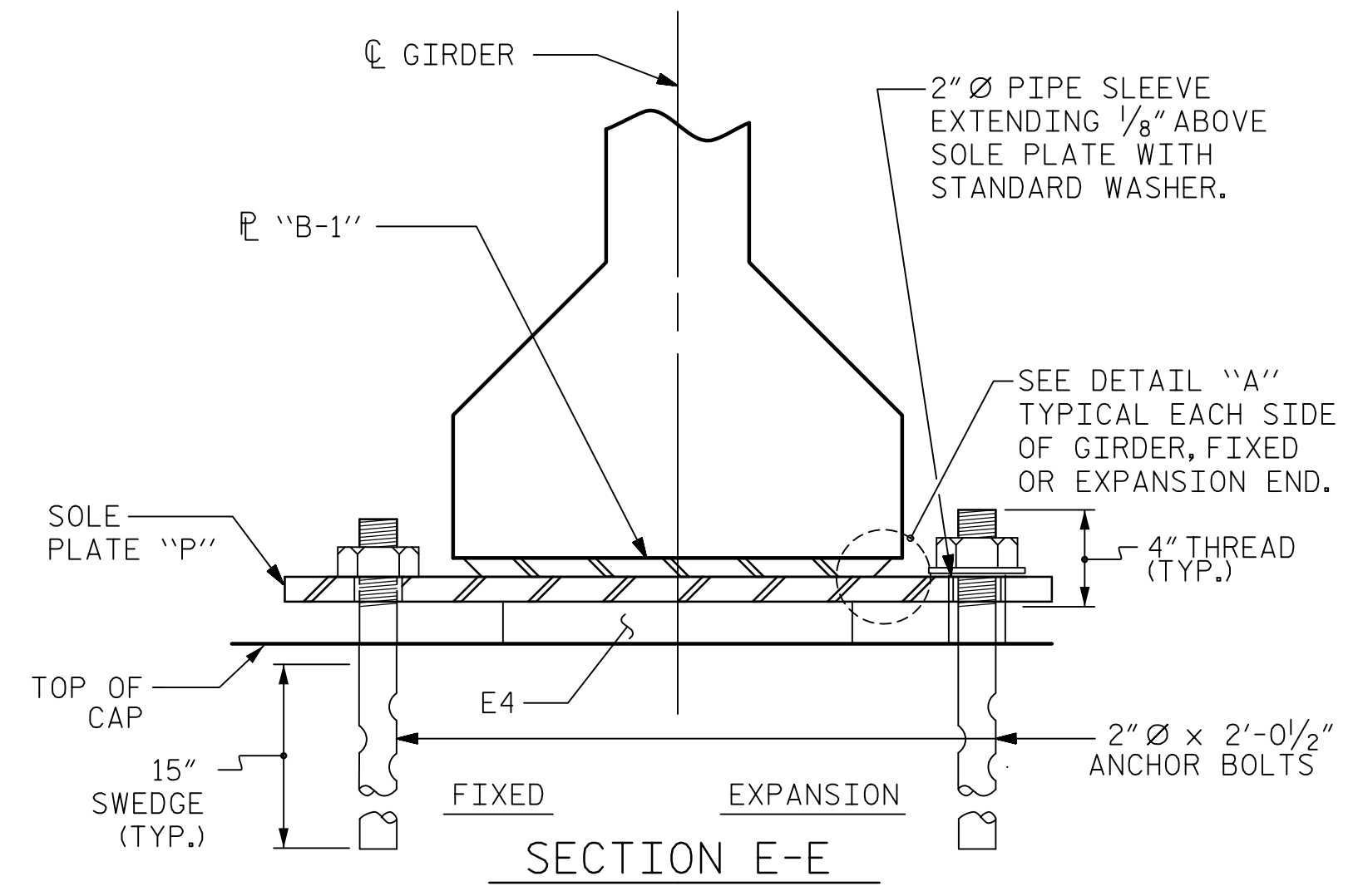
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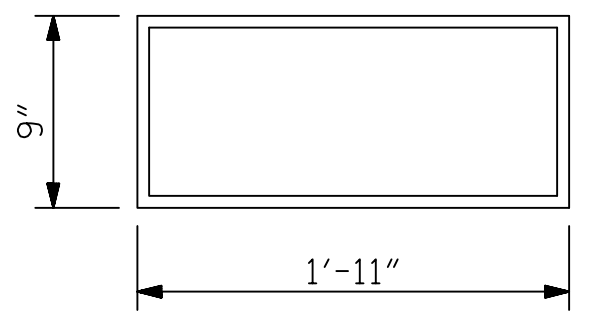
ASSEMBLED BY : H.T. ROSEMOND	DATE : 6/2019
CHECKED BY : G.R. COLS	DATE : 6/2019
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CHECKED BY : GM 11/09	REV. 12/17 MAA/THC

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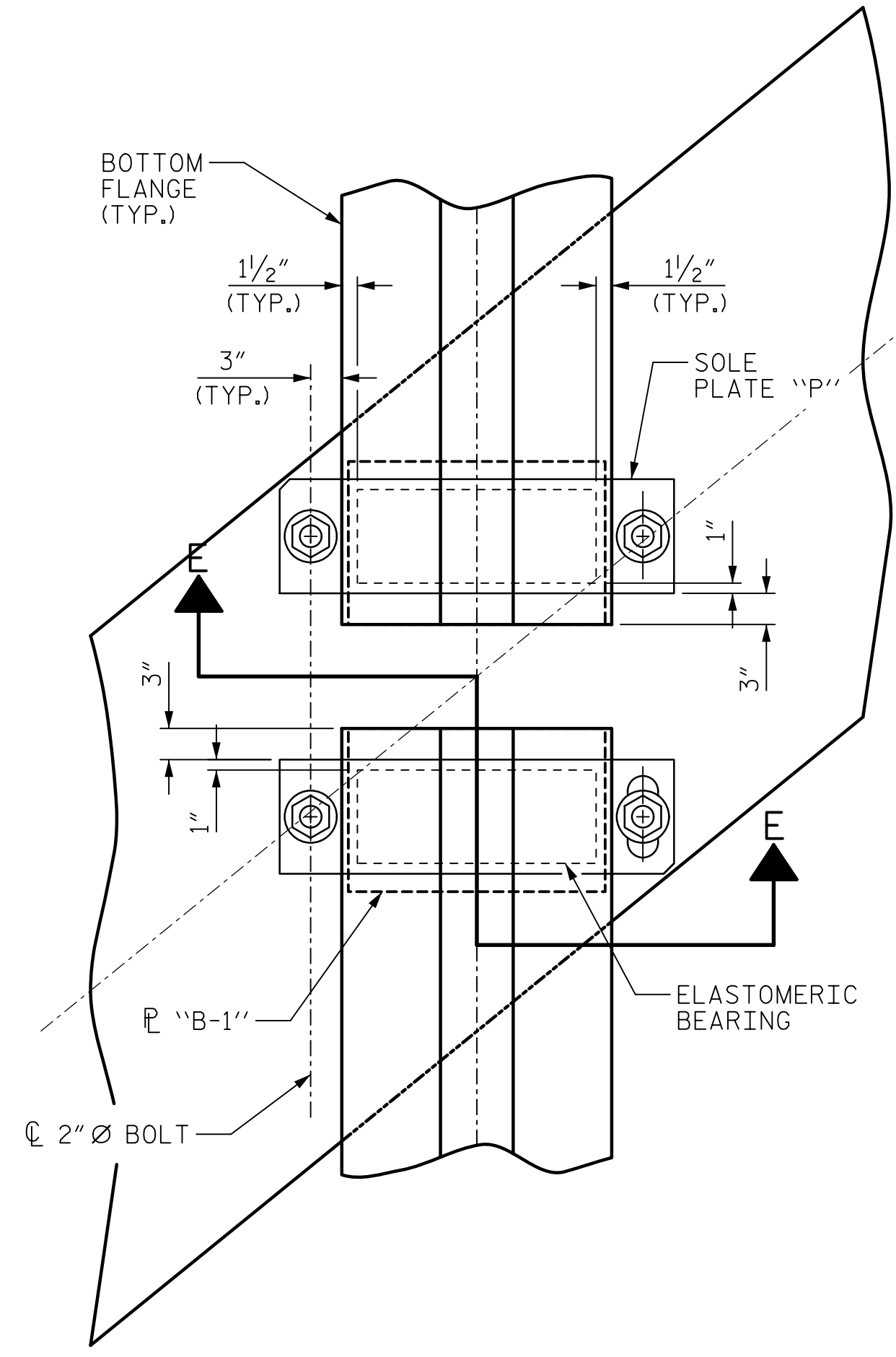
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E4 (16 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING

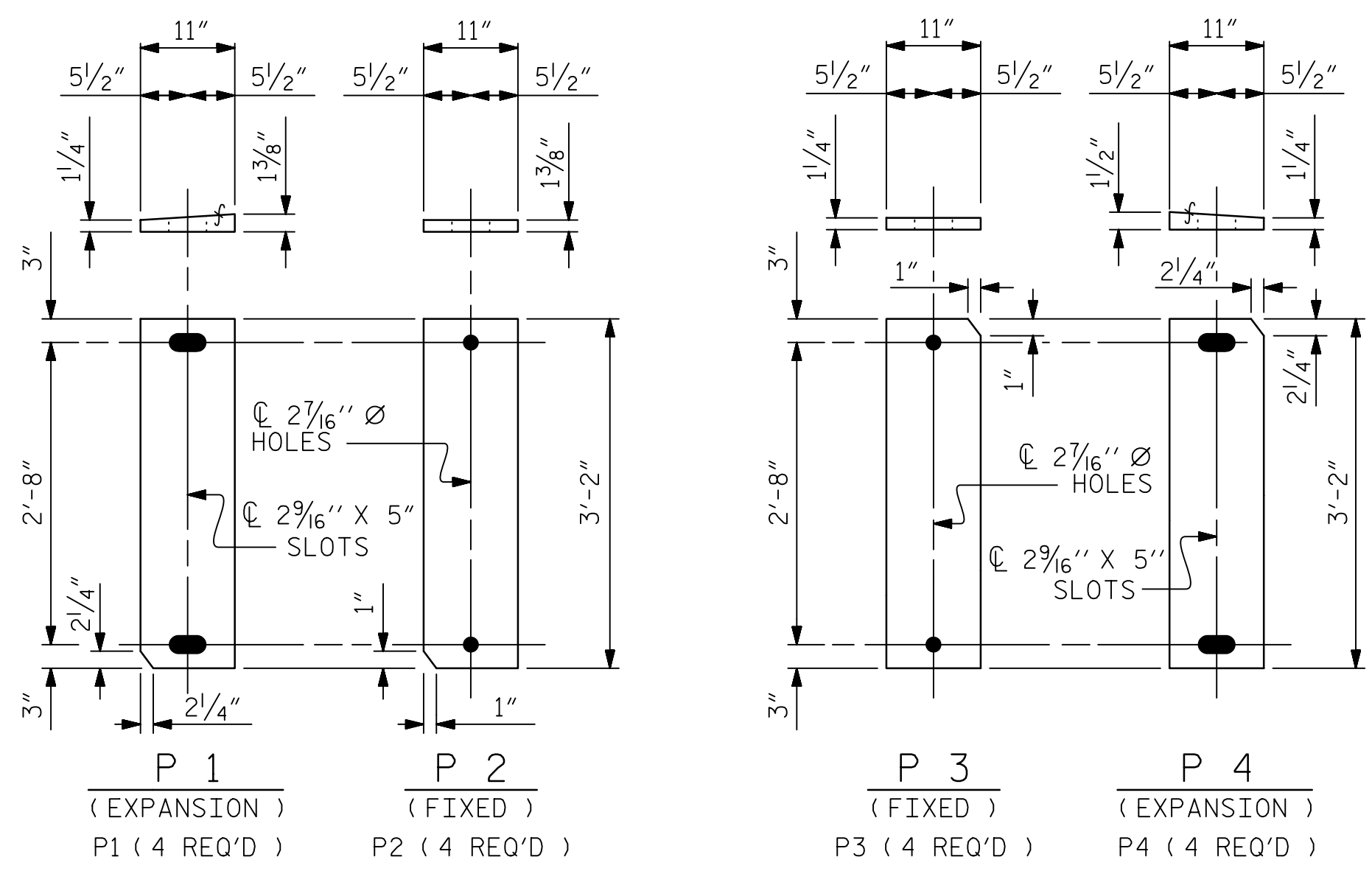
TYPE V

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



TYPICAL HALF-PLAN
(SHOWING CONTINUOUS BENT)

TYPICAL HALF-PLAN
(SHOWING SIMPLE SPAN BENT)



SOLE PLATE DETAILS ("P")

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.

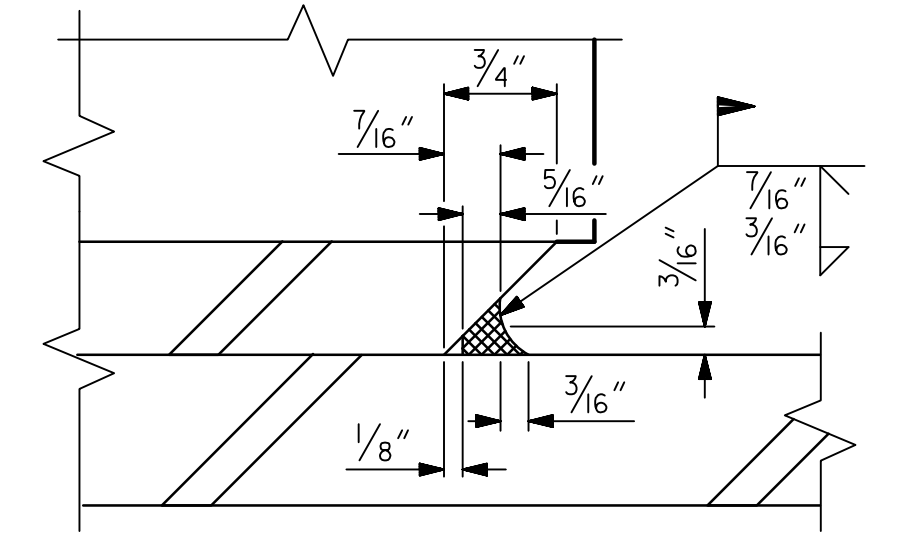
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

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.



DETAIL "A"

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AECOM License No. F-0342

Designed by:
John C. Morrison
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 030474
JOHN C. MORRISON
5/27/2020

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ELASTOMERIC BEARING
DETAILS
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			28

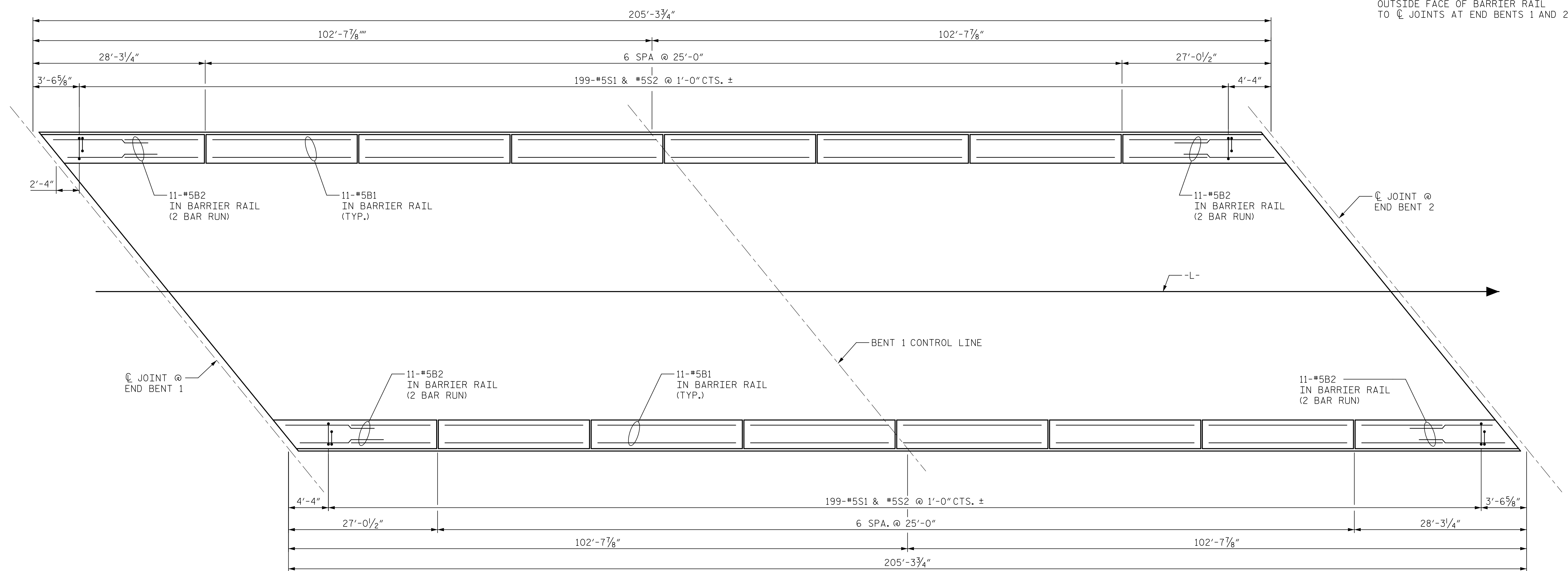
ASSEMBLED BY : H.T. ROSEMOND	DATE : 7/2019
CHECKED BY : D. RITACCO	DATE : 7/2019
DRAWN BY : EEM 2/97	REV. 6/13 AAC/MAA
CHECKED BY : VAP 2/97	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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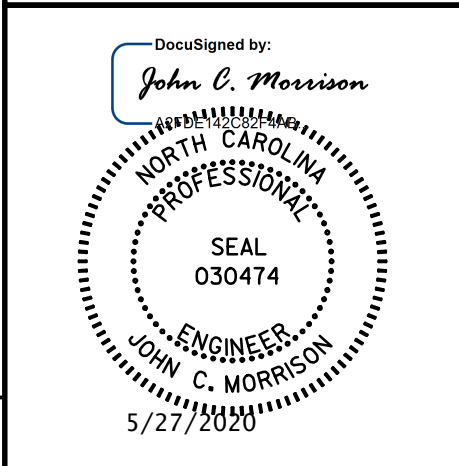
NOTE: DIMENSIONS MEASURED ALONG
OUTSIDE FACE OF BARRIER RAIL
TO $\text{\textcircled{C}}$ JOINTS AT END BENTS 1 AND 2



PLAN

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
 STATION: 19+56.99 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 CONCRETE BARRIER RAIL

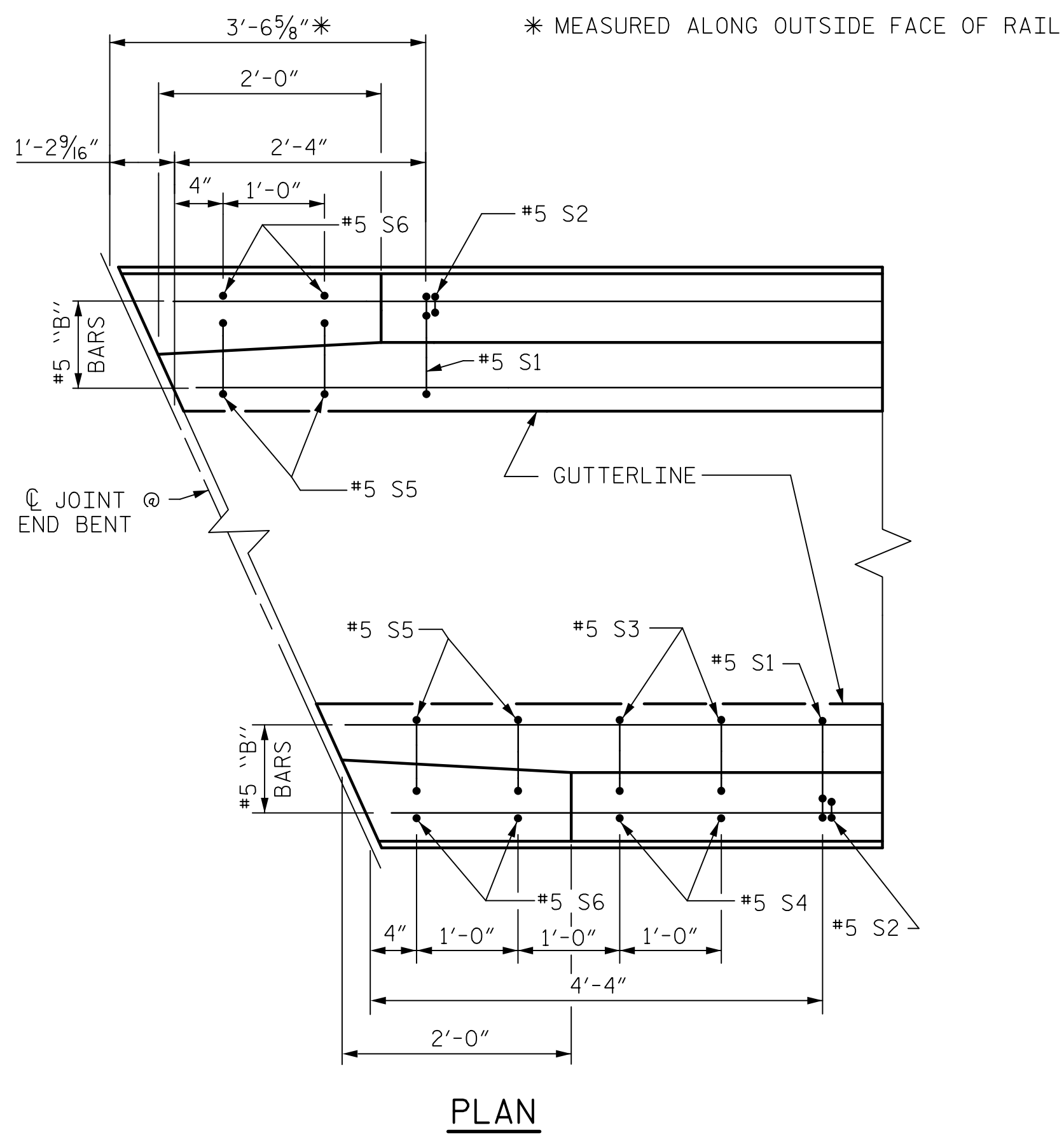
DRAWN BY : H.T. ROSEMOND	DATE : 06/2019
CHECKED BY : J.C. MORRISON	DATE : 06/2019
DESIGNED BY : H.T. ROSEMOND	DATE : 06/2019
DESIGN CHECKED BY : J.C. MORRISON	DATE : 06/2019

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
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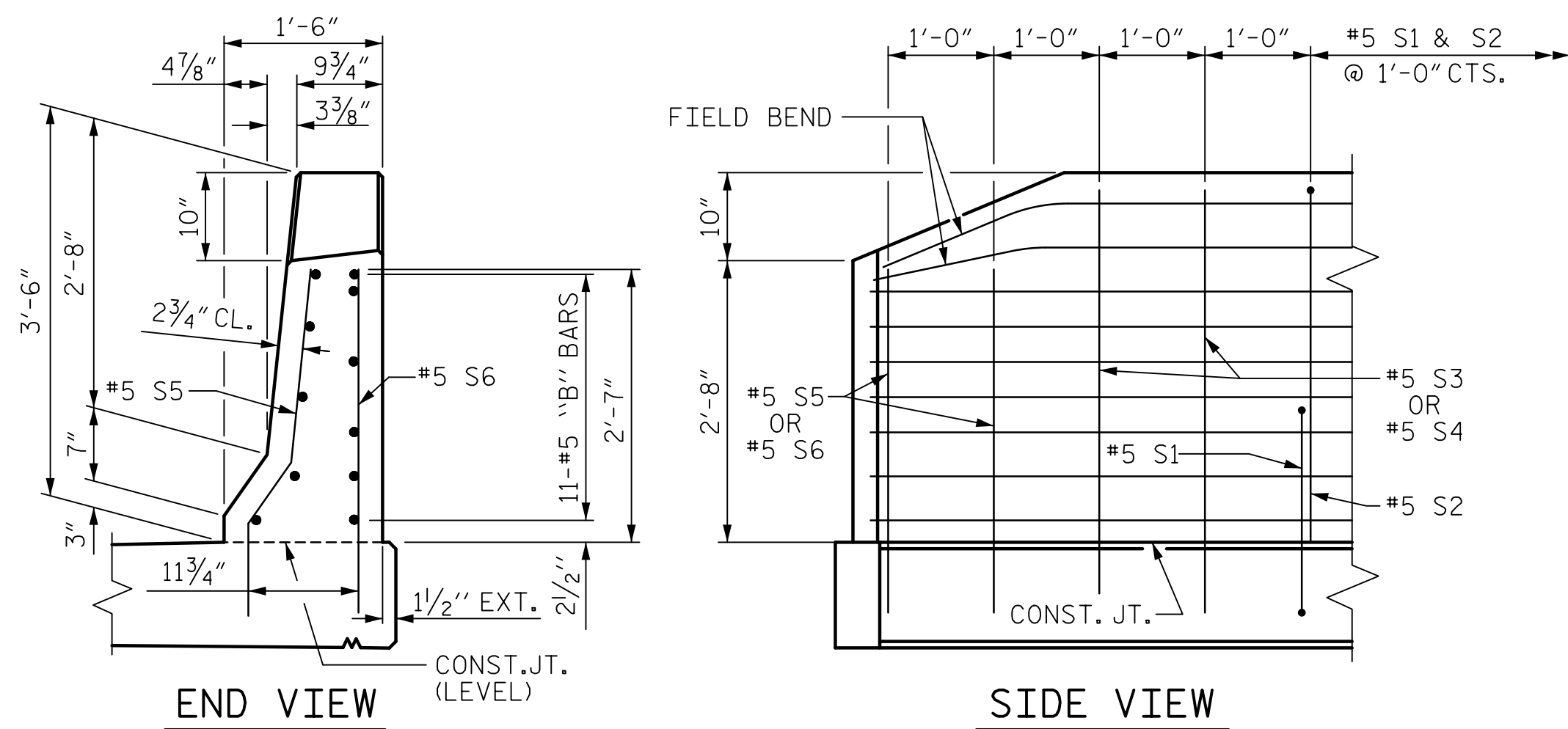
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			28

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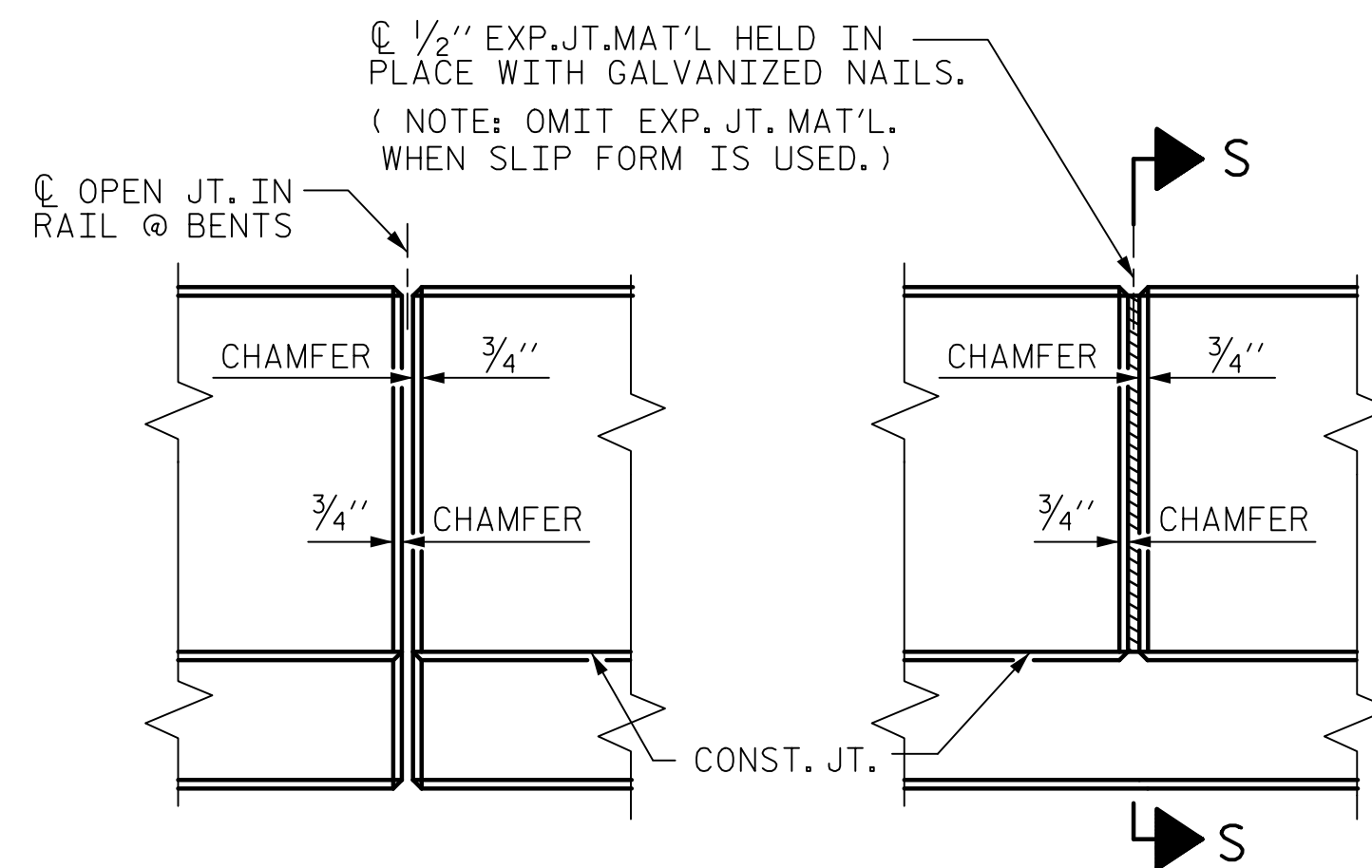


PLAN



END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWED JOINTS



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

NOTES

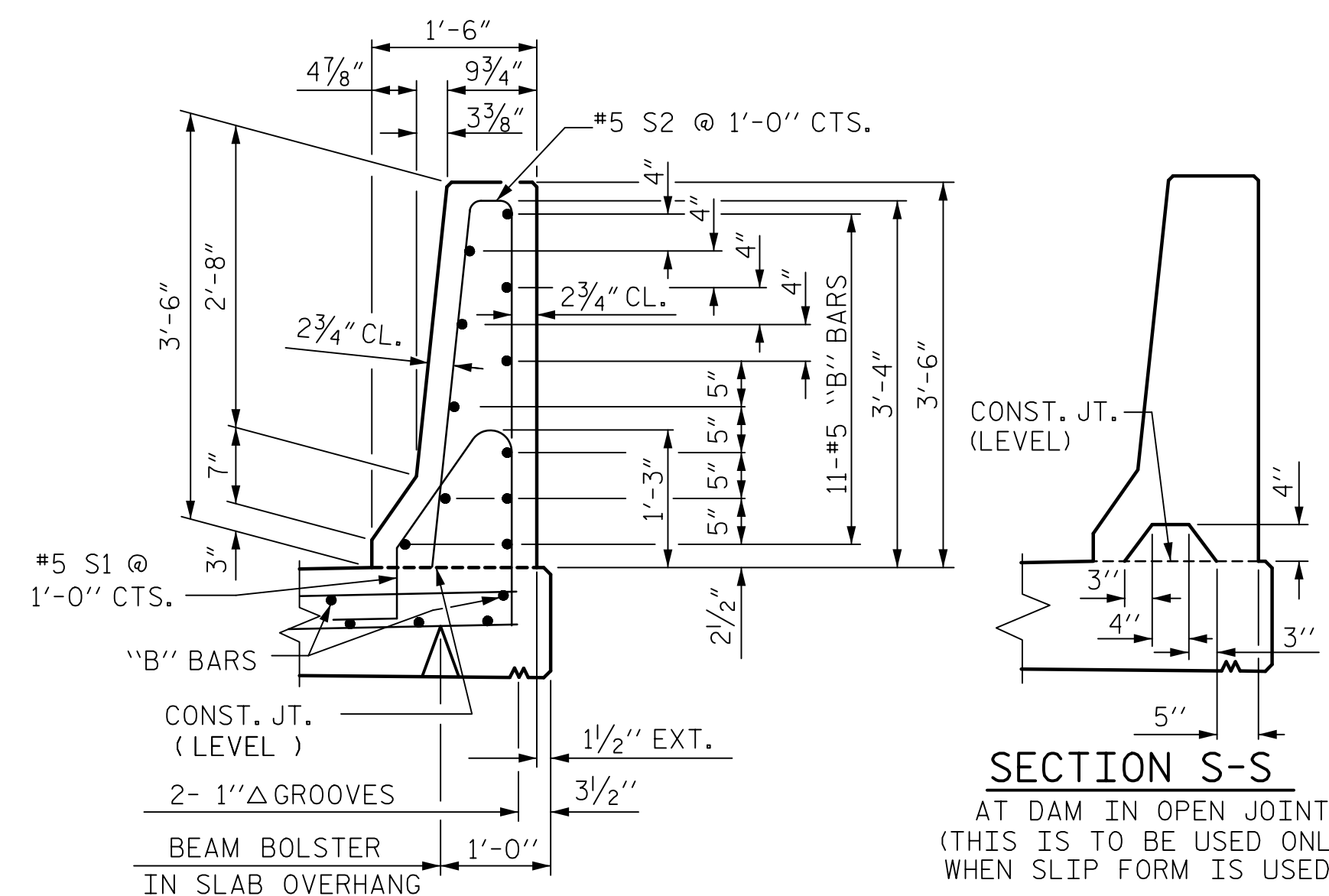
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

