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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE: LIVE-LOAD FACTORS (γ_{LL})	STRENGTH I – MOMENT: DISTRIBUTION FACTORS (DF)	STRENGTH I – MOMENT: RATING FACTOR	STRENGTH I – MOMENT: SPANS	STRENGTH I – MOMENT: GIRDER LOCATION	STRENGTH I – MOMENT: DISTANCE FROM LEFT END OF SPAN (ft)	STRENGTH I – SHEAR: DISTRIBUTION FACTORS (DF)	STRENGTH I – SHEAR: RATING FACTOR	STRENGTH I – SHEAR: SPAN	STRENGTH I – SHEAR: GIRDER LOCATION	STRENGTH I – SHEAR: DISTANCE FROM LEFT END OF SPAN (ft)	SERVICE III LIMIT STATE: LIVE-LOAD FACTORS (γ_{LL})	SERVICE III – MOMENT: DISTRIBUTION FACTORS (DF)	SERVICE III – MOMENT: RATING FACTOR	SERVICE III – MOMENT: SPANS	SERVICE III – MOMENT: GIRDER LOCATION	SERVICE III – MOMENT: DISTANCE FROM LEFT END OF SPAN (ft)	COMMENT NUMBER
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	1	1.08	--	1.75	0.966	1.21	A	E	43.9	1.109	1.28	A	I	26.1	0.80	0.966	1.08	A	E	43.9	--
DESIGN LOAD RATING	HL-93 (OPERATING)	N/A		1.57	--	1.35	0.966	1.57	A	E	43.9	1.109	2.01	A	I	17.1	N/A	--	--	--	--	--	--
DESIGN LOAD RATING	HS-20 (INVENTORY)	36.000	2	1.47	52.92	1.75	0.966	1.64	A	E	43.9	1.109	1.97	A	I	17.1	0.80	0.966	1.47	A	E	43.9	--
DESIGN LOAD RATING	HS-20 (OPERATING)	36.000		2.13	76.68	1.35	0.966	2.13	A	E	43.9	1.109	2.59	A	I	17.1	N/A	--	--	--	--	--	--
LEGAL LOAD RATING – SINGLE VEHICLE (SV)	SNSH	13.500		3.43	46.31	1.40	0.966	4.79	A	E	43.9	1.109	6.17	A	I	17.1	0.80	0.966	3.43	A	E	43.9	--
LEGAL LOAD RATING – SINGLE VEHICLE (SV)	SNGARBS2	20.000		2.51	50.20	1.40	0.966	3.50	A	E	43.9	1.109	4.33	A	I	17.1	0.80	0.966	2.51	A	E	43.9	--
LEGAL LOAD RATING – SINGLE VEHICLE (SV)	SNAGRIS2	22.000		2.36	51.92	1.40	0.966	3.29	A	E	43.9	1.109	4.01	A	I	17.1	0.80	0.966	2.36	A	E	43.9	--
LEGAL LOAD RATING – SINGLE VEHICLE (SV)	SNCOTTS3	27.250		1.70	46.33	1.40	0.966	2.38	A	E	43.9	1.109	3.01	A	I	17.1	0.80	0.966	1.70	A	E	43.9	--
LEGAL LOAD RATING – SINGLE VEHICLE (SV)	SNAGGRS4	34.925		1.41	49.24	1.40	0.966	1.96	A	E	43.9	1.109	2.47	A	I	17.1	0.80	0.966	1.41	A	E	43.9	--
LEGAL LOAD RATING – SINGLE VEHICLE (SV)	SNS5A	35.550		1.38	49.06	1.40	0.966	1.92	A	E	43.9	1.109	2.49	A	I	17.1	0.80	0.966	1.38	A	E	43.9	--
LEGAL LOAD RATING – SINGLE VEHICLE (SV)	SNS6A	39.950		1.26	50.34	1.40	0.966	1.75	A	E	43.9	1.109	2.26	A	I	17.1	0.80	0.966	1.26	A	E	43.9	--
LEGAL LOAD RATING – SINGLE VEHICLE (SV)	SNS7B	42.000		1.20	50.40	1.40	0.966	1.67	A	E	43.9	1.109	2.21	A	I	17.1	0.80	0.966	1.20	A	E	43.9	--
LEGAL LOAD RATING – TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.53	50.49	1.40	0.966	2.13	A	E	43.9	1.109	2.71	A	I	17.1	0.80	0.966	1.53	A	E	43.9	--
LEGAL LOAD RATING – TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT4A	33.075		1.53	50.60	1.40	0.966	2.14	A	E	43.9	1.109	2.65	A	I	17.1	0.80	0.966	1.53	A	E	43.9	--
LEGAL LOAD RATING – TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT6A	41.600		1.25	52.00	1.40	0.966	1.74	A	E	43.9	1.109	2.35	A	I	17.1	0.80	0.966	1.25	A	E	43.9	--
LEGAL LOAD RATING – TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT7A	42.000		1.25	52.50	1.40	0.966	1.74	A	E	43.9	1.109	2.30	A	I	17.1	0.80	0.966	1.25	A	E	43.9	--
LEGAL LOAD RATING – TRUCK TRACTOR SEMI-TRAILER (TTST)	TNT7B	42.000		1.28	53.76	1.40	0.966	1.79	A	E	43.9	1.109	2.16	A	I	17.1	0.80	0.966	1.28	A	E	43.9	--
LEGAL LOAD RATING – TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT4	43.000		1.23	52.89	1.40	0.966	1.71	A	E	43.9	1.109	2.09	A	I	17.1	0.80	0.966	1.23	A	E	43.9	--
LEGAL LOAD RATING – TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGT5A	45.000		1.16	52.20	1.40	0.966	1.62	A	E	43.9	1.109	2.06	A	I	17.1	0.80	0.966	1.16	A	E	43.9	--
LEGAL LOAD RATING – TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGT5B	45.000	3	1.15	51.75	1.40	0.966	1.61	A	E	43.9	1.109	1.98	A	I	17.1	0.80	0.966	1.15	A	E	43.9	--

LOAD FACTORS

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

NOTES

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

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

COMMENTS

1. RIGHT EXTERIOR GIRDER IS THE CONTROLLING EXTERIOR GIRDER.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

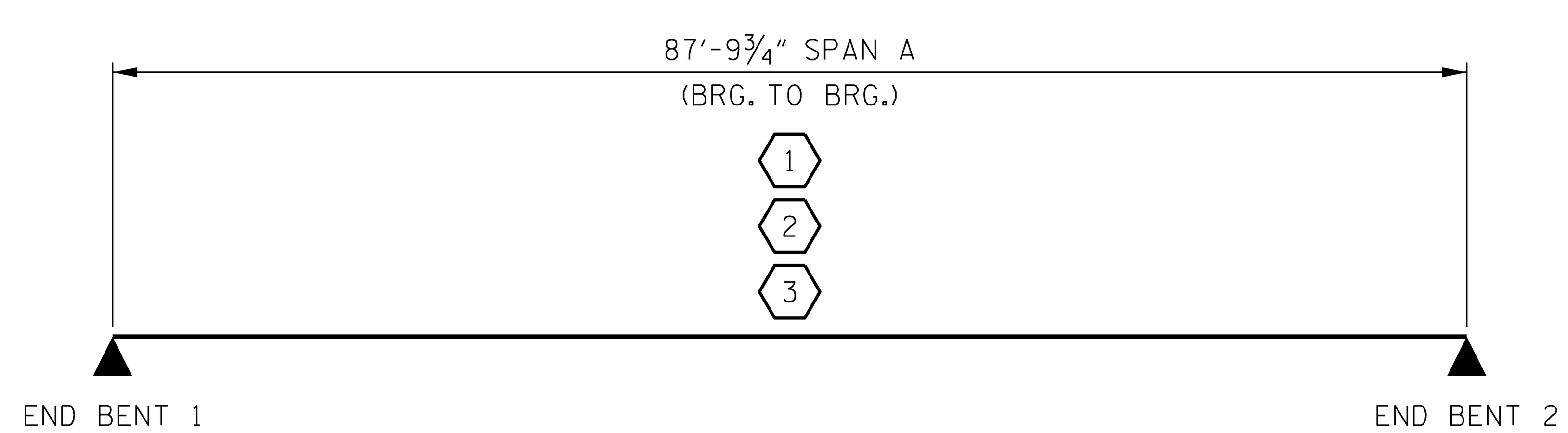
(3) LEGAL LOAD RATING ∗∗

∗∗ SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER

E - EXTERIOR GIRDER (RIGHT)



LRFR SUMMARY

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY: PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY:	K. E. LOFTON	DATE:	6-16
CHECKED BY:	A. D. SHAH	DATE:	10-16
DESIGN ENGINEER:	T. M. HARRIS	DATE:	10-16

REVISIONS

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

SHEET No. S9-4

TOTAL SHEETS 25

STD. No. LRFR1

STR. #9

ASSEMBLED BY: K. E. LOFTON	DATE: 6-16
CHECKED BY: A. D. SHAH	DATE: 10-16
DRAWN BY: MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY: GM/DI 2/08	REV. 10/1/11 MAA/GM

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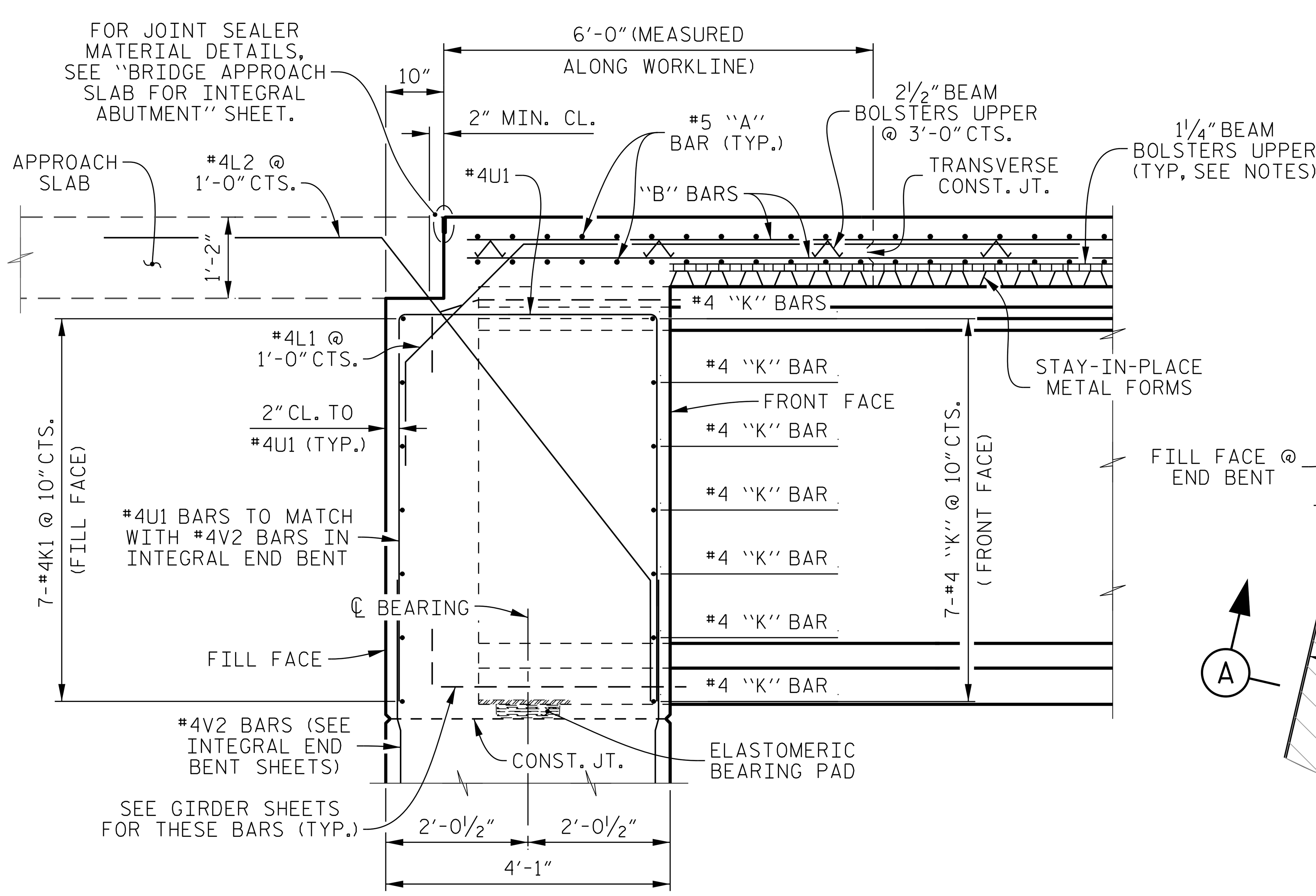
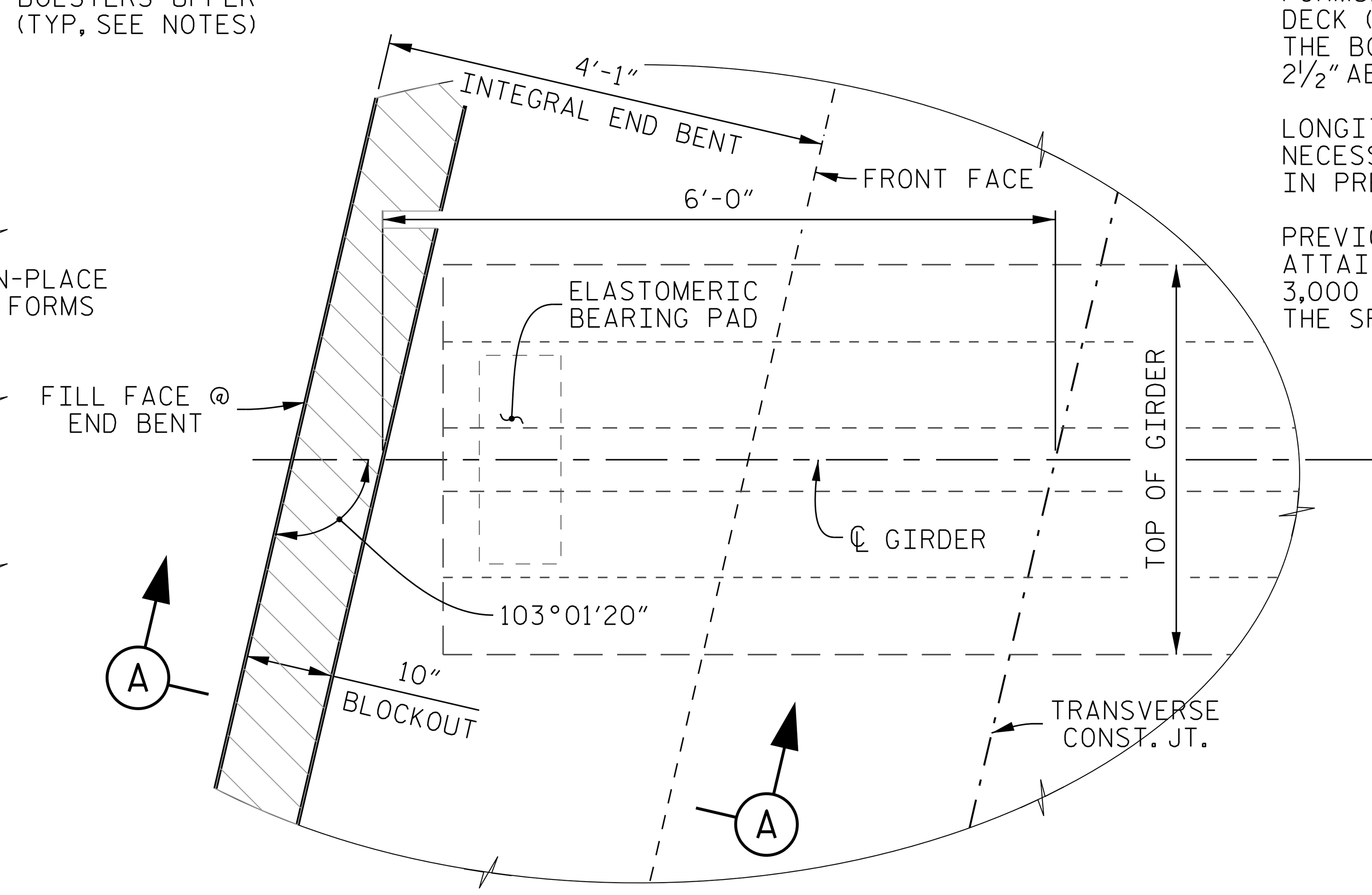
TYPICAL SECTION AT INTEGRAL END BENT 1 AND END BENT 2



SECTION A–A

SECTION THRU INTEGRAL END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



PLAN OF GIRDER – INTEGRAL END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

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

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

FOR F-SHAPE CONCRETE BARRIER RAIL DETAILS, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

FOR END VIEW OF INTEGRAL DIAPHRAGM, SEE SHEET 2 OF 2.

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY :
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NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	T. M. HARRIS	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

REVISIONS

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

SHEET No. S9–5

TOTAL SHEETS 25

STR. #9

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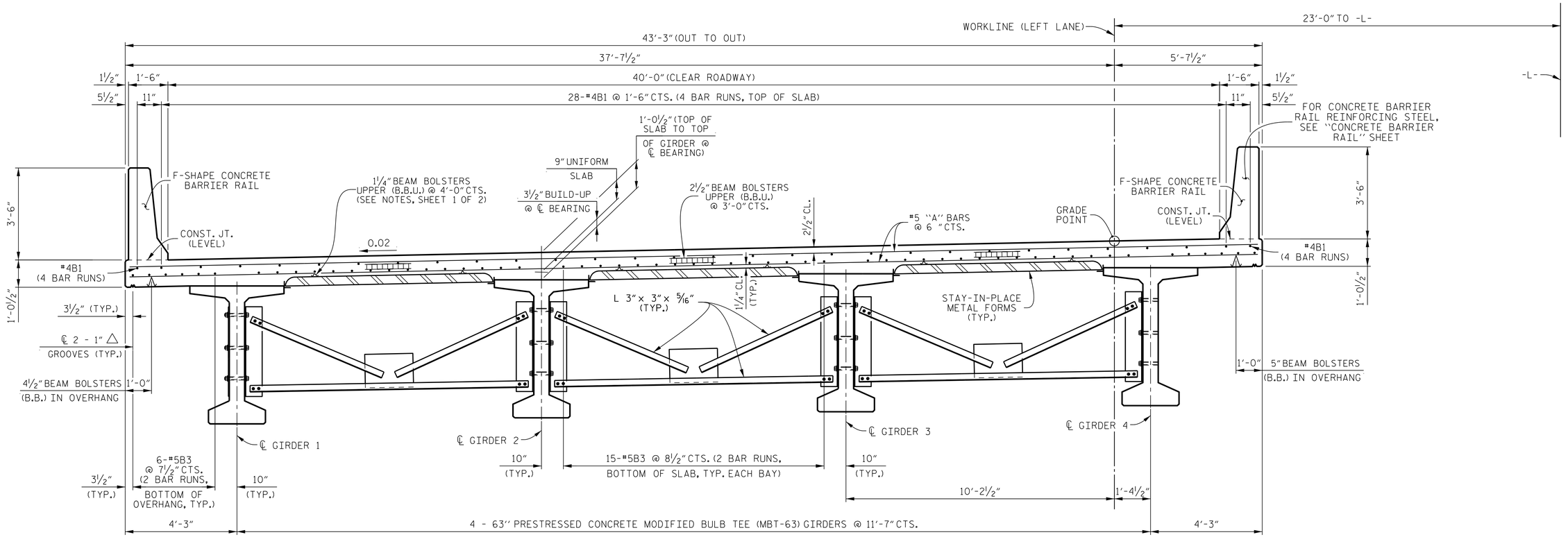
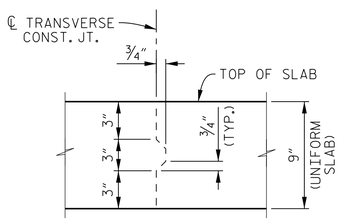


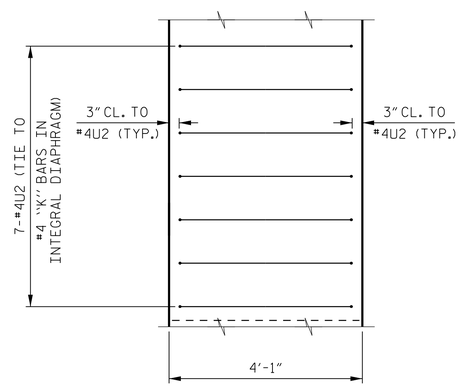
TYPICAL SECTION AT INTERMEDIATE STEEL DIAPHRAGMS

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



END VIEW OF INTEGRAL DIAPHRAGM

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION (LEFT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S9-6
1			3			TOTAL SHEETS
2			4			25

DRAWN BY : K. E. LOFTON DATE : 6-16
CHECKED BY : T. M. HARRIS DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS DATE : 10-16

PLANS PREPARED BY :
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FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STR. #9

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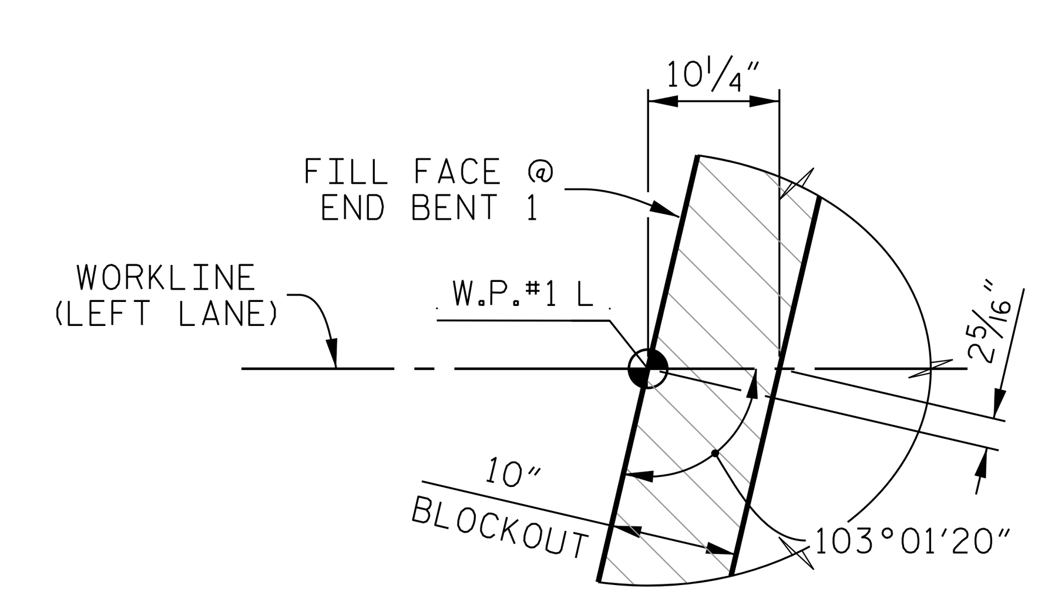
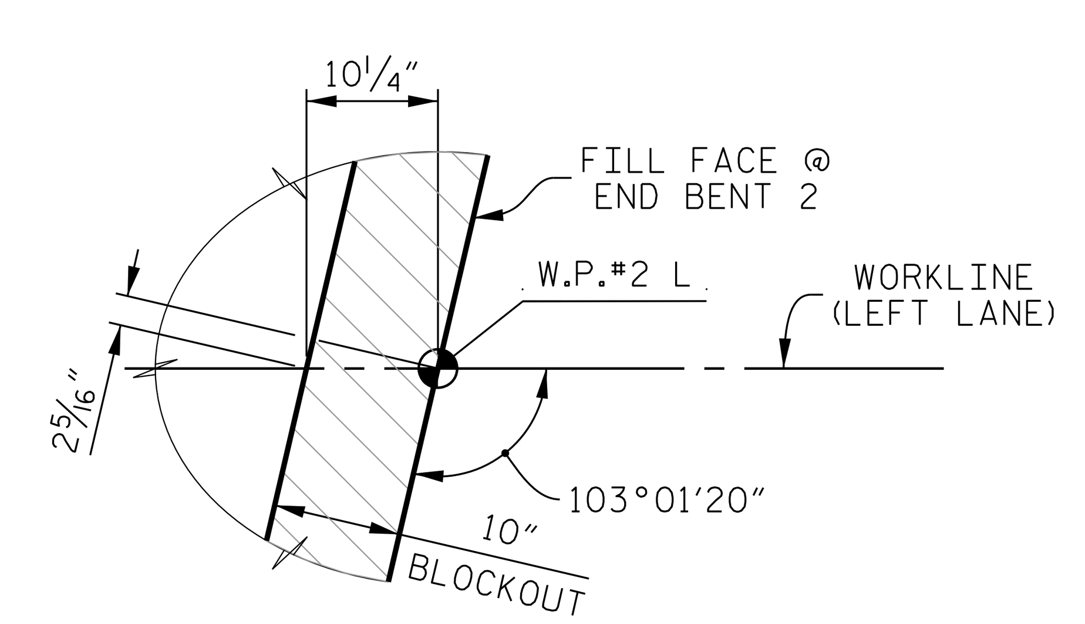
PLAN OF SPAN



DETAIL "A"



DETAIL "B"

NOTES

#5 "A" BARS SHALL BE PLACED PERPENDICULAR TO WORKLINE WITH A 2" MINIMUM CLEARANCE ON EACH END.

FOR REINFORCING STEEL IN CONCRETE BARRIER RAIL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR SLAB POURING SEQUENCE AND SPLICE CHART, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIDERS" SHEET.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

DRAWN BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

PLANS PREPARED BY :

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

2/3/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

(LEFT LANE)

REVISIONS

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

SHEET No. S9-7

TOTAL SHEETS 25

STR. #9

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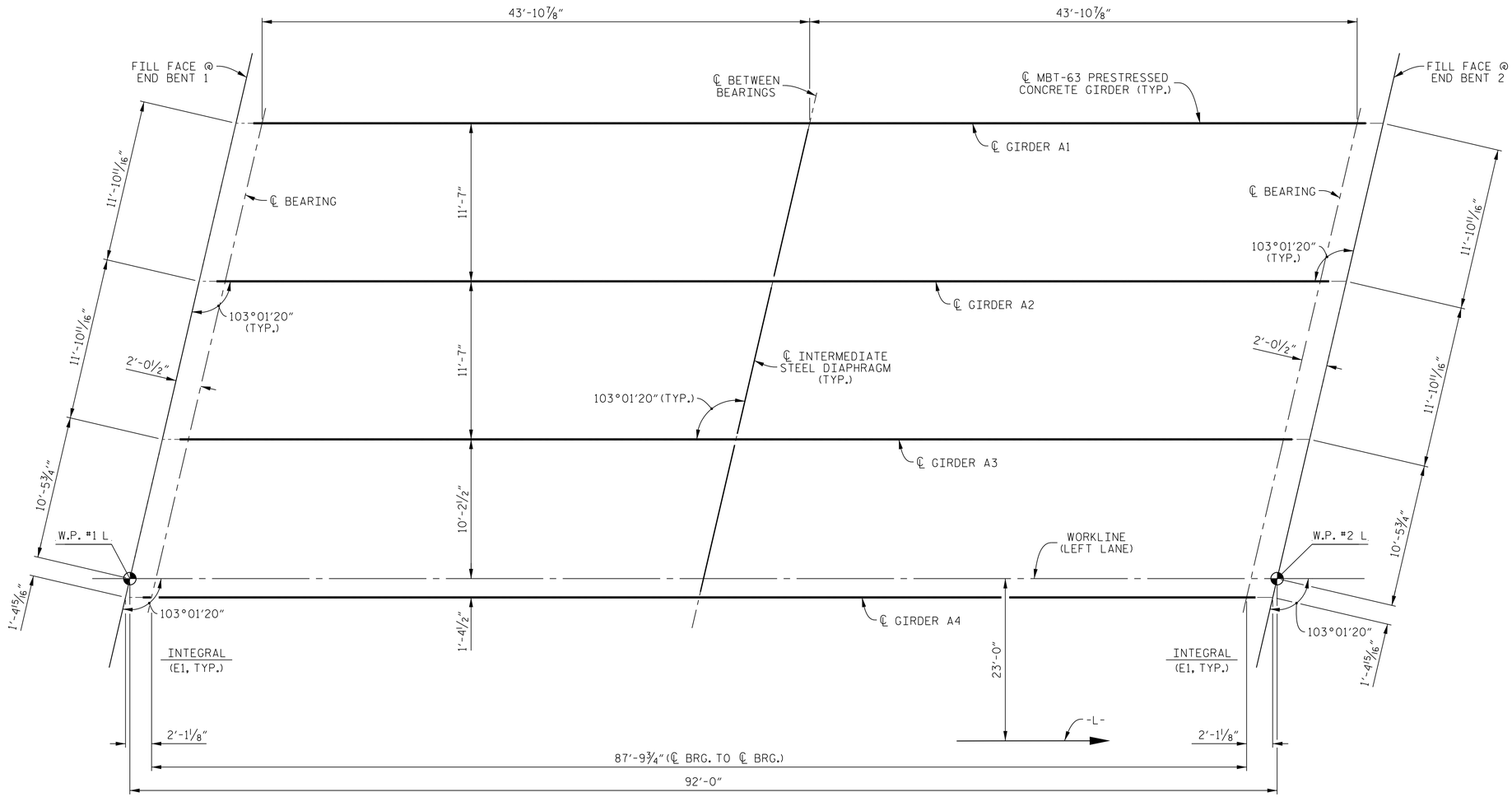

SPAN A

FRAMING PLAN

NOTES

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.

FOR ELASTOMERIC BEARING DETAILS, SEE "ELASTOMERIC BEARING DETAILS PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE" SHEET.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

DRAWN BY : K. E. LOFTON DATE : 6-16
CHECKED BY : A. D. SHAH DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS DATE : 10-16

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FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS MARK HARRIS
Thomas Mark Harris
84C113A5C7...
2/3/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

(LEFT LANE)

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S9-8
1			3			TOTAL SHEETS
2			4			25

STR. #9

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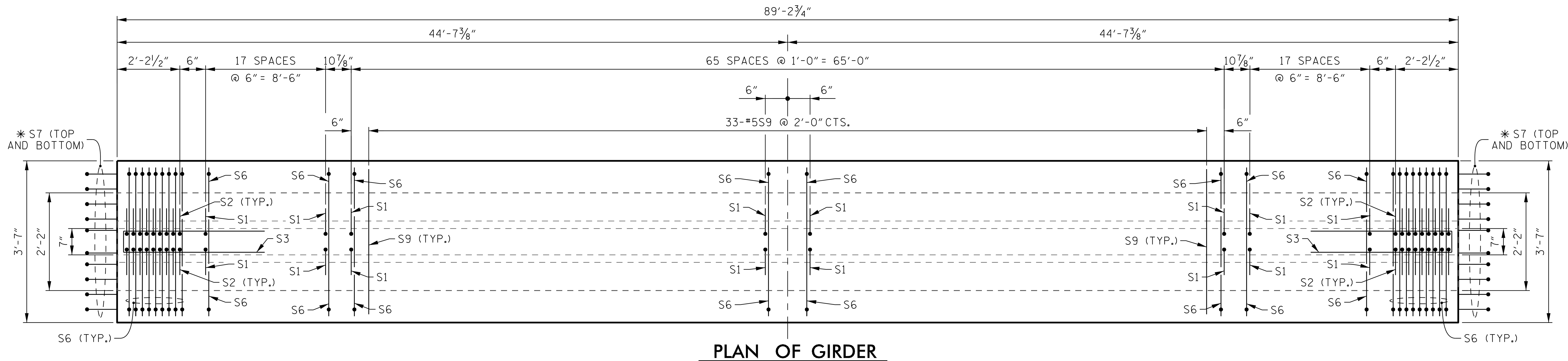
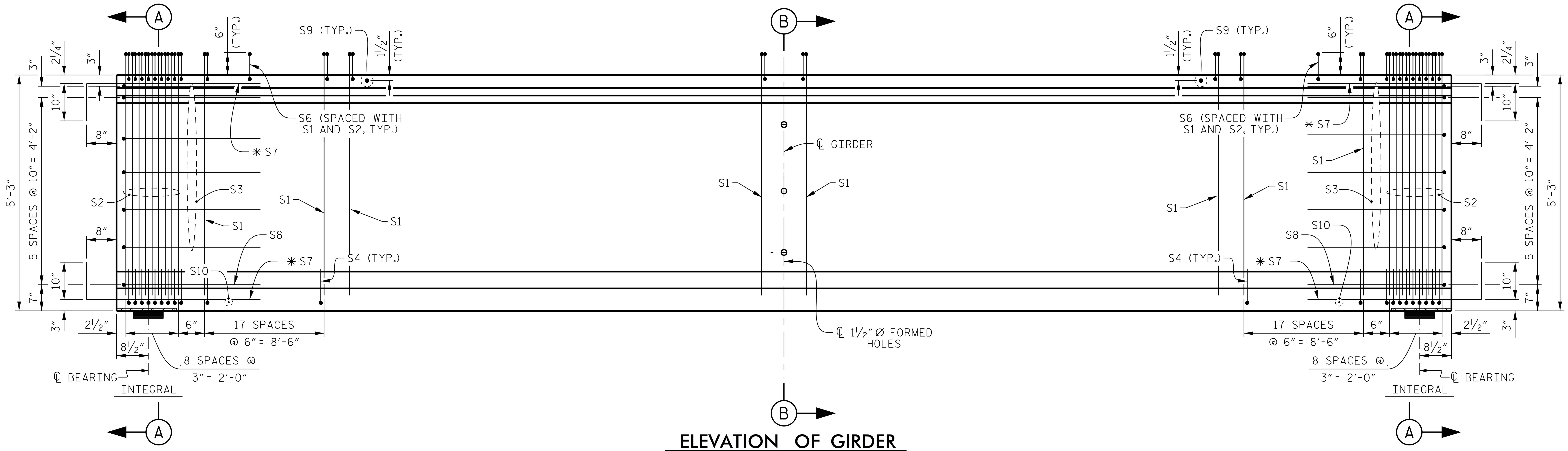


PLAN OF GIRDER



ELEVATION OF GIRDER

NOTES

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

FOR STRAND PATTERN, SEE SHEET 2 OF 3.

FOR ADDITIONAL NOTES, SEE SHEET 3 OF 3.

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

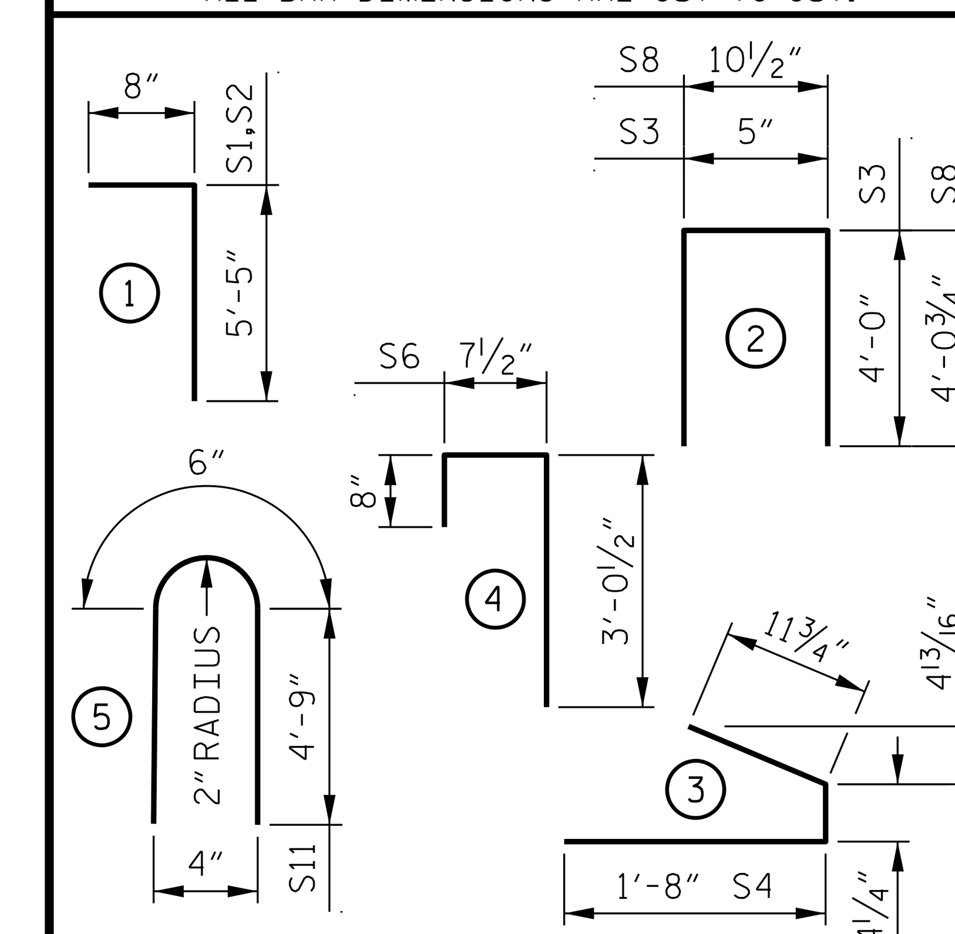
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	204	#4	1	6'- 1"	829
S2	36	#5	1	6'- 1"	228
S3	12	#4	2	8'- 5"	67
S4	108	#4	3	3'- 0"	216
S6	240	#5	4	4'- 4"	1,085
✱ S7	40	#5	STR	3'- 8"	153
S8	2	#5	2	9'- 0"	19
S9	33	#5	STR	3'- 3"	112
S10	2	#3	STR	1'-10"	1
S11	4	#5	5	10'- 0"	42
S12	8	#4	STR	8'- 0"	43

✱ 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	7,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
GIRDERS	LB.	C.Y.	No.
A1 THRU A4	2,795	17.7	30

GIRDERS REQUIRED

LOCATION	NUMBER	LENGTH	TOTAL LENGTH
SPAN A	4	89'-2¾"	356.92'

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 1 OF 3

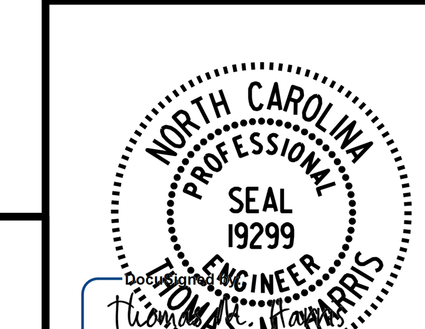
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

63" PRESTRESSED CONCRETE MODIFIED BULB TEE GIRDER

(LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



2/3/2017

PLANS PREPARED BY :
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NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	T. M. HARRIS	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

ASSEMBLED BY : K. E. LOFTON DATE : 6-16
CHECKED BY : T. M. HARRIS DATE : 10-16

DRAWN BY : EEM 2/6/97
CHECKED BY : VAP 2/6/97

REV. 10/1/11	MAA/GM
REV. 6/13	MAA/GM
REV. 1/15	MAA/TMG

REVISIONS

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

SHEET No. S9-9

TOTAL SHEETS 25

STD. No. PCG7

STR. #9

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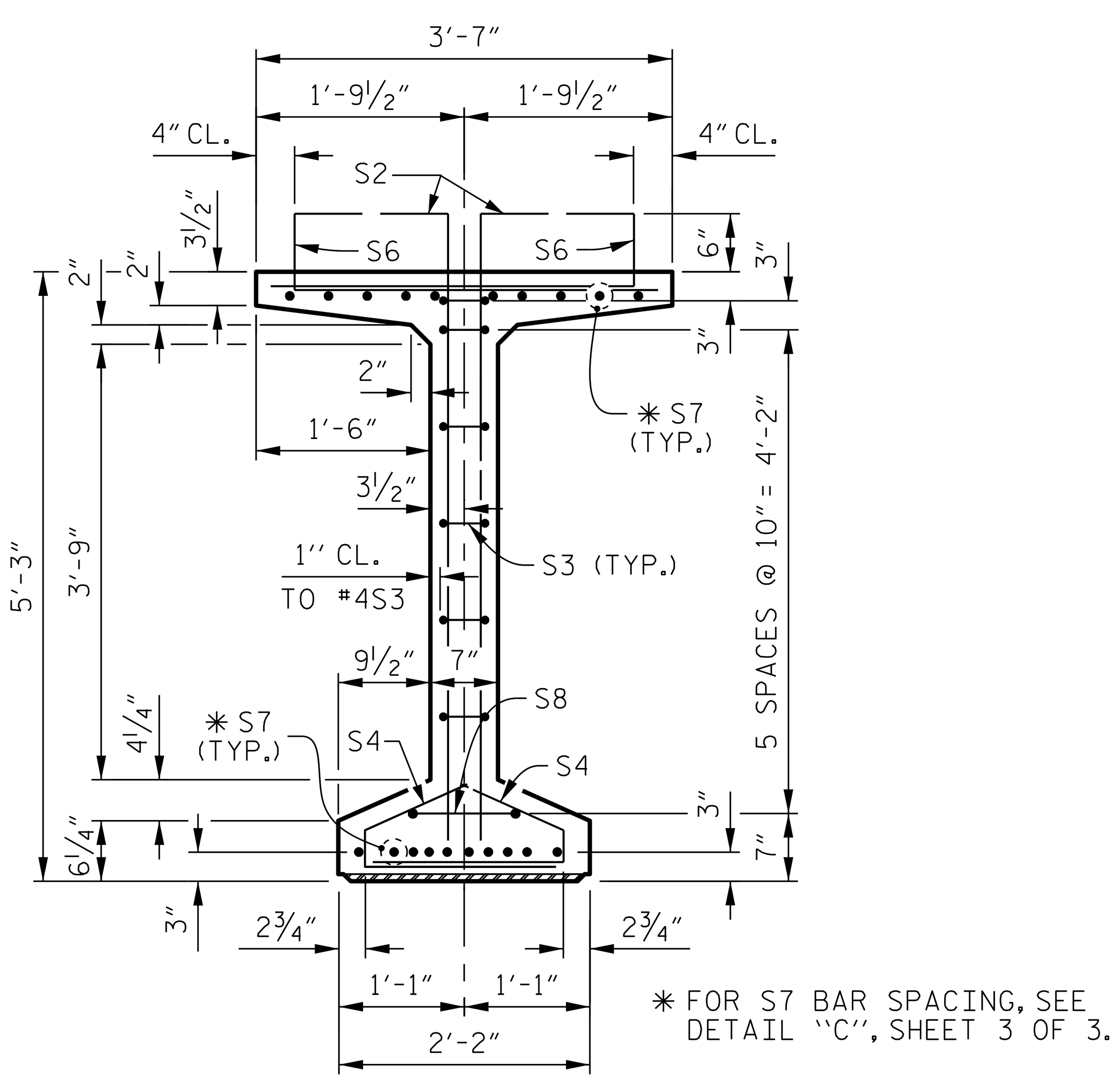
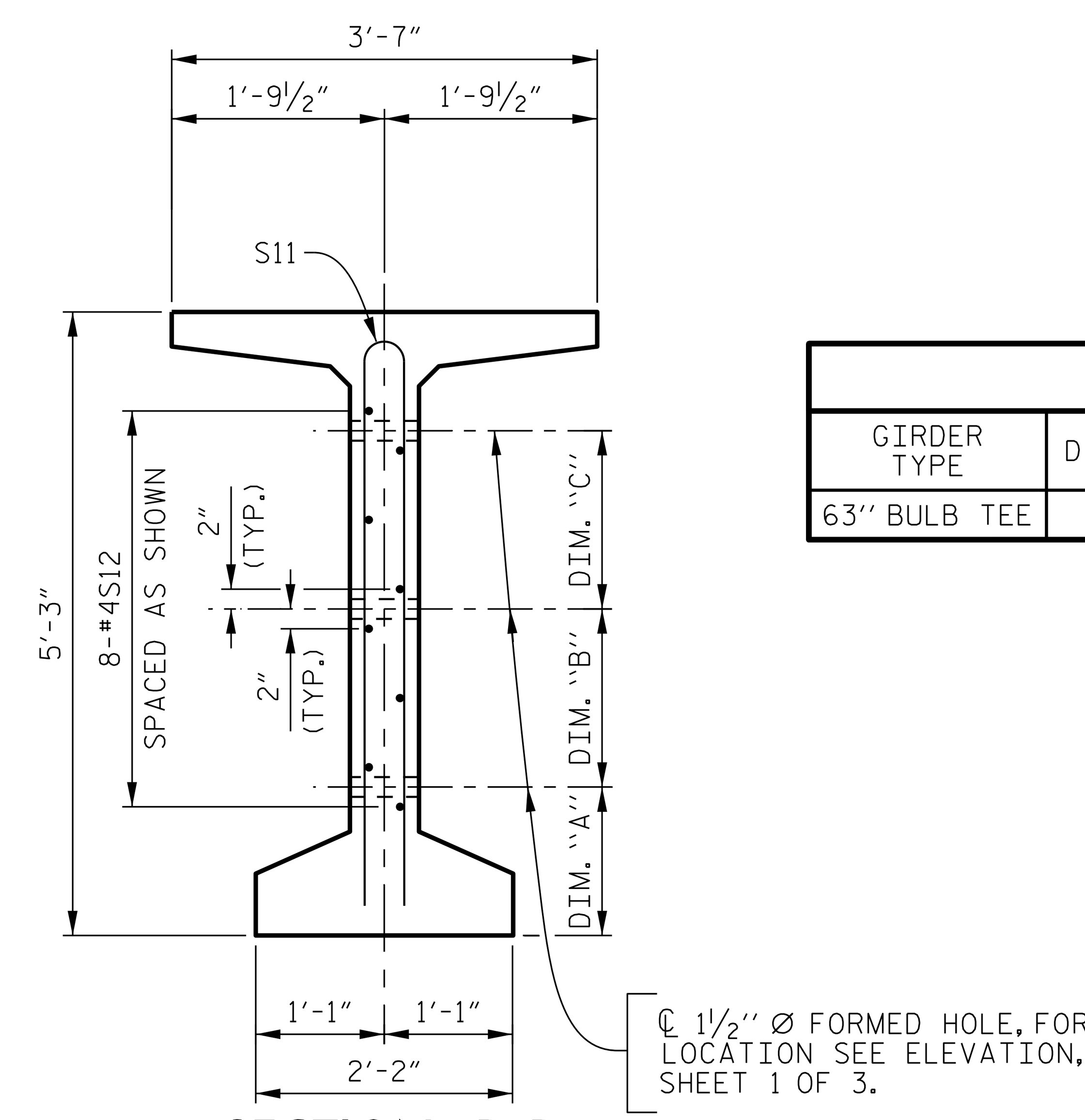


∗ FOR S7 BAR SPACING, SEE DETAIL "C", SHEET 3 OF 3.

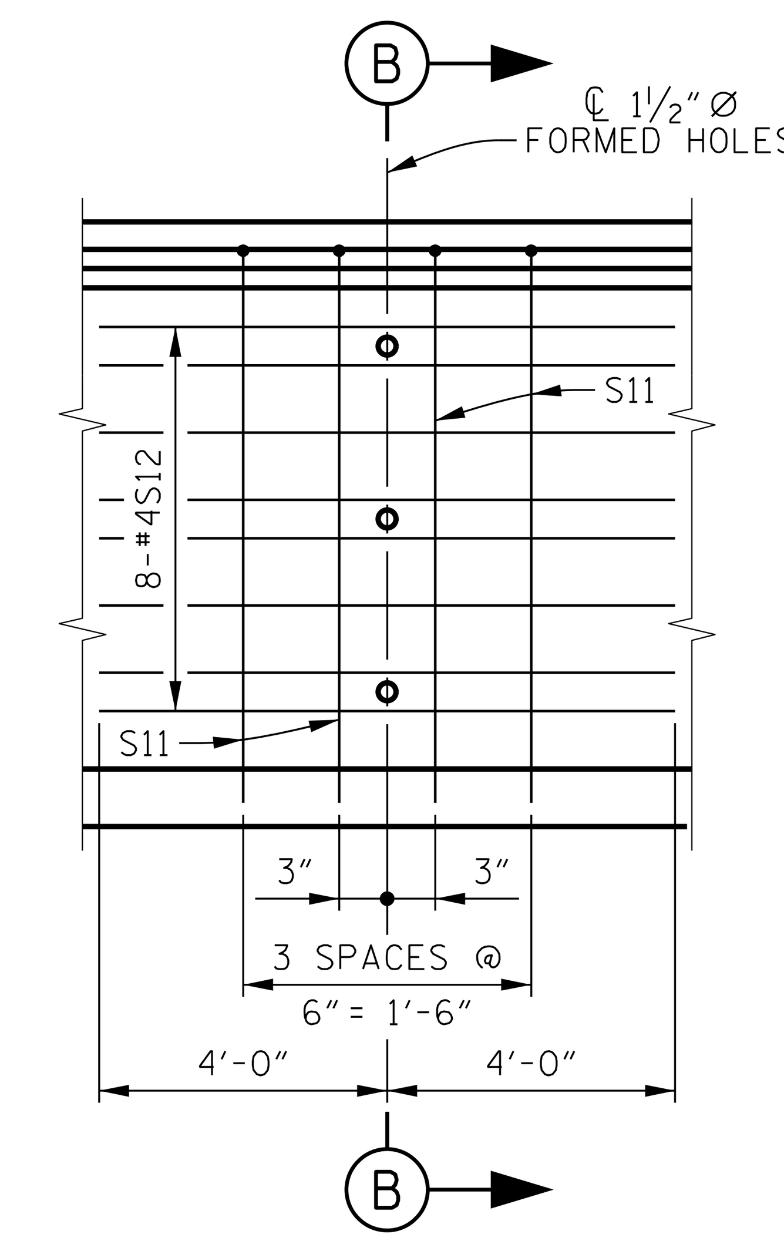
SECTION A–A



SECTION B–B

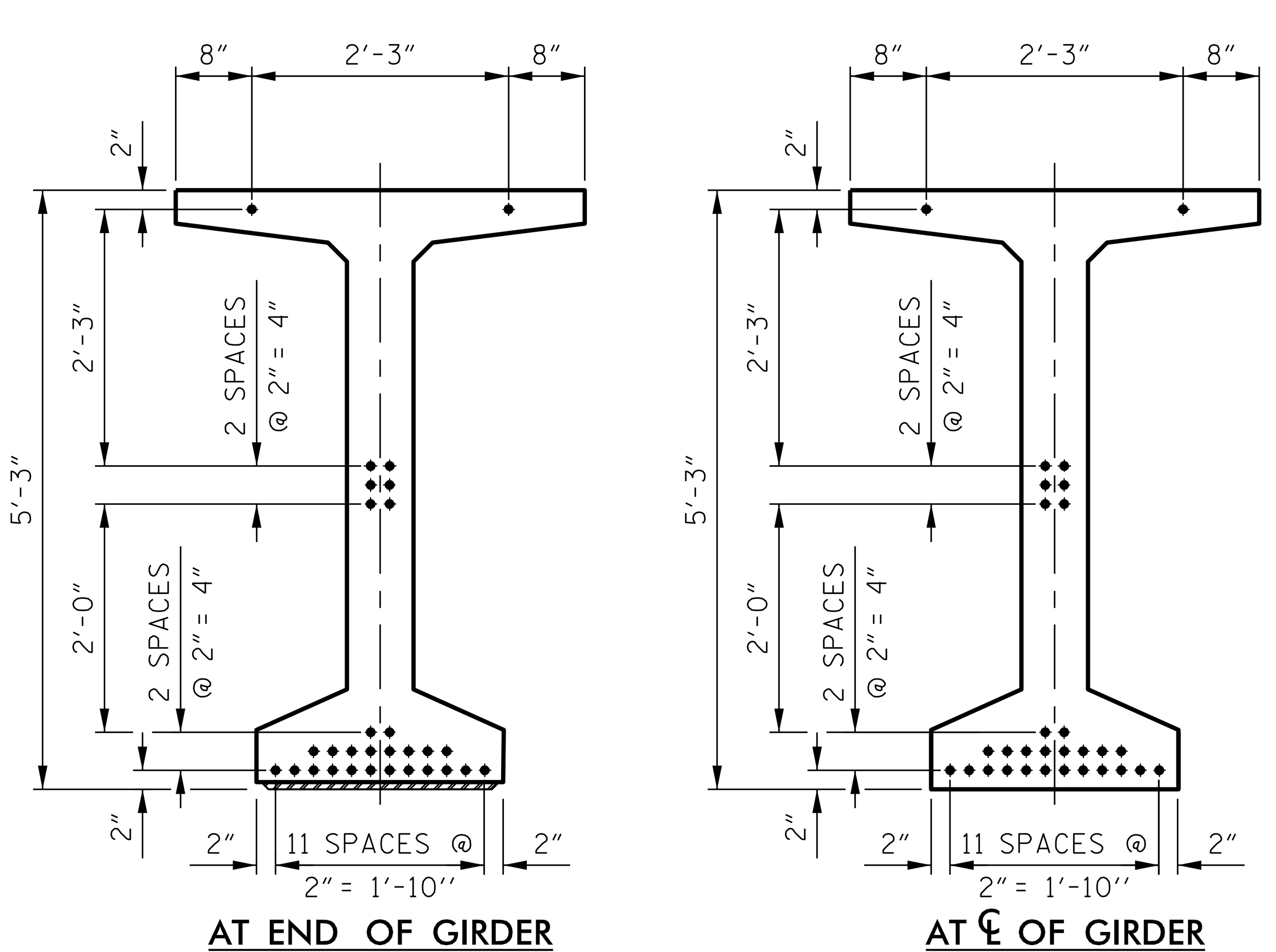
(S1, S6 AND S9 BARS NOT SHOWN)

TABLE			
GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"
63" BULB TEE	1'-9"	1'-5"	11¾"



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS



30 – 0.6" Ø LOW RELAXATION STRAND LAYOUT

● FULLY BONDED STRANDS

PROJECT NO. R–2707C
CLEVELAND COUNTY
STATION: 611+32.01 –L–

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

63" PRESTRESSED CONCRETE MODIFIED BULB TEE GIRDER (LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY :
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	T. M. HARRIS	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

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

SHEET No. S9–10
TOTAL SHEETS 25

STD. No. PCG7
STR. #9

ASSEMBLED BY : K. E. LOFTON	DATE : 6-16		
CHECKED BY : T. M. HARRIS	DATE : 10-16		
DRAWN BY : EEM 2/6/97	REV. 10/1/11	MAA/GM	
CHECKED BY : VAP 2/6/97	REV. 6/13	MAA/GM	
	REV. 1/15	MAA/TMG	

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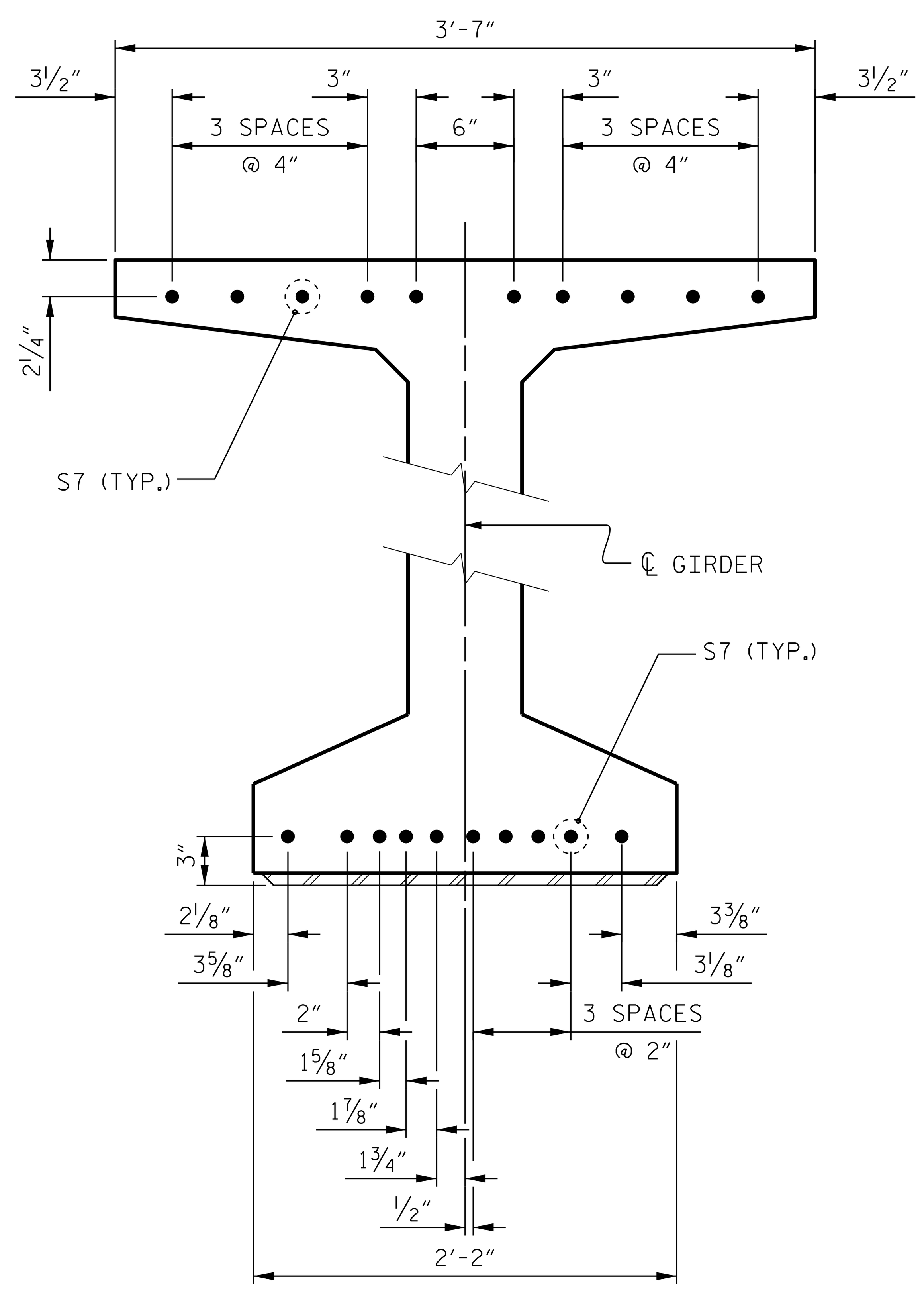
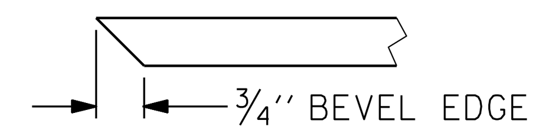


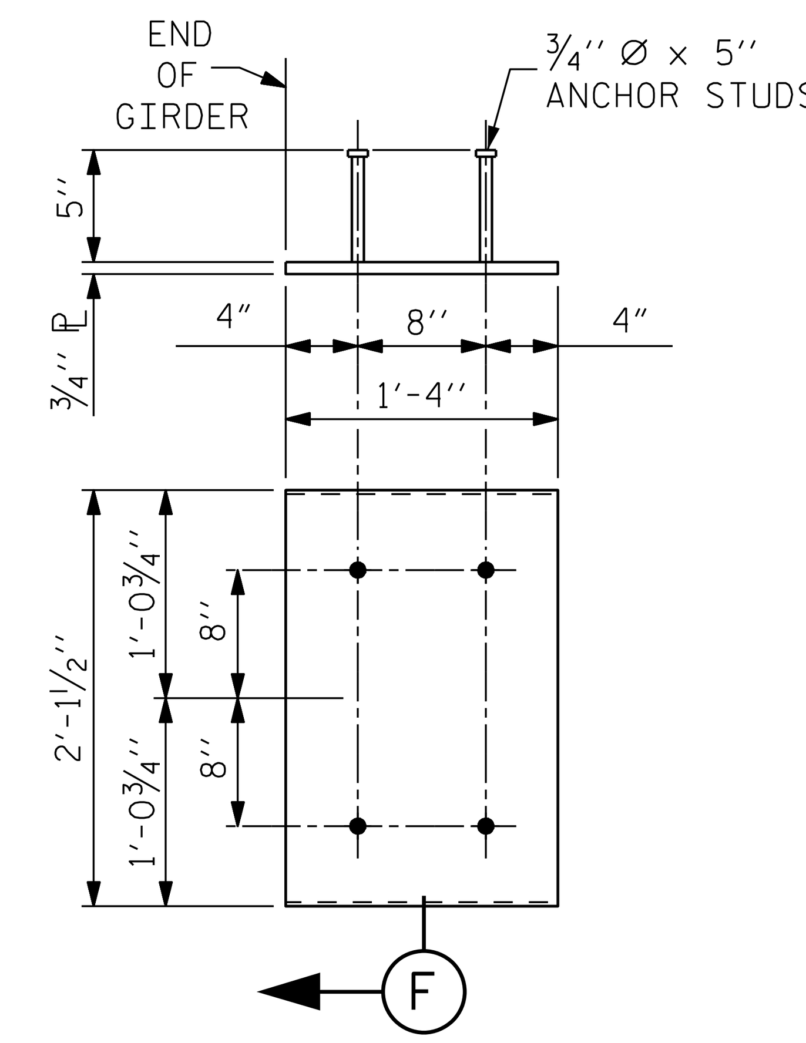
DETAIL "C"

(FOR 63" MODIFIED BULB TEES)



SECTION "F"

(SEE NOTES)



EMBEDDED PLATE "B-1" DETAILS FOR 63" MODIFIED BULB TEES

(2 REQUIRED PER GIRDER)

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.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5,800 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".

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

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 4,500 LBS.

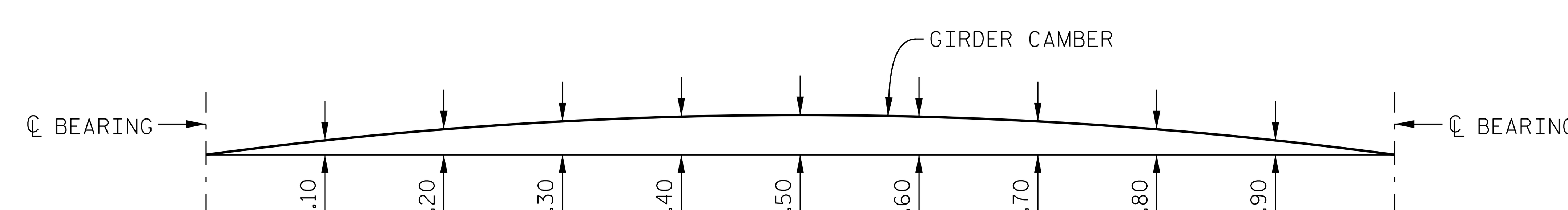
FOR EMBEDDED CLIPS FOR PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.

CAMBER AND DEAD LOAD DEFLECTIONS

	SPAN A										
GIRDERS 1 THRU 4	℄ BRG.	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	℄ BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.048	0.090	0.123	0.144	0.152	0.144	0.123	0.090	0.048	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✱ ↓	0.000	0.027	0.054	0.075	0.088	0.092	0.088	0.075	0.054	0.027	0.000
FINAL CAMBER ↑	0	¼"	7/16"	9/16"	11/16"	11/16"	11/16"	9/16"	7/16"	¼"	0

✱ INCLUDES FUTURE WEARING SURFACE

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



GIRDER CAMBER AND DEFLECTIONS

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

63" PRESTRESSED CONCRETE MODIFIED BULB TEE GIRDER

(LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS

3/29/2017

PLANS PREPARED BY :
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Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY : K. E. LOFTON	DATE : 6-16
CHECKED BY : T. M. HARRIS	DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS	DATE : 10-16

ASSEMBLED BY : K. E. LOFTON	DATE : 6-16		
CHECKED BY : T. M. HARRIS	DATE : 10-16		
DRAWN BY : ELR 11/91	REV. 10/1/11	MAA/GM	
CHECKED BY : GRP 11/91	REV. 1/15	MAA/TMG	
	REV. 2/15	MAA/TMG	

REVISIONS

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1			3		
2			4		

SHEET No. S9-11

TOTAL SHEETS 25

STD. No. PCG9

STR. #9

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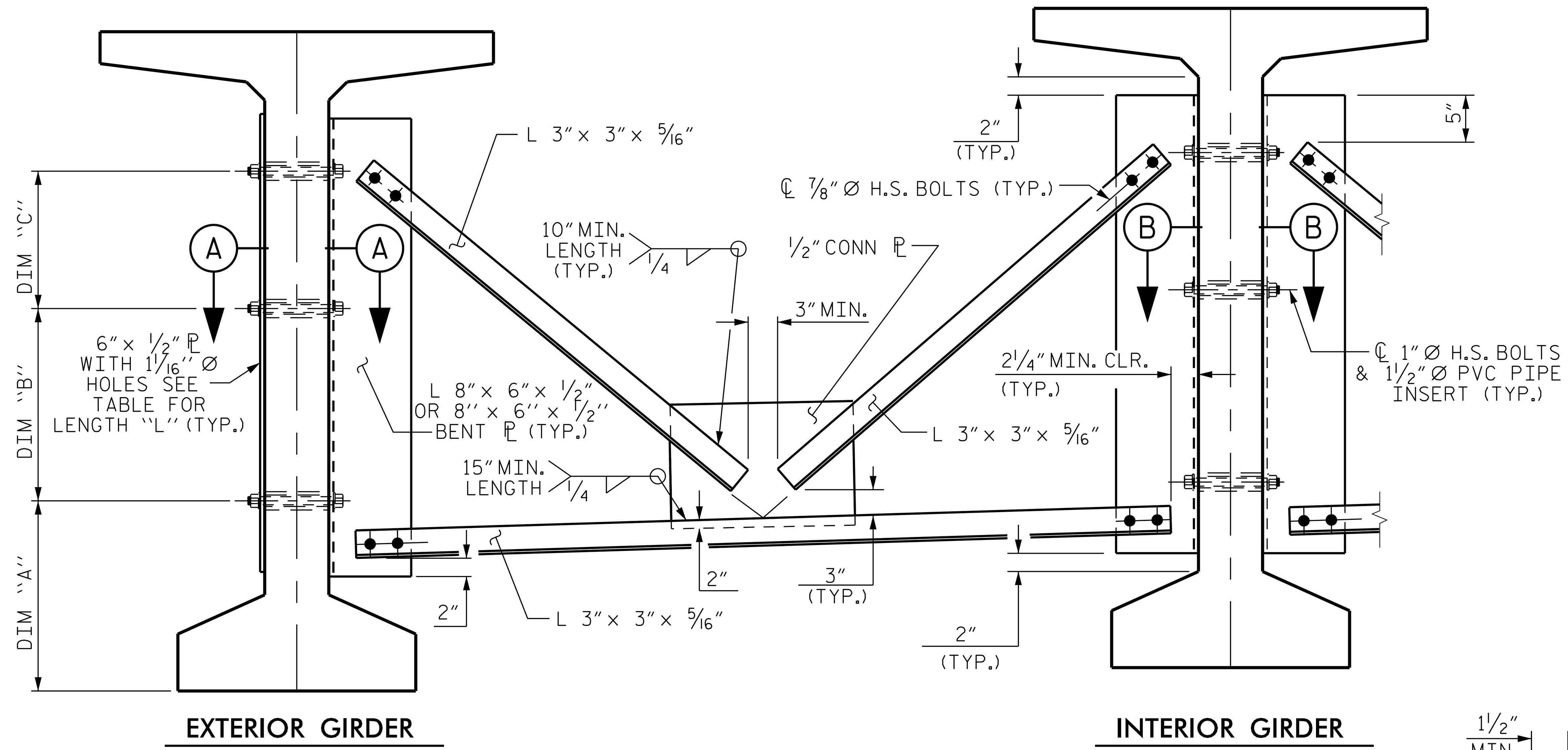
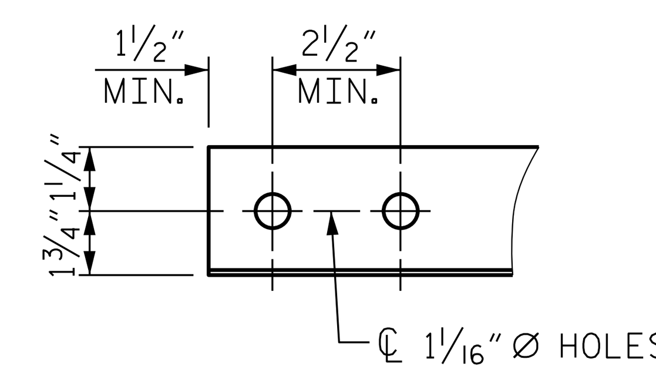
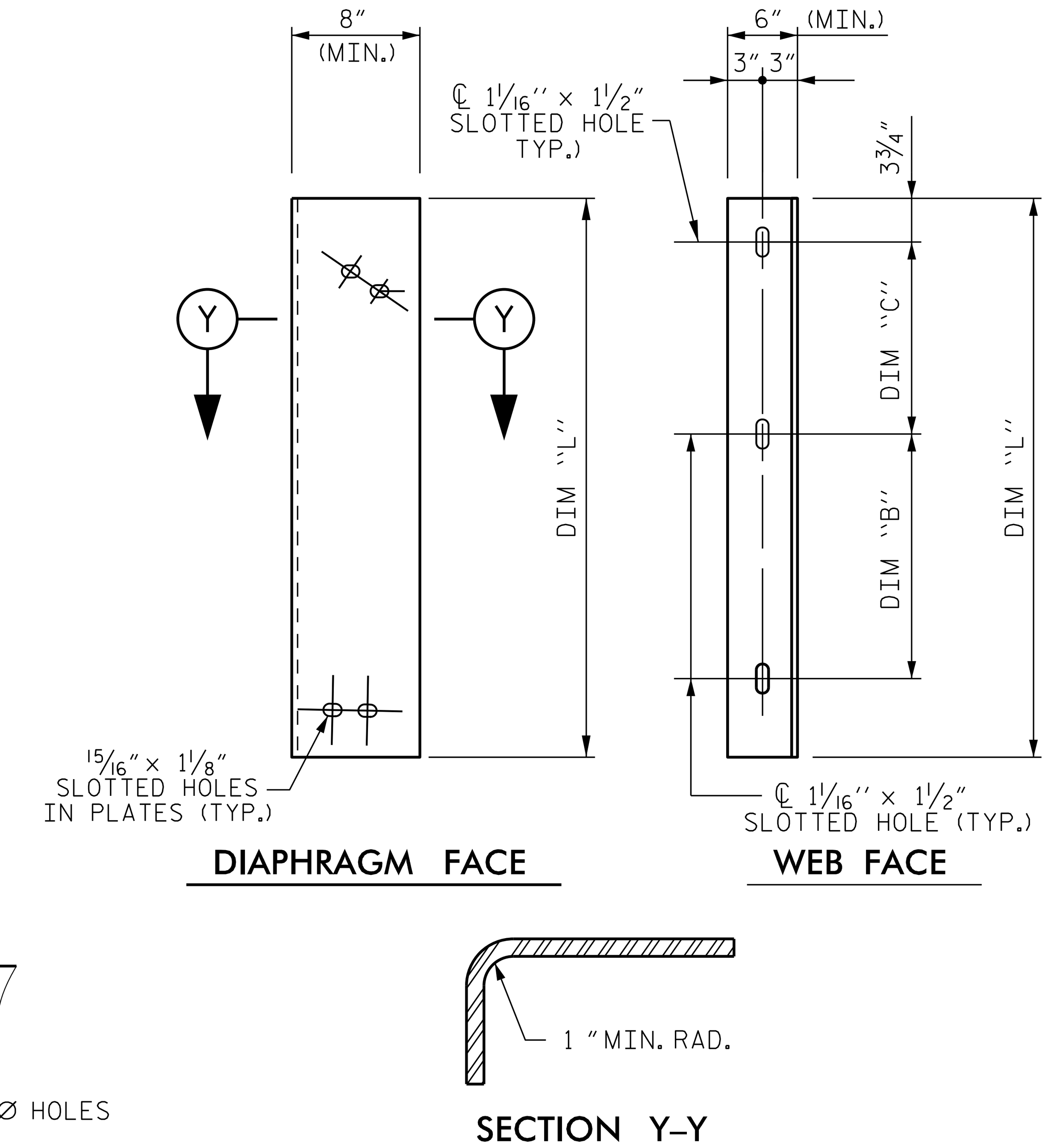


PART SECTION AT INTERMEDIATE DIAPHRAGM
(63″ BULB TEE)



ANGLE END
(L 3″× 3″× 5/16″)



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 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 AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE 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.

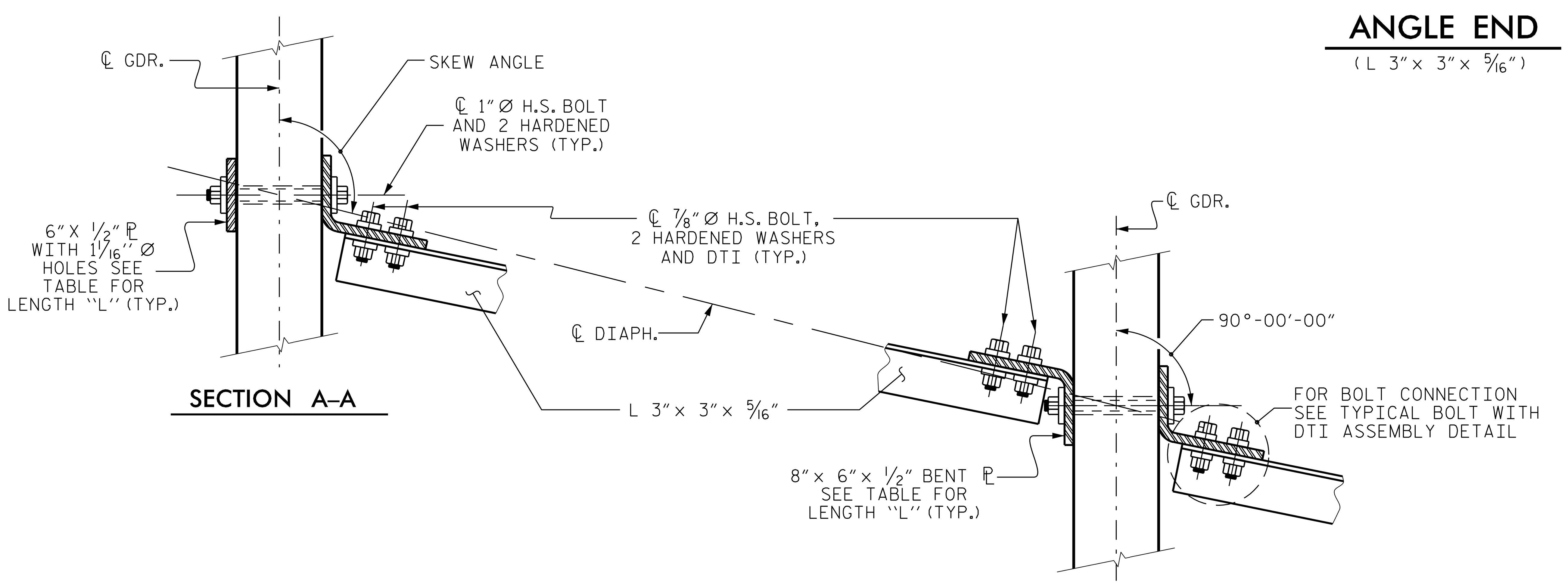
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4″PROJECTION BEYOND THE NUT.

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.

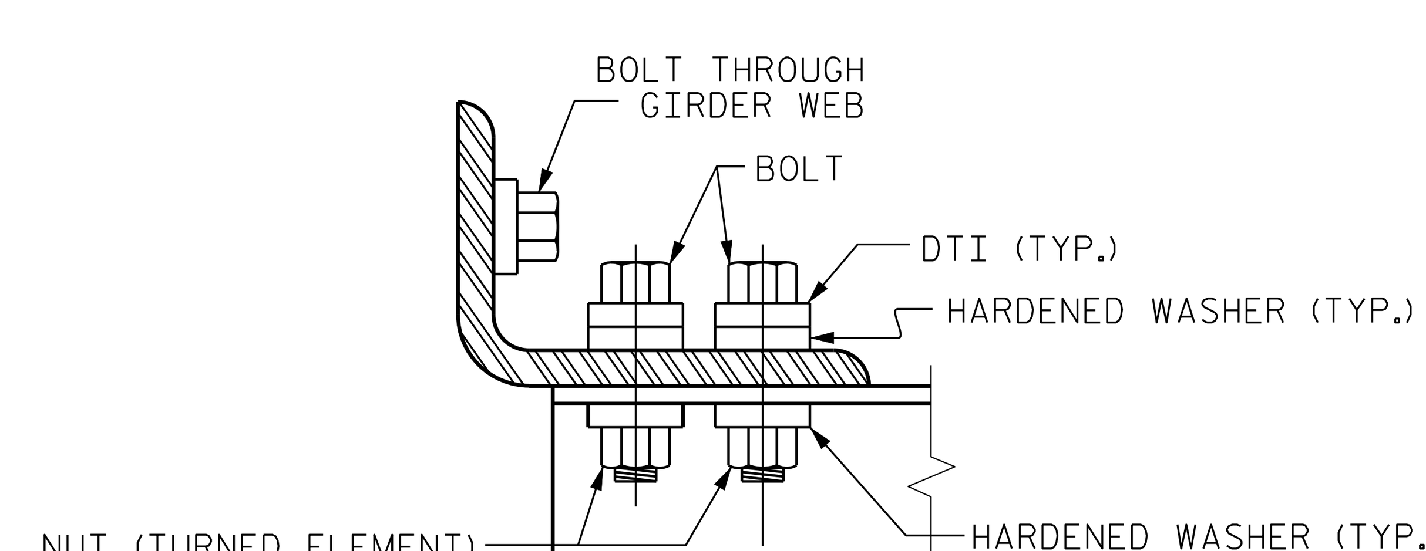
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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



CONNECTION DETAILS
(90°< SKEW < 110°)

TABLE				
GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
63″ BULB TEE	1′-9″	1′-5″	11 3/4″	3′-5″



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R–2707C
CLEVELAND COUNTY
STATION: 611+32.01 –L–

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR 63″ MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

(LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS 2/3/2017

PLANS PREPARED BY :
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606–3386
NC LICENSE No. F–0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	6–16
CHECKED BY :	A. D. SHAH	DATE :	10–16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10–16

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

SHEET No. S9–12
TOTAL SHEETS 25

STD. No. PCG11

STR. *9

ASSEMBLED BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DRAWN BY : RWW 11/09	ADDED 11/23/09		
CHECKED BY : GM 11/09	REV. 10/1/11	MAA/GM	

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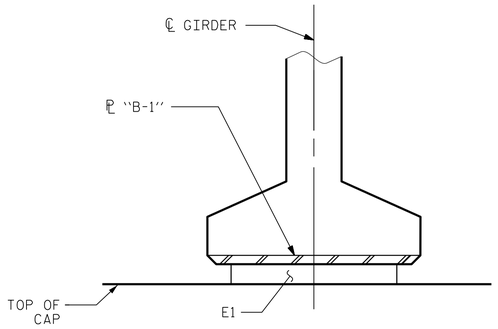
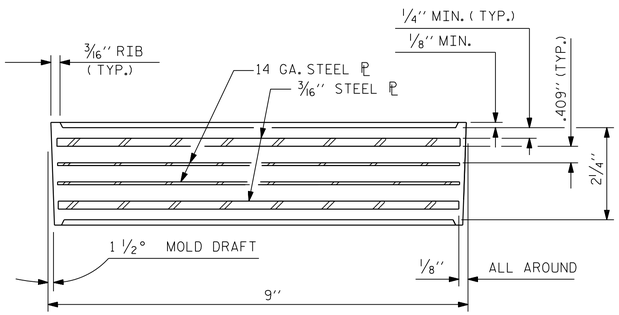
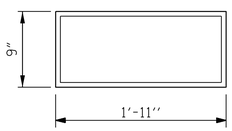


INTEGRAL

SECTION E–E



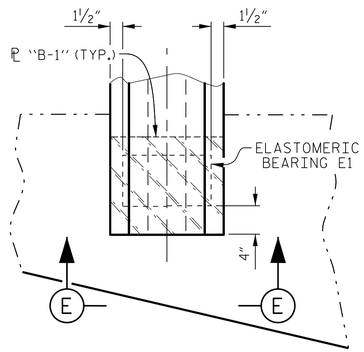
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (8 REQUIRED)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



PARTIAL PLAN – INTEGRAL END BENT

NOTES

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.

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

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

ASSEMBLED BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DRAWN BY : EEM	2/97	REV. 10/1/11	MAA/GM
CHECKED BY : VAP	2/97	REV. 6/13	AAC/MAA
		REV. 1/15	MAA/TMG

DRAWN BY :	K. E. LOFTON	DATE : 6–16
CHECKED BY :	A. D. SHAH	DATE : 10–16
DESIGN ENGINEER :	T. M. HARRIS	DATE : 10–16

PLANS PREPARED BY :

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
84C113A5C7584E4...
2/3/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE (LEFT LANE)

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S9–13
1			3			TOTAL SHEETS
2			4			25

STD. No. EB4 STR. #9

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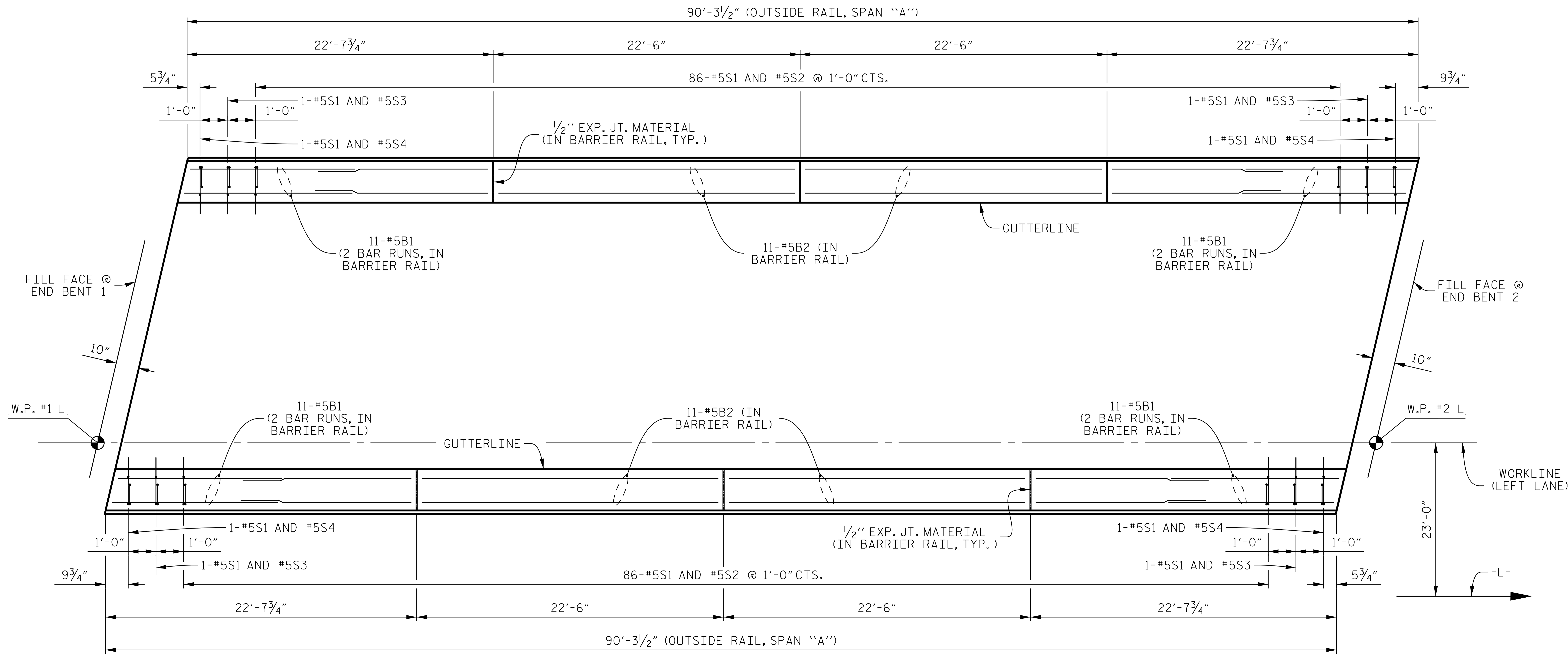
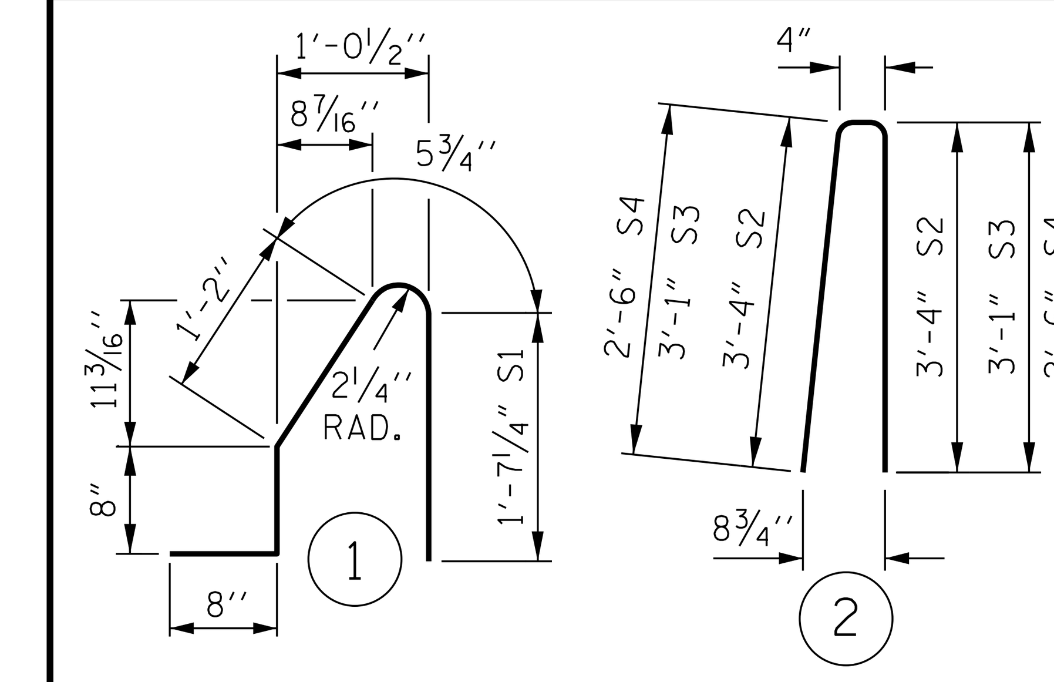


PLAN OF BARRIER RAIL

SPLICE LENGTH		
BAR	SIZE	LENGTH
B1	#5	3'-5"

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
*B1	88	#5	STR	12'-10"	1,178
*B2	44	#5	STR	22'- 1"	1,013
*S1	180	#5	1	4'- 7"	860
*S2	172	#5	2	7'- 0"	1,256
*S3	4	#5	2	6'- 6"	27
*S4	4	#5	2	5'- 4"	22

*EPOXY COATED REINFORCING STEEL	4,356 LBS.
CLASS "AA" CONCRETE	24.5 CU. YDS.
CONCRETE BARRIER RAIL	180.58 LIN. FT.

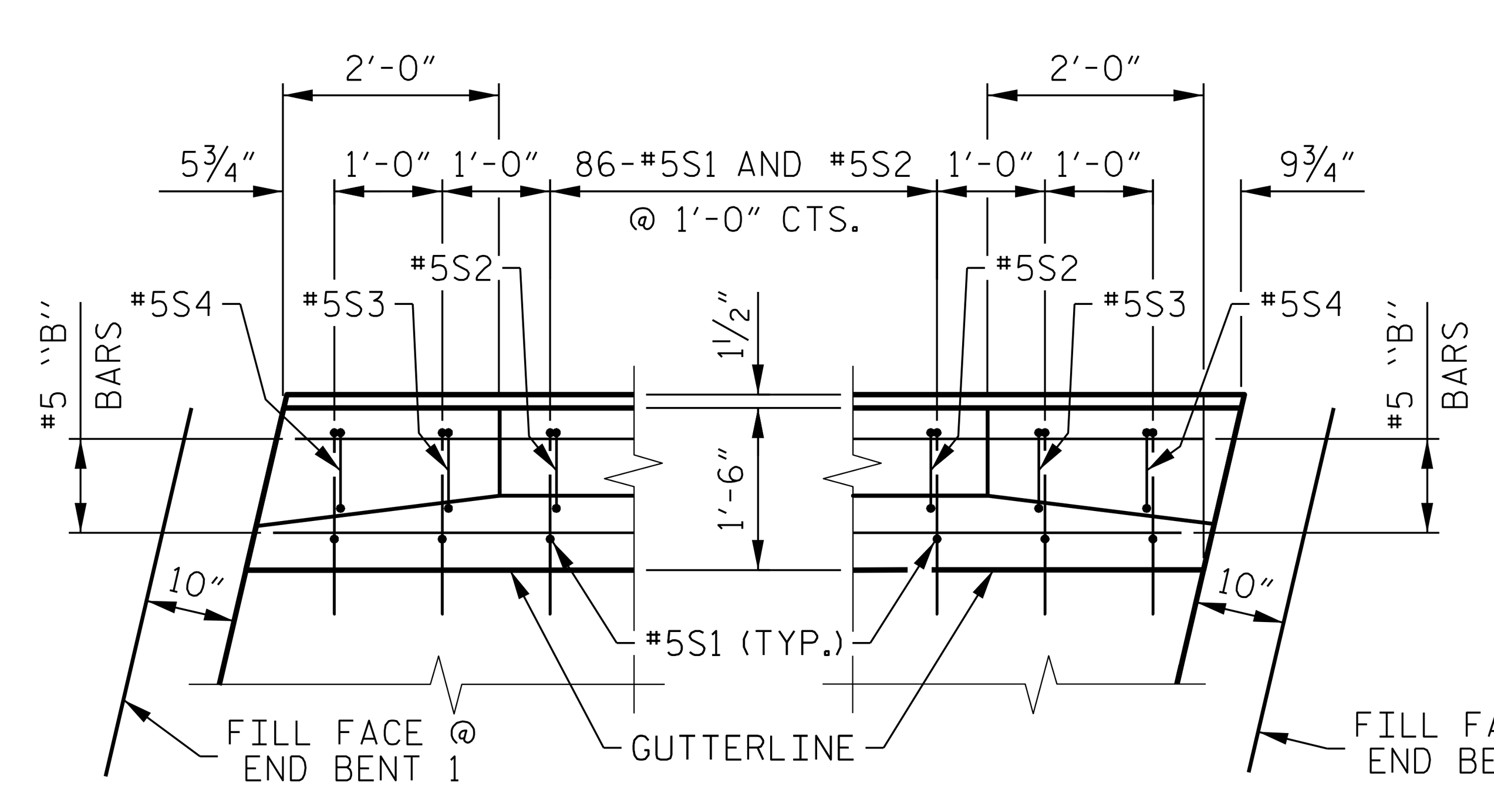
NOTES

THE BARRIER RAIL IN SPAN "A" SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE 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.

THE #5S1 AND #5S2 BARS MAY BE SHIFTED AS NECESSARY TO CLEAR EXPANSION JOINTS IN RAIL.

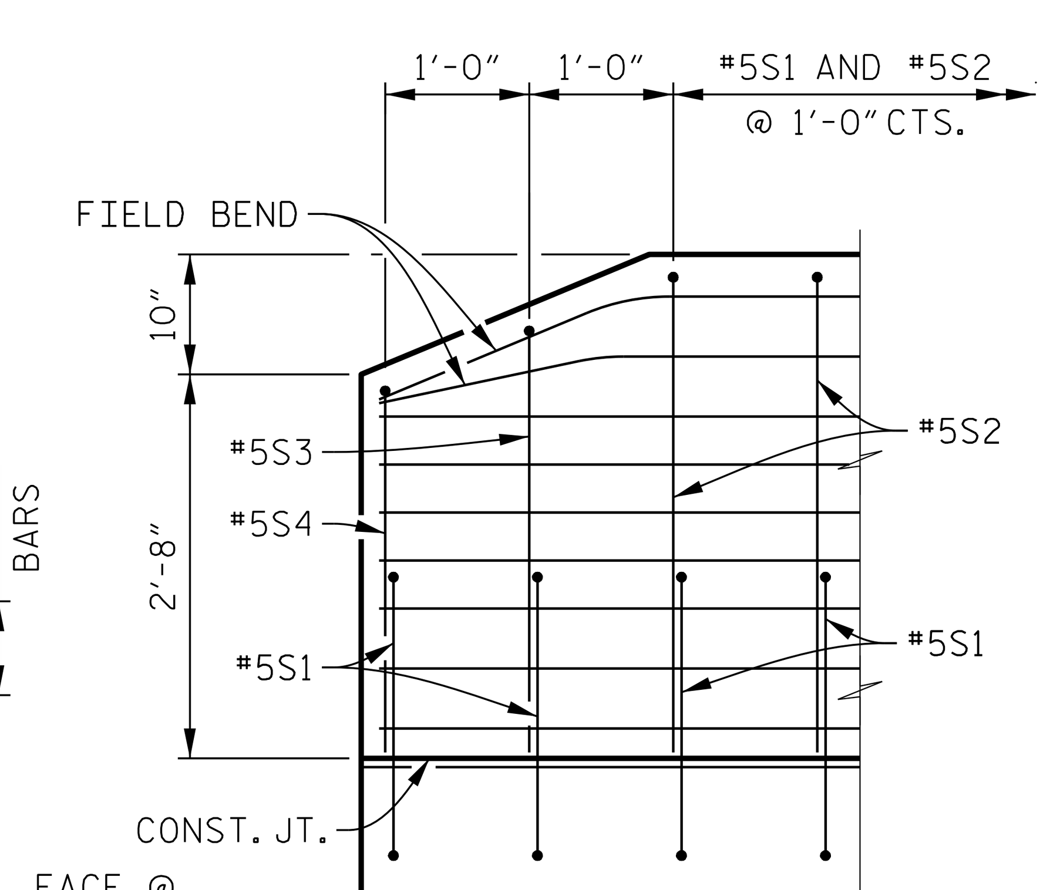


PLAN @ END BENT 1

LEFT SIDE SHOWN, RIGHT SIDE SIMILAR

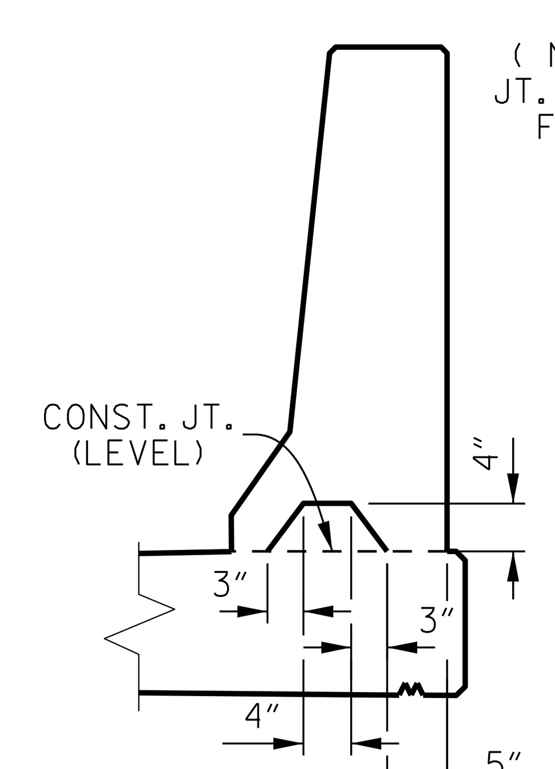
PLAN @ END BENT 2

LEFT SIDE SHOWN, RIGHT SIDE SIMILAR



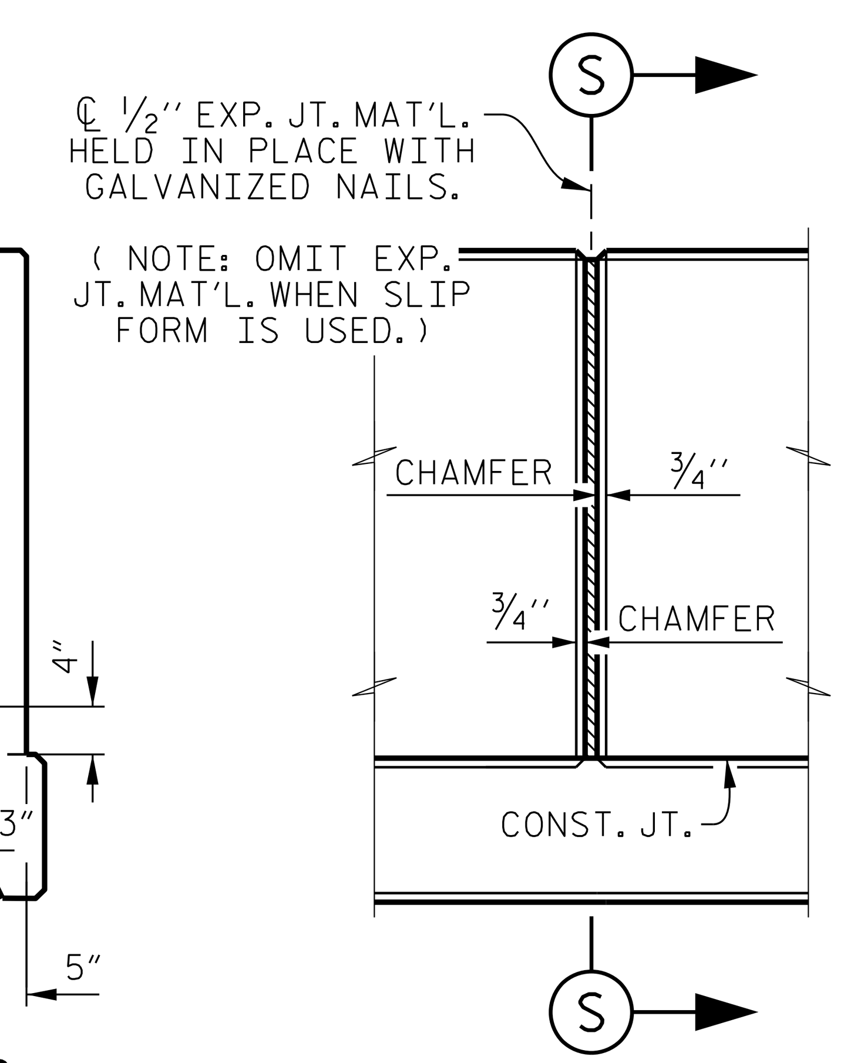
ELEVATION VIEW

END OF RAIL DETAILS

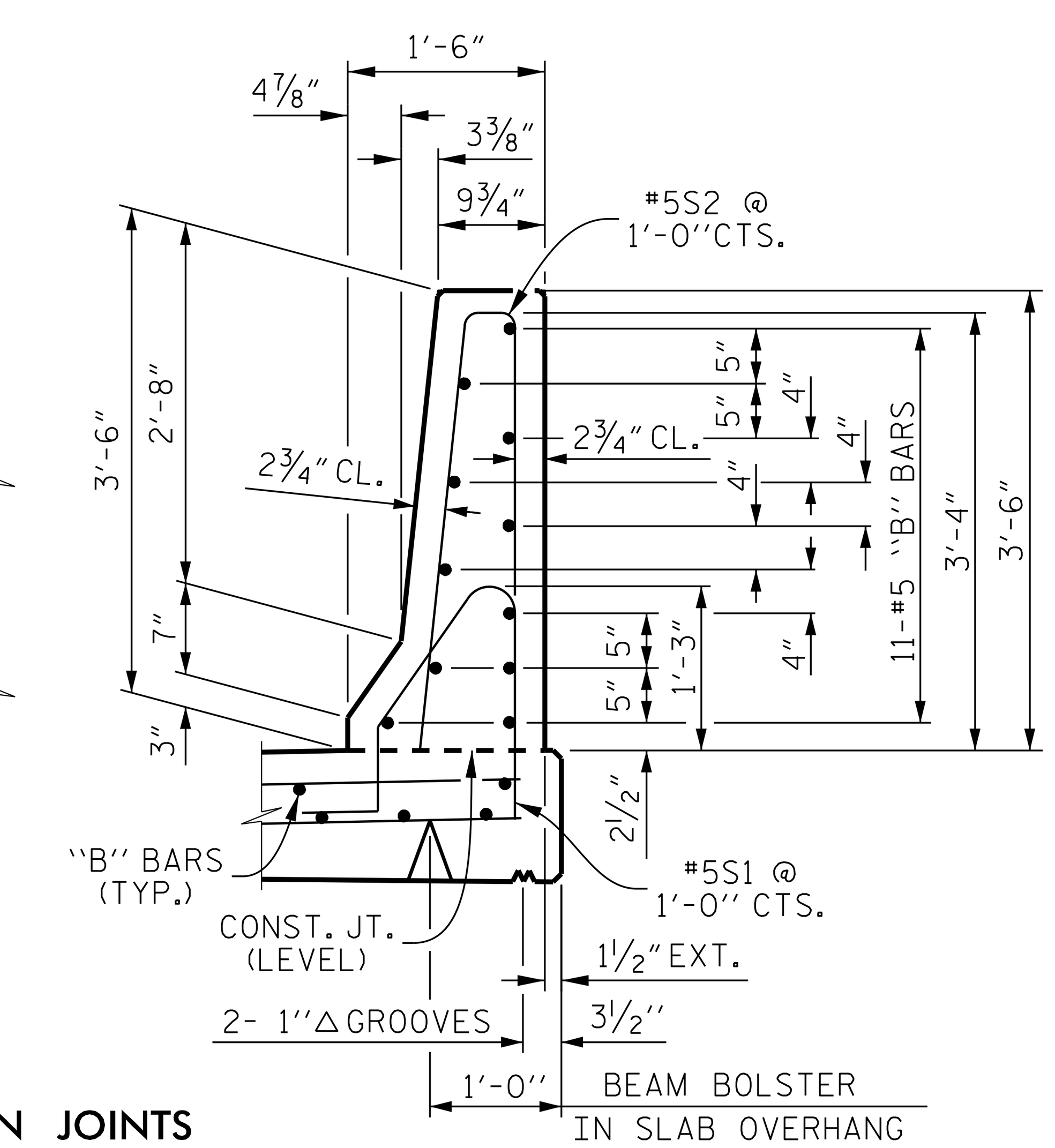


SECTION S-S

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



ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL

BARRIER RAIL DETAILS

PROJECT NO. R-2707C

CLEVELAND COUNTY

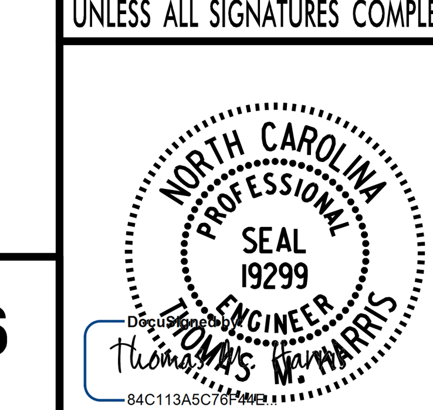
STATION: 611+32.01 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL (LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

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No.	BY:	DATE:		No.	BY:	DATE:	
1				3			
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SHEET No. S9-14

TOTAL SHEETS 25

ASSEMBLED BY :	K. E. LOFTON	DATE :	6-16
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CHECKED BY : SJD 9/87	REV. 7/12	MAA/GM	
	REV. 6/13	MAA/GM	

STD. No. CBR1

STR. #9

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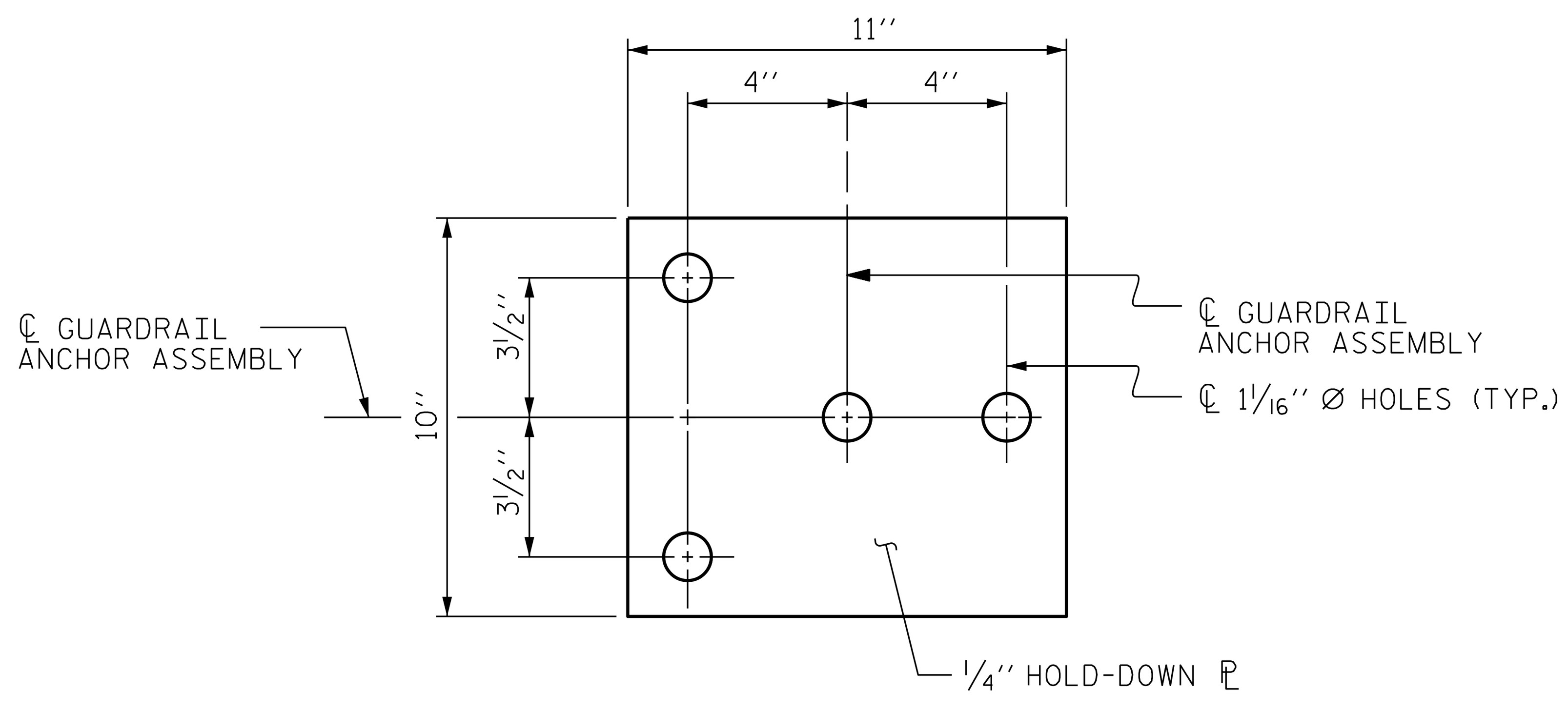

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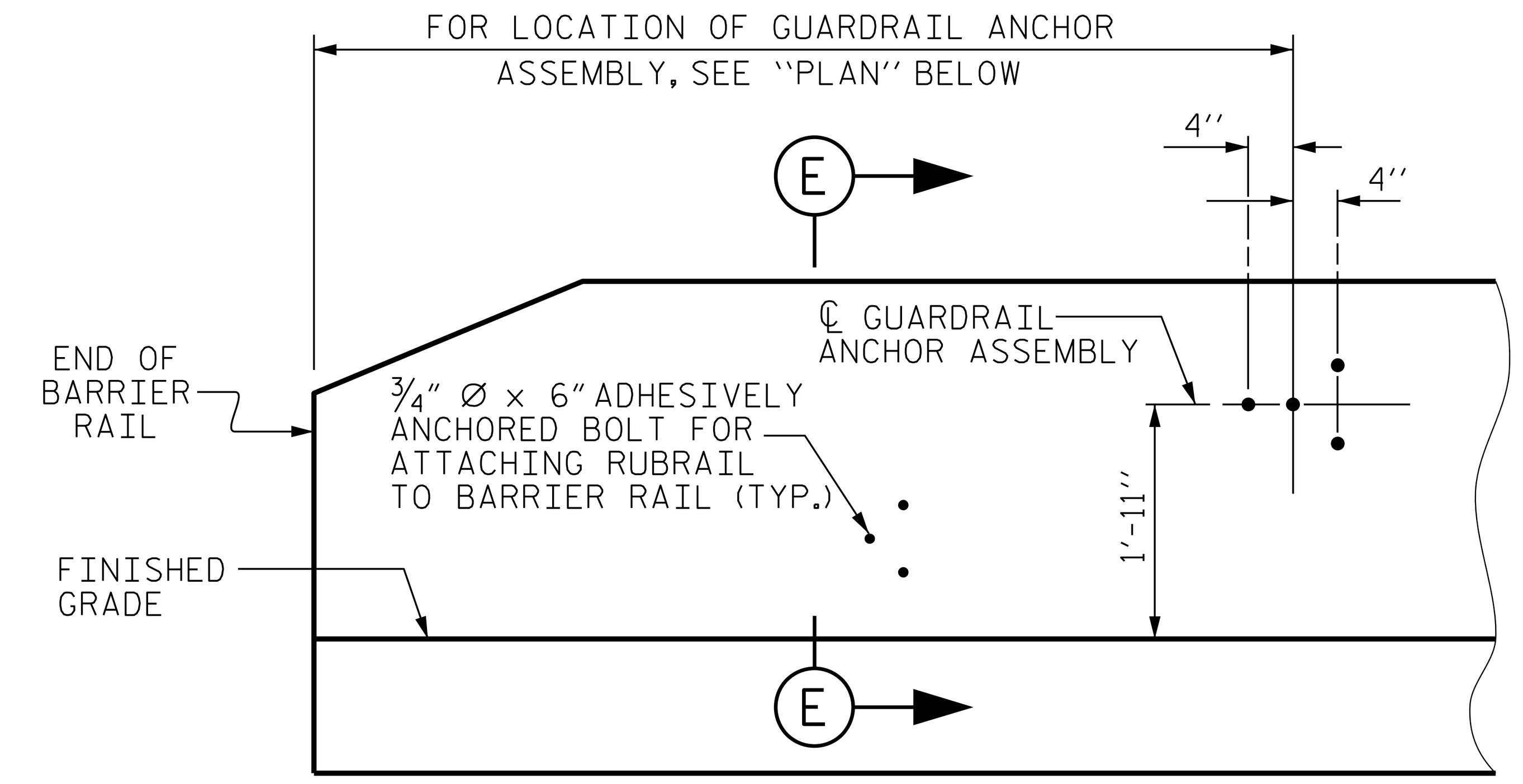


ELEVATION

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼'' HOLD DOWN PLATE AND 4 - ⅞'' 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 ⅞'' 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.)

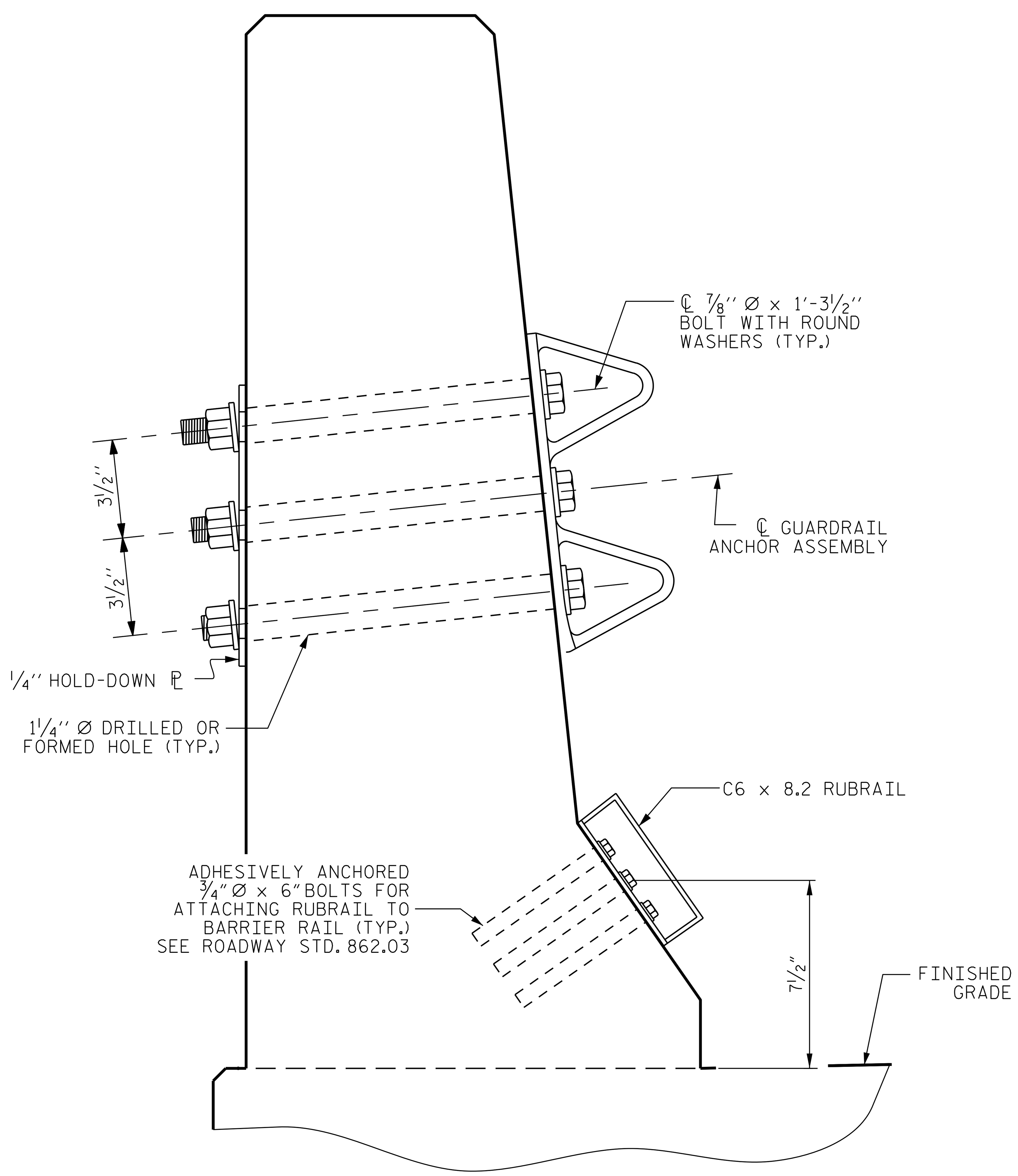
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

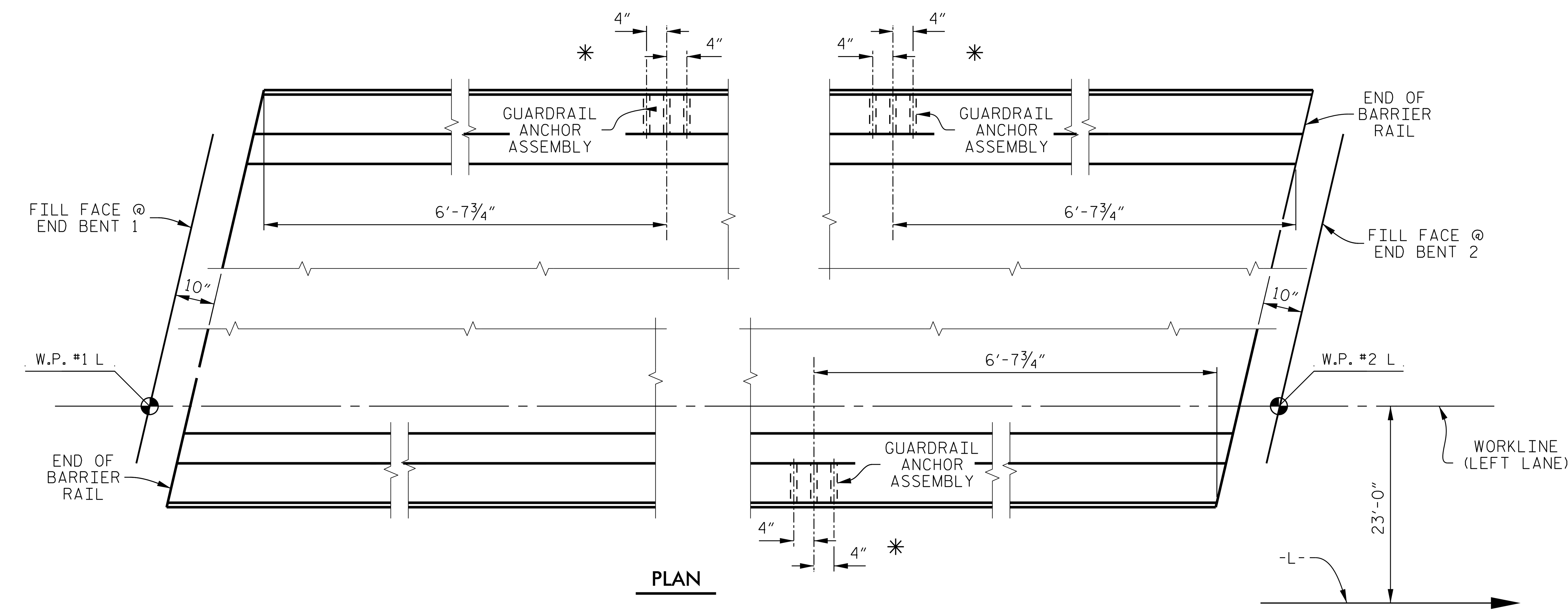
THE 1¼'' Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 x 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE ¾" Ø x 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

✱ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL (LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY :
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

ASSEMBLED BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	A. D. SHAH	DATE :	10-16

DRAWN BY : TLA 5/06	REV. 10/1/11	MAA/GM
CHECKED BY : GM 5/06	REV. 7/12	MAA/GM
	REV. 6/13	MAA/GM

REVISIONS

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

SHEET No. S9-15
TOTAL SHEETS 25

STD. No. GRA2
STR. #9

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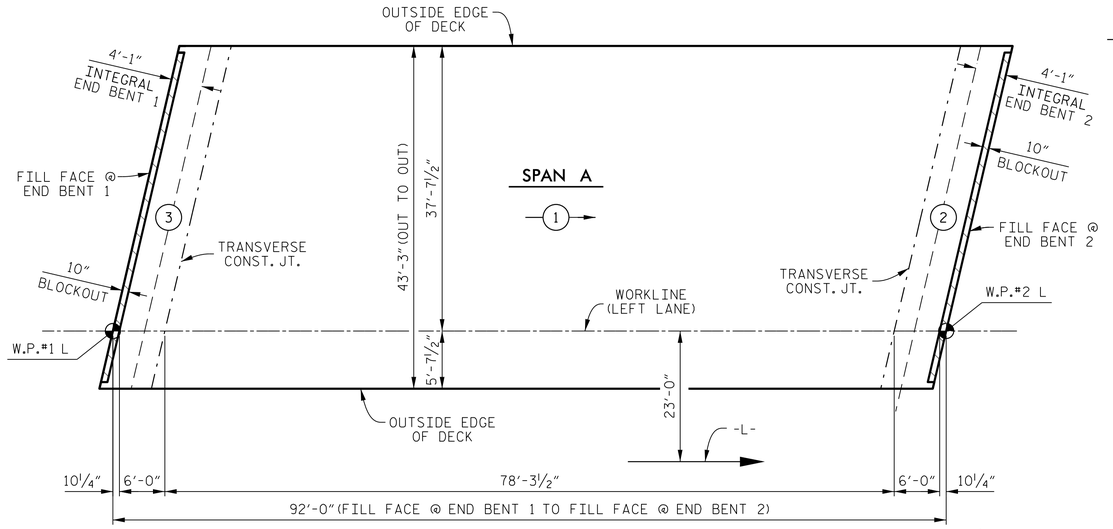


POURING SEQUENCE

NOTES

POUR 2 AND POUR 3 MAY BE COMBINED.

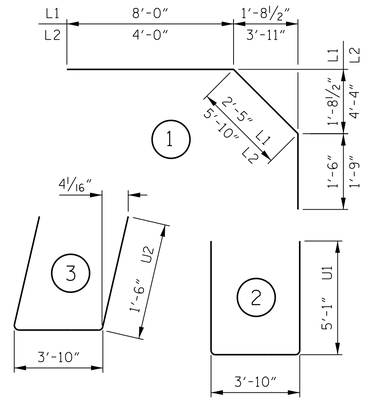
DIRECTION OF POUR 1 MAY BE REVERSED.

(#) INDICATES POUR NUMBER AND DIRECTION OF POUR.

CLASS AA CONCRETE BREAKDOWN

POUR 1	116.9 CU. YDS.
POUR 2	44.1 CU. YDS.
POUR 3	44.1 CU. YDS.
TOTAL	205.1 CU. YDS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

TOTAL SUPERSTRUCTURE QUANTITIES

	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL	CLASS "AA" CONCRETE
	LBS.	LBS.	CU. YDS.
SPAN A	14,989	13,994	205.1
** TOTAL	14,989	13,994	205.1

** QUANTITIES FOR CONCRETE BARRIER RAIL ARE NOT INCLUDED. SEE "CONCRETE BARRIER RAIL" SHEET FOR DETAILS.

GROOVING BRIDGE FLOORS

APPROACH SLAB AT END BENT 1	1,089 SQ. FT.
BRIDGE DECK	3,327 SQ. FT.
APPROACH SLAB AT END BENT 2	1,089 SQ. FT.
TOTAL	5,505 SQ. FT.

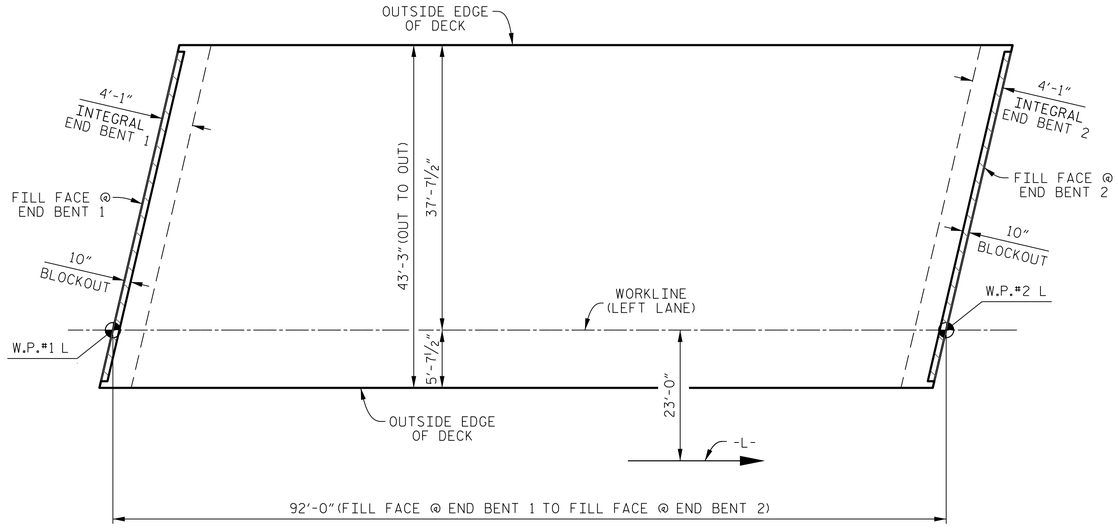
BILL OF MATERIAL

SPAN A

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
* A1	161	#5	STR	42'-11"	7,207
* A101	2	#5	STR	40'- 9"	85
* A102	2	#5	STR	38'- 7"	80
* A103	2	#5	STR	36'- 5"	76
* A104	2	#5	STR	34'- 3"	71
* A105	2	#5	STR	32'- 2"	67
* A106	2	#5	STR	30'- 0"	63
* A107	2	#5	STR	27'-10"	58
* A108	2	#5	STR	25'- 8"	54
* A109	2	#5	STR	23'- 6"	49
* A110	2	#5	STR	21'- 4"	45
* A111	2	#5	STR	19'- 2"	40
* A112	2	#5	STR	17'- 0"	35
* A113	2	#5	STR	14'-10"	31
* A114	2	#5	STR	12'- 8"	26
* A115	2	#5	STR	10'- 6"	22
* A116	2	#5	STR	8'- 4"	17
* A117	2	#5	STR	6'- 2"	13
* A118	2	#5	STR	4'- 0"	8
A2	161	#5	STR	42'-11"	7,207
A201	2	#5	STR	40'- 9"	85
A202	2	#5	STR	38'- 7"	80
A203	2	#5	STR	36'- 5"	76
A204	2	#5	STR	34'- 3"	71
A205	2	#5	STR	32'- 2"	67
A206	2	#5	STR	30'- 0"	63
A207	2	#5	STR	27'-10"	58
A208	2	#5	STR	25'- 8"	54
A209	2	#5	STR	23'- 6"	49
A210	2	#5	STR	21'- 4"	45
A211	2	#5	STR	19'- 2"	40
A212	2	#5	STR	17'- 0"	35
A213	2	#5	STR	14'-10"	31
A214	2	#5	STR	12'- 8"	26
A215	2	#5	STR	10'- 6"	22
A216	2	#5	STR	8'- 4"	17
A217	2	#5	STR	6'- 2"	13
A218	2	#5	STR	4'- 0"	8
* B1	120	#4	STR	24'- 0"	1,924
* B2	162	#5	STR	18'- 5"	3,112
B3	114	#5	STR	46'- 1"	5,479
K1	28	#4	STR	22'-11"	429
K2	6	#4	STR	7'-10"	31
K3	30	#4	STR	10'- 9"	215
K4	6	#4	STR	9'- 4"	37
K5	4	#4	STR	2'- 2"	6
K6	20	#4	STR	3'- 7"	48
K7	4	#4	STR	2'-11"	8
* L1	60	#4	1	11'-11"	478
* L2	56	#4	1	11'- 7"	433
U1	60	#4	2	14'- 0"	561
U2	28	#4	3	6'-10"	128

REINFORCING STEEL 14,989 LBS.

* EPOXY COATED REINFORCING STEEL 13,994 LBS.



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(3,979 SQ. FT.)

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"			

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

(LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M HARRIS
2/3/2017

DRAWN BY : K. E. LOFTON DATE : 6-16
CHECKED BY : A. D. SHAH DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS DATE : 10-16

PLANS PREPARED BY :
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NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

REVISIONS						SHEET No.
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2			4			25

STR. #9

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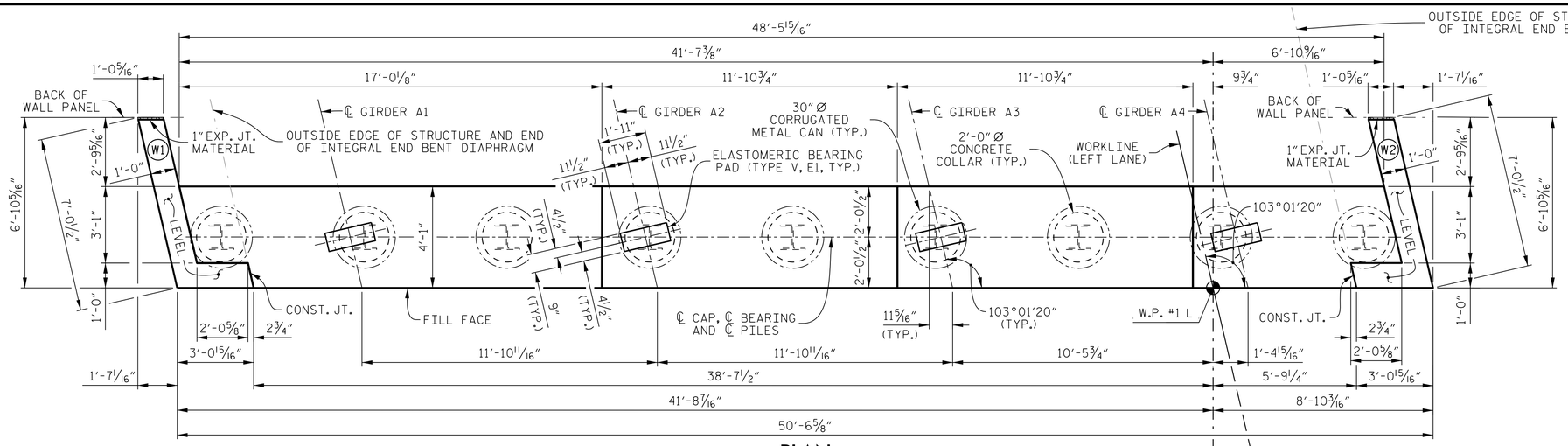
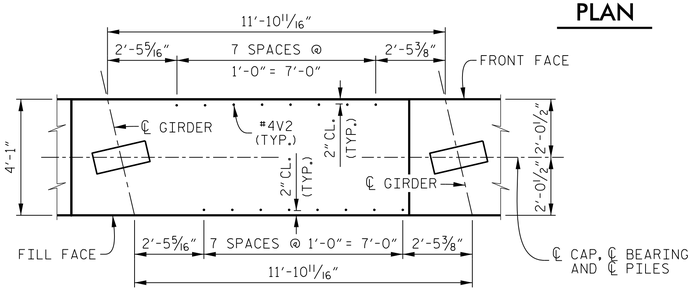
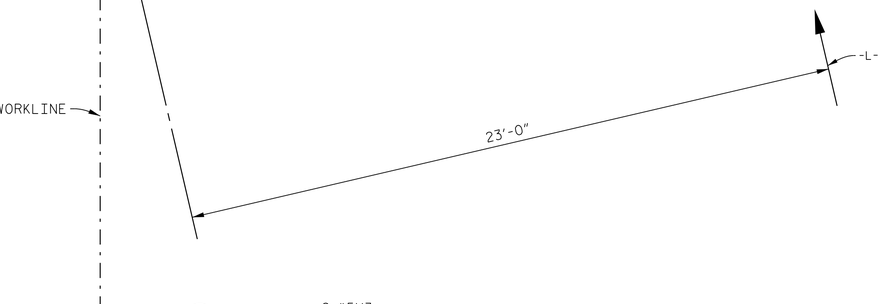
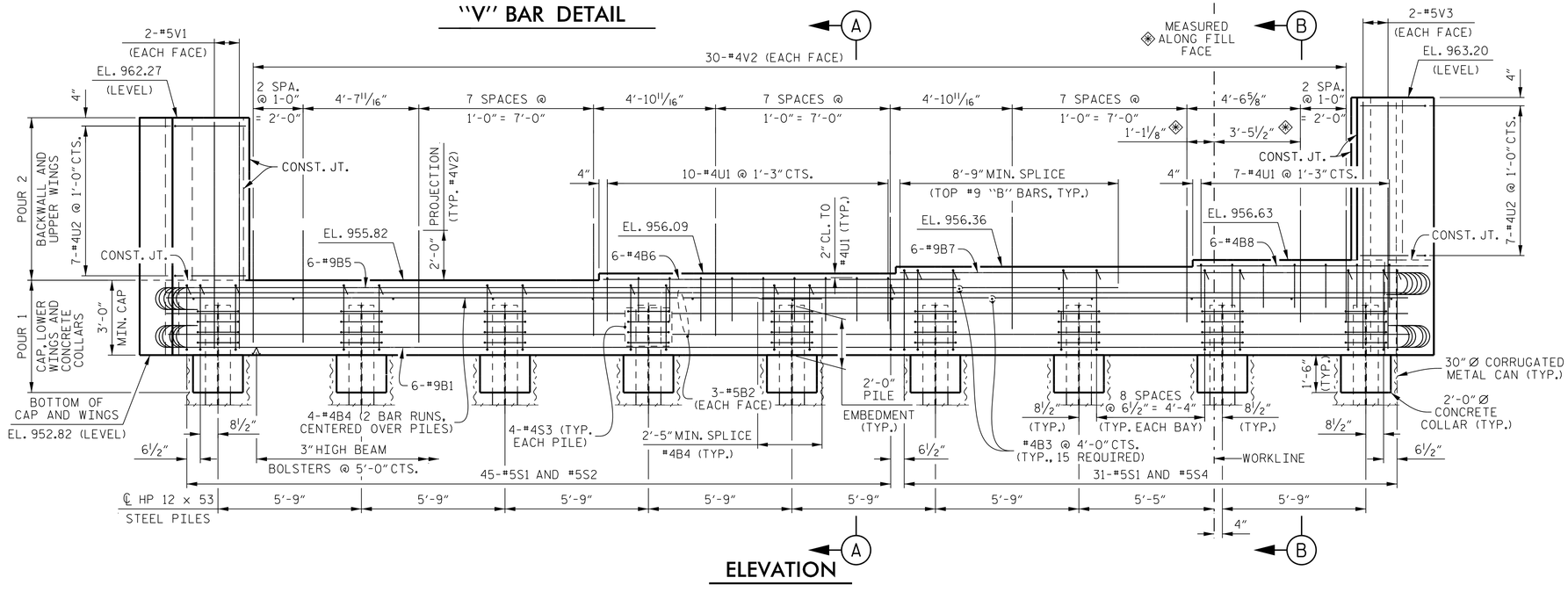


PLAN



"V" BAR DETAIL





ELEVATION

NOTES

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4V2 BARS.

THE TOP SURFACE OF THE END BENT CAP UNDER THE INTEGRAL END BENT DIAPHRAGM, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR TEMPORARY DRAINAGE AT END BENT DETAIL, SEE SHEET 3 OF 3.

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

FOR INTEGRAL END BENT DIAPHRAGM DETAILS, SEE "TYPICAL SECTION" AND "PLAN OF SPAN" SHEETS.

THE COST TO FURNISH AND INSTALL THE 30" Ø CORRUGATED METAL CANS SHALL BE INCLUDED IN THE CONTRACT PRICE FOR MSE RETAINING WALL.

WING (W1) AND WING (W2) DETAILS ARE BASED ON A 5 1/2" WALL PANEL THICKNESS AND USING DOWELS FOR THE COPING. CONTRACTOR MAY ADJUST WINGS SLIGHTLY AS NECESSARY, BASED ON APPROVED MSE WALL SHOP DRAWINGS.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

(LEFT LANE)

DRAWN BY : K. E. LOFTON DATE : 6-16
CHECKED BY : A. D. SHAH DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS DATE : 10-16

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FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

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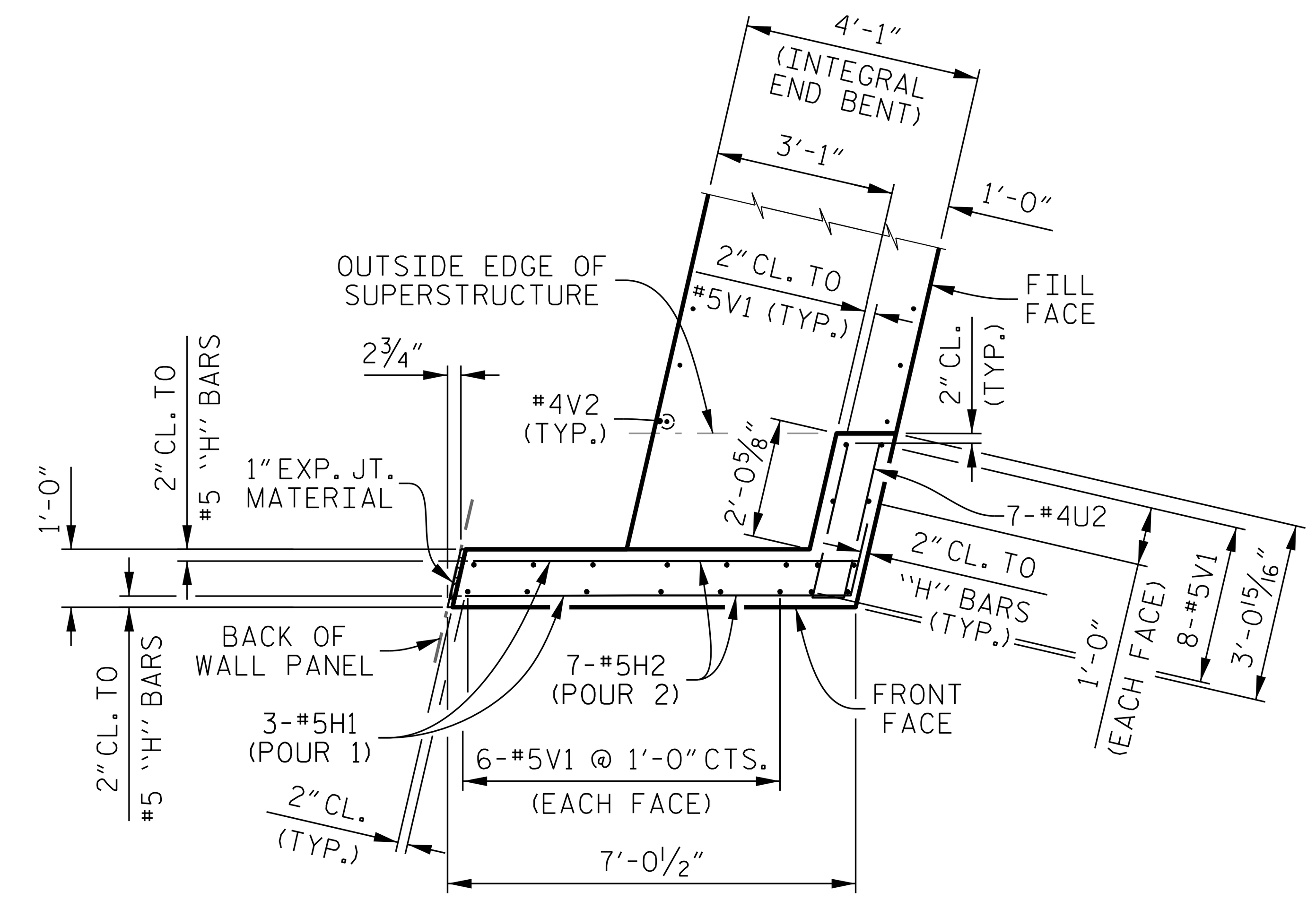
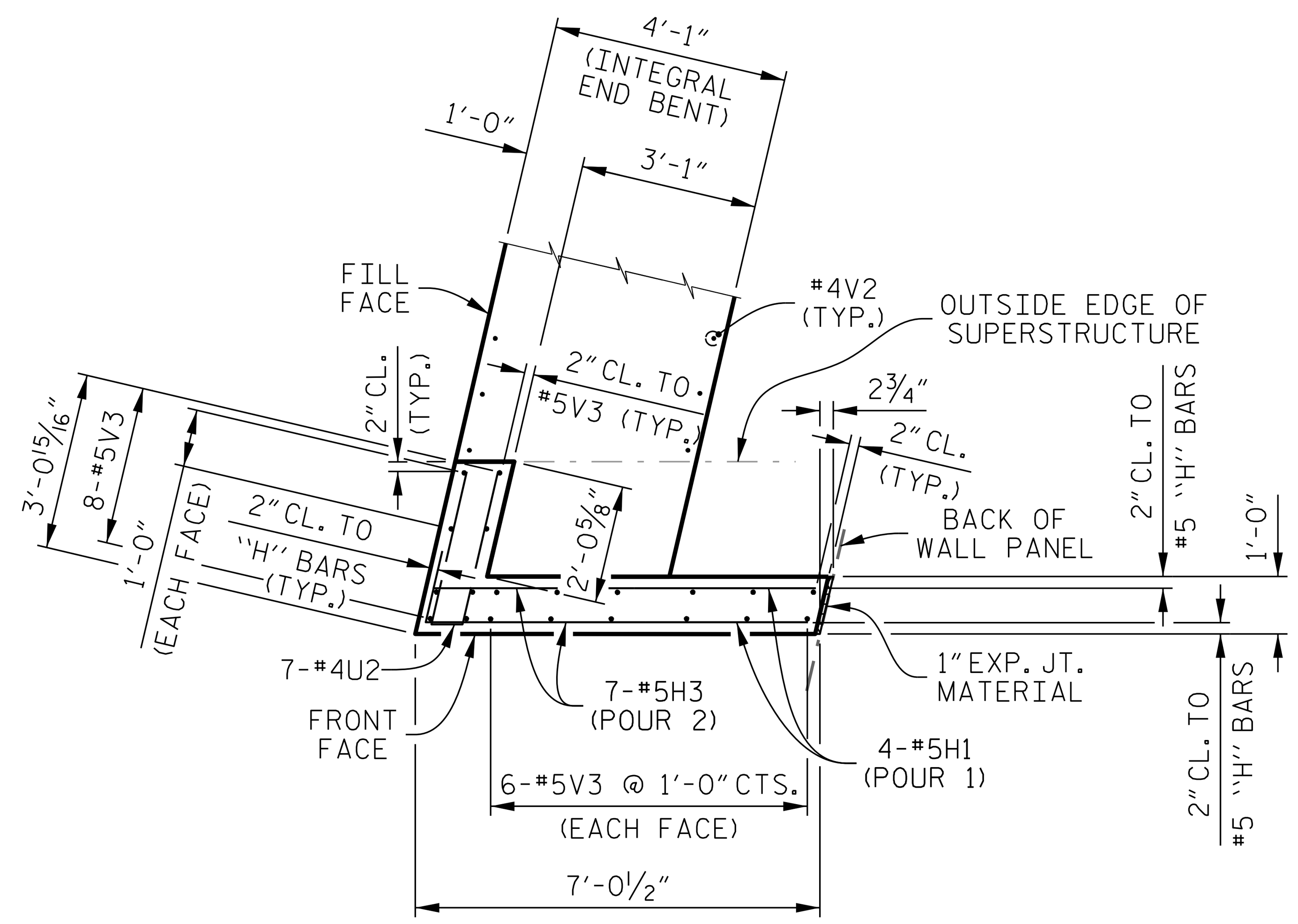
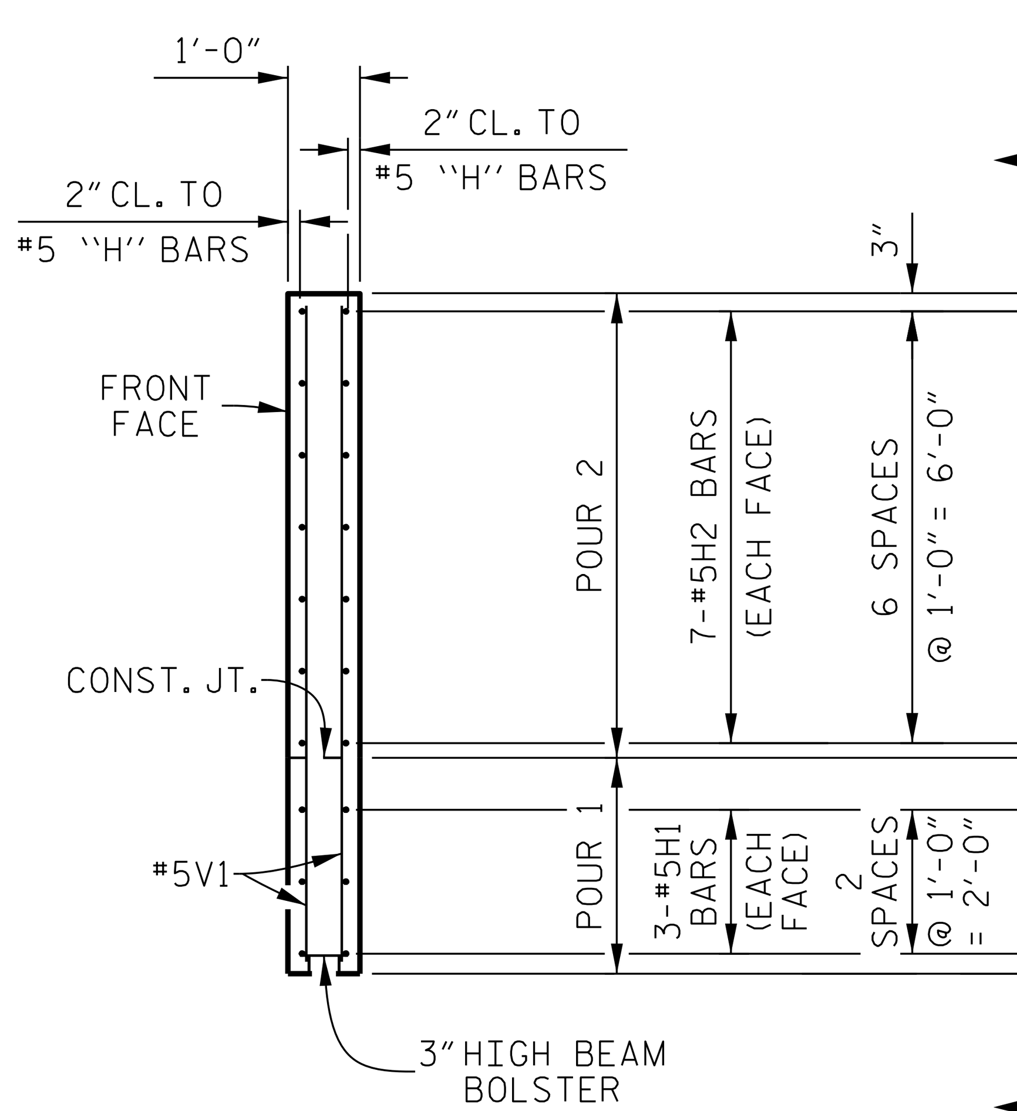