WHEN FOAM JOINT SEAL IS REQUIRED, THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF BARRIER RAIL.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3, S4, S5 AND S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, S4, S5 AND S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

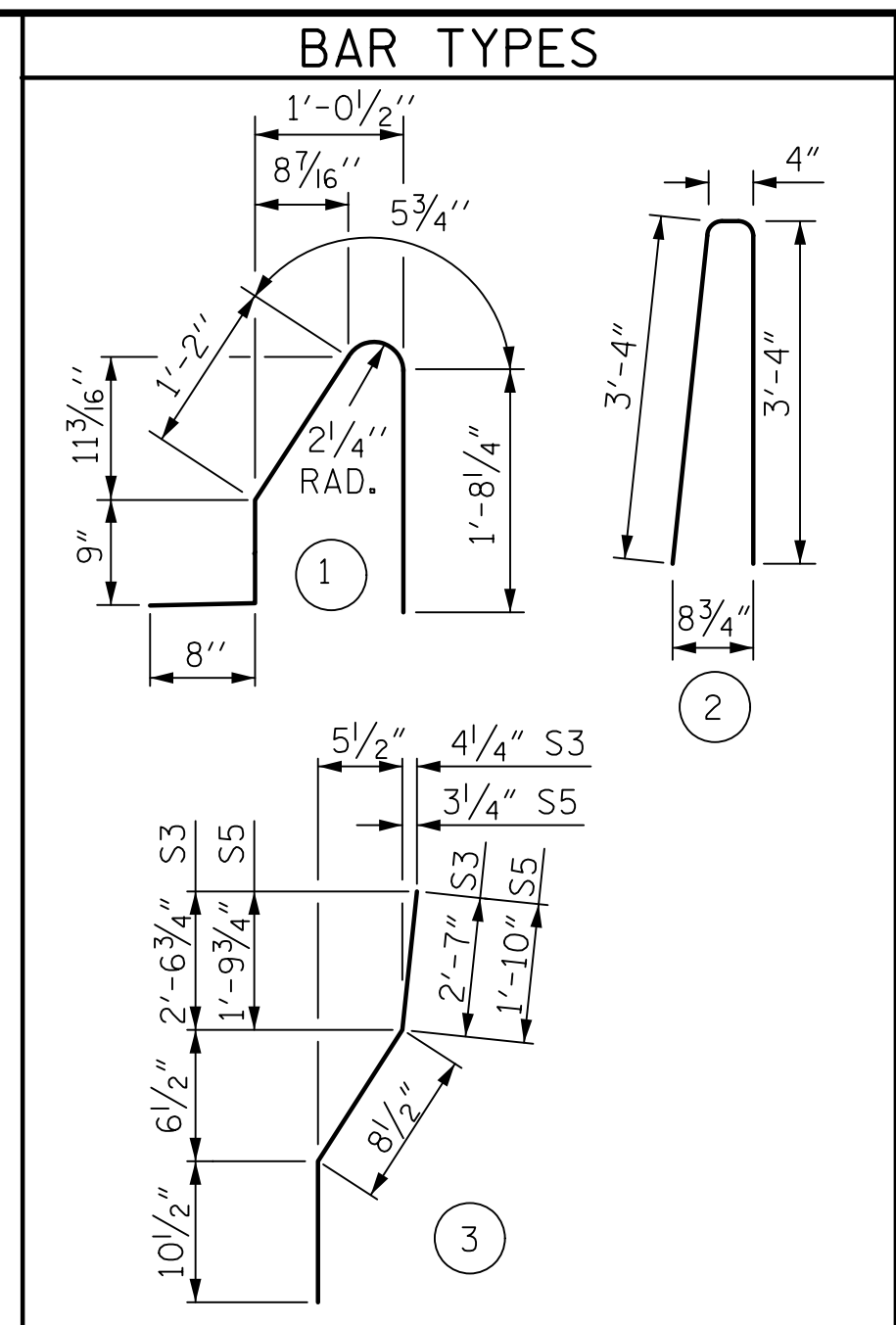
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS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



SECTION THRU RAIL

SECTION S-S

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



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL					
FOR CONCRETE BARRIER RAIL ONLY					
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
* S1	398	#5	1	4'-9"	1972
* S2	398	#5	2	7'-0"	2906
* S3	4	#5	3	4'-2"	17
* S4	4	#5	STR	4'-0"	17
* S5	8	#5	3	3'-5"	29
* S6	8	#5	STR	3'-3"	27
* B1	132	#5	STR	24'-7"	3385
* B2	88	#5	STR	15'-0"	1377
* EPOXY COATED REINFORCING STEEL					9,730 LBS.
CLASS AA CONCRETE					55.9 CU. YDS.
CONCRETE BARRIER RAIL					410.6 LIN. FT.

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 2 OF 2

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030474
JOHN C. MORRISON
5/27/2020

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD CONCRETE BARRIER RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S-15					TOTAL SHEETS 28

ASSEMBLED BY : H.T. ROSEMOND	DATE : 06/2019
CHECKED BY : J.C. MORRISON	DATE : 06/2019
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

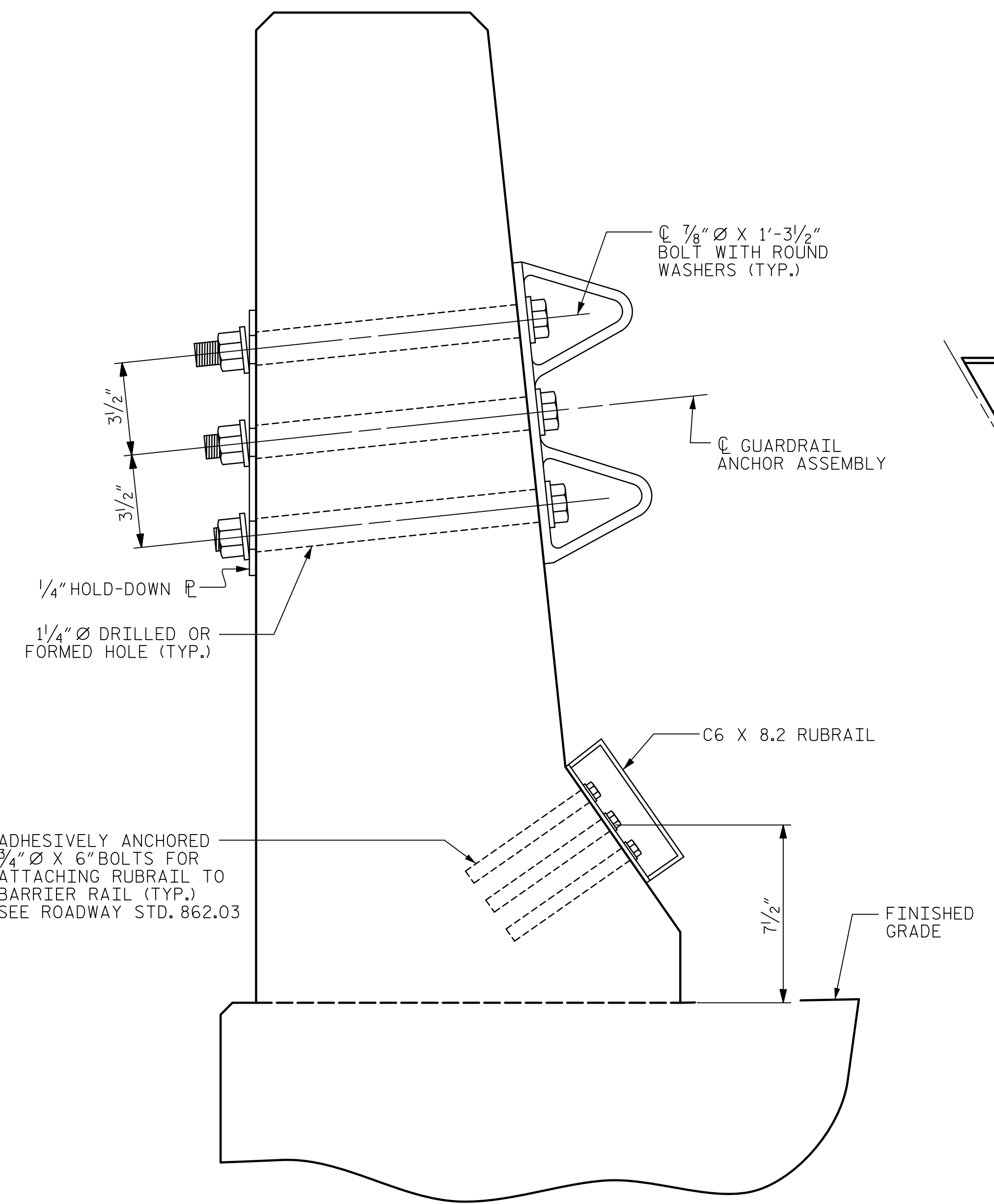
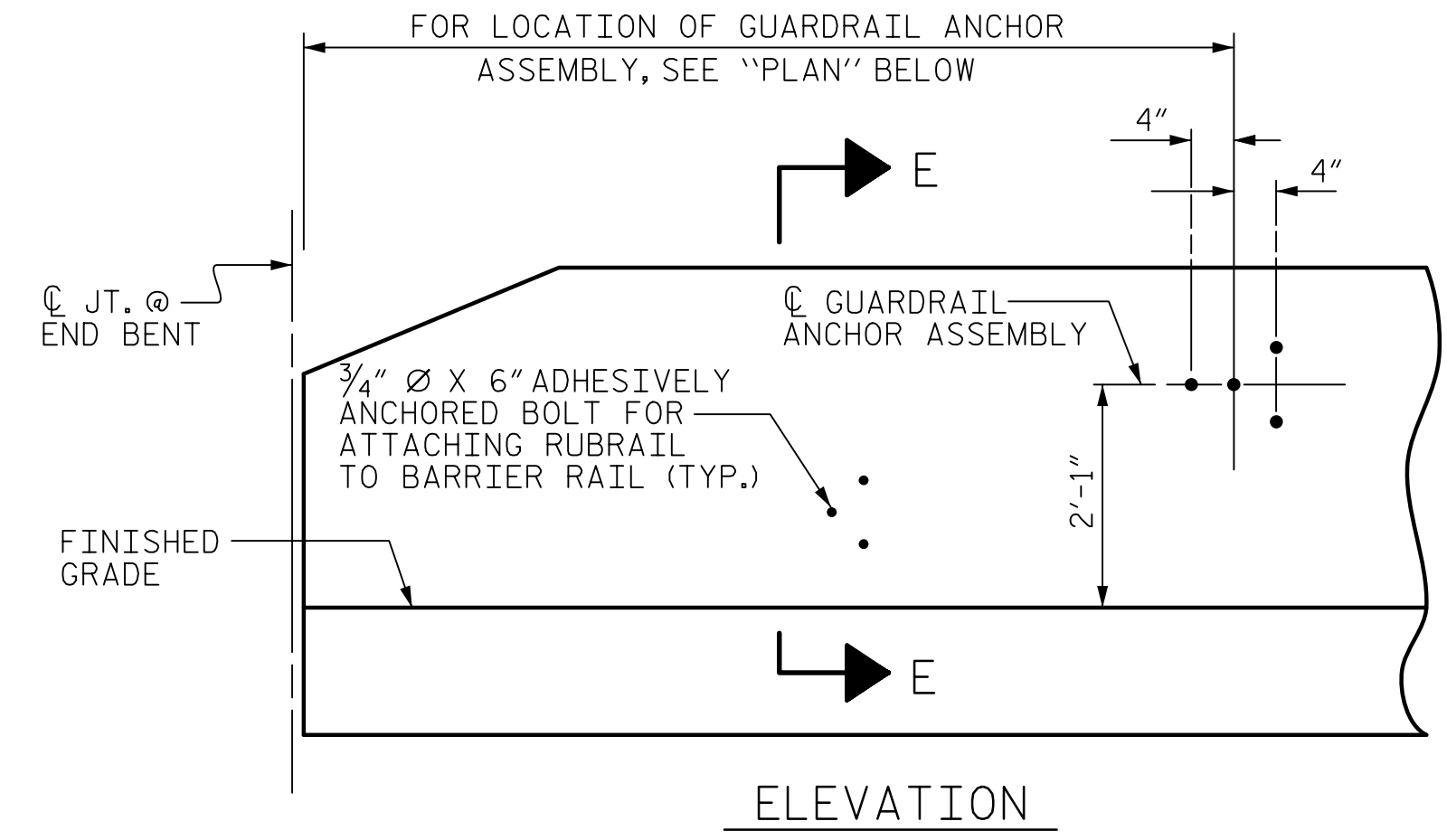
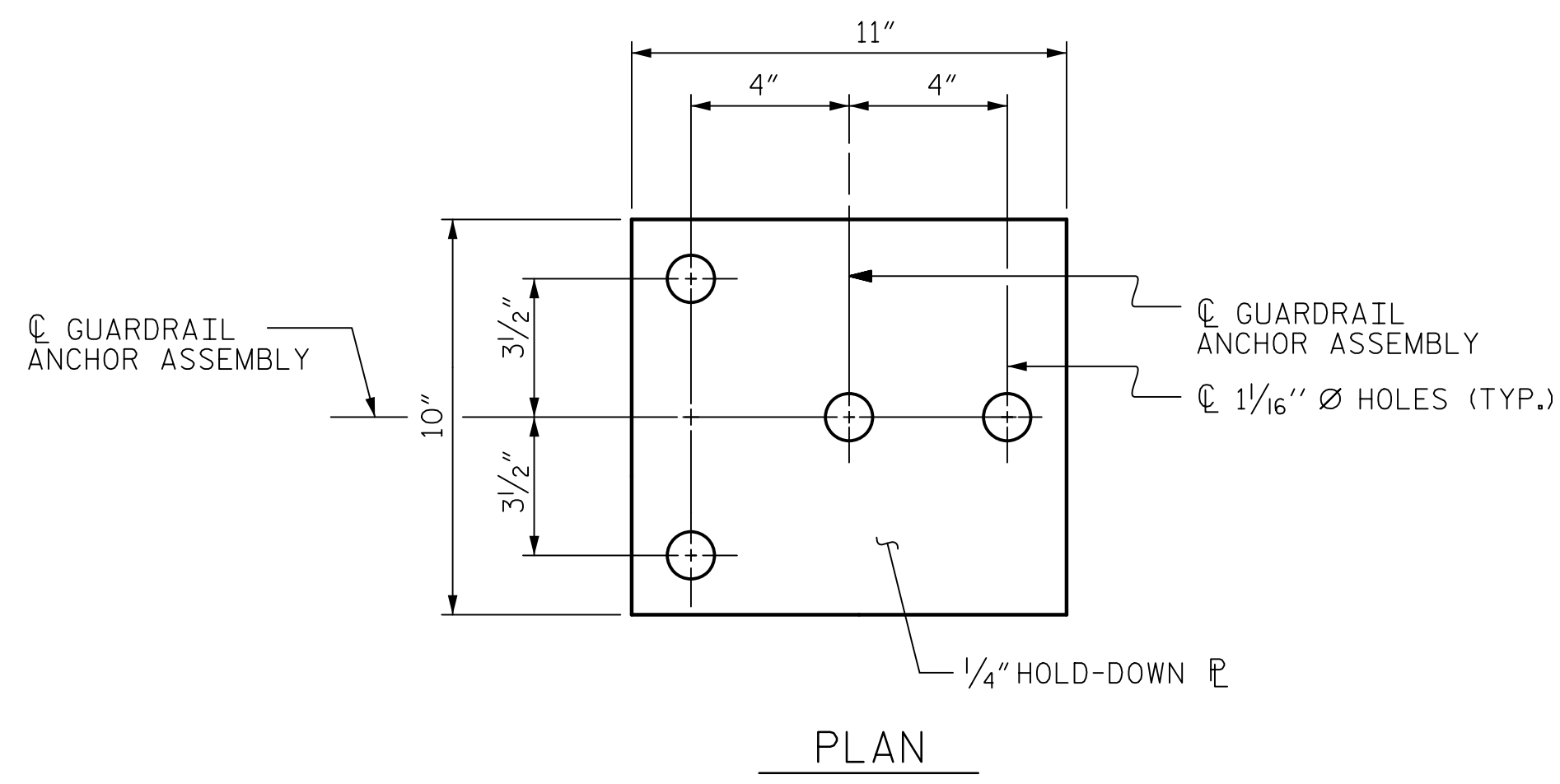
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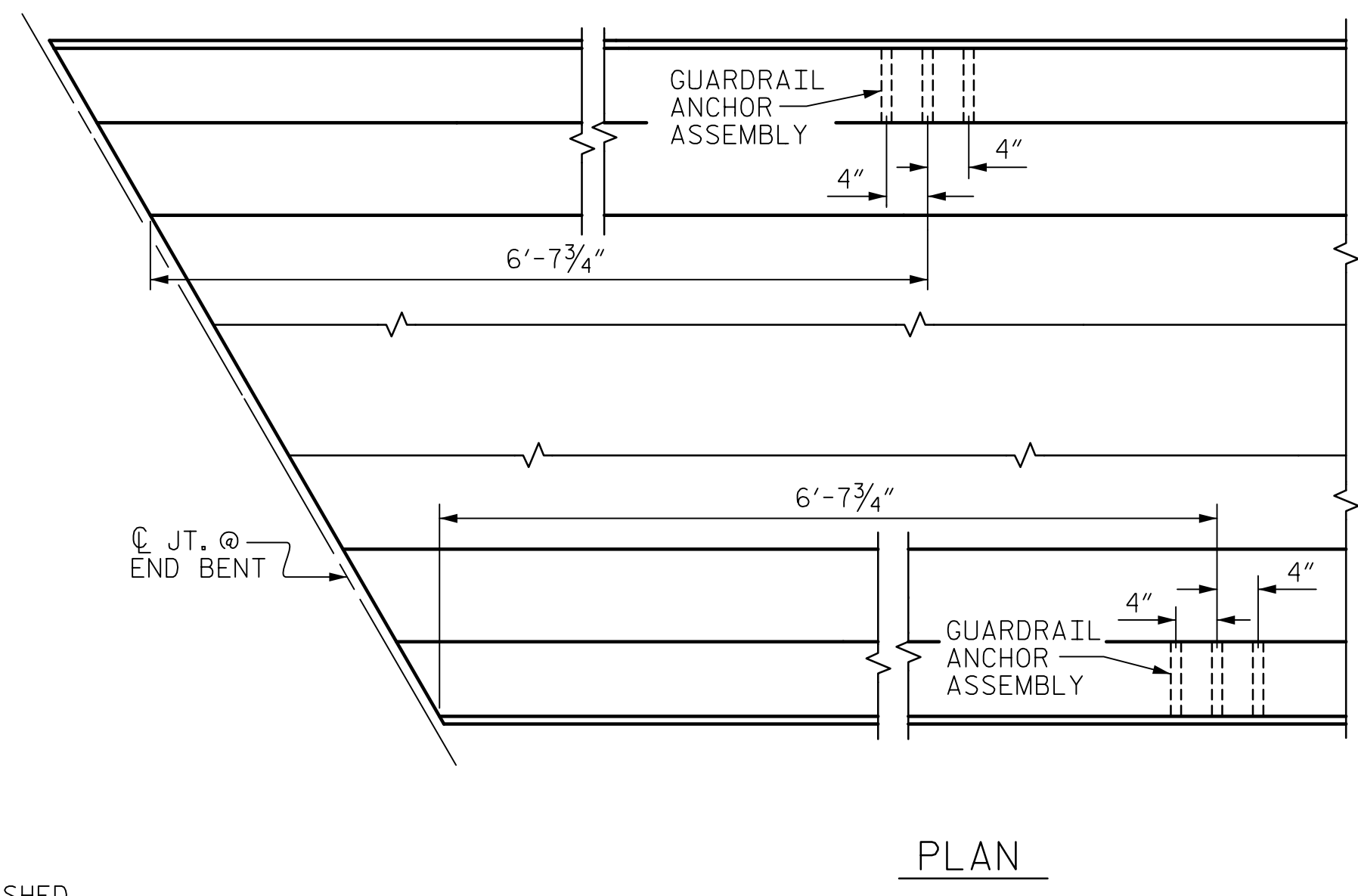
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DATE: 5/27/2019
TIME: 12:55:01 PM

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SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



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 - 1/8" 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 1/8" 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.)

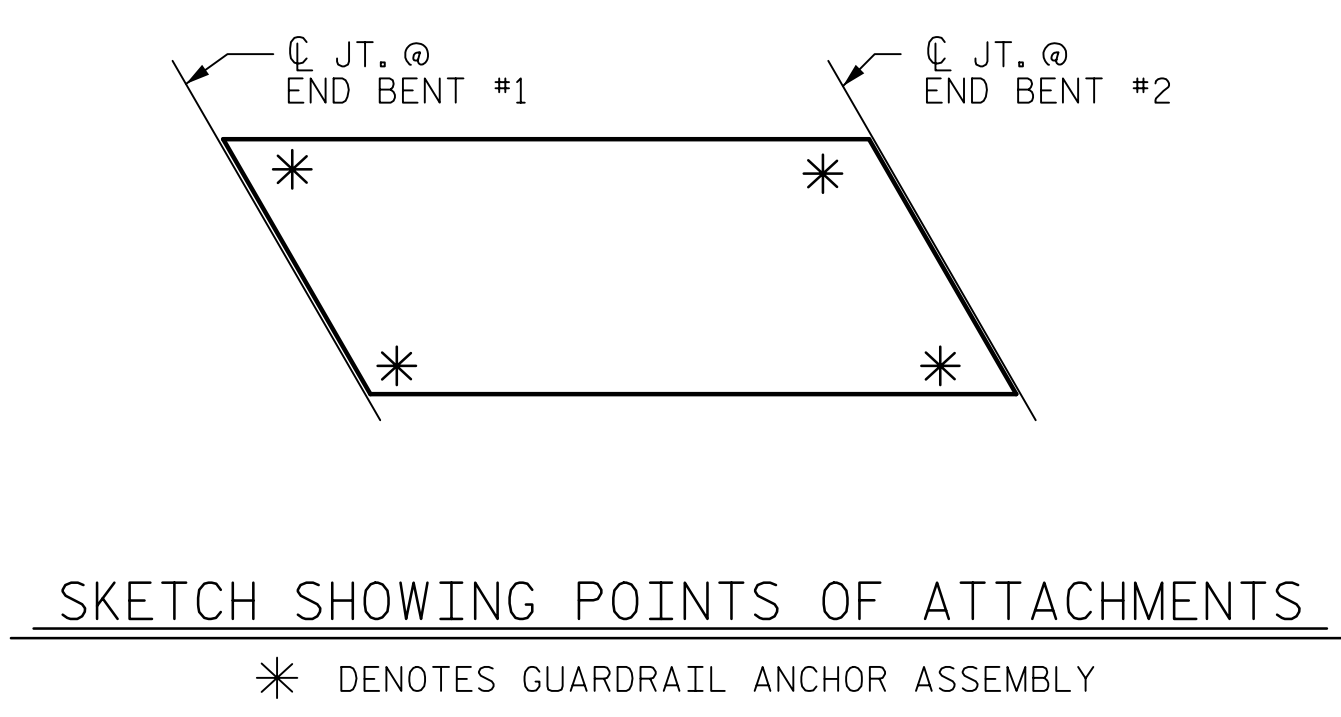
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 1/4" 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

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ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

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JOHN C. MORRISON
5/27/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE
FOR BARRIER RAIL

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

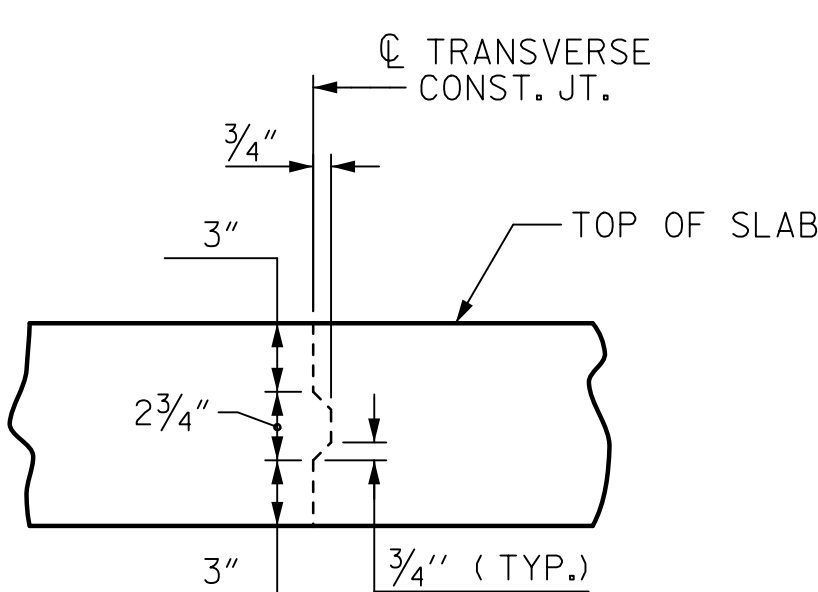
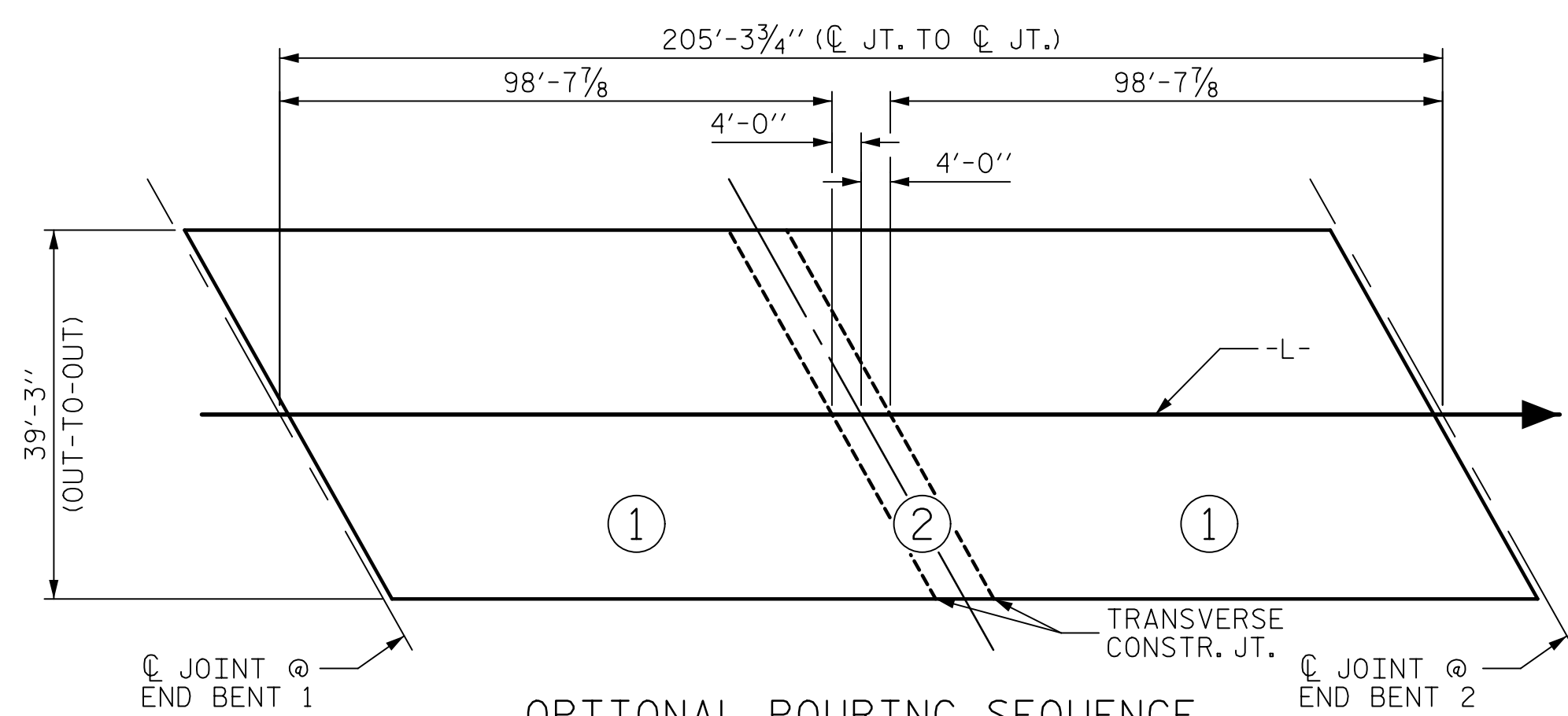
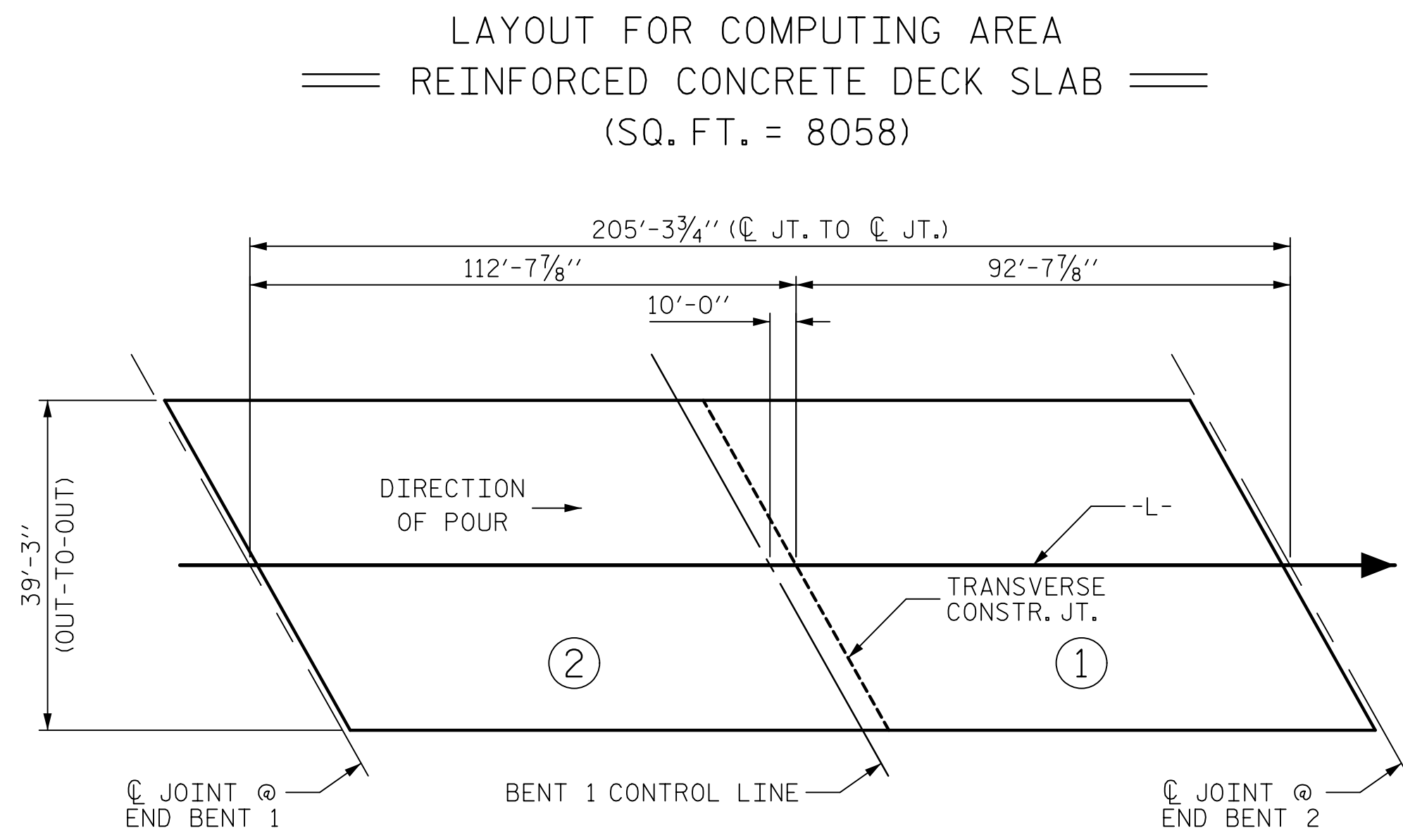
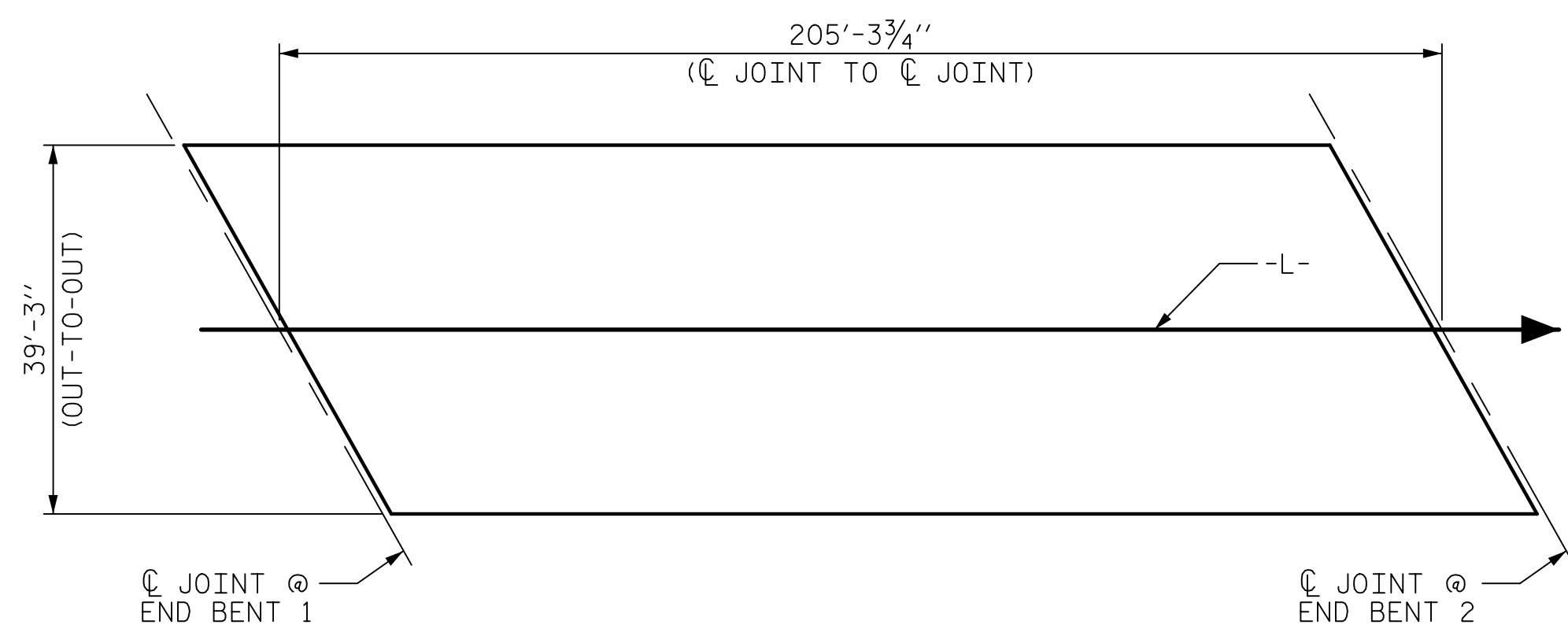
SHEET NO. S-16
TOTAL SHEETS 28

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CHECKED BY : D. RITACCO	DATE : 7/2019
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

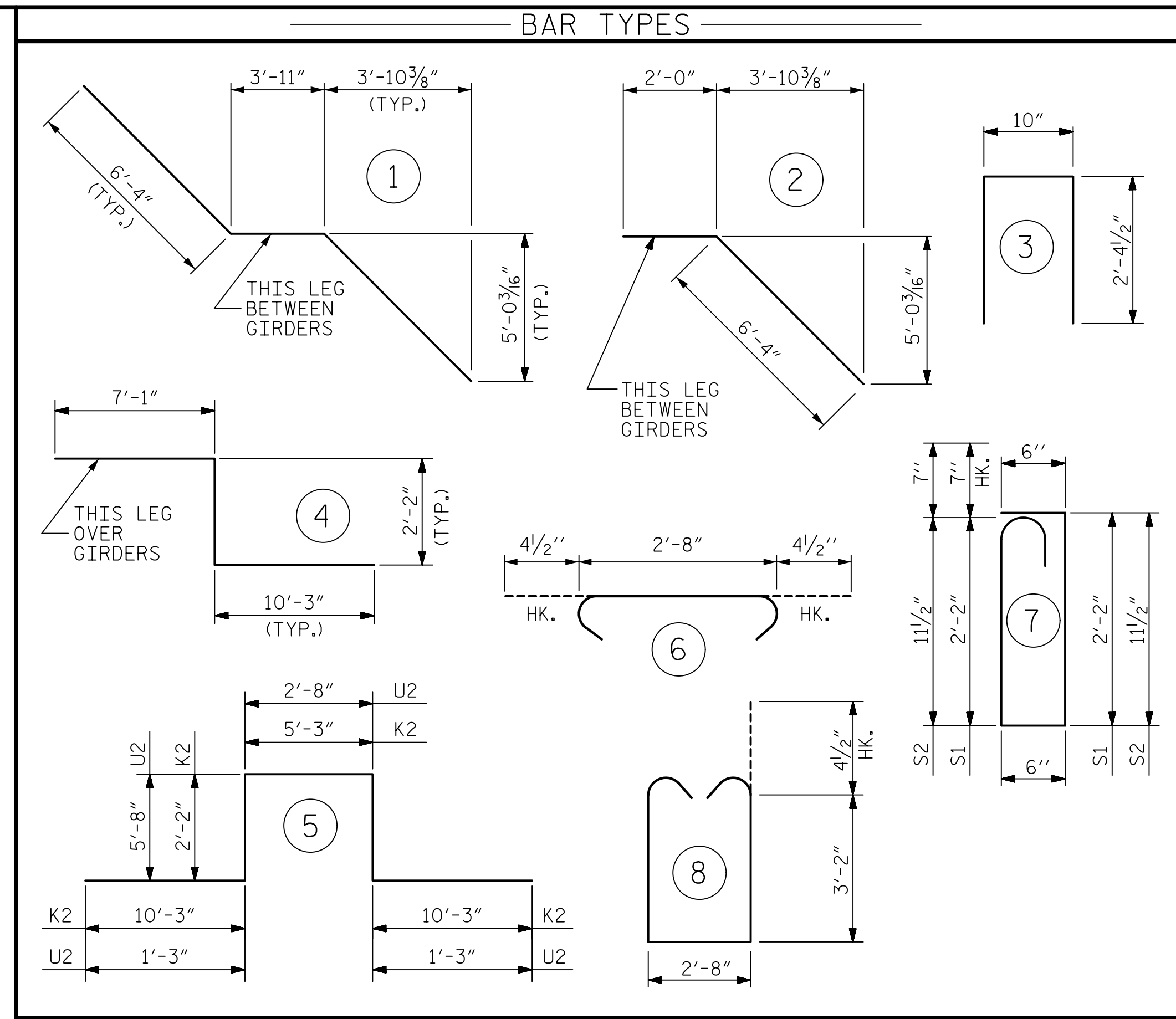
DOCUMENT NOT CONSIDERED
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SIGNATURES COMPLETED

REINFORCING BAR SCHEDULE											
BAR	No.	SIZE	TYPE	LENGTH	WEIGHT	BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
* A1	295	5	STR	38'-11"	11974	A210	2	5	STR	9'-1"	19
A2	295	5	STR	38'-11"	11974	A211	2	5	STR	9'-9"	20
* A3	6	6	STR	25'-0"	225	A212	2	5	STR	10'-6"	22
						A213	2	5	STR	11'-3"	23
* A101	2	5	STR	2'-7"	5	A214	2	5	STR	11'-11"	25
* A102	2	5	STR	3'-3"	7	A215	2	5	STR	12'-8"	26
* A103	2	5	STR	4'-0"	8	A216	2	5	STR	13'-5"	28
* A104	2	5	STR	4'-9"	10	A217	2	5	STR	14'-1"	29
* A105	2	5	STR	5'-5"	11	A218	2	5	STR	14'-10"	31
* A106	2	5	STR	6'-2"	13	A219	2	5	STR	15'-6"	32
* A107	2	5	STR	6'-11"	14	A220	2	5	STR	16'-3"	34
* A108	2	5	STR	7'-7"	16	A221	2	5	STR	16'-12"	35
* A109	2	5	STR	8'-4"	17	A222	2	5	STR	17'-8"	37
* A110	2	5	STR	9'-0"	19	A223	2	5	STR	18'-5"	38
* A111	2	5	STR	9'-9"	20	A224	2	5	STR	19'-1"	40
* A112	2	5	STR	10'-6"	22	A225	2	5	STR	19'-10"	41
* A113	2	5	STR	11'-2"	23	A226	2	5	STR	20'-7"	43
* A114	2	5	STR	11'-11"	25	A227	2	5	STR	21'-3"	44
* A115	2	5	STR	12'-7"	26	A228	2	5	STR	21'-12"	46
* A116	2	5	STR	13'-4"	28	A229	2	5	STR	22'-8"	47
* A117	2	5	STR	14'-1"	29	A230	2	5	STR	23'-5"	49
* A118	2	5	STR	14'-9"	31	A231	2	5	STR	24'-2"	50
* A119	2	5	STR	15'-6"	32	A232	2	5	STR	24'-10"	52
* A120	2	5	STR	16'-2"	34	A233	2	5	STR	25'-7"	53
* A121	2	5	STR	16'-11"	35	A234	2	5	STR	26'-4"	55
* A122	2	5	STR	17'-8"	37	A235	2	5	STR	27'-0"	56
* A123	2	5	STR	18'-4"	38	A236	2	5	STR	27'-9"	58
* A124	2	5	STR	19'-1"	40	A237	2	5	STR	28'-5"	59
* A125	2	5	STR	19'-10"	41	A238	2	5	STR	29'-2"	61
* A126	2	5	STR	20'-6"	43	A239	2	5	STR	29'-11"	62
* A127	2	5	STR	21'-3"	44	A240	2	5	STR	30'-7"	64
* A128	2	5	STR	21'-11"	46	A241	2	5	STR	31'-4"	65
* A129	2	5	STR	22'-8"	47	A242	2	5	STR	32'-0"	67
* A130	2	5	STR	23'-5"	49	A243	2	5	STR	32'-9"	68
* A131	2	5	STR	24'-1"	50	A244	2	5	STR	33'-6"	70
* A132	2	5	STR	24'-10"	52	A245	2	5	STR	34'-2"	71
* A133	2	5	STR	25'-6"	53	A246	2	5	STR	34'-11"	73
* A134	2	5	STR	26'-3"	55	A247	2	5	STR	35'-7"	74
* A135	2	5	STR	27'-0"	56	A248	2	5	STR	36'-4"	76
* A136	2	5	STR	27'-8"	58	A249	2	5	STR	37'-1"	77
* A137	2	5	STR	28'-5"	59	A250	2	5	STR	37'-9"	79
* A138	2	5	STR	29'-1"	61	A251	2	5	STR	38'-6"	80
* A139	2	5	STR	29'-10"	62						
* A140	2	5	STR	30'-7"	64	* B1	116	4	STR	35'-2"	2725
* A141	2	5	STR	31'-3"	65	* B2	58	6	STR	37'-3"	3245
* A142	2	5	STR	32'-0"	67	* B3	50	6	STR	31'-0"	2328
* A143	2	5	STR	32'-8"	68	B4	132	5	STR	53'-0"	7297
* A144	2	5	STR	33'-5"	70						
* A145	2	5	STR	34'-2"	71	* G1	2	5	STR	50'-2"	105
* A146	2	5	STR	34'-10"	73						
* A147	2	5	STR	35'-7"	74	* K1	8	8	4	19'-6"	417
* A148	2	5	STR	36'-4"	76	* K2	8	8	5	30'-1"	643
* A149	2	5	STR	37'-0"	77	K3	18	6	STR	8'-6"	230
* A150	2	5	STR	37'-9"	79	K4	6	4	STR	10'-4"	41
* A151	2	5	STR	38'-5"	80	K5	36	4	STR	12'-4"	297
						K6	6	4	STR	8'-10"	35
A201	2	5	STR	2'-7"	5	K7	12	4	2	8'-4"	67
A202	2	5	STR	3'-4"	7	K8	12	4	1	16'-7"	133
A203	2	5	STR	4'-1"	8						
A204	2	5	STR	4'-9"	10	* S1	54	5	7	5'-11"	333
A205	2	5	STR	5'-6"	11	* S2	24	5	7	3'-6"	88
A206	2	5	STR	6'-2"	13	* S3	54	4	3	5'-7"	201
A207	2	5	STR	6'-11"	14	S4	141	4	6	3'-5"	322
A208	2	5	STR	7'-8"	16						
A209	2	5	STR	8'-4"	17	U1	12	4	8	9'-9"	78
						U2	21	4	5	16'-6"	231

TOTAL REINFORCING STEEL	LBS.	22,885
* TOTAL EPOXY COATED REINFORCING STEEL	LBS.	24,464



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



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	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

GROOVING BRIDGE FLOORS	
APPROACH SLABS	990 SQ.FT.
BRIDGE DECK	6,764 SQ.FT.
TOTAL	7,754 SQ.FT.

PROJECT NO. **BR-0042**
ROCKINGHAM COUNTY
STATION: **19+56.99 -L-**

SUPERSTRUCTURE BILL OF MATERIAL			
	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
SPANS A, B	---	22,885	24,464
POUR #1	93.3	---	---
POUR #2	129.7	---	---
TOTAL **	223.0	22,885	24,464

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NORTH CAROLINA PROFESSIONAL ENGINEER
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5/27/2020

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			28

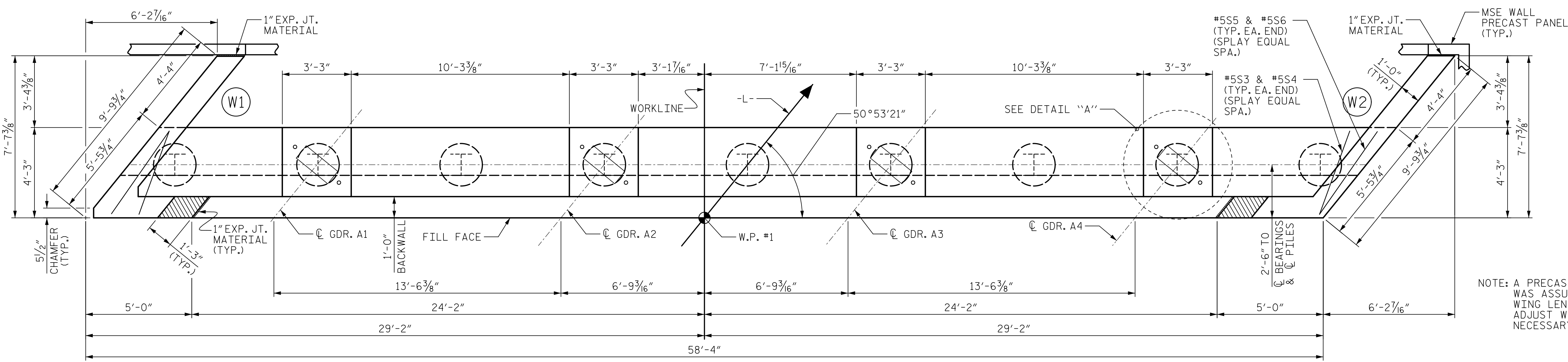
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CHECKED BY: J.C. MORRISON DATE: 06/20/19
DESIGNED BY: T.B. STUMP DATE: 06/20/19
DESIGN CHECKED BY: J.C. MORRISON DATE: 06/20/19

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**QUANTITIES FOR CONCRETE BARRIER RAIL ARE NOT INCLUDED.

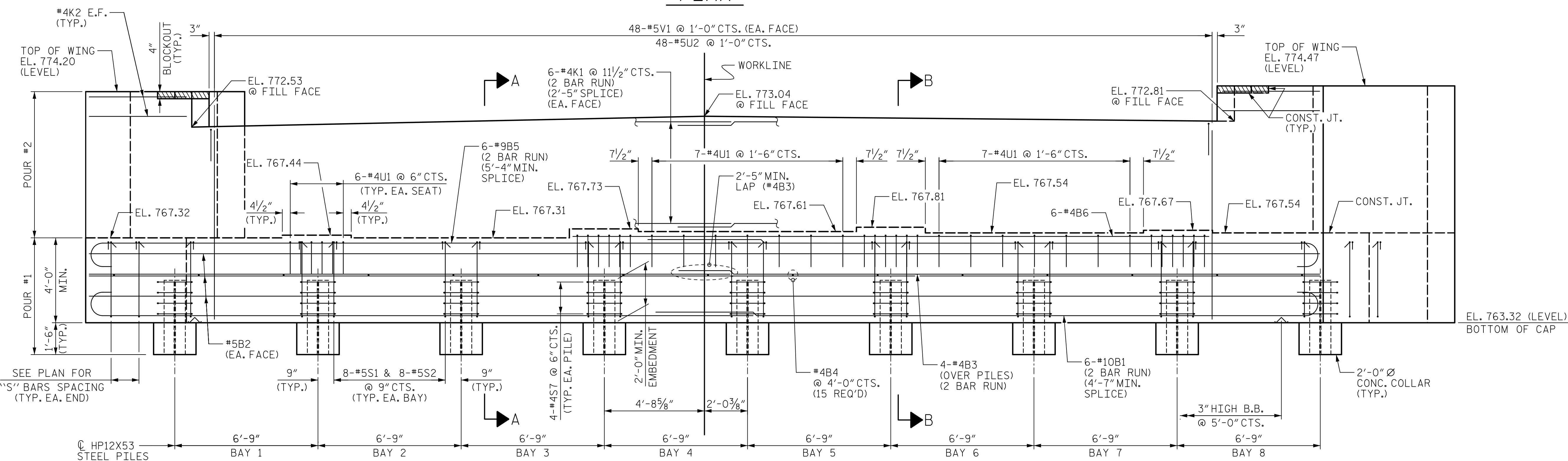
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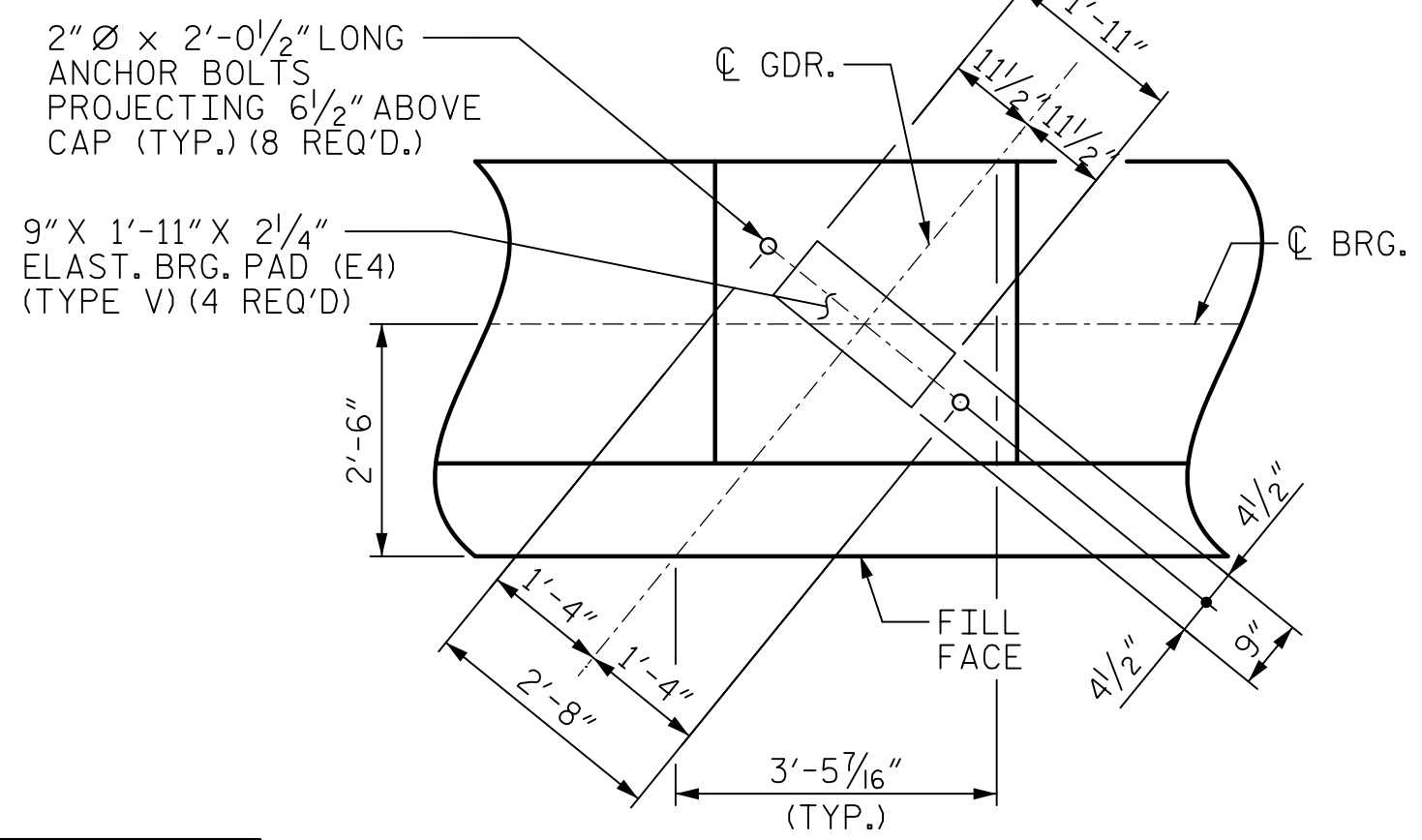


NOTE: A PRECAST PANEL THICKNESS OF 6" WAS ASSUMED FOR ESTABLISHING WING LENGTH. CONTRACTOR SHALL ADJUST WING LENGTH AS NECESSARY.

PLAN



ELEVATION



DETAIL "A"
(TYP. EA. GIRDER)

NOTES:
STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHORS.
#5 "V" BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING
THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT THE RATE OF 2%.
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 CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 1 OF 3

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5/27/2020

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
END BENT 1

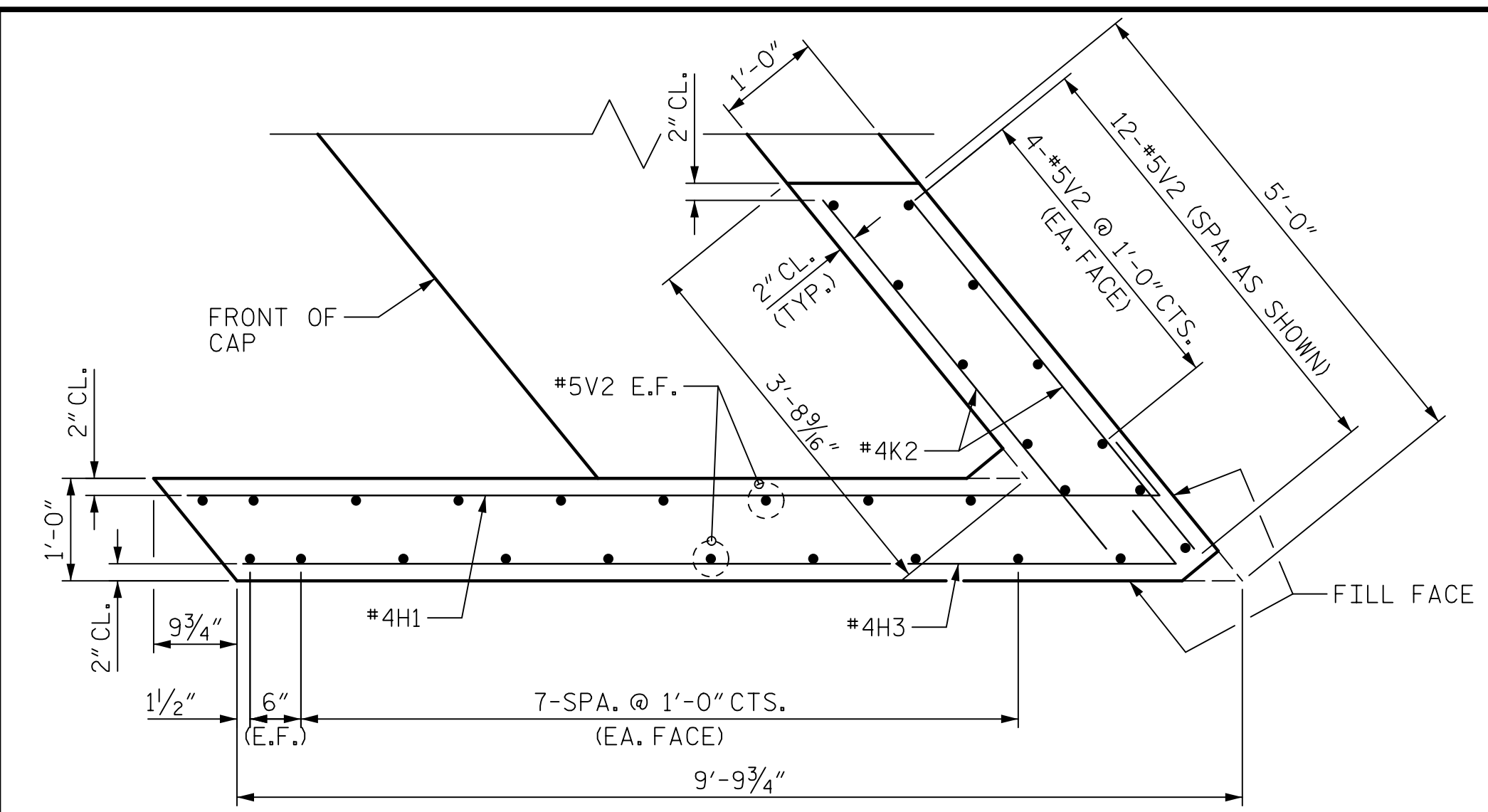
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DESIGN CHECKED BY : J.C. MORRISON DATE : 07/2019

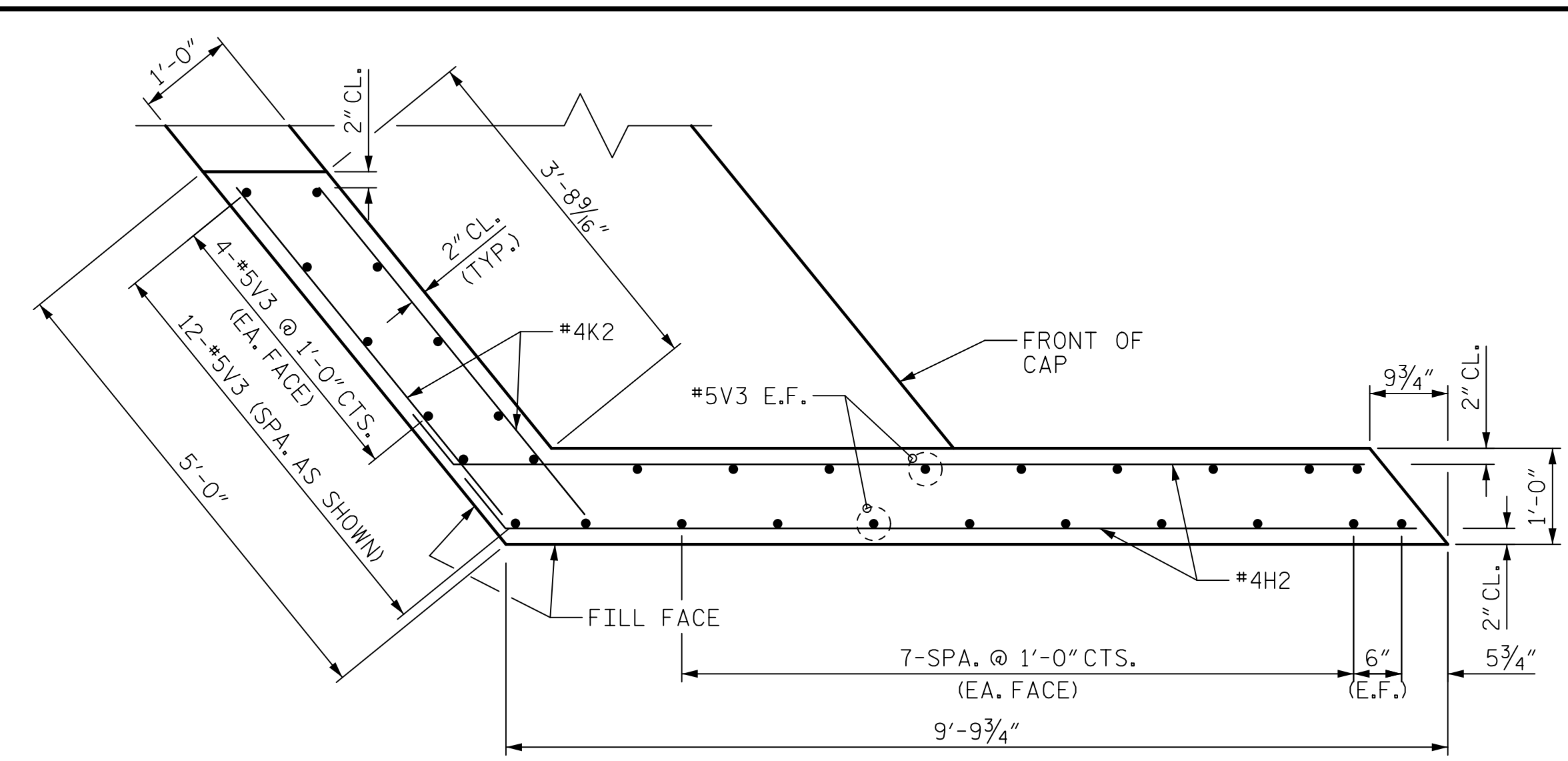
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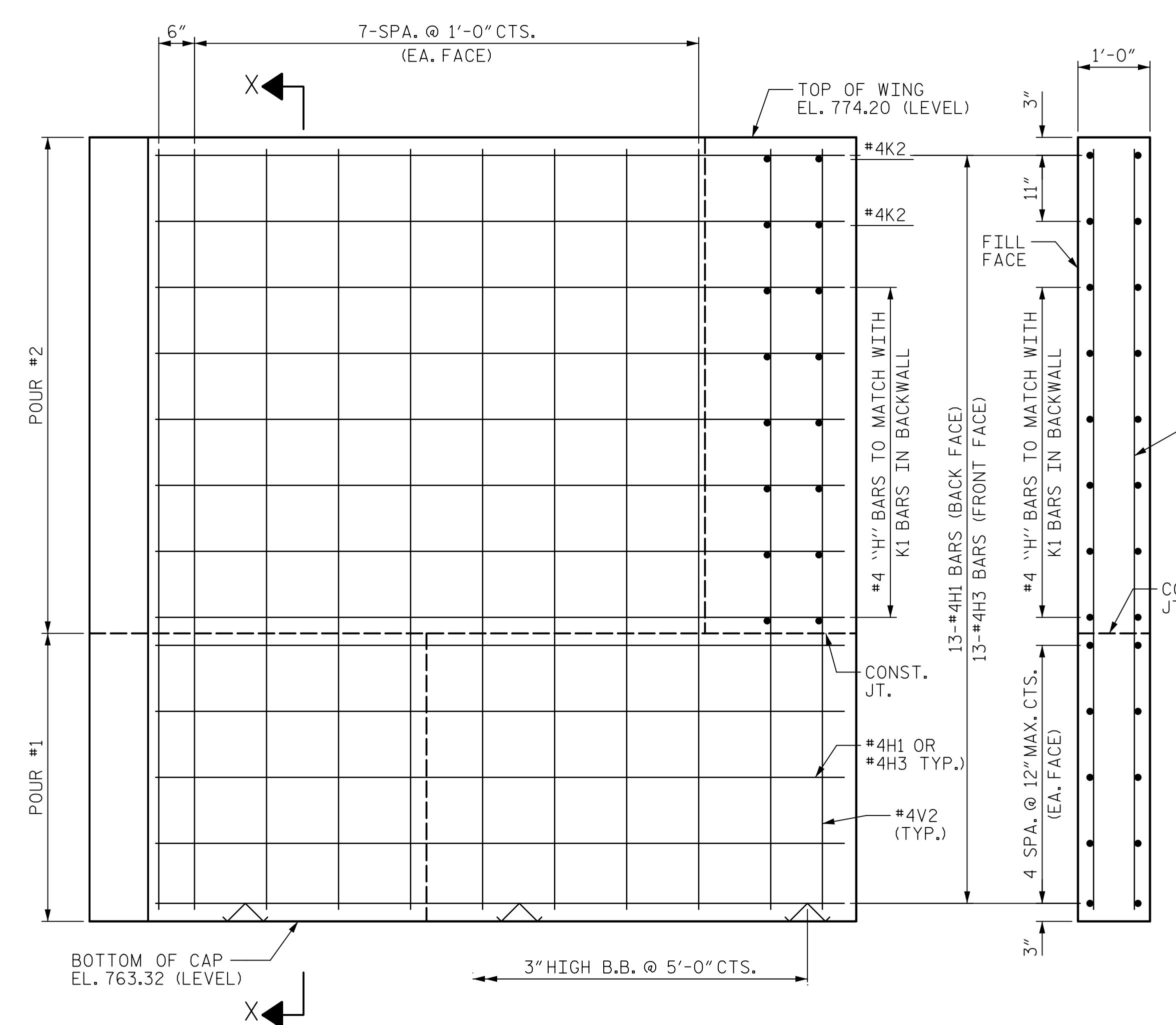
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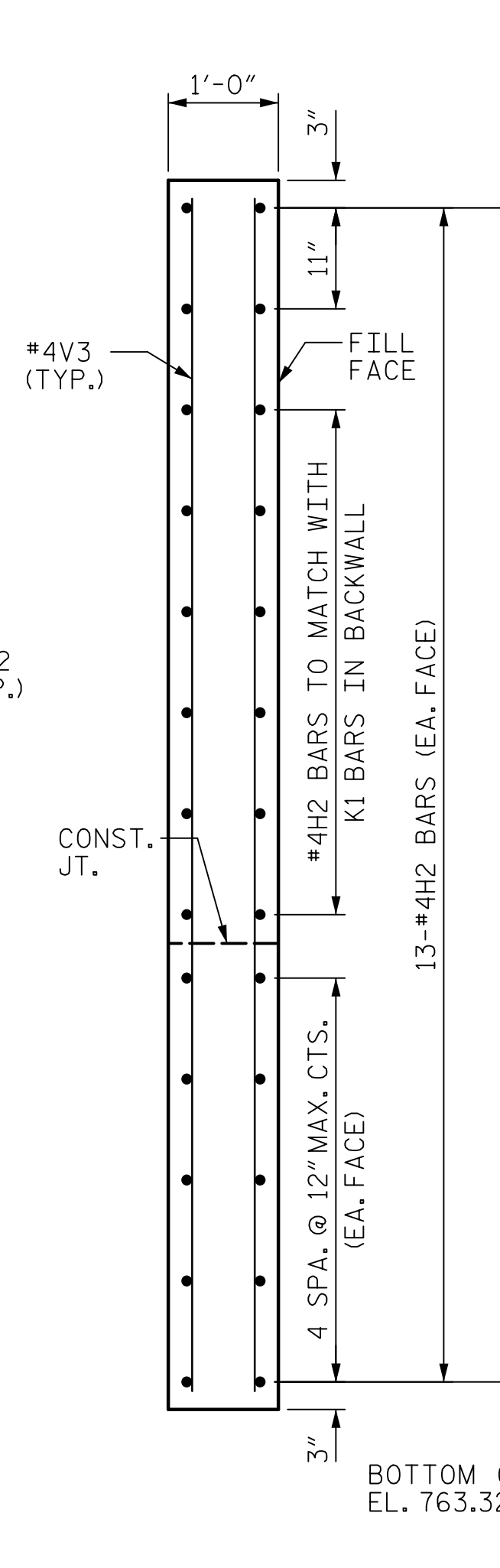
PLAN OF WING W1