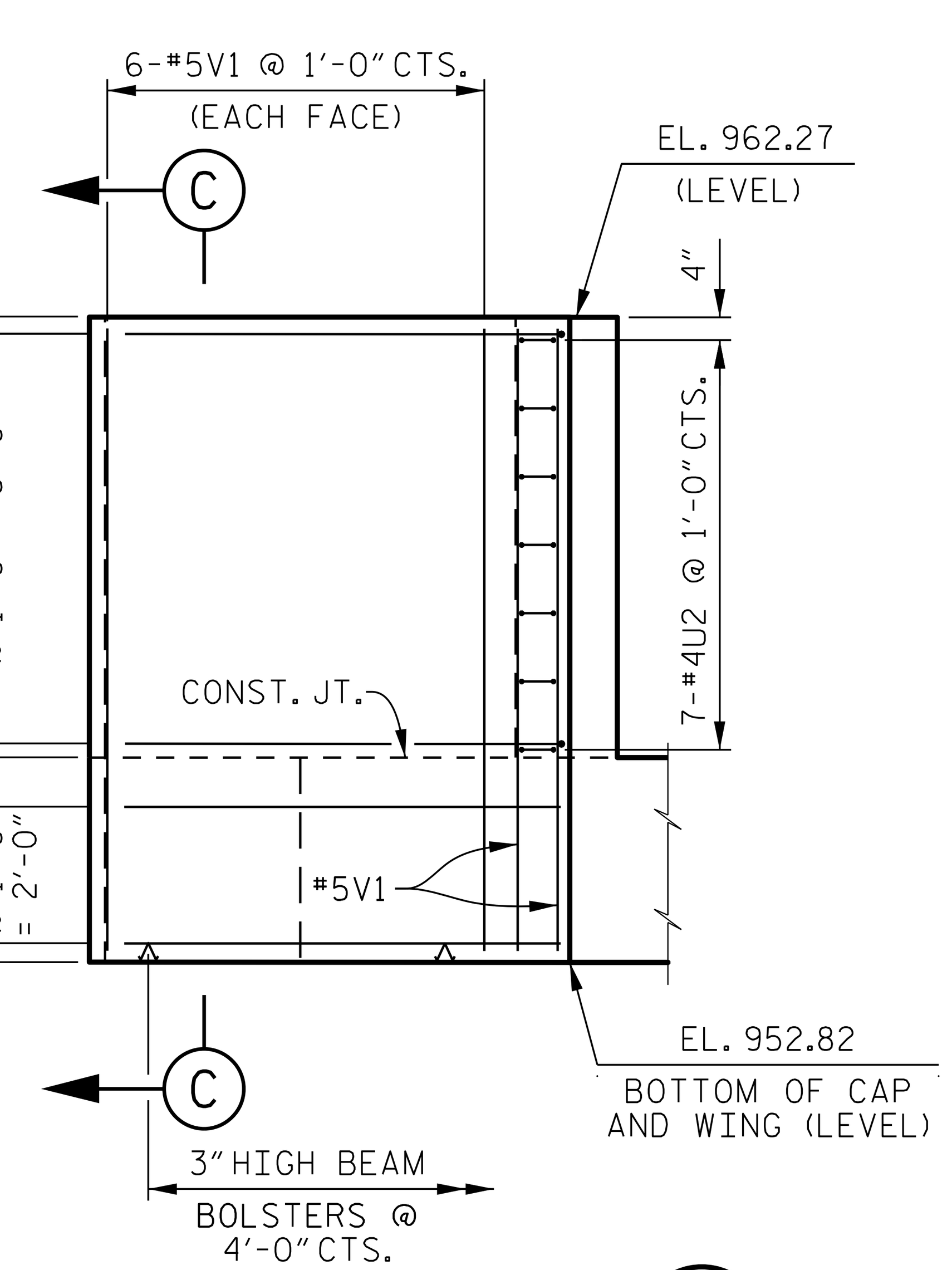
PLAN OF WING W1



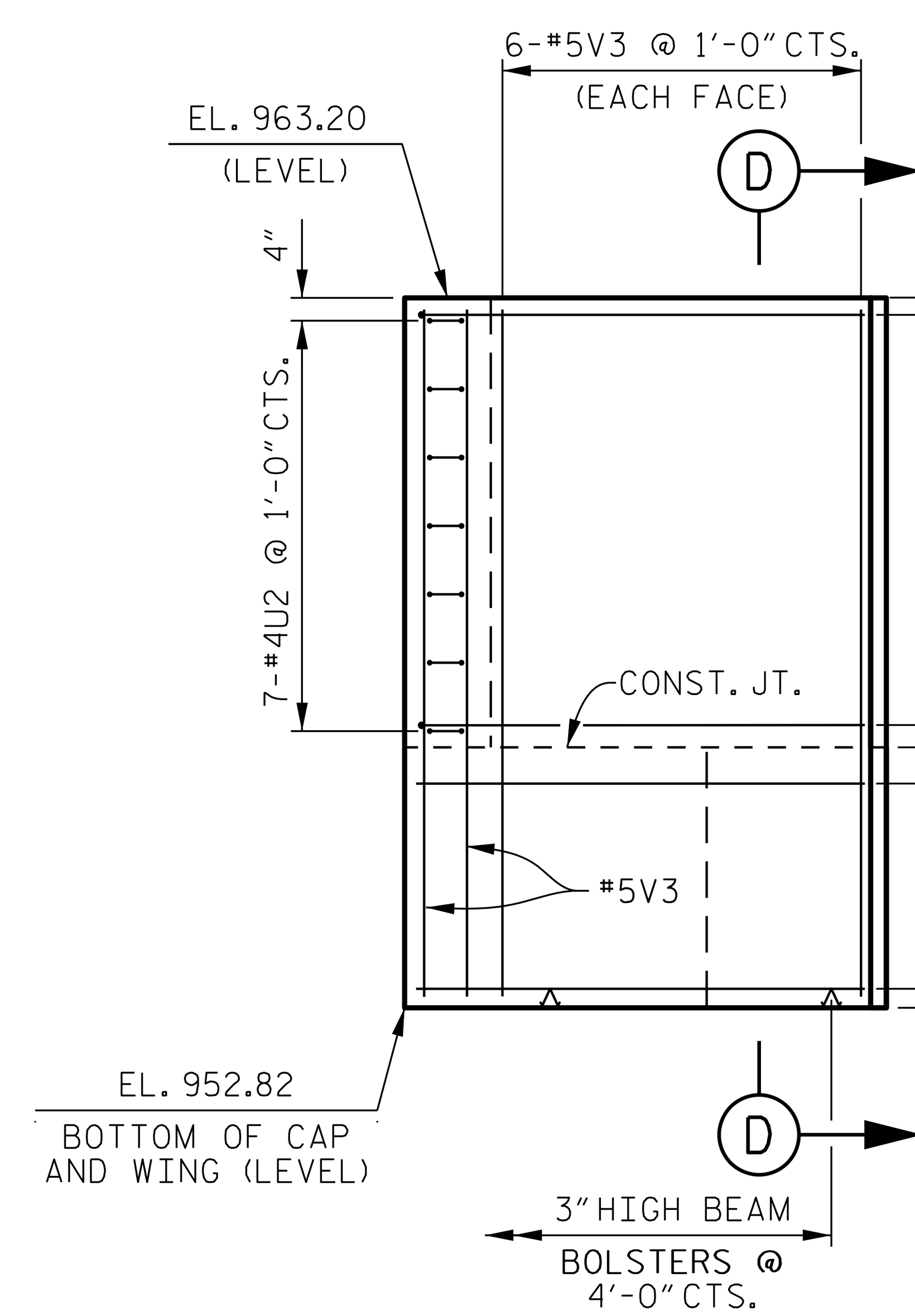
PLAN OF WING W2



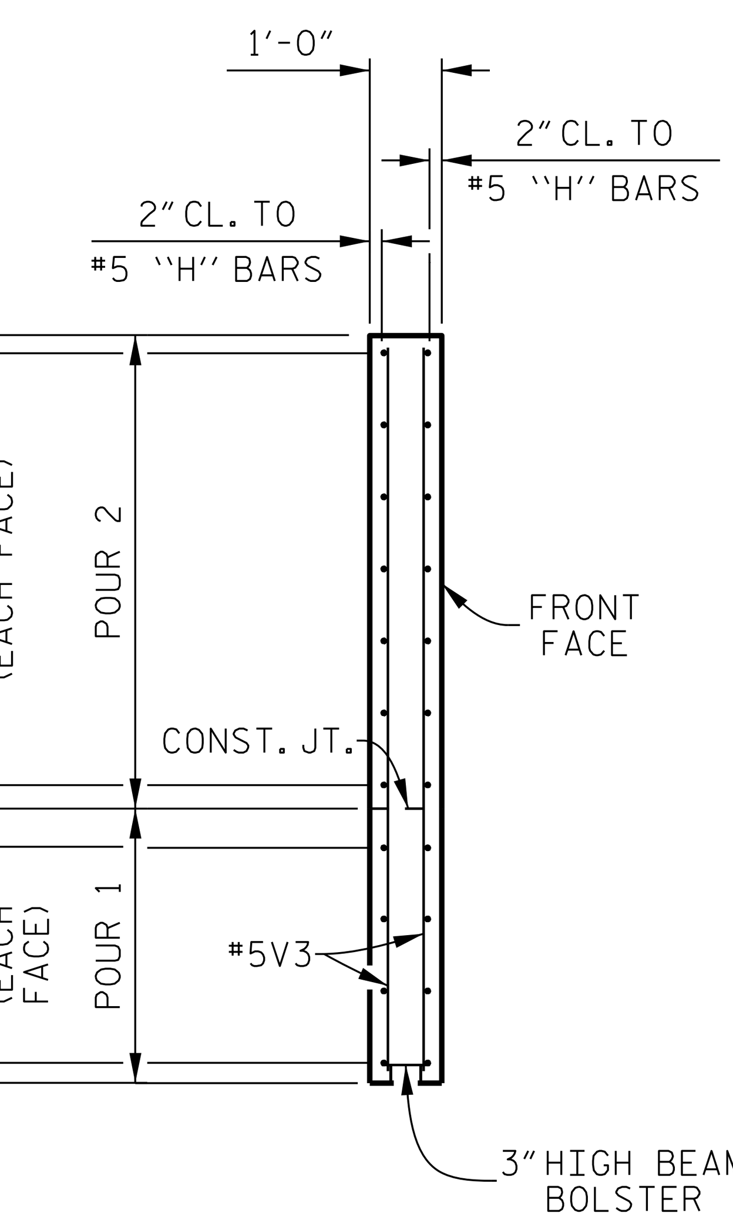
SECTION C–C



ELEVATION OF WING W1



ELEVATION OF WING W2



SECTION D–D

PROJECT NO. R–2707C
CLEVELAND COUNTY
STATION: 611+32.01 –L–

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1
(LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY :
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NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

REVISIONS

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2			4		

SHEET No. S9–18
TOTAL SHEETS 25
STR. #9

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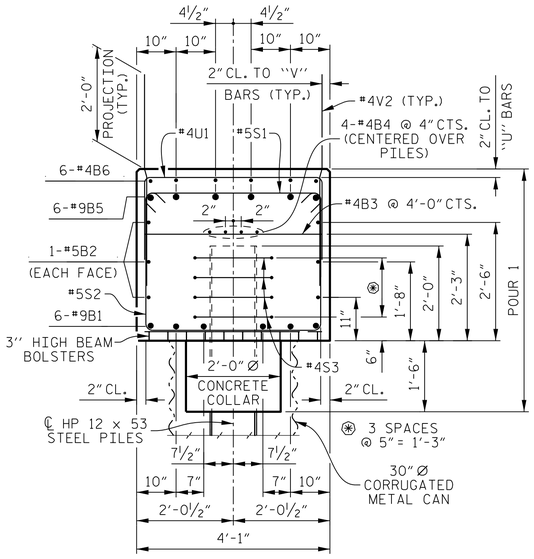
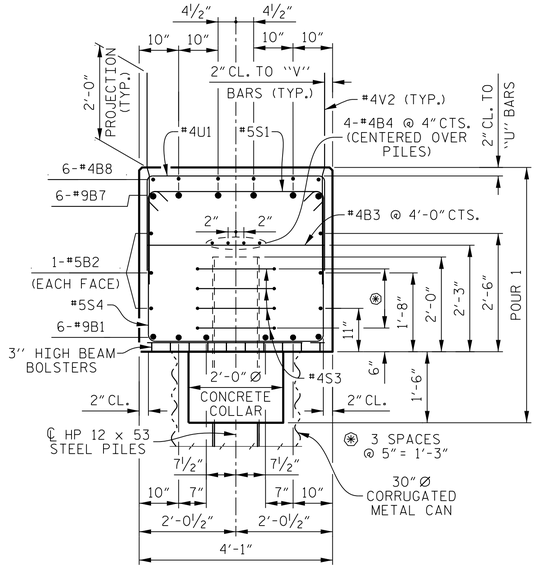
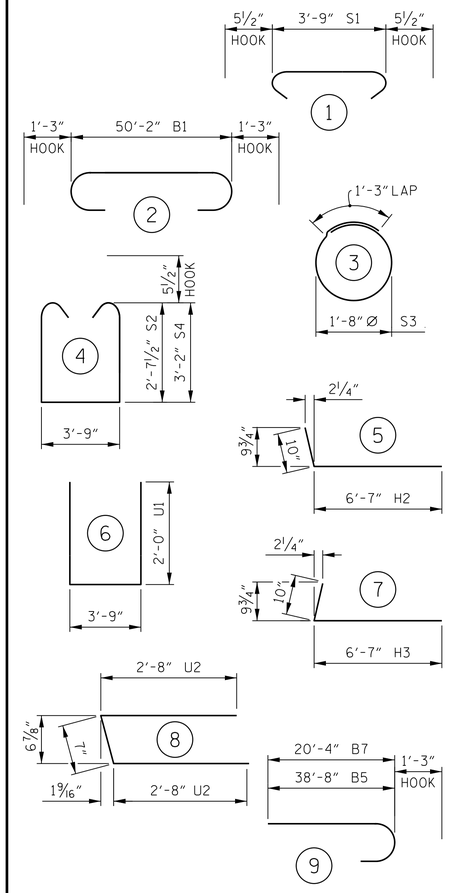


SECTION A–A



SECTION B–B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	2	52'-8"	1,074
B2	6	#5	STR	50'-2"	314
B3	15	#4	STR	3'-9"	38
B4	8	#4	STR	26'-4"	141
B5	6	#9	9	39'-11"	814
B6	6	#4	STR	14'-6"	58
B7	6	#9	9	21'-7"	440
B8	6	#4	STR	8'-9"	35
H1	14	#5	STR	6'-7"	96
H2	14	#5	5	7'-5"	108
H3	14	#5	7	7'-5"	108
S1	76	#5	1	4'-8"	370
S2	45	#5	4	9'-11"	465
S3	36	#4	3	6'-6"	156
S4	31	#5	4	11'-0"	356
U1	17	#4	6	7'-9"	88
U2	14	#4	8	5'-11"	55
V1	20	#5	STR	8'-11"	186
V2	60	#4	STR	4'-6"	180
V3	20	#5	STR	9'-11"	207

REINFORCING STEEL 5,289 LBS.

CLASS "A" CONCRETE

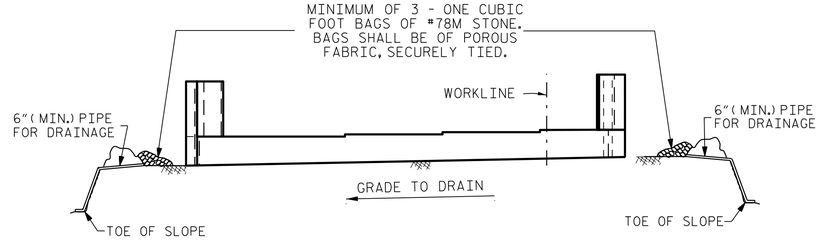
POUR 1 COLLARS, CAP AND LOWER WINGS 27.8 CU. YDS.

POUR 2 BACKWALL AND UPPER WINGS 4.4 CU. YDS.

TOTAL 32.2 CU. YDS.

PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES 9 EACH

HP 12 x 53 STEEL PILES
9 REQUIRED 700.0 LIN. FT.

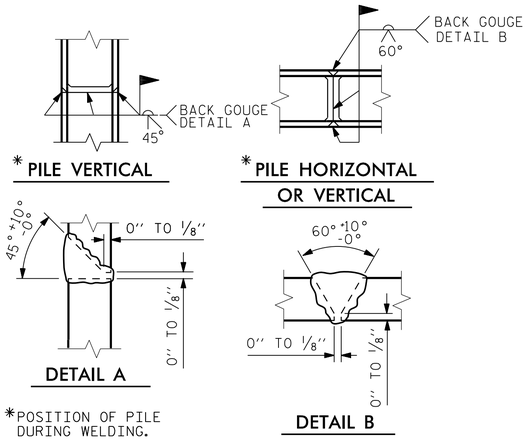


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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



PILE SPLICE DETAILS

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

(LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/17/2017

REVISIONS						SHEET No.
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1			3			TOTAL SHEETS
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STR. #9

DRAWN BY : K. E. LOFTON DATE : 6–16
CHECKED BY : A. D. SHAH DATE : 10–16
DESIGN ENGINEER : T. M. HARRIS DATE : 10–16

PLANS PREPARED BY :
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NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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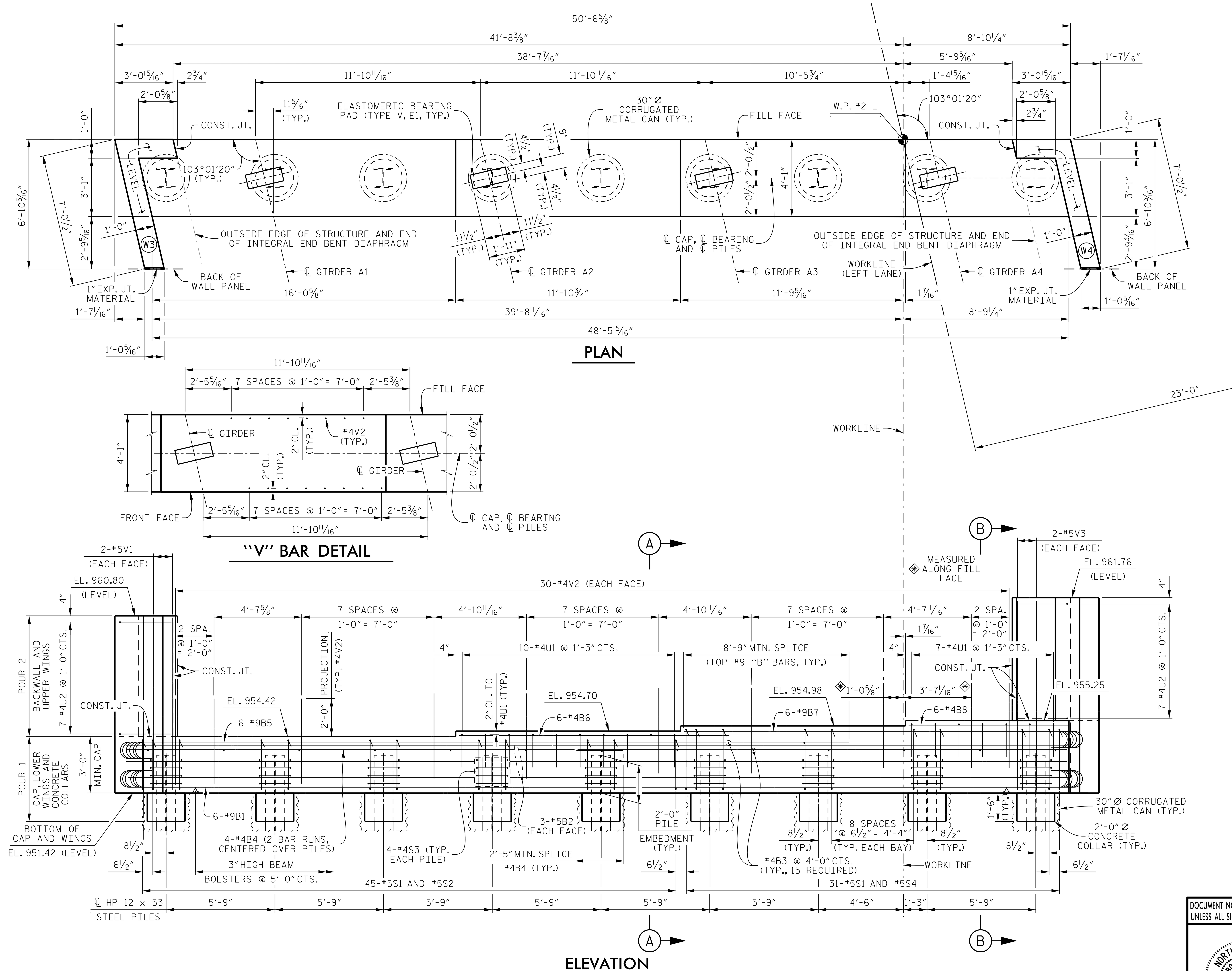

NOTES

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4V2 BARS.

THE TOP SURFACE OF THE END BENT CAP UNDER THE INTEGRAL END BENT DIAPHRAGM, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR TEMPORARY DRAINAGE AT END BENT DETAIL, SEE SHEET 3 OF 3.

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

FOR INTEGRAL END BENT DIAPHRAGM DETAILS, SEE "TYPICAL SECTION" AND "PLAN OF SPAN" SHEETS.

THE COST TO FURNISH AND INSTALL THE 30" Ø CORRUGATED METAL CANS SHALL BE INCLUDED IN THE CONTRACT PRICE FOR MSE RETAINING WALL.

WING W3 AND WING W4 DETAILS ARE BASED ON A 5 1/2" WALL PANEL THICKNESS AND USING DOWELS FOR THE COPING. CONTRACTOR MAY ADJUST WINGS SLIGHTLY AS NECESSARY, BASED ON APPROVED MSE WALL SHOP DRAWINGS.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

(LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY :
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

REVISIONS

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

SHEET No. S9-20

TOTAL SHEETS 25

STR. #9

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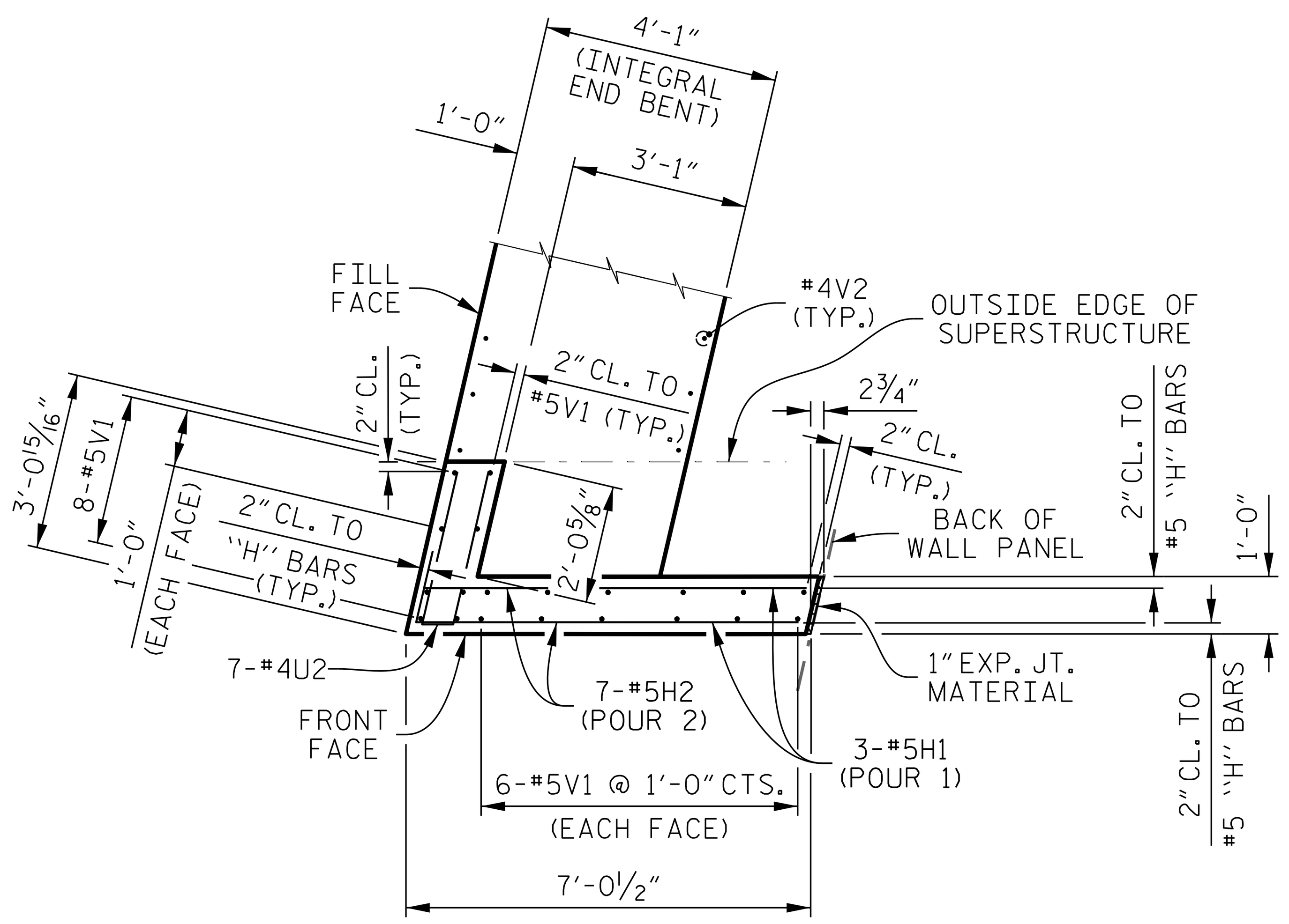
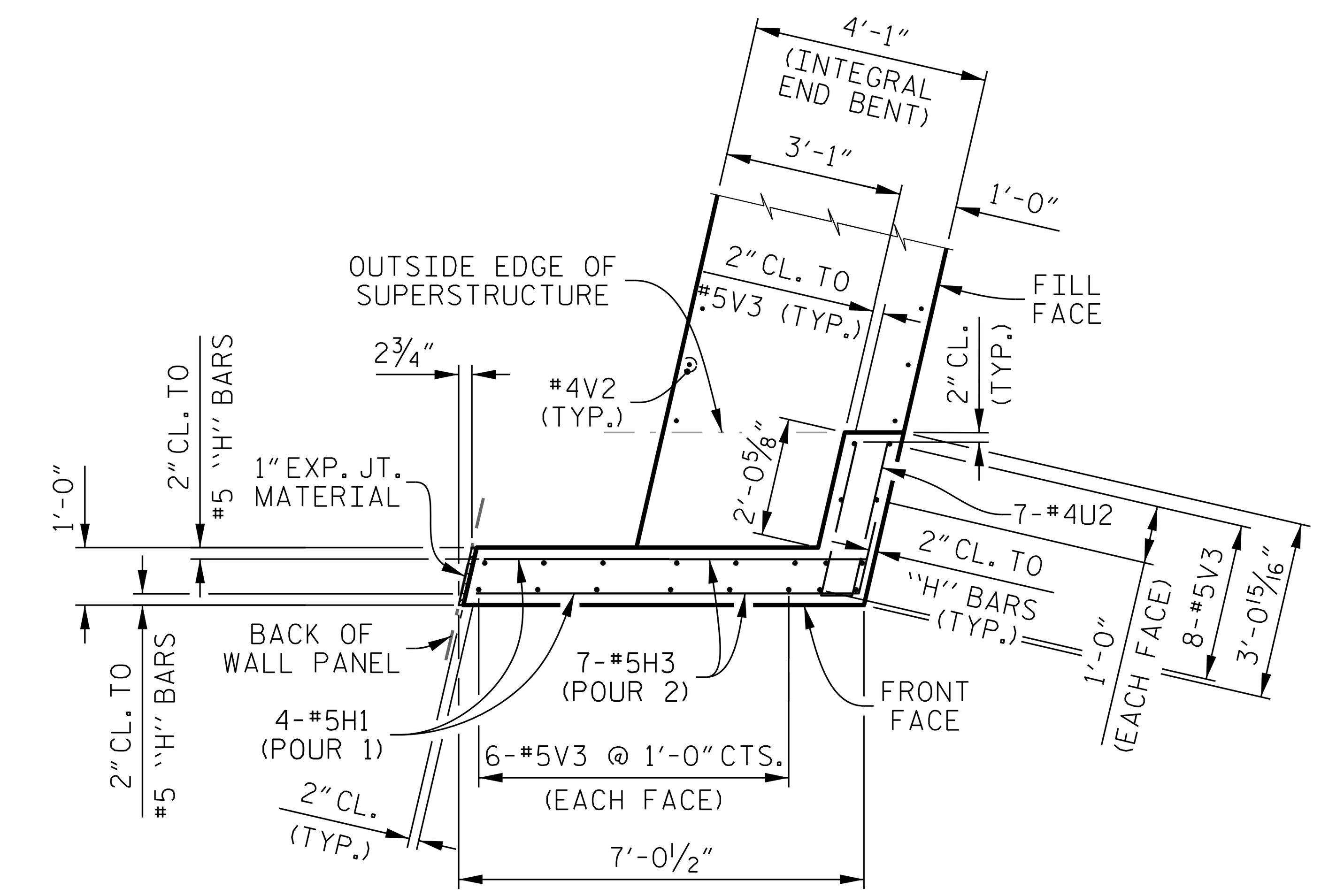


PLAN OF WING (W3)



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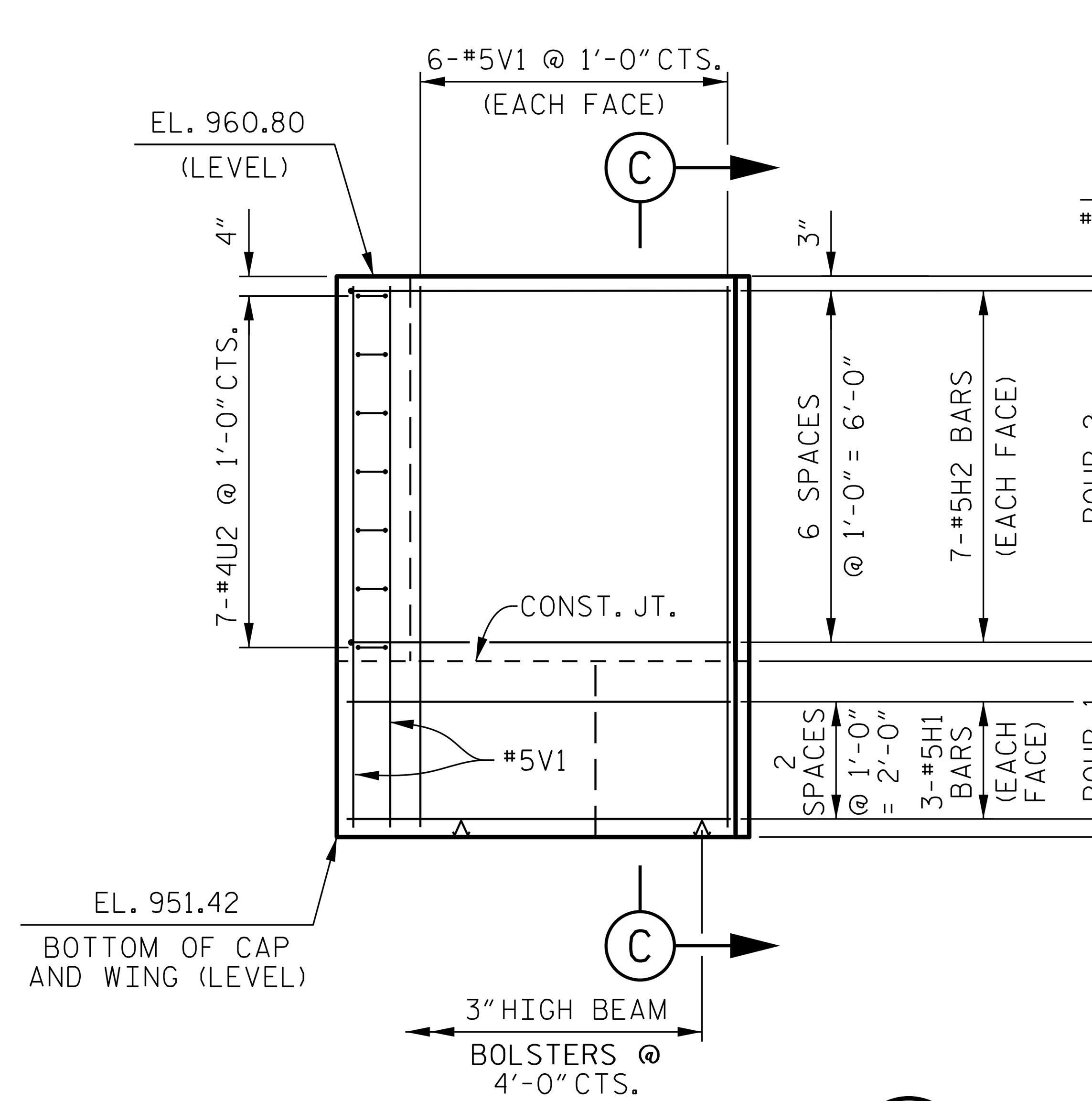
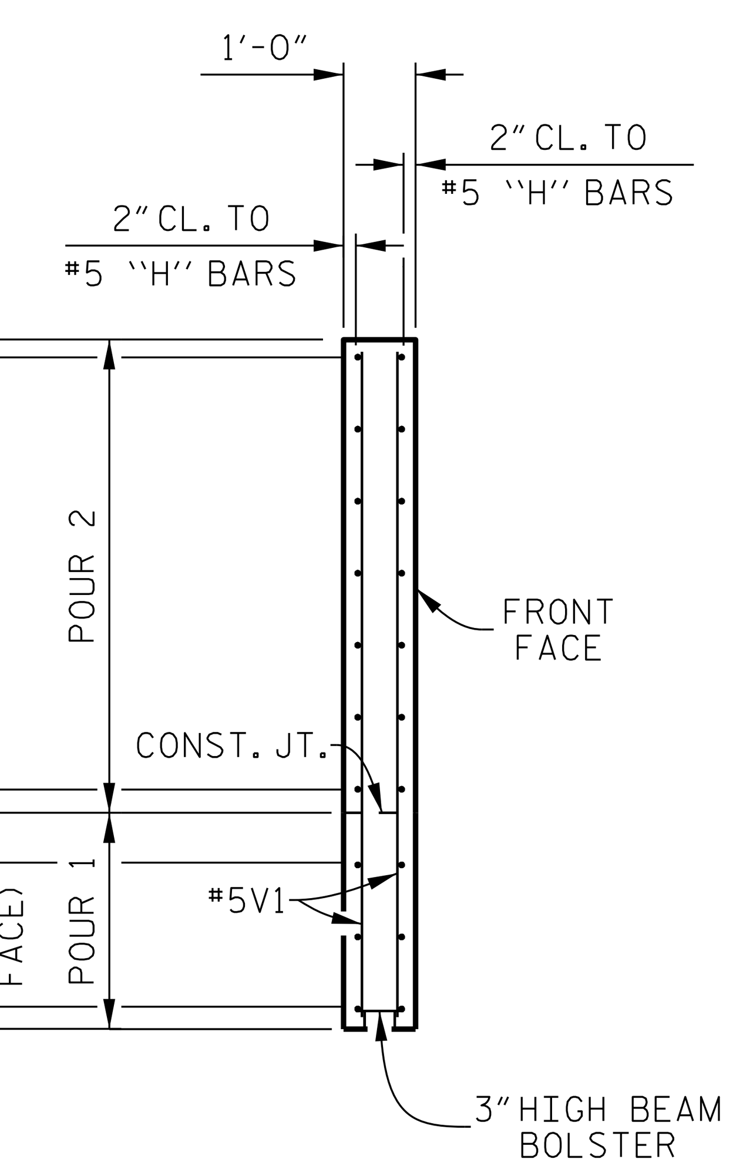
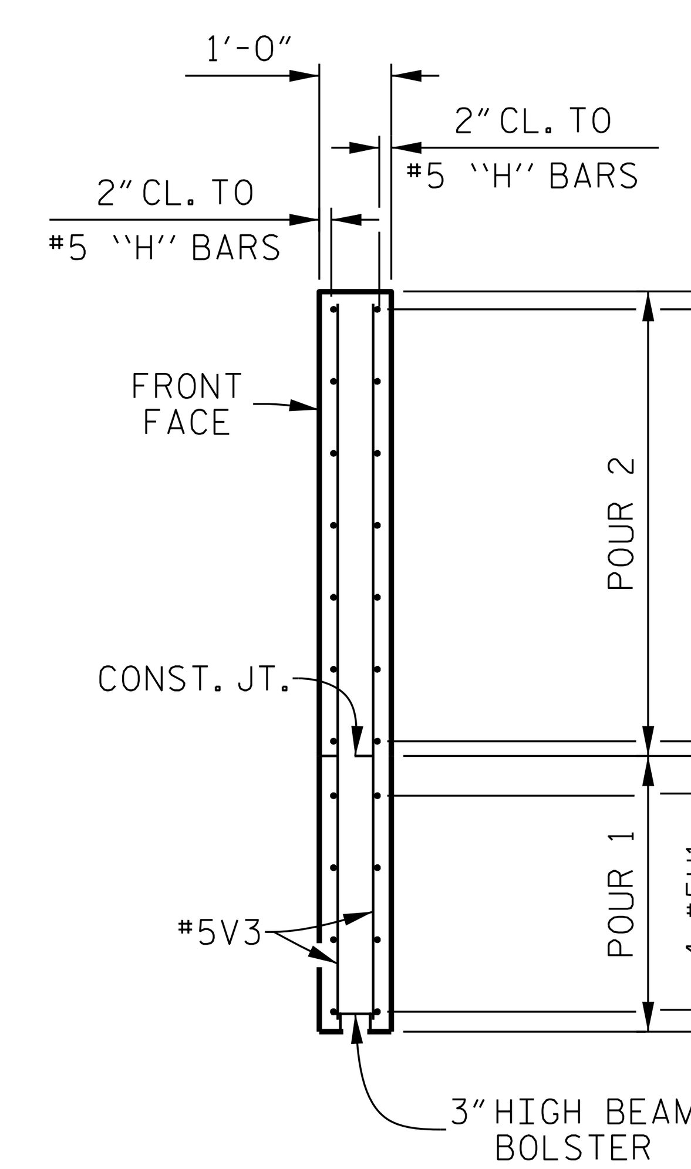


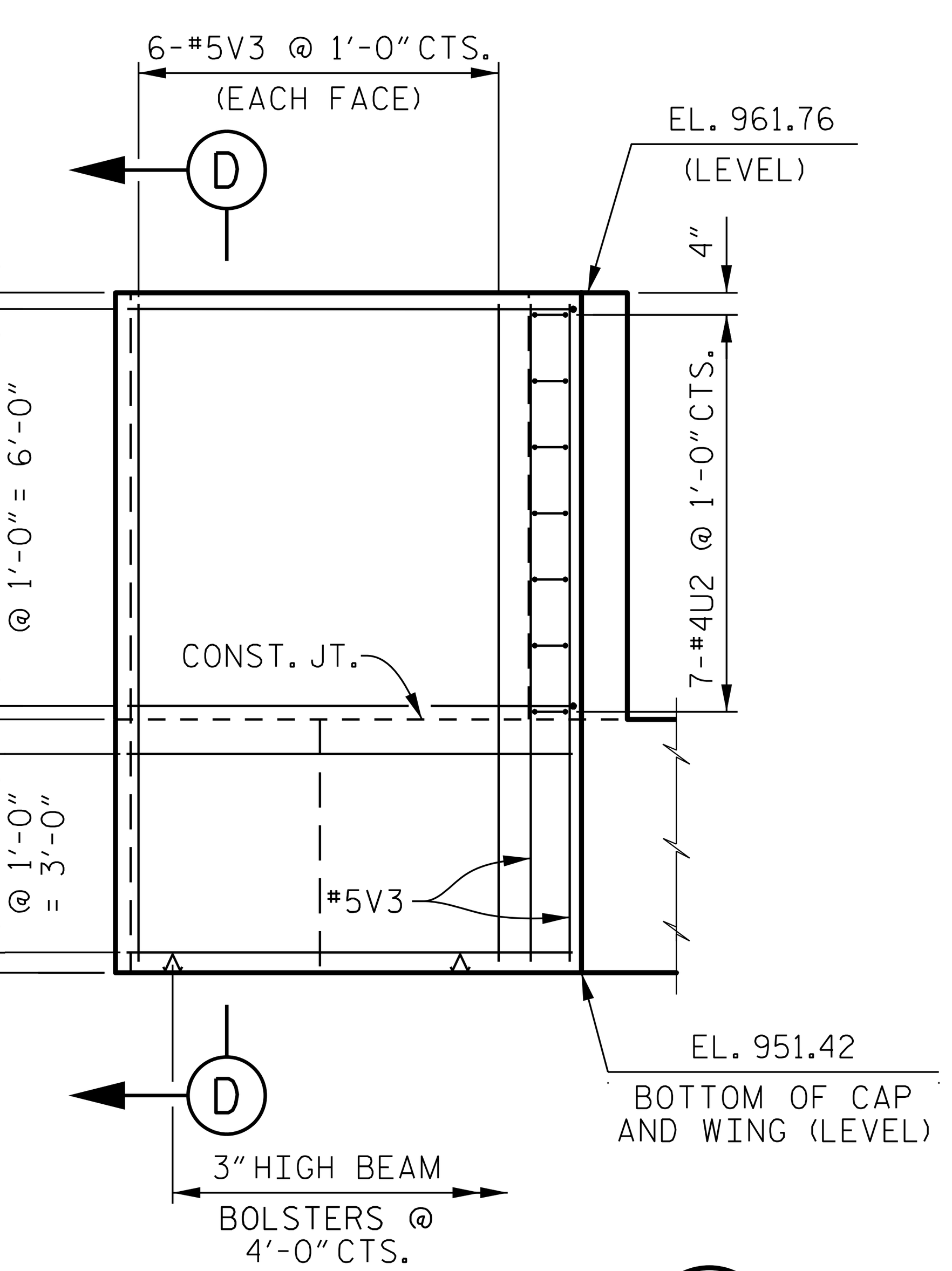
ELEVATION OF WING (W3)



SECTION C–C



SECTION D–D



ELEVATION OF WING (W4)

PROJECT NO. R-2707C
CLEVELAND COUNTY
STATION: 611+32.01 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2
(LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY:
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5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

REVISIONS

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1			3		
2			4		

SHEET No. S9-21
TOTAL SHEETS 25
STR. #9

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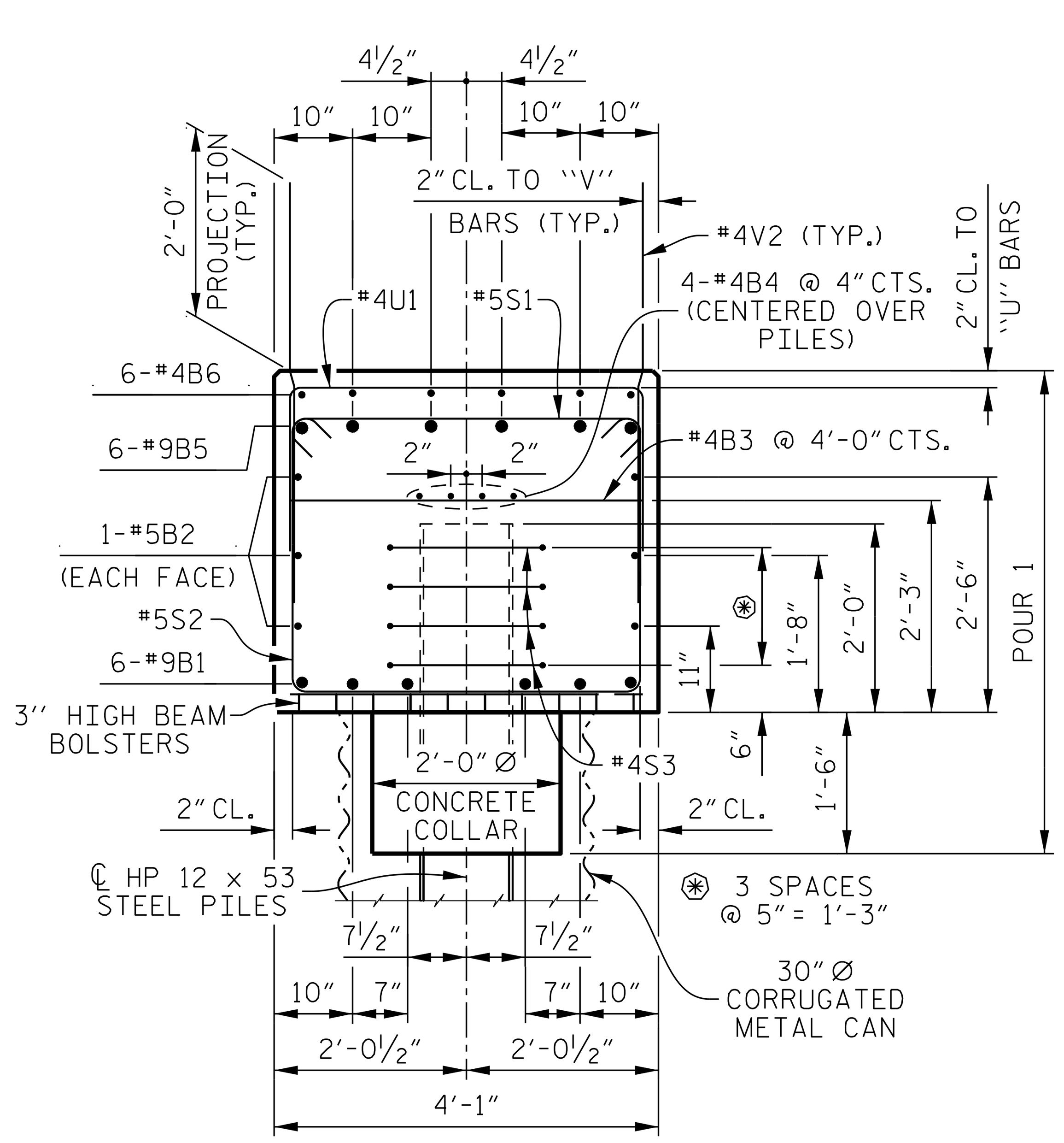
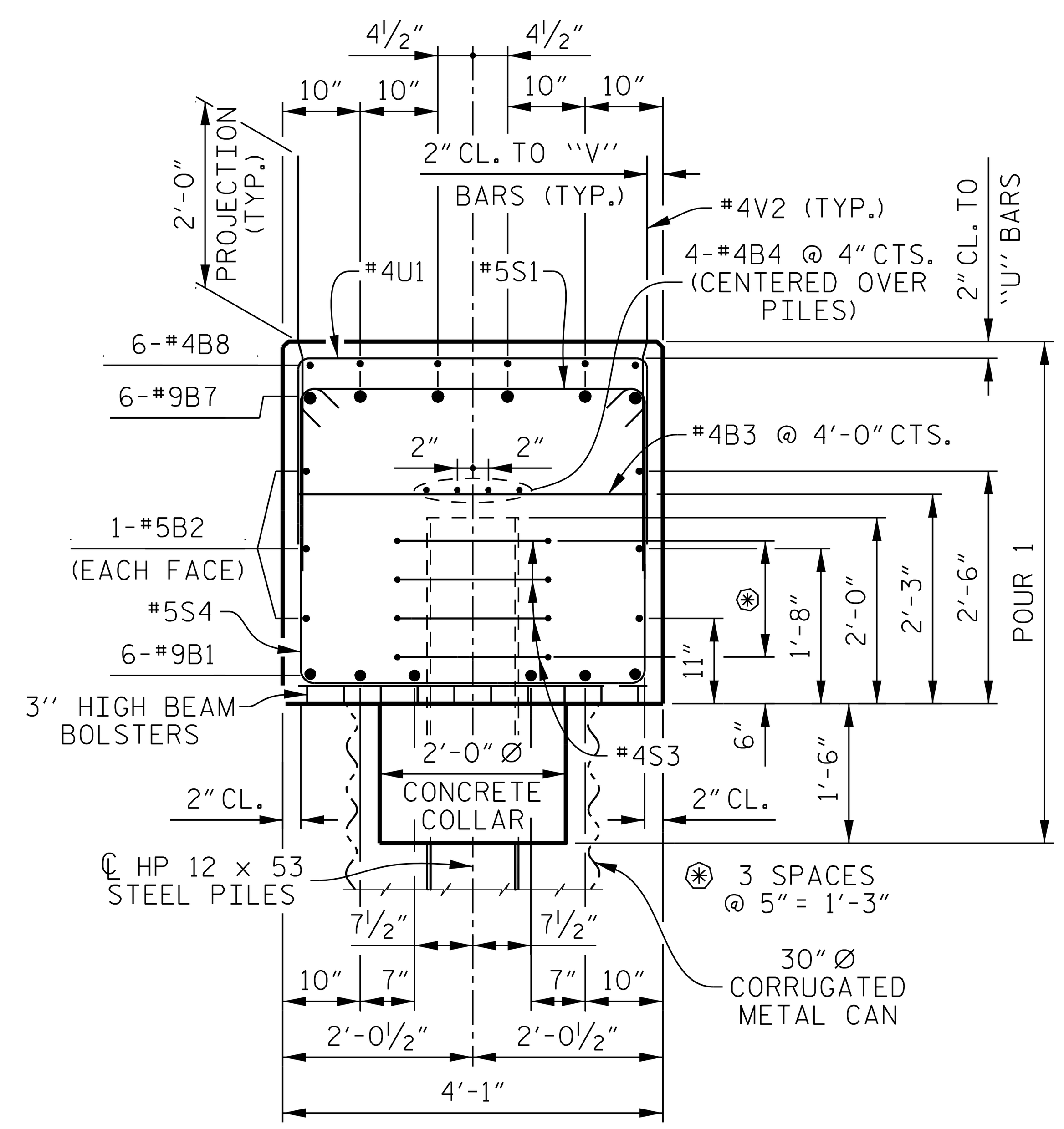
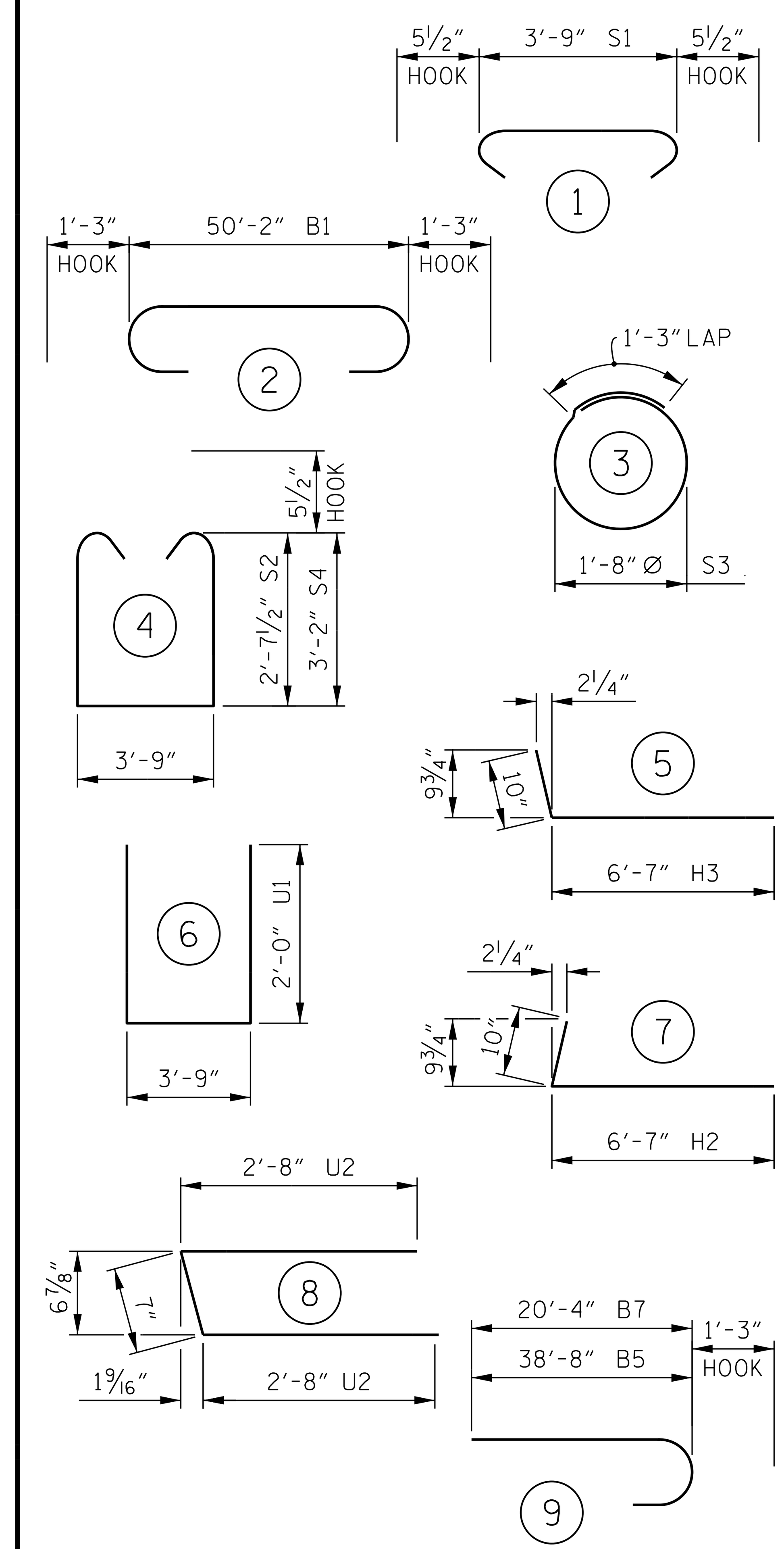


SECTION A–A



SECTION B–B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

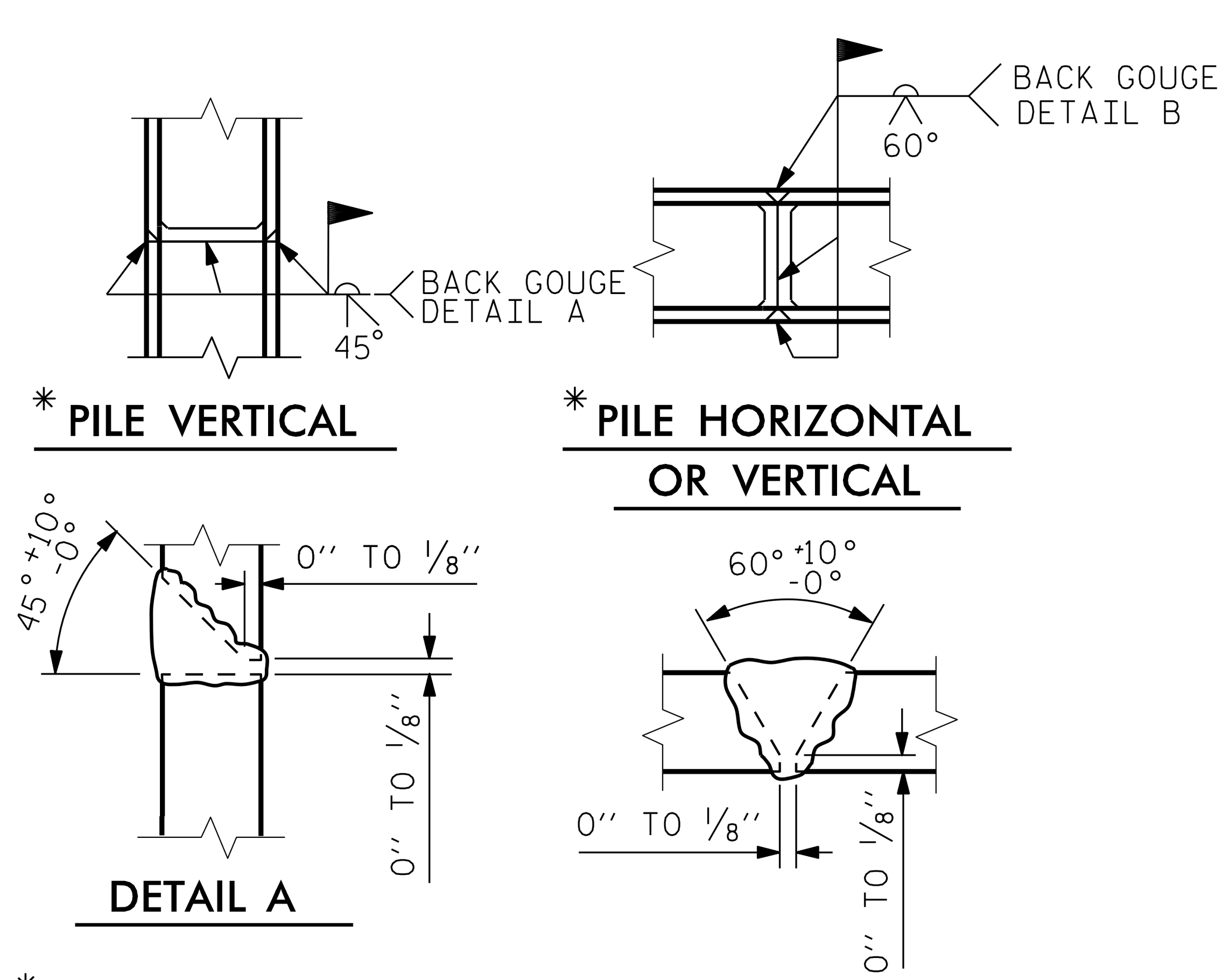
BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	2	52′- 8″	1,074
B2	6	#5	STR	50′- 2″	314
B3	15	#4	STR	3′- 9″	38
B4	8	#4	STR	26′- 4″	141
B5	6	#9	9	39′-11″	814
B6	6	#4	STR	14′- 6″	58
B7	6	#9	9	21′- 7″	440
B8	6	#4	STR	8′- 9″	35
H1	14	#5	STR	6′- 7″	96
H2	14	#5	7	7′- 5″	108
H3	14	#5	5	7′- 5″	108
S1	76	#5	1	4′- 8″	370
S2	45	#5	4	9′-11″	465
S3	36	#4	3	6′- 6″	156
S4	31	#5	4	11′- 0″	356
U1	17	#4	6	7′- 9″	88
U2	14	#4	8	5′-11″	55
V1	20	#5	STR	8′-11″	186
V2	60	#4	STR	4′- 6″	180
V3	20	#5	STR	9′-11″	207

REINFORCING STEEL 5,289 LBS.

CLASS "A" CONCRETE
POUR 1 COLLARS, CAP AND LOWER WINGS 27.8 CU. YDS.
POUR 2 BACKWALL AND UPPER WINGS 4.4 CU. YDS.
TOTAL 32.2 CU. YDS.

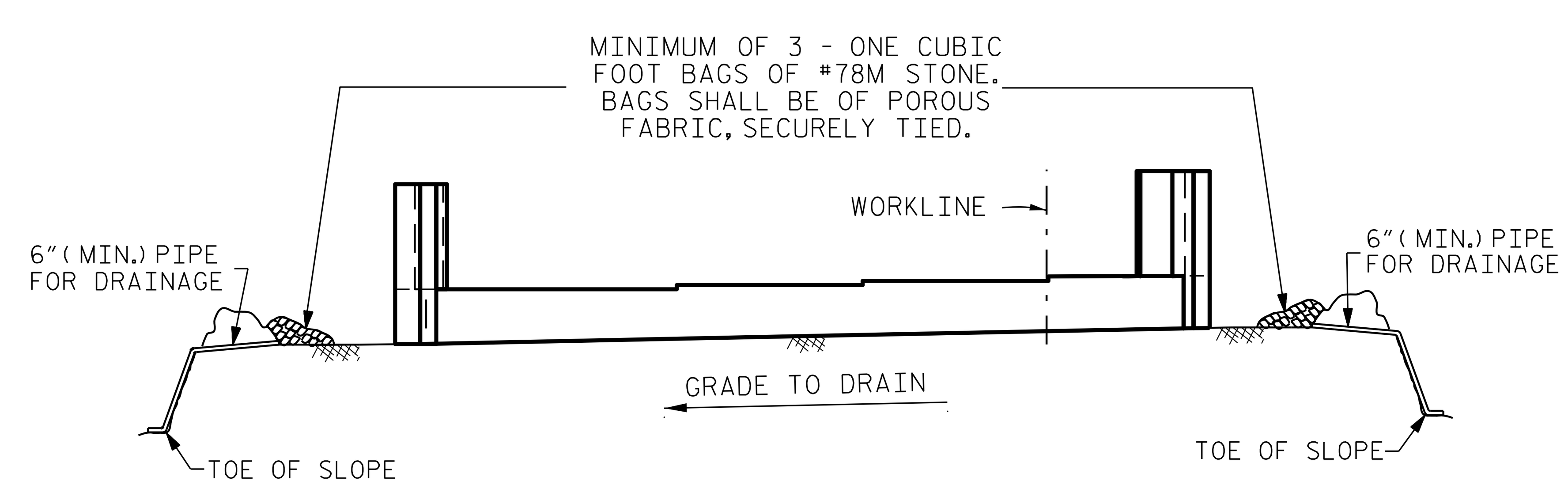
PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES 9 EACH

HP 12 x 53 STEEL PILES
9 REQUIRED 675.0 LIN. FT.



*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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

PROJECT NO. R–2707C
CLEVELAND COUNTY
STATION: 611+32.01 –L–

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2
(LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19299 THOMAS M. HARRIS
2/17/2017

PLANS PREPARED BY :
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5540 Centerview Drive, Suite 217
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NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	6-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

REVISIONS

No.	BY:	DATE:	No.	BY:	DATE:
1			3		
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SHEET No. S9–22
TOTAL SHEETS 25
STR. #9

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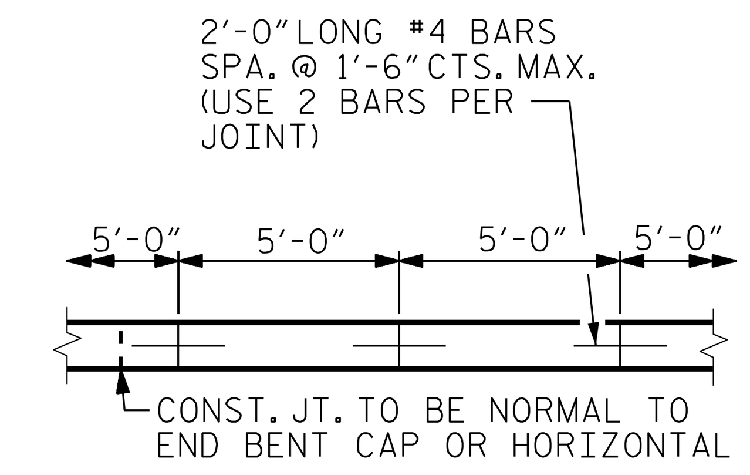
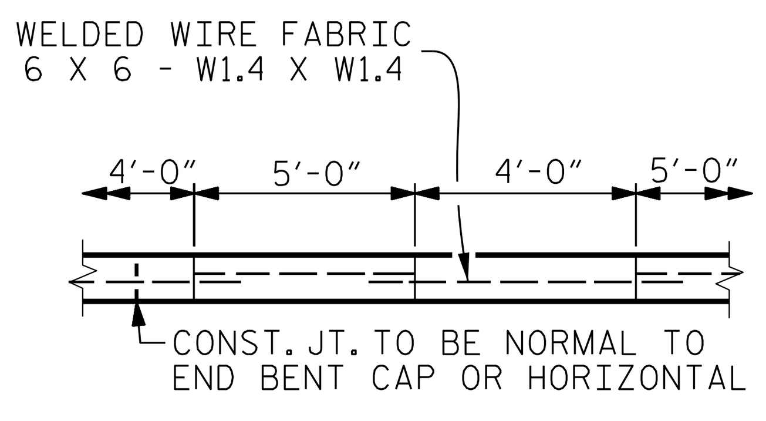
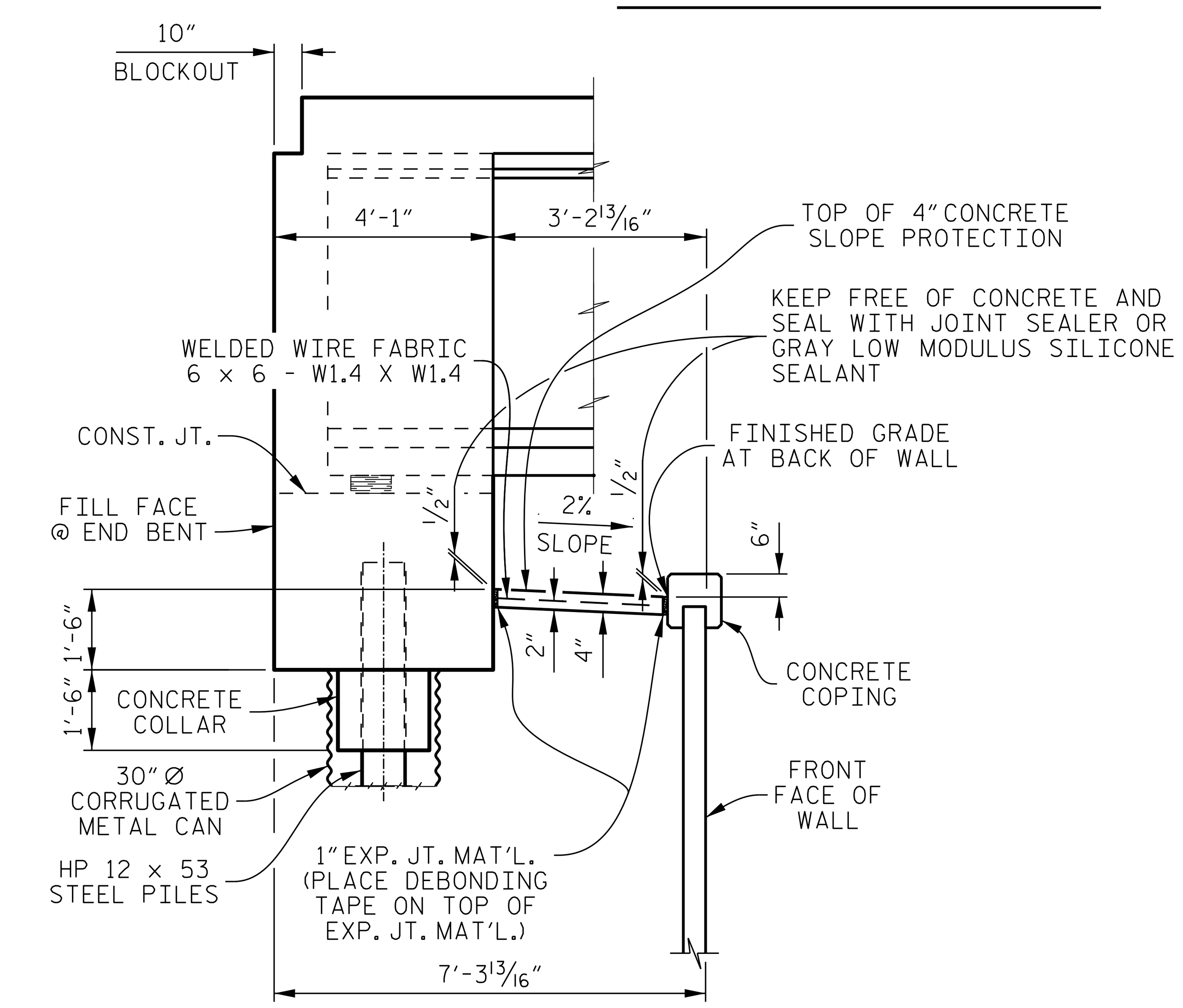


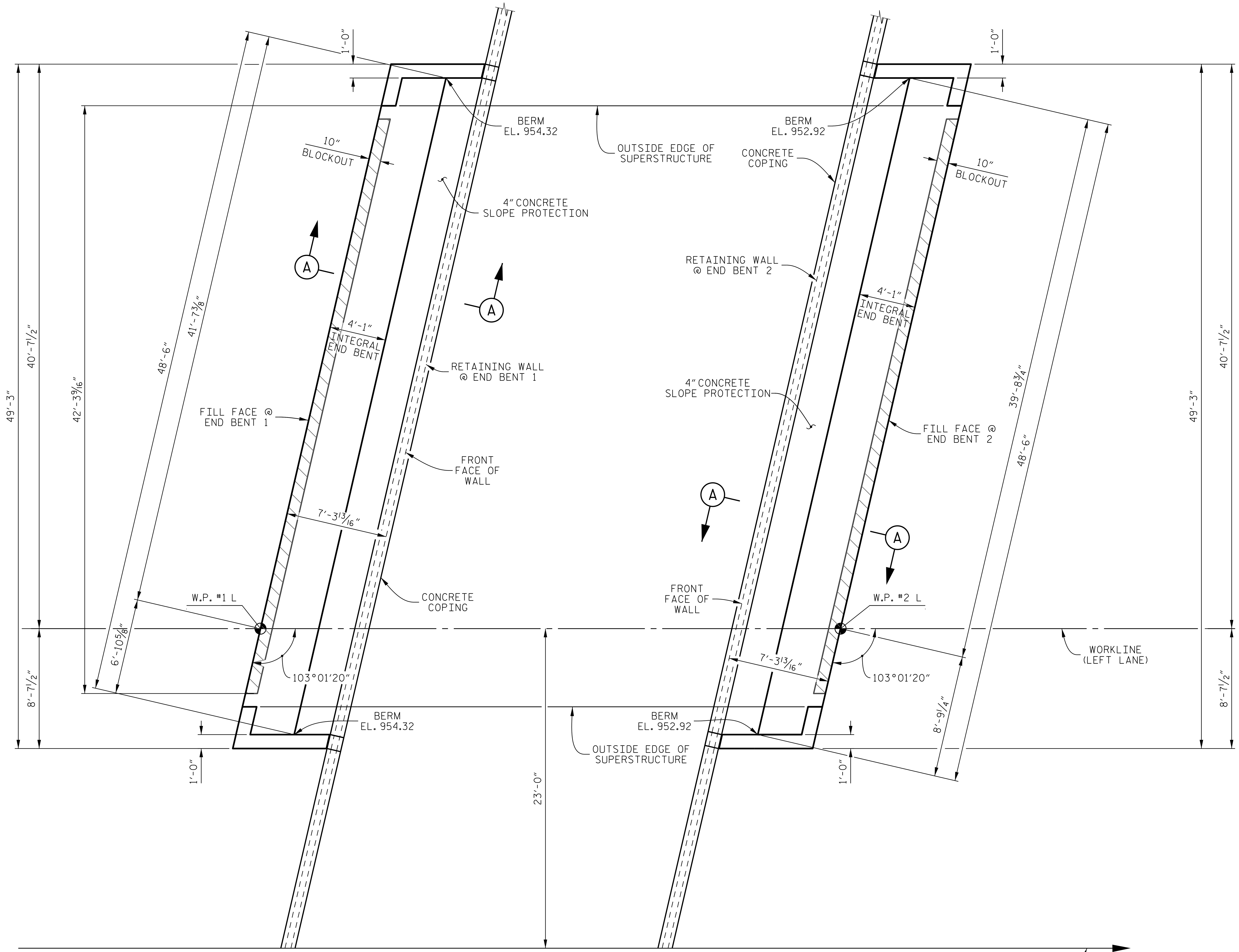
POURING DETAIL



OPTIONAL POURING DETAIL



SECTION A–A



END BENT 1
(INTEGRAL)

END BENT 2
(INTEGRAL)

PLAN

APPROACH SLABS AND CONCRETE DITCHES NOT SHOWN

BRIDGE AT STA. 611+32.01 -L- (LEFT LANE)	4" SLOPE PROTECTION	WELDED WIRE FABRIC
	SQUARE YARDS	APPROX. LINEAR FEET
END BENT 1	14	25
END BENT 2	14	25

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS.

STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT.

MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

SLOPE PROTECTION 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. 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.

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ASSEMBLED BY : K. E. LOFTON	DATE : 6-16		
CHECKED BY : A. D. SHAH	DATE : 10-16		
DRAWN BY : ELR 5/92	REV. 10/1/11 MAA/GM		
CHECKED BY : GRP 6/92	REV. 12/21/11 MAA/GM	REV. 1/16 MAA/TMG	

DRAWN BY : K. E. LOFTON DATE : 6-16
CHECKED BY : A. D. SHAH DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS DATE : 10-16

PLANS PREPARED BY :
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NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS (LEFT LANE)

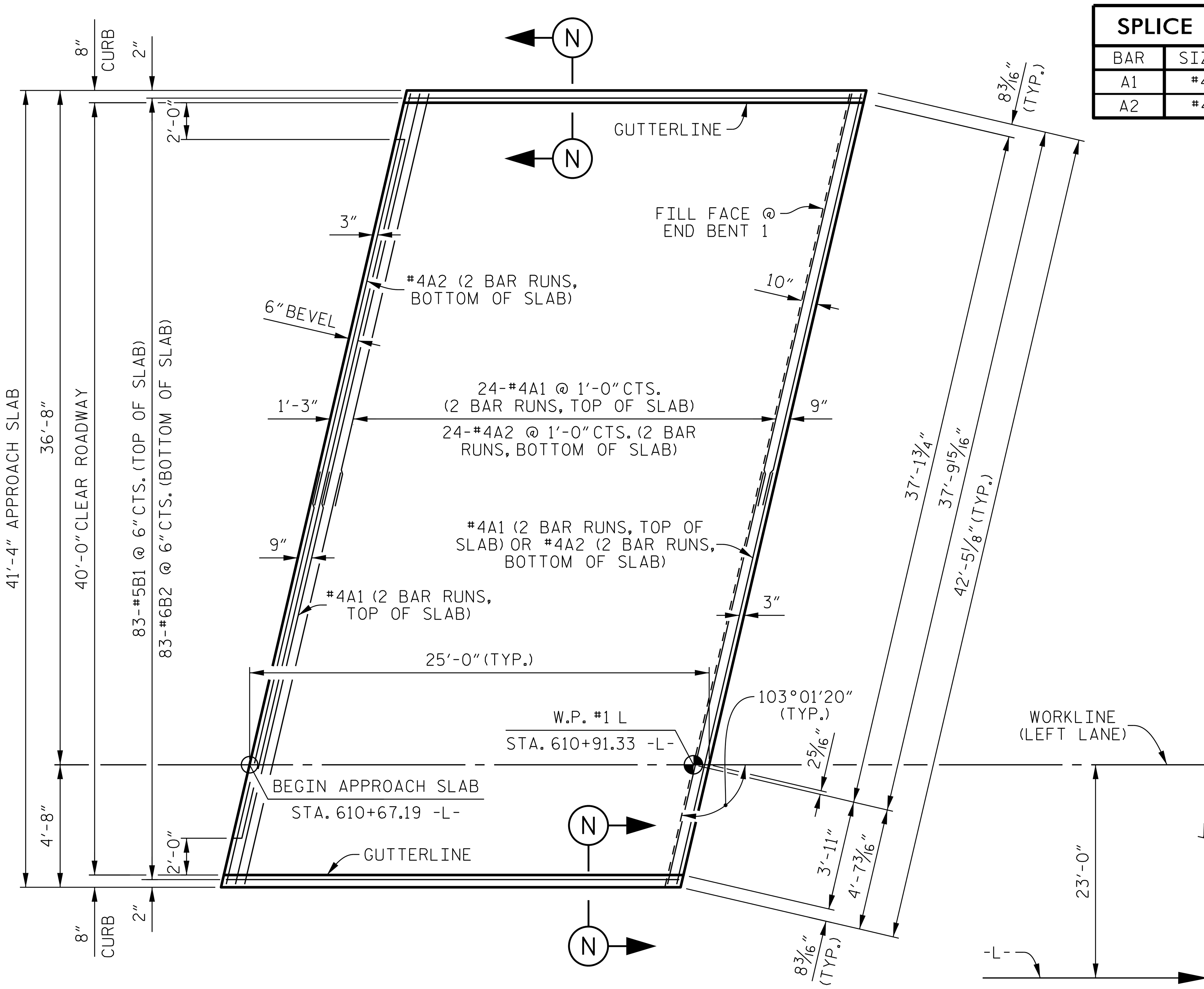
REVISIONS					
No.	BY:	DATE:	No.	BY:	DATE:
1			3		
2			4		

SHEET No. S9–23
TOTAL SHEETS 25

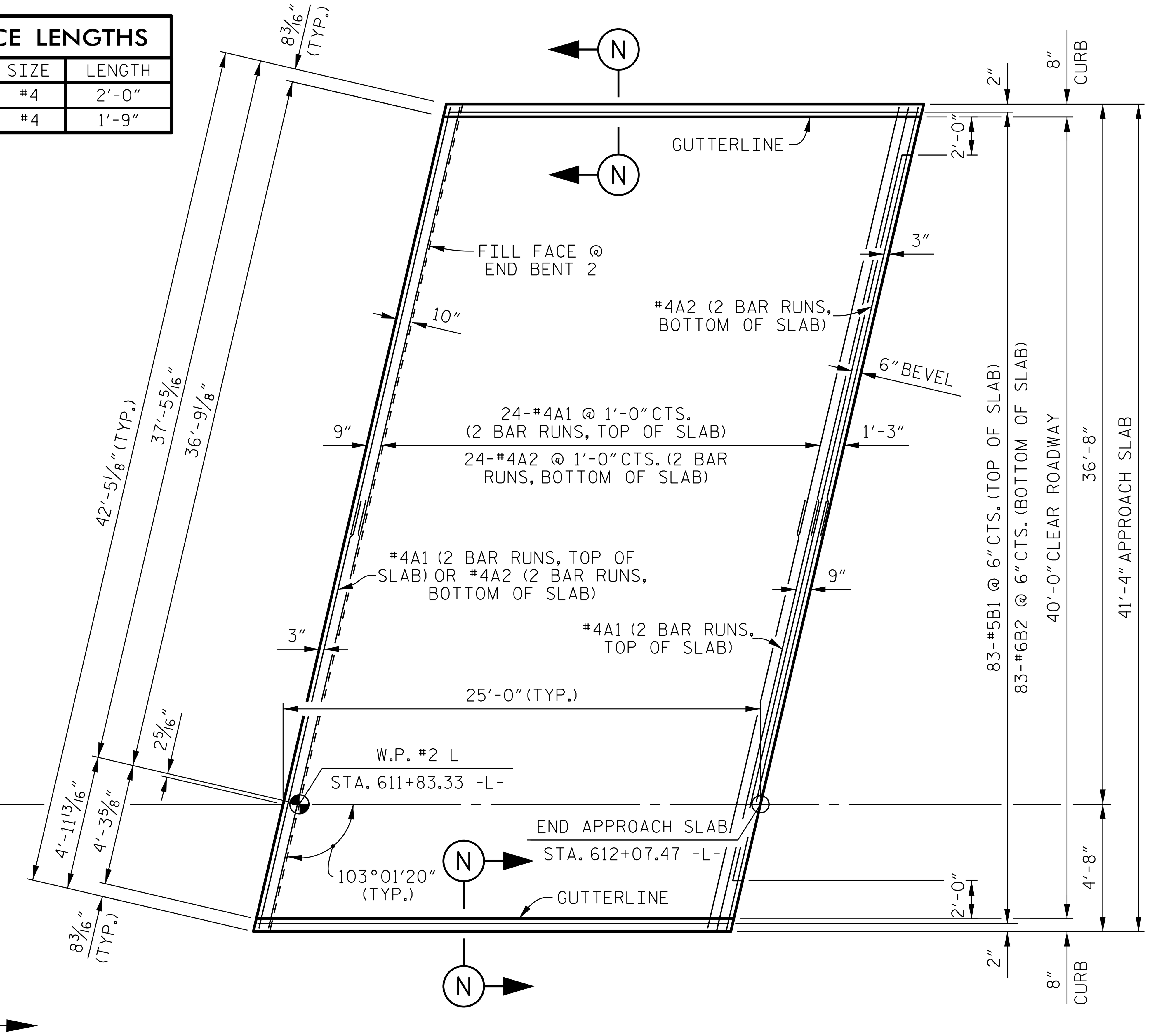
STD. No. SP1
STR. #9

SPLICE LENGTHS

BAR	SIZE	LENGTH
A1	#4	2'-0"
A2	#4	1'-9"



PLAN OF APPROACH SLAB AT END BENT 1



PLAN OF APPROACH SLAB AT END BENT 2

BILL OF MATERIAL

APPROACH SLAB AT END BENT 1 OR END BENT 2

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	22'- 1"	767
A2	52	#4	STR	21'-11"	761
* B1	83	#5	STR	24'- 2"	2,092
B2	83	#6	STR	24'- 8"	3,075

REINFORCING STEEL 3,836 LBS.

* EPOXY COATED REINFORCING STEEL 2,859 LBS.

CLASS "AA" CONCRETE 44.5 CU. YDS.

(2 APPROACH SLABS REQUIRED)

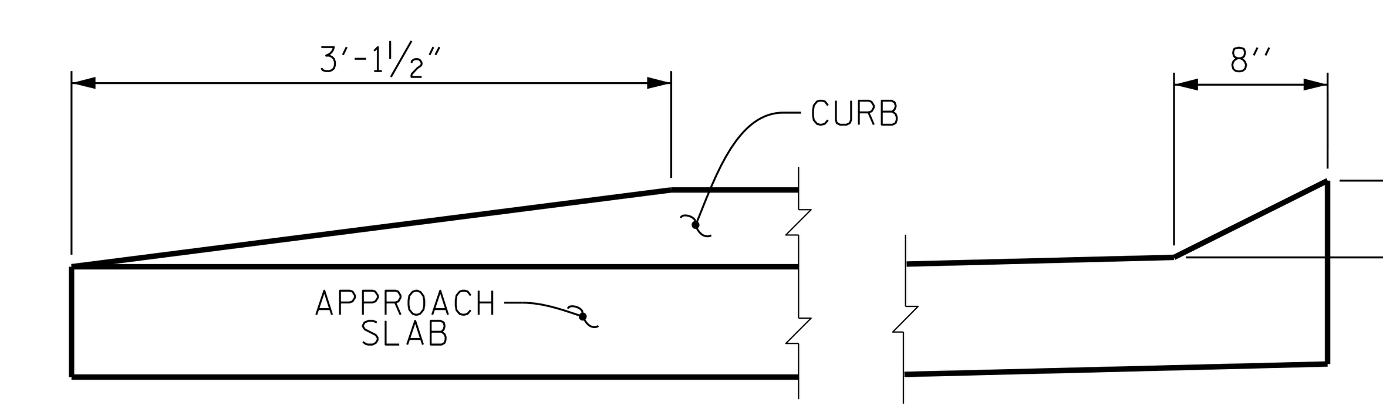
NOTES

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

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.

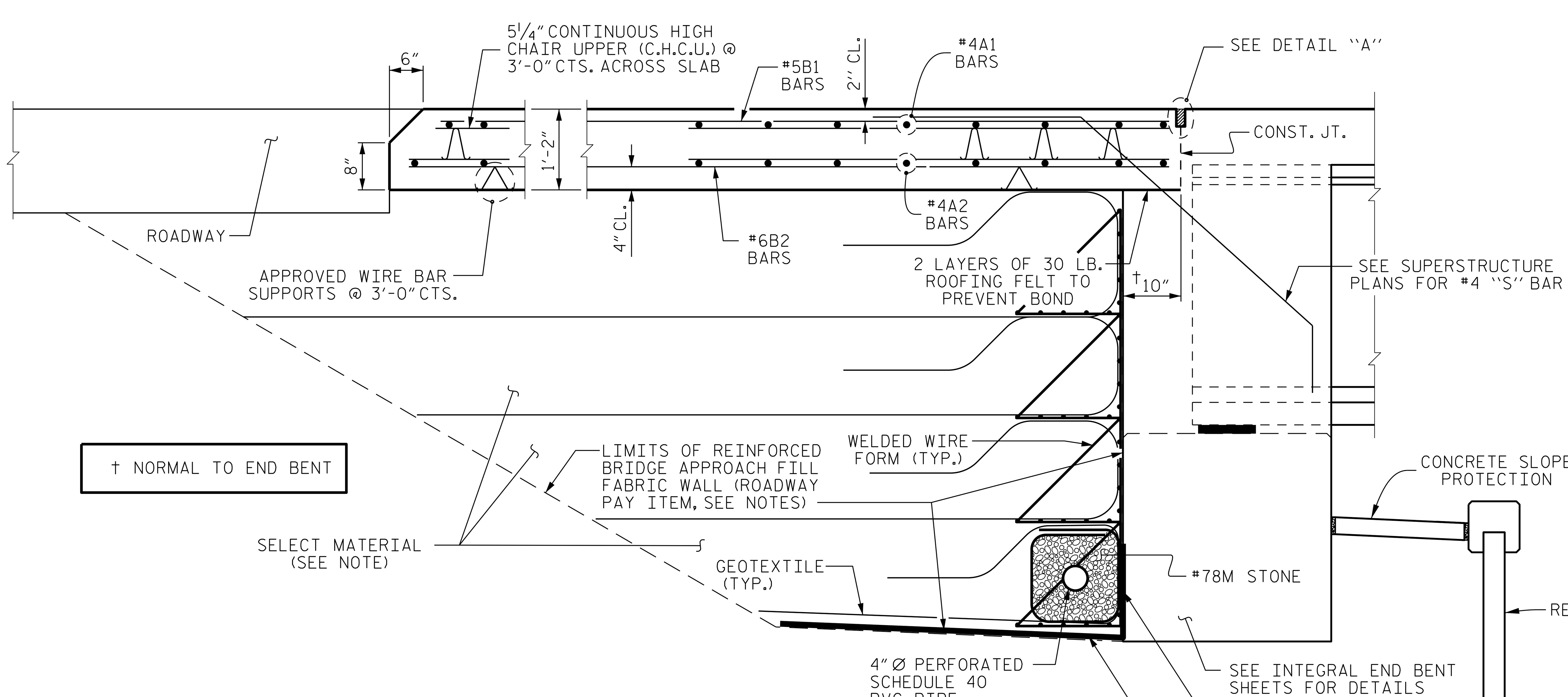
FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.



END OF CURB WITHOUT SHOULDER BERM GUTTER

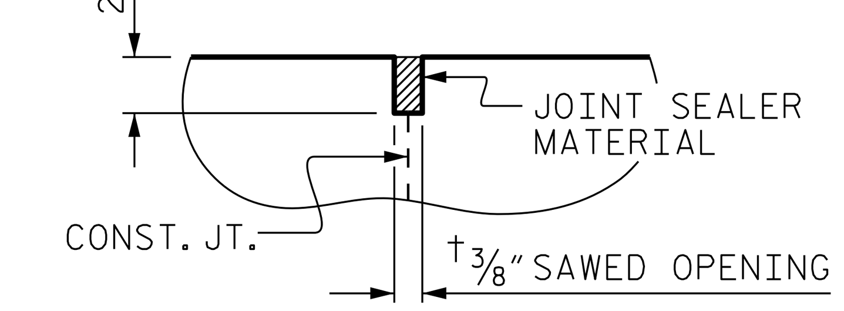
SECTION N–N

CURB DETAILS



† NORMAL TO END BENT

SECTION THRU SLAB



DETAIL "A"

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT (LEFT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

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1			3				
2			4				

SHEET No. S9-24
TOTAL SHEETS 25

PLANS PREPARED BY: PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY:	K. E. LOFTON	DATE:	6-16
CHECKED BY:	A. D. SHAH	DATE:	10-16
DESIGN ENGINEER:	T. M. HARRIS	DATE:	10-16

ASSEMBLED BY:	K. E. LOFTON	DATE:	6-16
CHECKED BY:	A. D. SHAH	DATE:	10-16
DRAWN BY: TLA 10/05	REV. 10/1/11	MAA/GM	
CHECKED BY: GM 5/06	REV. 12/21/11	MAA/GM	
	REV. 6/13	MAA/GM	

STD. No. BAS5

STR. #9

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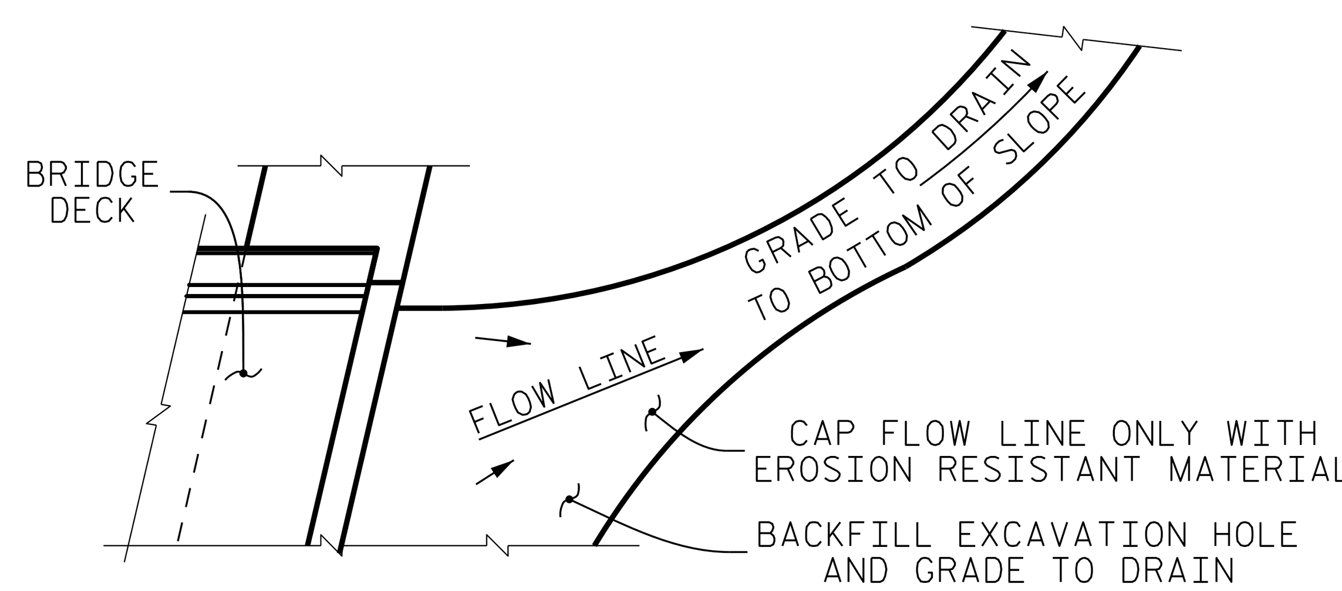
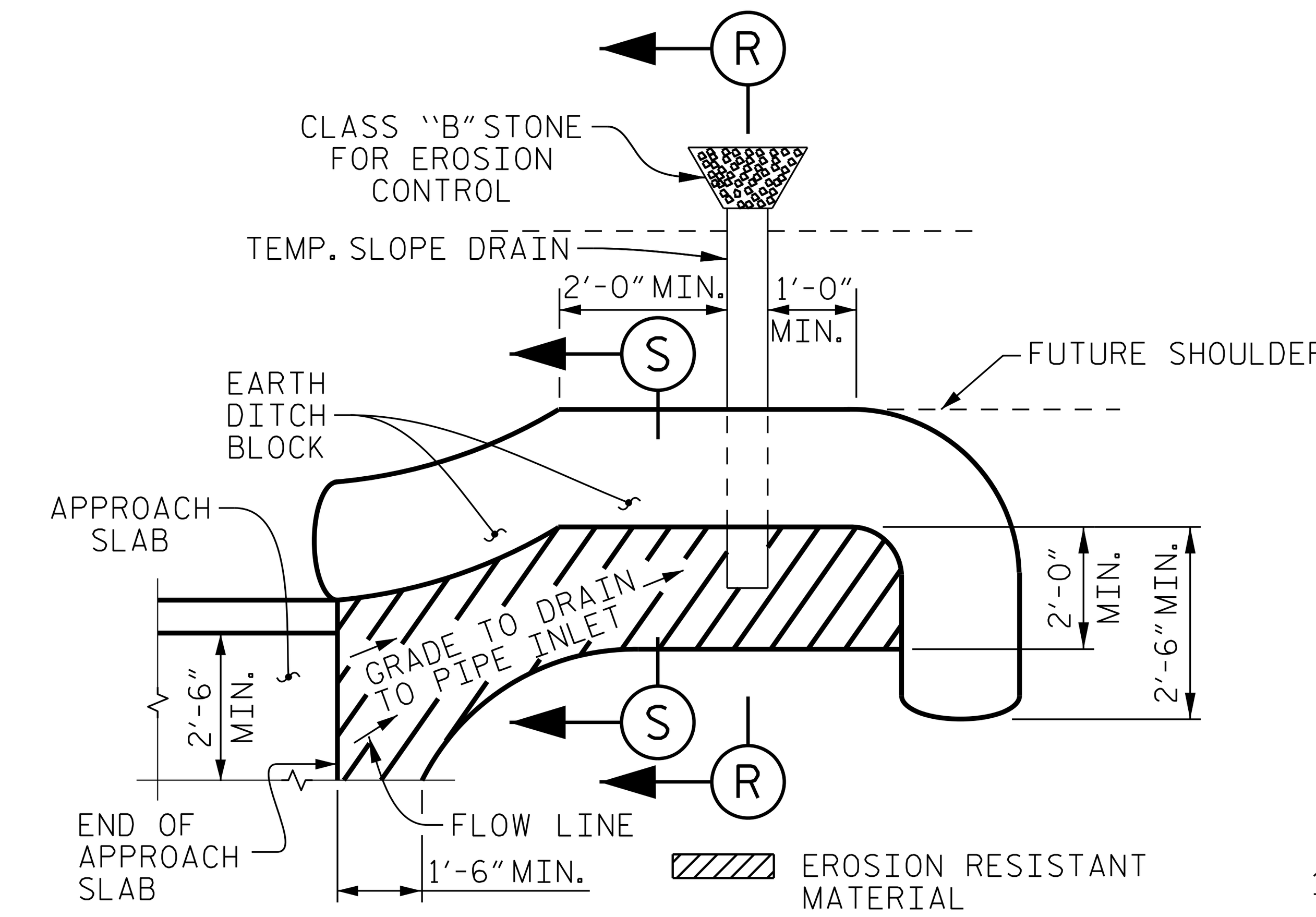


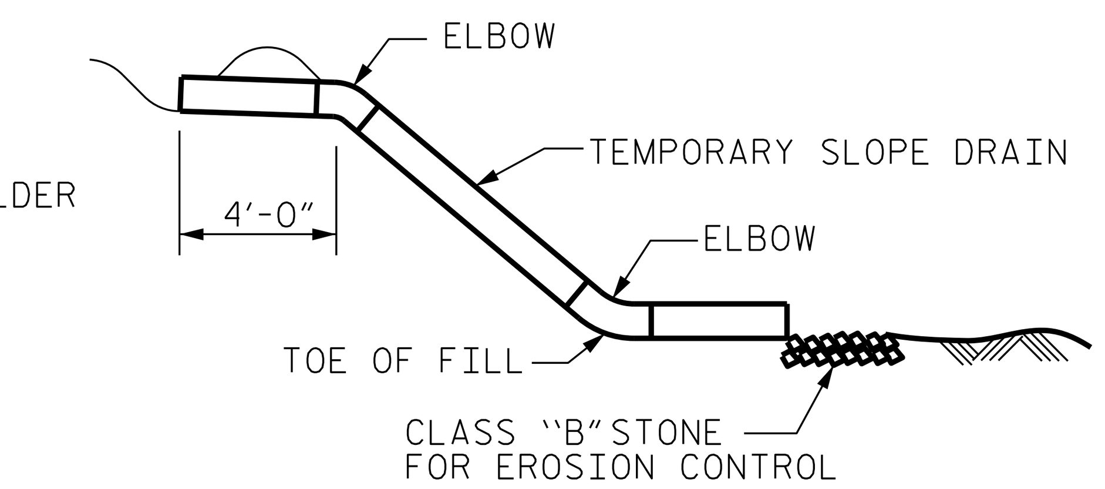
IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO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

TEMPORARY DRAINAGE DETAIL

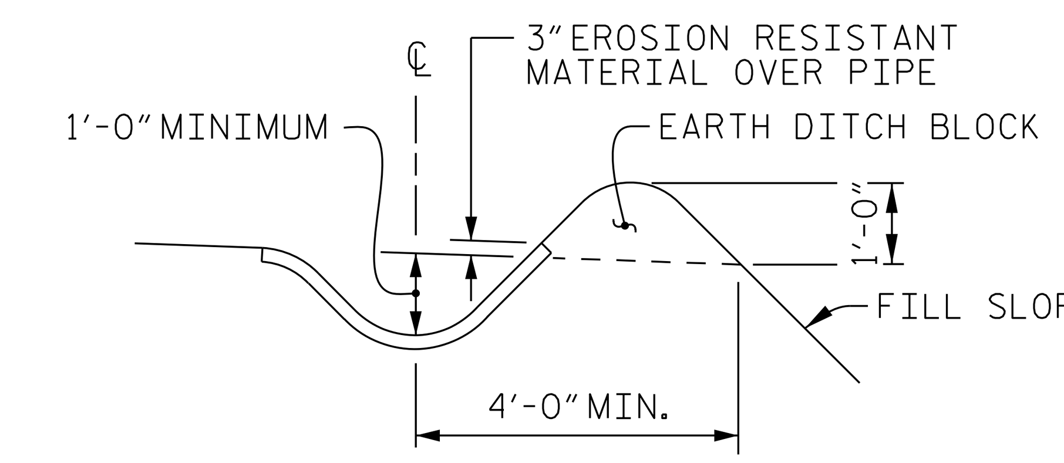


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS (LEFT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19299 THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY :
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NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE : 6-16
CHECKED BY :	A. D. SHAH	DATE : 10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE : 10-16

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SHEET No. S9–25
TOTAL SHEETS 25

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STR. #9

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CHECKED BY : A. D. SHAH	DATE : 10-16	
DRAWN BY : FCJ 11/88	REV. 10/1/11	MAA/GM
CHECKED BY : ABR 11/88	REV. 7/12	MAA/GM
	REV. 6/13	MAA/GM

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DATE: 1/3/2017 12:47:50 PM

P.V.I. = STA. 610+60.00
EL. = 969.29'
V.C. = 1150.00'
(+)0.7078% (-)3.3030%

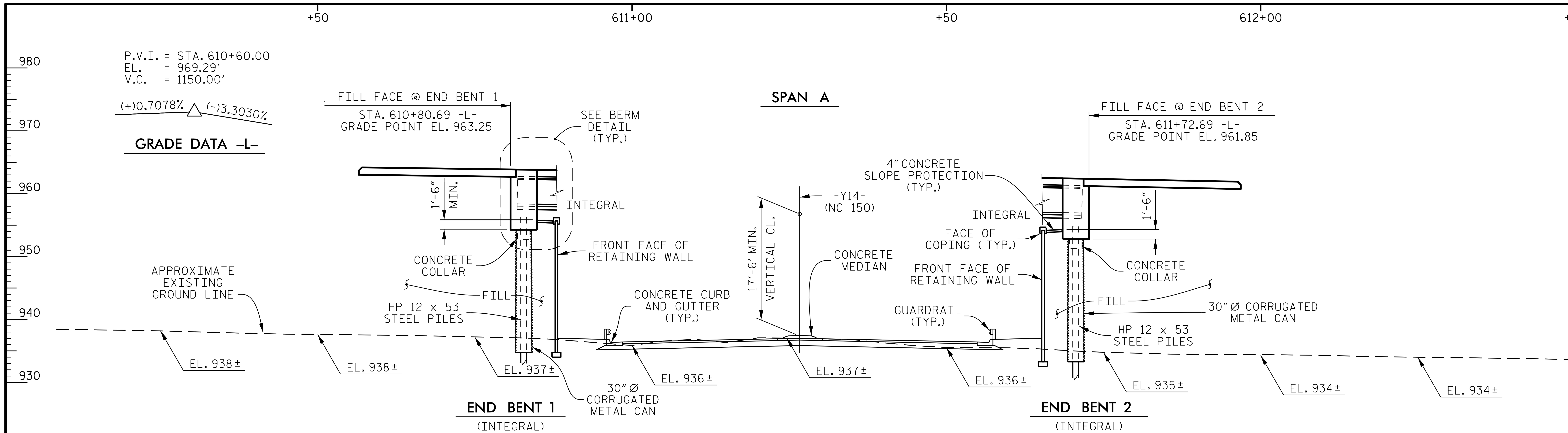
GRADE DATA -L-

P.V.I. = STA. 36+75.00
EL. = 937.15'
V.C. = 350.00'
(+)4.1257% (+)0.3207%

GRADE DATA -Y14-

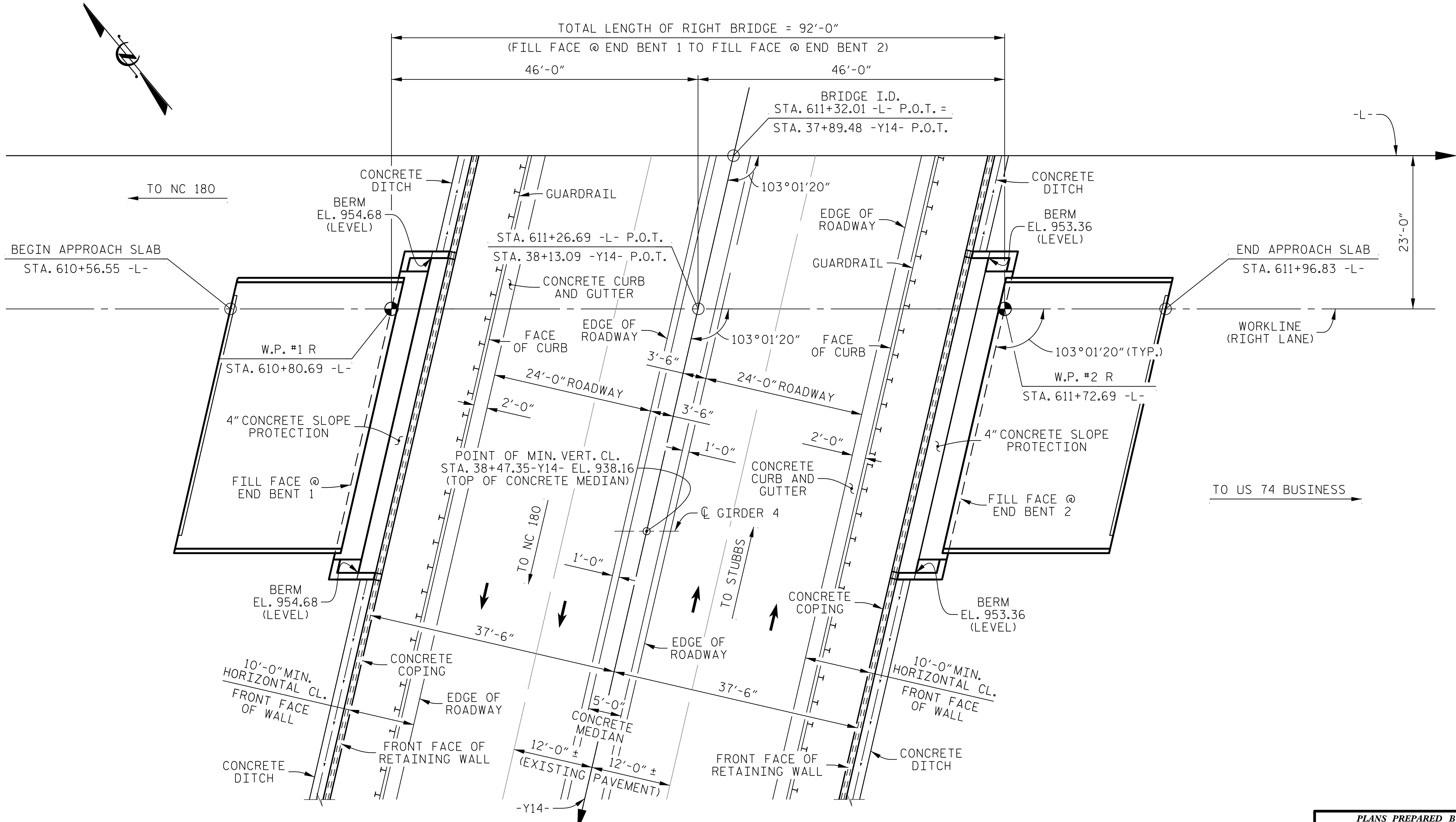
NOTE

FOR NOTES, SEE SHEET 3 OF 3.



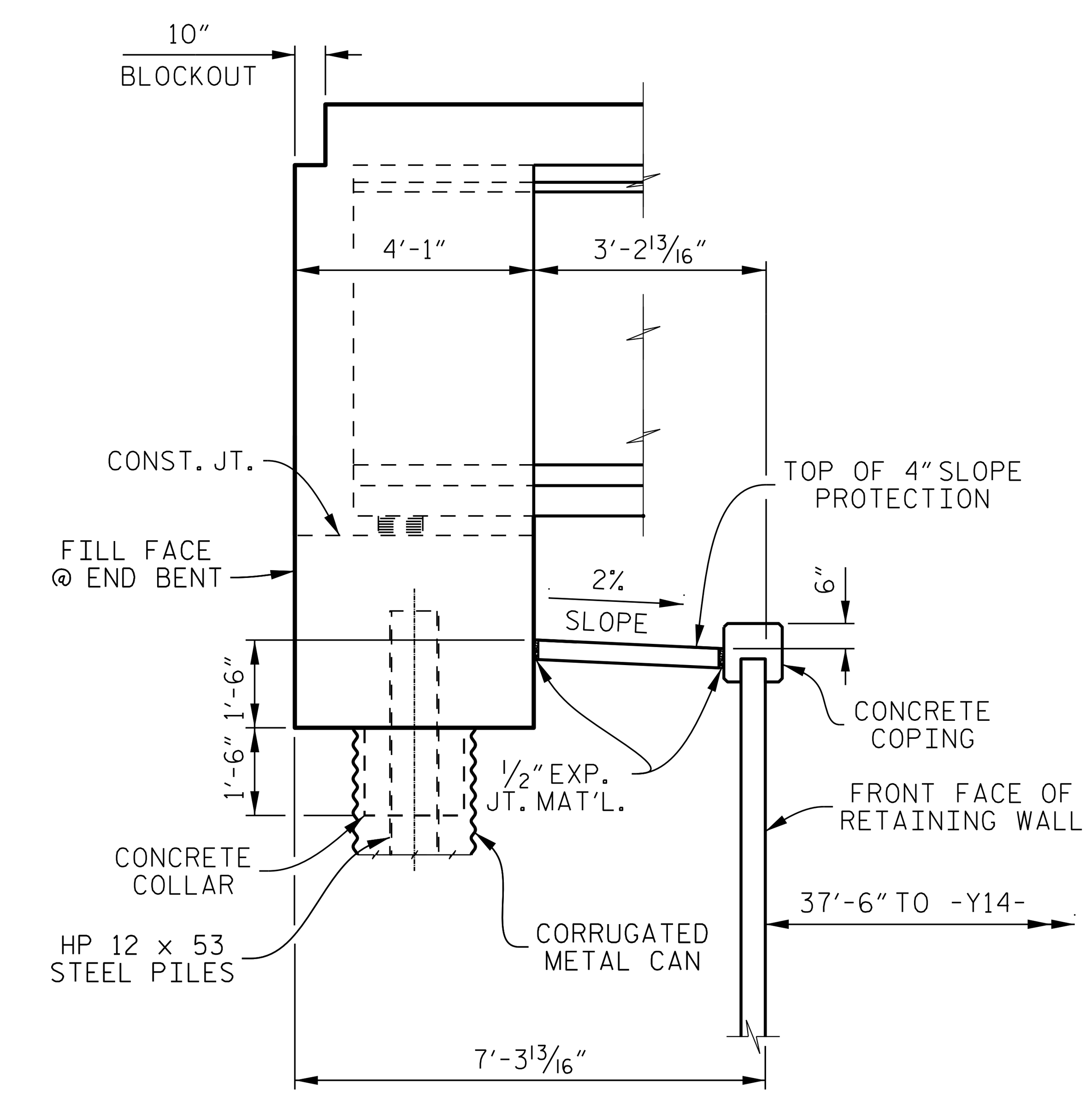
SECTION ALONG WORKLINE (RIGHT LANE)

(SECTION AT RIGHT ANGLES TO END BENTS)



PLAN

METAL CANS AND PILES NOT SHOWN IN PLAN VIEW.



BERM DETAIL

(NORMAL TO FILL FACE)

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-
37+89.48 -Y14-

SHEET 1 OF 3 BRIDGE No. 475

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER NC 150 (-Y14-) ON SHELBY BYPASS (-L-) BETWEEN NC 180 AND US 74 BUSINESS
(RIGHT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY:
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	10-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

REVISIONS

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

SHEET No. S10-1
TOTAL SHEETS 25
STR. #10

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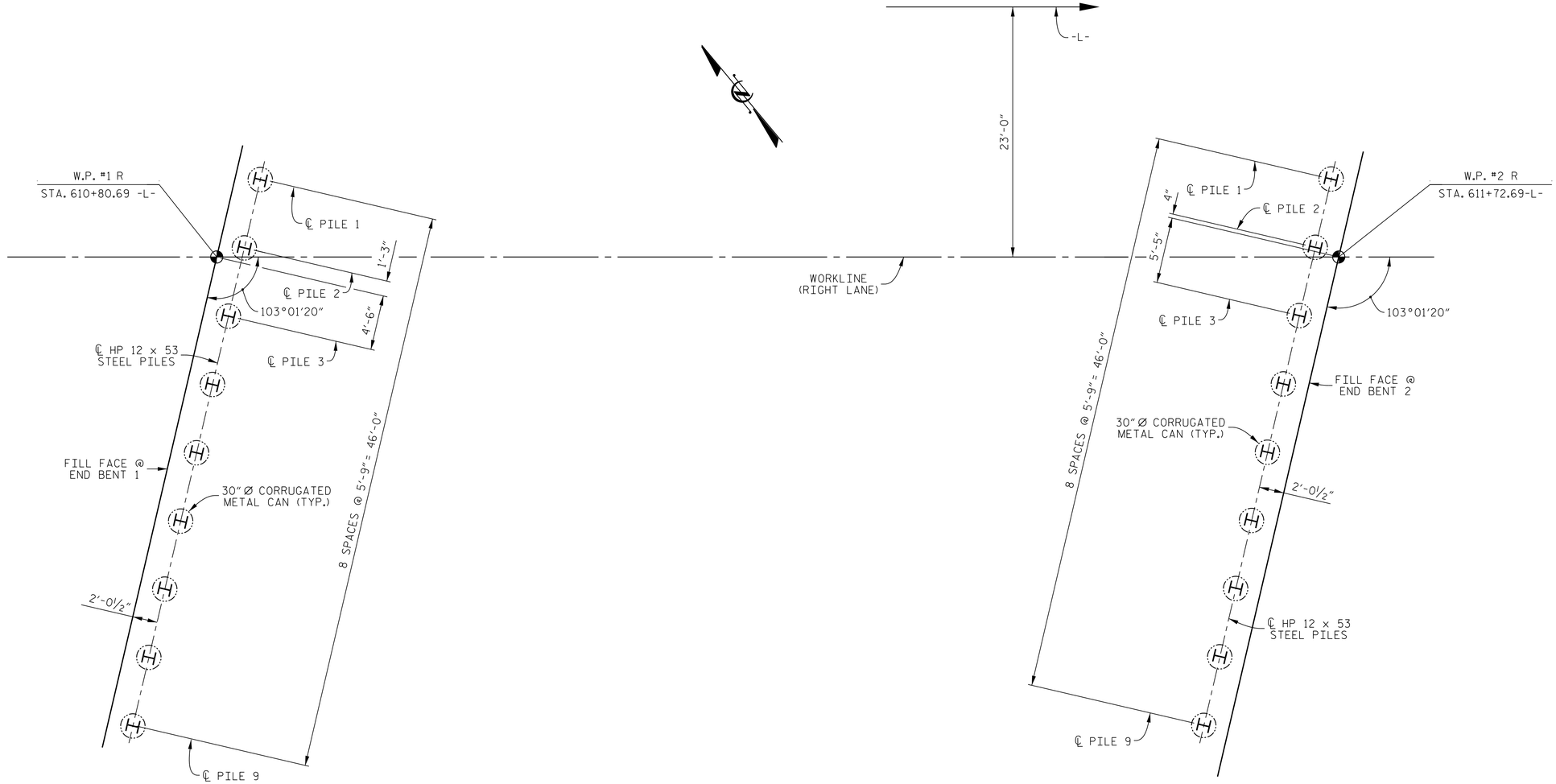

END BENT 1
(INTEGRAL)

END BENT 2
(INTEGRAL)

FOUNDATION LAYOUT

NOTES

ALL END BENT PILES ARE VERTICAL HP 12 x 53 STEEL PILES.

DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINES AT THE BOTTOM OF THE END BENT CAPS.

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

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 105 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 215 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 215 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

DRIVE PILES AT END BENT 1 AND END BENT 2 AFTER MSE WALL CONSTRUCTION AND AFTER THE 1 MONTH WAITING PERIOD.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 35,000 TO 55,000 FT.-LBS. PER BLOW WILL BE REQUIRED TO DRIVE PILES AT THE END BENTS. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING PILES WITH THE 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.

INSTALLATION OF 30"DIAMETER CORRUGATED METAL CANS FROM THE BOTTOM OF THE PILE CAP TO THE LEVELING PAD ELEVATION IS REQUIRED FOR PILES AT END BENT 1 AND END BENT 2. THE CANS SHALL BE DESIGNED TO WITHSTAND THE PRESSURES FROM COMPACTION OPERATIONS ON ADJACENT FILLS WITHOUT DISTORTION. AT A MINIMUM, CORRUGATED METAL CANS SHALL BE 16-GAUGE WITH A WALL THICKNESS OF 0.064".

LOOSELY BACKFILL CORRUGATED METAL CANS USING SAME MATERIAL AS MSE REINFORCEMENT ZONE PRIOR TO CONSTRUCTION OF THE END BENT PILE CAP. DO NOT COMPACT MATERIAL WITHIN THE CAN.

OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING MSE RETAINING WALL AT END BENT 1 AND END BENT 2 TO THE BOTTOM OF CAP ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND REINFORCED BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT 1. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 2 OF 3

DRAWN BY : K. E. LOFTON DATE : 10-16
CHECKED BY : T. M. HARRIS DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS DATE : 10-16

PLANS PREPARED BY :
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FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS HARRIS
Thomas Harris
2/3/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER NC 150 (-Y14-) ON SHELBY BYPASS (-L-) BETWEEN NC 180 AND US 74 BUSINESS
(RIGHT LANE)

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S10-2
1			3			TOTAL SHEETS
2			4			25

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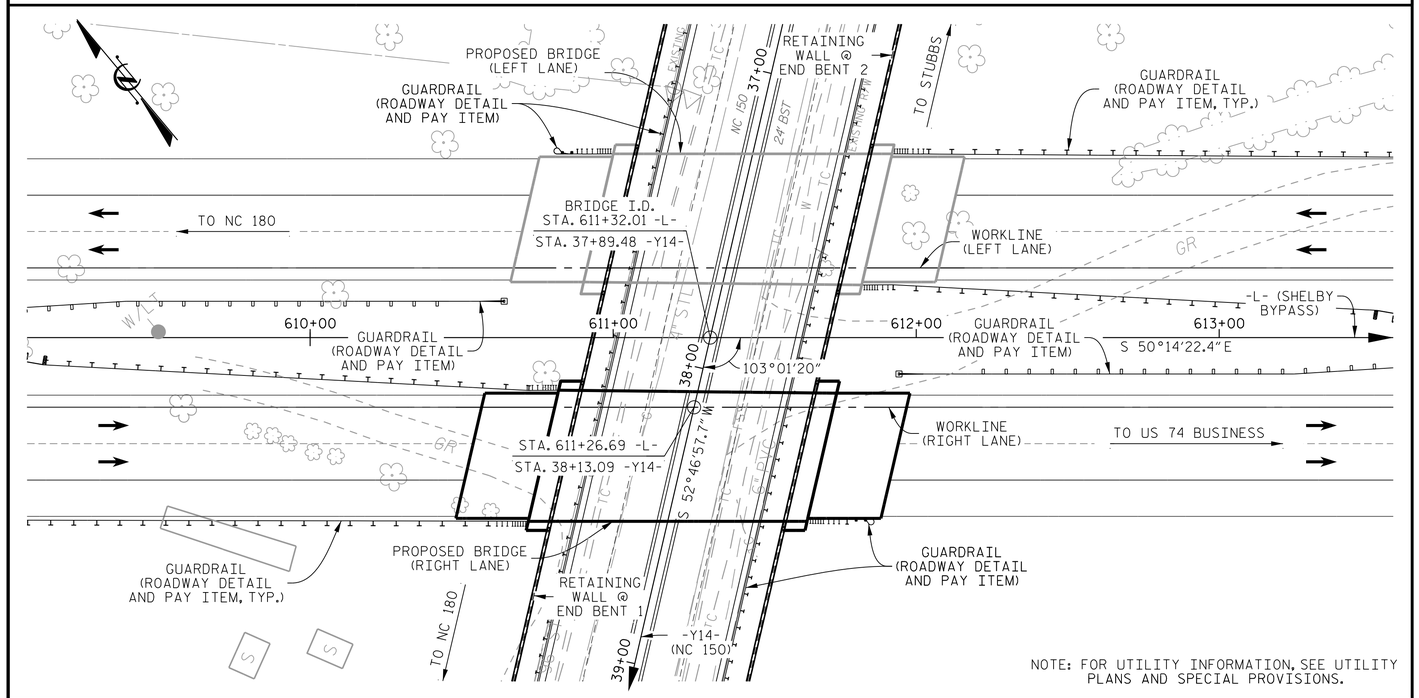
BENCHMARK: #27 - CHISLED SQUARE WITH "X" ON THE NORTH EAST WING WALL OF BRIDGE THAT CROSSES RAILROAD 102.86' RIGHT OF STA. 595+20.66 -L- EL. 944.58 N 579370.5 E 1255991.6



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.

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.

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 SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	MODIFIED 63" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES	HP 12 x 53 STEEL PILES		PDA TESTING	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS
	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	No.	LIN. FT.	EACH	No.	LIN. FT.	EACH	LIN. FT.	SQ. YD.	LUMP SUM
SUPERSTRUCTURE	3,979	5,505		LUMP SUM		4	356.92					180.58		LUMP SUM
END BENT 1			31.5		5,258			9	9	720.0			14	
END BENT 2			31.5		5,258			9	9	720.0	1		14	
TOTAL	3,979	5,505	63.0	LUMP SUM	10,516	4	356.92	18	18	1,440.0	1	180.58	28	LUMP SUM

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER NC 150 (-Y14-) ON SHELBY BYPASS (-L-) BETWEEN NC 180 AND US 74 BUSINESS (RIGHT LANE)

DRAWN BY : K. E. LOFTON DATE : 10-16
CHECKED BY : A. D. SHAH DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS DATE : 10-16

PLANS PREPARED BY :
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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M HARRIS
2/17/2017

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S10-3
1			3			TOTAL SHEETS
2			4			25

STR. #10

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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	SPANS	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	SPANS	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.08	--	1.75	0.966	1.21	A	E	43.9	1.109	1.28	A	I	26.1	0.80	0.966	1.08	A	E	43.9	--
		HL-93 (OPERATING)	N/A		1.57	--	1.35	0.966	1.57	A	E	43.9	1.109	2.01	A	I	17.1	N/A	--	--	--	--	--	--
		HS-20 (INVENTORY)	36.000	2	1.47	52.92	1.75	0.966	1.64	A	E	43.9	1.109	1.97	A	I	17.1	0.80	0.966	1.47	A	E	43.9	--
		HS-20 (OPERATING)	36.000		2.13	76.68	1.35	0.966	2.13	A	E	43.9	1.109	2.59	A	I	17.1	N/A	--	--	--	--	--	--
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.43	46.31	1.40	0.966	4.79	A	E	43.9	1.109	6.17	A	I	17.1	0.80	0.966	3.43	A	E	43.9	--
		SNGARBS2	20.000		2.51	50.20	1.40	0.966	3.50	A	E	43.9	1.109	4.33	A	I	17.1	0.80	0.966	2.51	A	E	43.9	--
		SNAGRIS2	22.000		2.36	51.92	1.40	0.966	3.29	A	E	43.9	1.109	4.01	A	I	17.1	0.80	0.966	2.36	A	E	43.9	--
		SNCOTTS3	27.250		1.70	46.33	1.40	0.966	2.38	A	E	43.9	1.109	3.01	A	I	17.1	0.80	0.966	1.70	A	E	43.9	--
		SNAGGRS4	34.925		1.41	49.24	1.40	0.966	1.96	A	E	43.9	1.109	2.47	A	I	17.1	0.80	0.966	1.41	A	E	43.9	--
		SNS5A	35.550		1.38	49.06	1.40	0.966	1.92	A	E	43.9	1.109	2.49	A	I	17.1	0.80	0.966	1.38	A	E	43.9	--
		SNS6A	39.950		1.26	50.34	1.40	0.966	1.75	A	E	43.9	1.109	2.26	A	I	17.1	0.80	0.966	1.26	A	E	43.9	--
		SNS7B	42.000		1.20	50.40	1.40	0.966	1.67	A	E	43.9	1.109	2.21	A	I	17.1	0.80	0.966	1.20	A	E	43.9	--
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.53	50.49	1.40	0.966	2.13	A	E	43.9	1.109	2.71	A	I	17.1	0.80	0.966	1.53	A	E	43.9	--
		TNT4A	33.075		1.53	50.60	1.40	0.966	2.14	A	E	43.9	1.109	2.65	A	I	17.1	0.80	0.966	1.53	A	E	43.9	--
		TNT6A	41.600		1.25	52.00	1.40	0.966	1.74	A	E	43.9	1.109	2.35	A	I	17.1	0.80	0.966	1.25	A	E	43.9	--
		TNT7A	42.000		1.25	52.50	1.40	0.966	1.74	A	E	43.9	1.109	2.30	A	I	17.1	0.80	0.966	1.25	A	E	43.9	--
		TNT7B	42.000		1.28	53.76	1.40	0.966	1.79	A	E	43.9	1.109	2.16	A	I	17.1	0.80	0.966	1.28	A	E	43.9	--
		TNAGRIT4	43.000		1.23	52.89	1.40	0.966	1.71	A	E	43.9	1.109	2.09	A	I	17.1	0.80	0.966	1.23	A	E	43.9	--
		TNAGT5A	45.000		1.16	52.20	1.40	0.966	1.62	A	E	43.9	1.109	2.06	A	I	17.1	0.80	0.966	1.16	A	E	43.9	--
		TNAGT5B	45.000	3	1.15	51.75	1.40	0.966	1.61	A	E	43.9	1.109	1.98	A	I	17.1	0.80	0.966	1.15	A	E	43.9	--

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. LEFT EXTERIOR GIRDER IS THE CONTROLLING EXTERIOR GIRDER.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

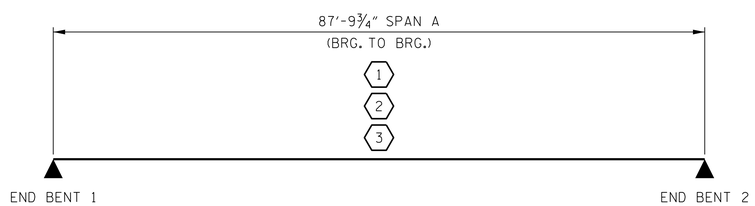
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
E - EXTERIOR GIRDER (LEFT)



LRFR SUMMARY

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

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:	S10-4
1			3			TOTAL SHEETS
2			4			25

STD. No. LRFR1 STR. #10

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
84C113A5C...
2/3/2017

PLANS PREPARED BY :
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5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY : K. E. LOFTON DATE : 10-16
CHECKED BY : A. D. SHAH DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS DATE : 10-16

ASSEMBLED BY : K.E.LOFTON DATE : 10-16
CHECKED BY : A.D.SHAH DATE : 10-16
DRAWN BY : MAA 1/08 | REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08 | REV. 10/1/11 MAA/GM

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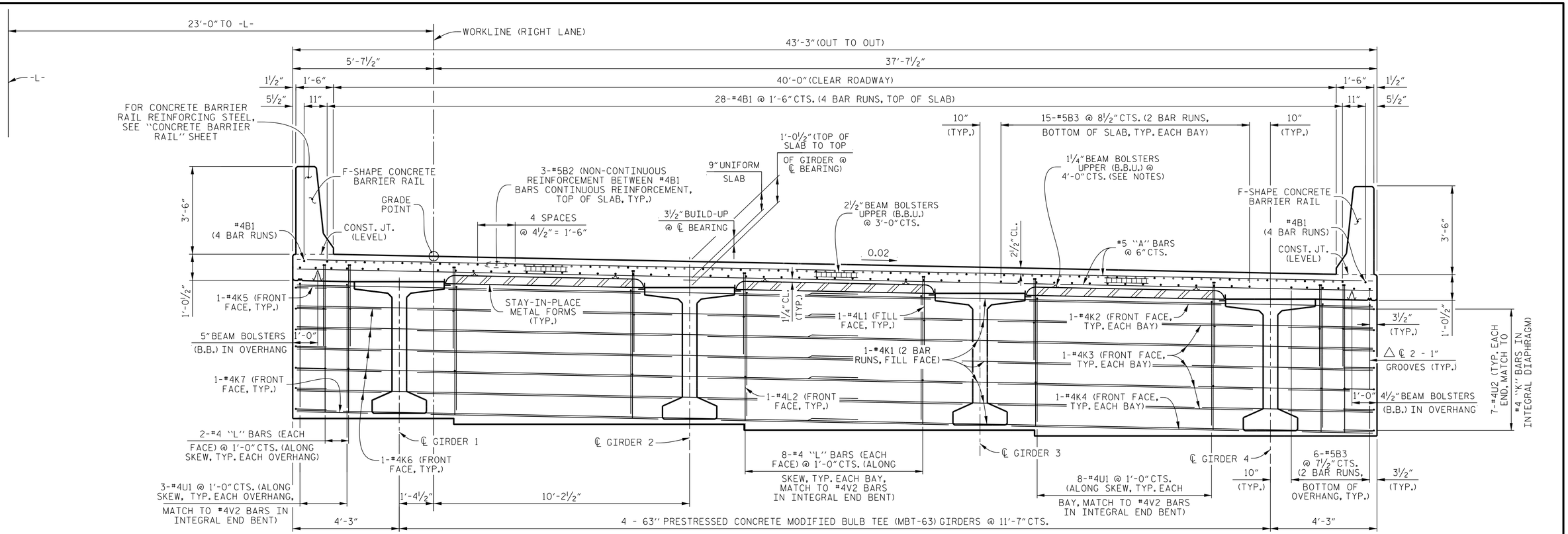
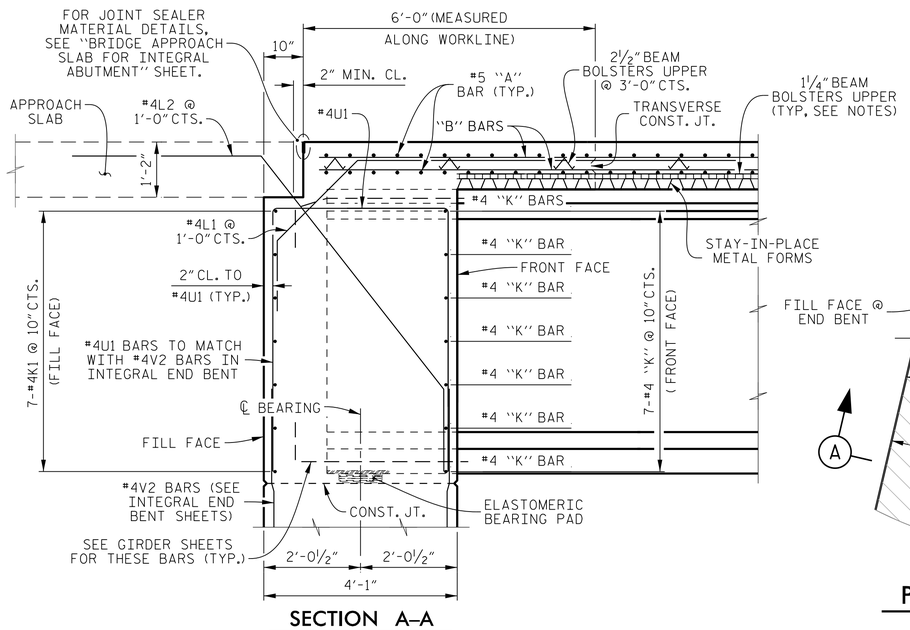


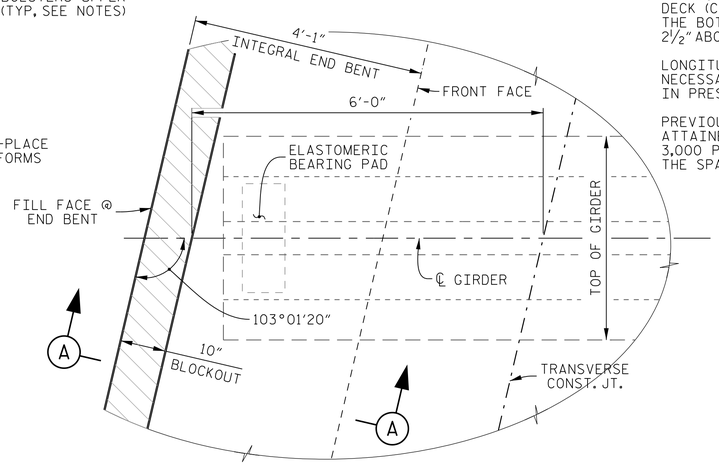
TYPICAL SECTION AT INTEGRAL END BENT 1 AND END BENT 2



SECTION A–A

SECTION THRU INTEGRAL END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



PLAN OF GIRDER – INTEGRAL END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

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

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

FOR F-SHAPE CONCRETE BARRIER RAIL DETAILS, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

FOR END VIEW OF INTEGRAL DIAPHRAGM, SEE SHEET 2 OF 2.

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION (RIGHT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M HARRIS
2/3/2017

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S10–5
1			3			TOTAL SHEETS
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STR. #10

DRAWN BY : K. E. LOFTON DATE : 10–16
CHECKED BY : T. M. HARRIS DATE : 10–16
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FILE: j:\r-2707c structures\structures\plans - smu_final\410_009_R2707C_smu_bt_S10-5.dgn
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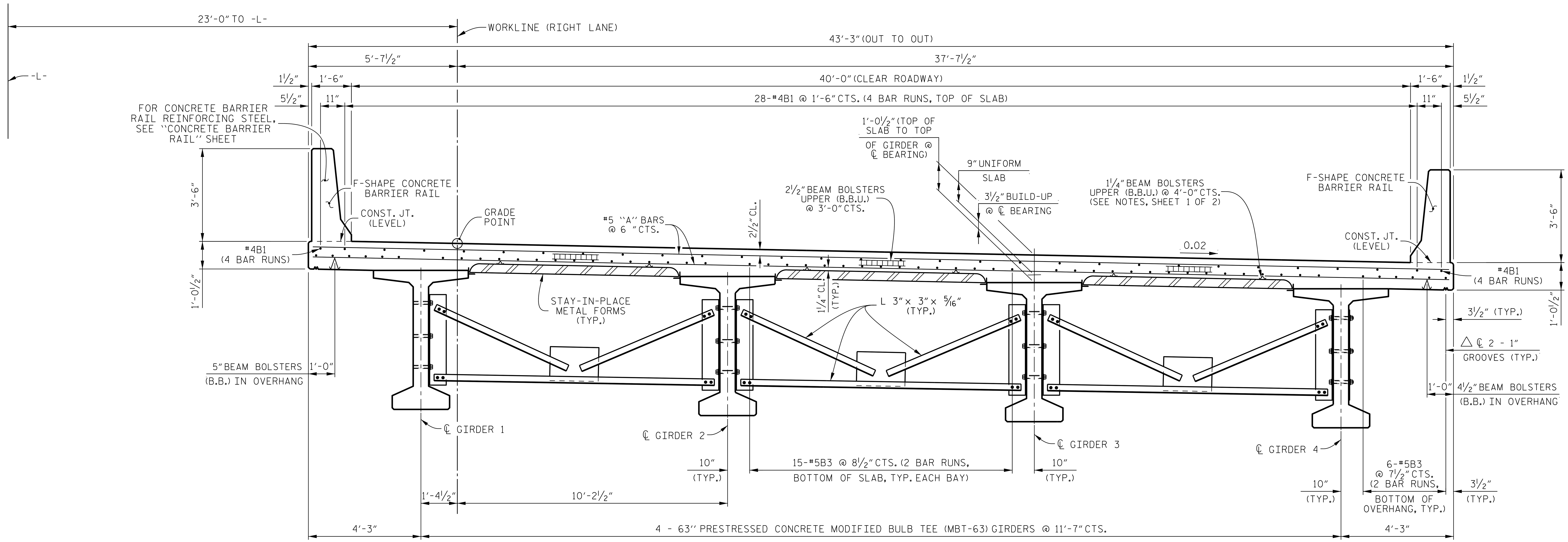
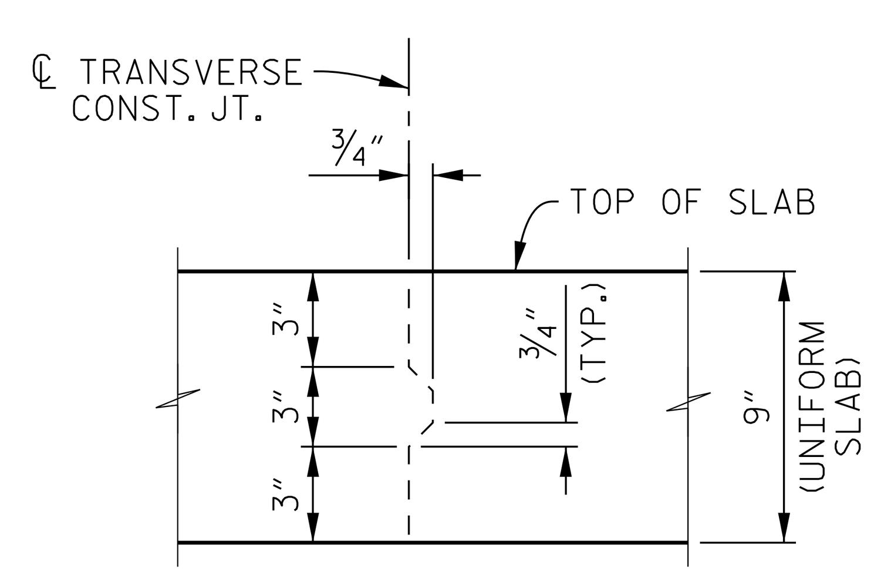


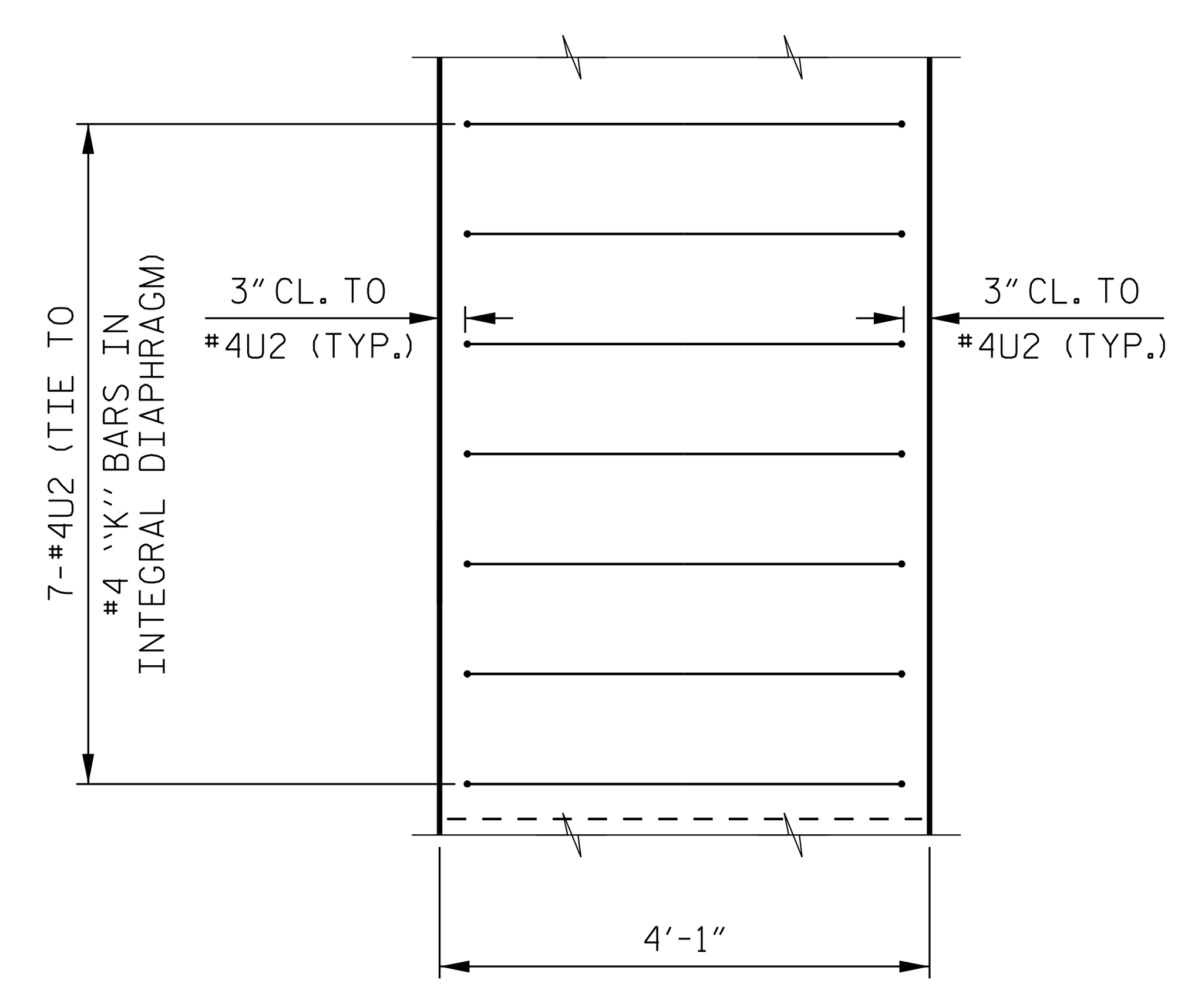
TYPICAL SECTION AT INTERMEDIATE STEEL DIAPHRAGMS

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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



END VIEW OF INTEGRAL DIAPHRAGM

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION (RIGHT LANE)

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Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	10-16
CHECKED BY :	T. M. HARRIS	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

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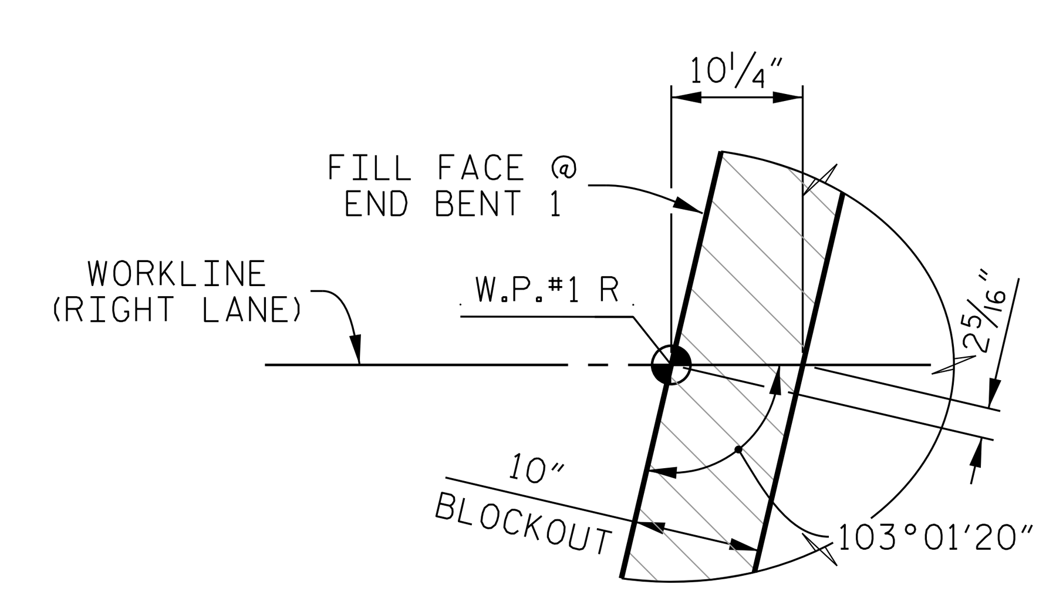
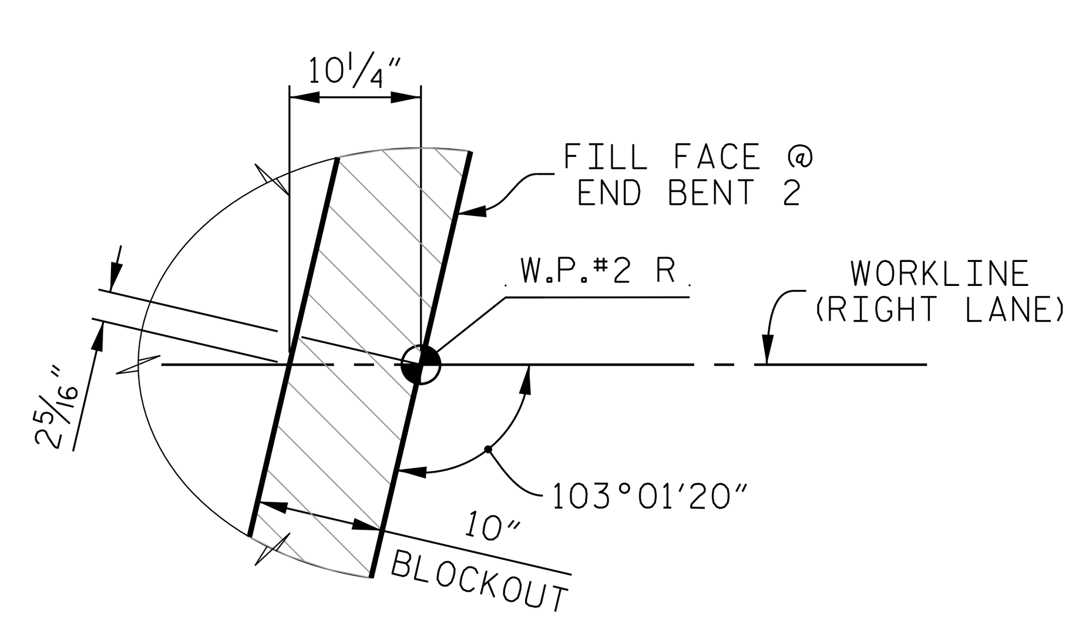
PLAN OF SPAN



DETAIL "A"



DETAIL "B"

NOTES

#5 "A" BARS SHALL BE PLACED PERPENDICULAR TO WORKLINE WITH A 2" MINIMUM CLEARANCE ON EACH END.

FOR REINFORCING STEEL IN CONCRETE BARRIER RAIL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR SLAB POURING SEQUENCE AND SPLICE CHART, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIDERS" SHEET.