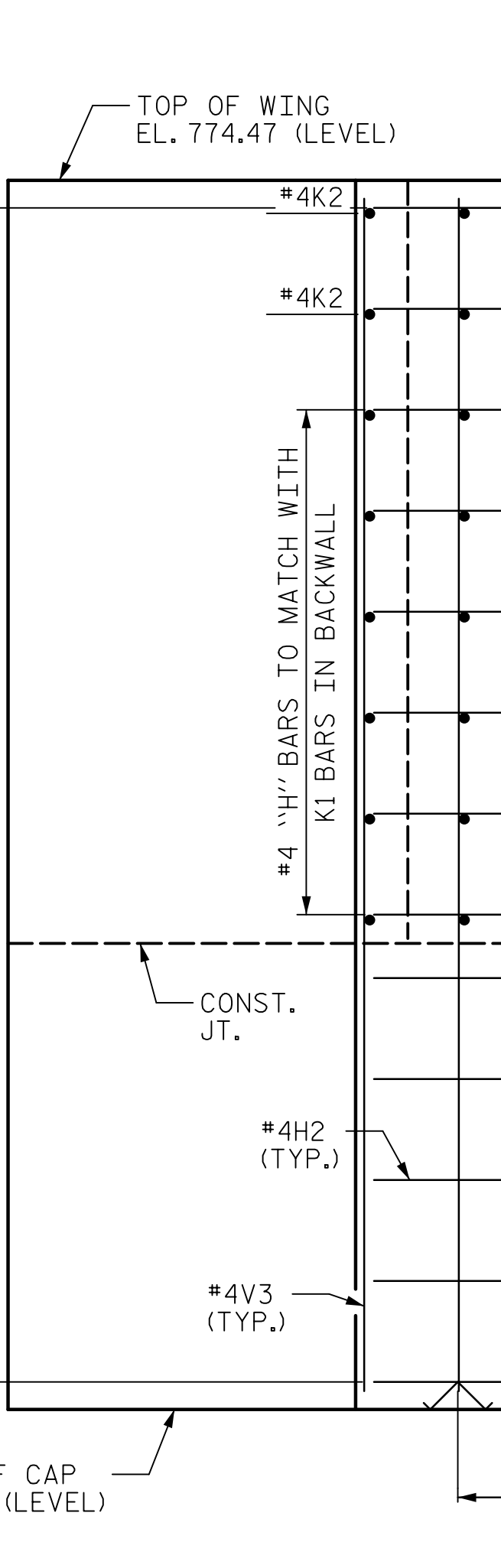
PLAN OF WING W2



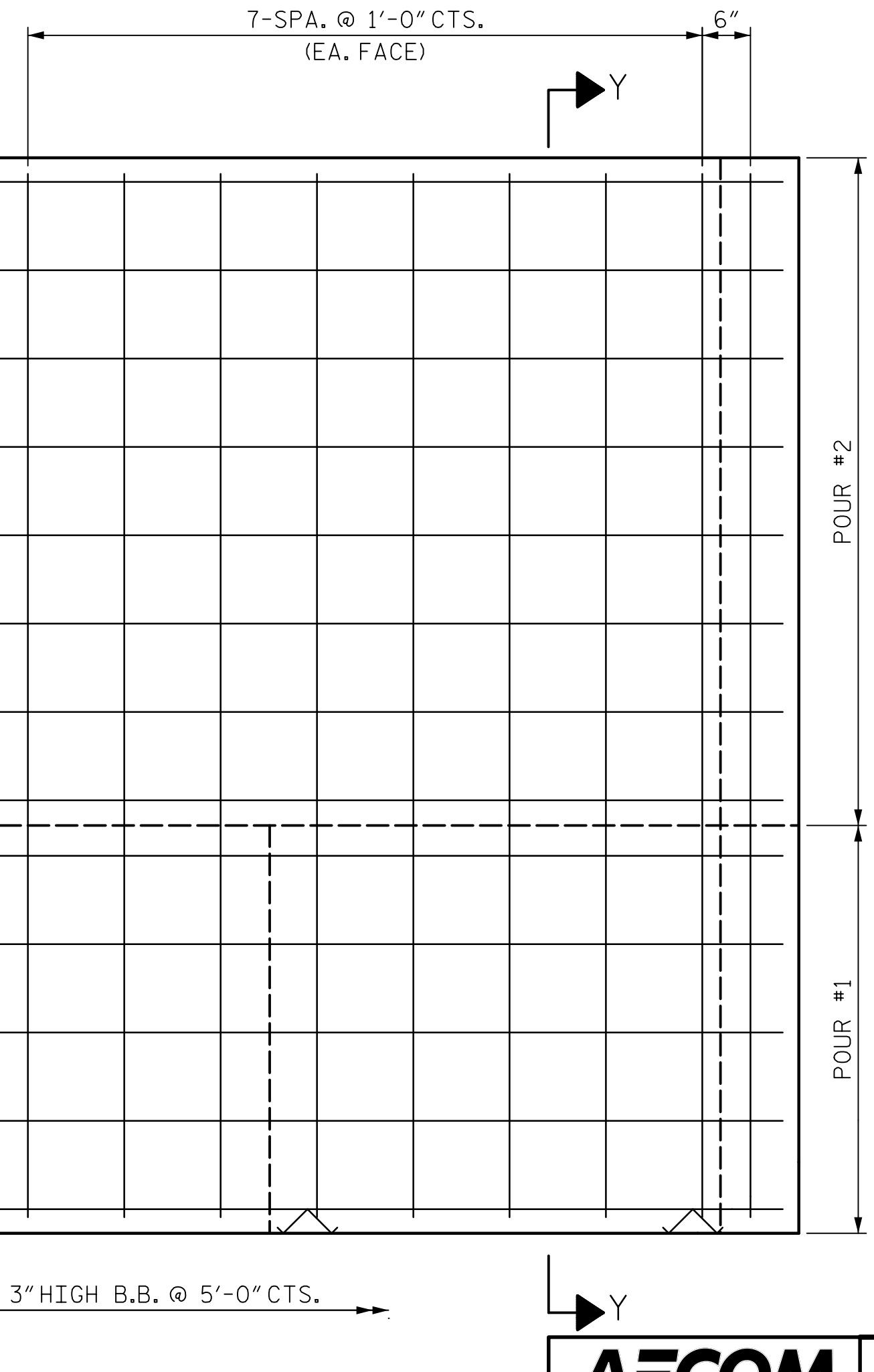
ELEVATION OF WING W1



SECTION X-X



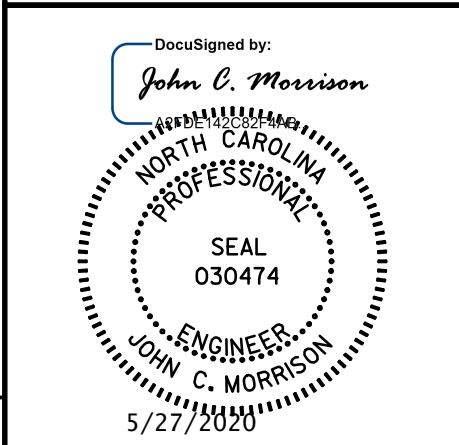
SECTION Y-Y



ELEVATION OF WING W2

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 2 OF 3



STATE OF NORTH CAROLINA
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RALEIGH
SUPERSTRUCTURE
END BENT 1

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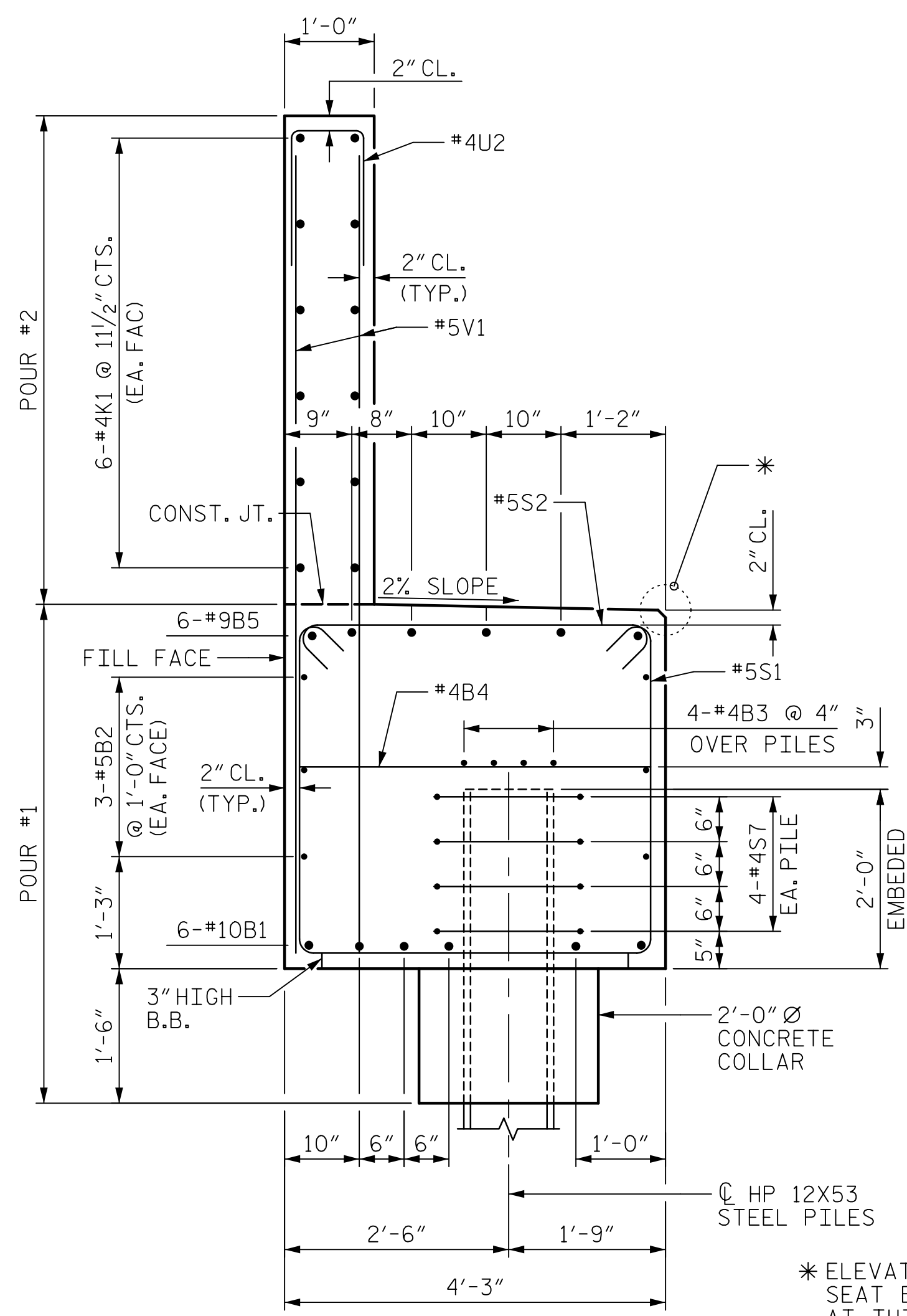
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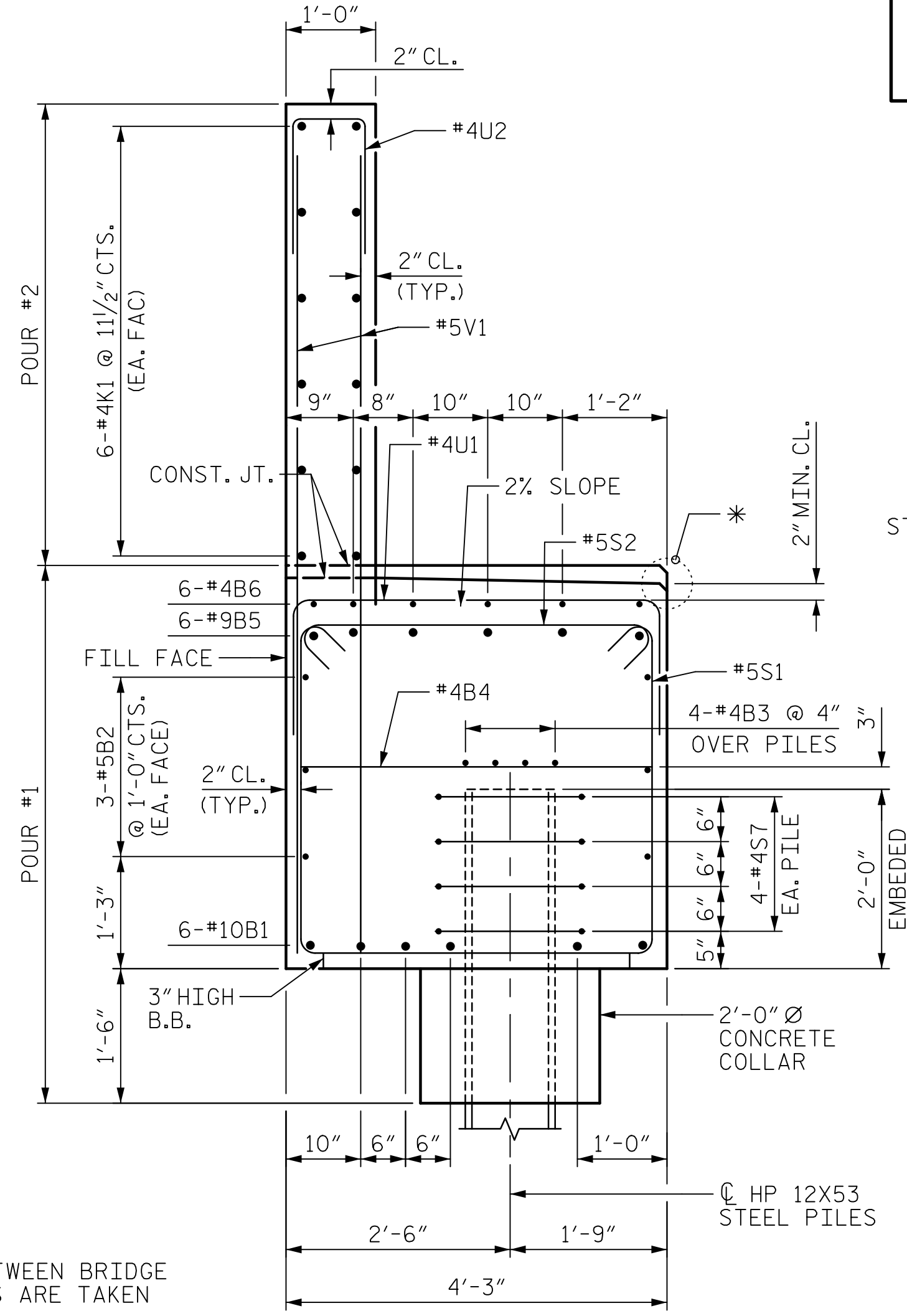
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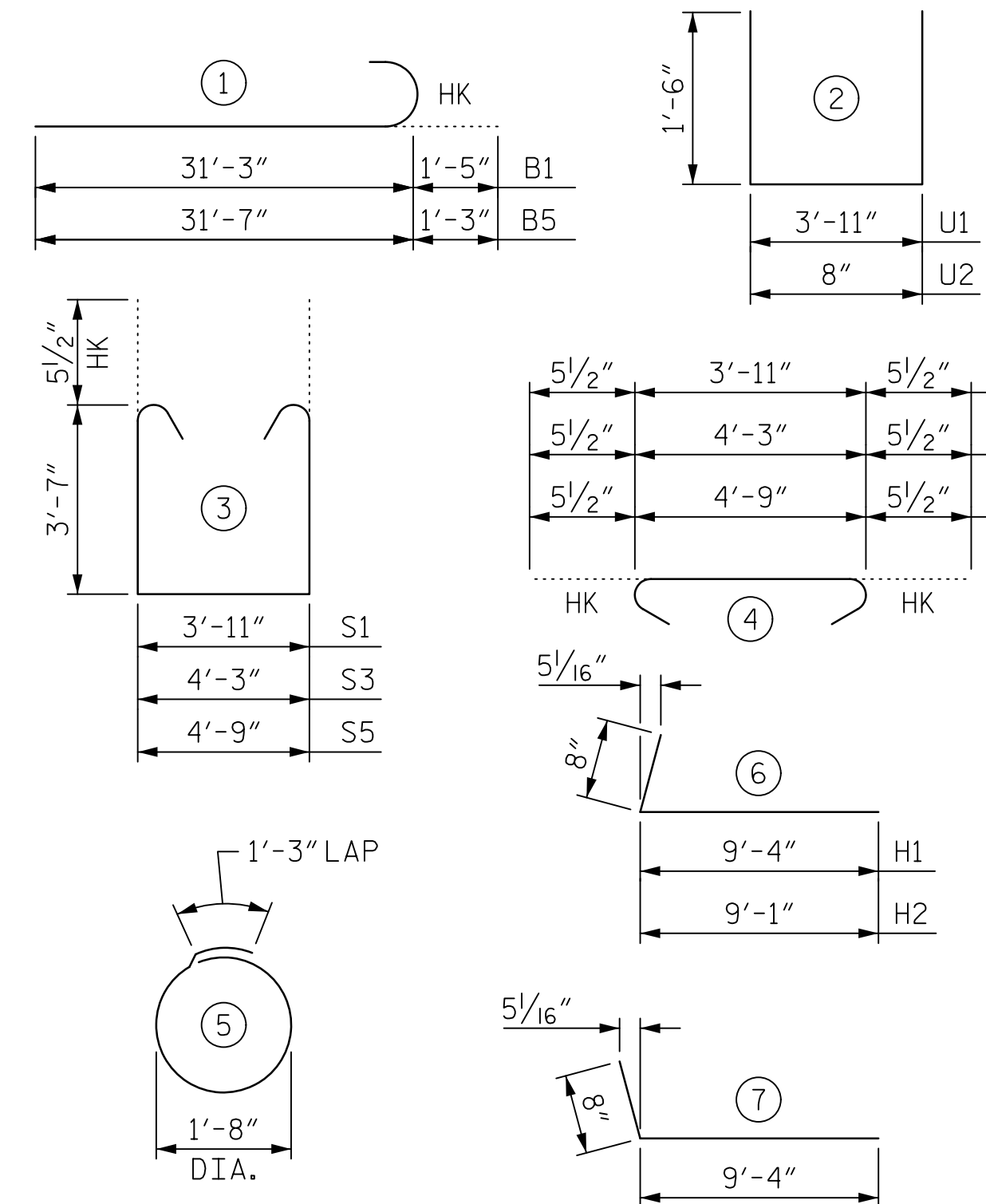
SECTION A-A



SECTION B-B

* ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS ARE TAKEN AT THIS POINT

BAR TYPE



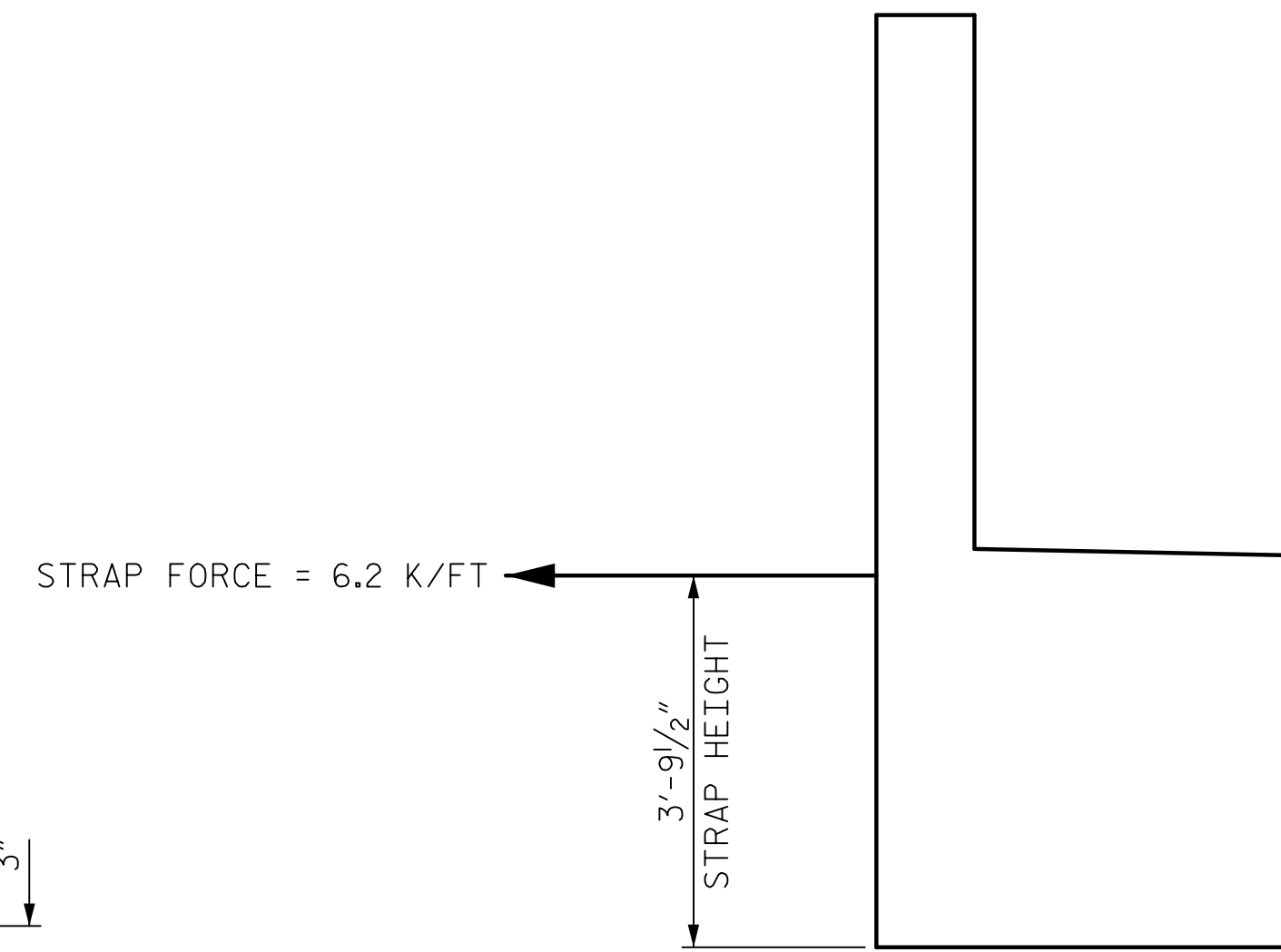
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	10	1	32'-8"	1687
B2	6	5	STR	58'-0"	363
B3	8	4	STR	30'-3"	162
B4	15	4	STR	3'-8"	37
B5	12	9	1	32'-10"	1340
B6	6	4	STR	30'-0"	120
H1	13	4	6	10'-0"	87
H2	26	4	7	10'-0"	174
H3	13	4	6	9'-9"	85
K1	24	4	STR	30'-3"	485
K2	8	4	STR	4'-4"	23
S1	64	5	3	12'-0"	801
S2	64	5	4	4'-10"	323
S3	2	5	3	12'-4"	26
S4	2	5	4	5'-2"	11
S5	2	5	3	12'-10"	27
S6	2	5	4	5'-8"	12
S7	36	4	5	6'-6"	156
U1	38	4	2	6'-11"	176
U2	48	5	2	3'-8"	184
V1	48	5	STR	8'-9"	438
V2	30	5	STR	10'-6"	329
V3	30	5	STR	10'-9"	336

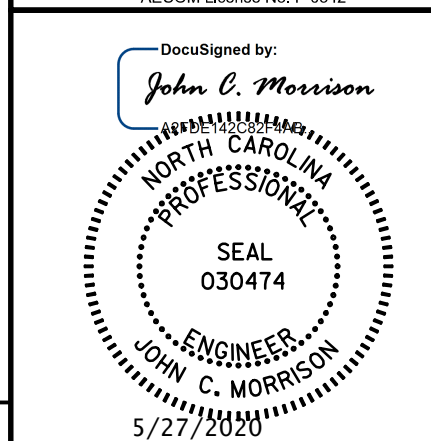
TOTAL REINFORCING STEEL	7,382 LBS.
CLASS A CONCRETE	
POUR #1 (CAP, COLLARS & LOWER WINGWALLS)	41.4 C.Y.
POUR #2 (UPPER BACKWALL & WINGWALL)	16.5 C.Y.
TOTAL	57.9 C.Y.
HP 12x53 STEEL PILES:	
NO. = 9	630 LIN. FT.
PILE DRIVING EQUIPMENT SETUP	
NO. = 9	



STRAP FORCE

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
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RALEIGH
SUPERSTRUCTURE
END BENT 1

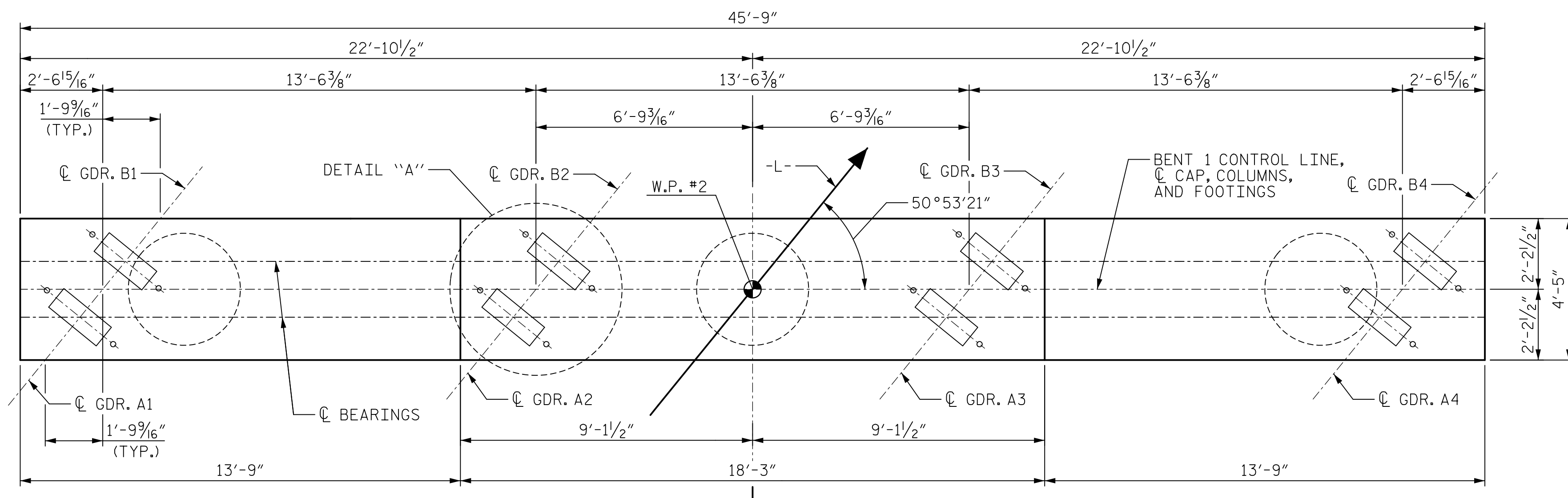
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1			3			TOTAL SHEETS
2			4			28

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DESIGN CHECKED BY : J.C. MORRISON DATE : 07/2019