PROJECT NO. R-2707C
CLEVELAND COUNTY
STATION: 611+32.01 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN
(RIGHT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19299 THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY:
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FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	10-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

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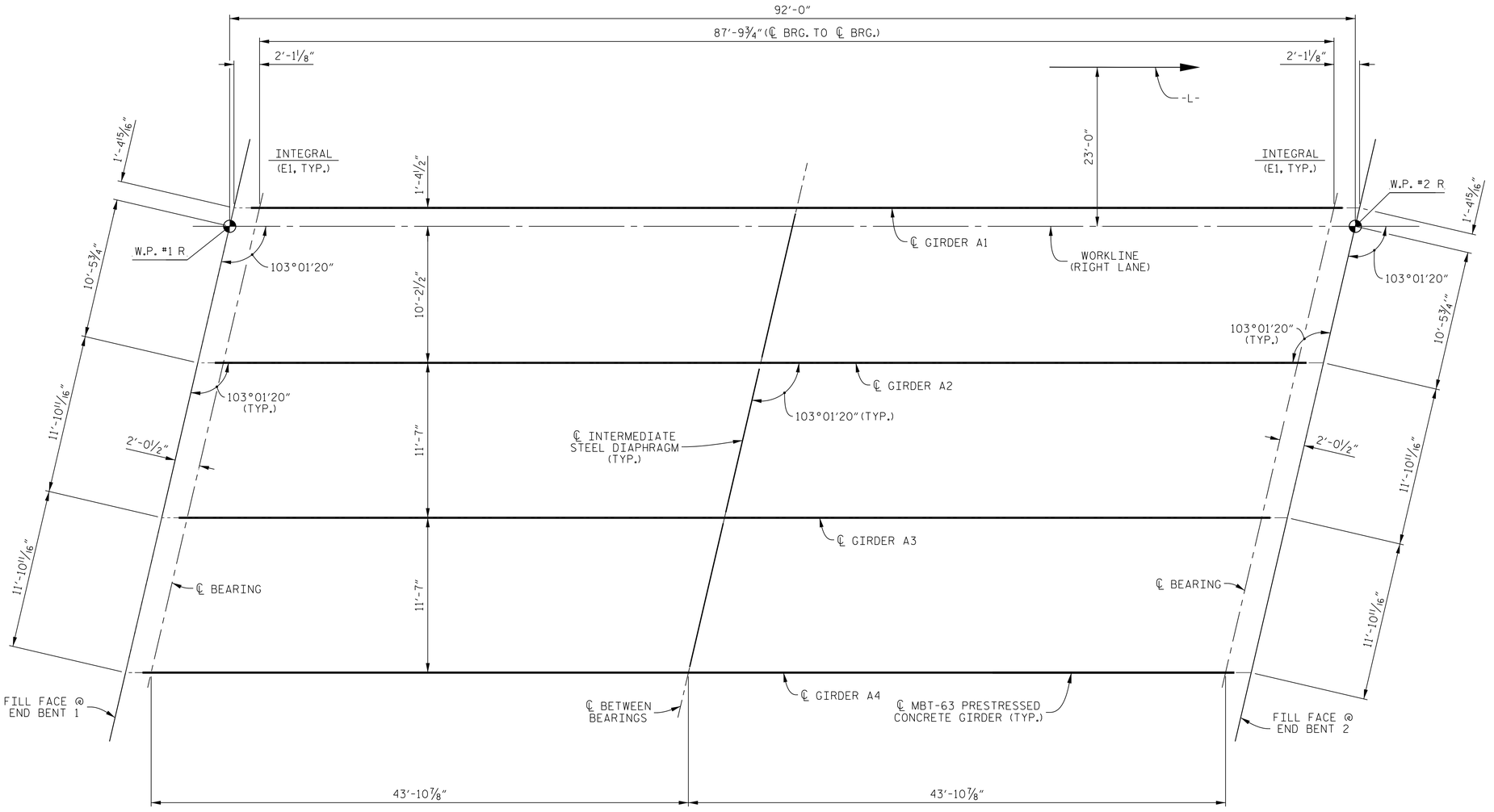

SPAN A

FRAMING PLAN

NOTES

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.

FOR ELASTOMERIC BEARING DETAILS, SEE "ELASTOMERIC BEARING DETAILS PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE" SHEET.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

(RIGHT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS W. HARRIS
2/3/2017

DRAWN BY : K. E. LOFTON DATE : 10-16
CHECKED BY : A. D. SHAH DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS DATE : 10-16

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FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

REVISIONS						SHEET No.
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1			3			TOTAL SHEETS
2			4			25

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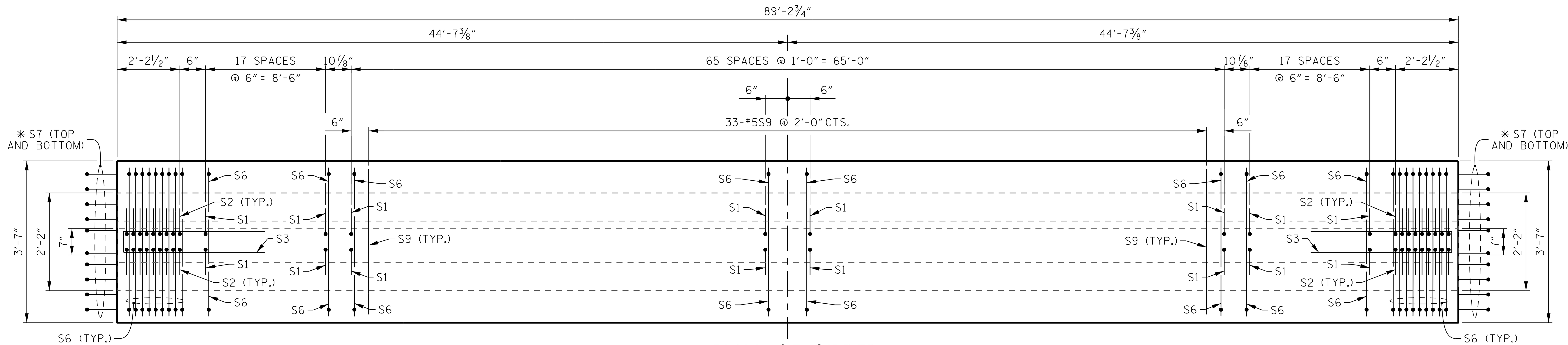
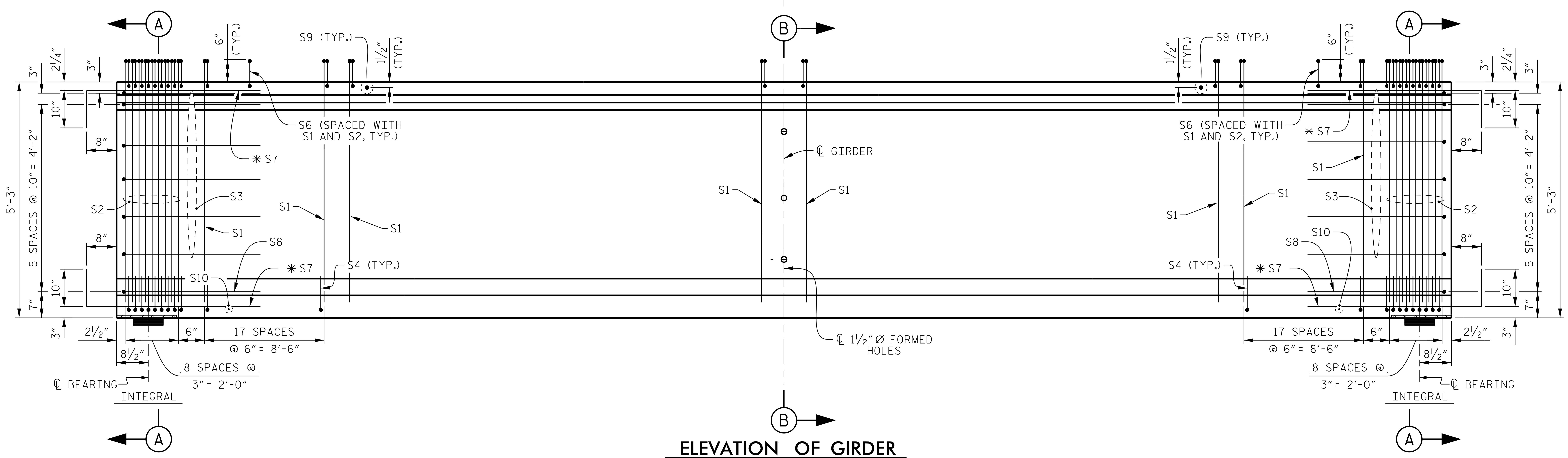


PLAN OF GIRDER



ELEVATION OF GIRDER

NOTES

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

FOR STRAND PATTERN, SEE SHEET 2 OF 3.

FOR ADDITIONAL NOTES, SEE SHEET 3 OF 3.

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

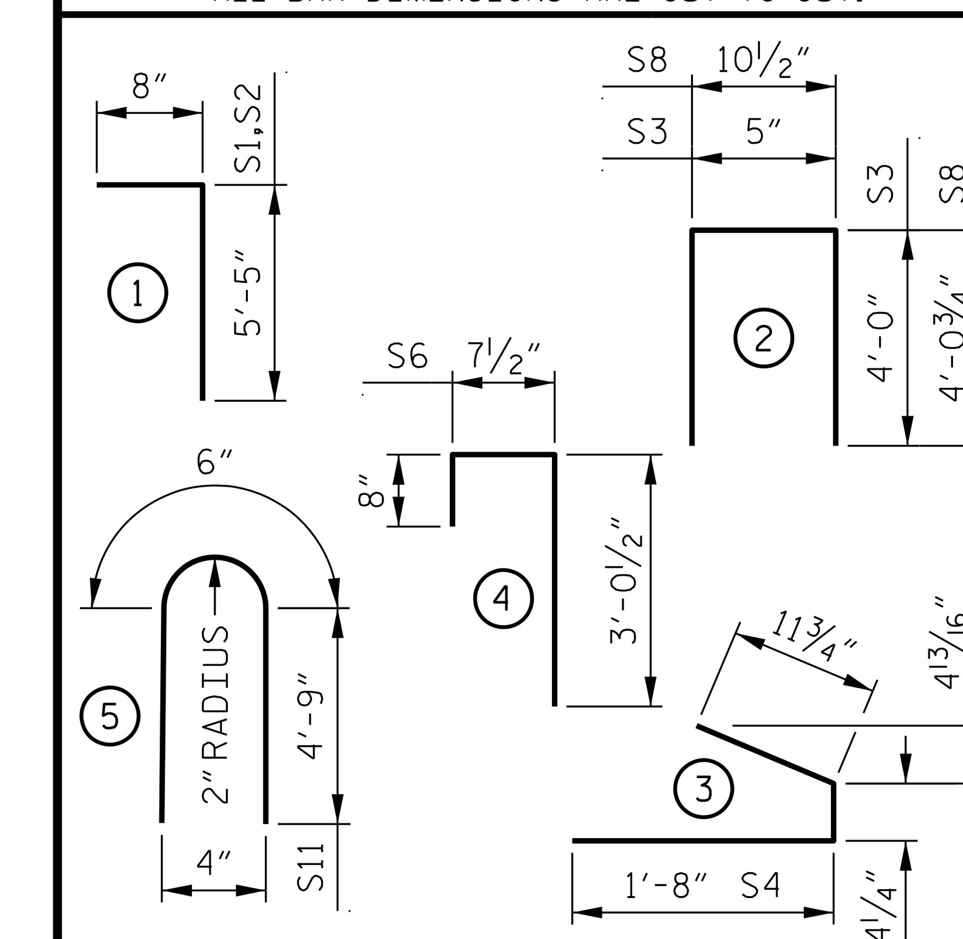
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	204	#4	1	6'- 1"	829
S2	36	#5	1	6'- 1"	228
S3	12	#4	2	8'- 5"	67
S4	108	#4	3	3'- 0"	216
S6	240	#5	4	4'- 4"	1,085
✱ S7	40	#5	STR	3'- 8"	153
S8	2	#5	2	9'- 0"	19
S9	33	#5	STR	3'- 3"	112
S10	2	#3	STR	1'-10"	1
S11	4	#5	5	10'- 0"	42
S12	8	#4	STR	8'- 0"	43

✱ 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	7,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
GIRDERS	LB.	C.Y.	No.
A1 THRU A4	2,795	17.7	30

GIRDERS REQUIRED

LOCATION	NUMBER	LENGTH	TOTAL LENGTH
SPAN A	4	89'-2¾"	356.92'

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

63" PRESTRESSED CONCRETE MODIFIED BULB TEE GIRDER (RIGHT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

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2				4			

SHEET No. S10-9

TOTAL SHEETS 25

STD. No. PCG7 STR. #10

PLANS PREPARED BY :
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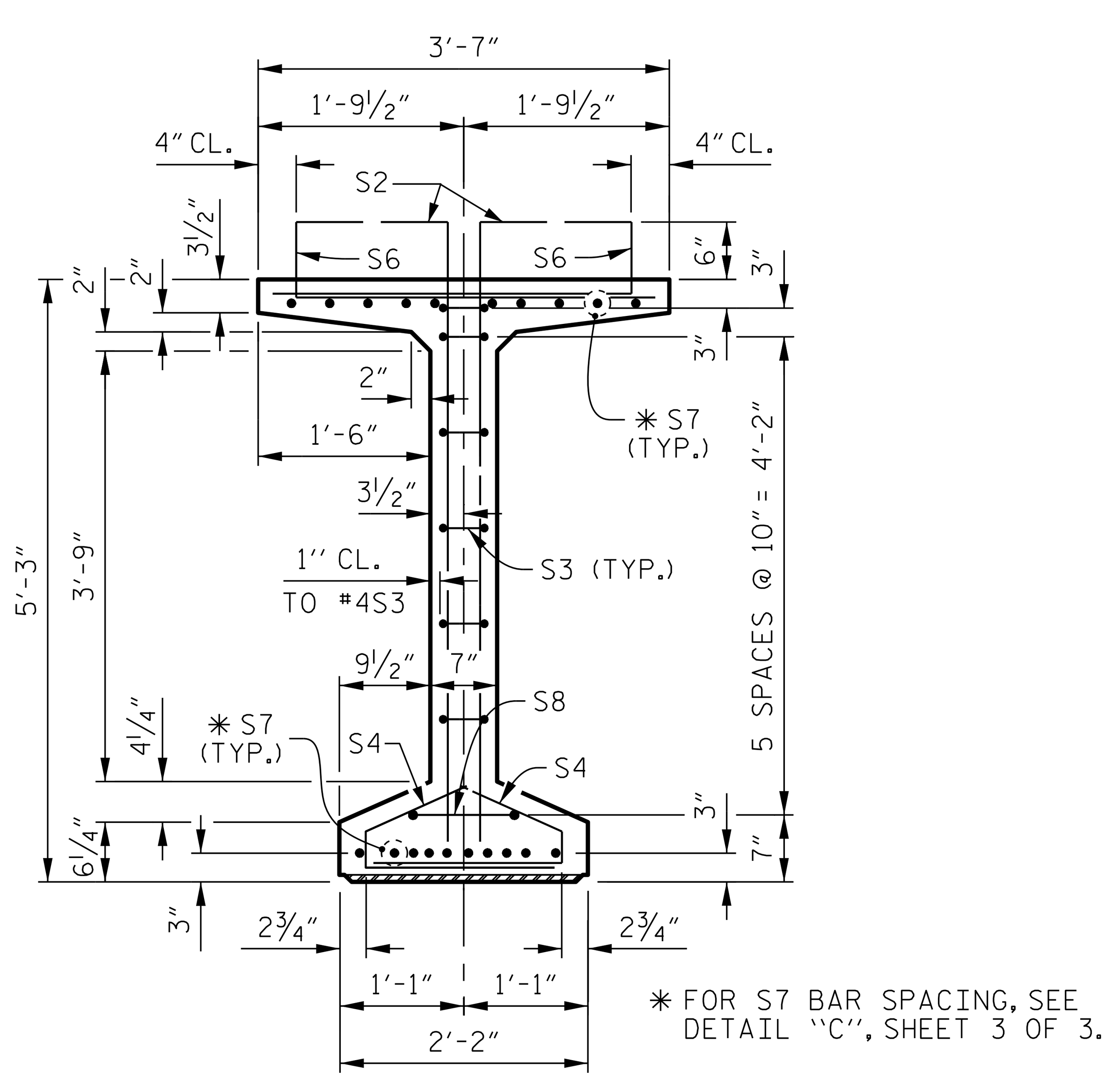
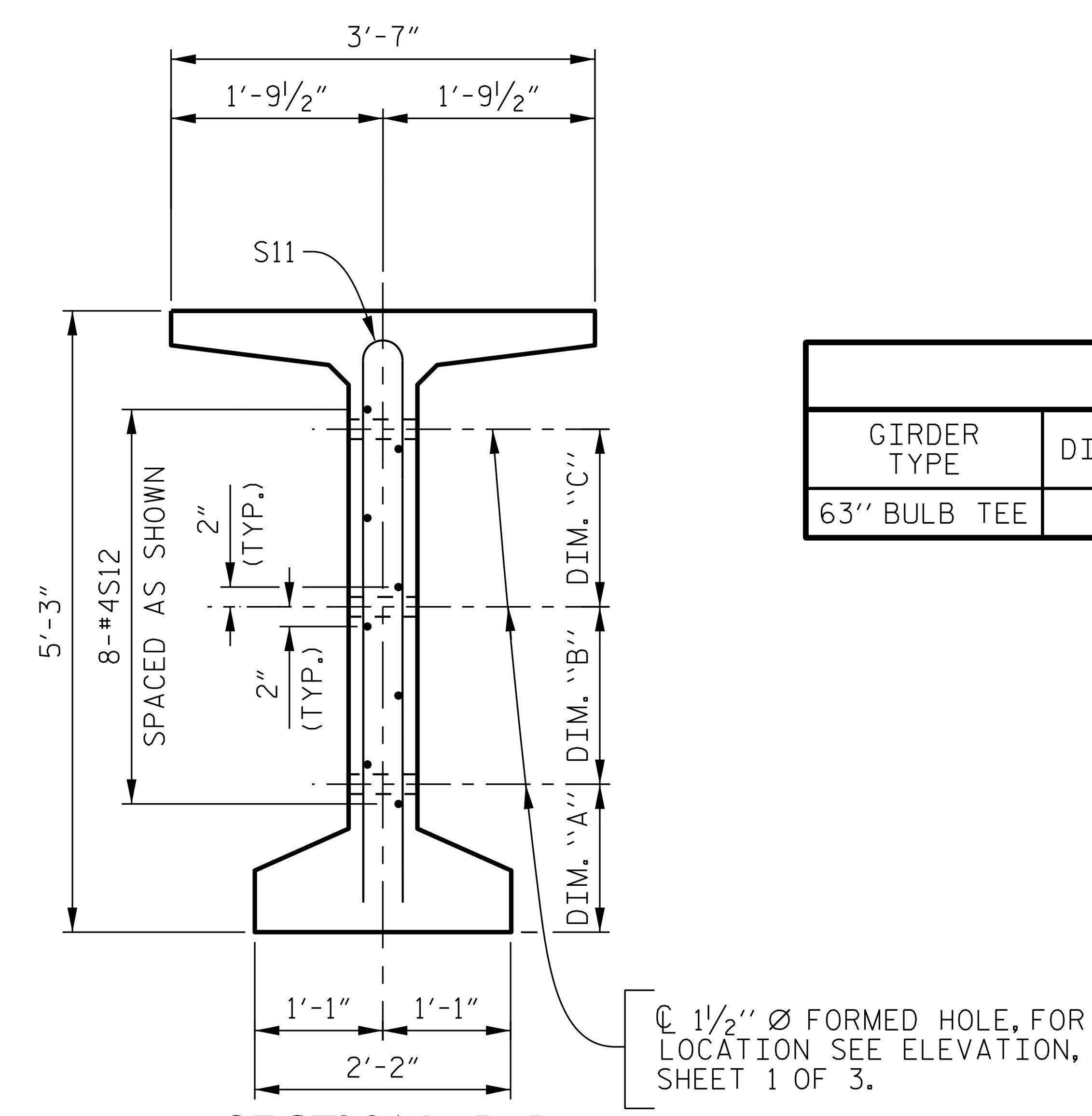
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY : K. E. LOFTON DATE : 10-16
CHECKED BY : A. D. SHAH DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS DATE : 10-16

ASSEMBLED BY : K. E. LOFTON DATE : 10-16
CHECKED BY : A. D. SHAH DATE : 10-16
DRAWN BY : EEM 2/6/97 REV. 10/1/11 MAA/GM
CHECKED BY : VAP 2/6/97 REV. 6/13 MAA/GM
REV. 1/15 MAA/TMG



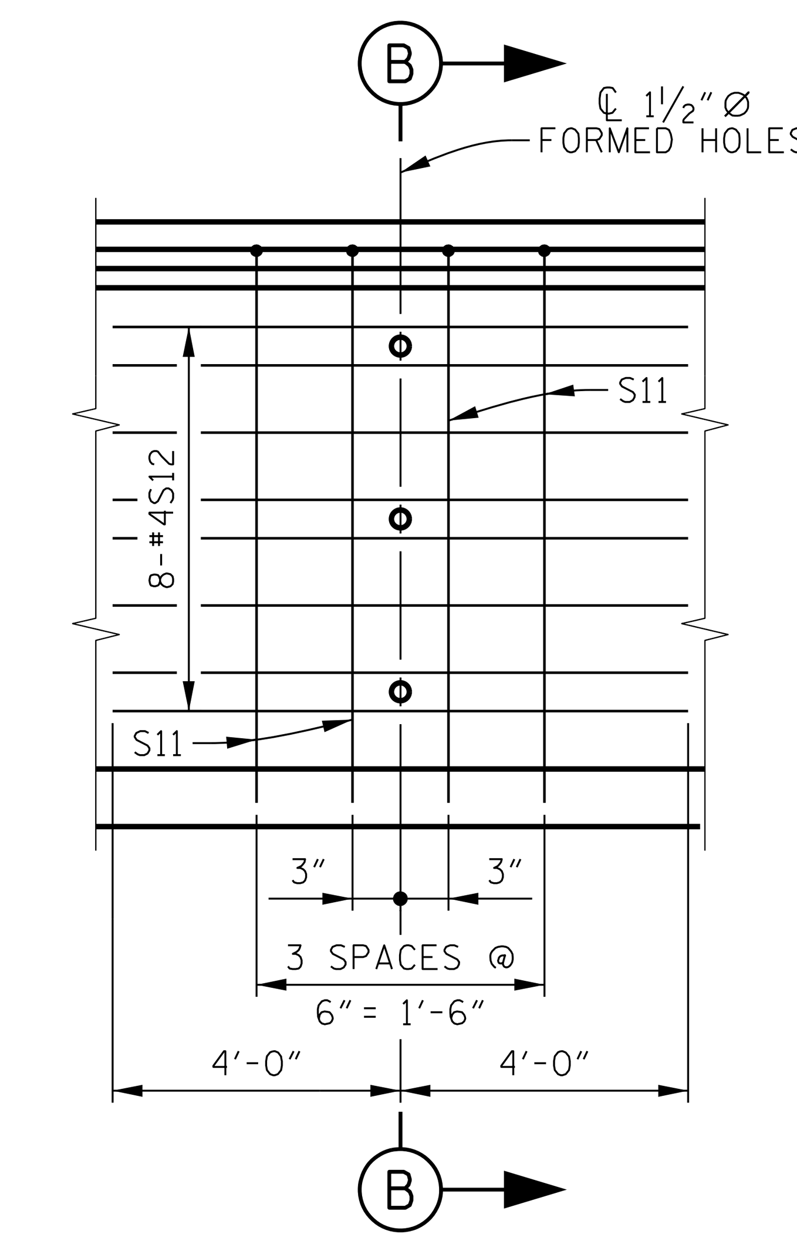
SECTION A–A



SECTION B–B

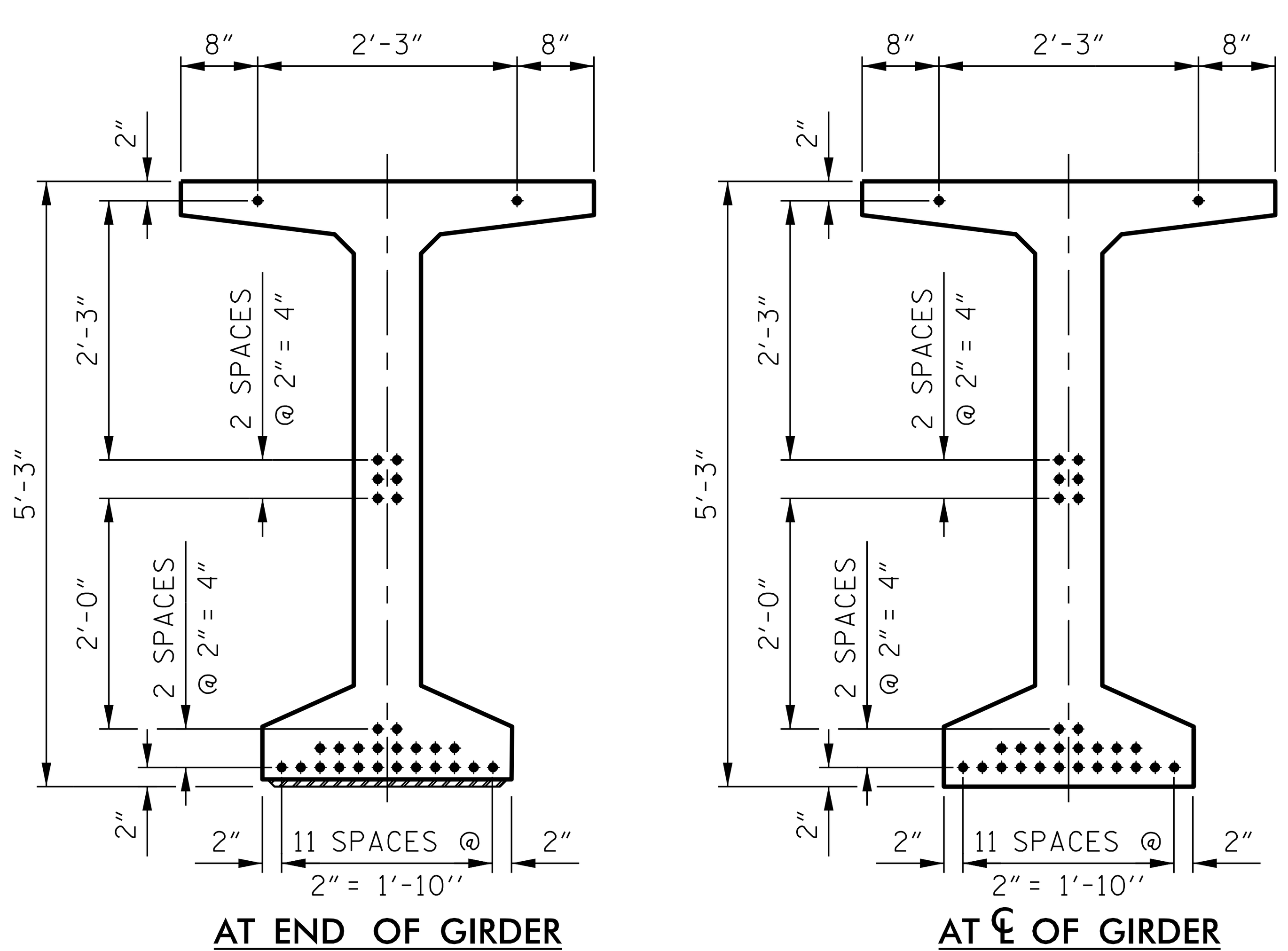
(S1, S6 AND S9 BARS NOT SHOWN)

TABLE			
GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"
63" BULB TEE	1'-9"	1'-5"	11¾"



PARTIAL ELEVATION

SHOWING INTERMEDIATE
DIAPHRAGM REINFORCING
STEEL FOR ALL GIRDERS



30 – 0.6" Ø LOW RELAXATION STRAND LAYOUT

● FULLY BONDED STRANDS

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

63" PRESTRESSED CONCRETE MODIFIED BULB TEE GIRDER

(RIGHT LANE)

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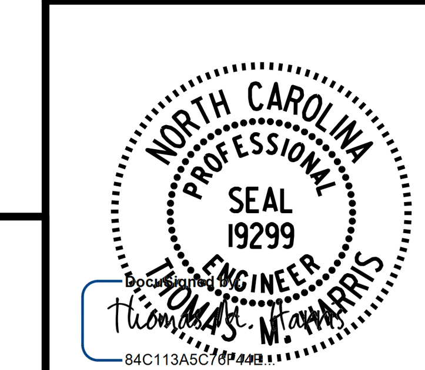

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NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	10-16
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DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

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1			3		
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	REV. 1/15 MAA/TMG

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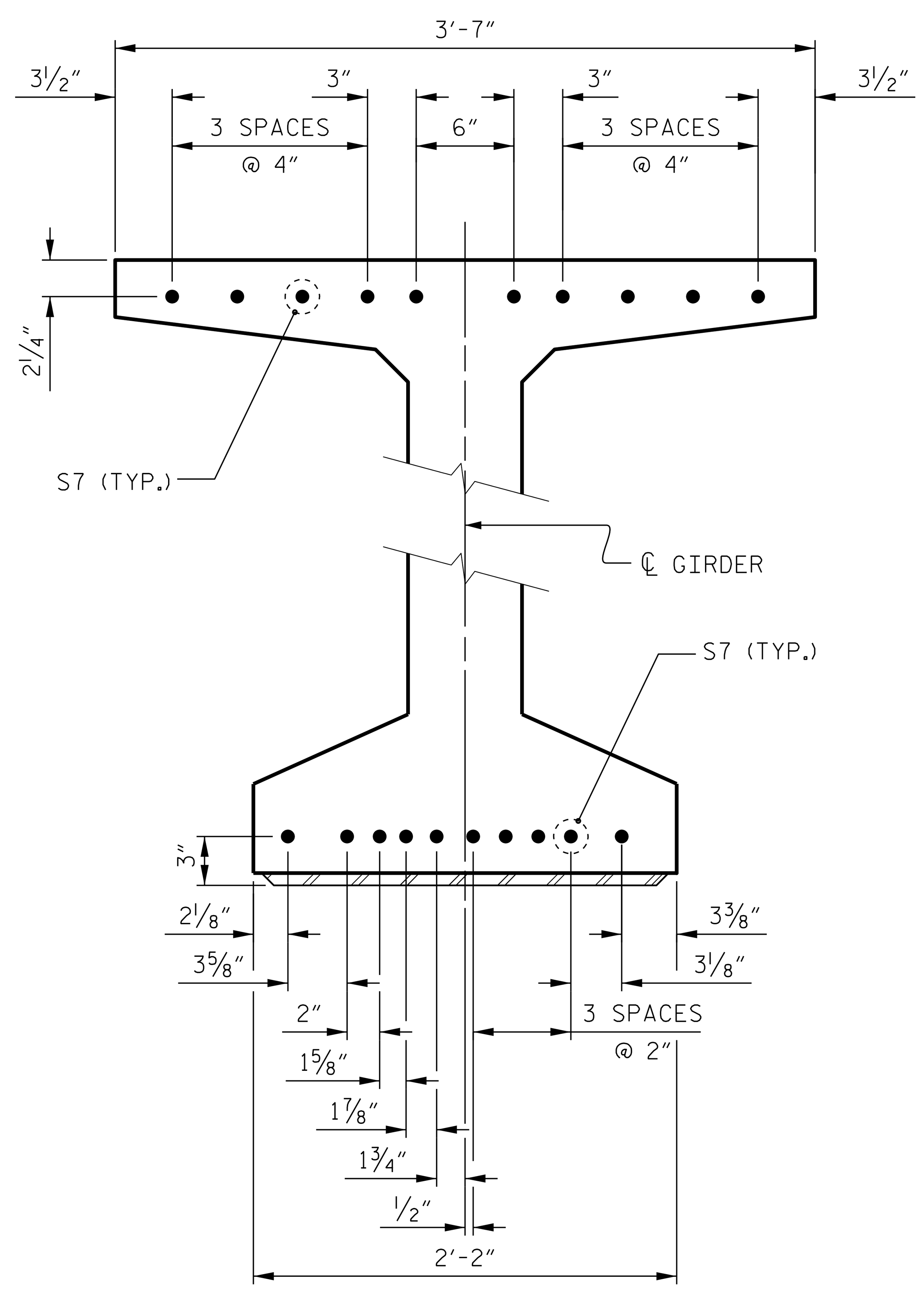
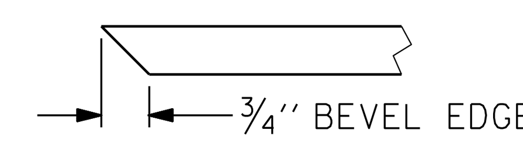


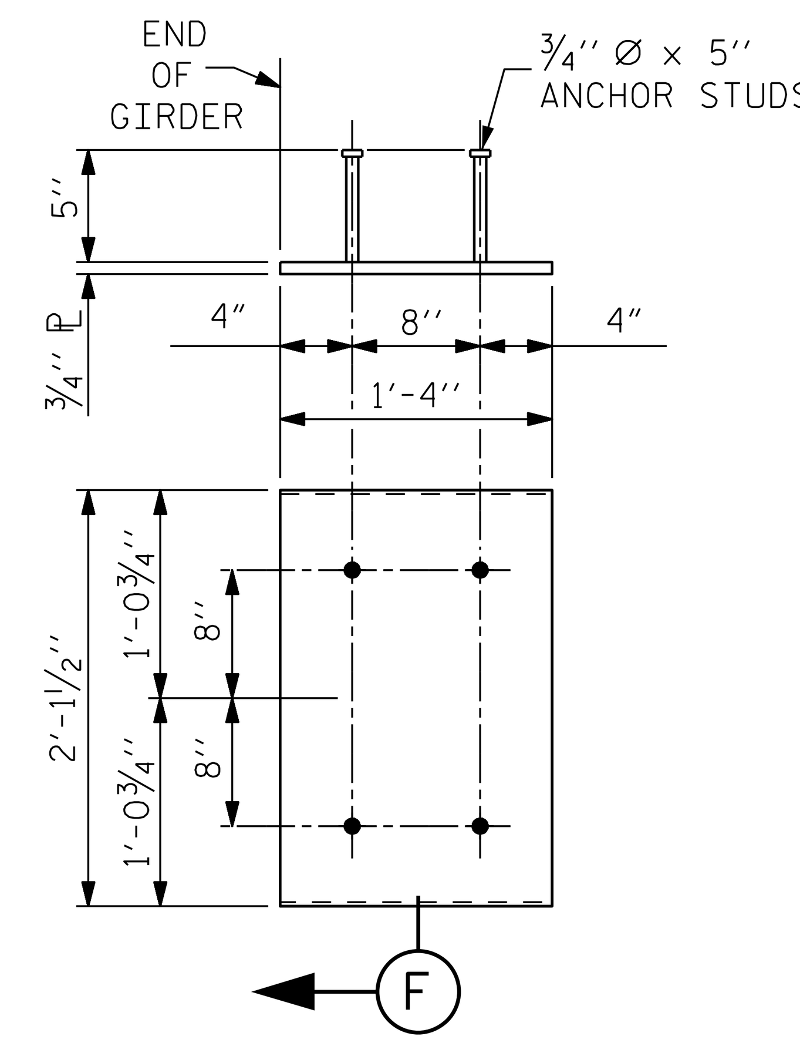
DETAIL "C"

(FOR 63" MODIFIED BULB TEES)



SECTION "F"

(SEE NOTES)



EMBEDDED PLATE "B-1" DETAILS FOR 63" MODIFIED BULB TEES

(2 REQUIRED PER GIRDER)

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.

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 5,800 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".

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

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 4,500 LBS.

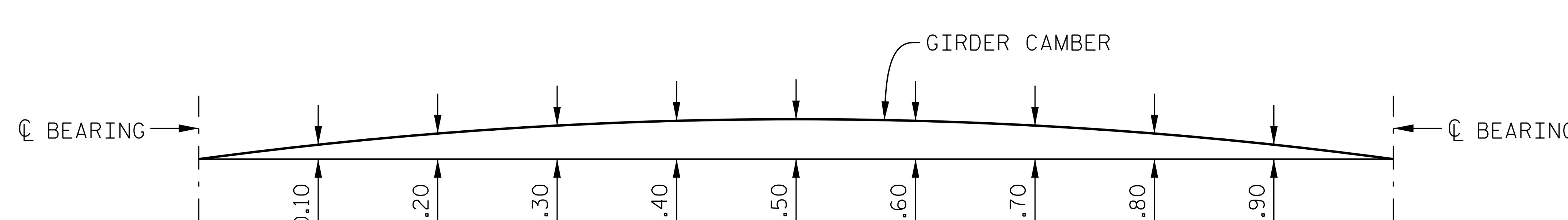
FOR EMBEDDED CLIPS FOR PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.

CAMBER AND DEAD LOAD DEFLECTIONS

	SPAN A										
GIRDERS 1 THRU 4	℄ BRG.	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	℄ BRG.
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.048	0.090	0.123	0.144	0.152	0.144	0.123	0.090	0.048	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.027	0.054	0.075	0.088	0.092	0.088	0.075	0.054	0.027	0.000
FINAL CAMBER ↑	0	¼"	7/16"	9/16"	11/16"	11/16"	11/16"	9/16"	7/16"	¼"	0

* INCLUDES FUTURE WEARING SURFACE

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



GIRDER CAMBER AND DEFLECTIONS

PROJECT NO. R-2707C
CLEVELAND COUNTY
STATION: 611+32.01 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

63" PRESTRESSED CONCRETE MODIFIED BULB TEE GIRDER

(RIGHT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
3/29/2017

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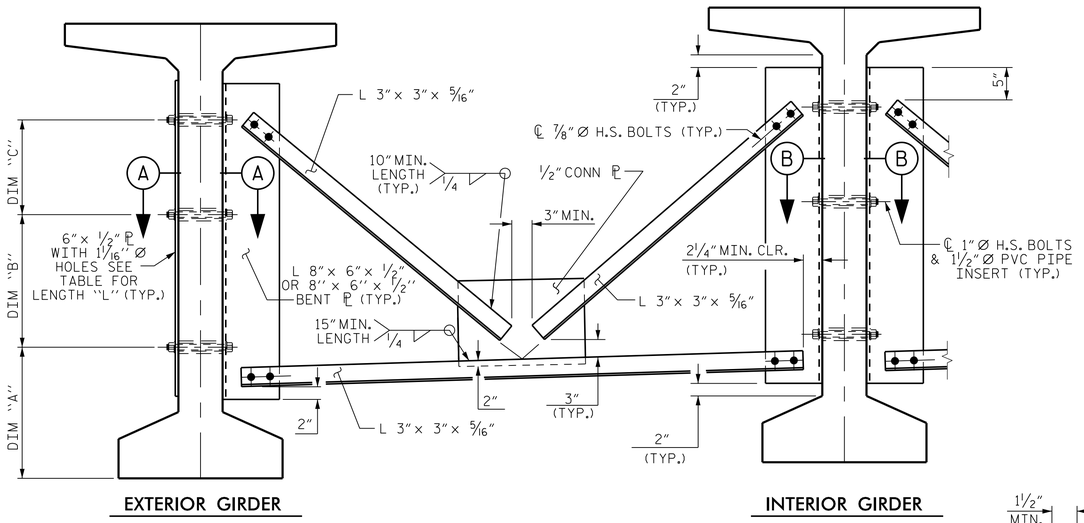
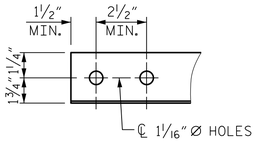


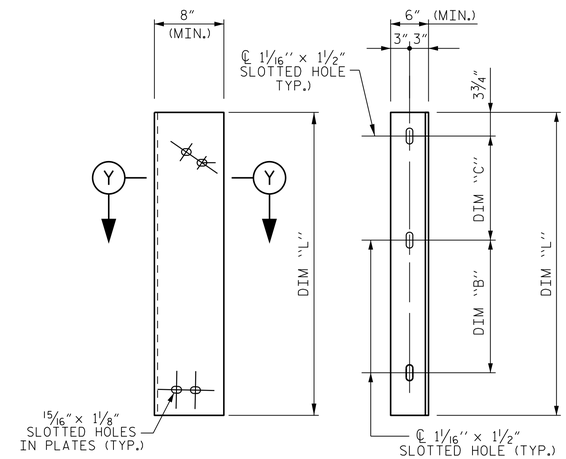
PART SECTION AT INTERMEDIATE DIAPHRAGM

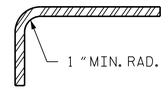
(63″ BULB TEE)



ANGLE END

(L 3″ × 3″ × 5/16″)





SECTION Y–Y

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 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 AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE 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.

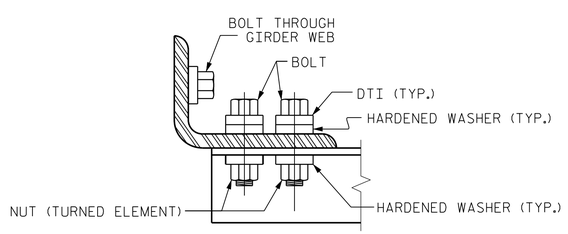
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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

CONNECTION DETAILS

(90°< SKEW < 110°)

TABLE				
GIRDER TYPE	DIM ″A″	DIM ″B″	DIM ″C″	DIM ″L″
63″ BULB TEE	1′-9″	1′-5″	11¾″	3′-5″



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR 63″ MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

(RIGHT LANE)

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
84C113A5C...
2/3/2017

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No.	BY:	DATE:	No.	BY:	DATE:	S10–12
1			3			TOTAL SHEETS
2			4			25

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ASSEMBLED BY :	K.E.LOFTON	DATE : 10-16
CHECKED BY :	A.D.SHAH	DATE : 10-16
DRAWN BY :	RWW 11/09	ADDED 11/23/09
CHECKED BY :	GM 11/09	REV. 10/1/11 MAA/GM

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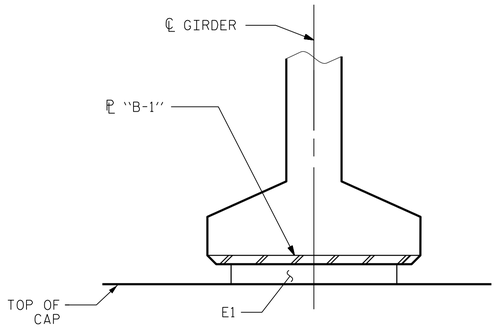
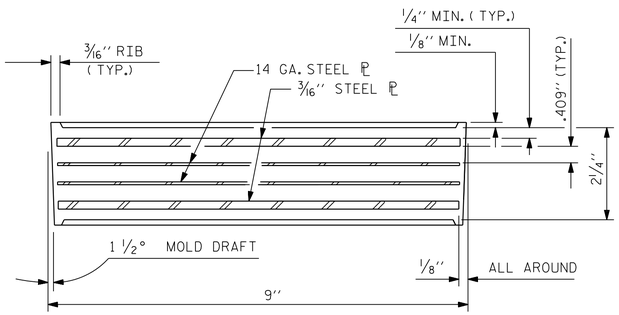
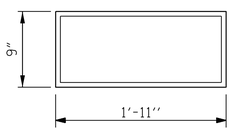


INTEGRAL

SECTION E–E



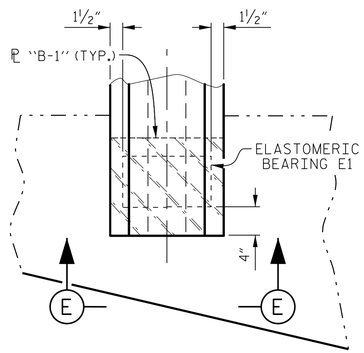
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (8 REQUIRED)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



PARTIAL PLAN – INTEGRAL END BENT

NOTES

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.

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

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

ASSEMBLED BY :	K. E. LOFTON	DATE :	10-16		
CHECKED BY :	A. D. SHAH	DATE :	10-16		
DRAWN BY : EEM	2/97	REV. 10/1/11	MAA/GM		
CHECKED BY : VAP	2/97	REV. 6/13	AAC/MAA		
		REV. 1/15	MAA/TMG		

DRAWN BY :	K. E. LOFTON	DATE :	10–16
CHECKED BY :	A. D. SHAH	DATE :	10–16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10–16

PLANS PREPARED BY :

PARSONS

5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
84C113A5C7DF44E...
2/3/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE
(RIGHT LANE)

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S10–13
1			3			TOTAL SHEETS
2			4			25

STD. No. EB4 STR. #10

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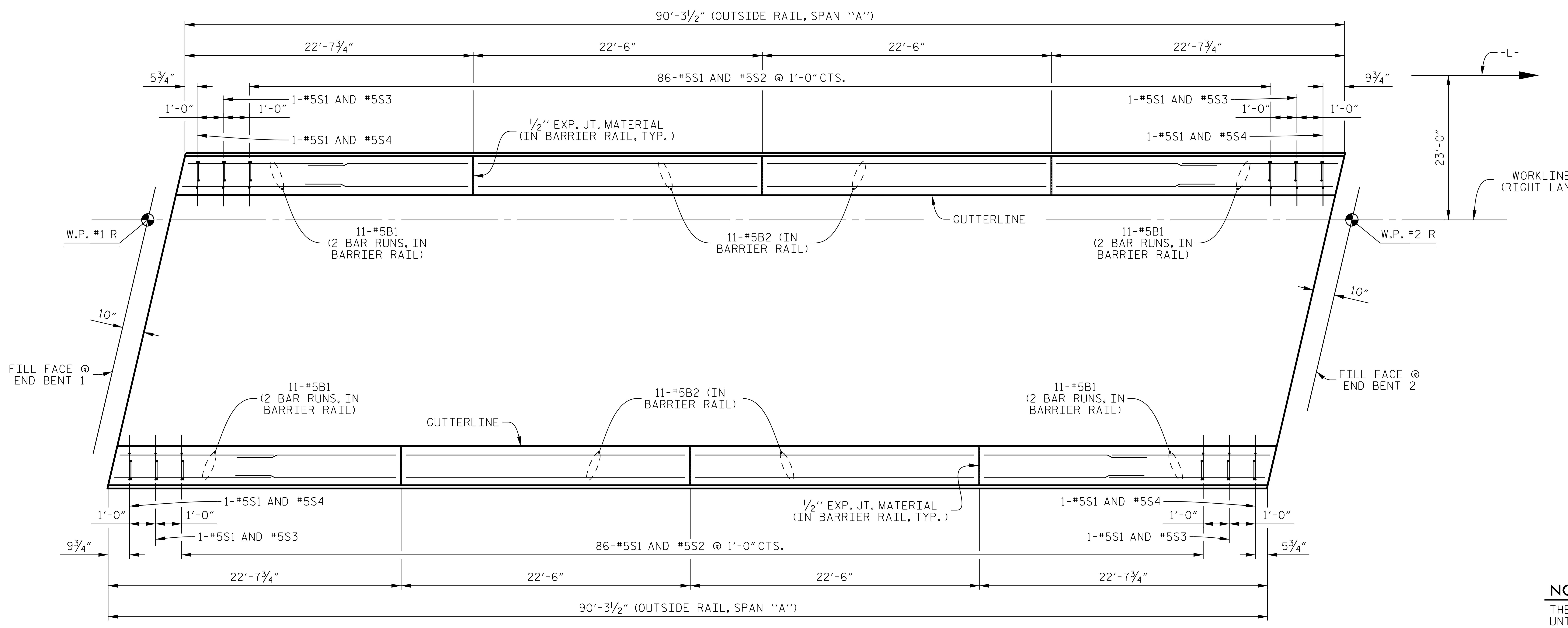
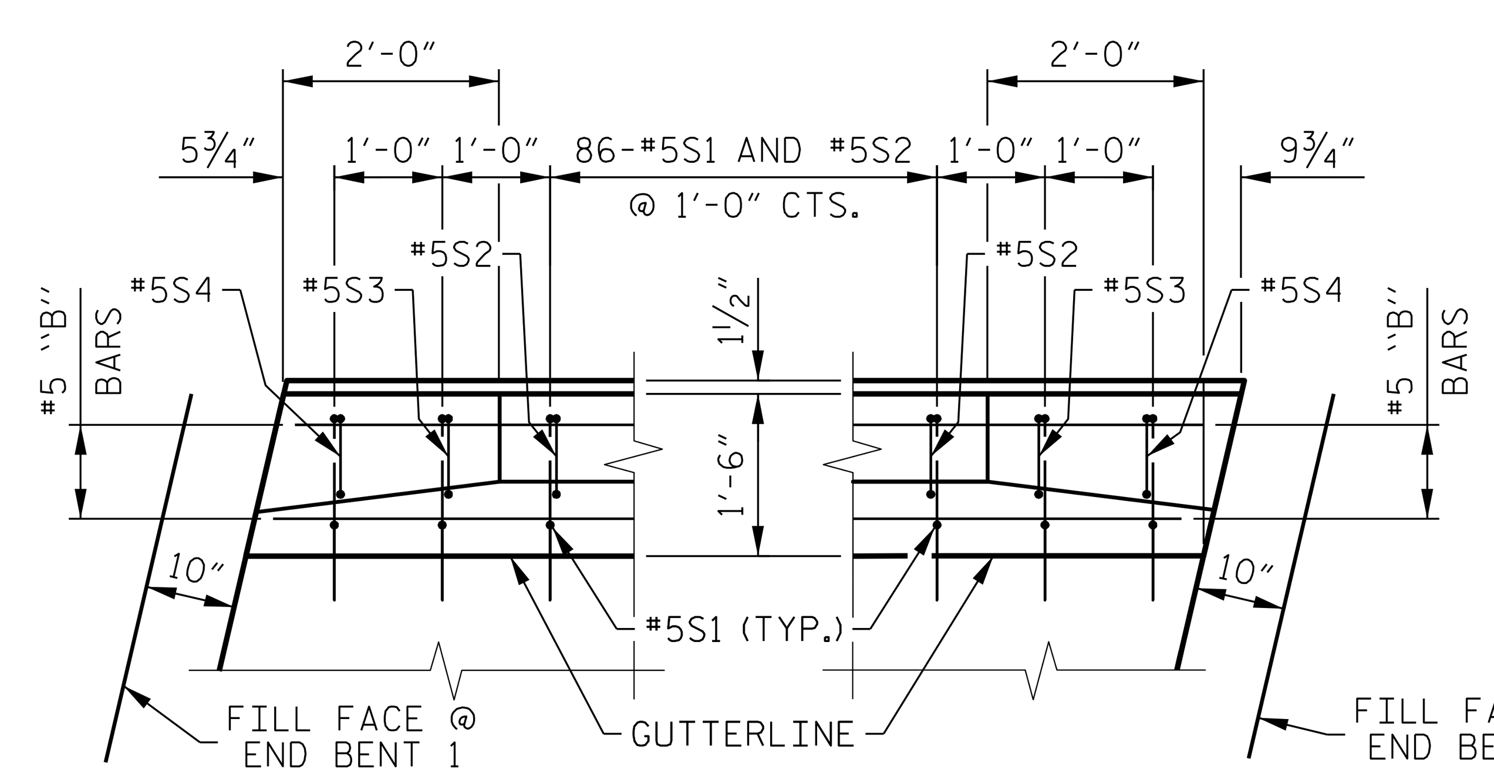


PLAN OF BARRIER RAIL

SPLICE LENGTH		
BAR	SIZE	LENGTH
B1	#5	3'-5"



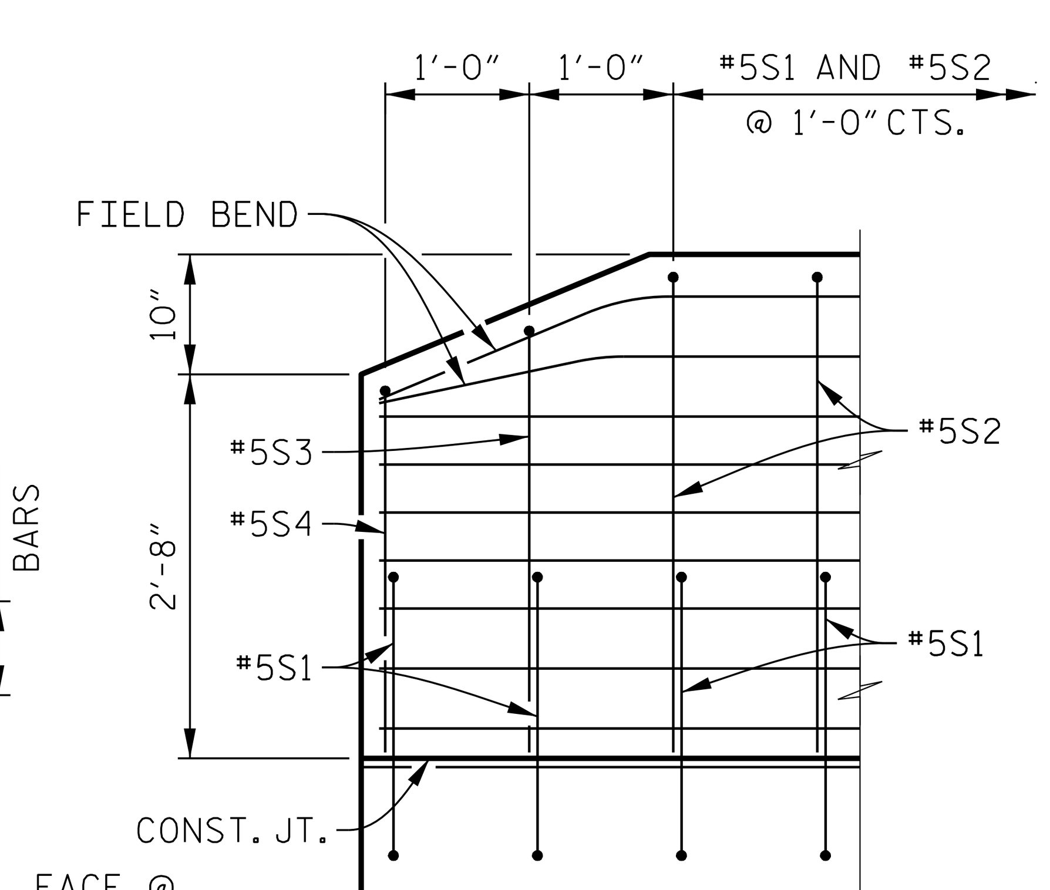
PLAN @ END BENT 1

LEFT SIDE SHOWN, RIGHT SIDE SIMILAR

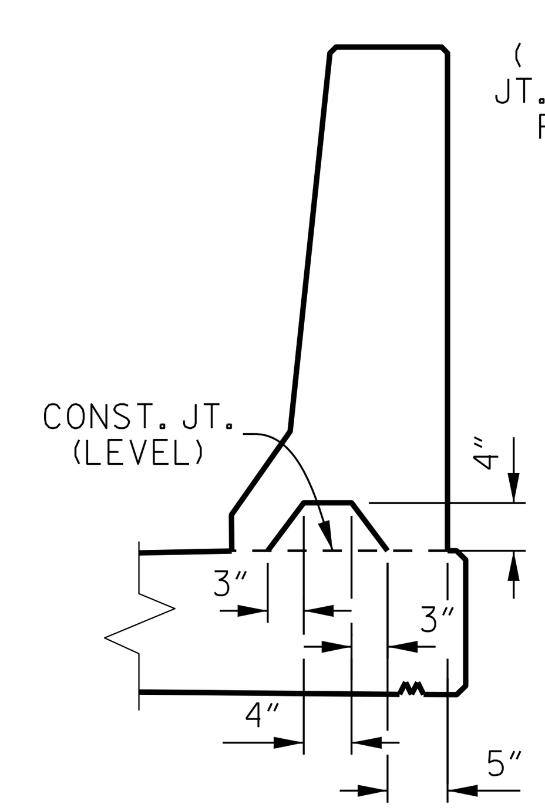
PLAN @ END BENT 2

LEFT SIDE SHOWN, RIGHT SIDE SIMILAR

END OF RAIL DETAILS

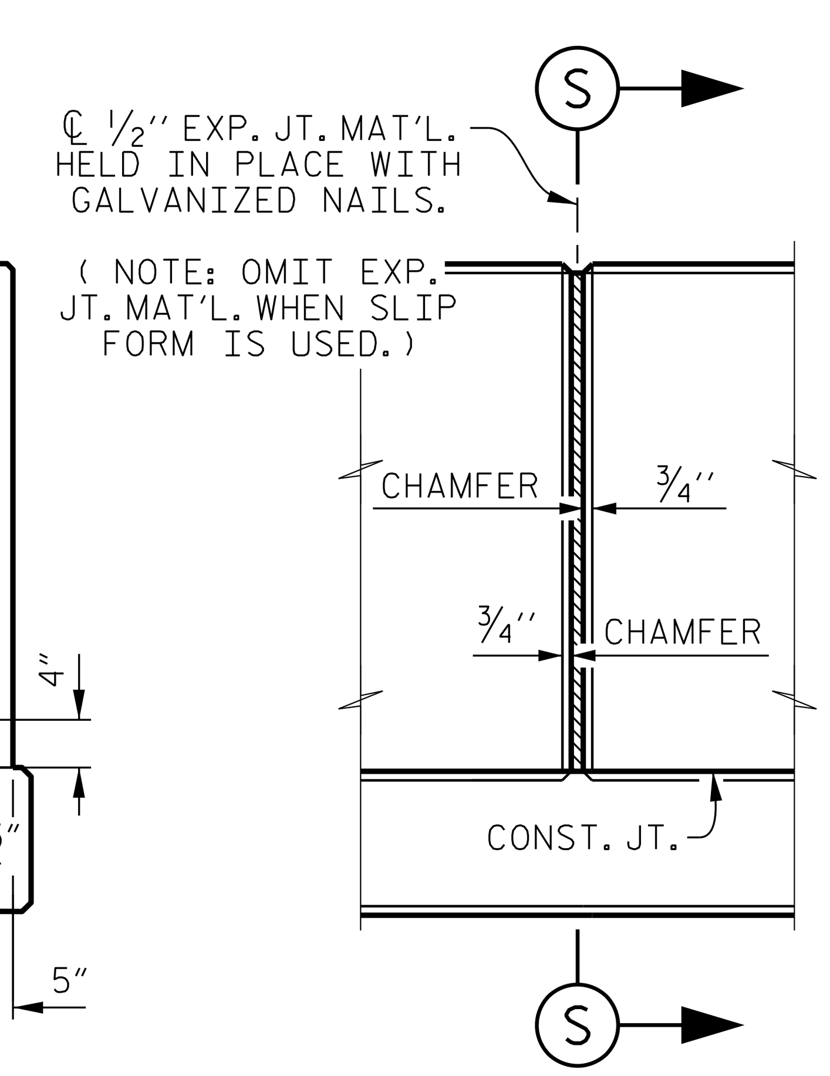


ELEVATION VIEW

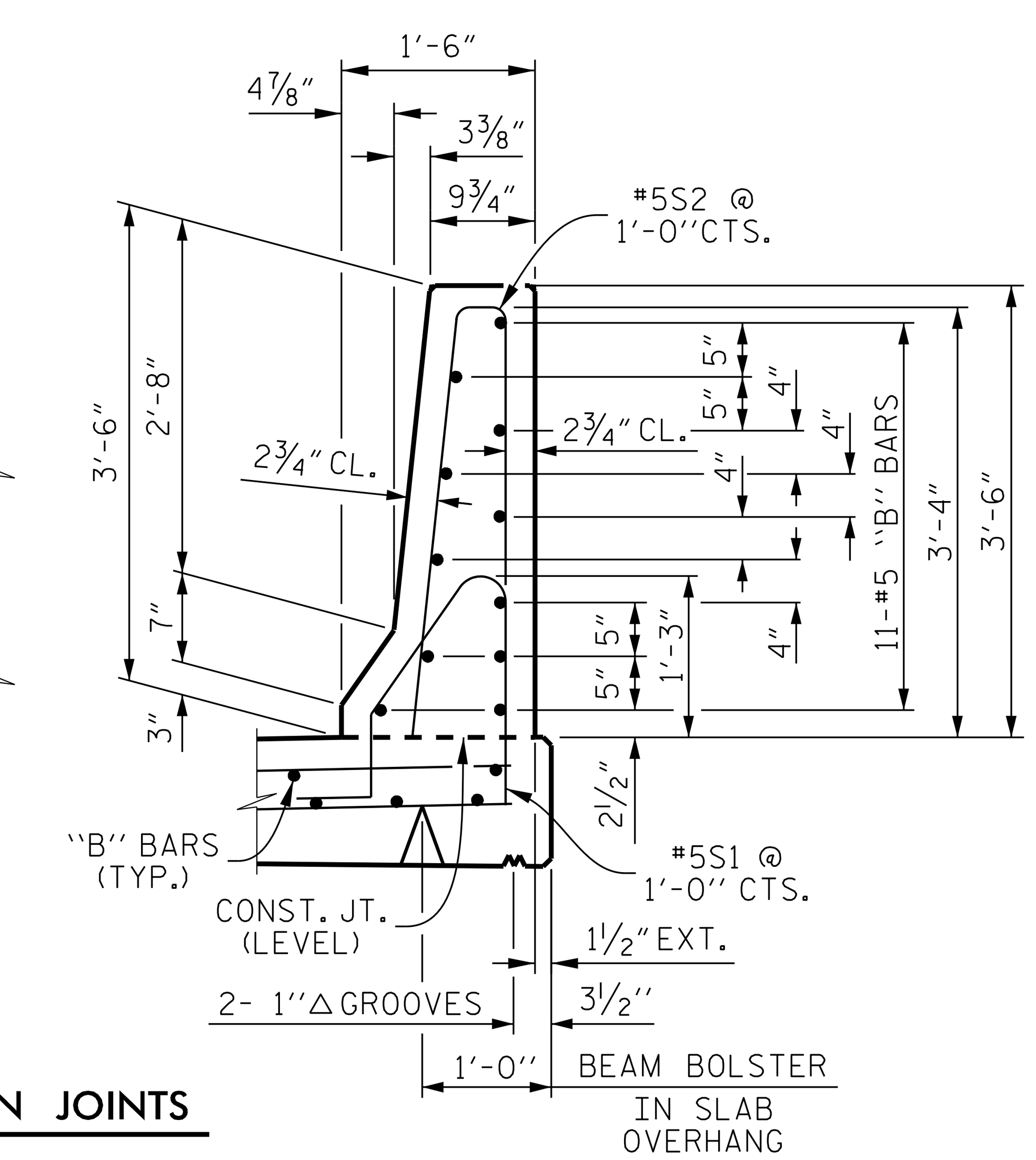


SECTION S-S

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



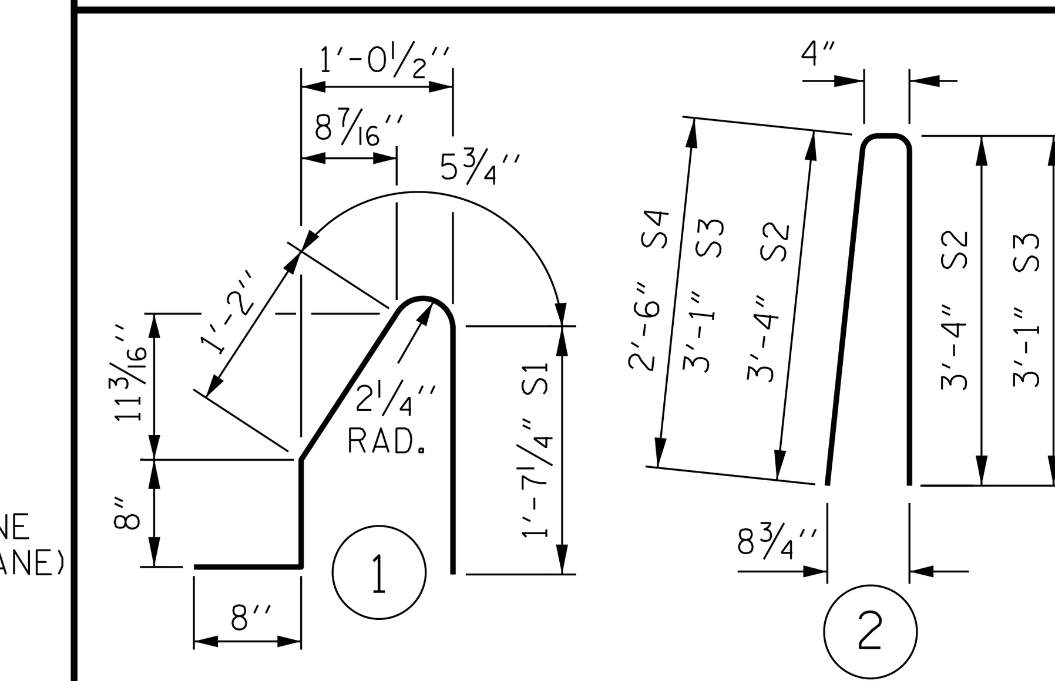
ELEVATION AT EXPANSION JOINTS



SECTION THRU RAIL

BARRIER RAIL DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
* B1	88	#5	STR	12'-10"	1,178
* B2	44	#5	STR	22'- 1"	1,013
* S1	180	#5	1	4'- 7"	860
* S2	172	#5	2	7'- 0"	1,256
* S3	4	#5	2	6'- 6"	27
* S4	4	#5	2	5'- 4"	22
* EPOXY COATED REINFORCING STEEL					4,356 LBS.
CLASS "AA" CONCRETE					24.5 CU. YDS.
CONCRETE BARRIER RAIL					180.58 LIN. FT.

NOTES

THE BARRIER RAIL IN SPAN "A" SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE 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.

THE #5S1 AND #5S2 BARS MAY BE SHIFTED AS NECESSARY TO CLEAR EXPANSION JOINTS IN RAIL.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL (RIGHT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

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

SHEET No. S10-14
TOTAL SHEETS 25

PLANS PREPARED BY:
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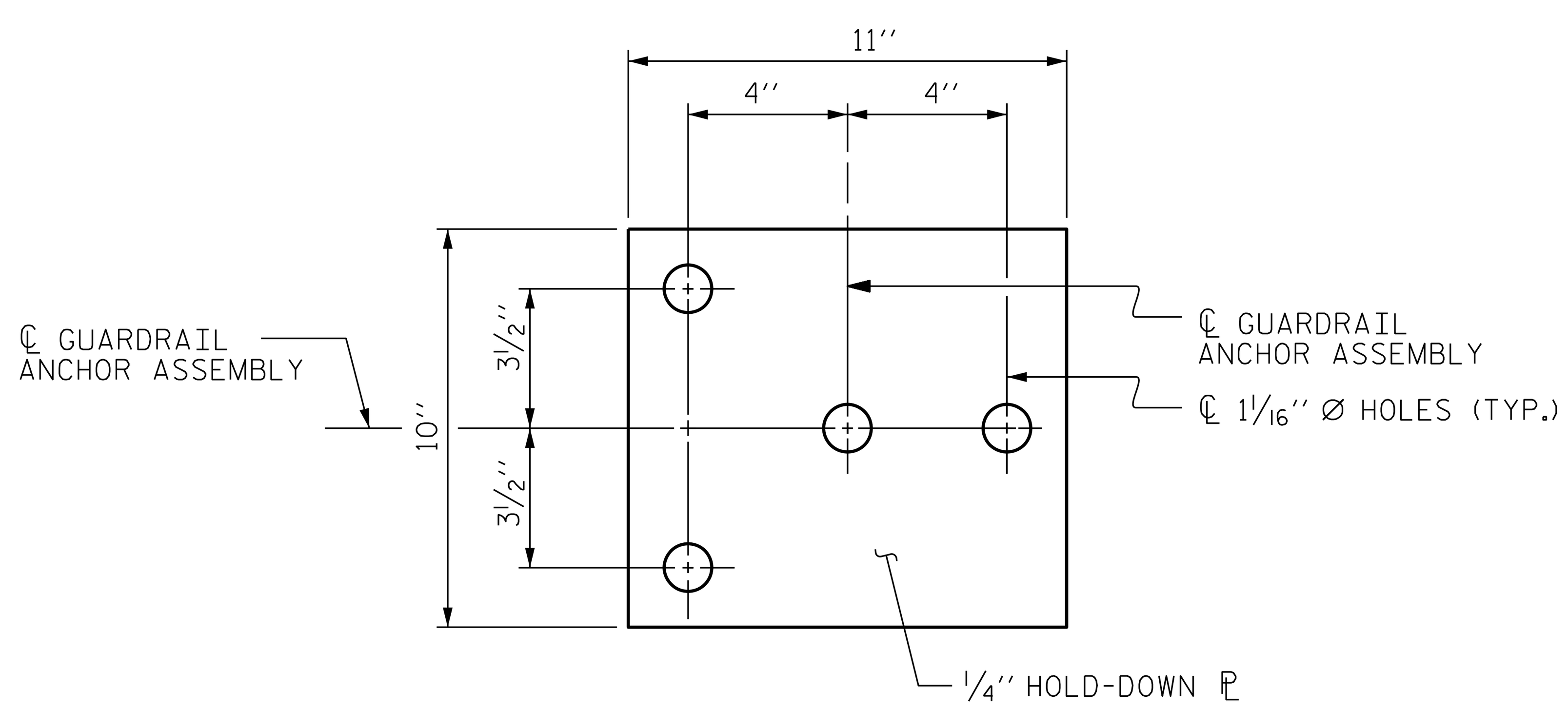
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

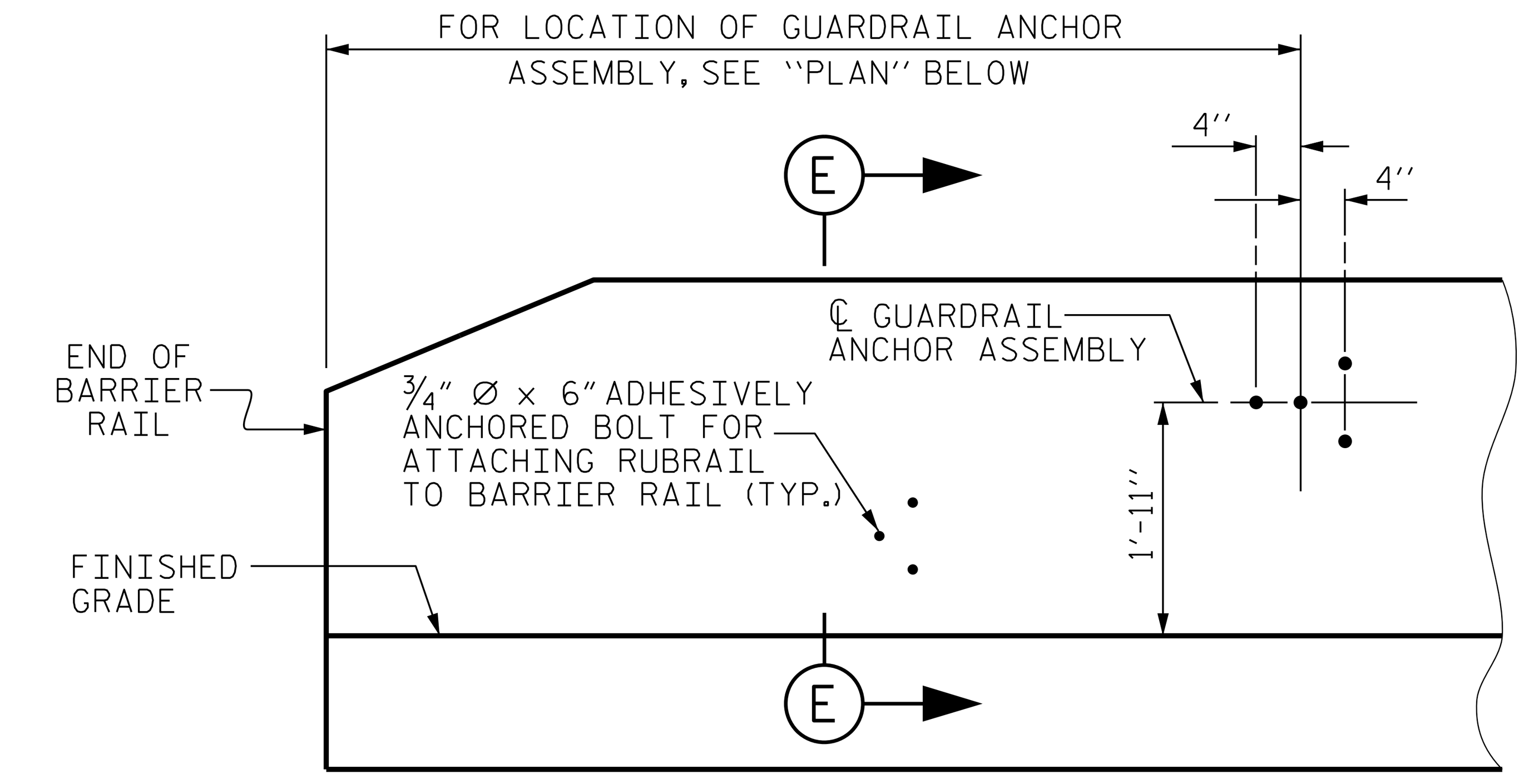
DRAWN BY :	K. E. LOFTON	DATE :	10-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

ASSEMBLED BY :	K. E. LOFTON	DATE :	10-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DRAWN BY : ARB 5/87	REV. 10/1/11	MAA/GM	
CHECKED BY : SJD 9/87	REV. 7/12	MAA/GM	
	REV. 6/13	MAA/GM	

STD. No. CBR1 STR. #10



PLAN



ELEVATION

(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.)