DATE: 5/27/2020
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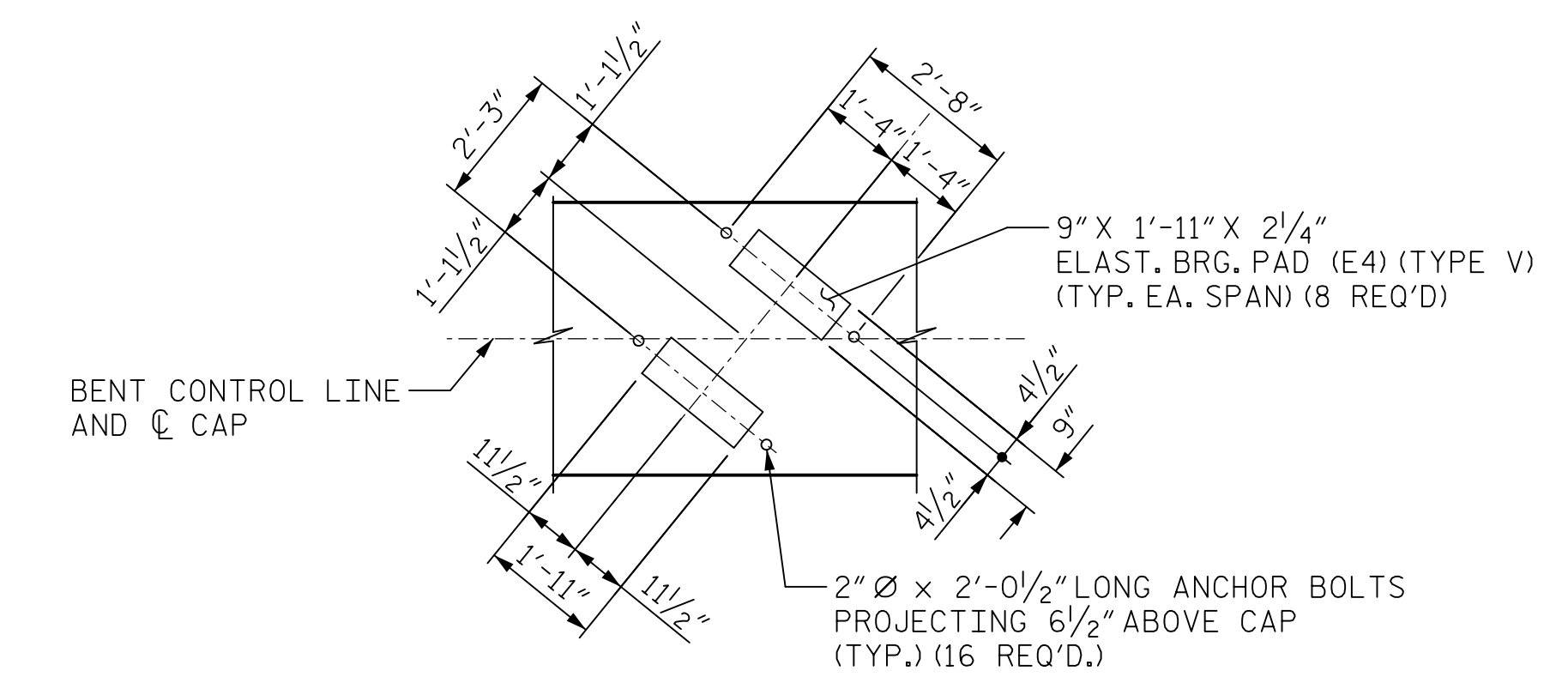
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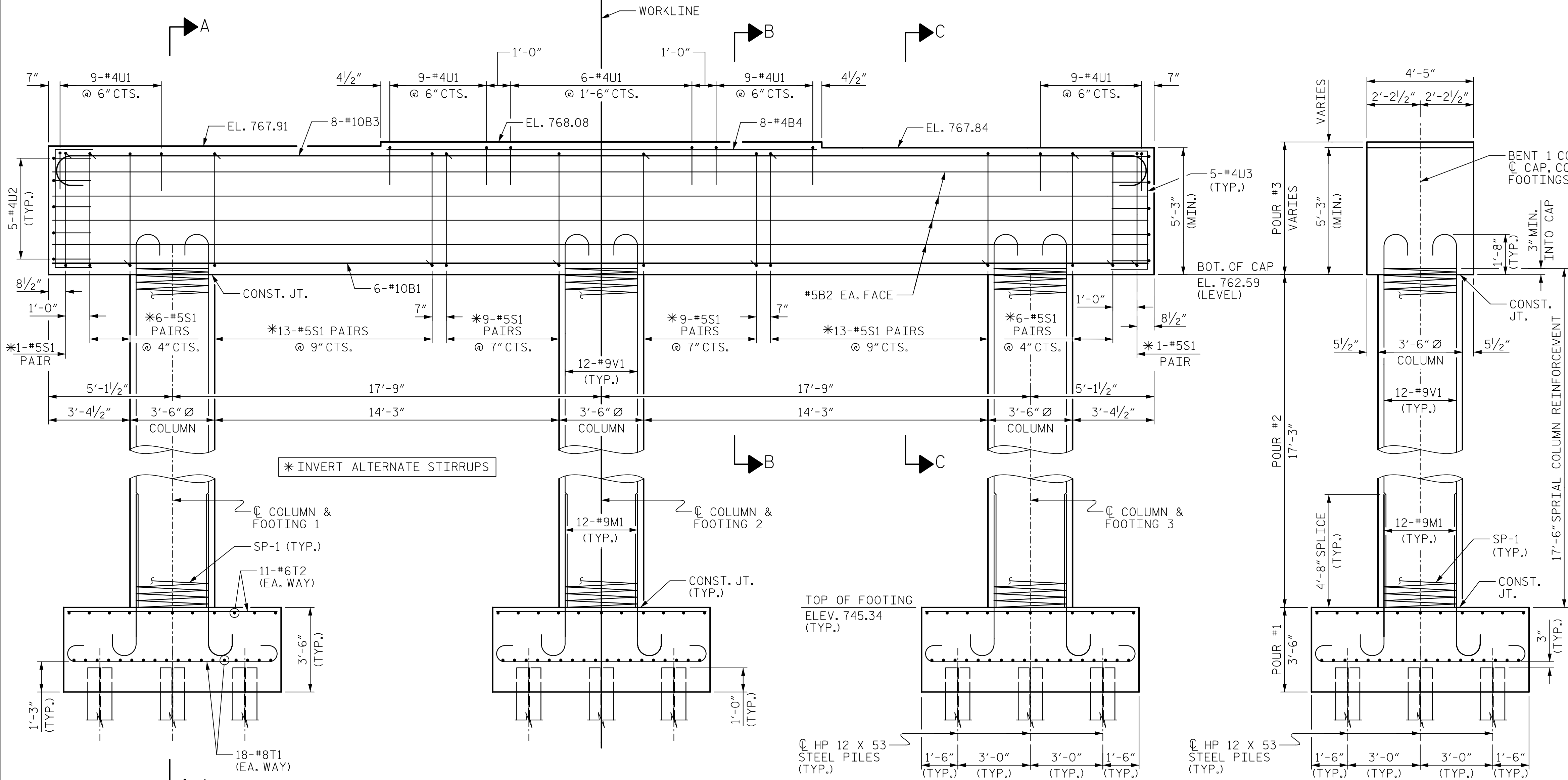
SPAN B

SPAN A

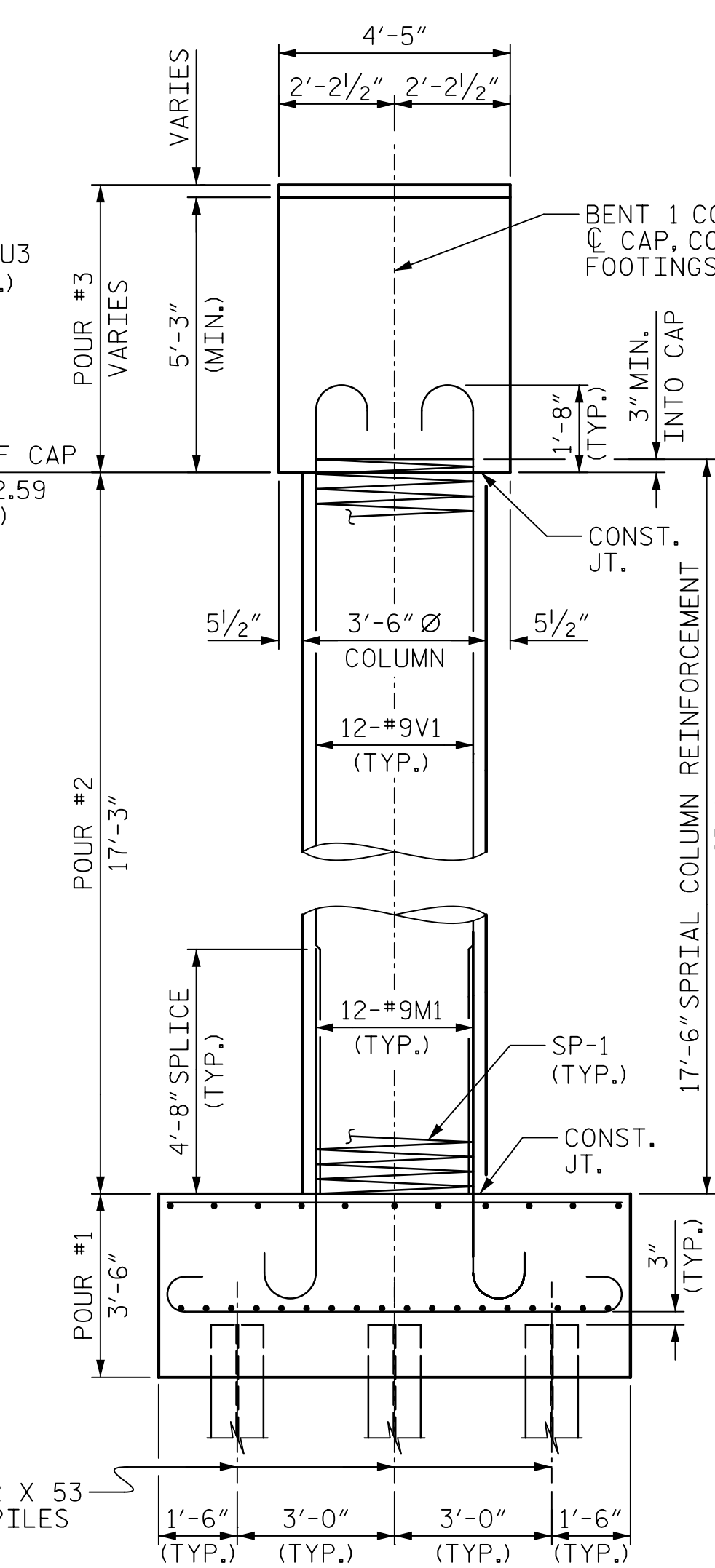
NOTES:
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.



DETAIL "A"



ELEVATION



SECTION A-A

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 1 OF 2

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John C. Morrison
NORTH CAROLINA
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ENGINEER
SEAL
030474
JOHN C. MORRISON
5/27/2020

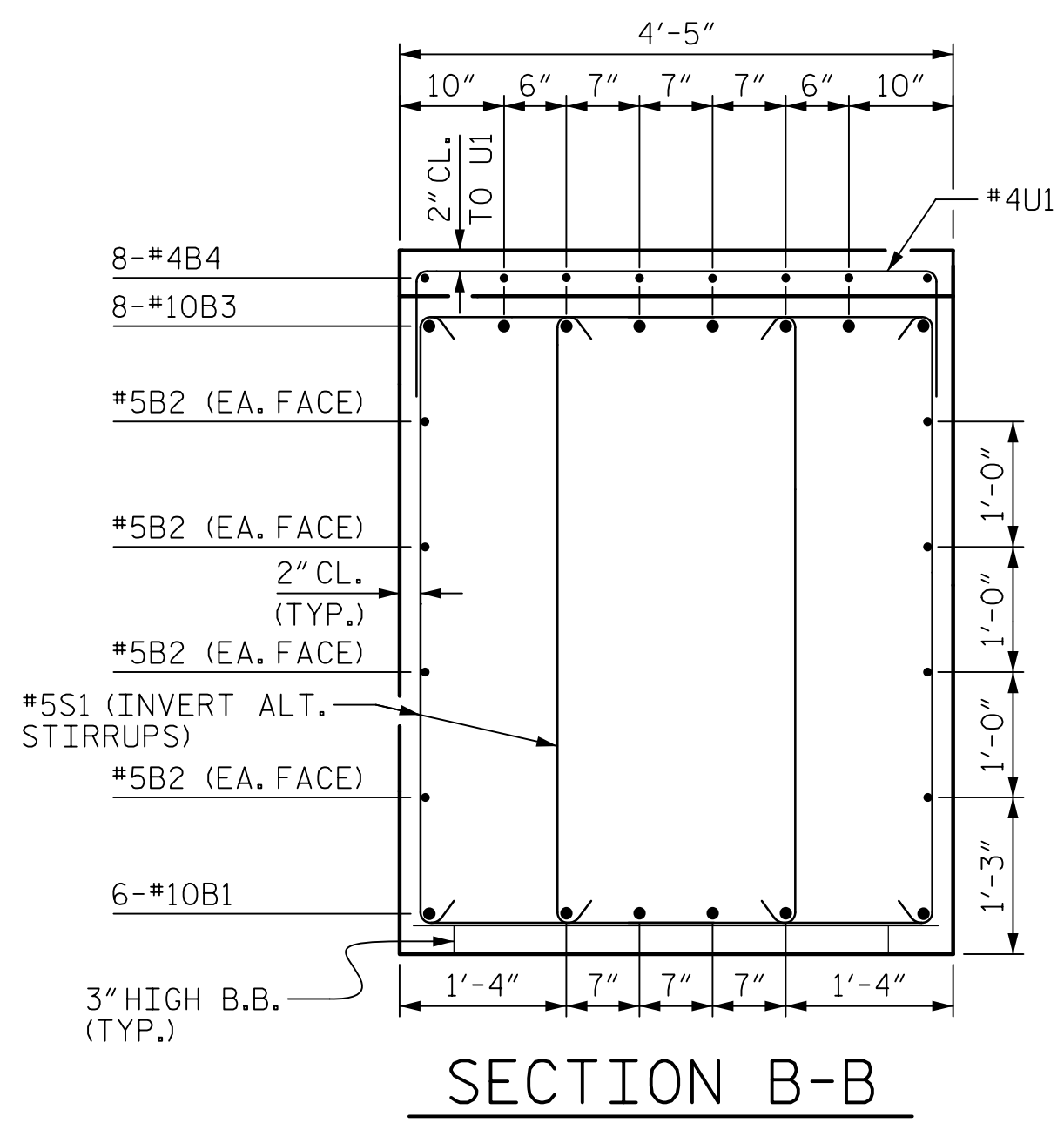
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SUBSTRUCTURE					
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REVISIONS					
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2			4		
SHEET NO.					S-21
TOTAL SHEETS					28

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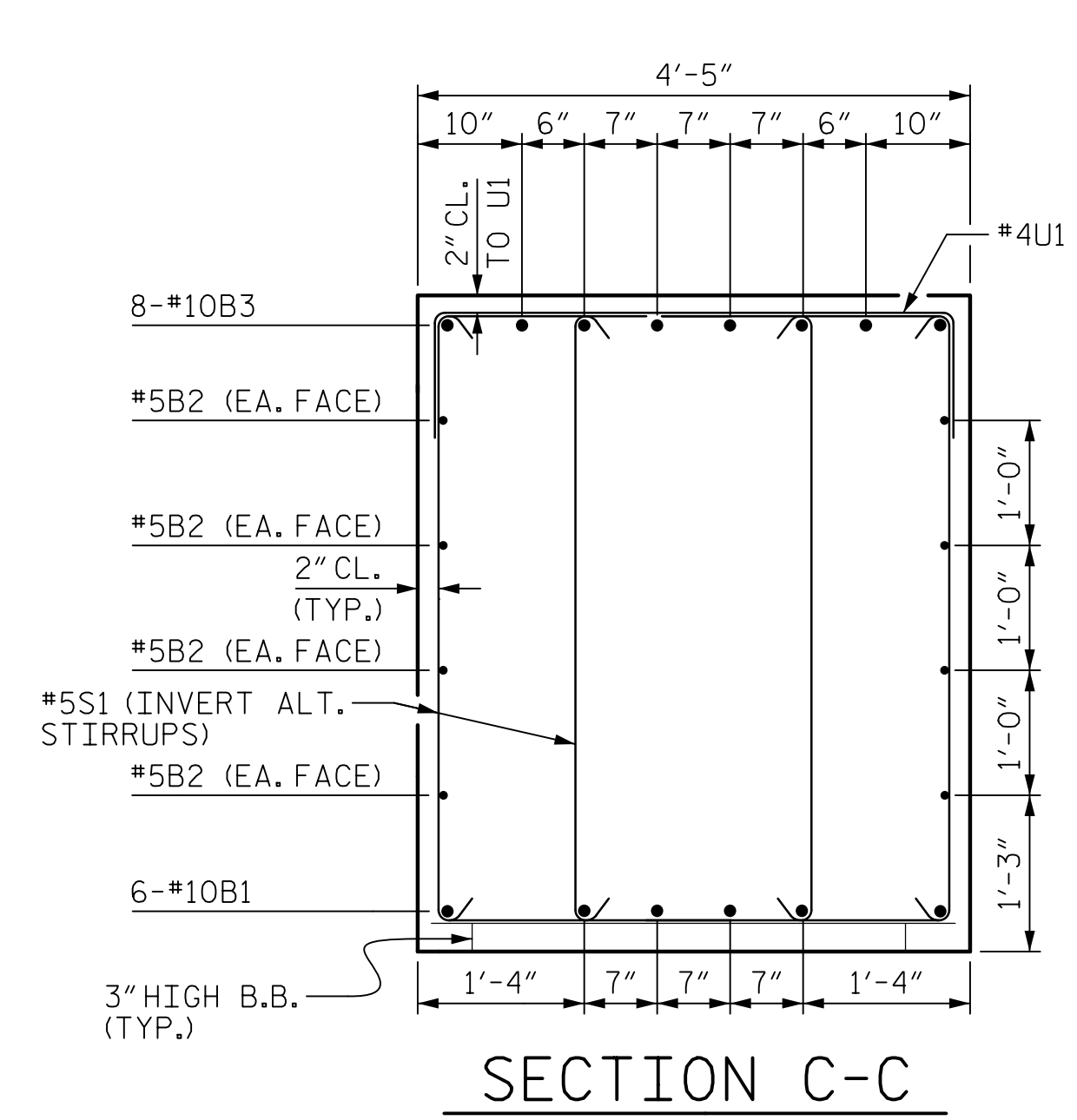
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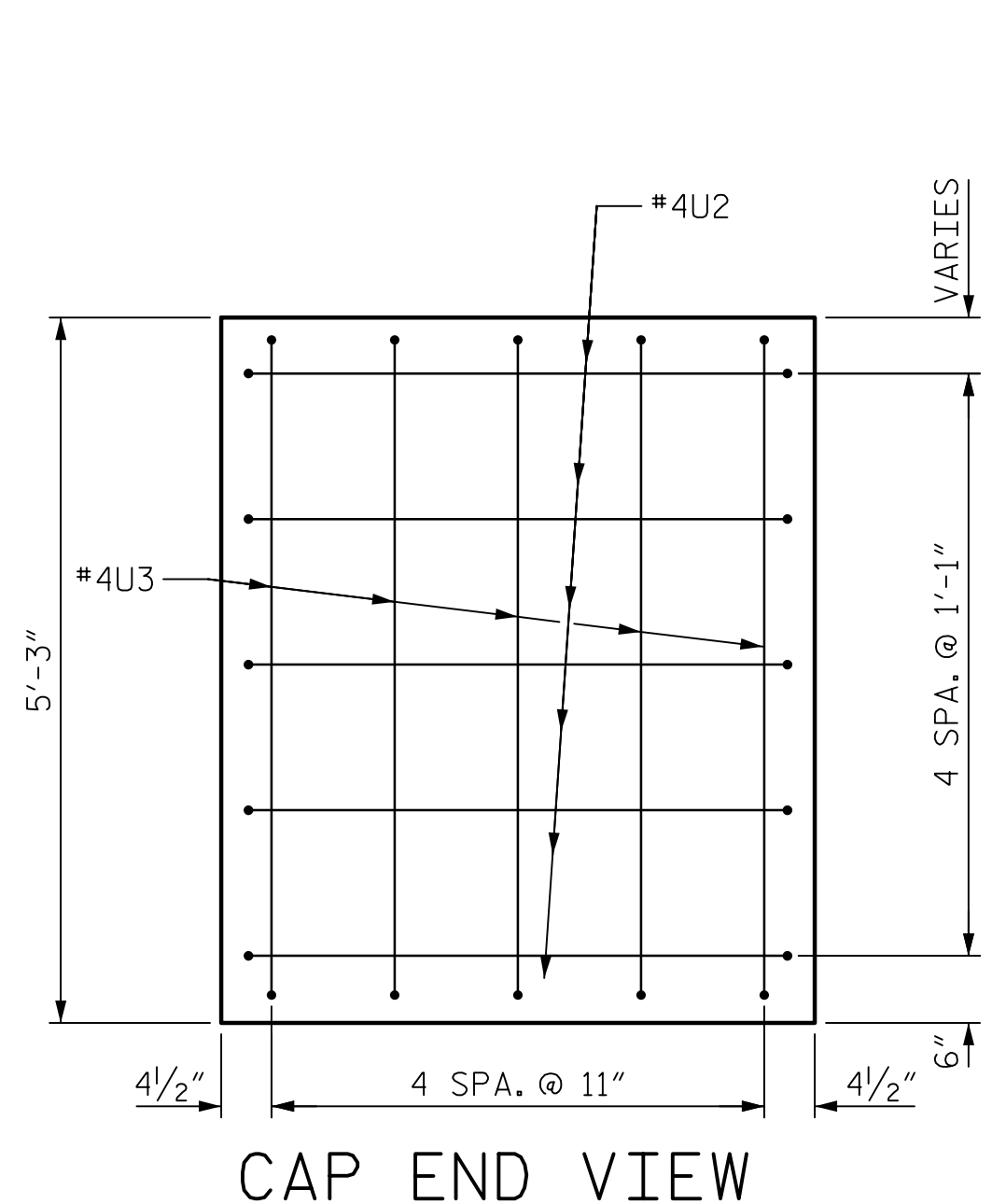
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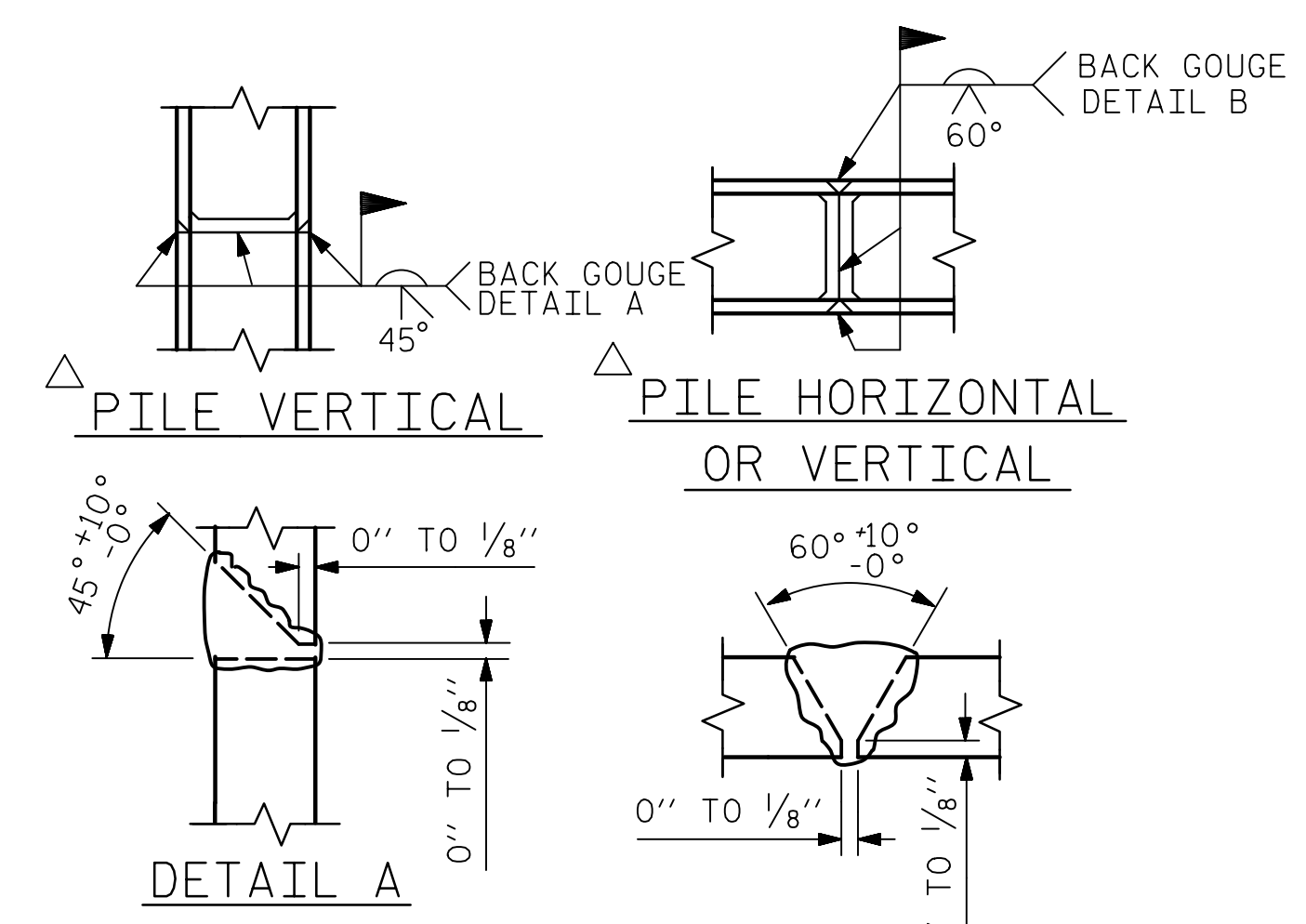
SECTION B-B



SECTION C-C

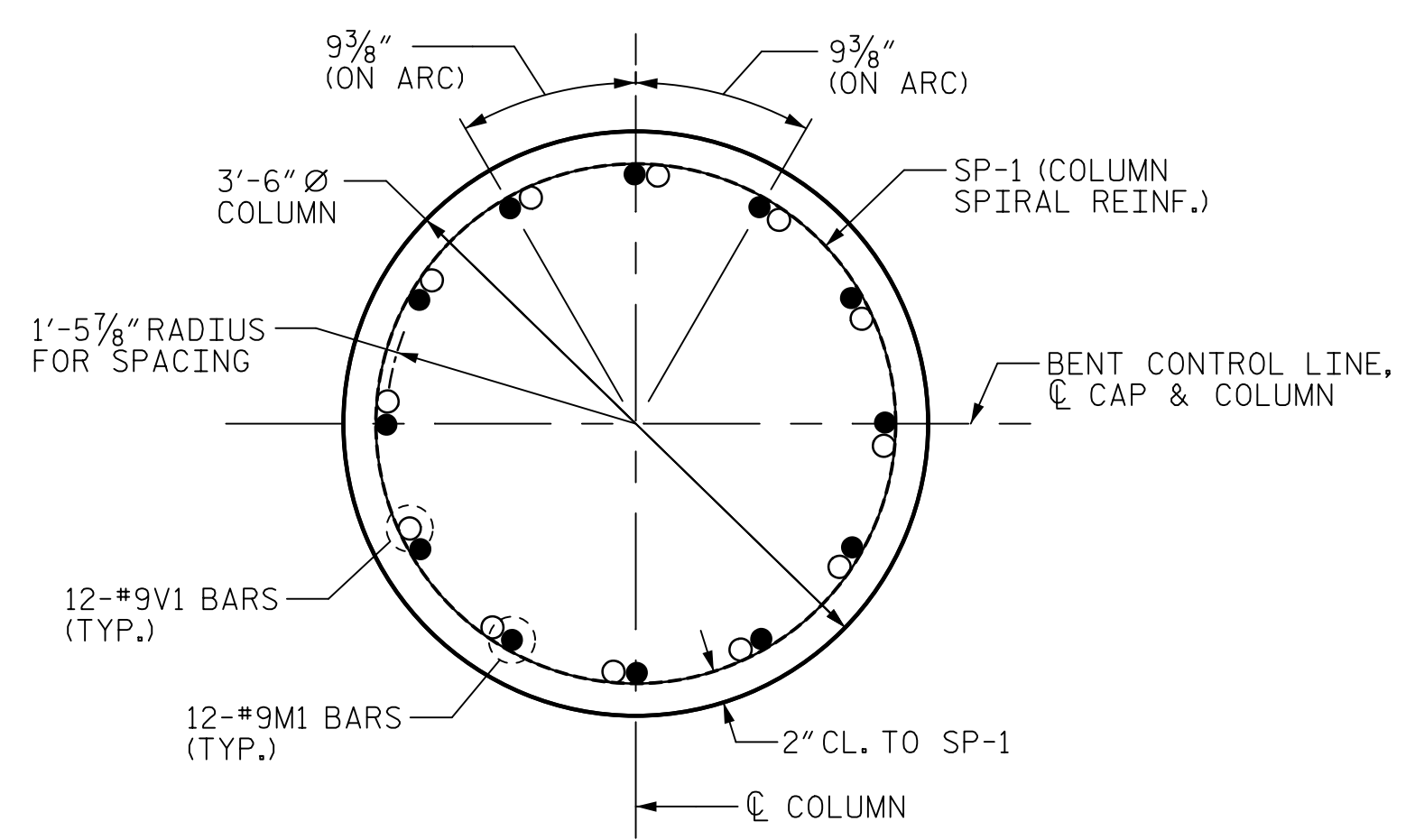


CAP END VIEW

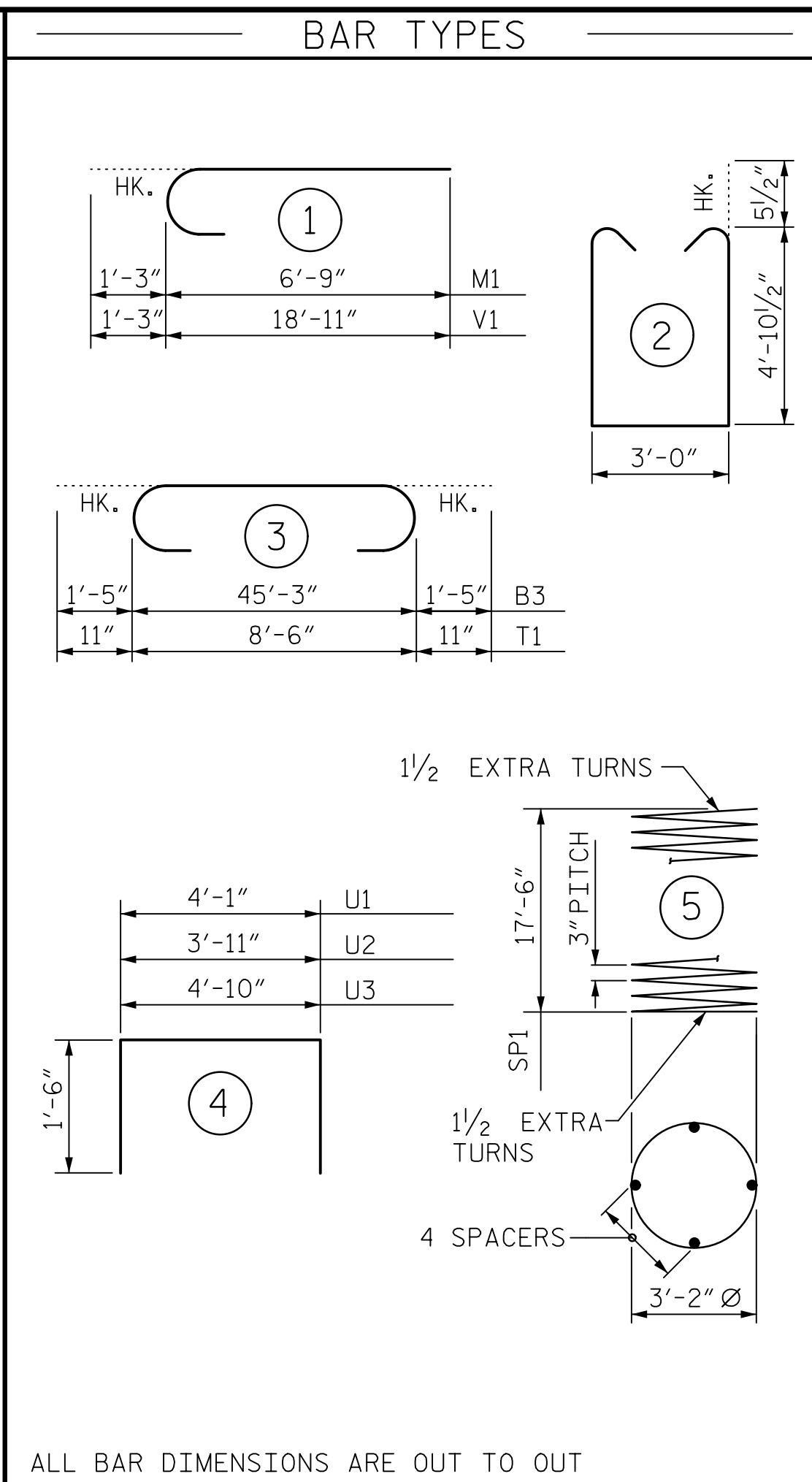


PILE SPLICE DETAILS

POSITION OF PILE DURING WELDING.

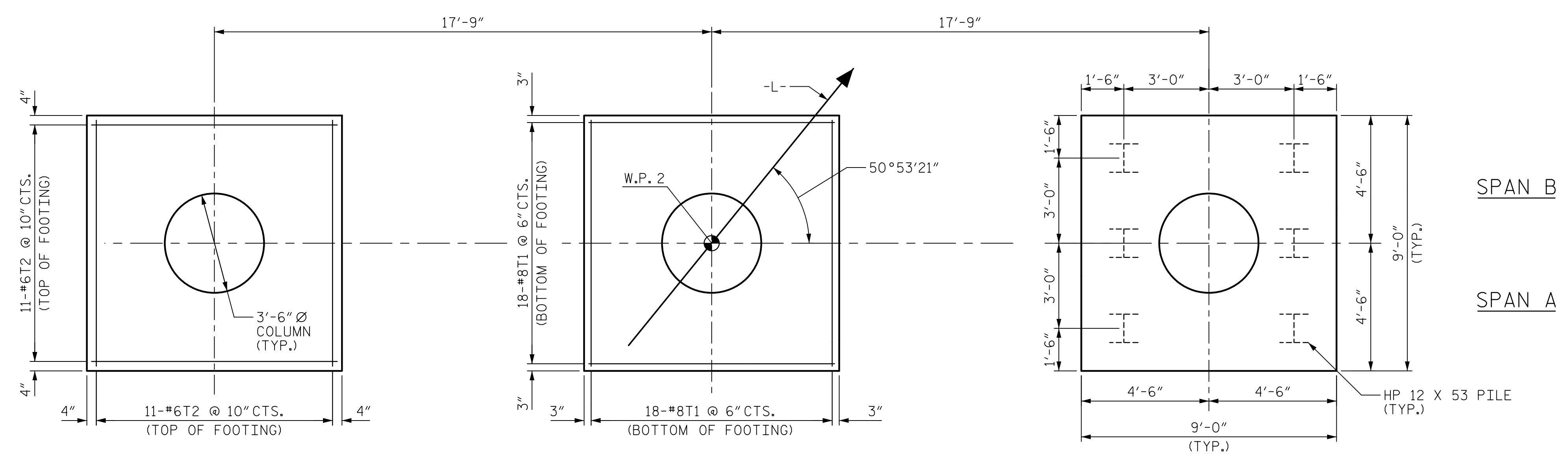


SECTION THRU COLUMN



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL					
BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	10	STR	45'-3"	1168
B2	8	5	STR	45'-3"	378
B3	8	10	3	48'-1"	1655
B4	8	4	STR	17'-11"	96
M1	36	9	1	8'-0"	979
S1	116	5	2	13'-8"	1654
T1	108	8	3	10'-4"	2980
T2	66	6	STR	8'-6"	843
U1	42	4	4	7'-1"	199
U2	10	4	4	6'-11"	46
U3	10	4	4	7'-10"	52
V1	36	9	1	20'-2"	2468
REINFORCING STEEL					12,518 LBS.
SP-1	3	*	5	716'-11"	1437
SPIRAL COLUMN REINFORCING STEEL					1437 LBS.
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN					
POUR #1 (FOOTINGS)					31.5 C.Y.
POUR #2 (COLUMNS)					18.4 C.Y.
POUR #3 (CAP)					40.9 C.Y.
TOTAL CLASS A CONCRETE					90.9 C.Y.
HP 12 X 53 STEEL PILES					
NO. = 18					720 LIN. FT.
PILE DRIVING EQUIPMENT SETUP					
NO. = 18					



PLAN OF FOOTINGS & COLUMNS

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 2 OF 2

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SEAL 030474
JOHN C. MORRISON
5/27/2019

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
BENT 1					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
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2			4		

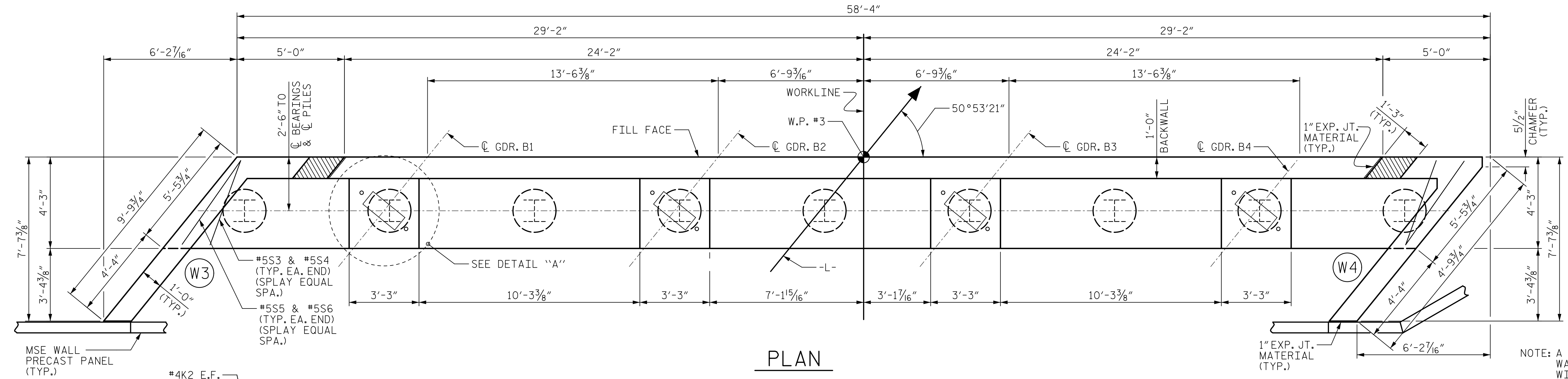
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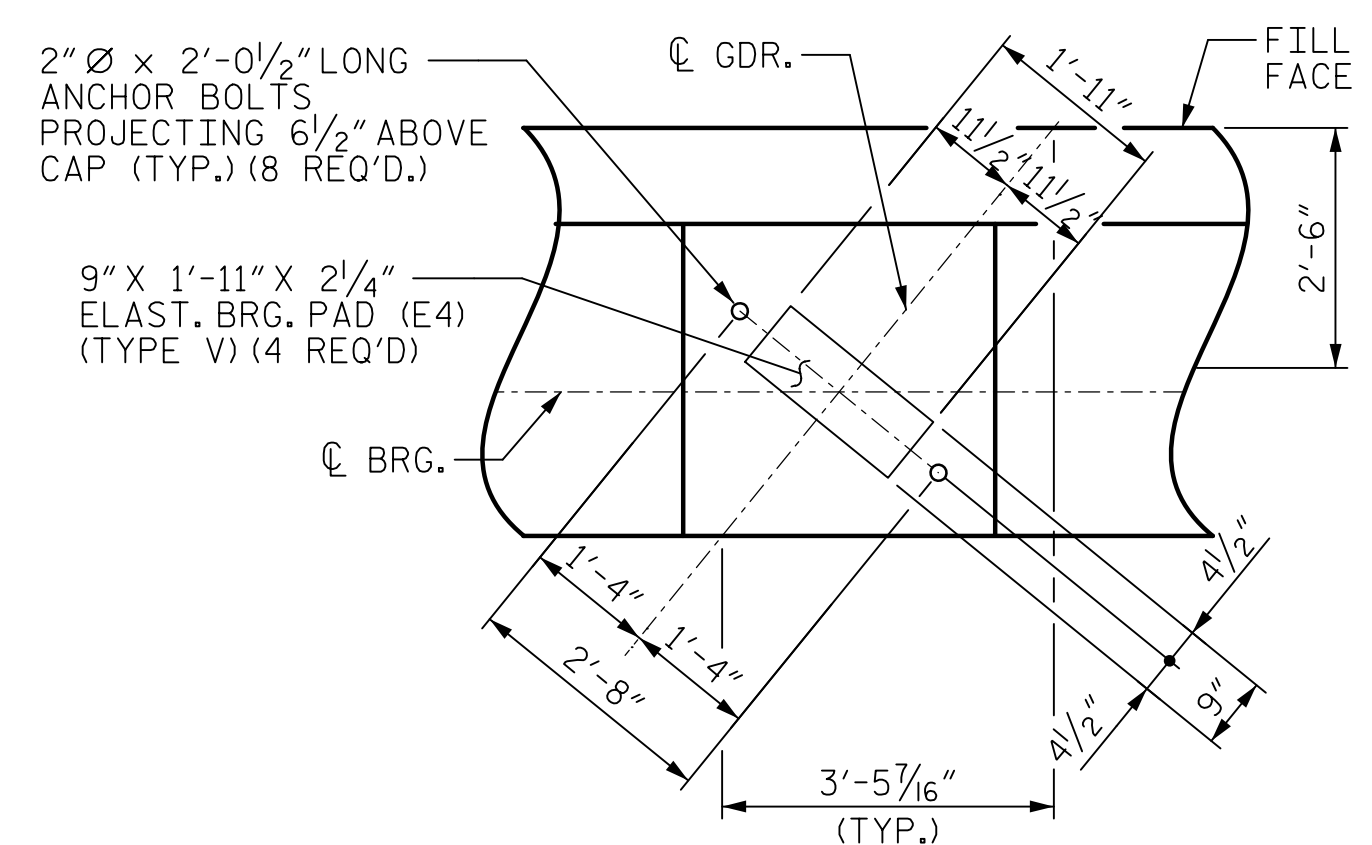
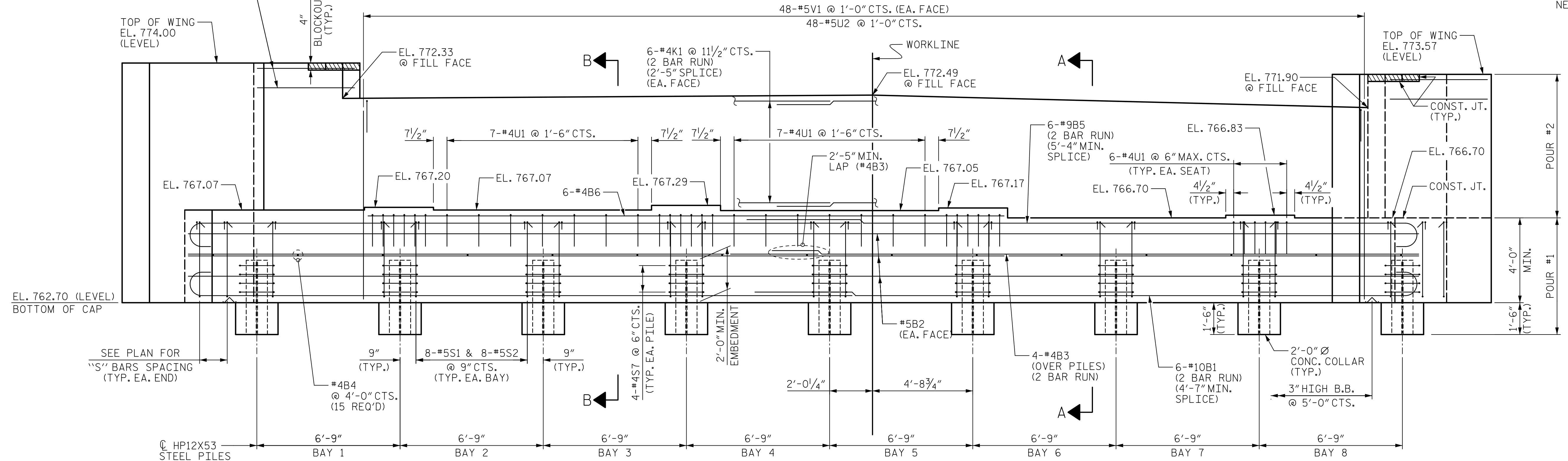
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TOTAL SHEETS
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NOTE: A PRECAST PANEL THICKNESS OF 6" WAS ASSUMED FOR ESTABLISHING WING LENGTH. CONTRACTOR SHALL ADJUST WING LENGTH AS NECESSARY.



NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHORS.

#5 "V" BARS IN BACKWALL SHALL BE PLACED 2" CLEAR FROM TOP OF BACKWALL.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING

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

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 CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
 STATION: 19+56.99 -L-

SHEET 1 OF 3

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 SEAL
 030474
 ENGINEER
 JOHN C. MORRISON
 5/27/2020

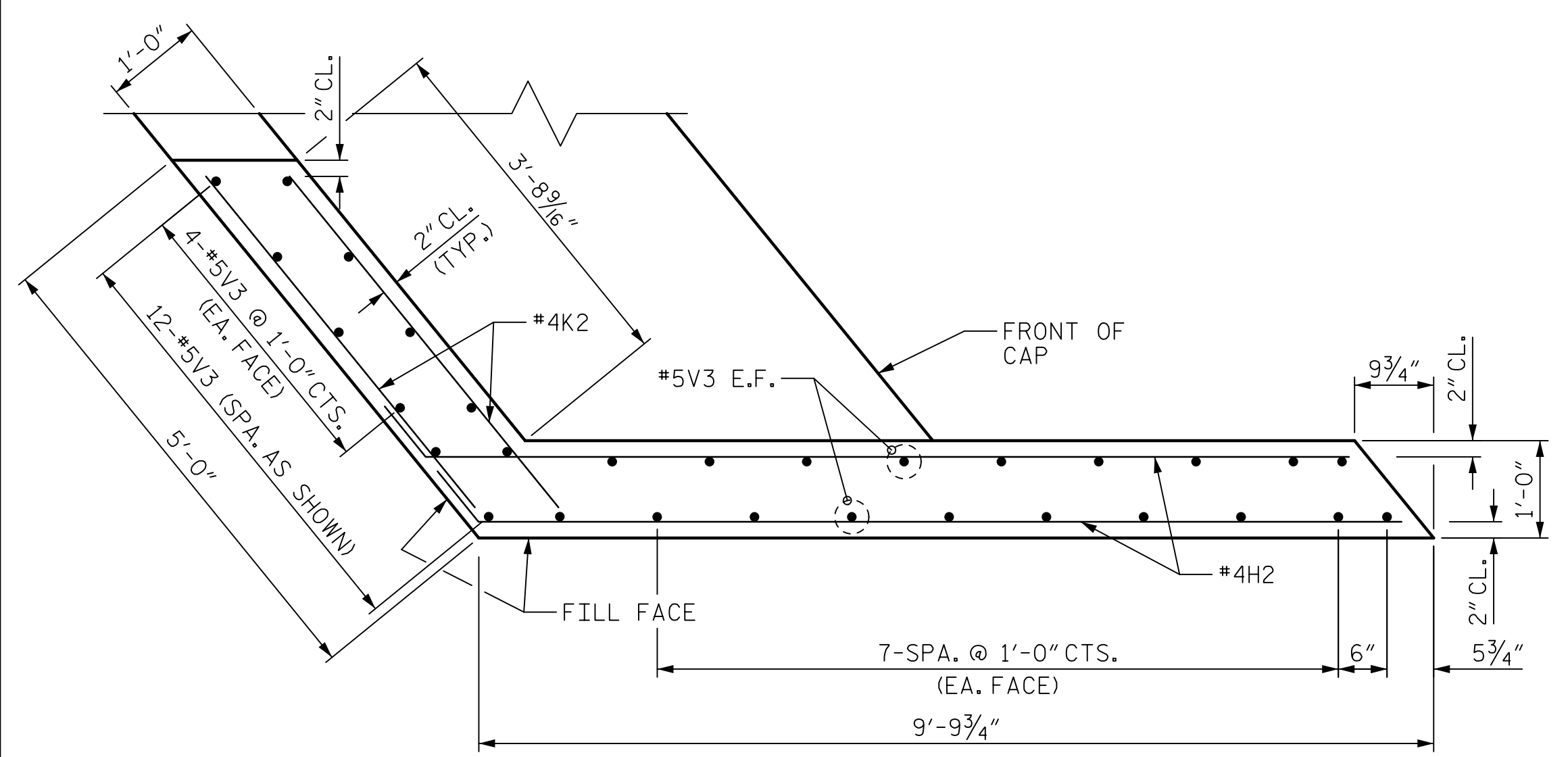
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 DESIGN CHECKED BY : J.C. MORRISON DATE : 07/2019

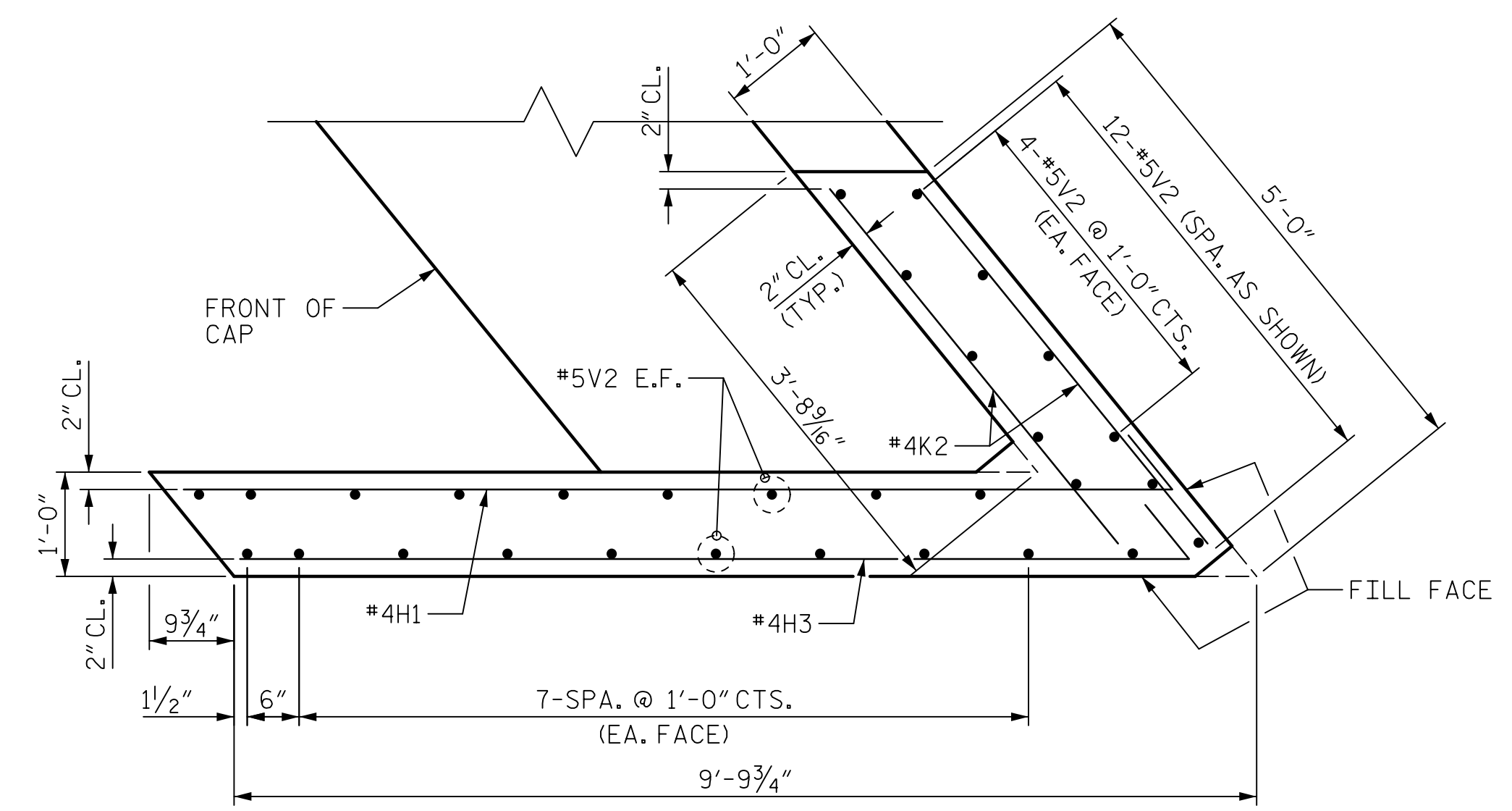
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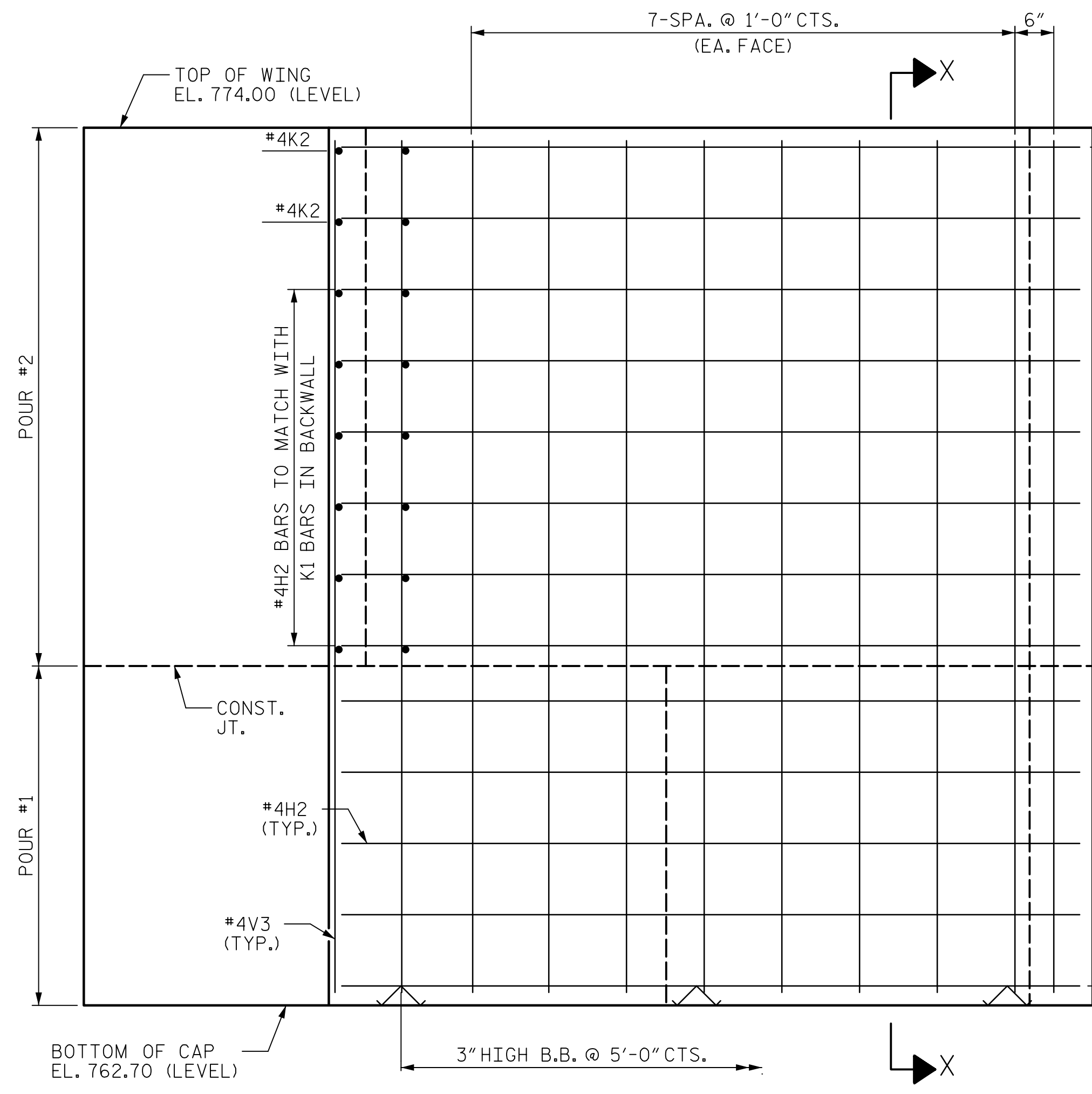
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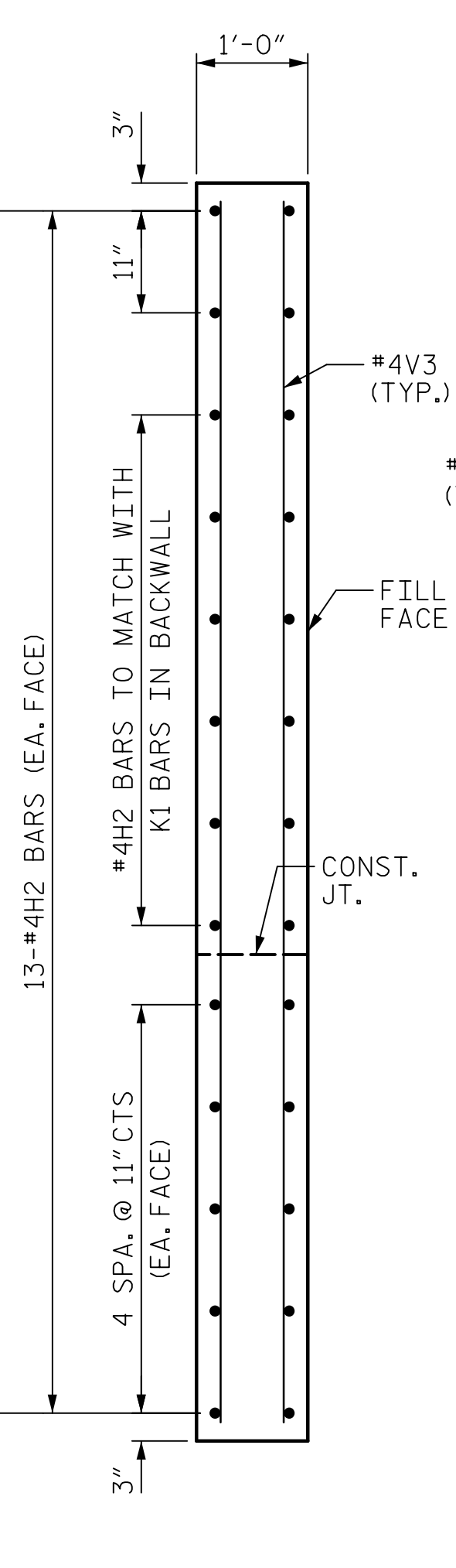
PLAN OF WING W3



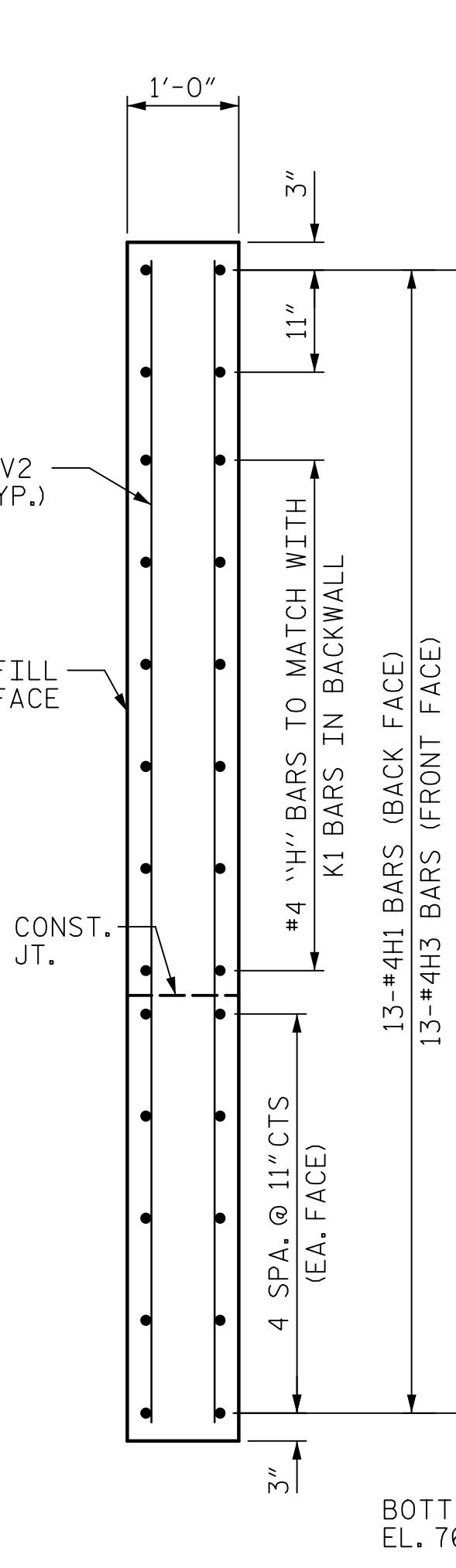
PLAN OF WING W4



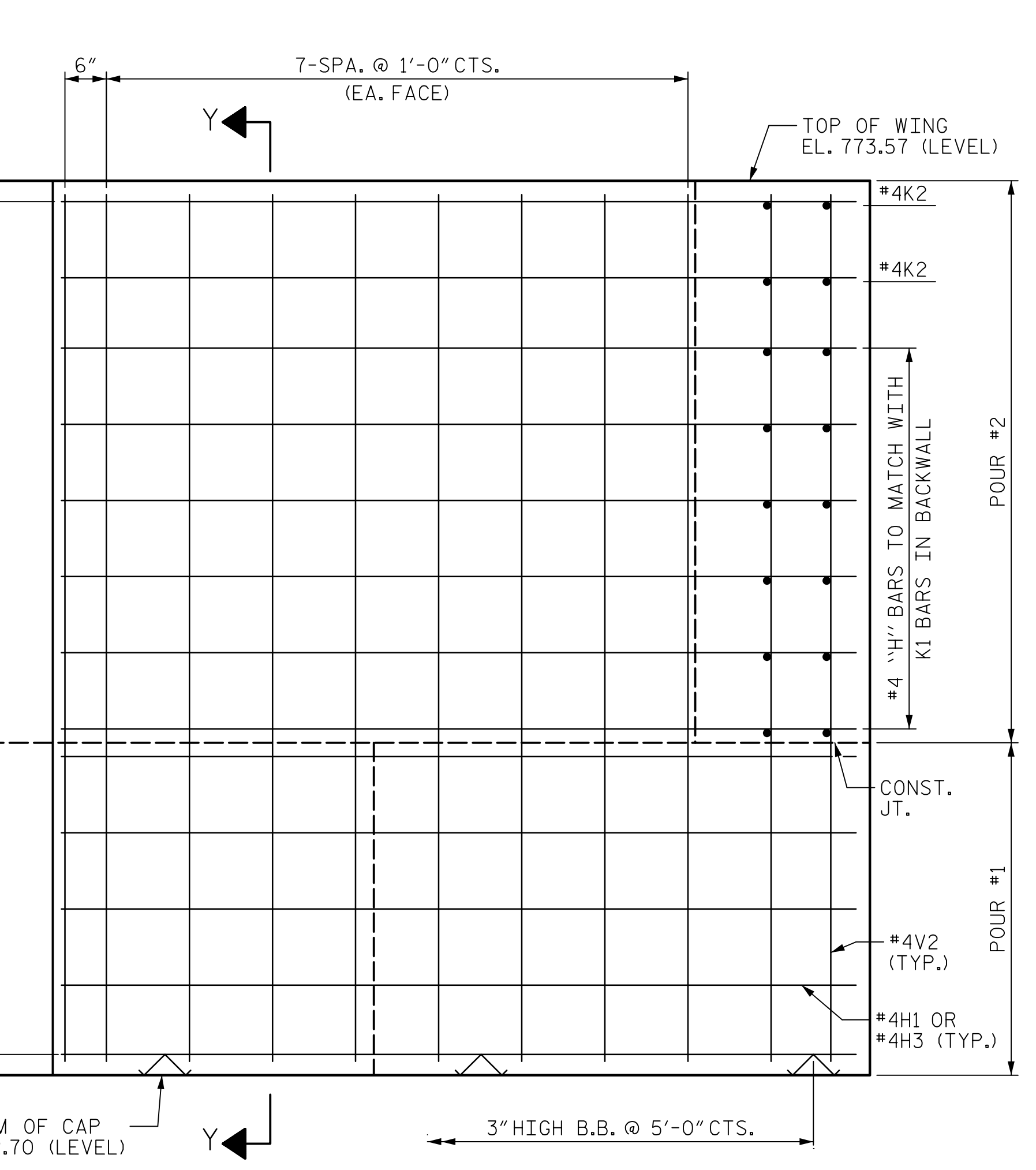
ELEVATION OF WING W3



SECTION X-X



SECTION Y-Y



ELEVATION OF WING W4

PROJECT NO. BR-0042
 ROCKINGHAM COUNTY
 STATION: 19+56.99 -L-

SHEET 2 OF 3

DRAWN BY : T.B. STUMP	DATE : 07/2019
CHECKED BY : D. RITACCO	DATE : 07/2019
DESIGNED BY : D. RITACCO	DATE : 07/2019
DESIGN CHECKED BY : J.C. MORRISON	DATE : 07/2019

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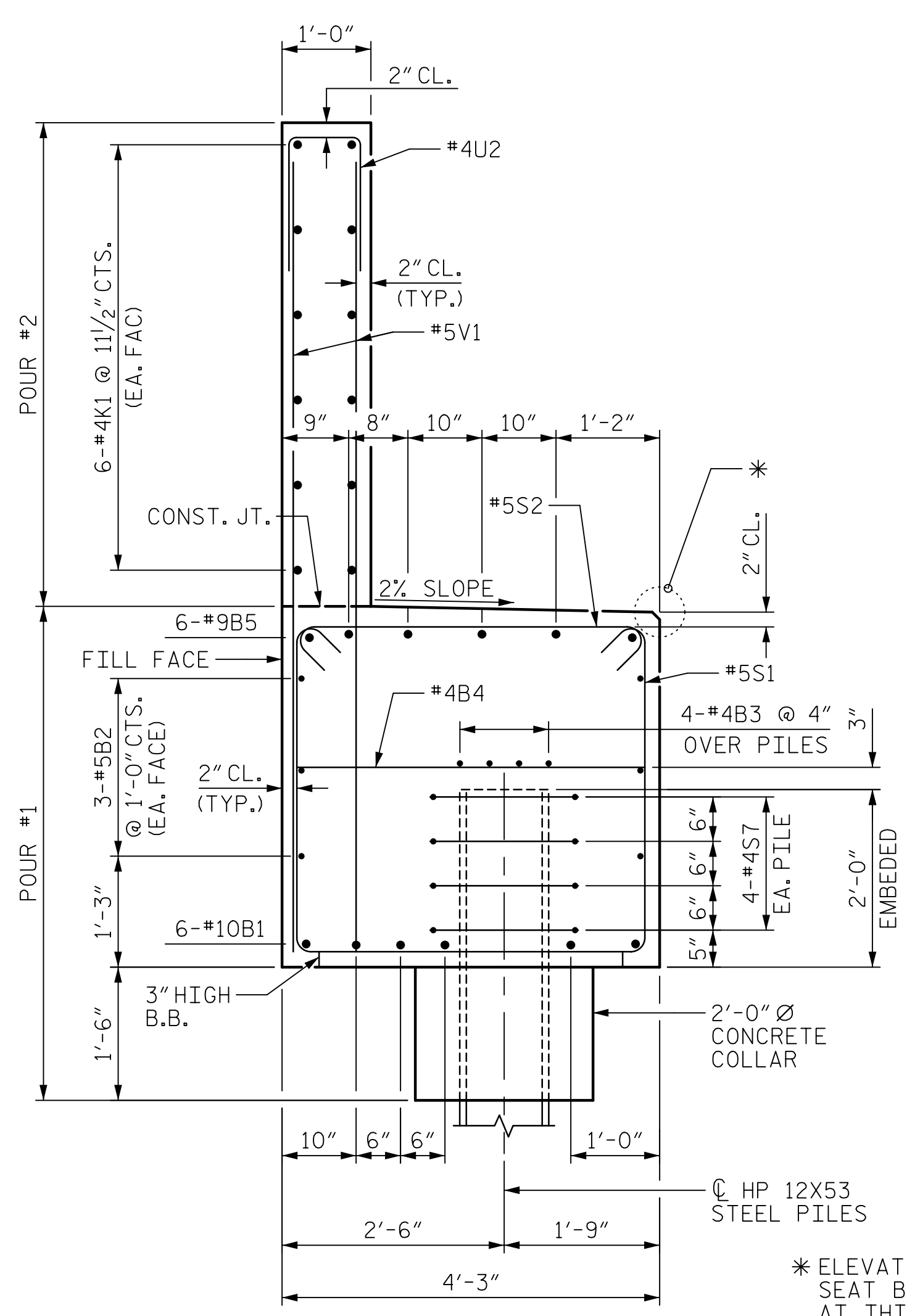
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 (919) 854-6200 www.aecom.com
 AECOM License No. F-0342