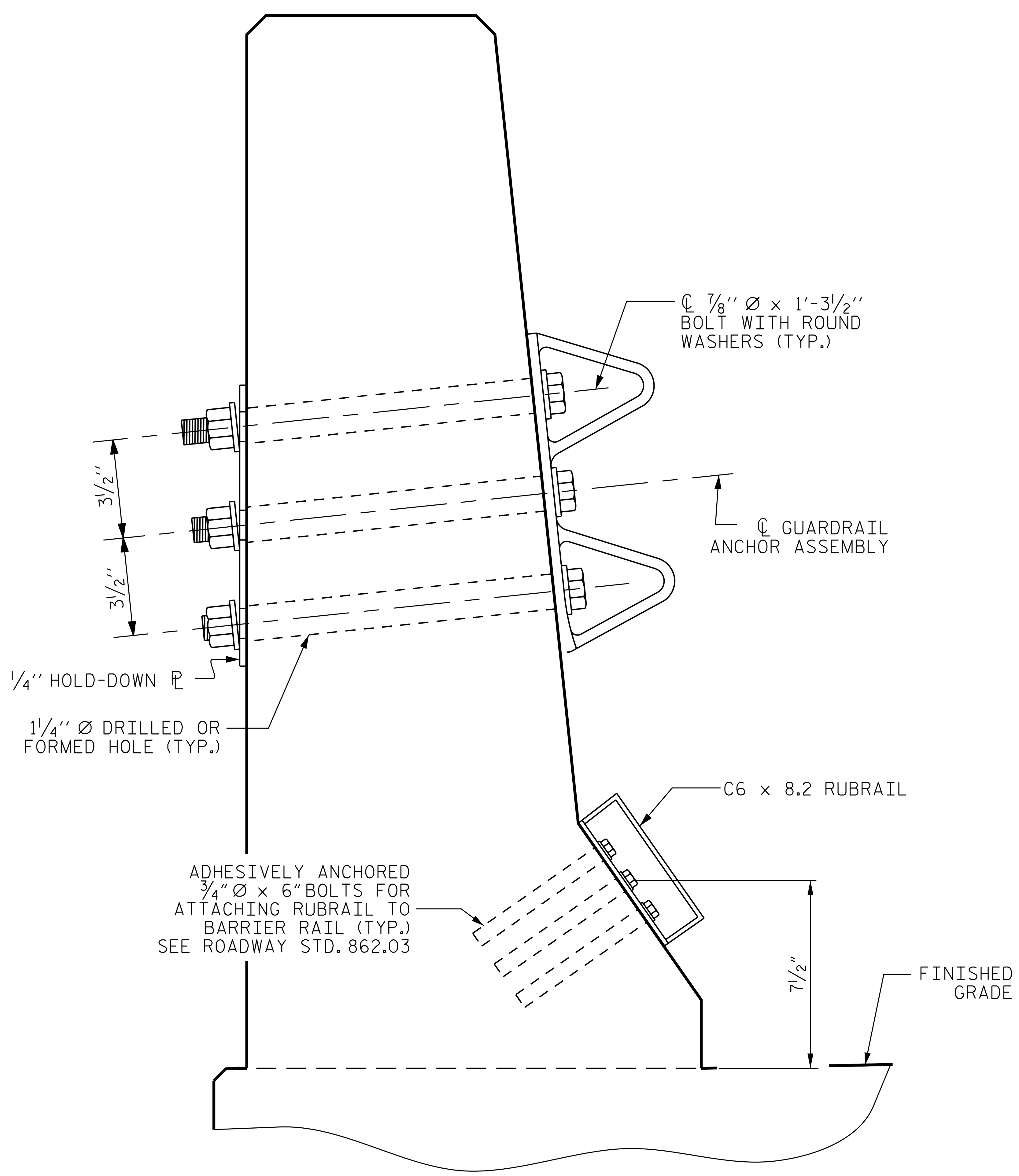
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

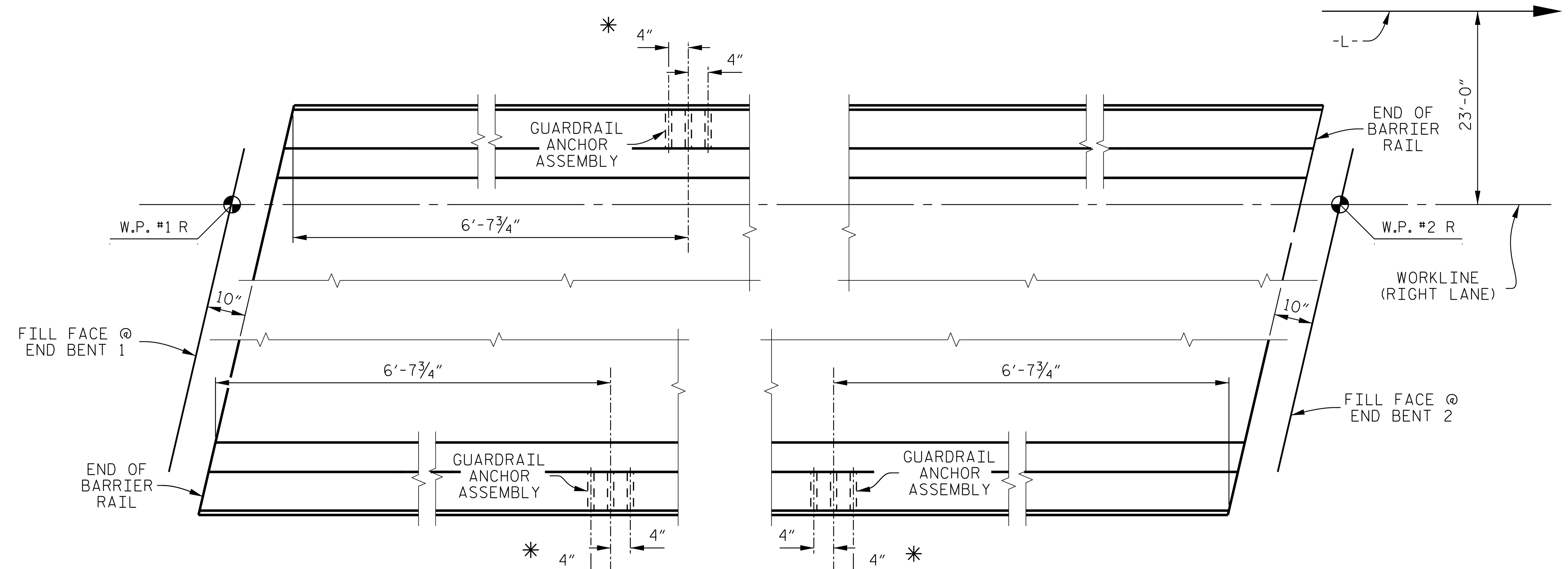
THE 1 1/4'' Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

✱ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL (RIGHT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY :
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	10-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

ASSEMBLED BY :	K. E. LOFTON	DATE :	10-16
CHECKED BY :	A. D. SHAH	DATE :	10-16

DRAWN BY : TLA 5/06	REV. 10/1/11	MAA/GM	
CHECKED BY : GM 5/06	REV. 7/12	MAA/GM	
	REV. 6/13	MAA/GM	

REVISIONS

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

SHEET No. S10-15

TOTAL SHEETS 25

STD. No. GRA2

STR. #10

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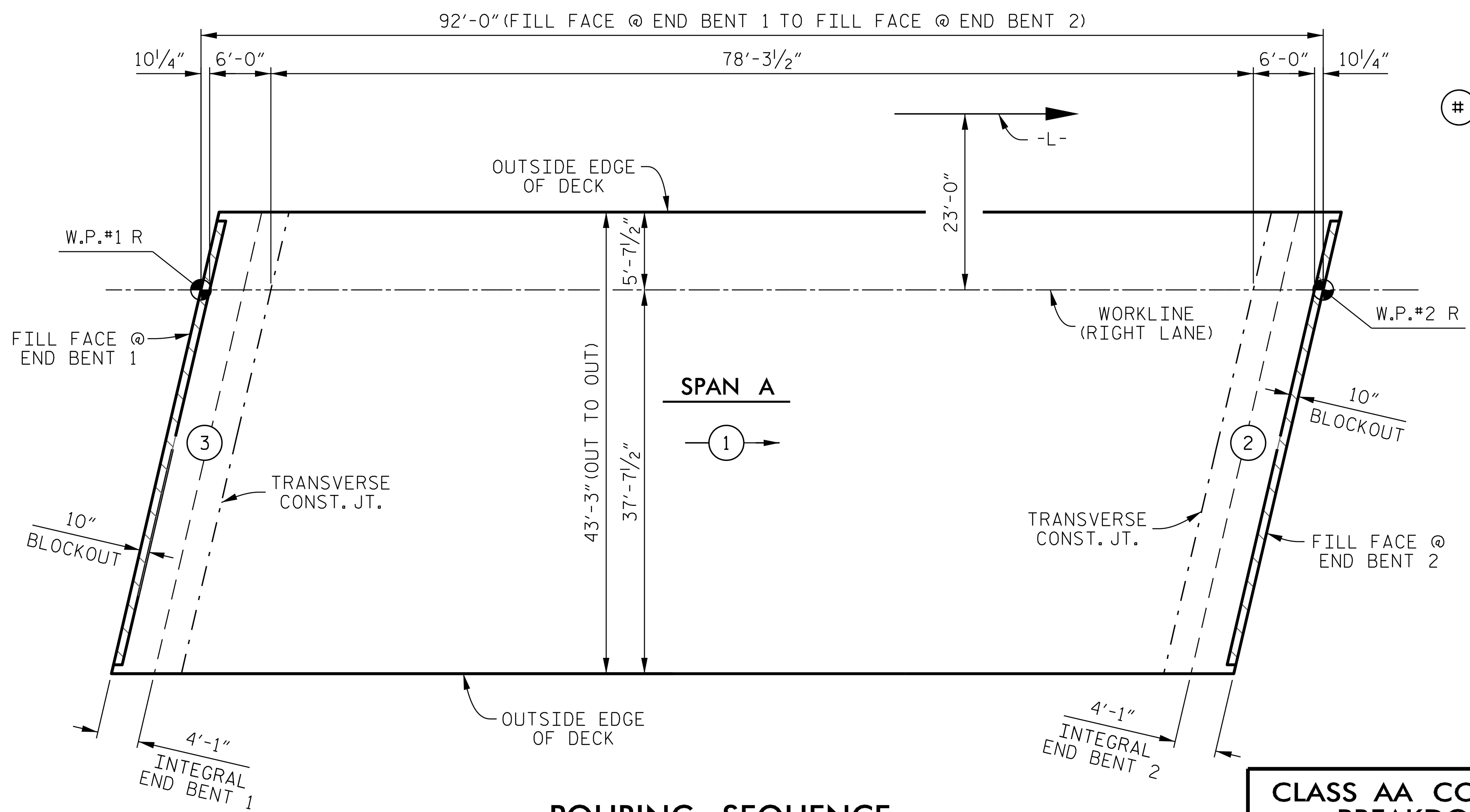
NOTES

POUR 2 AND POUR 3 MAY BE COMBINED.

DIRECTION OF POUR 1 MAY BE REVERSED.

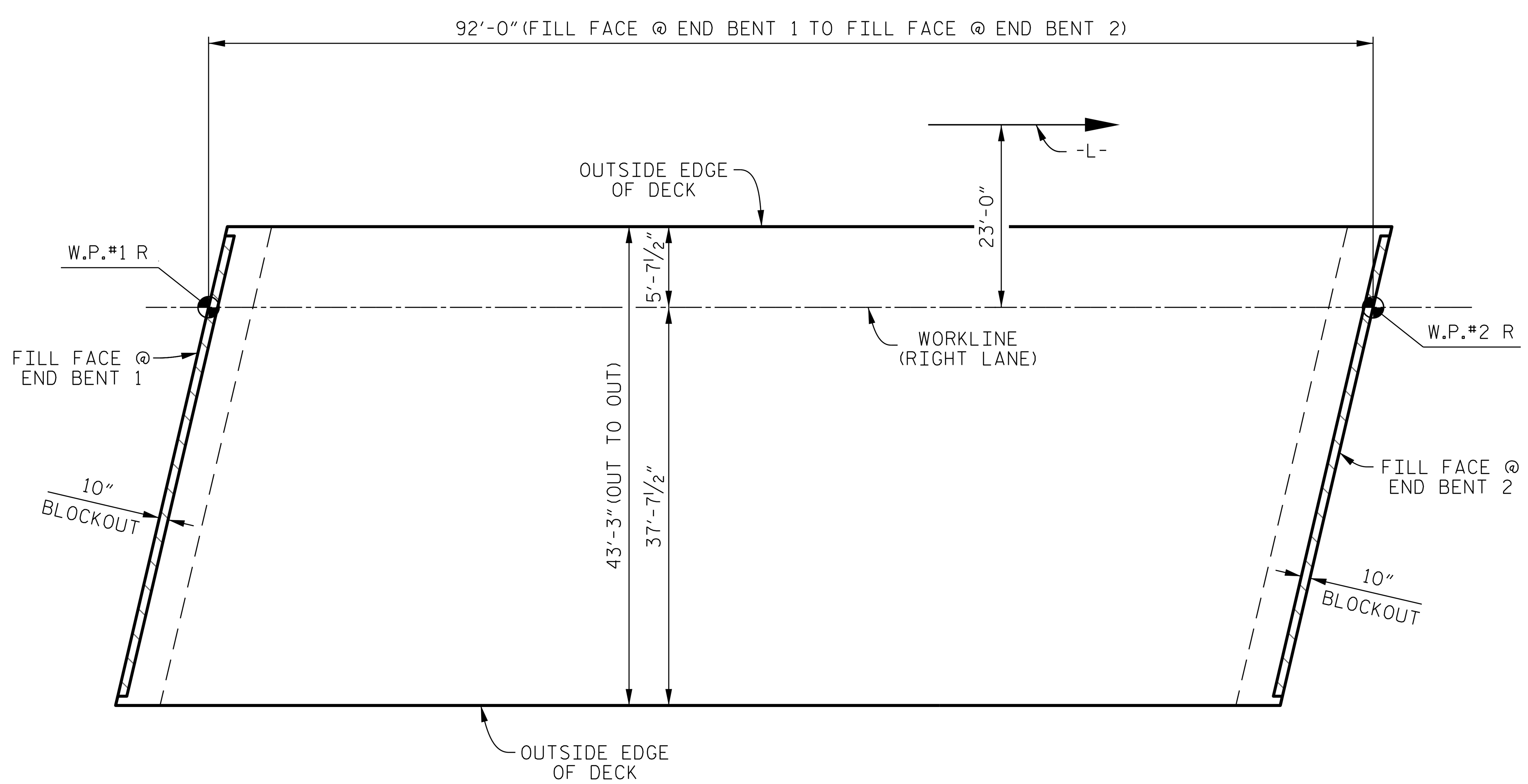
(#) → INDICATES POUR NUMBER AND DIRECTION OF POUR.



POURING SEQUENCE

CLASS AA CONCRETE BREAKDOWN

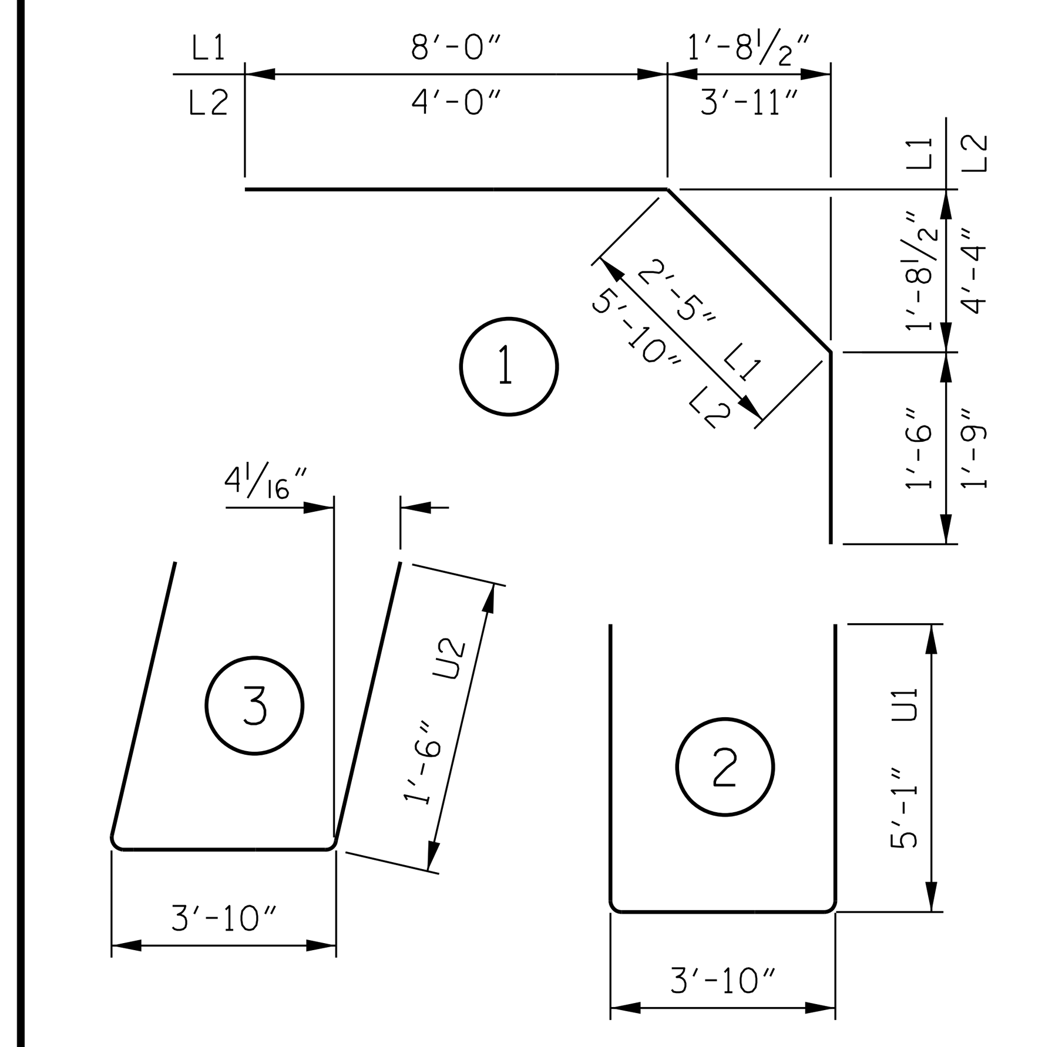
POUR 1	116.9 CU. YDS.
POUR 2	44.1 CU. YDS.
POUR 3	44.1 CU. YDS.
TOTAL	205.1 CU. YDS.



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(3,979 SQ. FT.)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

TOTAL SUPERSTRUCTURE QUANTITIES

	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL	CLASS "AA" CONCRETE
	LBS.	LBS.	CU. YDS.
SPAN A	14,989	13,994	205.1
** TOTAL	14,989	13,994	205.1

** QUANTITIES FOR CONCRETE BARRIER RAIL ARE NOT INCLUDED. SEE "CONCRETE BARRIER RAIL" SHEET FOR DETAILS.

GROOVING BRIDGE FLOORS

APPROACH SLAB AT END BENT 1	1,089 SQ. FT.
BRIDGE DECK	3,327 SQ. FT.
APPROACH SLAB AT END BENT 2	1,089 SQ. FT.
TOTAL	5,505 SQ. FT.

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

SPAN A

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
* A1	161	#5	STR	42'-11"	7,207
* A101	2	#5	STR	40'- 9"	85
* A102	2	#5	STR	38'- 7"	80
* A103	2	#5	STR	36'- 5"	76
* A104	2	#5	STR	34'- 3"	71
* A105	2	#5	STR	32'- 2"	67
* A106	2	#5	STR	30'- 0"	63
* A107	2	#5	STR	27'-10"	58
* A108	2	#5	STR	25'- 8"	54
* A109	2	#5	STR	23'- 6"	49
* A110	2	#5	STR	21'- 4"	45
* A111	2	#5	STR	19'- 2"	40
* A112	2	#5	STR	17'- 0"	35
* A113	2	#5	STR	14'-10"	31
* A114	2	#5	STR	12'- 8"	26
* A115	2	#5	STR	10'- 6"	22
* A116	2	#5	STR	8'- 4"	17
* A117	2	#5	STR	6'- 2"	13
* A118	2	#5	STR	4'- 0"	8
A2	161	#5	STR	42'-11"	7,207
A201	2	#5	STR	40'- 9"	85
A202	2	#5	STR	38'- 7"	80
A203	2	#5	STR	36'- 5"	76
A204	2	#5	STR	34'- 3"	71
A205	2	#5	STR	32'- 2"	67
A206	2	#5	STR	30'- 0"	63
A207	2	#5	STR	27'-10"	58
A208	2	#5	STR	25'- 8"	54
A209	2	#5	STR	23'- 6"	49
A210	2	#5	STR	21'- 4"	45
A211	2	#5	STR	19'- 2"	40
A212	2	#5	STR	17'- 0"	35
A213	2	#5	STR	14'-10"	31
A214	2	#5	STR	12'- 8"	26
A215	2	#5	STR	10'- 6"	22
A216	2	#5	STR	8'- 4"	17
A217	2	#5	STR	6'- 2"	13
A218	2	#5	STR	4'- 0"	8
* B1	120	#4	STR	24'- 0"	1,924
* B2	162	#5	STR	18'- 5"	3,112
B3	114	#5	STR	46'- 1"	5,479
K1	28	#4	STR	22'-11"	429
K2	6	#4	STR	7'-10"	31
K3	30	#4	STR	10'- 9"	215
K4	6	#4	STR	9'- 4"	37
K5	4	#4	STR	2'- 2"	6
K6	20	#4	STR	3'- 7"	48
K7	4	#4	STR	2'-11"	8
* L1	60	#4	1	11'-11"	478
* L2	56	#4	1	11'- 7"	433
U1	60	#4	2	14'- 0"	561
U2	28	#4	3	6'-10"	128

REINFORCING STEEL 14,989 LBS.

* EPOXY COATED REINFORCING STEEL 13,994 LBS.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

(RIGHT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS W. HARRIS

2/3/2017

DRAWN BY :	K. E. LOFTON	DATE : 10-16
CHECKED BY :	A. D. SHAH	DATE : 10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE : 10-16

PLANS PREPARED BY :
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NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

REVISIONS

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SHEET No. S10-16

TOTAL SHEETS 25

STR. #10

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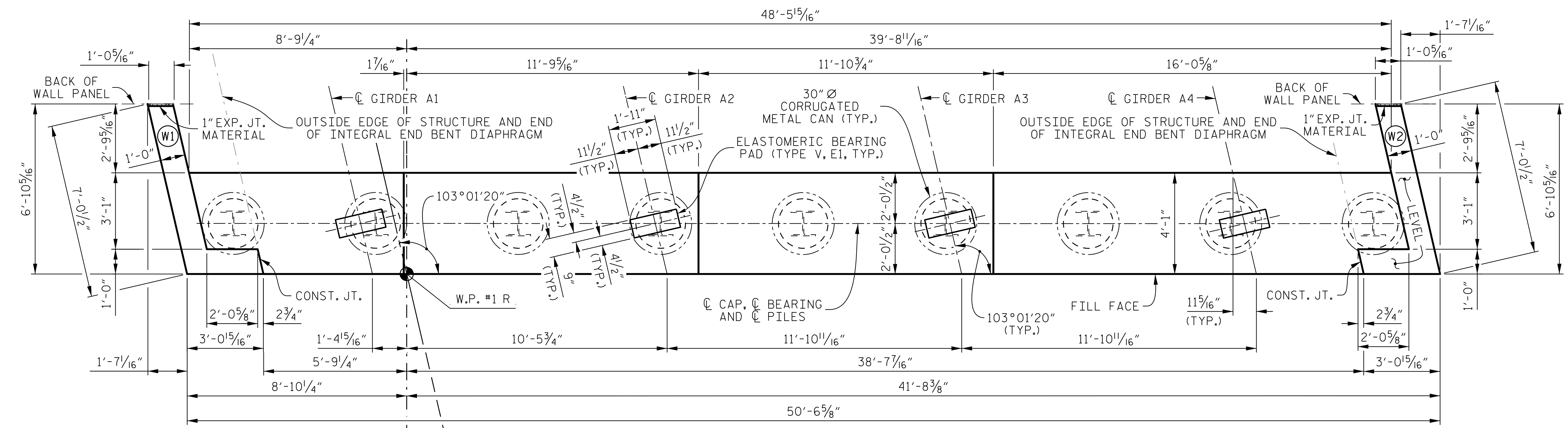
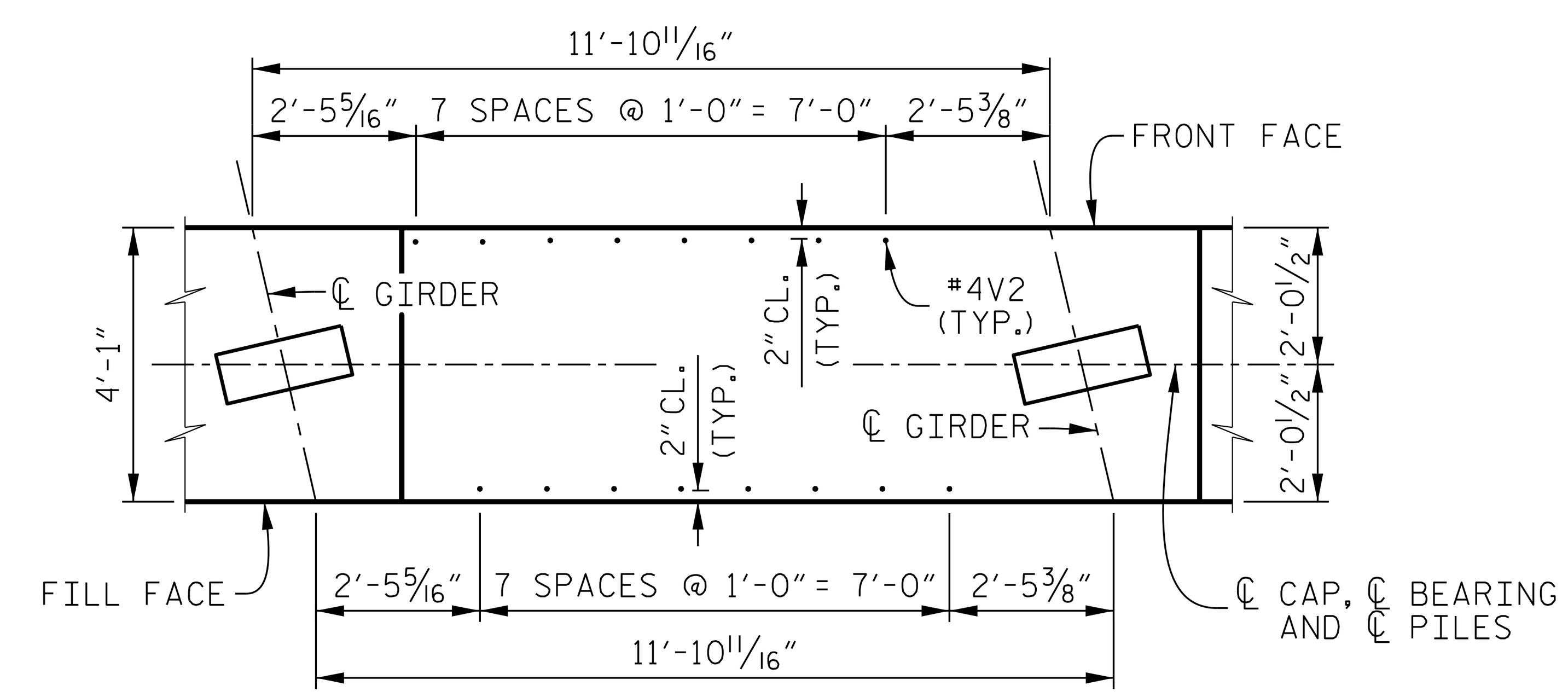
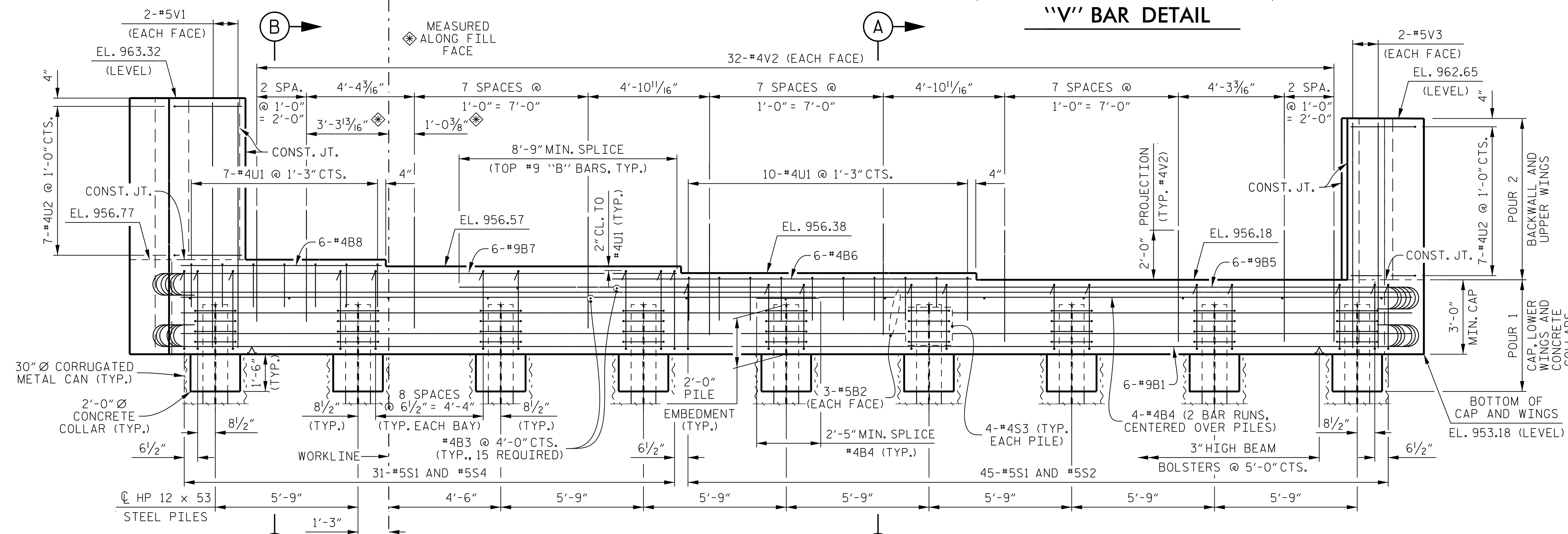


PLAN



"V" BAR DETAIL



ELEVATION

NOTES

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4V2 BARS.

THE TOP SURFACE OF THE END BENT CAP UNDER THE INTEGRAL END BENT DIAPHRAGM, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR TEMPORARY DRAINAGE AT END BENT DETAIL, SEE SHEET 3 OF 3.

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

FOR INTEGRAL END BENT DIAPHRAGM DETAILS, SEE "TYPICAL SECTION" AND "PLAN OF SPAN" SHEETS.

THE COST TO FURNISH AND INSTALL THE 30" Ø CORRUGATED METAL CANS SHALL BE INCLUDED IN THE CONTRACT PRICE FOR MSE RETAINING WALL.

WING (W1) AND WING (W2) DETAILS ARE BASED ON A 5 1/2" WALL PANEL THICKNESS AND USING DOWELS FOR THE COPING. CONTRACTOR MAY ADJUST WINGS SLIGHTLY AS NECESSARY, BASED ON APPROVED MSE WALL SHOP DRAWINGS.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

(RIGHT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS — 2/3/2017

PLANS PREPARED BY: PARSONS, 5540 Centerview Drive, Suite 217, Raleigh, NC 27606-3386, NC LICENSE No. F-0246, FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY:	K. E. LOFTON	DATE: 10-16
CHECKED BY:	A. D. SHAH	DATE: 10-16
DESIGN ENGINEER:	T. M. HARRIS	DATE: 10-16

REVISIONS

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

SHEET No. S10-17
TOTAL SHEETS 25
STR. #10

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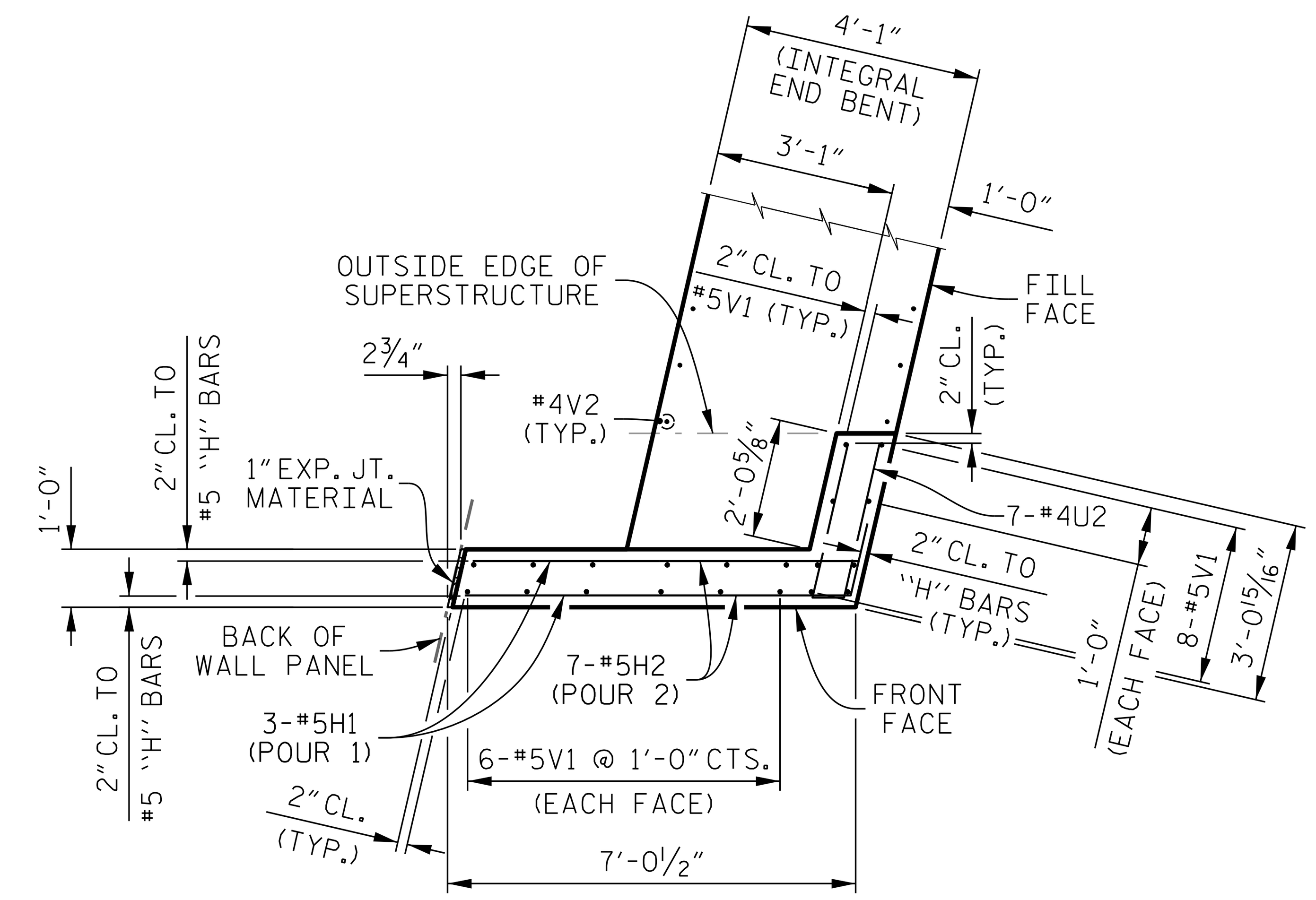
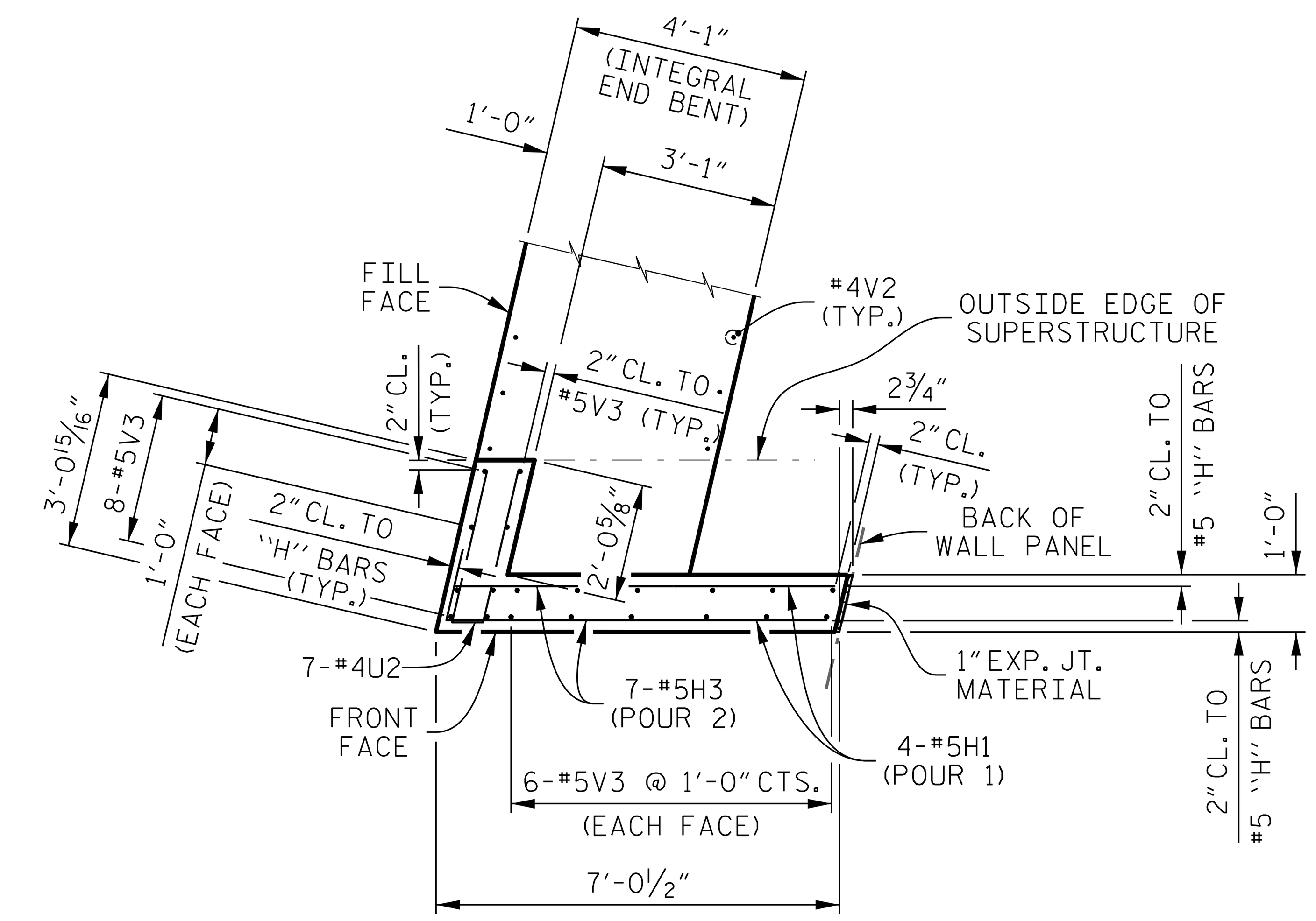
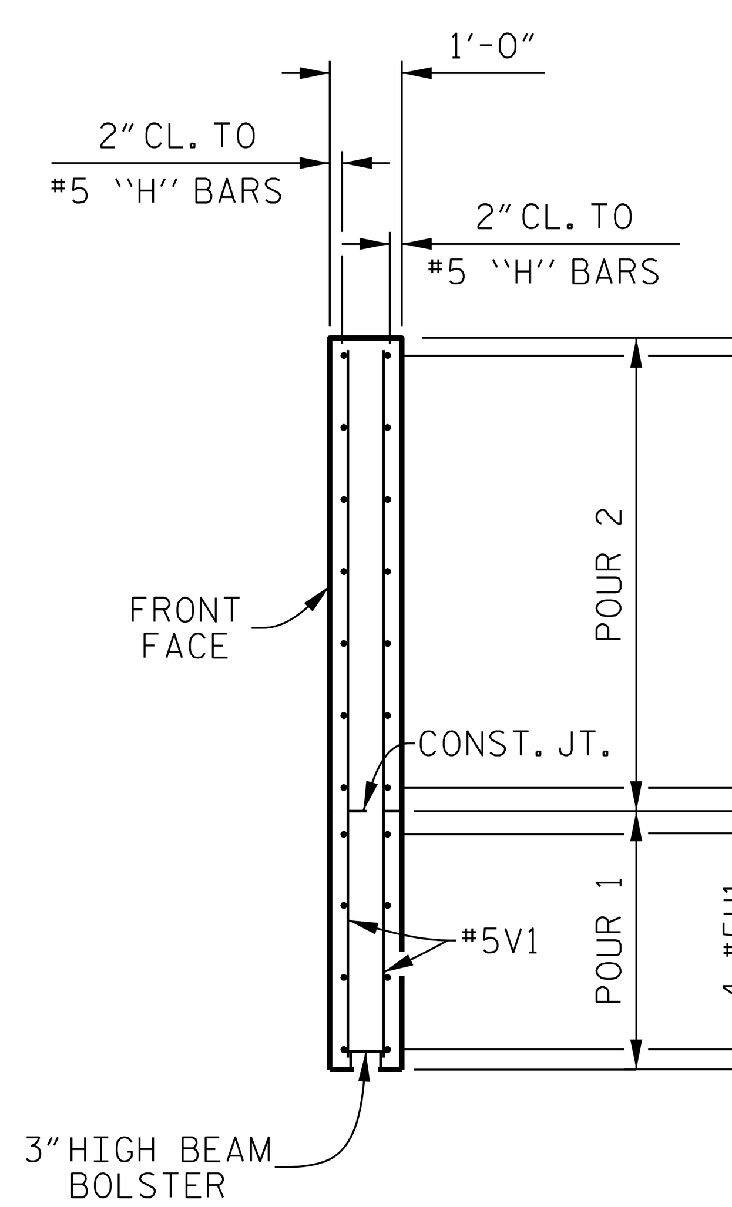


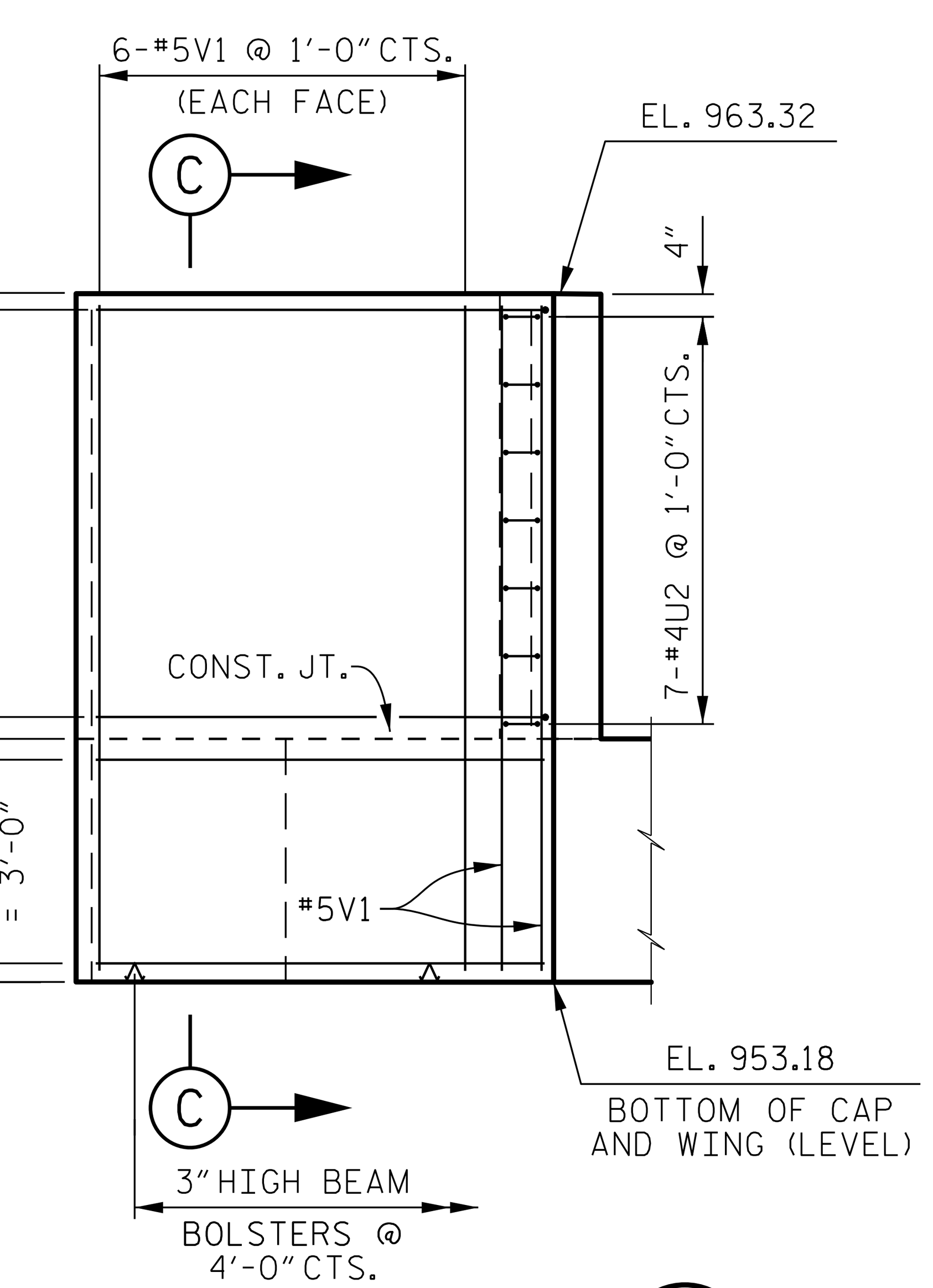
PLAN OF WING (W1)



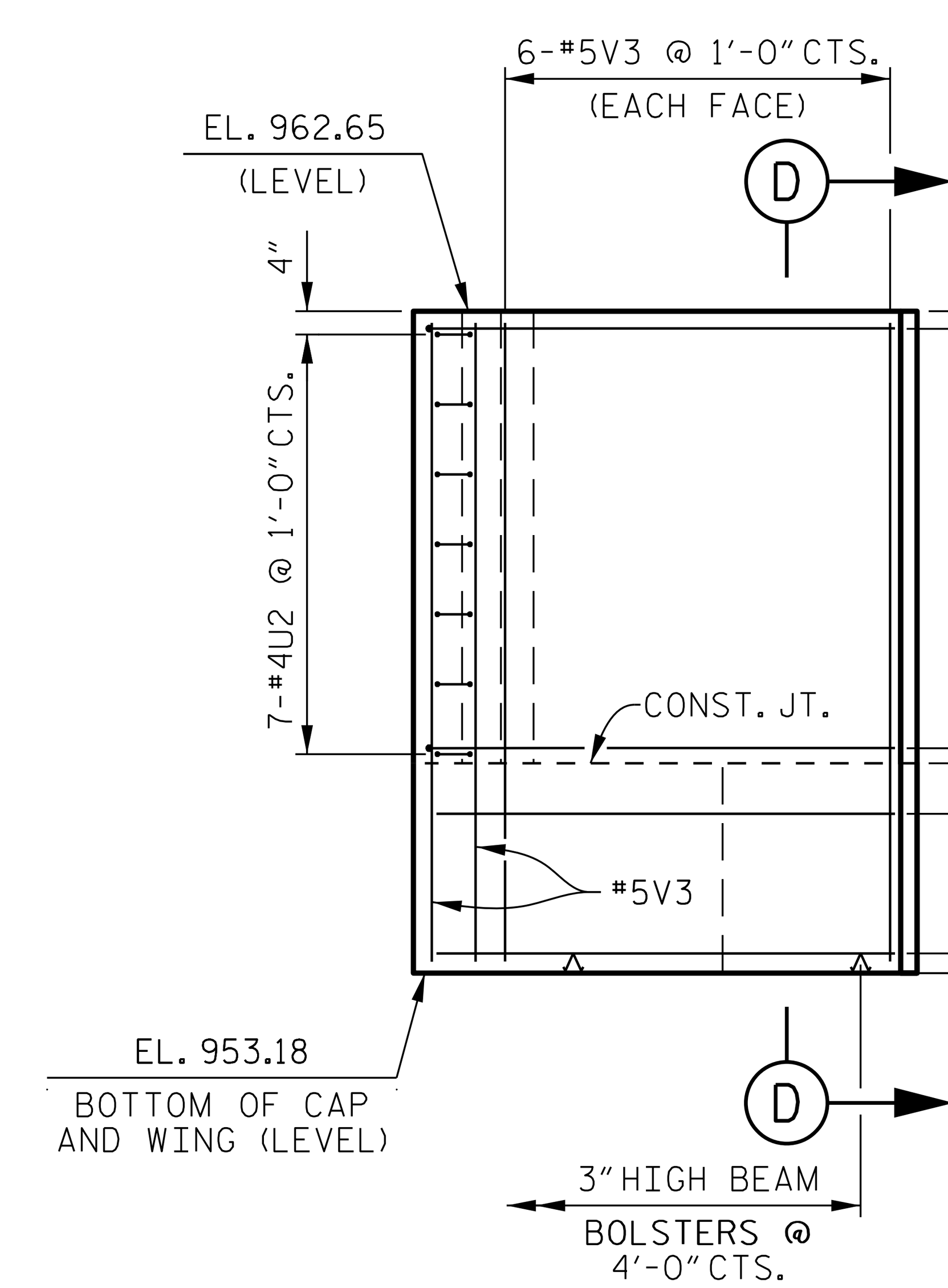
PLAN OF WING (W2)



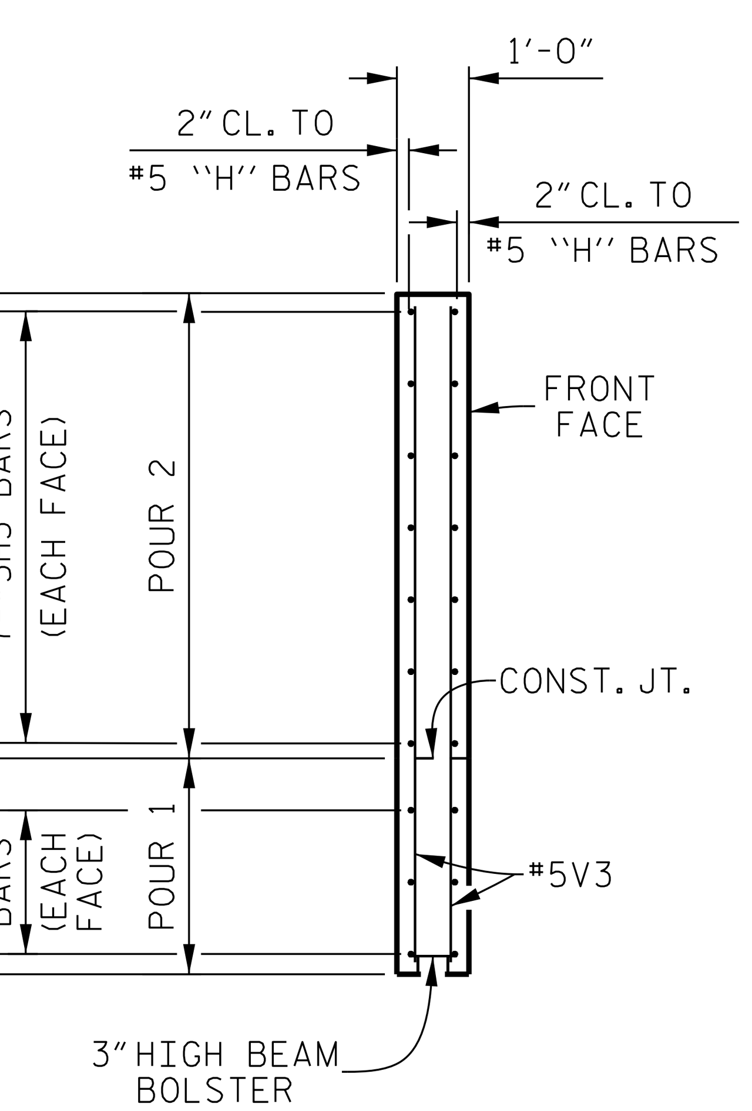
SECTION C–C



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION D–D

PROJECT NO. R-2707C
CLEVELAND COUNTY
STATION: 611+32.01 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1
(RIGHT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY :
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY :	K. E. LOFTON	DATE :	10-16
CHECKED BY :	A. D. SHAH	DATE :	10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE :	10-16

REVISIONS

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

SHEET No. S10-18
TOTAL SHEETS 25
STR. #10

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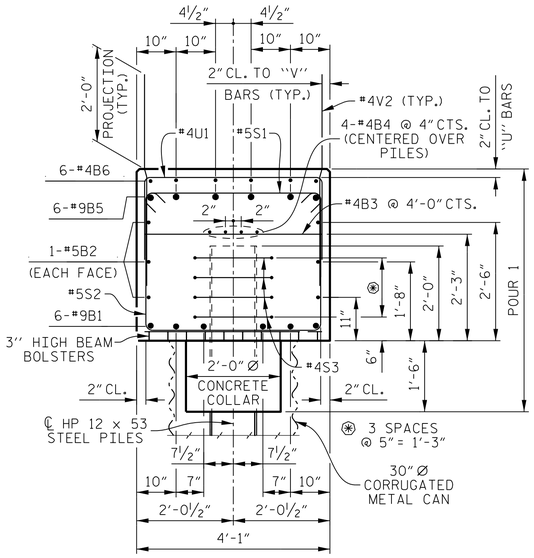
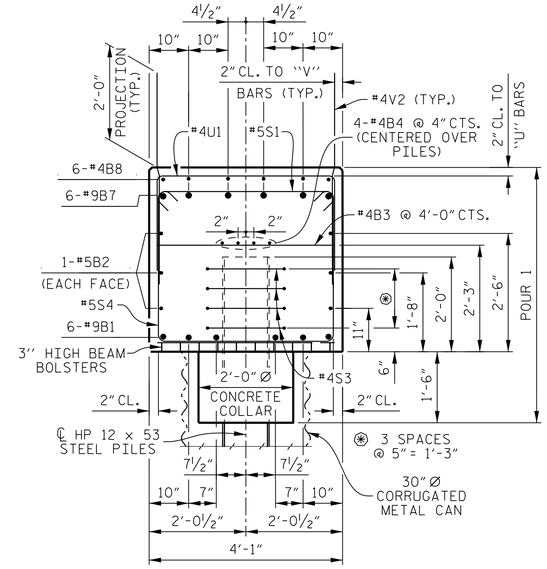
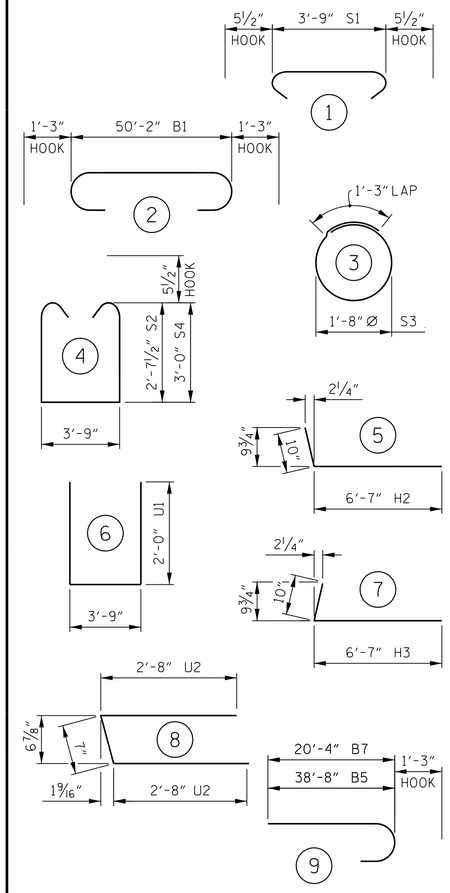


SECTION A–A



SECTION B–B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	2	52'-8"	1,074
B2	6	#5	STR	50'-2"	314
B3	15	#4	STR	3'-9"	38
B4	8	#4	STR	26'-4"	141
B5	6	#9	9	39'-0"	796
B6	6	#4	STR	14'-8"	59
B7	6	#9	9	21'-7"	440
B8	6	#4	STR	8'-5"	34
H1	14	#5	STR	6'-7"	96
H2	14	#5	7	7'-5"	108
H3	14	#5	5	7'-5"	108
S1	76	#5	1	4'-8"	370
S2	45	#5	4	9'-11"	465
S3	36	#4	3	6'-6"	156
S4	31	#5	4	10'-8"	345
U1	17	#4	6	7'-9"	88
U2	14	#4	8	5'-11"	55
V1	20	#5	STR	9'-9"	203
V2	60	#4	STR	4'-6"	180
V3	20	#5	STR	9'-0"	188

REINFORCING STEEL 5,258 LBS.

CLASS "A" CONCRETE

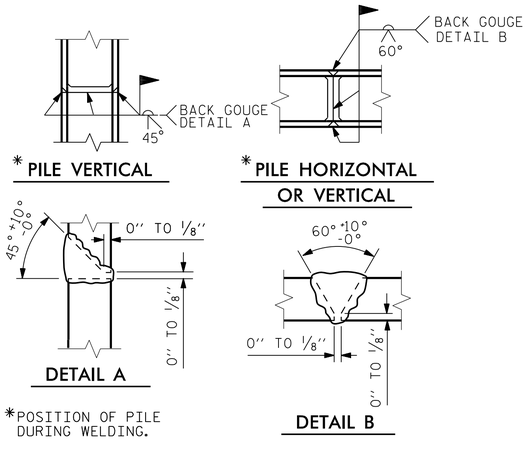
POUR 1 COLLARS, CAP AND LOWER WINGS 27.1 CU. YDS.

POUR 2 BACKWALL AND UPPER WINGS 4.4 CU. YDS.

TOTAL 31.5 CU. YDS.

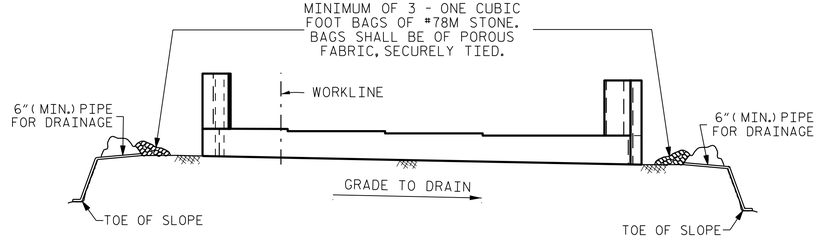
PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES 9 EACH

HP 12 x 53 STEEL PILES
9 REQUIRED 720.0 LIN. FT.



*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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

(RIGHT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/17/2017

DRAWN BY : K. E. LOFTON DATE : 10-16
CHECKED BY : A. D. SHAH DATE : 10-16
DESIGN ENGINEER : T. M. HARRIS DATE : 10-16

PLANS PREPARED BY :
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S10–19
1			3			TOTAL SHEETS
2			4			25

STR. #10

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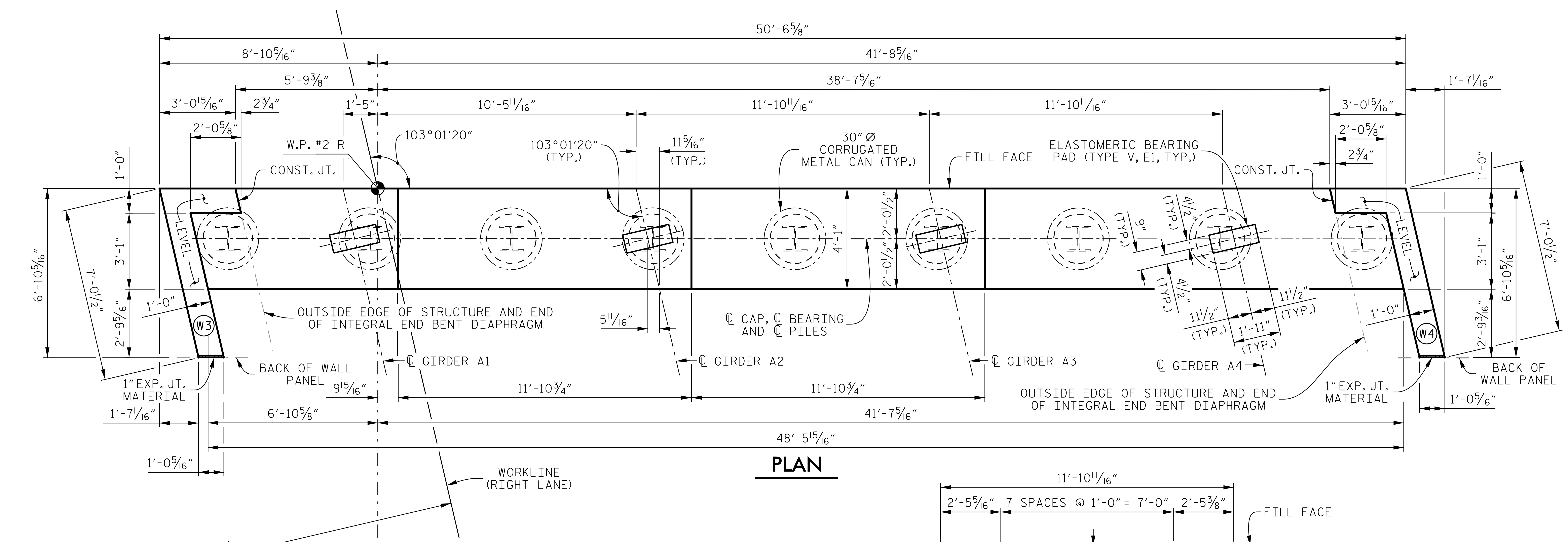
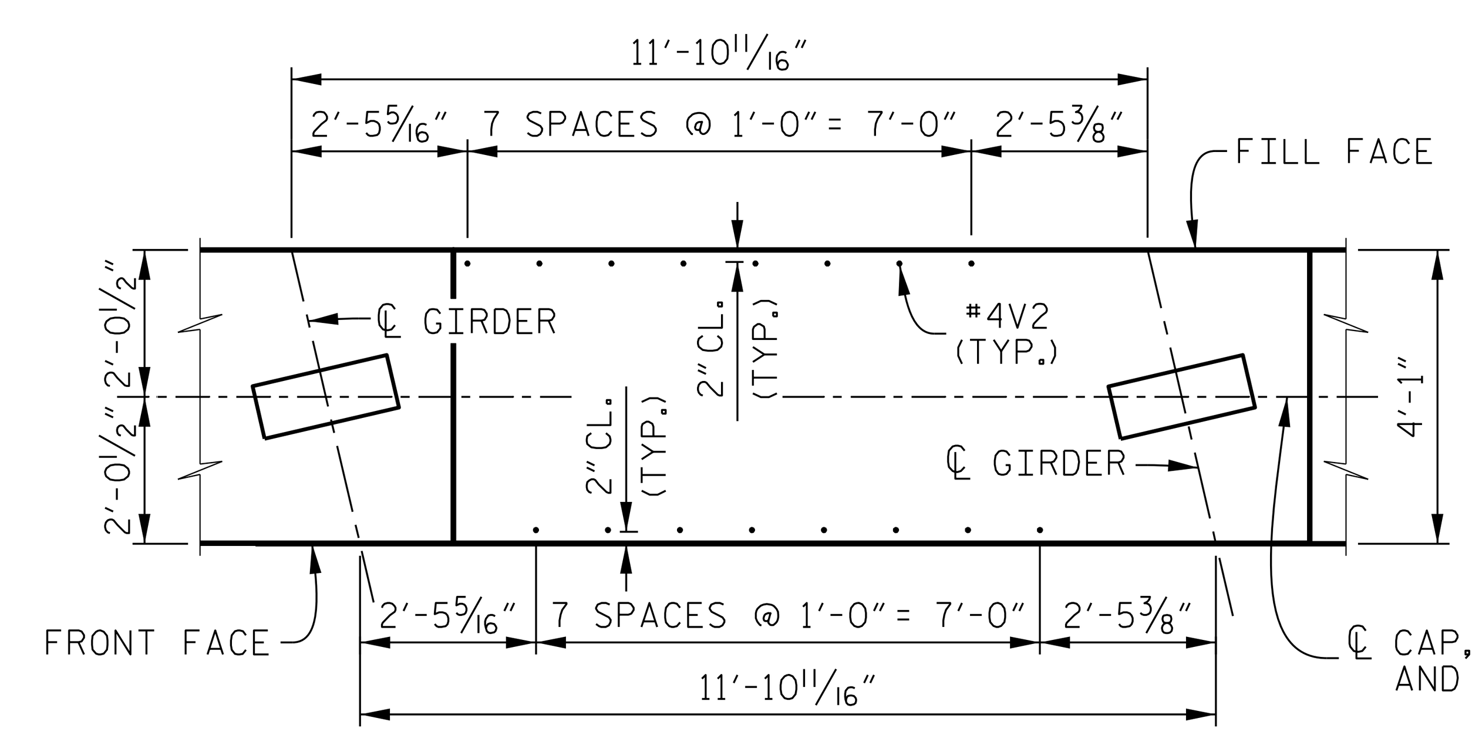
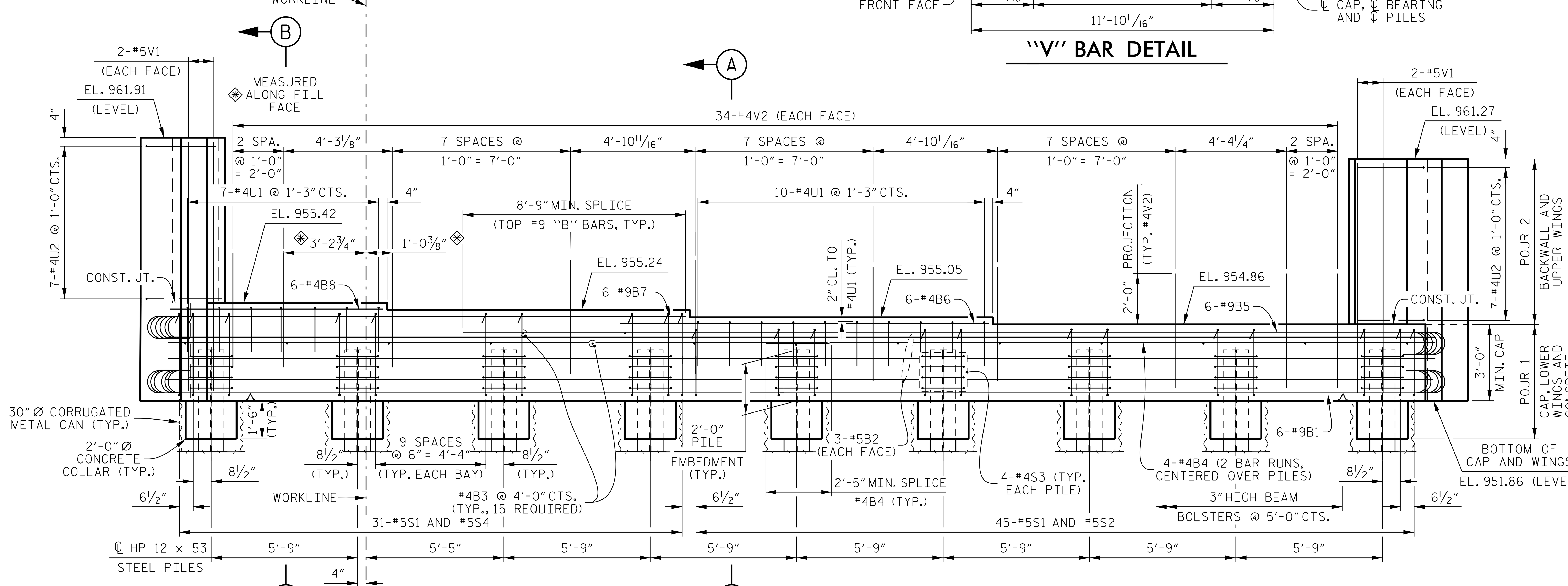


PLAN



"V" BAR DETAIL



ELEVATION

NOTES

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.

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4V2 BARS.

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

FOR PILE SPLICE DETAILS, SEE SHEET 3 OF 3.

FOR TEMPORARY DRAINAGE AT END BENT DETAIL, SEE SHEET 3 OF 3.

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

FOR INTEGRAL END BENT DIAPHRAGM DETAILS, SEE "TYPICAL SECTION" AND "PLAN OF SPAN" SHEETS.

THE COST TO FURNISH AND INSTALL THE 30" Ø CORRUGATED METAL CANS SHALL BE INCLUDED IN THE CONTRACT PRICE FOR MSE RETAINING WALL.