Designed by:
John C. Morrison
 NORTH CAROLINA
 PROFESSIONAL
 SEAL
 030474
 ENGINEER
 JOHN C. MORRISON
 5/27/2020

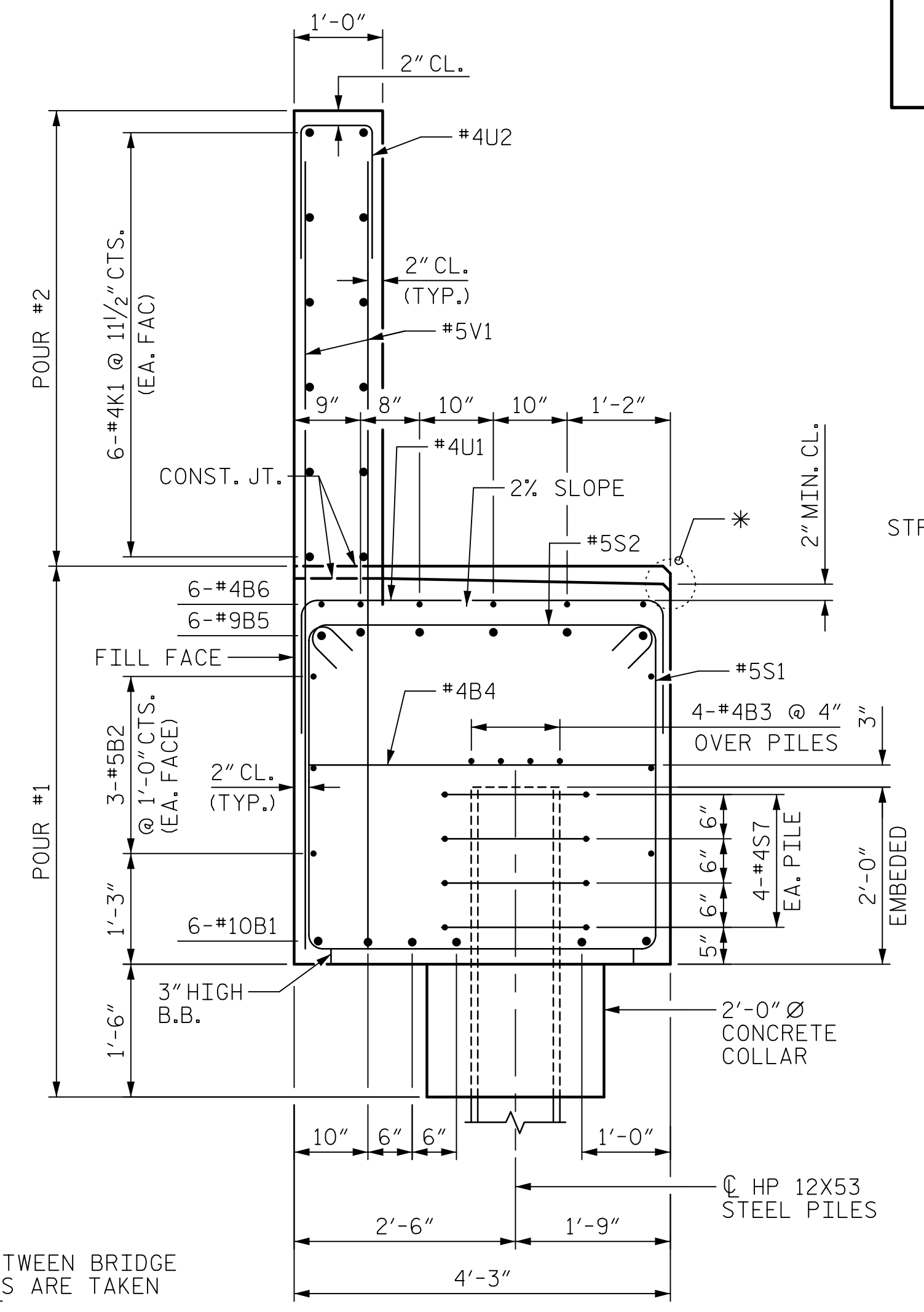
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE END BENT 2					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-24
TOTAL SHEETS					28

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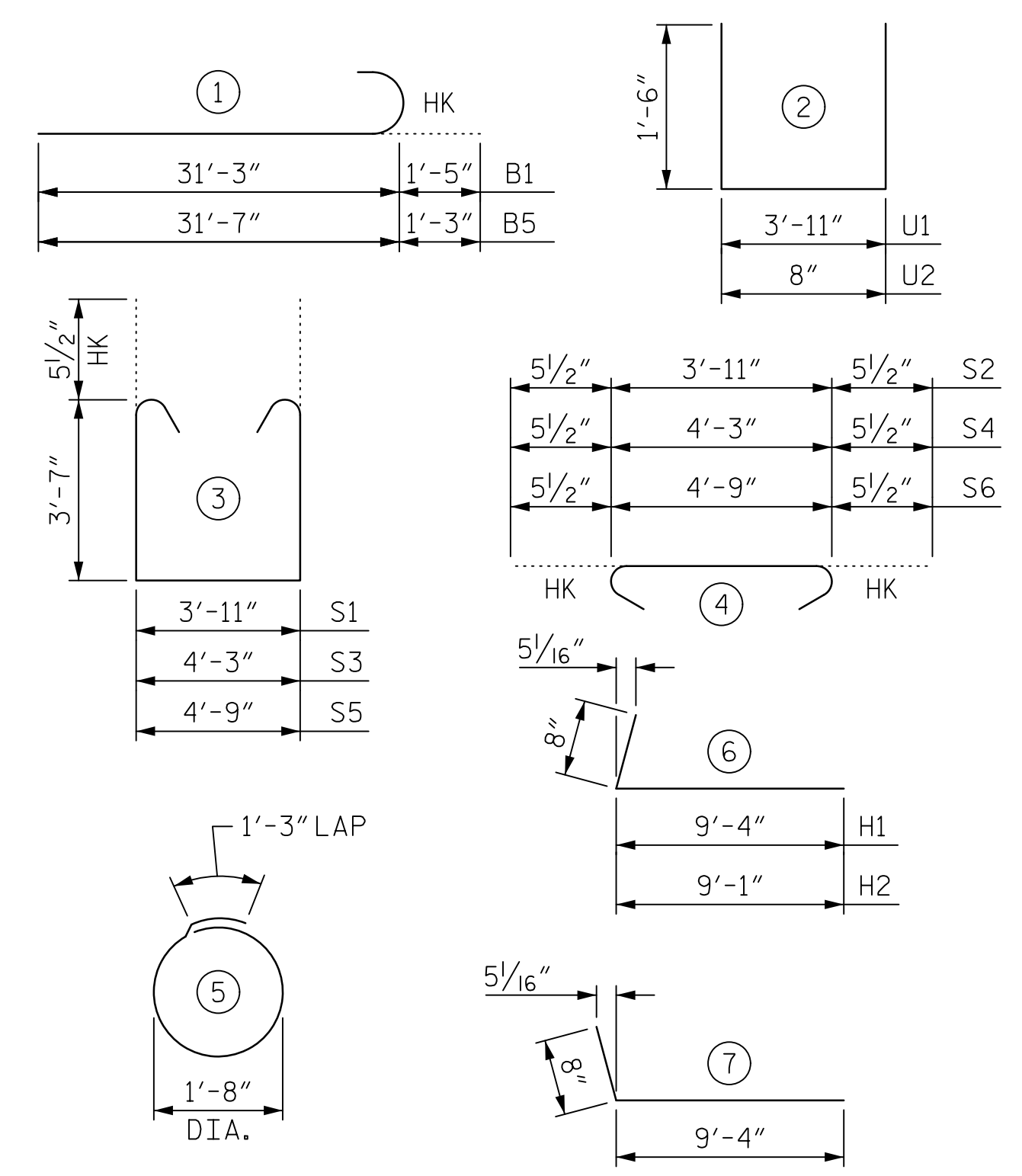
SECTION A-A



SECTION B-B

* ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS ARE TAKEN AT THIS POINT

BAR TYPE



BILL OF MATERIAL

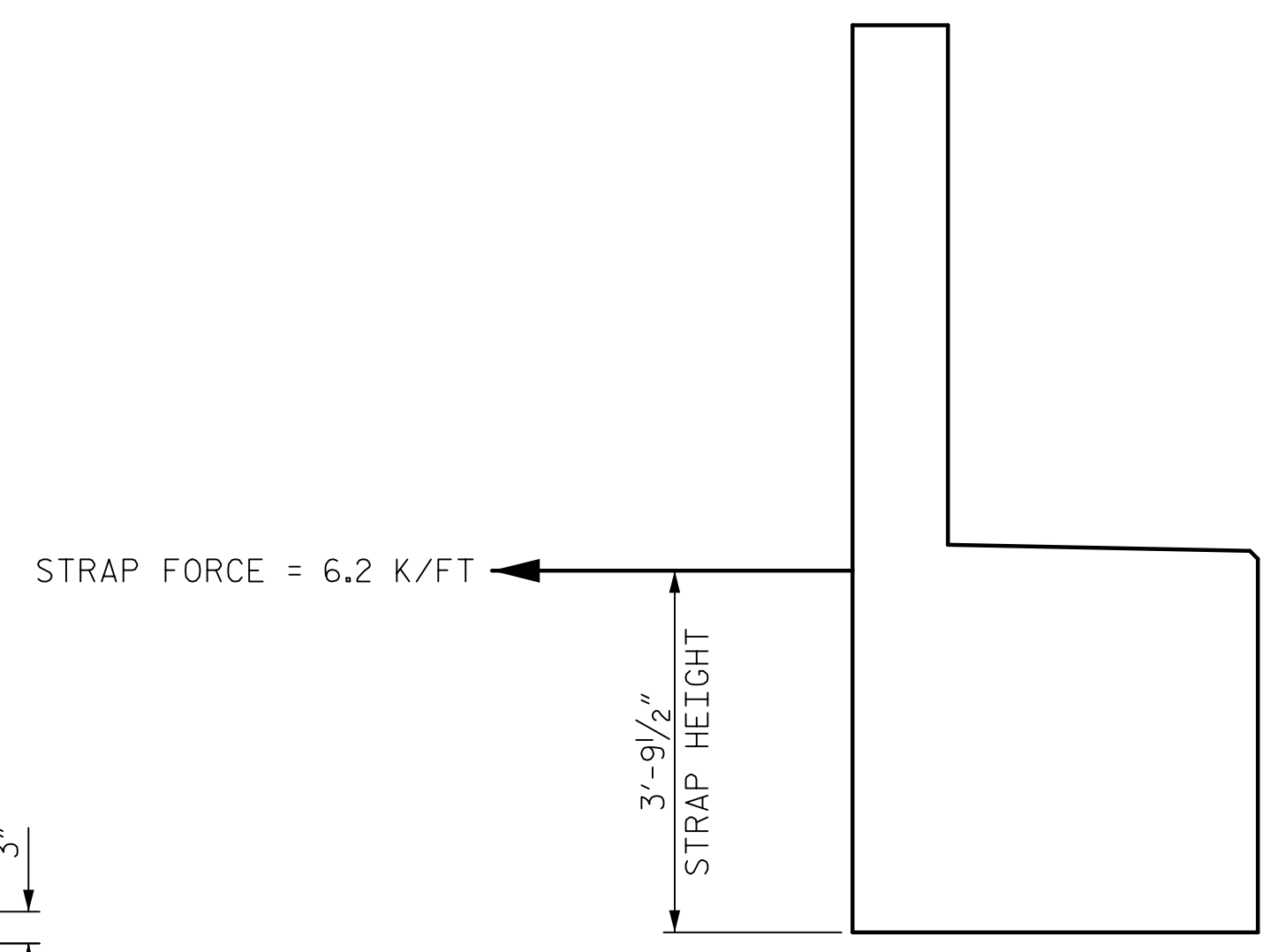
END BENT 1

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	10	1	32'-8"	1687
B2	6	5	STR	58'-0"	363
B3	8	4	STR	30'-3"	162
B4	15	4	STR	3'-8"	37
B5	12	9	1	32'-10"	1340
B6	6	4	STR	30'-0"	120
H1	13	4	6	10'-0"	87
H2	26	4	7	10'-0"	174
H3	13	4	6	9'-9"	85
K1	24	4	STR	30'-3"	485
K2	8	4	STR	4'-4"	23
S1	64	5	3	12'-0"	801
S2	64	5	4	4'-10"	323
S3	2	5	3	12'-4"	26
S4	2	5	4	5'-2"	11
S5	2	5	3	12'-10"	27
S6	2	5	4	5'-8"	12
S7	36	4	5	6'-6"	156
U1	38	4	2	6'-11"	176
U2	48	5	2	3'-8"	184
V1	48	5	STR	8'-9"	438
V2	30	5	STR	10'-6"	329
V3	30	5	STR	10'-9"	336

TOTAL REINFORCING STEEL 7,382 LBS.

CLASS A CONCRETE

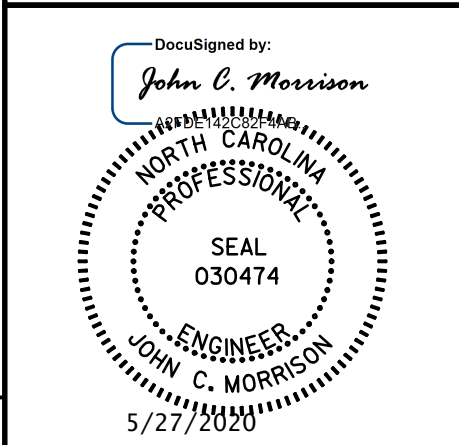
POUR #1 (CAP, COLLARS & LOWER WINGWALLS)	42.1 C.Y.
POUR #2 (UPPER BACKWALL & WINGWALL)	16.5 C.Y.
TOTAL	58.6 C.Y.
HP 12x53 STEEL PILES:	
NO. = 9	405 LIN. FT.
PILE DRIVING EQUIPMENT SETUP	
NO. = 9	



STRAP FORCE

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 3 OF 3



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

END BENT 2

REVISIONS

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

SHEET NO. S-25
TOTAL SHEETS 28

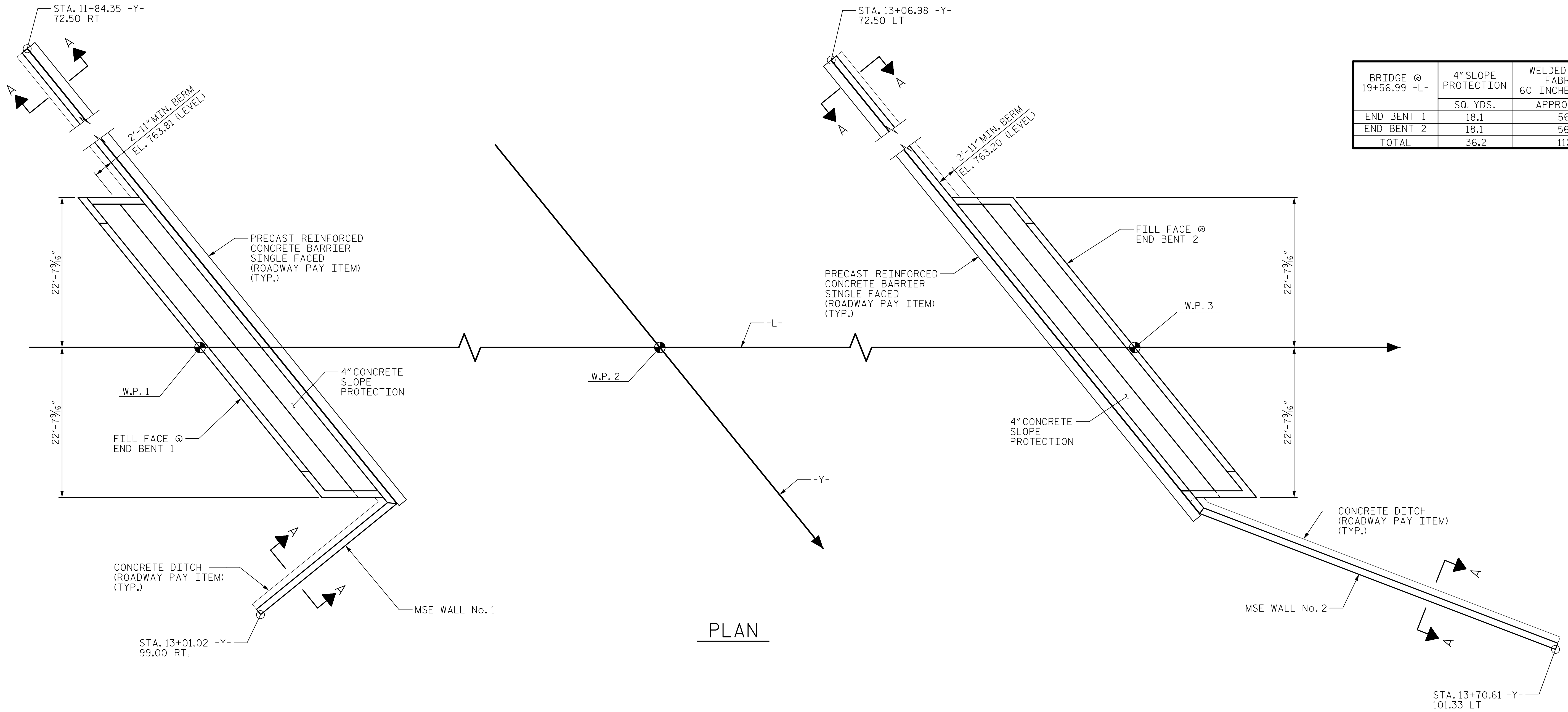
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CHECKED BY : D. RITACCO	DATE : 08/2019
DESIGNED BY : D. RITACCO	DATE : 07/2019
DESIGN CHECKED BY : J.C. MORRISON	DATE : 07/2019

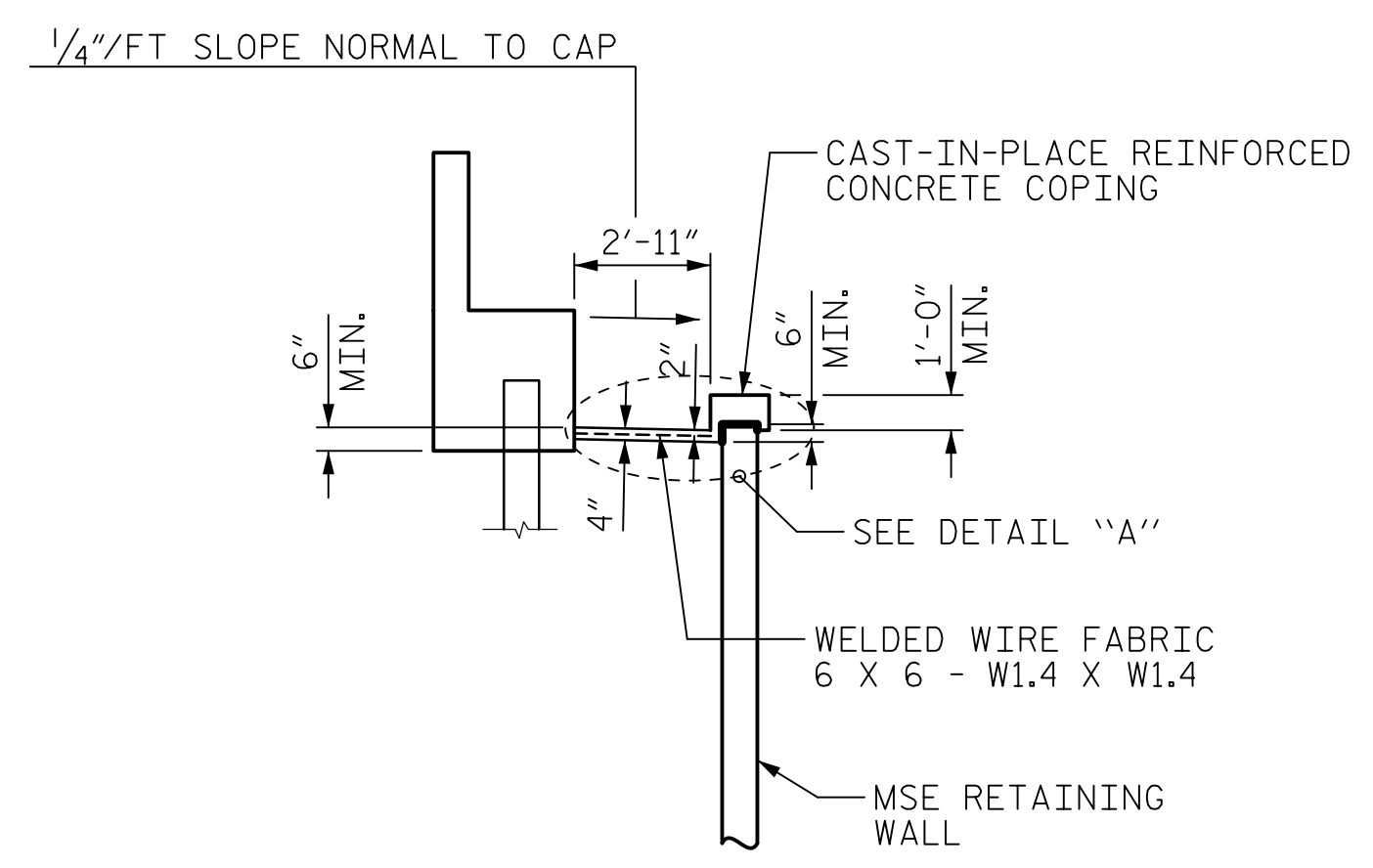
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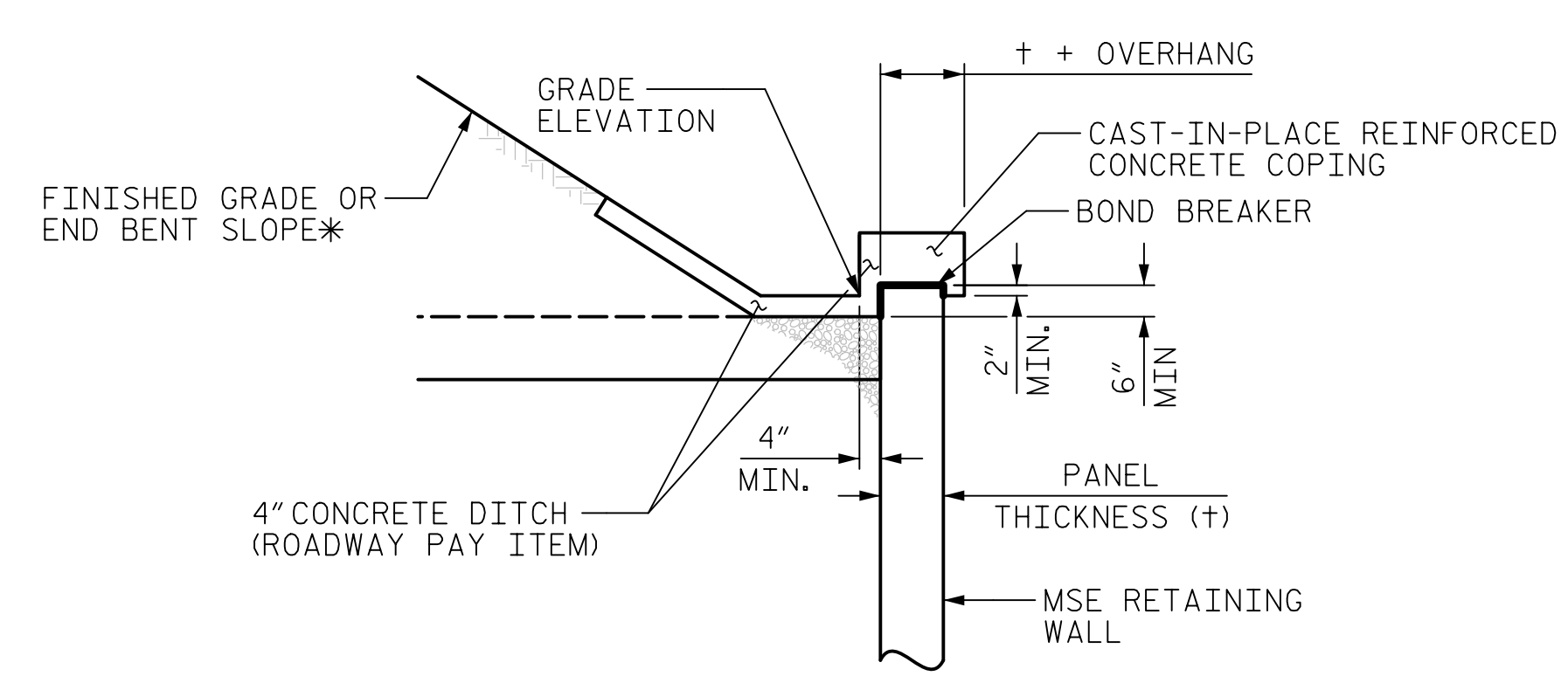
BRIDGE @ 19+56.99 -L-	4" SLOPE PROTECTION	WELDED WIRE FABRIC 60 INCHES WIDE
	SQ. YDS.	APPROX. LF
END BENT 1	18.1	56
END BENT 2	18.1	56
TOTAL	36.2	112



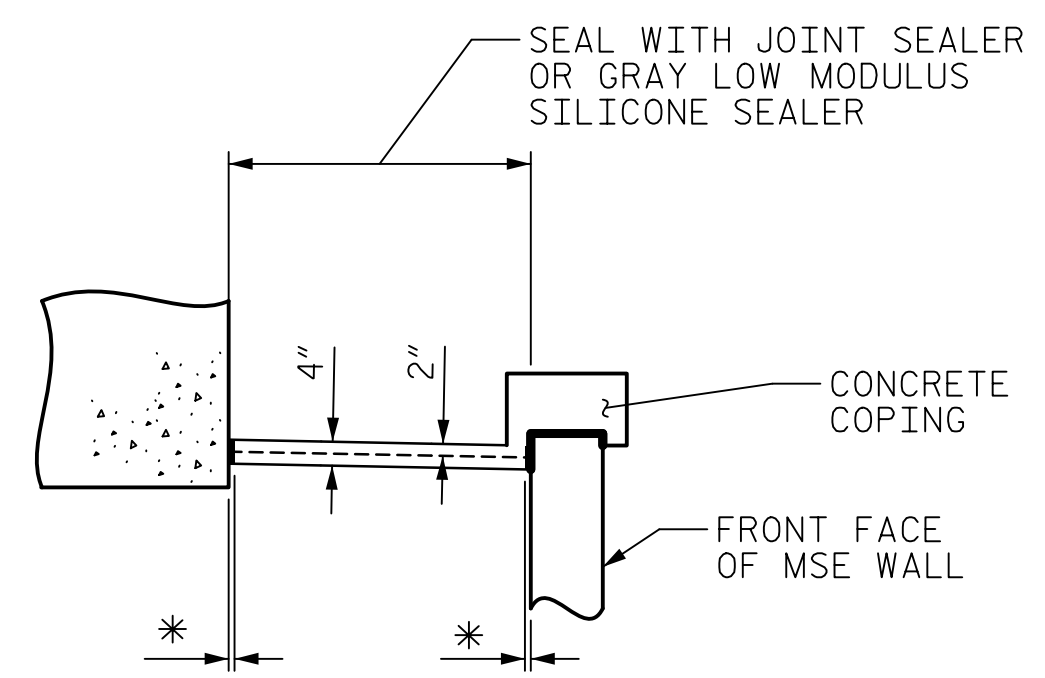
PLAN



SECTION ALONG C ROADWAY



SECTION A-A



DETAIL "A"

* 1" EXP. JT. MAT'L.
(PLACE DEBONDING TAPE
ON TOP OF EXP. JT. MAT'L.)