WING (W3) AND WING (W4) DIMENSIONS AND DETAILS ARE BASED ON A 5½" WALL PANEL THICKNESS AND USING DOWELS FOR THE COPING.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 611+32.01 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

(RIGHT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19299 THOMAS M. HARRIS 2/3/2017

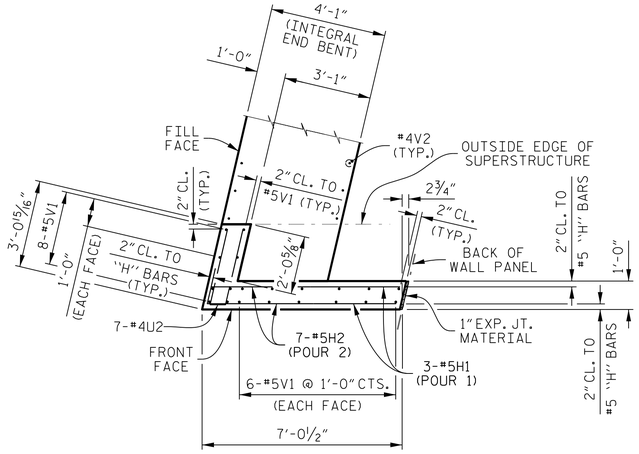
PLANS PREPARED BY: PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY:	K. E. LOFTON	DATE:	10-16
CHECKED BY:	A. D. SHAH	DATE:	10-16
DESIGN ENGINEER:	T. M. HARRIS	DATE:	10-16

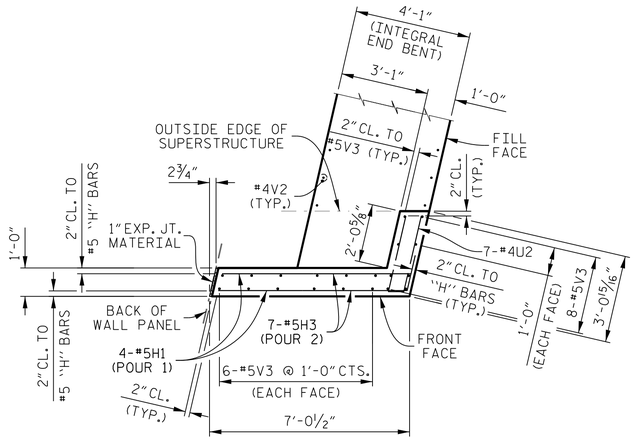
REVISIONS

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

SHEET No. S10-20
TOTAL SHEETS 25
STR. #10



PLAN OF WING W3



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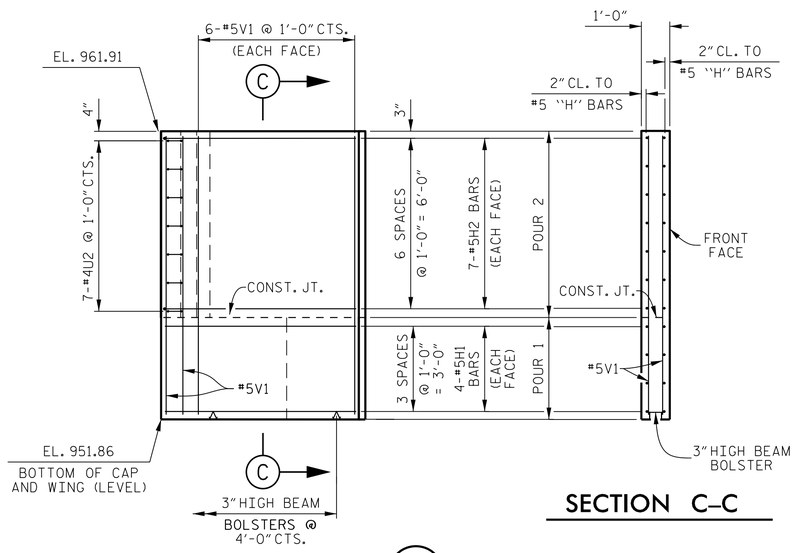
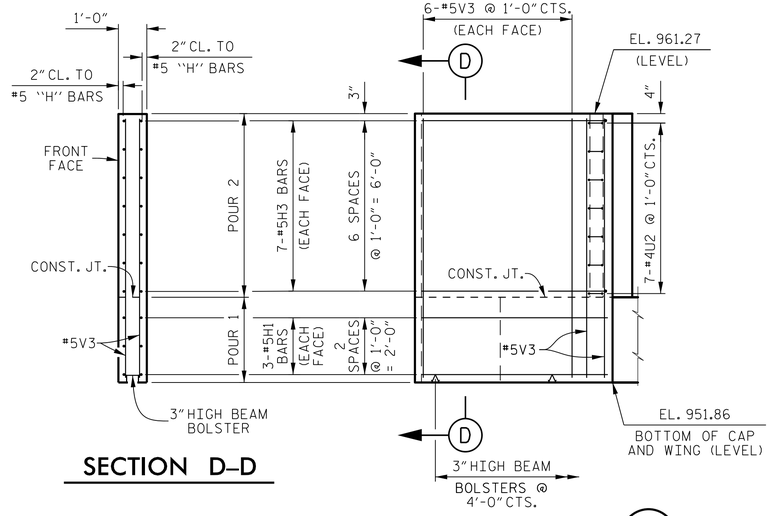


SECTION C–C

ELEVATION OF WING W3



SECTION D–D

ELEVATION OF WING W4

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

(RIGHT LANE)

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S10–21
1			3			TOTAL SHEETS
2			4			25

STR. #10

DRAWN BY : K. E. LOFTON DATE : 10–16
CHECKED BY : A. D. SHAH DATE : 10–16
DESIGN ENGINEER : T. M. HARRIS DATE : 10–16

PLANS PREPARED BY :
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

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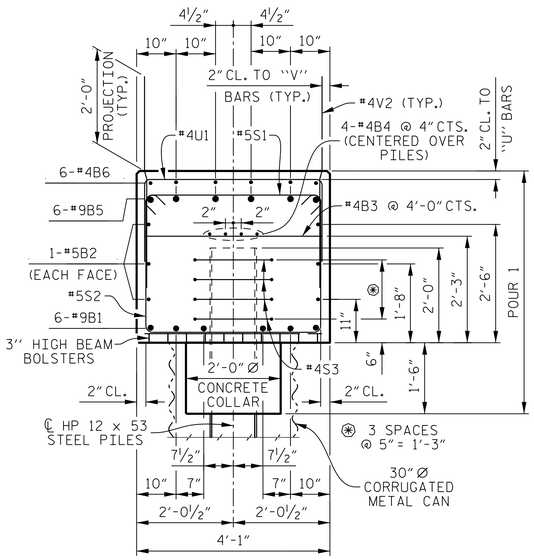
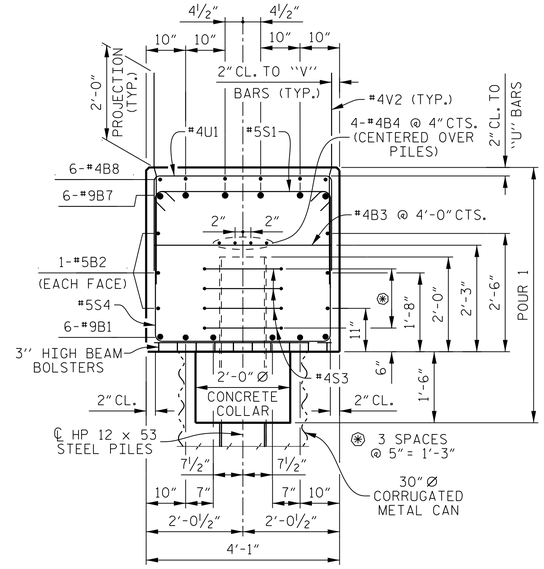
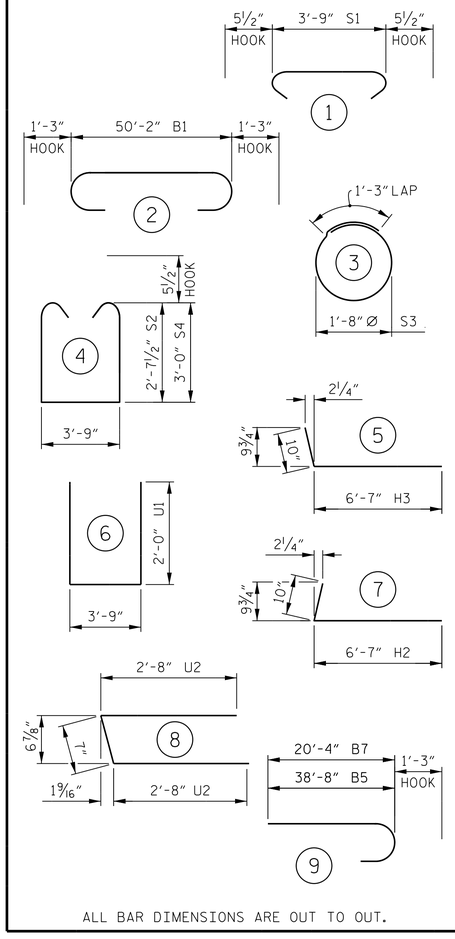


SECTION A–A



SECTION B–B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	2	52'-8"	1,074
B2	6	#5	STR	50'-2"	314
B3	15	#4	STR	3'-9"	38
B4	8	#4	STR	26'-4"	141
B5	6	#9	9	39'-0"	796
B6	6	#4	STR	14'-8"	59
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REINFORCING STEEL 5,258 LBS.

CLASS "A" CONCRETE

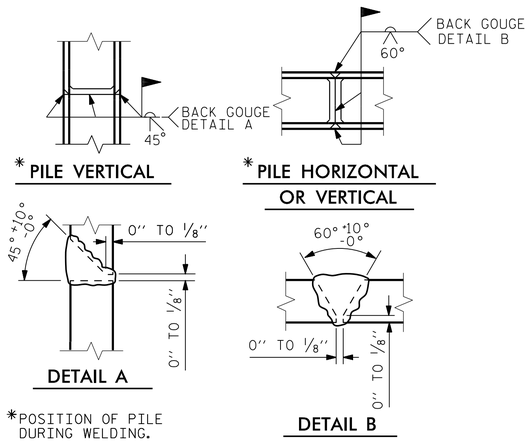
POUR 1 COLLARS, CAP AND LOWER WINGS 27.1 CU. YDS.

POUR 2 BACKWALL AND UPPER WINGS 4.4 CU. YDS.

TOTAL 31.5 CU. YDS.

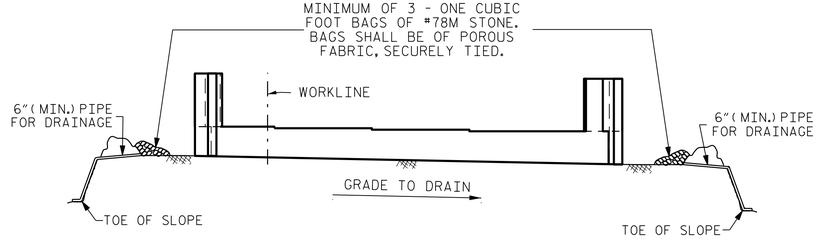
PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES 9 EACH

HP 12 x 53 STEEL PILES
9 REQUIRED 720.0 LIN. FT.



*POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



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TEMPORARY DRAINAGE AT END BENT

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

(RIGHT LANE)

DRAWN BY : K. E. LOFTON DATE : 10–16
CHECKED BY : A. D. SHAH DATE : 10–16
DESIGN ENGINEER : T. M. HARRIS DATE : 10–16

PLANS PREPARED BY :
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M HARRIS
2/17/2017

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S10–22
1			3			TOTAL SHEETS
2			4			25

STR. #10

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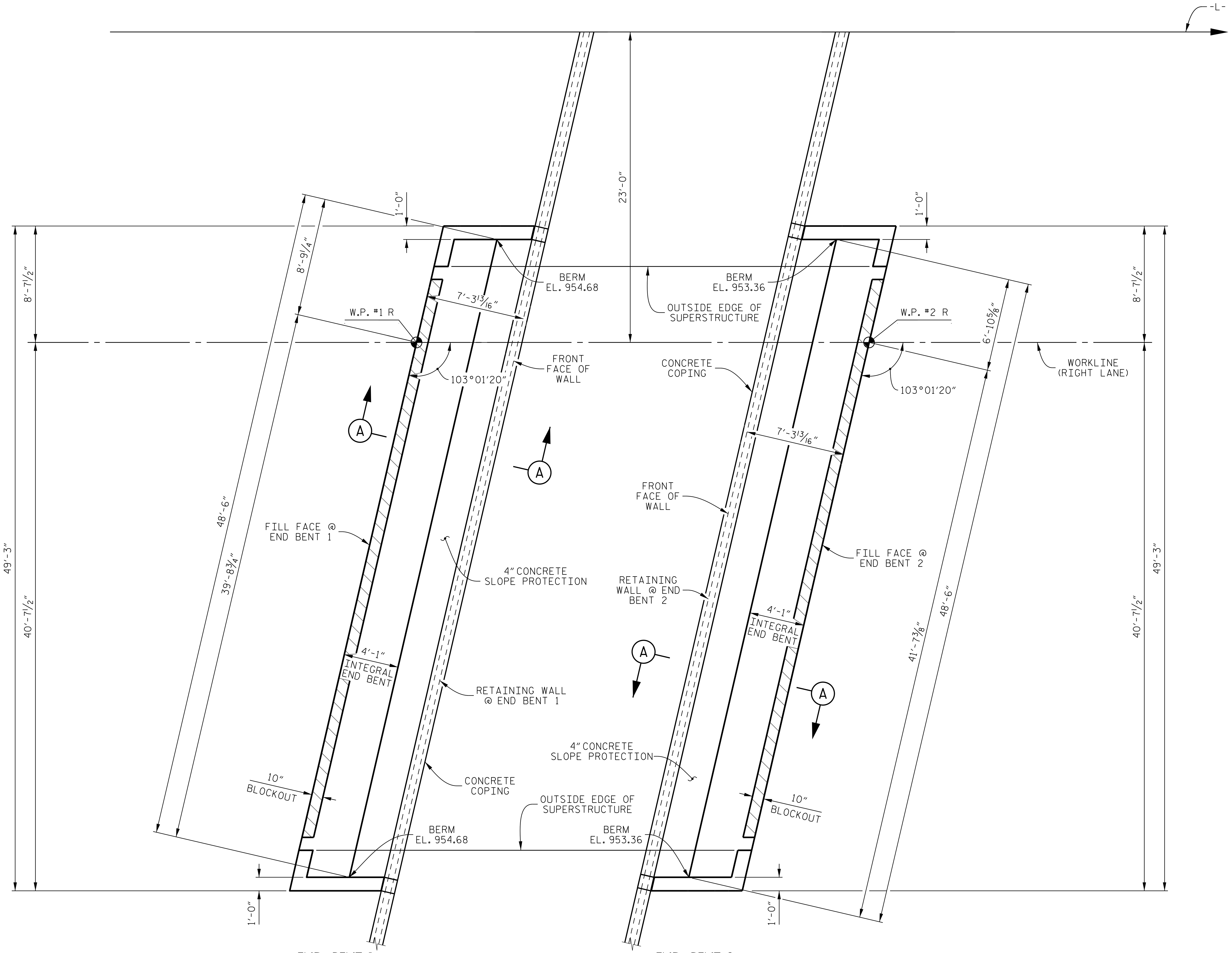
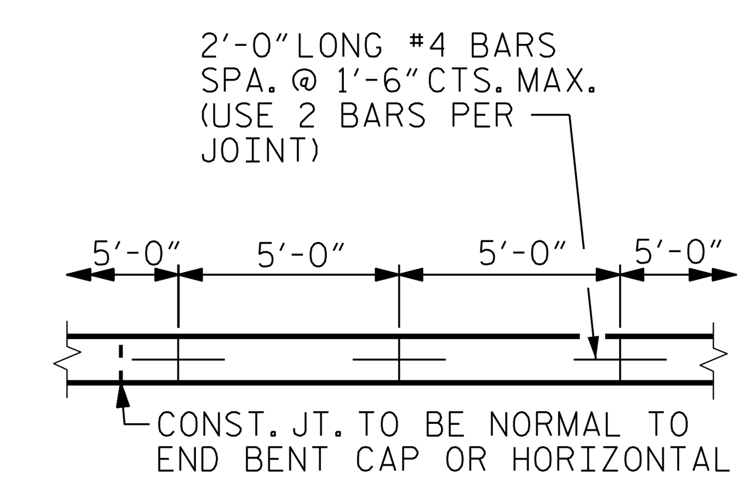
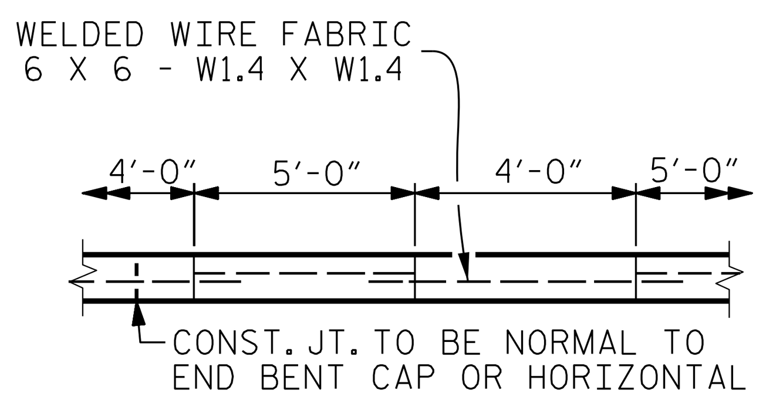


PLAN

APPROACH SLABS AND CONCRETE DITCHES NOT SHOWN

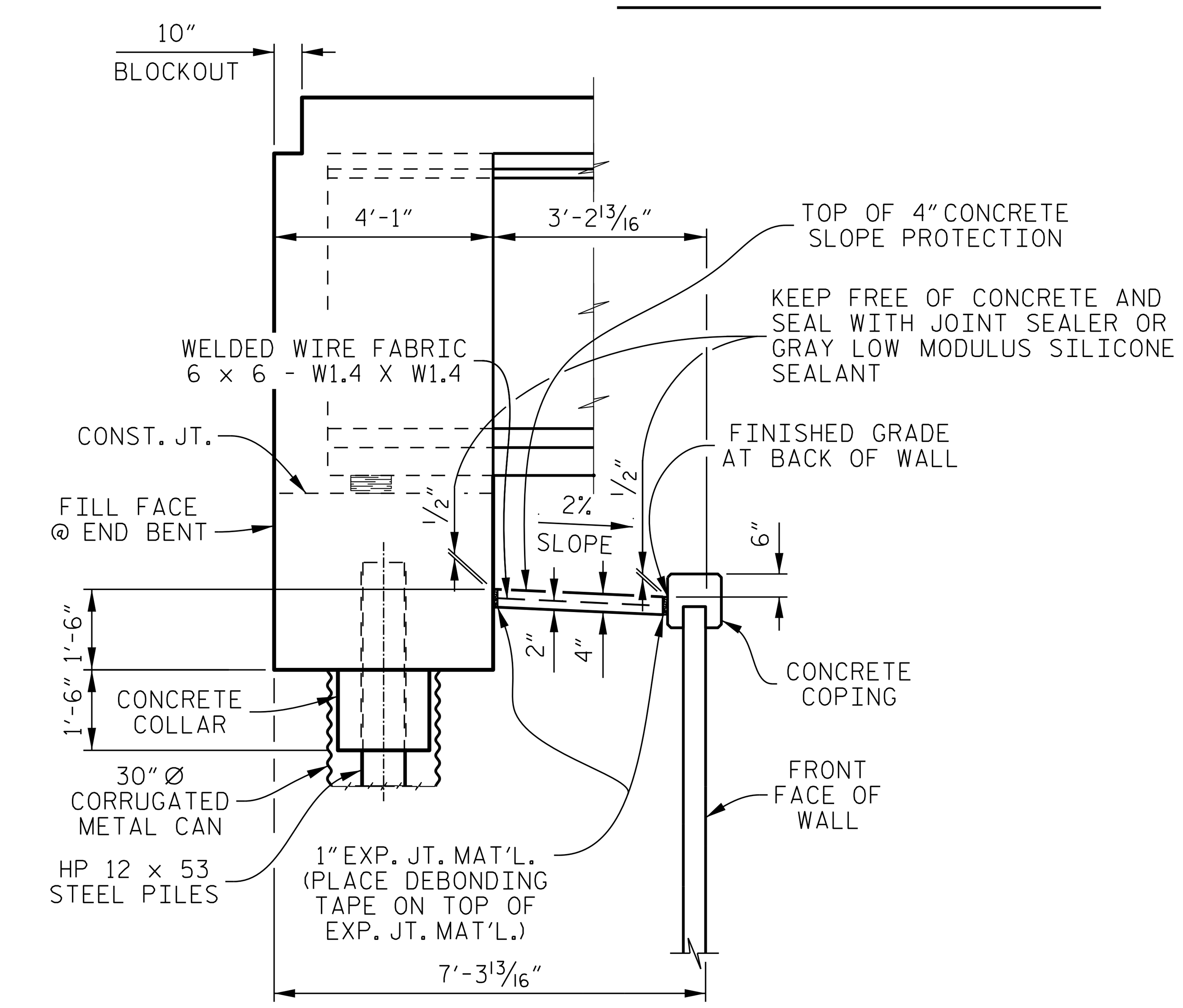


POURING DETAIL



POUR A 4'-0" STRIP FIRST.

OPTIONAL POURING DETAIL



SECTION A-A

BRIDGE AT STA. 611+32.01 -L- (RIGHT LANE)	4" SLOPE PROTECTION	WELDED WIRE FABRIC
	SQUARE YARDS	APPROX. LINEAR FEET
END BENT 1	14	25
END BENT 2	14	25

PROJECT NO. R-2707C
CLEVELAND COUNTY
STATION: 611+32.01 -L-

GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS.

STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT.

MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

SLOPE PROTECTION 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. 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.

ASSEMBLED BY : K. E. LOFTON	DATE : 10-16		
CHECKED BY : A. D. SHAH	DATE : 10-16		
DRAWN BY : ELR 5/92	REV. 10/1/11	MAA/GM	
CHECKED BY : GRP 6/92	REV. 12/21/11	MAA/GM	
	REV. 1/16	MAA/TMG	

DRAWN BY :	K. E. LOFTON	DATE : 10-16
CHECKED BY :	A. D. SHAH	DATE : 10-16
DESIGN ENGINEER :	T. M. HARRIS	DATE : 10-16

PLANS PREPARED BY :
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5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
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NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS (RIGHT LANE)

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

SHEET No. S10-23
TOTAL SHEETS 25

STD. No. SP1

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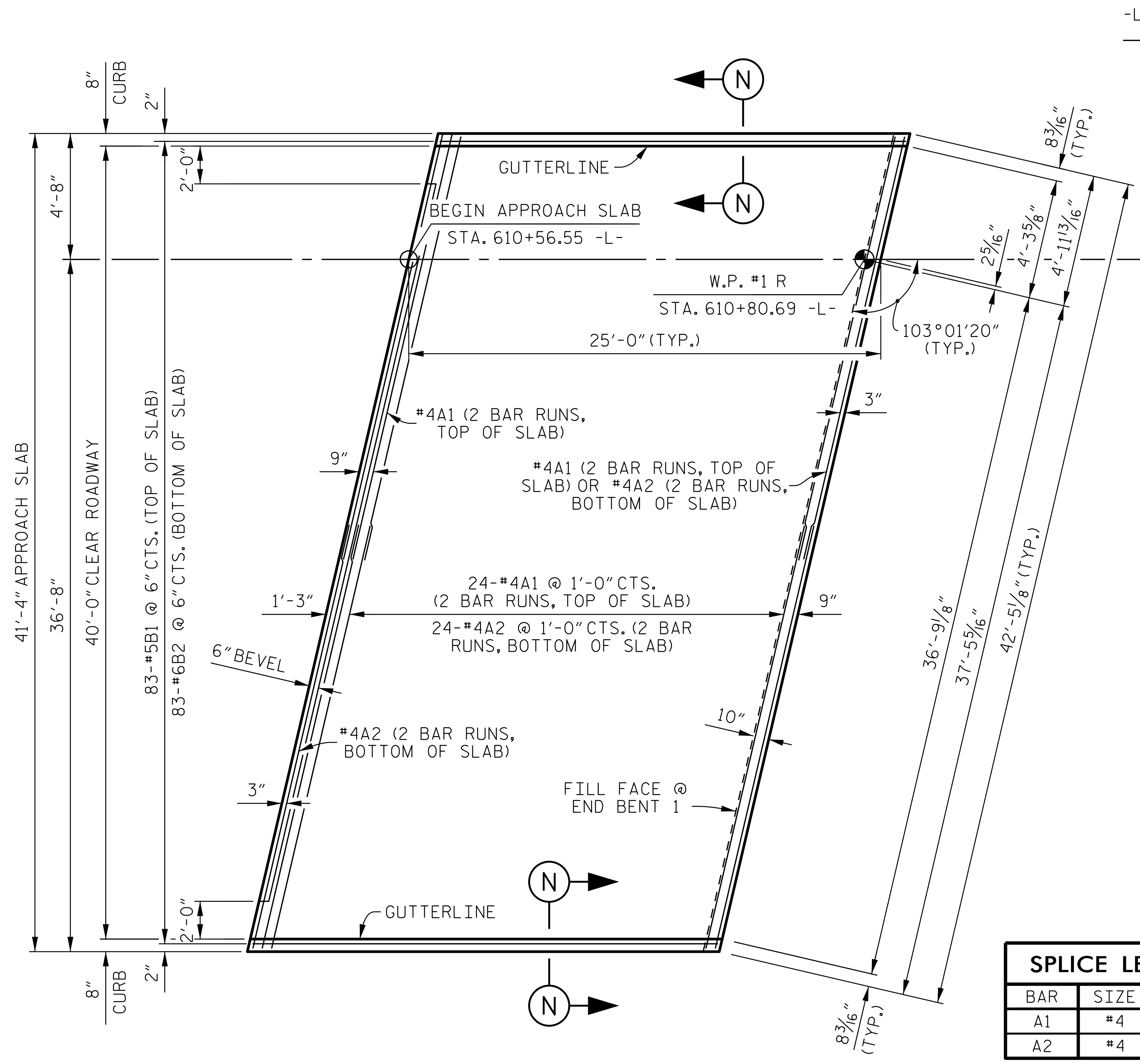
BILL OF MATERIAL

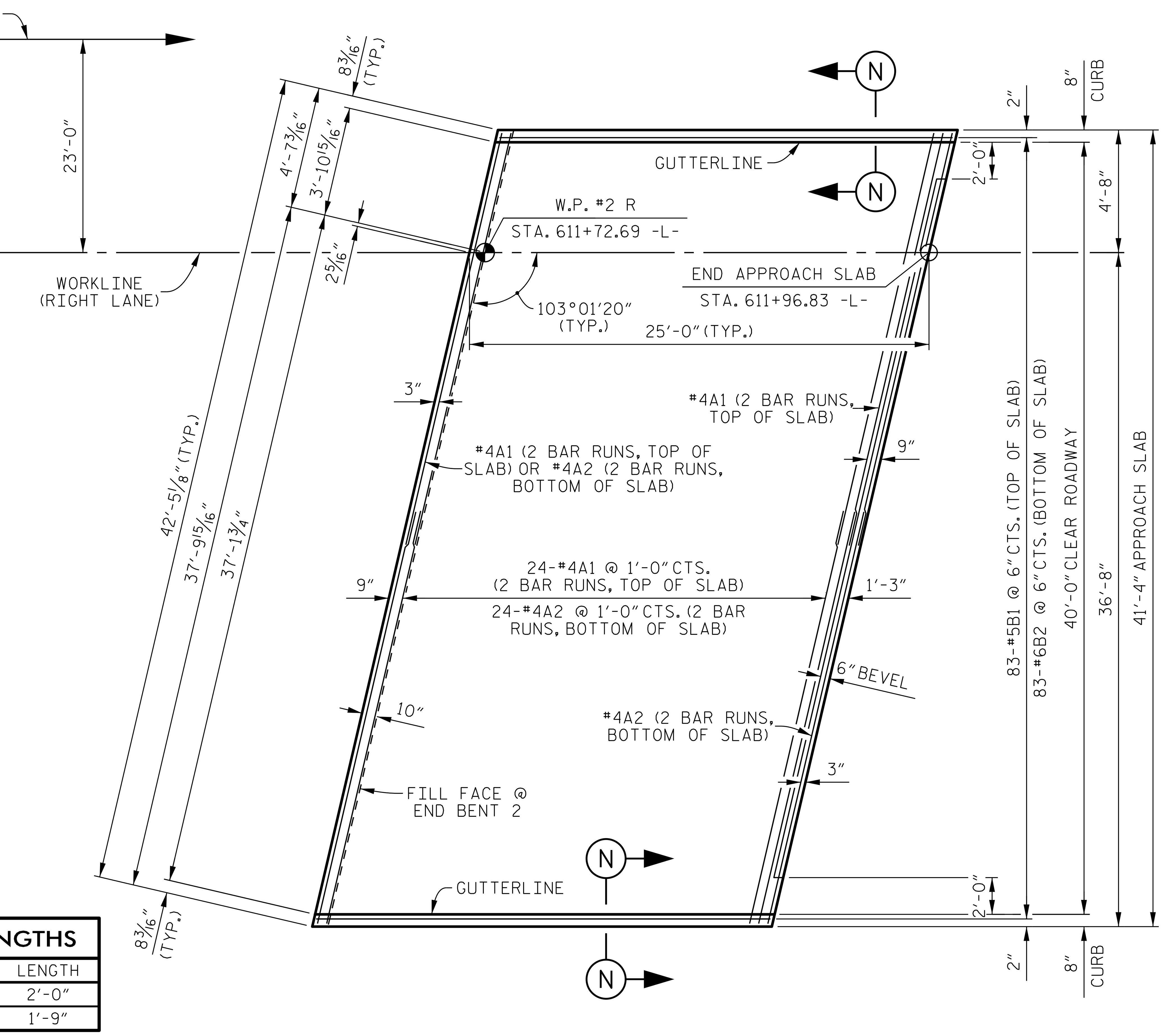
APPROACH SLAB AT END BENT 1 OR END BENT 2

BAR	No.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	22'-1"	767
A2	52	#4	STR	21'-11"	761
* B1	83	#5	STR	24'-2"	2,092
B2	83	#6	STR	24'-8"	3,075
REINFORCING STEEL					3,836 LBS.
* EPOXY COATED REINFORCING STEEL					2,859 LBS.
CLASS "AA" CONCRETE					44.5 CU. YDS.
(2 APPROACH SLABS REQUIRED)					



PLAN OF APPROACH SLAB AT END BENT 1

SPLICE LENGTHS		
BAR	SIZE	LENGTH
A1	#4	2'-0"
A2	#4	1'-9"



PLAN OF APPROACH SLAB AT END BENT 2

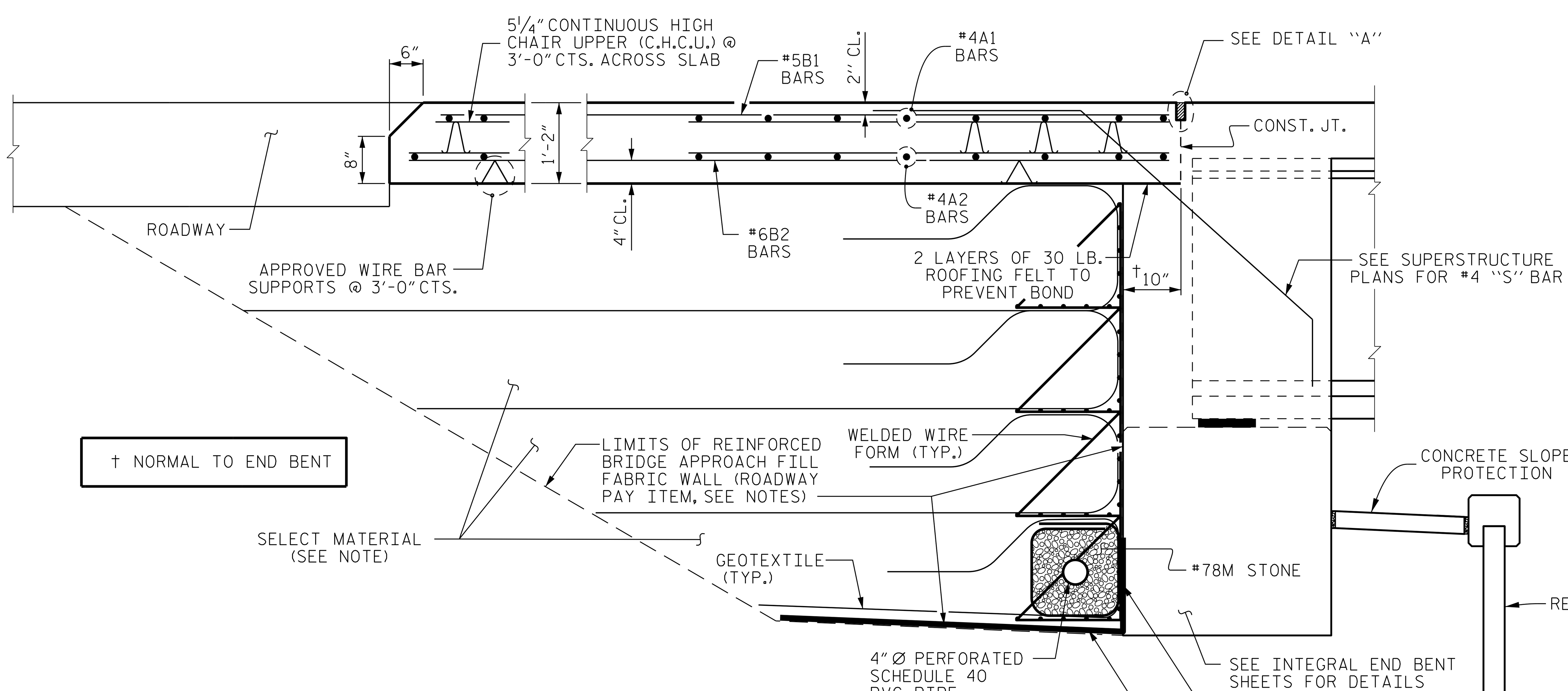
NOTES

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

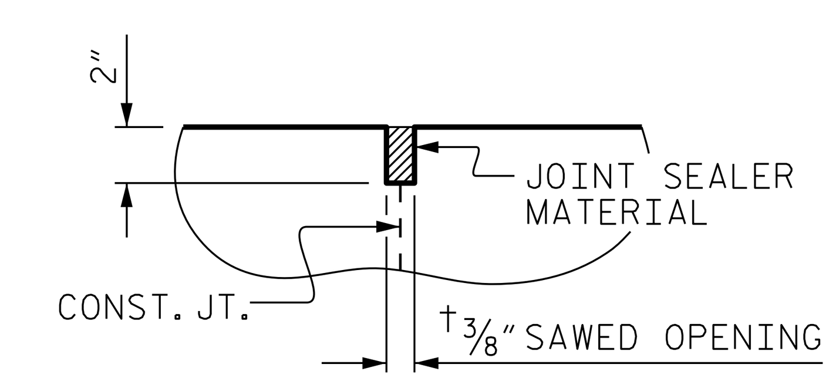
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

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.

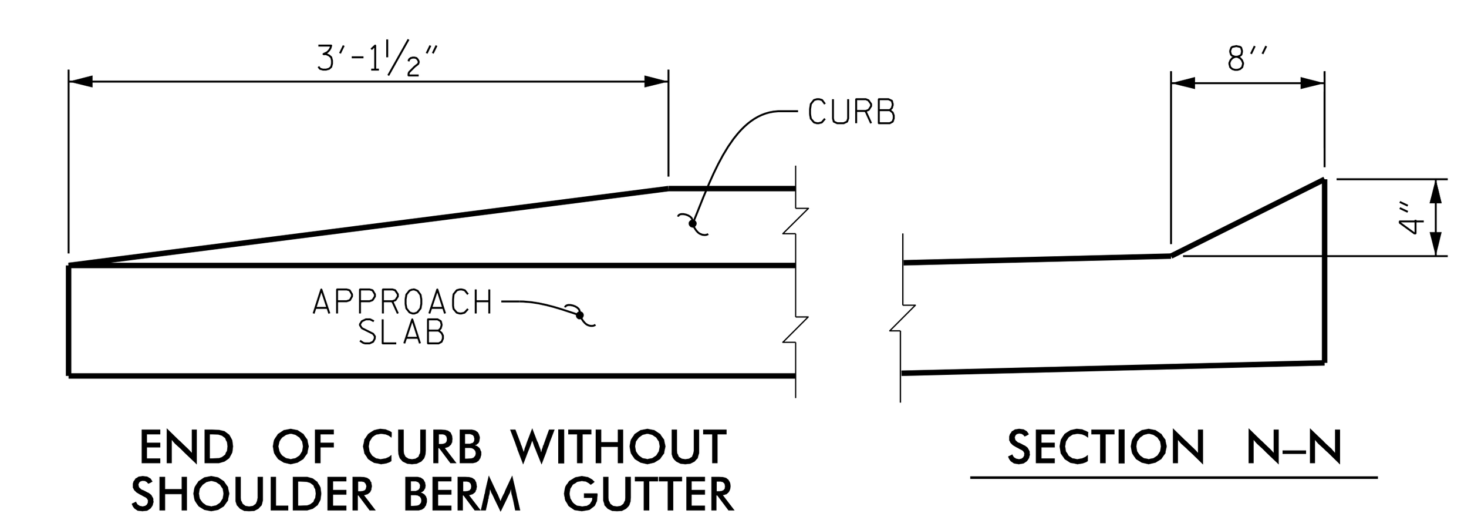
FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.



SECTION THRU SLAB



DETAIL "A"



END OF CURB WITHOUT SHOULDER BERM GUTTER

SECTION N–N

CURB DETAILS

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT (RIGHT LANE)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19299 THOMAS M. HARRIS
2/3/2017

PLANS PREPARED BY:
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DRAWN BY:	K. E. LOFTON	DATE:	10-16
CHECKED BY:	A. D. SHAH	DATE:	10-16
DESIGN ENGINEER:	T. M. HARRIS	DATE:	10-16

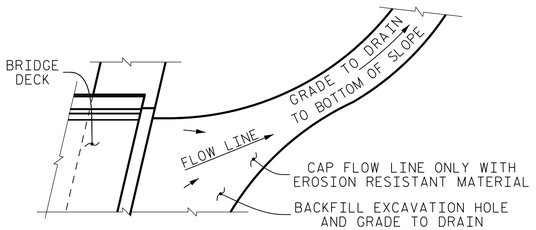
REVISIONS							
No.	BY:	DATE:		No.	BY:	DATE:	
1				3			
2				4			

SHEET No. S10-24
TOTAL SHEETS 25

STD. No. BAS5
STR. #10

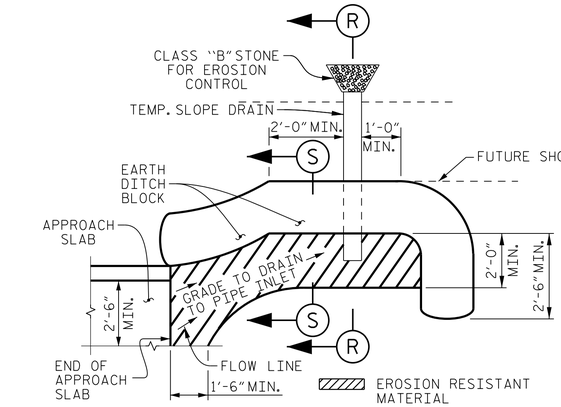
ASSEMBLED BY:	K. E. LOFTON	DATE:	10-16
CHECKED BY:	A. D. SHAH	DATE:	10-16
DRAWN BY: TLA 10/05	REV. 10/1/11	MAA/GM	
CHECKED BY: GM 5/06	REV. 12/12/11	MAA/GM	
	REV. 6/13	MAA/GM	

FILE: ...r2707c_smu_ast_S10-24.dgn
DATE: 2/2/2017



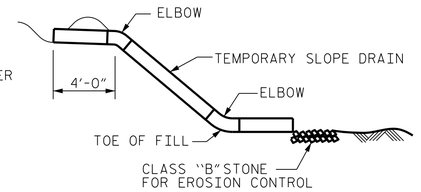
IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO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

TEMPORARY DRAINAGE DETAIL

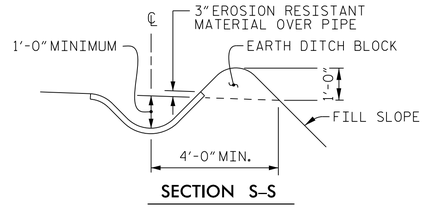


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PROJECT NO. R–2707C

CLEVELAND COUNTY

STATION: 611+32.01 –L–

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS (RIGHT LANE)

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S10–25
1			3			TOTAL SHEETS
2			4			25

ASSEMBLED BY : K. E. LOFTON	DATE : 10-16	
CHECKED BY : A. D. SHAH	DATE : 10-16	
DRAWN BY : FCJ 11/88	REV. 10/1/11	MAA/GM
CHECKED BY : ABR 11/88	REV. 7/12	MAA/GM
	REV. 6/13	MAA/GM

DRAWN BY : K. E. LOFTON DATE : 10–16
CHECKED BY : A. D. SHAH DATE : 10–16
DESIGN ENGINEER : T. M. HARRIS DATE : 10–16

PLANS PREPARED BY :
PARSONS
5540 Centerview Drive, Suite 217
Raleigh, NC 27606-3386
NC LICENSE No. F-0246
FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 19299 ENGINEER THOMAS M. HARRIS
2/3/2017

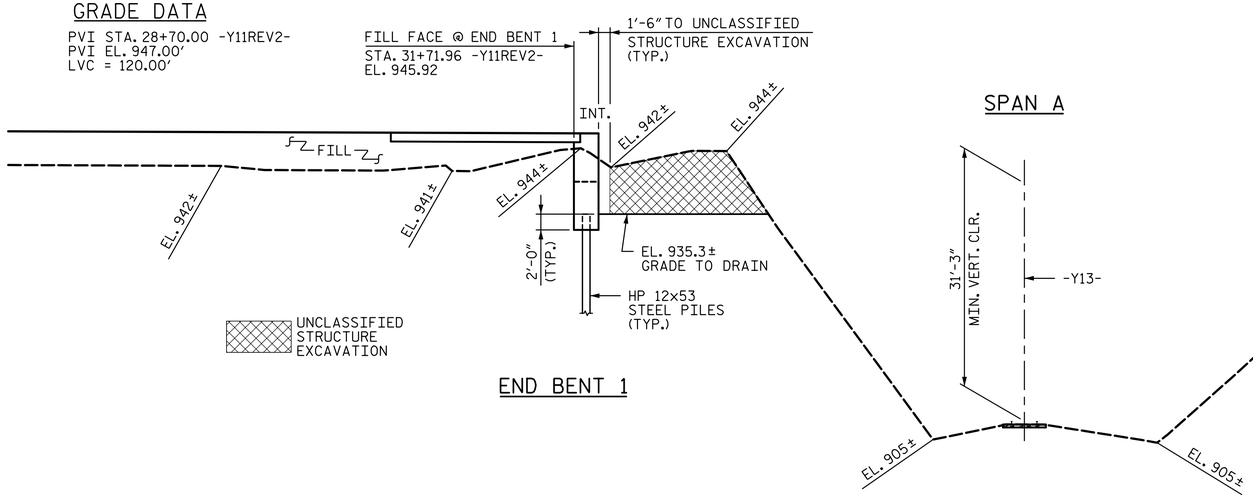
STD. No. BAS4 STR. #10

FILE: i:\-2707c structures\structures\plans - smu_final\410_049_R2707C_smu_as2_S10-25.dgn
DATE: 1/31/2017 12:48:47 PM

GRADE DATA

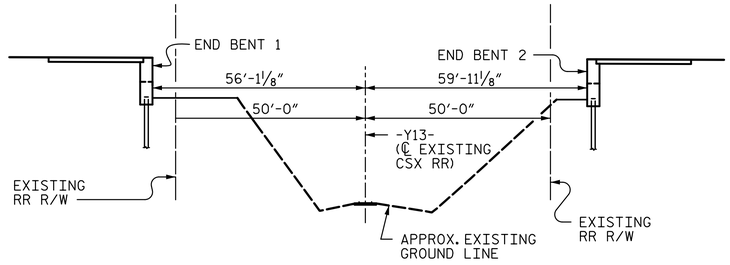
PVI STA. 28+70.00 -Y11REV2-
PVI EL. 947.00'
LVC = 120.00'

(-)0.9730% (-)0.3561%



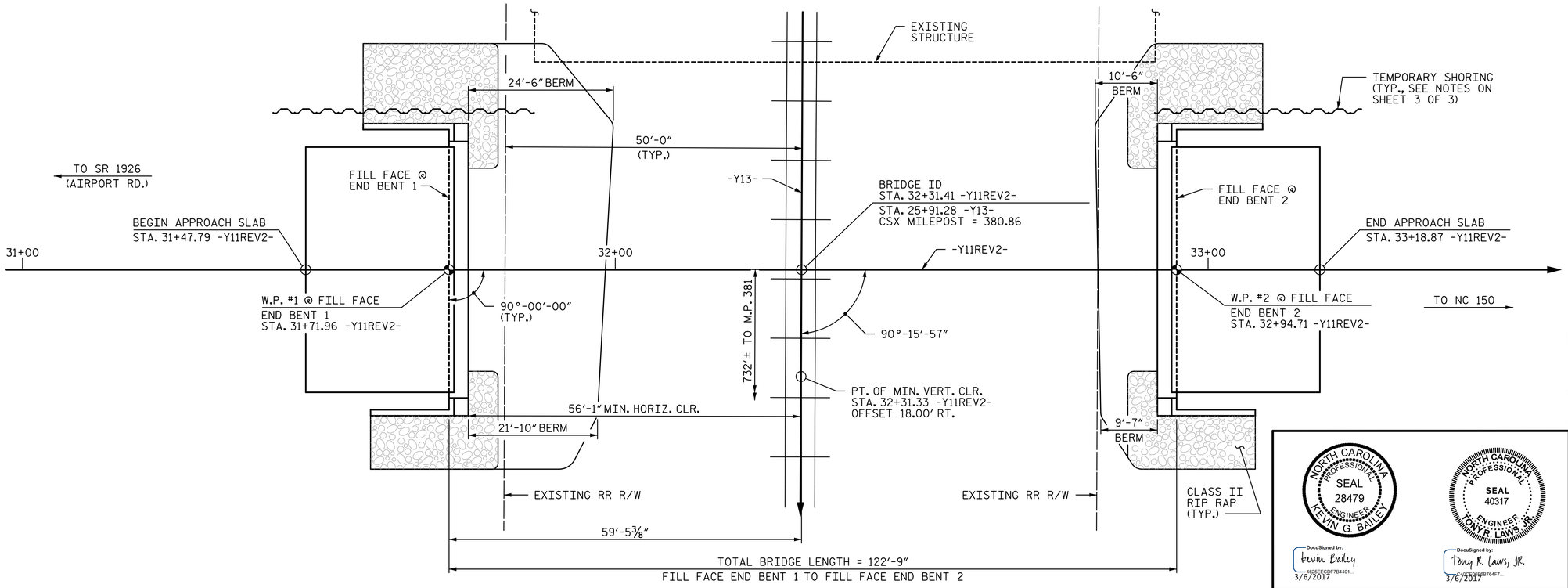
TOP OF RAIL ELEVATIONS	
TRACK STATION ALONG -Y13-	EXISTING CSX RR
25+70.00	907.280
25+80.00	907.399
25+90.00	907.492
26+00.00	907.585
26+10.00	907.675
26+20.00	907.766

TOP OF RAIL ELEVATIONS SHOWN ON THE PLANS ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING CONSTRUCTION, VERIFY THE TOP OF RAIL ELEVATIONS.



BRIDGE LENGTH BASED ON THIS THEORETICAL SECTION

(MEASURED PERPENDICULAR TO -Y13-)
(LOOKING DOWNSTATION ALONG -Y13-)



PLAN

(END BENT PILES NOT SHOWN FOR CLARITY)

PROJECT NO. R-2707C
CLEVELAND COUNTY
STATION: 32+31.41 -Y11REV2-
25+91.28 -Y13-
SHEET 1 OF 3 MILEPOST 380.86 BRIDGE NO. 476

NORTH CAROLINA PROFESSIONAL SEAL 28479 ENGINEER KEVIN G. BAILEY
DocuSigned by: Kevin Bailey 3/6/2017
NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.
DocuSigned by: Tony R. Laws, JR. 3/6/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STV 100 Years
STV ENGINEERS, INC.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

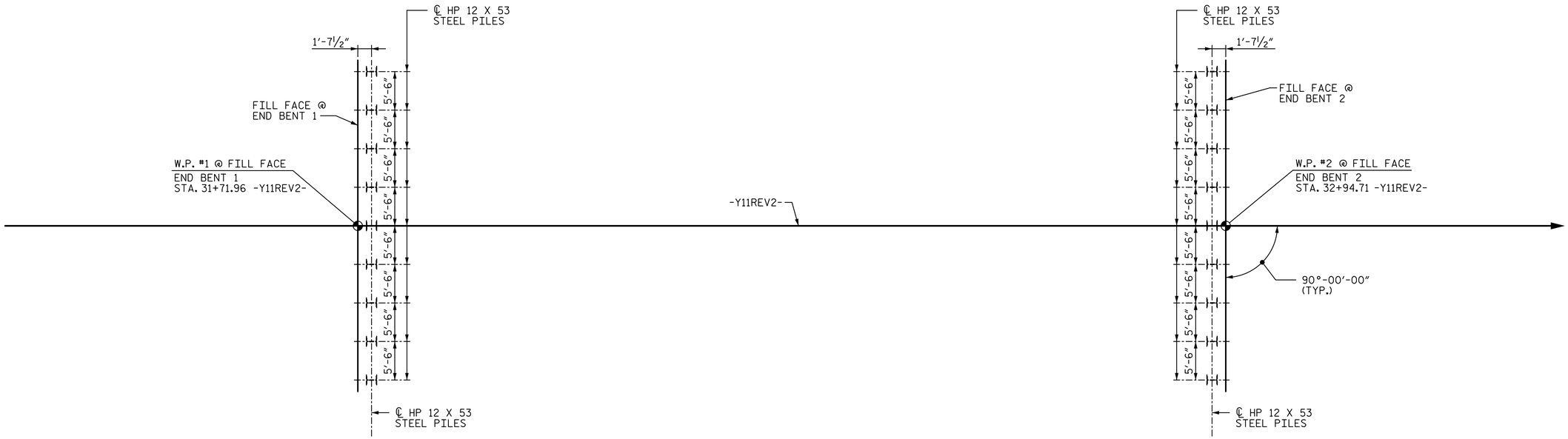
BRIDGE ON -Y11REV2- (NC 180) OVER -Y13- (CSX RR) BETWEEN SR 1926 & NC 150

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-01
1			3			TOTAL SHEETS
2			4			27

STR. #11

DRAWN BY : MBC DATE : 9-16
CHECKED BY : AJP DATE : 9-16
DESIGN ENGINEER OF RECORD: T. LAWS DATE : 9-16

3/6/2017 12:25:32 PM R:\Ustation\Mll_001_R2707C_SMU_GD01_S11-1.dgn



END BENT 1

END BENT 2

FOUNDATION LAYOUT

FOUNDATION NOTES:

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

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 183 TONS PER PILE.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-
25+91.28 -Y13-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 28479 ENGINEER KEVIN G. BAILEY

DocuSigned by: Kevin Bailey 3/6/2017

NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.

DocuSigned by: Tony R. Laws, JR. 3/6/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STV 100 Years

STV ENGINEERS, INC.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

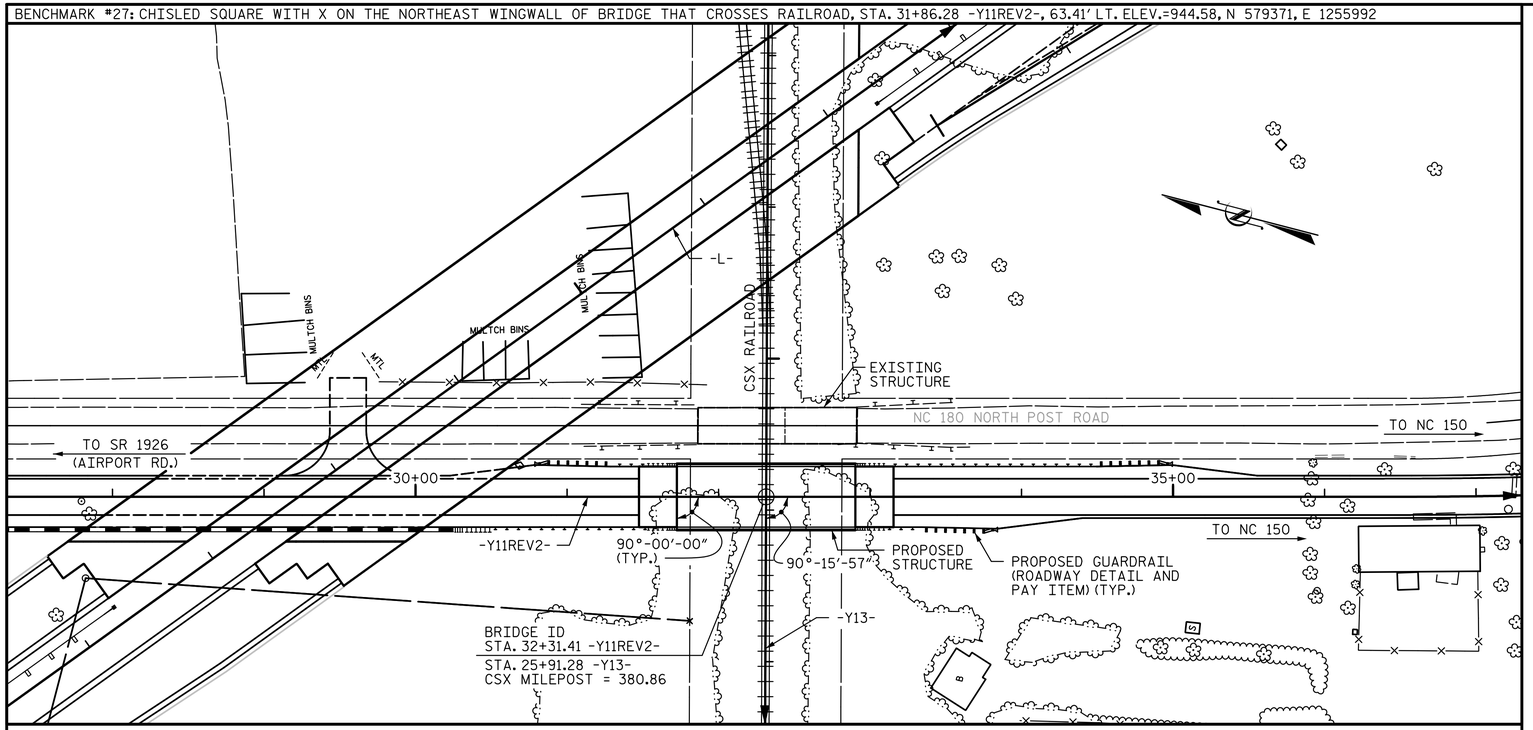
FOUNDATION LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-02
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : MBC	DATE : 9-16	DESIGN ENGINEER OF RECORD: T. LAWS	DATE : 9-16
CHECKED BY : AJP	DATE : 9-16		

3/6/2017 12:25:32 PM R:\Ustation\411_003_R2707C_SMU_GD02_S11-2.dgn

BENCHMARK #27: CHISLED SQUARE WITH X ON THE NORTHEAST WINGWALL OF BRIDGE THAT CROSSES RAILROAD, STA. 31+86.28 -Y11REV2-, 63.41' LT. ELEV.=944.58, N 579371, E 1255992

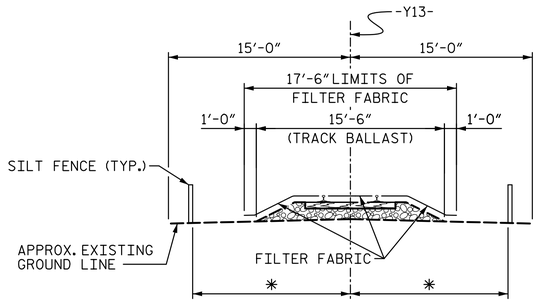


LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	MODIFIED 63" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIP. SETUP FOR HP 12x53 STEEL PILES	HP 12x53 STEEL PILES		CONCRETE BARRIER RAIL	60" CHAIN LINK FENCE	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	ASBESTOS ASSESSMENT
	LUMP SUM	LUMP SUM	SQ. FT.	SQ. FT.	CU. YD.	LUMP SUM	LBS.	NO.	LIN. FT.	EA.	NO.	LIN. FT.	LIN. FT.	LIN. FT.	TONS	SQ. YD.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			5,309	6,330		LUMP SUM		5	604.58				242.2	228.0			LUMP SUM	LUMP SUM
END BENT 1					45.3		6,193			9	9	495			68	75		
END BENT 2					45.3		6,193			9	9	360			68	75		
TOTAL	LUMP SUM	LUMP SUM	5,309	6,330	107.2	LUMP SUM	12,386	5	604.58	18	18	855	242.2	228.0	136	150	LUMP SUM	LUMP SUM



RAILROAD EROSION CONTROL DETAIL

* TO BE DETERMINED BY THE RESIDENT ENGINEER IN CONSULTATION WITH THE RAILROAD ENGINEER.

NOTES:

RAILROAD EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO PERFORMING ANY WORK IN THE RAILROAD RIGHT-OF-WAY.

ADDITIONAL EROSION CONTROL MEASURES FOR PROTECTION OF RAILROAD DITCHES MAY BE REQUIRED AS DIRECTED BY THE ENGINEER.

NO SEPARATE PAYMENT WILL BE MADE FOR RAILROAD EROSION CONTROL MEASURES.

LIMITS OF SILT FENCE AND FILTER FABRIC PARALLEL TO RAILROAD SHALL EXTEND A MINIMUM OF 25'-0" OUTSIDE EDGE OF SUPERSTRUCTURE OR TOE OF SLOPE ON CONSTRUCTION. A GREATER LENGTH OF SILT FENCE OR FILTER FABRIC MAY BE REQUIRED IF SO DIRECTED BY THE ENGINEER.

FILTER FABRIC TO BE NAILED TO TIMBER RAIL TIES WITH PRIME SOURCE "GRIP CAP" OR EQUIVALENT. FILTER FABRIC ON SHOULDER TO BE SECURED AS DIRECTED BY THE ENGINEER AND RAILROAD.

DRAWN BY : MBC DATE : 9-16
CHECKED BY : AJP DATE : 9-16
DESIGN ENGINEER OF RECORD: T. LAWS DATE : 9-16

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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 FOUNDATION NOTES, SEE "FOUNDATION LAYOUT" SHEET.

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 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.

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.

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.

STEEL SHEET PILING REQUIRED FOR SHORING SHALL BE HOT ROLLED.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA (ON SHEET 1 OF 3) SHALL BE EXCAVATED FOR A DISTANCE FROM THE CENTERLINE OF ROADWAY 38'± (LEFT) AND 34'± (RIGHT) AT BOTH END BENTS AND TO AN ELEVATION OF 935.3± AT END BENT 1 AND 934.8± AT END BENT 2 AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF (1) 47'-6" AND (1) 57'-6" SPANS WITH REINFORCED CONCRETE DECK ON STEEL I-BEAMS, WITH A CLEAR ROADWAY OF 24'-0" AND SUPPORTED BY REINFORCED CONCRETE ABUTMENTS, REINFORCED CONCRETE POST AND BEAM BENT ON SPREAD FOOTINGS SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT.

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 32+31.41 -Y11REV2-".

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

ANY SOIL EXCAVATED DUE TO CONSTRUCTION ACTIVITIES ON CSXT RIGHT OF WAY SHALL NOT BE REMOVED FROM THE PROPERTY. ANY EXCESS SOIL THAT IS NOT REUSED WITHIN THE CSXT RIGHT OF WAY SHALL BE TESTED BY A RAILROAD REPRESENTATIVE FOR CONTAMINATION AND DISPOSAL ACCORDINGLY AT AN APPROVED LANDFILL. CSXT WILL NOT BEAR ANY COSTS RELATED TO DISPOSAL OF SOILS GENERATED DUE TO CONSTRUCTION ACTIVITY RELATED TO THIS PROJECT.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

FOR REMOVAL OF EXISTING STRUCTURE, SEE SPECIAL PROVISIONS.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-
25+91.28 -Y13-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 28479 ENGINEER KEVIN G. BAILEY

DocuSigned by: Kevin Bailey 4626EECDF7B4401...
3/30/2017

NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.

DocuSigned by: Tony R. Laws, Jr. 540CE06F6B764F7...
3/30/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STV 100 Years
STV ENGINEERS, INC.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LOCATION SKETCH, GENERAL NOTES AND TOTAL BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-03
1			3			TOTAL SHEETS
2			4			27

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE							COMMENT NUMBER
								MOMENT					SHEAR						MOMENT							
							LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM 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	1.08	--	1.75	0.80	1.18	A	E	59.75	0.90	1.22	A	I	11.4	0.80	0.80	1.08	A	E	59.75	
		HL-93 (OPERATING)	N/A		1.54	--	1.35	0.80	1.54	A	E	59.75	0.90	1.70	A	I	11.4	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.57	56.52	1.75	0.80	1.73	A	E	59.75	0.90	1.83	A	I	11.4	0.80	0.80	1.57	A	E	59.75	
		HS-20 (OPERATING)	36.000		2.24	80.64	1.35	0.80	2.24	A	E	59.75	0.90	2.42	A	I	11.4	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.80	51.30	1.40	0.80	5.24	A	E	59.75	0.90	6.10	A	I	11.4	0.80	0.80	3.80	A	E	59.75	
		SNGARBS2	20.000		2.72	54.40	1.40	0.80	3.74	A	E	59.75	0.90	4.19	A	I	11.4	0.80	0.80	2.72	A	E	59.75	
		SNAGRIS2	22.000		2.53	55.66	1.40	0.80	3.48	A	E	59.75	0.90	3.84	A	I	11.4	0.80	0.80	2.53	A	E	59.75	
		SNCOTTS3	27.250		1.89	51.50	1.40	0.80	2.60	A	E	59.75	0.90	2.94	A	I	11.4	0.80	0.80	1.89	A	E	59.75	
		SNAGGRS4	34.925		1.53	53.44	1.40	0.80	2.11	A	E	59.75	0.90	2.34	A	I	11.4	0.80	0.80	1.53	A	E	59.75	
		SNS5A	35.550		1.50	53.33	1.40	0.80	2.07	A	E	59.75	0.90	2.34	A	I	11.4	0.80	0.80	1.50	A	E	59.75	
		SNS6A	39.950		1.36	54.33	1.40	0.80	1.87	A	E	59.75	0.90	2.10	A	I	11.4	0.80	0.80	1.36	A	E	59.75	
		SNS7B	42.000		1.30	54.60	1.40	0.80	1.78	A	E	59.75	0.90	2.03	A	I	11.4	0.80	0.80	1.30	A	E	59.75	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.65	54.45	1.40	0.80	2.28	A	E	59.75	0.90	2.55	A	I	11.4	0.80	0.80	1.65	A	E	59.75	
		TNT4A	33.075		1.66	54.90	1.40	0.80	2.28	A	E	59.75	0.90	2.50	A	I	11.4	0.80	0.80	1.66	A	E	59.75	
		TNT6A	41.600		1.34	55.74	1.40	0.80	1.84	A	E	59.75	0.90	2.12	A	I	11.4	0.80	0.80	1.34	A	E	59.75	
		TNT7A	42.000		1.34	56.28	1.40	0.80	1.84	A	E	59.75	0.90	2.08	A	I	11.4	0.80	0.80	1.34	A	E	59.75	
		TNT7B	42.000		1.36	57.12	1.40	0.80	1.88	A	E	59.75	0.90	2.00	A	I	11.4	0.80	0.80	1.36	A	E	59.75	
		TNAGRIT4	43.000		1.31	56.33	1.40	0.80	1.81	A	E	59.75	0.90	1.94	A	I	11.4	0.80	0.80	1.31	A	E	59.75	
		TNAGT5A	45.000	3	1.24	55.80	1.40	0.80	1.71	A	E	59.75	0.90	1.89	A	I	11.4	0.80	0.80	1.24	A	E	59.75	
		TNAGT5B	45.000	3	1.24	55.80	1.40	0.80	1.70	A	E	59.75	0.90	1.84	A	I	11.4	0.80	0.80	1.24	A	E	59.75	

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)

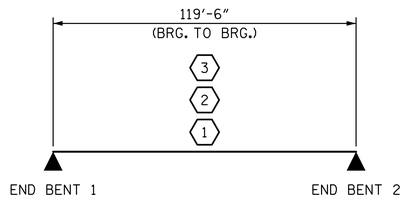
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
E - EXTERIOR GIRDER



LRFR SUMMARY

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.

DocuSigned by: Tony R. Laws, JR. 3/6/2017

STV 100 Years

STV ENGINEERS, INC.
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Charlotte, NC 28202
NC License Number F-0991

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-04
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : MBC DATE : 9-16
CHECKED BY : KGB DATE : 9-16
DESIGN ENGINEER OF RECORD: T. LAWS DATE : 9-16

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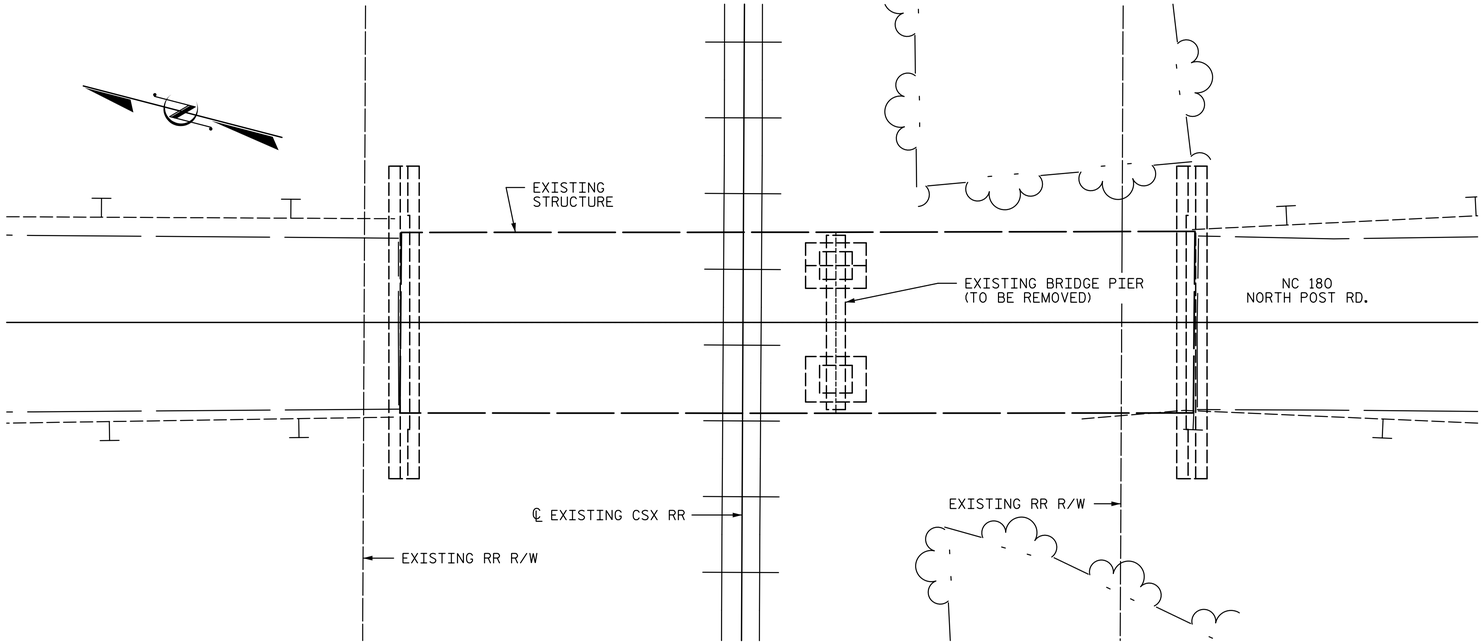
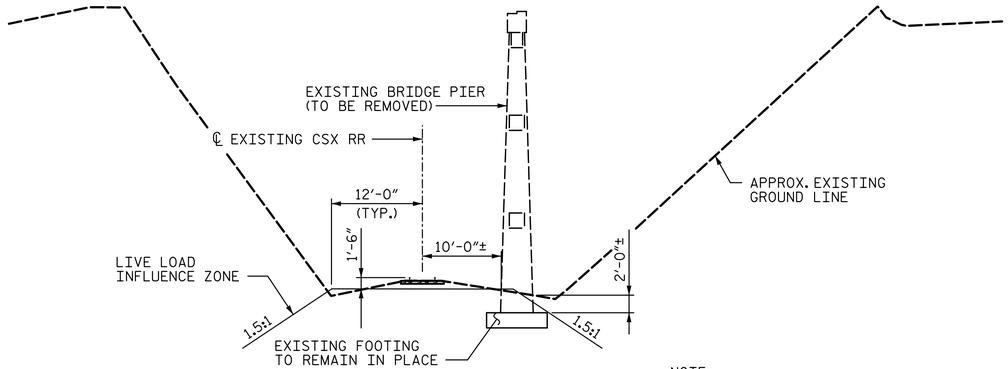


PLAN FOR STRUCTURE REMOVAL

(FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.)



SECTION VIEW

(LOOKING DOWNSTATION ALONG ℄ EXISTING CSX RR)

NOTE:
FOOTINGS SHALL BE LEFT IN PLACE. COLUMNS SHALL BE REMOVED TO 2'-0" BELOW GROUND LEVEL. METHOD FOR COLUMN REMOVAL SHALL BE INCLUDED IN EXISTING BRIDGE DEMOLITION PLAN. SEE RAILROAD AGREEMENT FOR EXPECTATIONS, REQUIREMENTS AND TIMING FOR COLUMN REMOVAL.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

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EXISTING STRUCTURE REMOVAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-05
1			3			TOTAL SHEETS
2			4			27

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CHECKED BY : AJP	DATE : 10-16		

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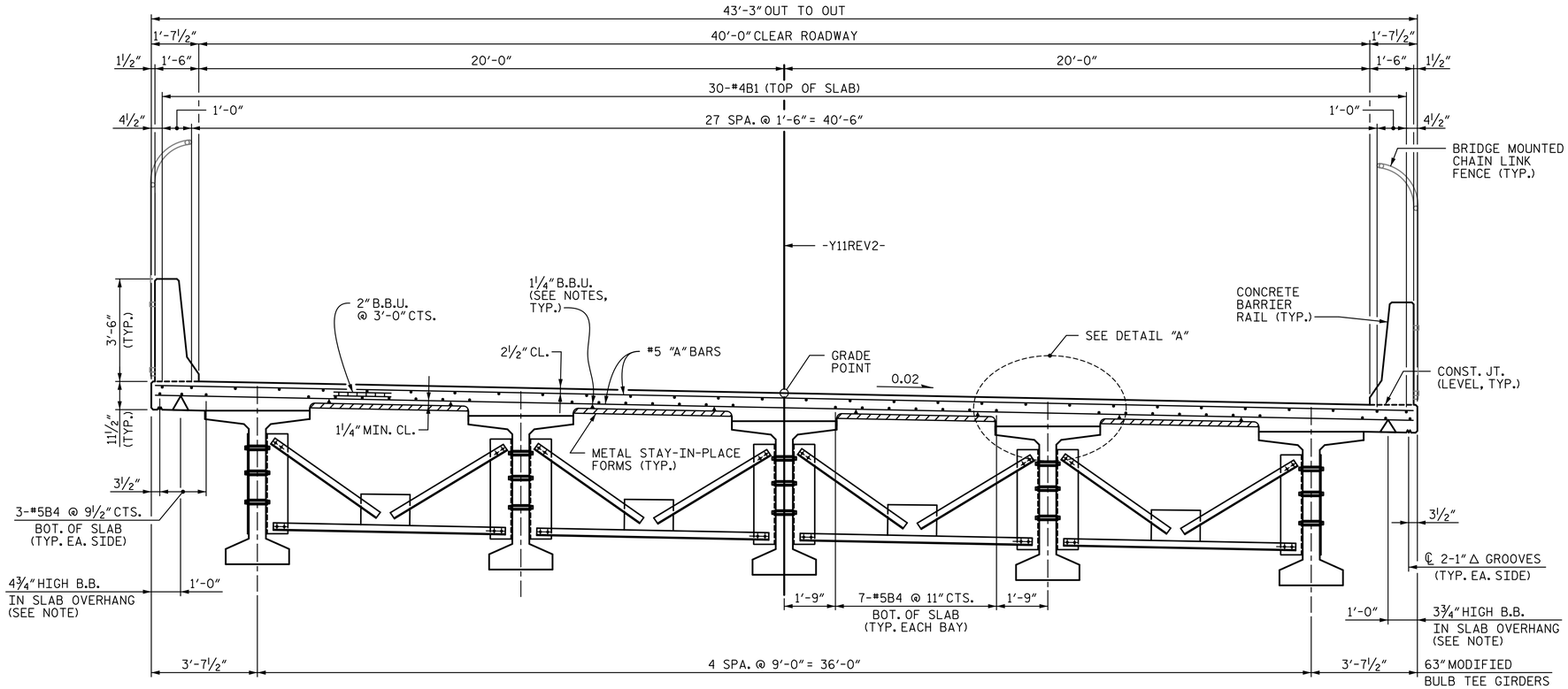
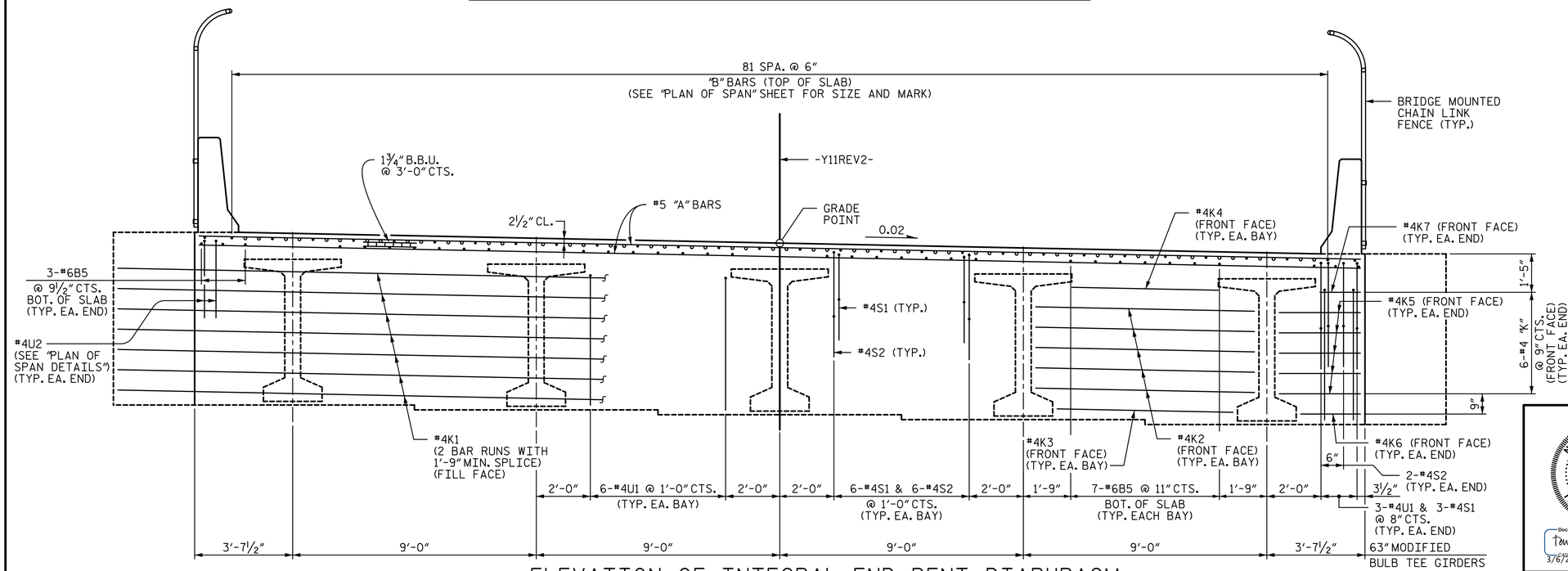


TYPICAL SECTION AT INTERMEDIATE DIAPHRAGMS



ELEVATION OF INTEGRAL END BENT DIAPHRAGM

(END BENT 1 SHOWN, END BENT 2 SIMILAR)
(LOOKING IN DIRECTION OF STATIONING,
WING REINFORCEMENT NOT SHOWN FOR CLARITY.)

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.