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
 STATION: 19+56.99 -L-

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Designed by:
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 JOHN C. MORRISON
 5/27/2020

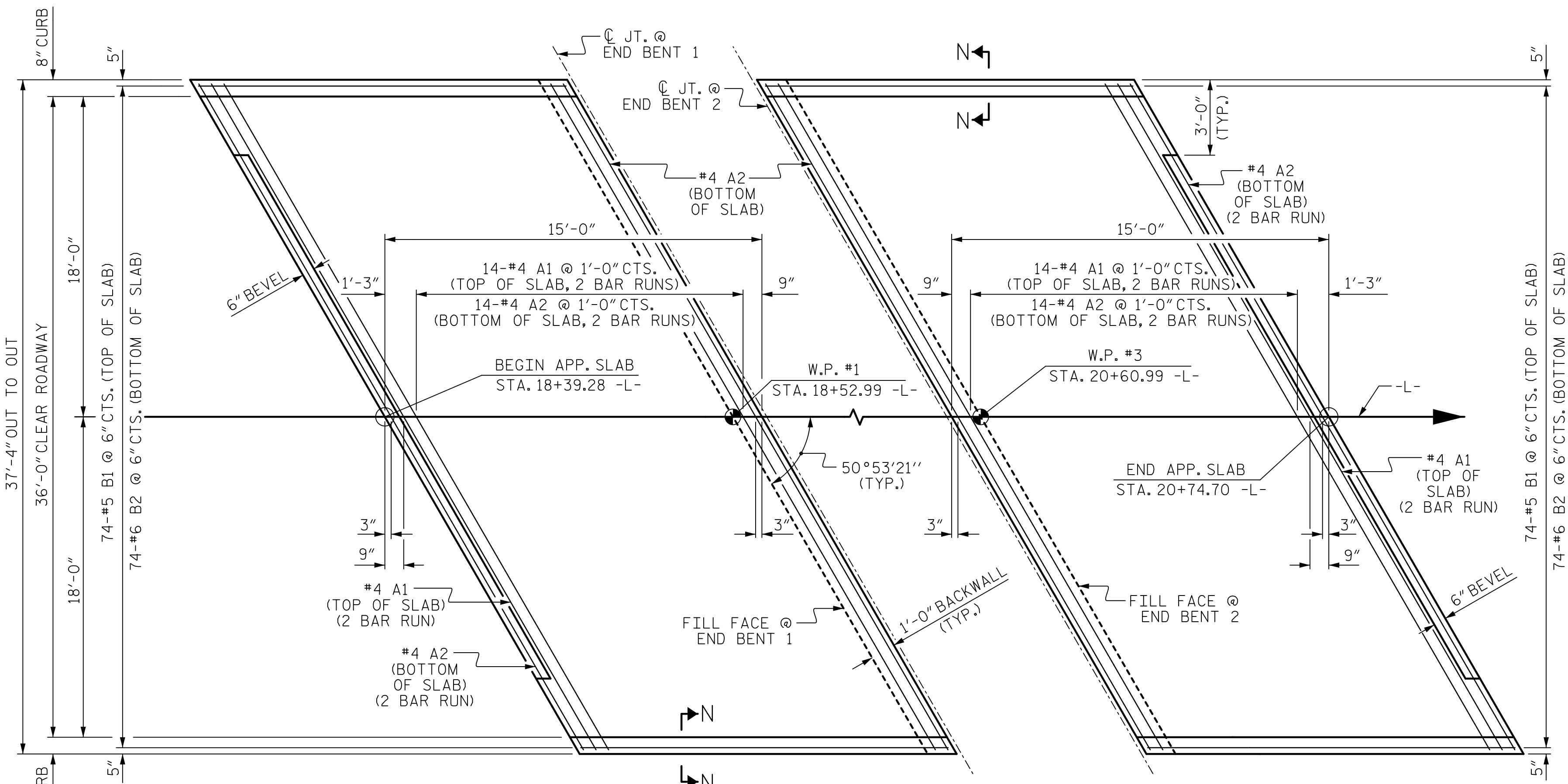
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
GENERAL DRAWING					
SLOPE PROTECTION DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-26
TOTAL SHEETS					28

DRAWN BY : H.T. ROSEMOND DATE : 07/2019
 CHECKED BY : J.C. MORRISON DATE : 07/2019
 DESIGNED BY : H.T. ROSEMOND DATE : 07/2019
 DESIGN CHECKED BY : J.C. MORRISON DATE : 07/2019

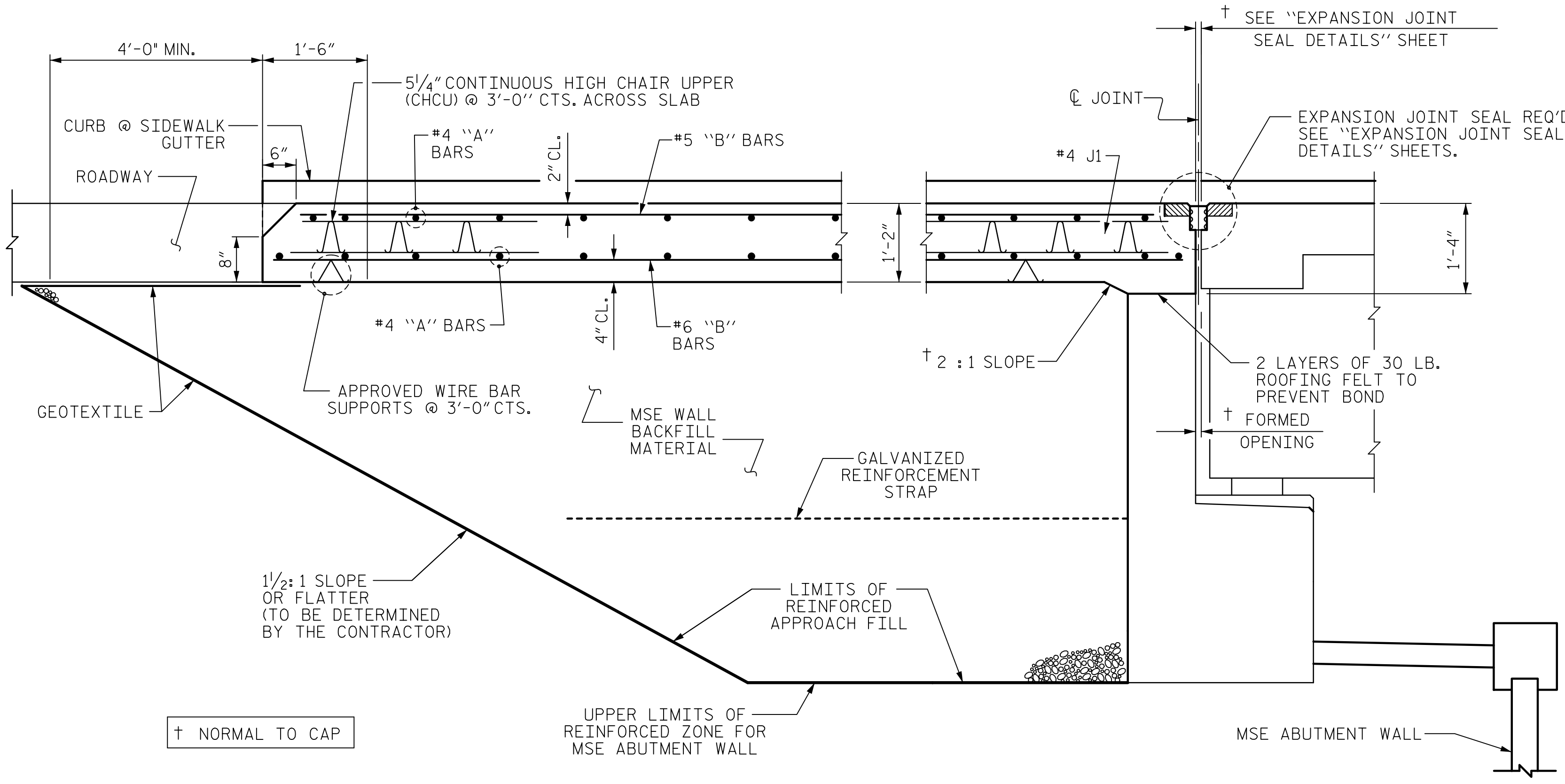
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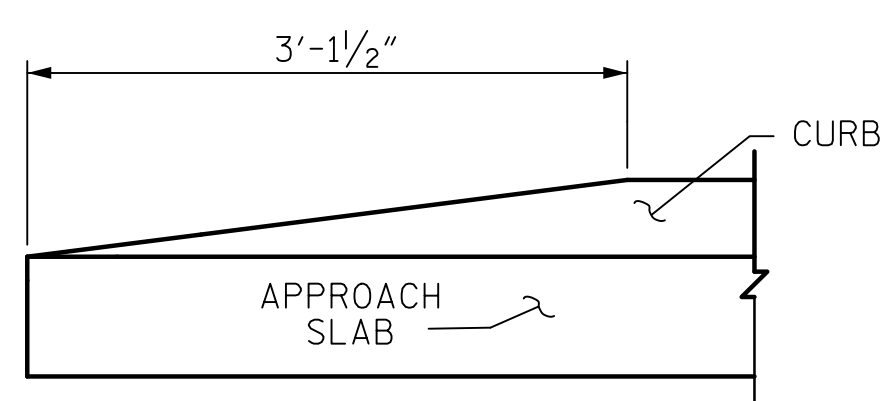
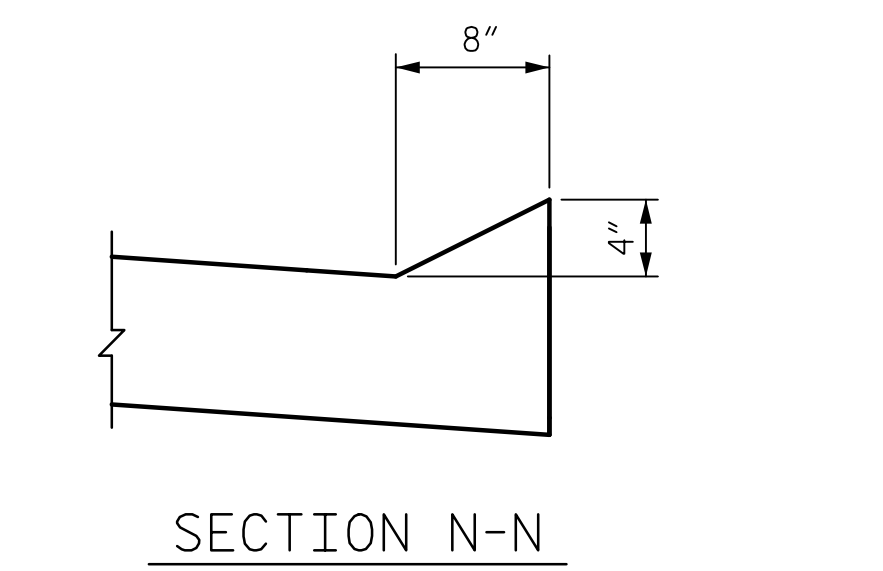
USE: *Use of this drawing for any other project is prohibited.*
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CHECKED BY: VAP 3/95



PLAN @ END BENT 1 PLAN @ END BENT 2
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



SECTION THRU SLAB
(TYPE III - REINFORCED APPROACH FILL)



END OF CURB WITHOUT
SHOULDER BERM GUTTER
CURB DETAILS

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, MSE WALL REINFORCEMENT, AND BACKFILL MATERIAL, SEE ROADWAY PLANS.

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

BACKFILL MATERIAL IS GOING TO BE THE AGGREGATE USED IN THE REINFORCED ZONE FOR THE MSE RETAINING WALL.

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

THE JOINT SHALL BE SAWS PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.

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

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

APPROACH SLAB AT END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	30	#4	STR	24'-11"	499
A2	32	#4	STR	24'-9"	529
*B1	74	#5	STR	14'-0"	1081
B2	74	#6	STR	14'-6"	1612

REINFORCING STEEL LBS. 2141

*EPOXY COATED REINFORCING STEEL LBS. 1580

CLASS AA CONCRETE C. Y. 24.4

APPROACH SLAB AT END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	30	#4	STR	24'-11"	499
A2	32	#4	STR	24'-9"	529
*B1	74	#5	STR	14'-0"	1081
B2	74	#6	STR	14'-6"	1612

REINFORCING STEEL LBS. 2141

*EPOXY COATED REINFORCING STEEL LBS. 1580

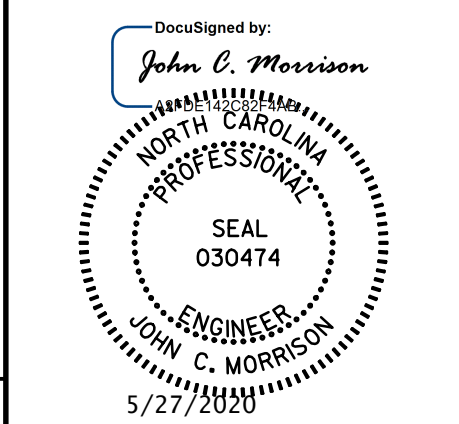
CLASS AA CONCRETE C. Y. 24.4

SPLICE LENGTHS

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

PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 1 OF 2



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			28

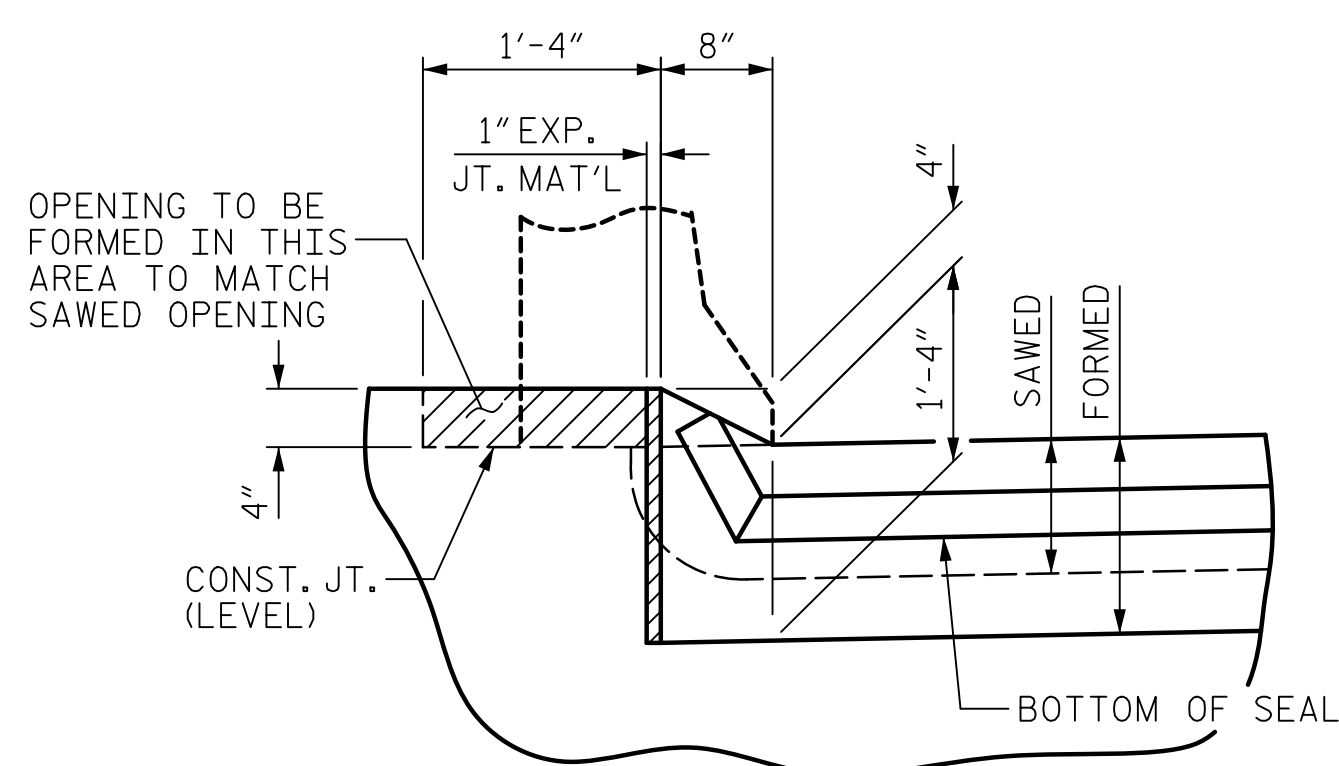
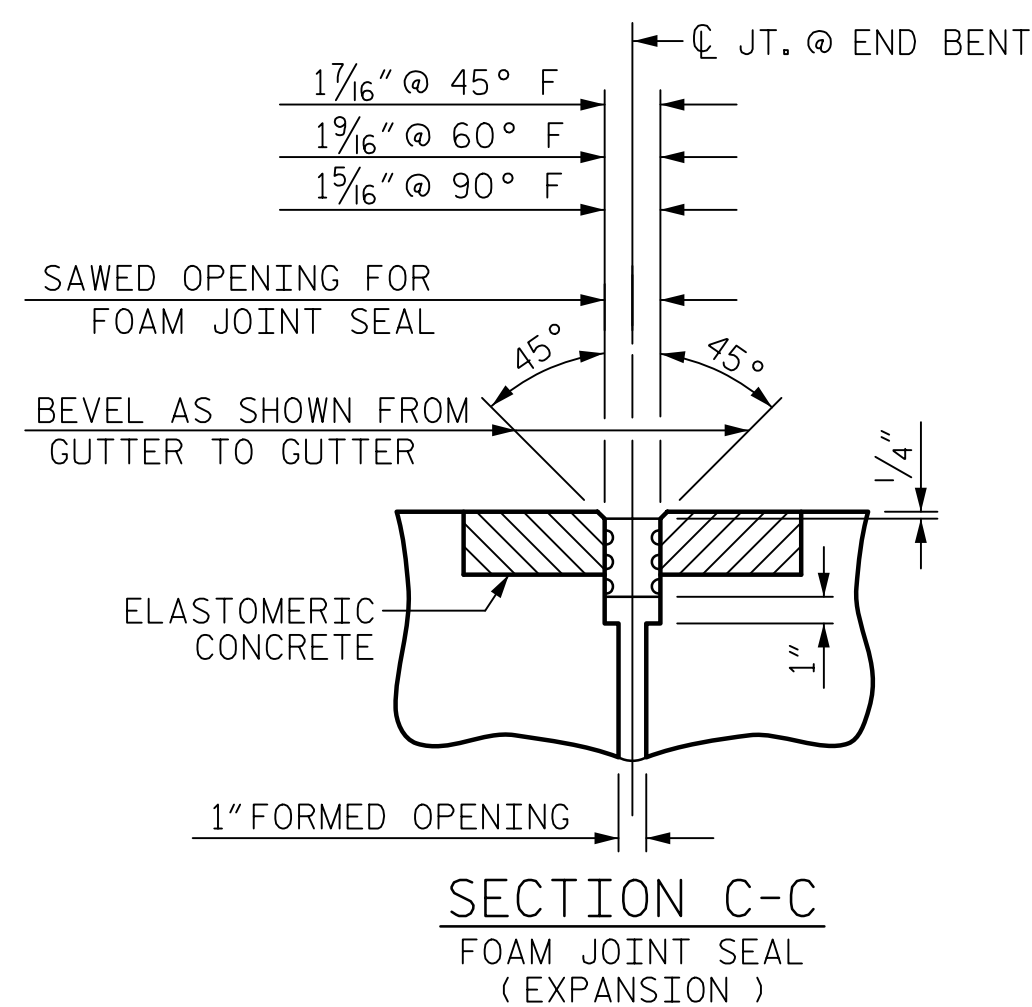
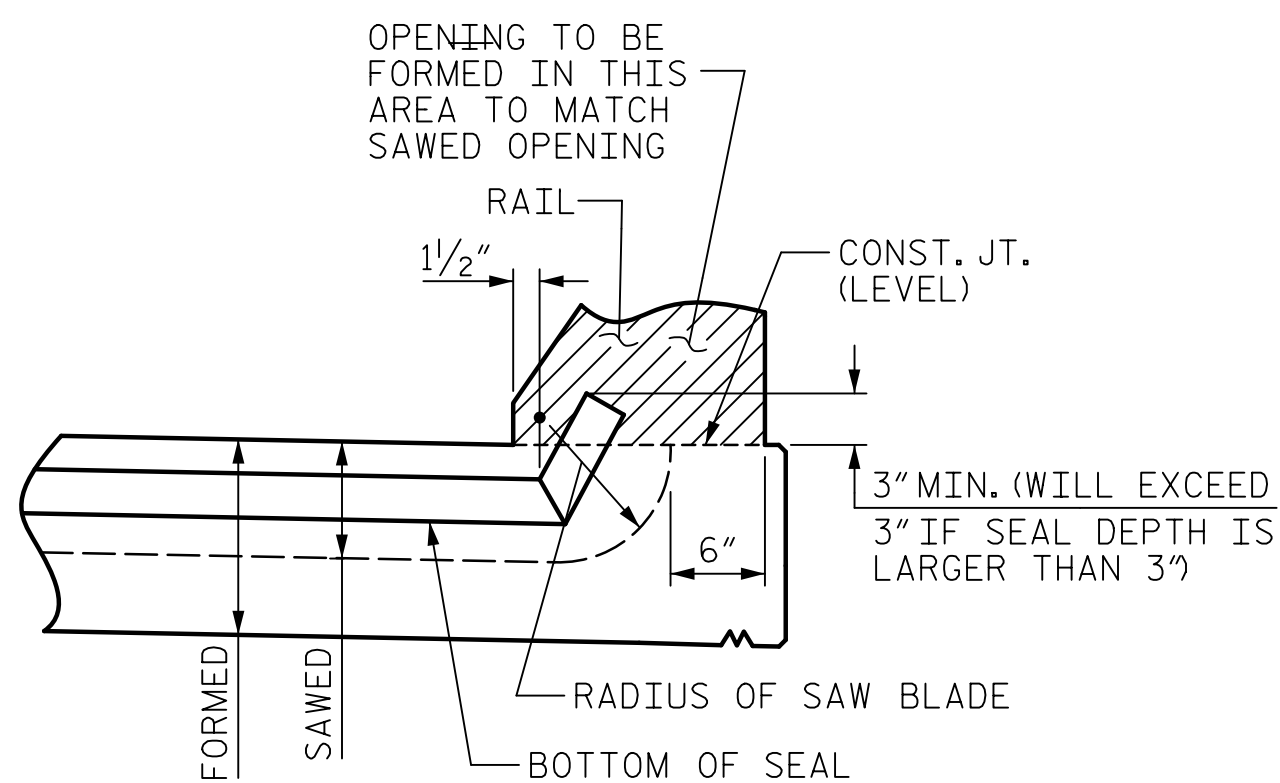
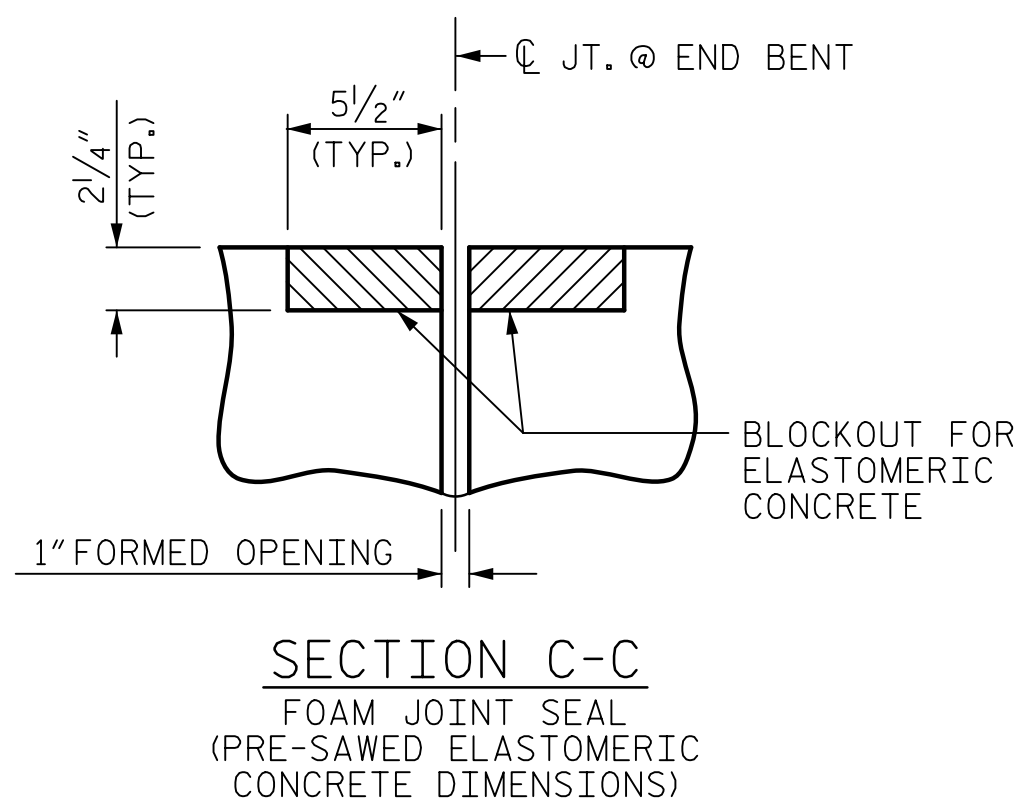
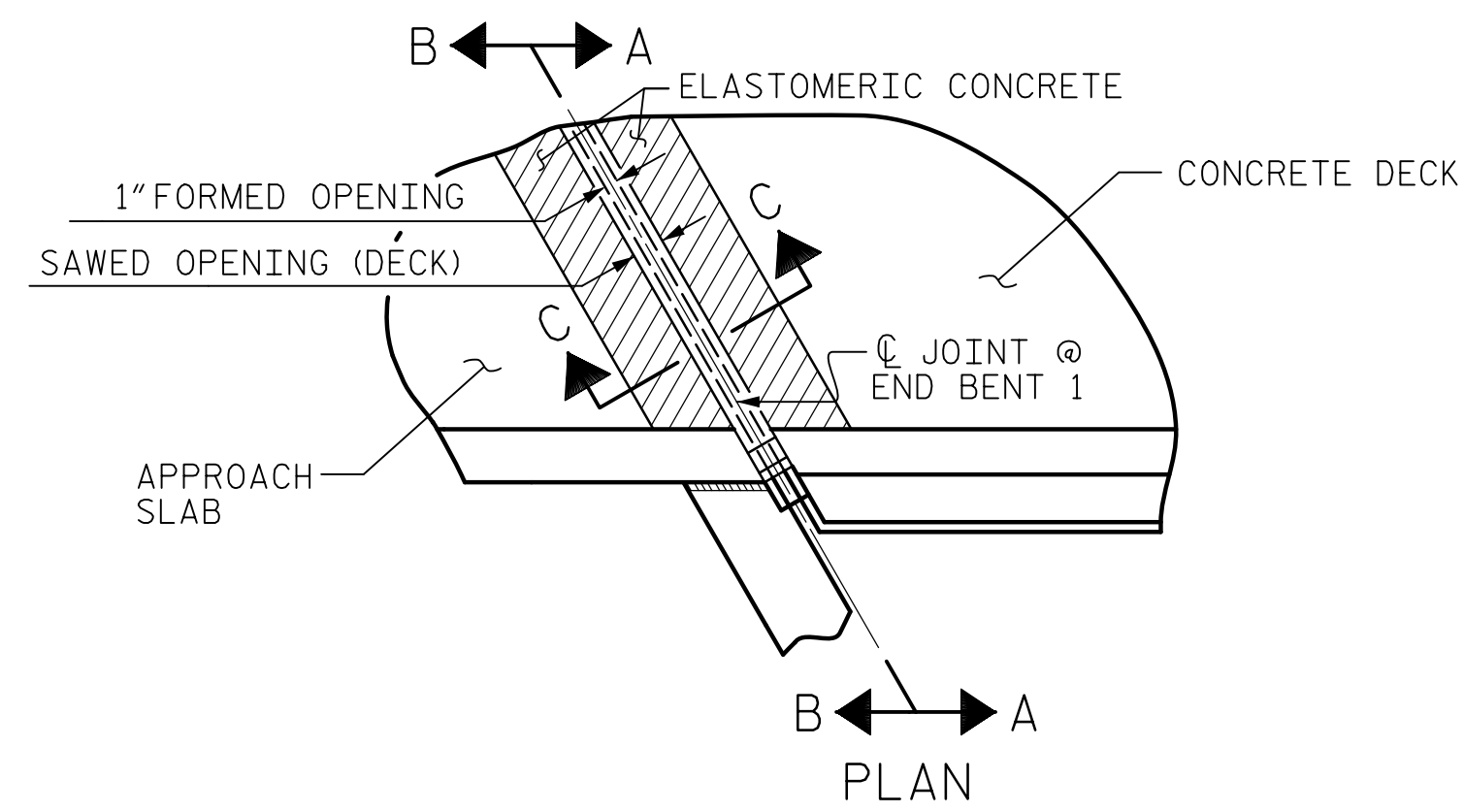
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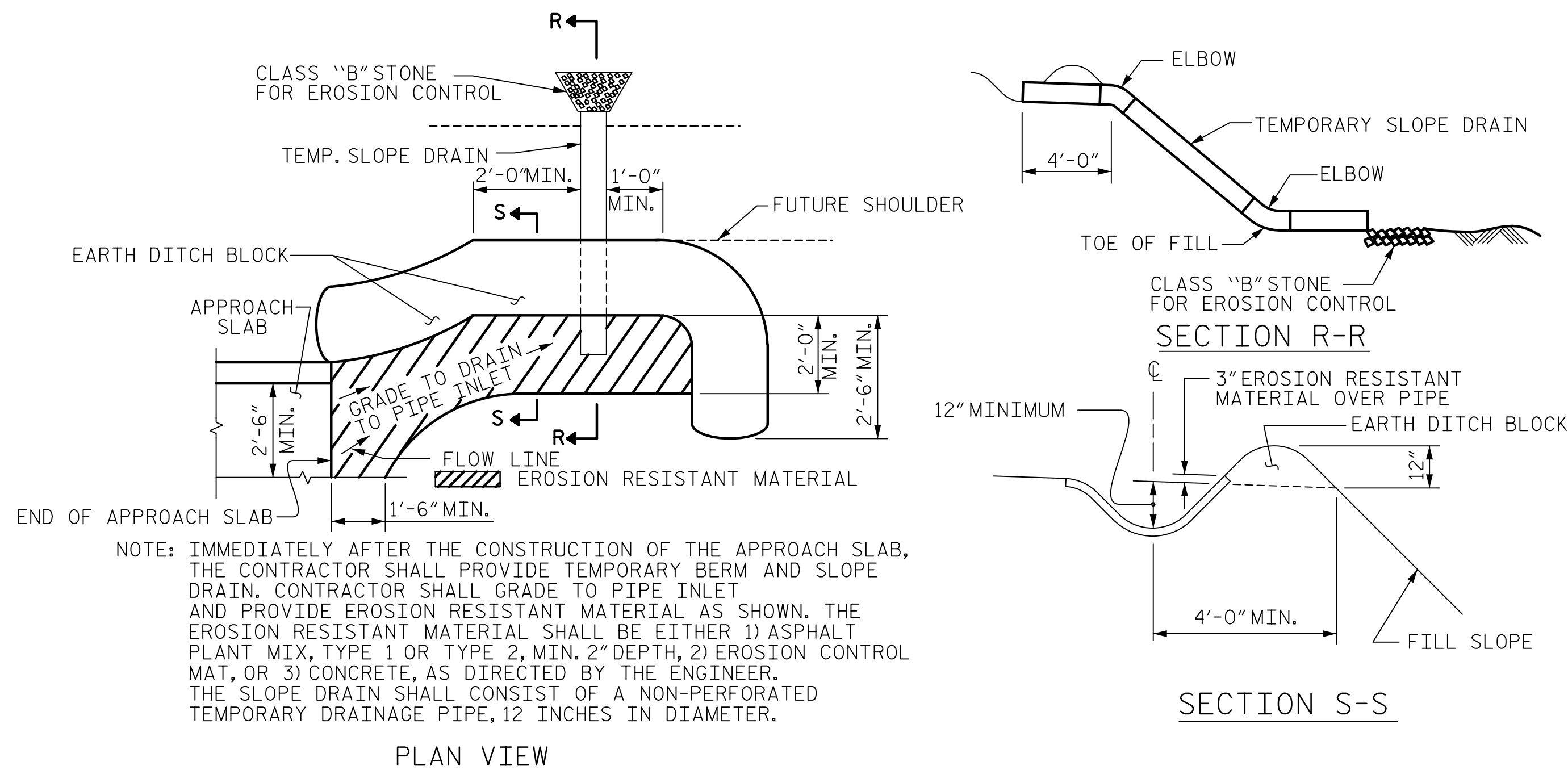


ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	3.99
2	3.99
TOTAL	7.98

* BASED ON THE MINIMUM BLOCKOUT SHOWN.

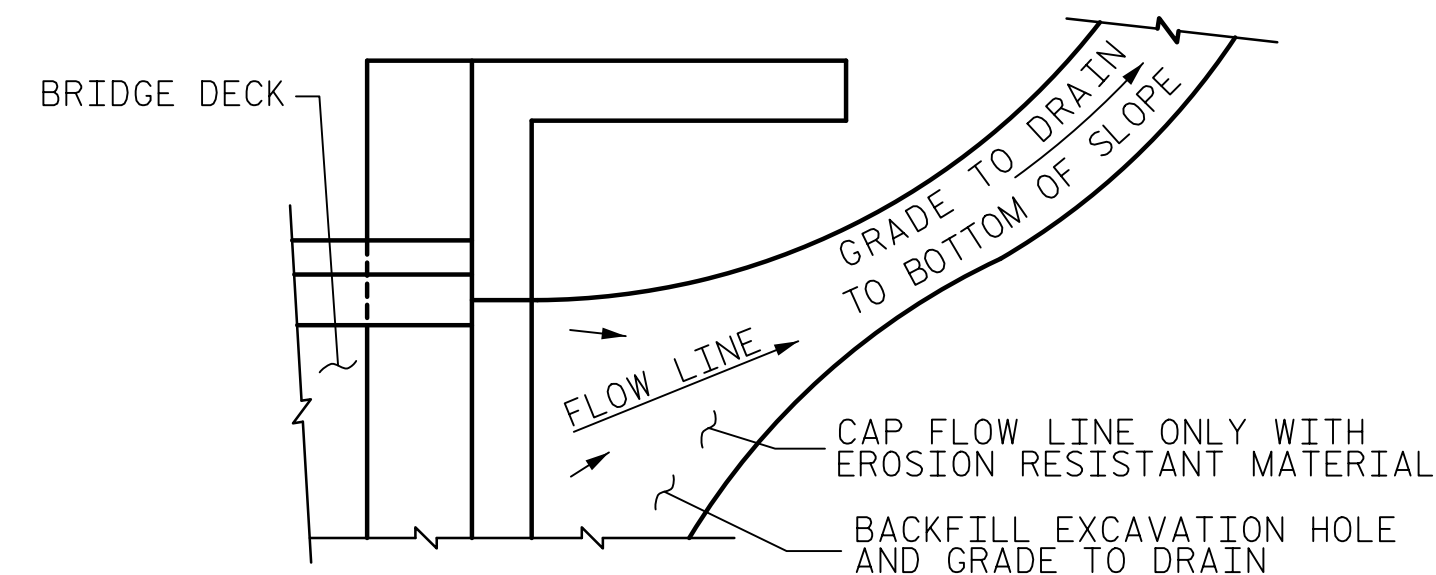
JOINT SEAL DETAILS @ END BENT

ASSEMBLED BY :	H.T. ROSEMOND	DATE :	7/2019
CHECKED BY :	D. RITACCO	DATE :	7/2019
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



TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



PROJECT NO. BR-0042
ROCKINGHAM COUNTY
STATION: 19+56.99 -L-

SHEET 2 OF 2

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DocuSigned by:
John C. Morrison
NORTH CAROLINA
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SEAL
030474
ENGINEER
JOHN C. MORRISON
5/27/2019

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
BRIDGE APPROACH SLAB DETAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-28
					TOTAL SHEETS 28

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STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $1\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A $\frac{1}{4}$ " FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A $\frac{1}{4}$ " RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE $\frac{7}{8}$ " \emptyset SHEAR STUDS FOR THE $\frac{3}{4}$ " \emptyset STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$ " \emptyset STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$ " \emptyset STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{3}{16}$ " IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

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