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

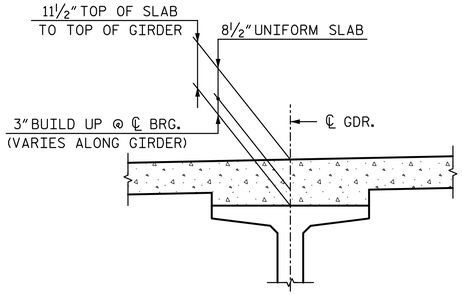
FOR INTERMEDIATE DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.

FOR BARRIER RAIL DETAILS, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR INTEGRAL BACKWALL AND WING WALL DIMENSIONS, DETAILS AND ELEVATIONS, SEE "PLAN OF SPANS DETAILS" SHEETS.

HEIGHT OF BEAM BOLSTER IS CALCULATED @ ℄ BEARING. CONTRACTOR SHALL ADJUST HEIGHTS, AS NECESSARY TO MAINTAIN PROPER CLEARANCE, DUE TO GIRDER CAMBER.

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



DETAIL "A"

PROJECT NO. R-2707C
CLEVELAND COUNTY
STATION: 32+31.41 -Y11REV2-

NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION & INTEGRAL BACKWALL

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NC License Number F-0991

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-06
1			3			TOTAL SHEETS
2			4			27

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CHECKED BY : JTG DATE : 9-16
DESIGN ENGINEER OF RECORD: T. LAWS DATE : 9-16

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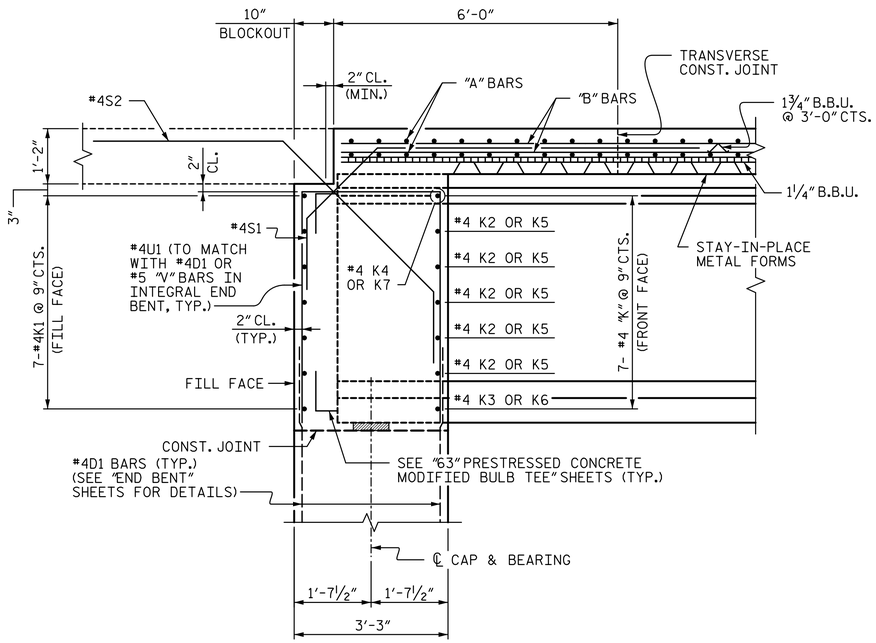
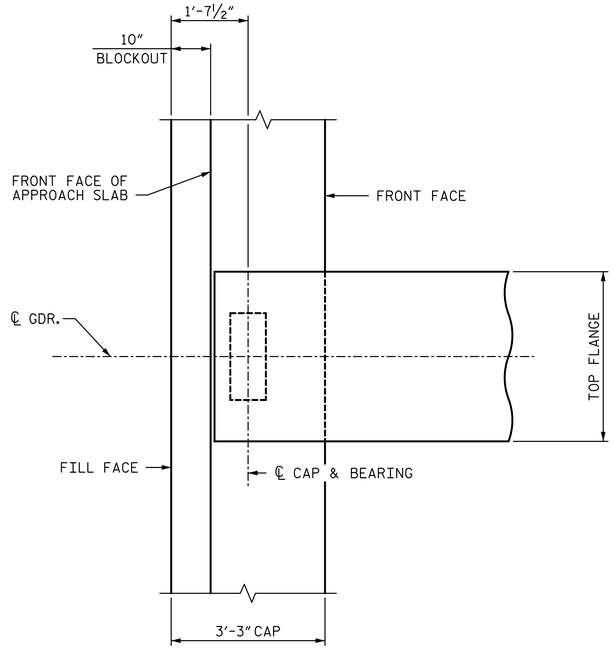
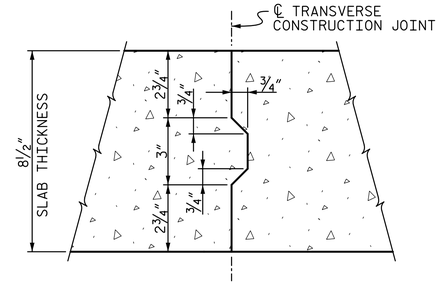


END OF GIRDER DETAIL AT INTEGRAL END BENT



PLAN



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

TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SUPERSTRUCTURE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-07
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : MBC	DATE : 9-16	DESIGN ENGINEER OF RECORD: T. LAWS	DATE : 9-16
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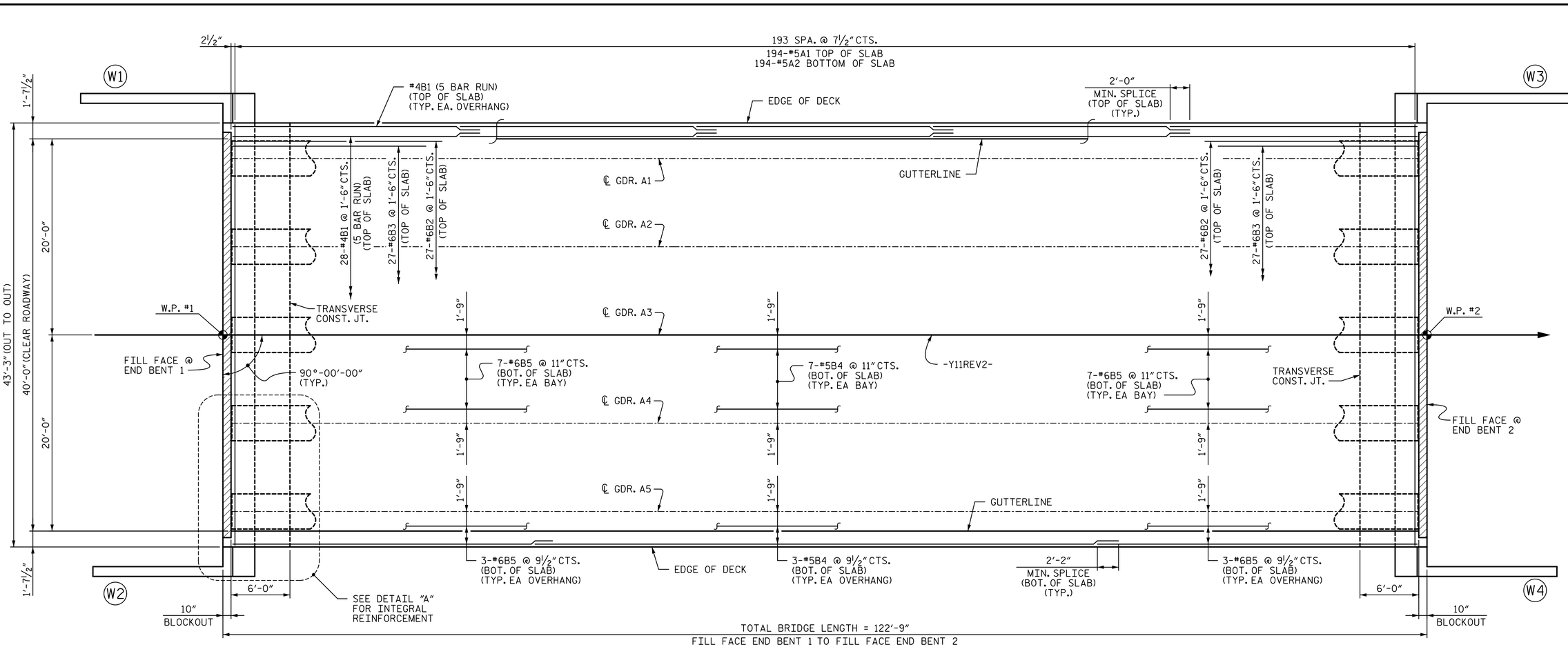
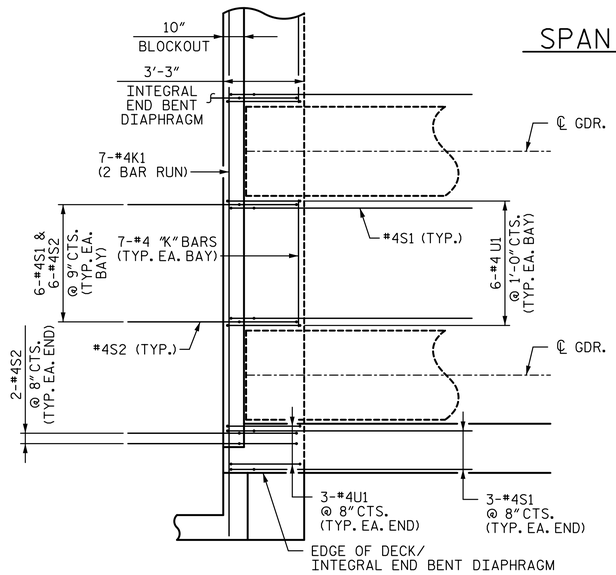


SPAN A



DETAIL A

(END BENT 1 SHOWN, END BENT 2 MIRRORED)
(#4U2 BARS NOT SHOWN FOR CLARITY, SEE "PLAN OF SPAN DETAILS" SHEETS)

NOTES:

1. FOR CONCRETE BARRIER RAIL DIMENSIONS, REINFORCEMENT AND JOINT SPACING, SEE "CONCRETE BARRIER RAIL" SHEET.
2. FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.
3. FOR TRANSVERSE CONST. JOINT IN DECK SLAB, SEE "SUPERSTRUCTURE DETAILS" SHEET.
4. FOR SPACING OF TOP AND BOTTOM "B" BARS, SEE "TYPICAL SECTION AND INTEGRAL BACKWALL" SHEET.

PROJECT NO. R-2707C
CLEVELAND COUNTY
STATION: 32+31.41 -Y11REV2-
SHEET 1 OF 3

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

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Charlotte, NC 28202
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-08
1			3			TOTAL SHEETS
2			4			27

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CHECKED BY : JTG DATE : 9-16
DESIGN ENGINEER OF RECORD: T. LAWS DATE : 9-16

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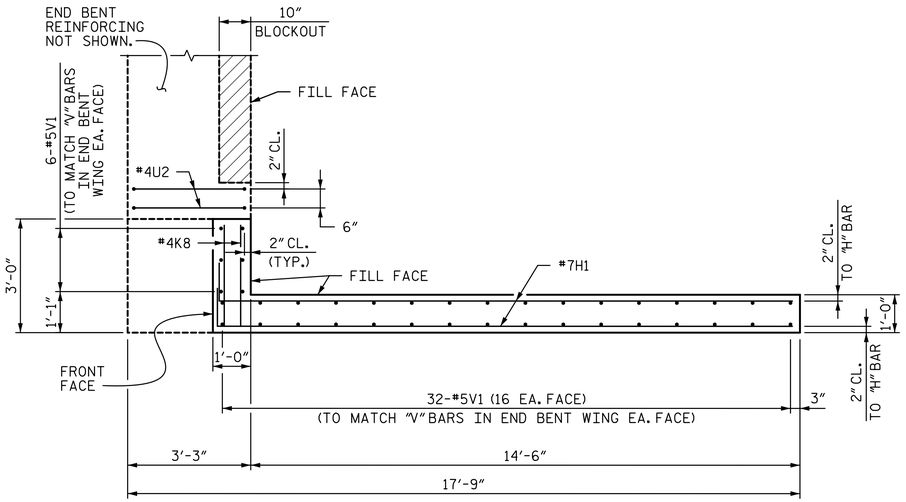
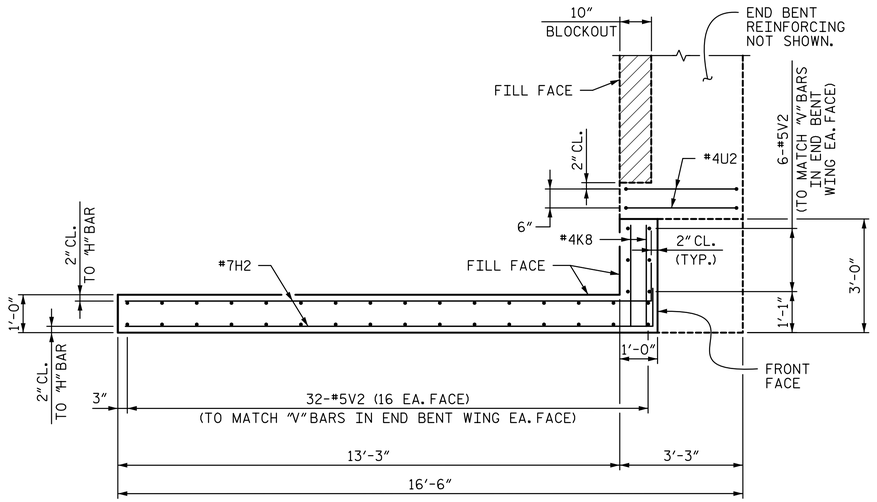
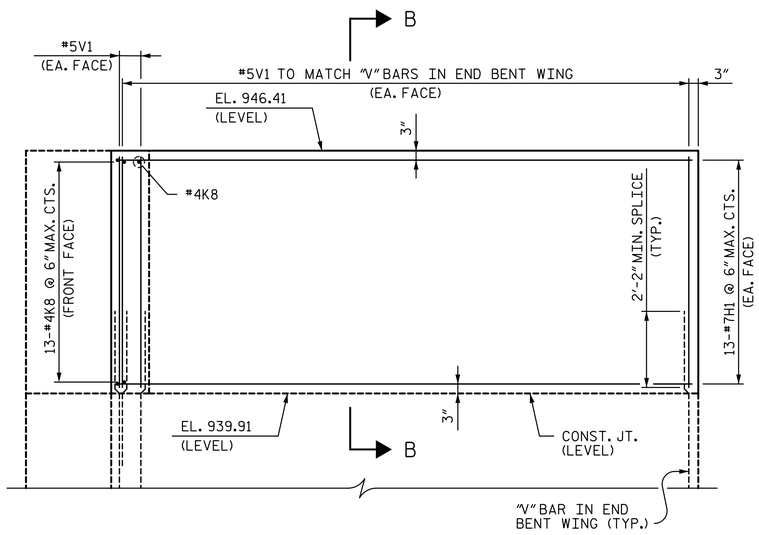


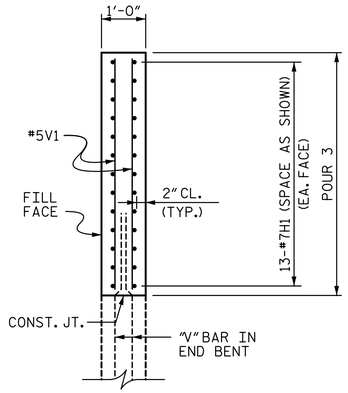
WING WALL PLAN (W1)



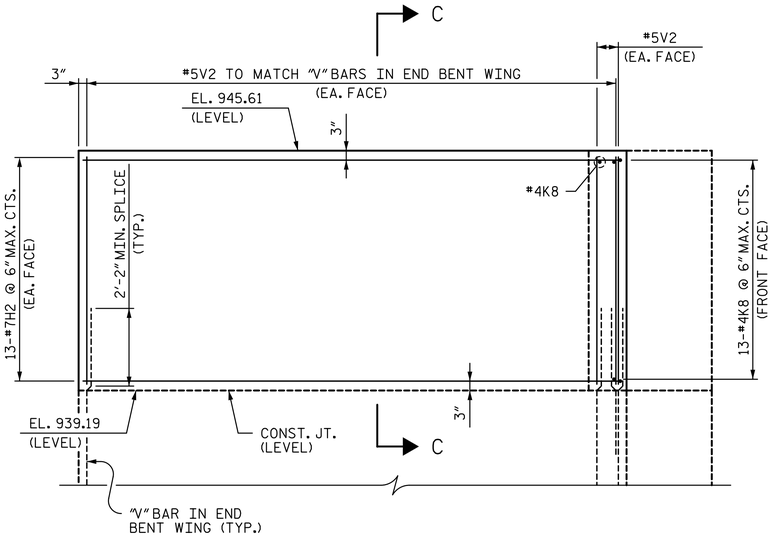
WING WALL PLAN (W2)



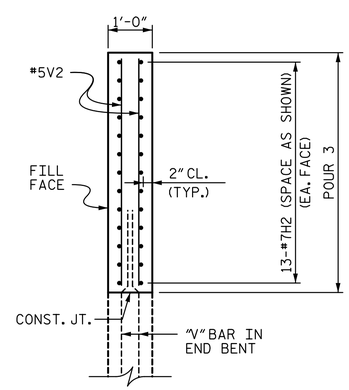
WING WALL ELEVATION (W1)



SECTION B-B



WING WALL ELEVATION (W2)



SECTION C-C

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

SHEET 2 OF 3

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900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-09
1			3			TOTAL SHEETS
2			4			27

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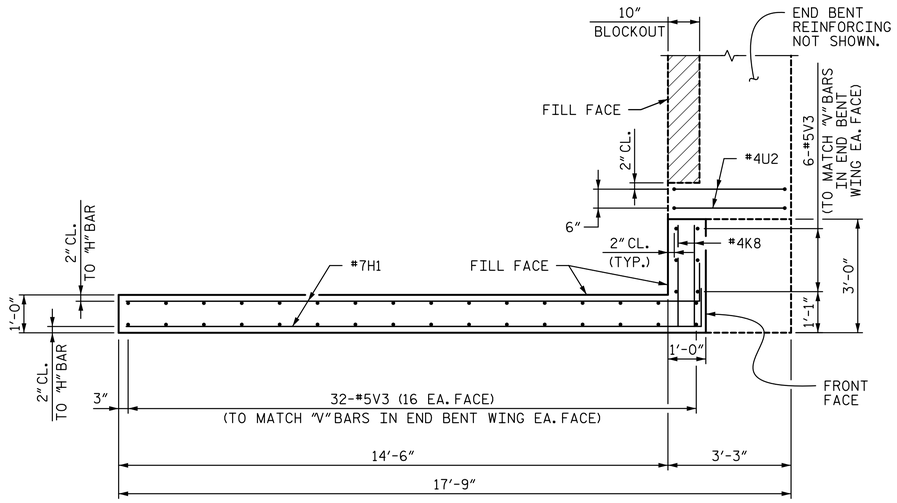
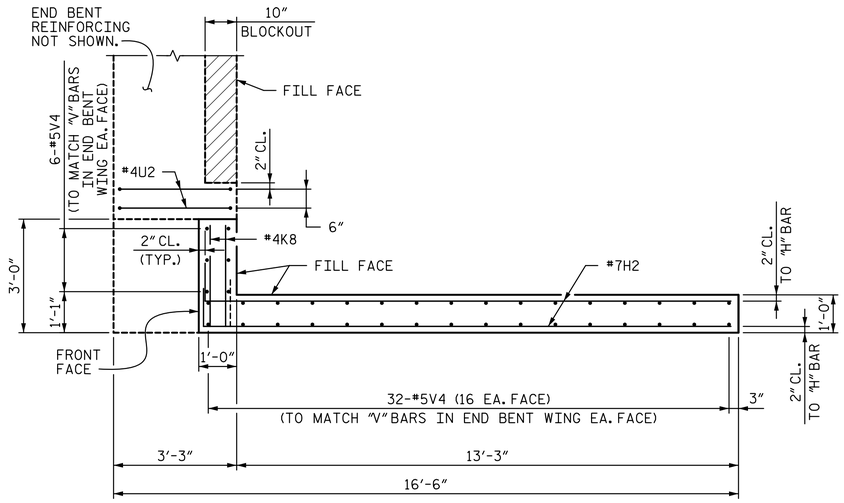
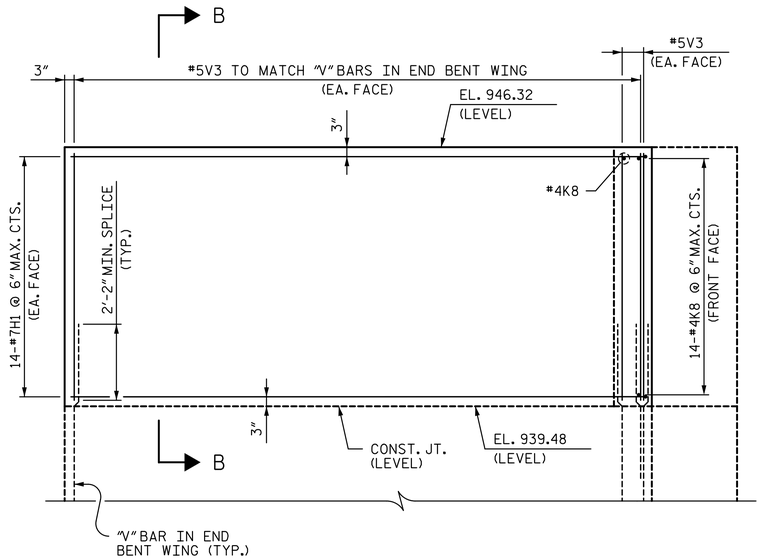


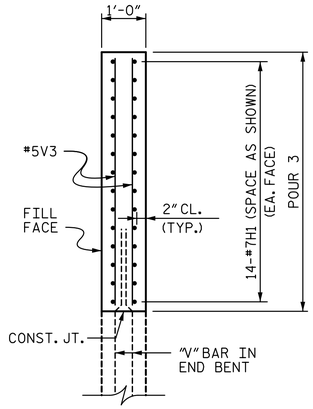
WING WALL PLAN (W3)



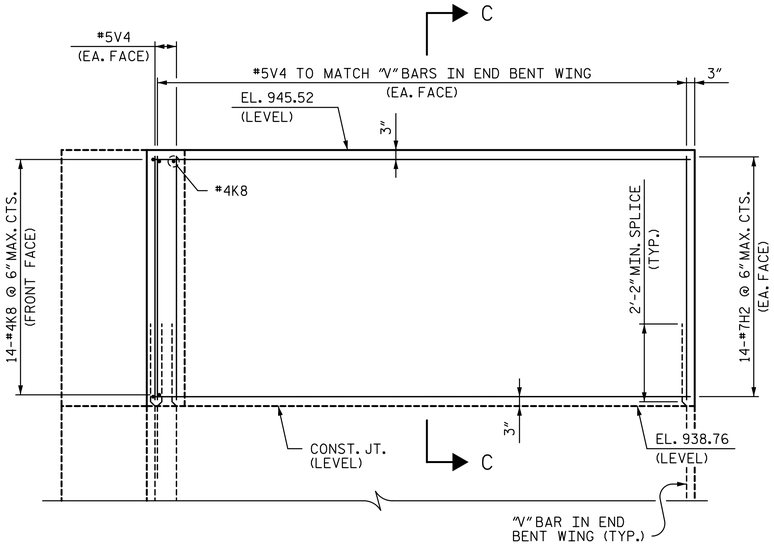
WING WALL PLAN (W4)



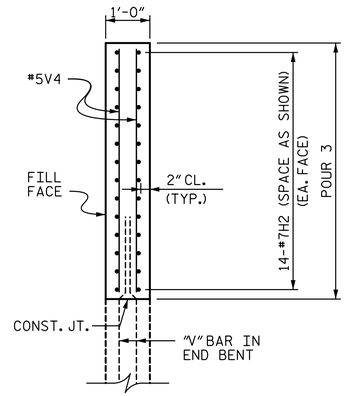
WING WALL ELEVATION (W3)



SECTION B-B



WING WALL ELEVATION (W4)



SECTION C-C

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

SHEET 3 OF 3

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STV 100 Years

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NC License Number F-0991

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-10
1			3			TOTAL SHEETS
2			4			27

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CHECKED BY : JTG	DATE : 9-16		

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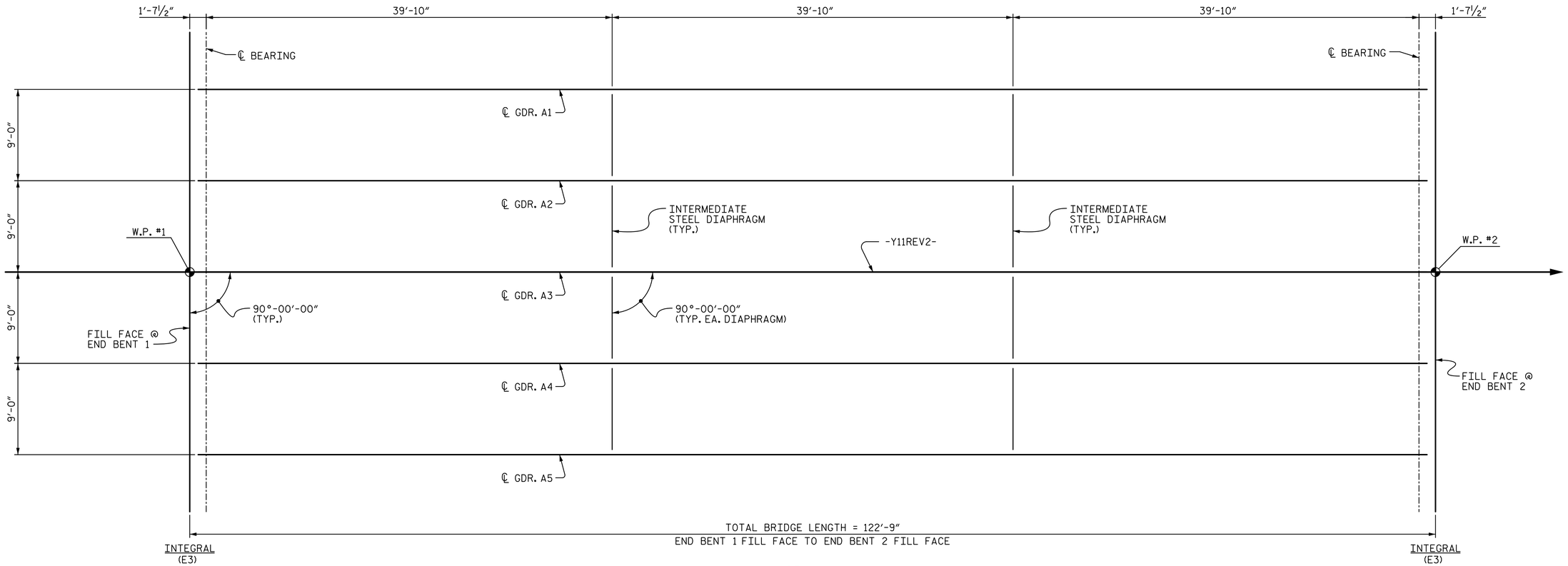
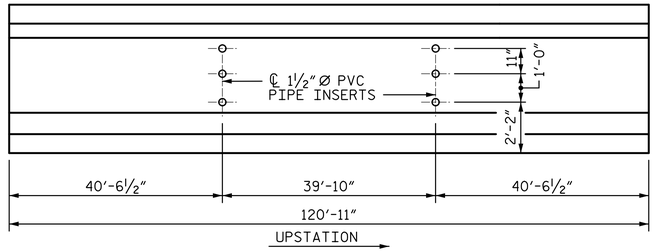


SPAN A

FRAMING PLAN

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS,
SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED
BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET.



GIRDER INSERTS

NOTES:

ALL GIRDER ALONE IN PLACE CAMBERS AND DEFLECTIONS ARE SHOWN IN DECIMAL FEET.

▲ DOES NOT INCLUDE FUTURE WEARING SURFACE.

DEAD LOAD DEFLECTION TABLE

GIRDERS 1 & 5

TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.046	0.091	0.134	0.173	0.207	0.236	0.260	0.277	0.287	0.291	0.287	0.277	0.260	0.236	0.207	0.173	0.134	0.091	0.046	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ▲ ↓	0.000	0.030	0.059	0.088	0.115	0.138	0.158	0.175	0.186	0.193	0.196	0.193	0.186	0.175	0.158	0.138	0.115	0.088	0.059	0.030	0.000
FINAL CAMBER ↑	0″	3/16″	3/8″	9/16″	11/16″	13/16″	15/16″	1″	1 1/16″	1 1/8″	1 1/8″	1 1/8″	1 1/16″	1″	15/16″	13/16″	11/16″	9/16″	3/8″	3/16″	0″

DEAD LOAD DEFLECTION TABLE

GIRDERS 2-4

TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.046	0.091	0.134	0.173	0.207	0.236	0.260	0.277	0.287	0.291	0.287	0.277	0.260	0.236	0.207	0.173	0.134	0.091	0.046	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ▲ ↓	0.000	0.032	0.062	0.093	0.122	0.147	0.168	0.185	0.198	0.205	0.208	0.205	0.198	0.185	0.168	0.147	0.122	0.093	0.062	0.032	0.000
FINAL CAMBER ↑	0″	3/16″	3/8″	1/2″	5/8″	3/4″	13/16″	7/8″	15/16″	1″	1″	1″	15/16″	7/8″	13/16″	3/4″	5/8″	1/2″	3/8″	3/16″	0″

PROJECT NO. R-2707C
CLEVELAND COUNTY
STATION: 32+31.41 -Y11REV2-

DRAWN BY : MBC DATE : 9-16
CHECKED BY : AJP DATE : 9-16

DESIGN ENGINEER OF RECORD: T. LAWS DATE : 9-16

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NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS

DocuSigned by: Tony R. Laws, JR. 3/6/2017

STV 100 Years

STV ENGINEERS, INC.
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NC License Number F-0991

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN & DEAD LOAD DEFLECTIONS

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

SHEET NO. S11-11
TOTAL SHEETS 27

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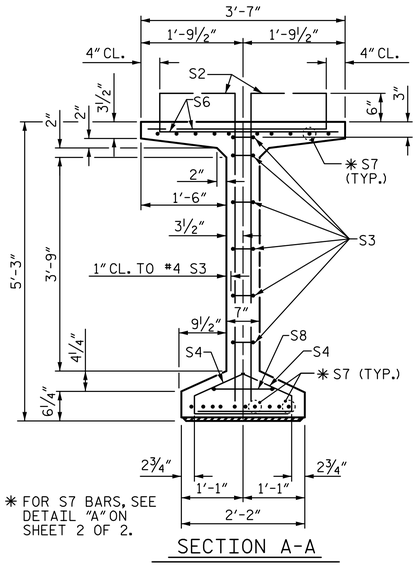
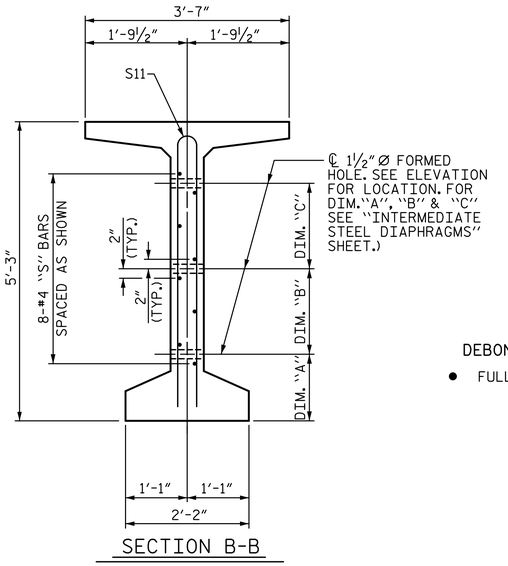


✱ FOR S7 BARS, SEE DETAIL "A" ON SHEET 2 OF 2.

SECTION A-A

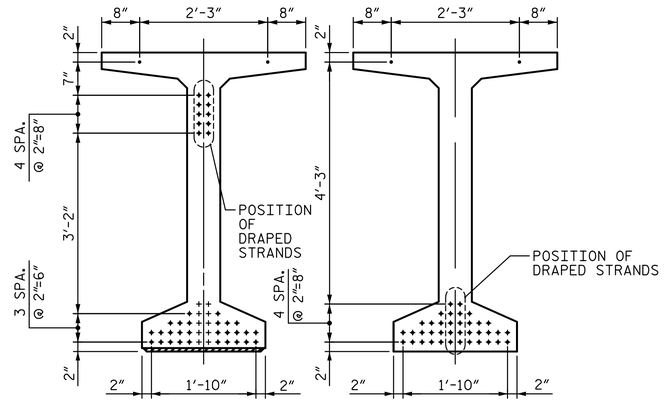


SECTION B-B

(S1, S6 AND S9 BARS NOT SHOWN)

DEBONDING LEGEND

● FULLY BONDED STRANDS

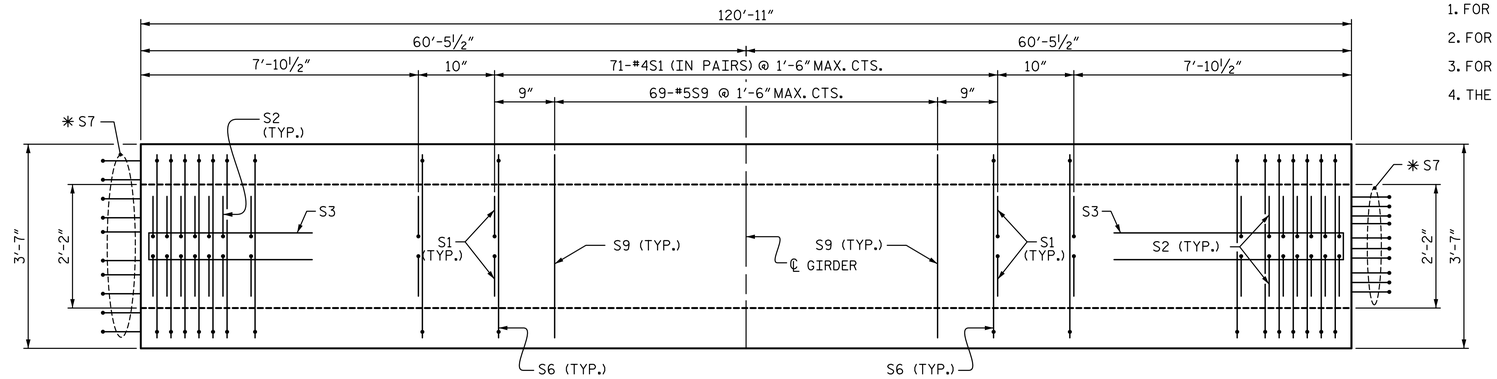


AT END OF GIRDER AT ℄ OF GIRDER

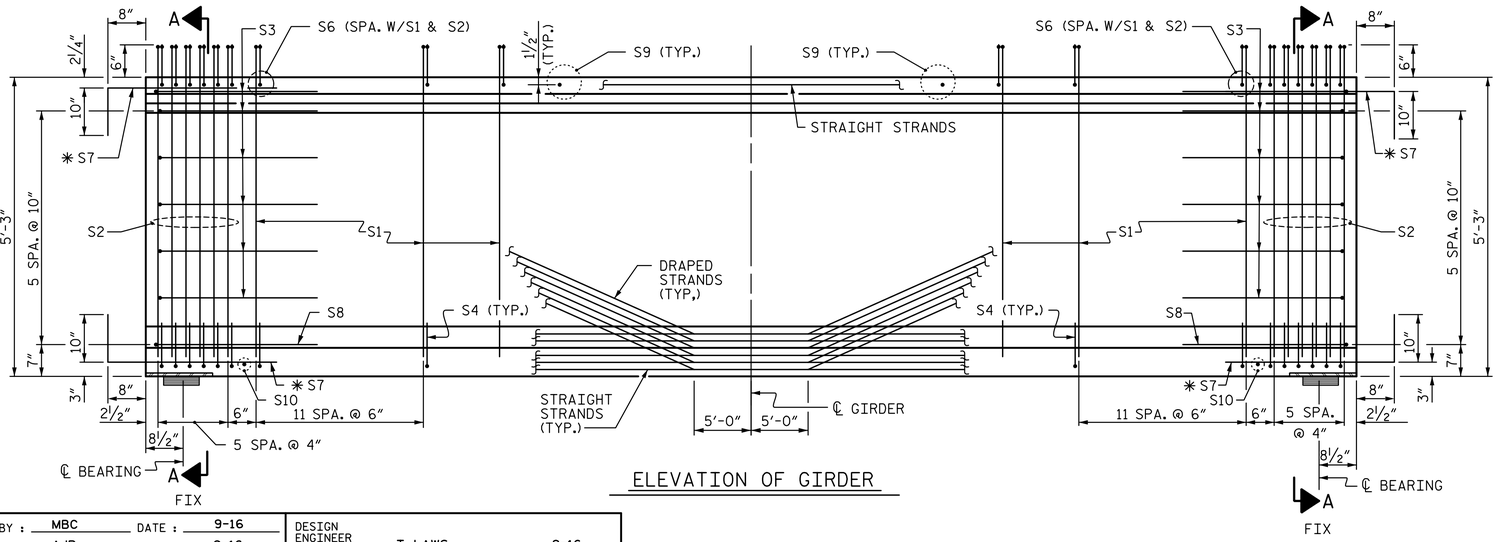
0.6" Ø LOW RELAXATION STRAND LAYOUT

NOTES:

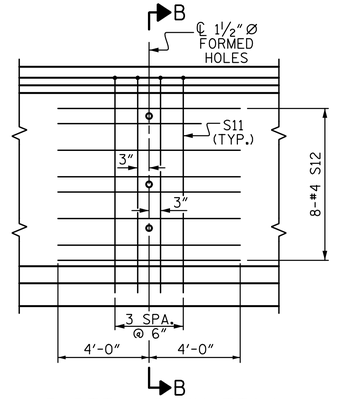
1. FOR DIAPHRAGM HOLE LOCATIONS, SEE "FRAMING PLAN" SHEET.
2. FOR ADDITIONAL GIRDER DETAILS, SEE SHEET 2 OF 2.
3. FOR NOTES, SEE SHEET 2 OF 2.
4. THE UPLIFT FORCE DUE TO DRAPED STRANDS IS 30 KIPS.



PLAN OF GIRDER



ELEVATION OF GIRDER



PARTIAL ELEVATION

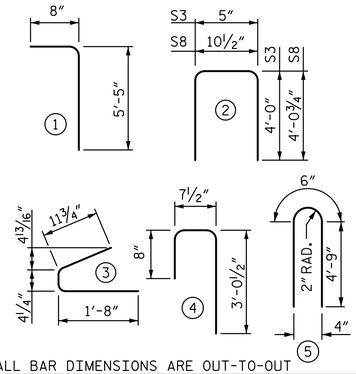
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	190	#4	1	6'-1"	772
S2	24	#6	1	6'-1"	219
S3	12	#4	2	8'-5"	67
S4	72	#4	3	3'-0"	144
S6	214	#5	4	4'-4"	967
✱S7	40	#5	STR	3'-8"	153
S8	2	#5	2	9'-0"	19
S9	69	#5	STR	3'-3"	234
S10	2	#3	STR	1'-10"	1
S11	8	#5	5	10'-0"	83
S12	16	#4	STR	8'-0"	86

✱ 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	9000 PSI CONCRETE	0.6" Ø L.R. STRANDS
LB.	C.Y.	No.
2745	24.0	40

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	120'-11"	604'-7"

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

SHEET 1 OF 2

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DocuSigned by: Terry R. Laws, Jr. 3/6/2017

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

63" PRESTRESSED CONCRETE MODIFIED BULB TEE

STV 100 Years

STV ENGINEERS, INC.
900 West Trade St., Suite 715
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NC License Number F-0991

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1			3			TOTAL SHEETS
2			4			27

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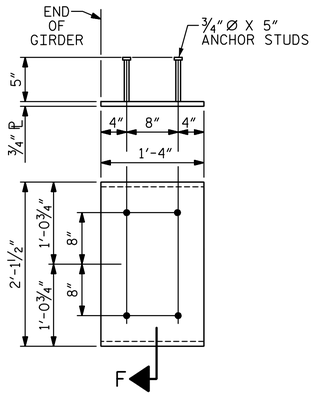
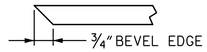


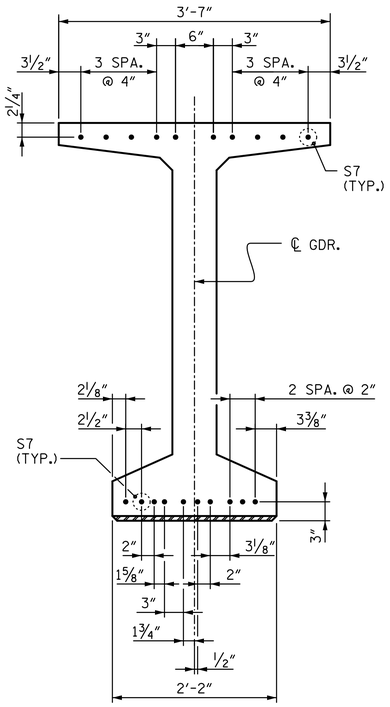


SECTION "F"

(SEE NOTES)

EMBEDDED PLATE "B-1" DETAILS

(2 REQ'D. PER GIRDER)



DETAIL "A"

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.

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 ENDWALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE PRESTRESSED 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 7,200 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".

WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

A 2"X 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE.

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 4,500 lbs.

FOR EMBEDDED CLIPS FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

SHEET 2 OF 2

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NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.

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STV 100 years

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

63" PRESTRESSED CONCRETE MODIFIED BULB TEE DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-13
1			3			TOTAL SHEETS
2			4			27

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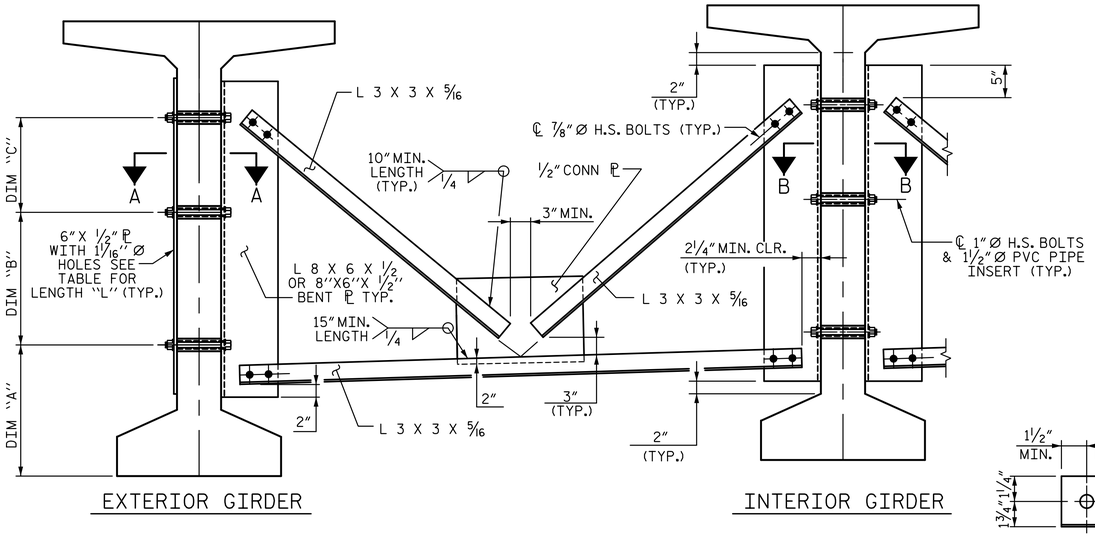
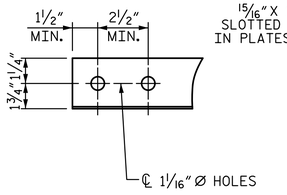
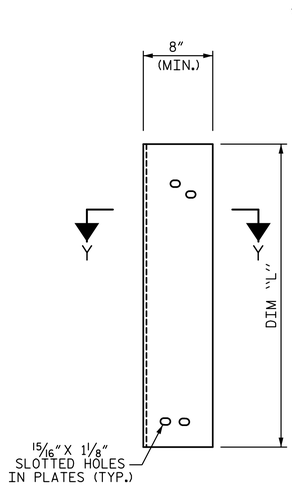


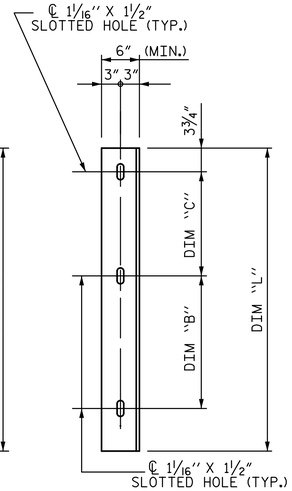
PART SECTION AT INTERMEDIATE DIAPHRAGM



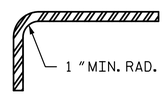
ANGLE END
(L 3 X 3 X 5/16)



DIAPHRAGM FACE

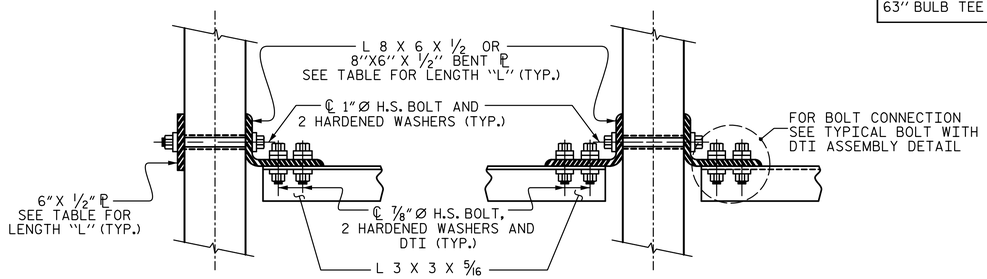


WEB FACE



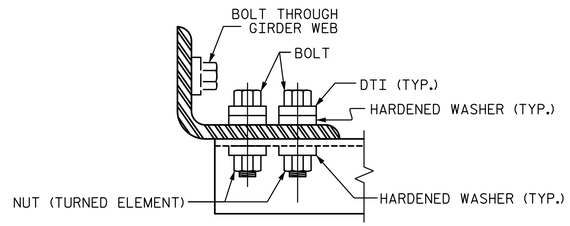
SECTION Y-Y

CONNECTOR PLATE DETAIL



SECTION A-A SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

TENSION ON THE ASTM A325 BOLTS THROUGH THE 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 AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE 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	2'-2"	1'-0"	11"	3'-5"

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

DRAWN BY : MBC DATE : 9-16

CHECKED BY : AJP DATE : 9-16

DESIGN ENGINEER OF RECORD: T. LAWS DATE : 9-16

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STV 100 Years

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NC License Number F-0991

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-14
1			3			TOTAL SHEETS
2			4			27

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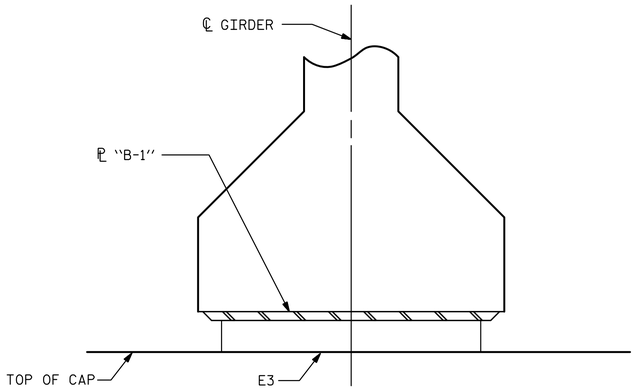
NOTES

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.

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



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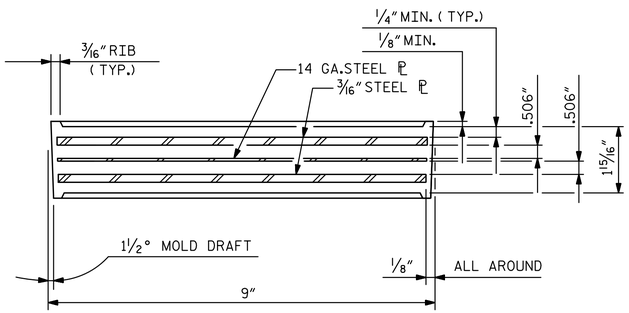
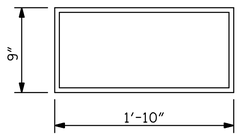
SECTION A-A

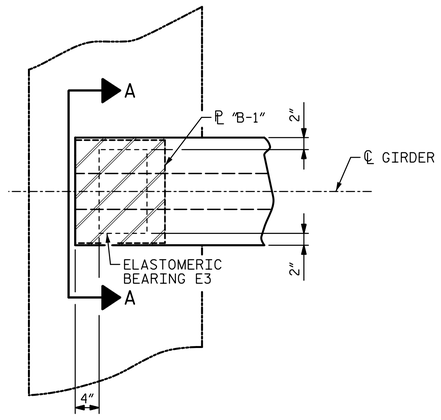


TYPICAL SECTION OF ELASTOMERIC BEARINGS



E3 (10 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING



PLAN VIEW
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

TYPE IV

PROJECT NO. R-2707C

CLEVELAND COUNTY

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ELASTOMERIC BEARING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-15
1			3			TOTAL SHEETS
2			4			27

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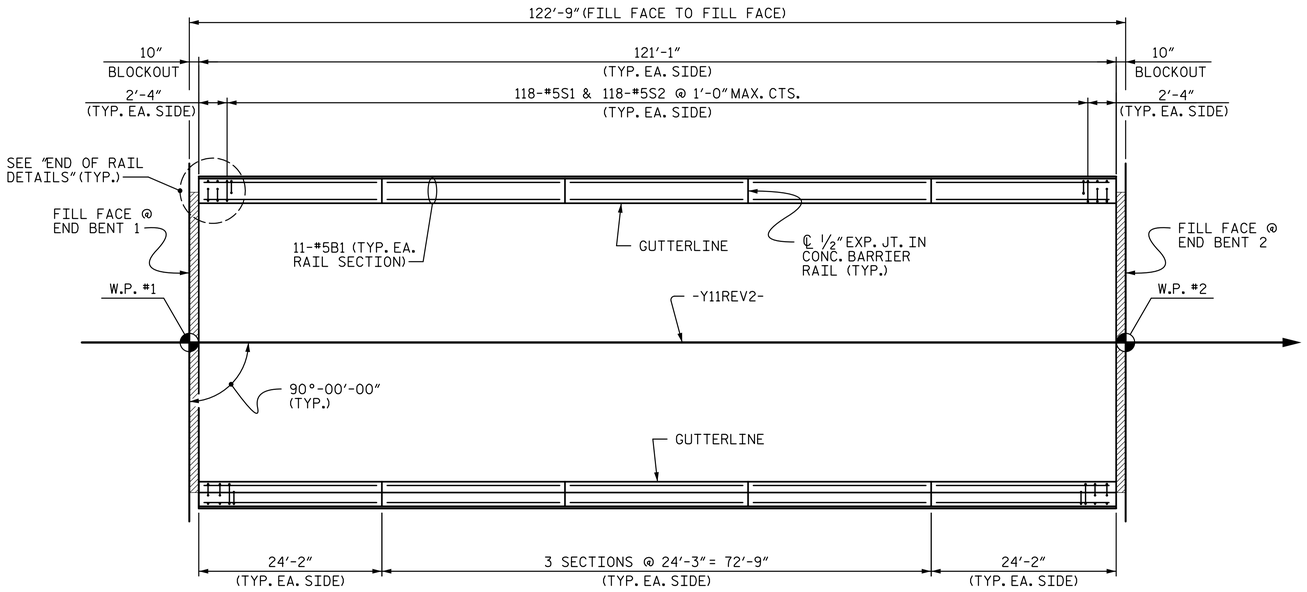


PLAN OF BARRIER RAIL

NOTES

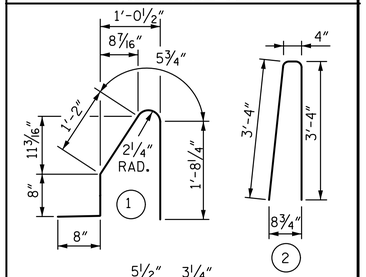
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 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.

#5S1 AND #5S2 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN RAIL.

BAR TYPES



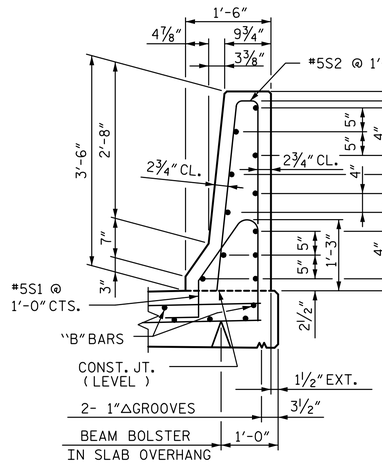
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

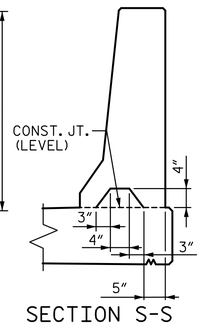
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	110	#5	STR	23'-9"	2725
* S1	236	#5	1	4'-8"	1149
* S2	236	#5	2	7'-0"	1723
* S5	8	#5	3	3'-5"	29
* S6	8	#5	STR	3'-3"	27

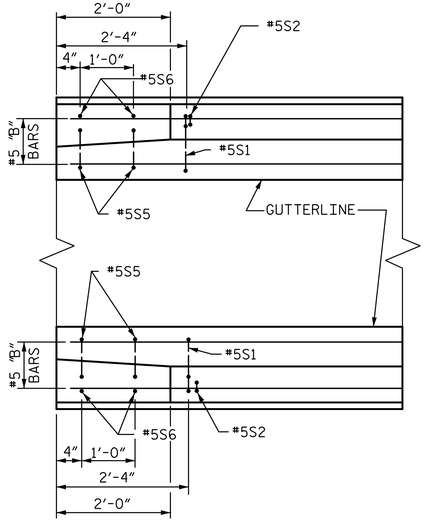
* EPOXY COATED REINFORCING STEEL	5653 LBS.
CLASS AA CONCRETE	32.4 CU. YDS.
CONCRETE BARRIER RAIL	242.2 LIN. FT.



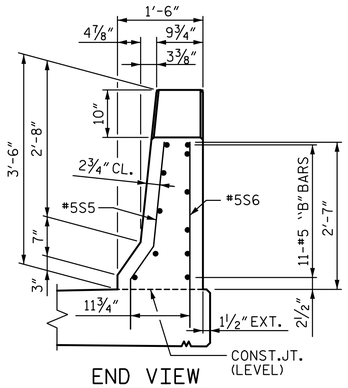
SECTION THRU RAIL



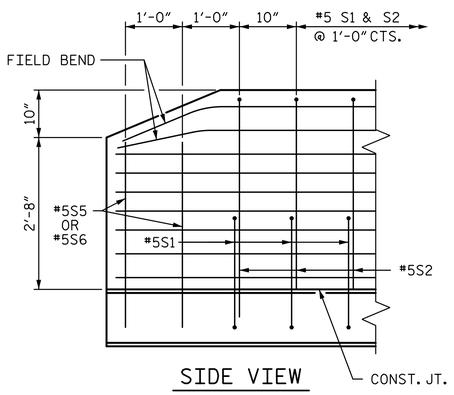
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



PLAN

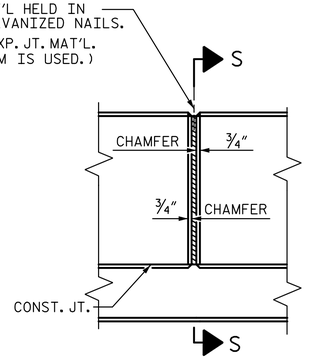


END VIEW



SIDE VIEW

END OF RAIL DETAILS



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

DRAWN BY : MBC DATE : 9-16

CHECKED BY : AJP DATE : 9-16

DESIGN ENGINEER OF RECORD: T. LAWS DATE : 9-16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.

DocuSigned by: Tony R. Laws, JR. 3/6/2017

STV 100 Years

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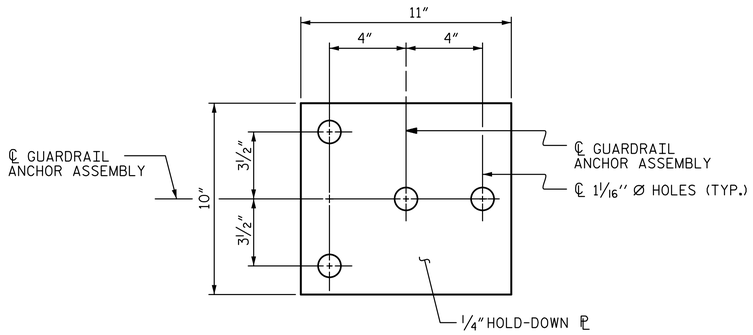
NC License Number F-0991

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

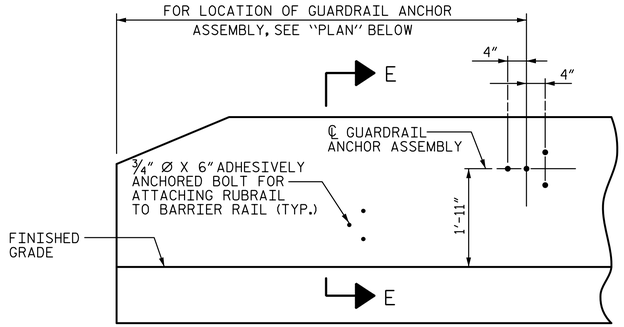
CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-16
1			3			TOTAL SHEETS
2			4			27

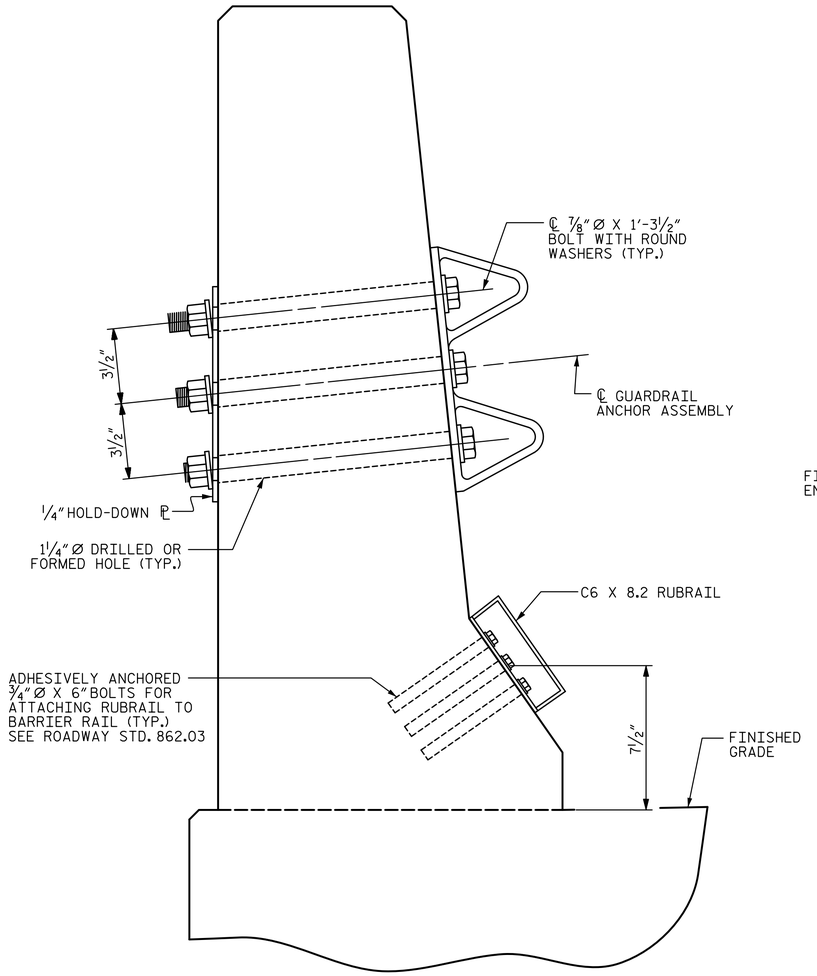
3/6/2017 12:25:43 PM R:\station\411_031_R2707C_SMU_CBR_S11-16.dgn



PLAN

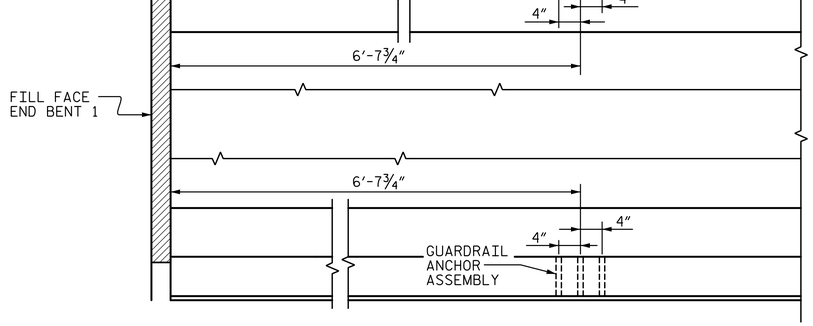


ELEVATION



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-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

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NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.

DocuSigned by: Tony R. Laws, JR. 3/6/2017

STV 100 Years

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NC License Number F-0991

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-17
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : MBC	DATE : 9-16	DESIGN ENGINEER OF RECORD: T. LAWS	DATE : 9-16
CHECKED BY : AJP	DATE : 9-16		

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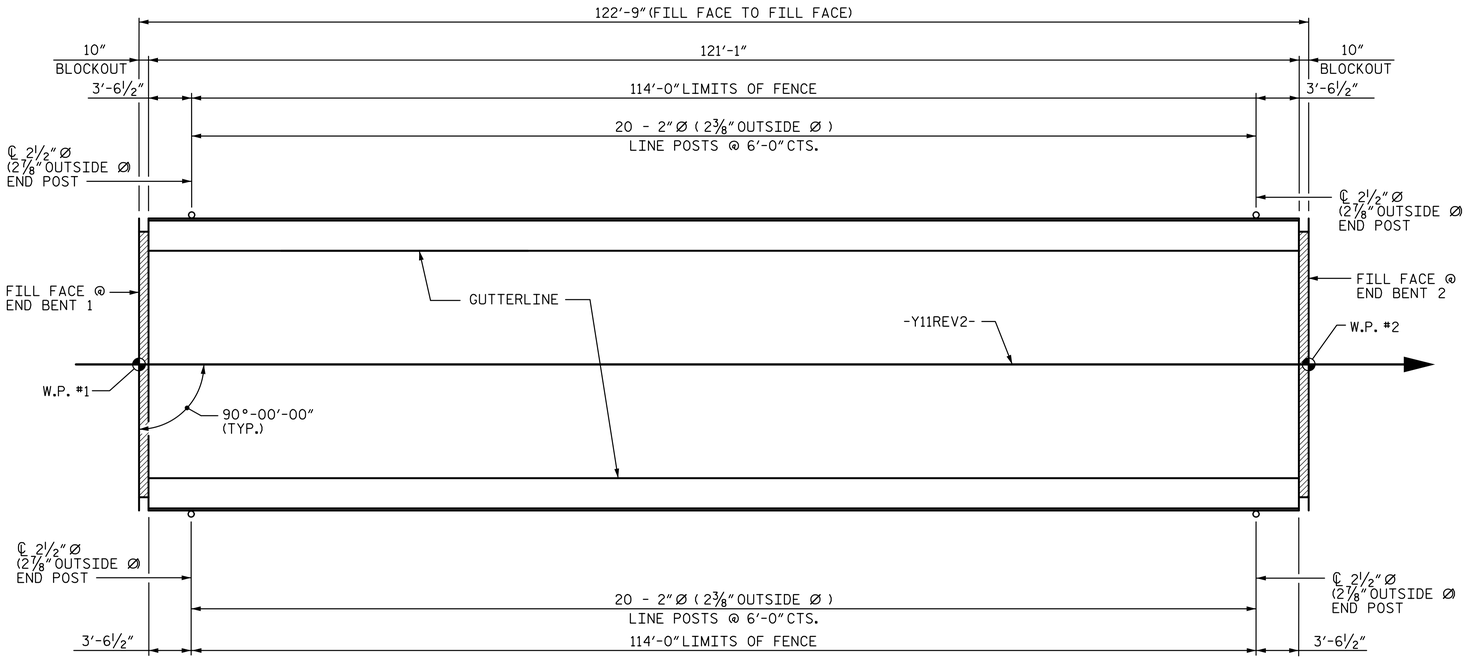
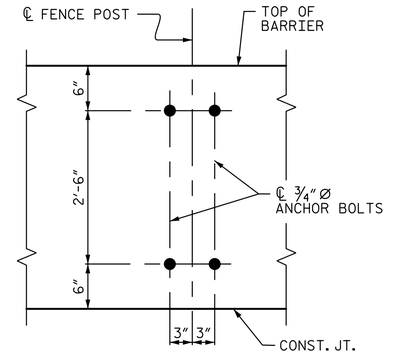


PLAN OF FENCE POST SPACING

PAY LENGTH 228.0 FEET



BOLT SETTING DETAIL

NOTES:

FOR BRIDGE MOUNTED CHAIN LINK FENCE, SEE SPECIAL PROVISIONS.

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 3#4" 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.)

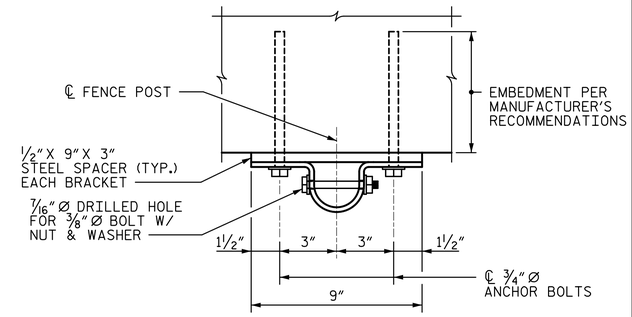
LEVEL ONE FIELD TESTING IS REQUIRED AND THE YIELD LOAD OF THE ANCHOR BOLTS IS 10.0 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS, SEE THE STANDARD SPECIFICATIONS.

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

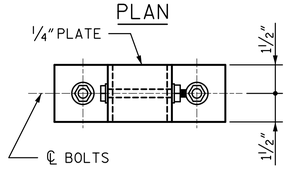
FENCE POST LOCATIONS SHALL BE SHIFTED, AS NECESSARY, TO MAINTAIN 1'-0" MINIMUM DISTANCE FROM ANCHOR BOLT TO JOINTS IN CONCRETE BARRIER RAIL.

DIMENSIONS TAKEN ALONG OUTSIDE FACE OF CONCRETE BARRIER RAIL.

CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO AVOID DAMAGING THE REINFORCING STEEL IN CONCRETE BARRIER RAIL.

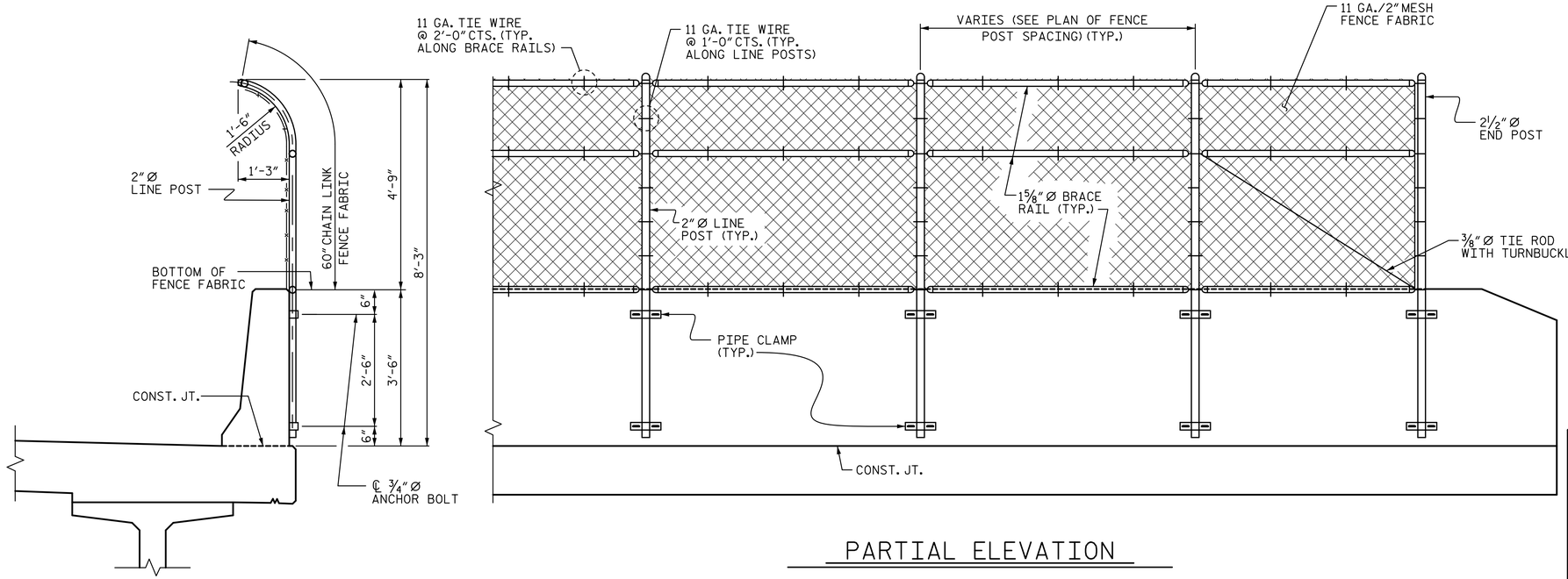


PLAN



ELEVATION

PIPE CLAMP DETAILS



SECTION THRU FENCE

PARTIAL ELEVATION

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

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NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.

DocuSigned by: Tony R. Laws, JR. 3/6/2017

STV 100 years

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE MOUNTED CHAIN LINK FENCE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-18
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : MBC	DATE : 9-16	DESIGN ENGINEER OF RECORD: T. LAWS	DATE : 9-16
CHECKED BY : AJP	DATE : 9-16		

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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″			

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,850 SQ.FT.
BRIDGE DECK	4,480 SQ.FT.
TOTAL	6,330 SQ.FT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	CLASS A CONCRETE	✳EPOXY COATED STEEL REINFORCING	STEEL REINFORCING
SPAN A	(CU. YDS.)	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	147.4			
POUR 2●	68.4			
POUR 3▲		16.6		
TOTAL✳✳	215.8	16.6	16,329	20,319

✳✳ QUANTITIES FOR CONCRETE BARRIER RAIL ARE NOT INCLUDED

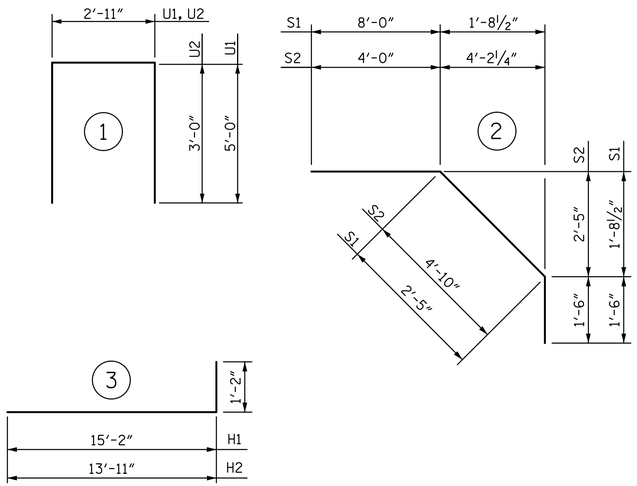
● POUR 2 INCLUDES CONCRETE FOR SUPERSTRUCTURE PORTION OF INTEGRAL END BENT. ALL COSTS ASSOCIATED WITH THE SUPERSTRUCTURE PORTION OF THE INTEGRAL END BENT, INCLUDING BUT NOT LIMITED TO, MATERIALS, LABOR AND ALL INCIDENTALS SHALL BE INCLUDED IN THE CONTRACT BID PRICE FOR REINFORCED CONCRETE DECK SLAB. NO ADDITIONAL PAYMENT WILL BE MADE.

▲ POUR 3 INCLUDES CONCRETE FOR SUPERSTRUCTURE PORTION OF WING WALLS. ALL COSTS ASSOCIATED WITH THE SUPERSTRUCTURE PORTION OF THE WING WALLS, INCLUDING BUT NOT LIMITED TO, MATERIALS, LABOR AND ALL INCIDENTALS SHALL BE INCLUDED IN THE CONTRACT BID PRICE FOR REINFORCED CONCRETE DECK SLAB. NO ADDITIONAL PAYMENT WILL BE MADE.

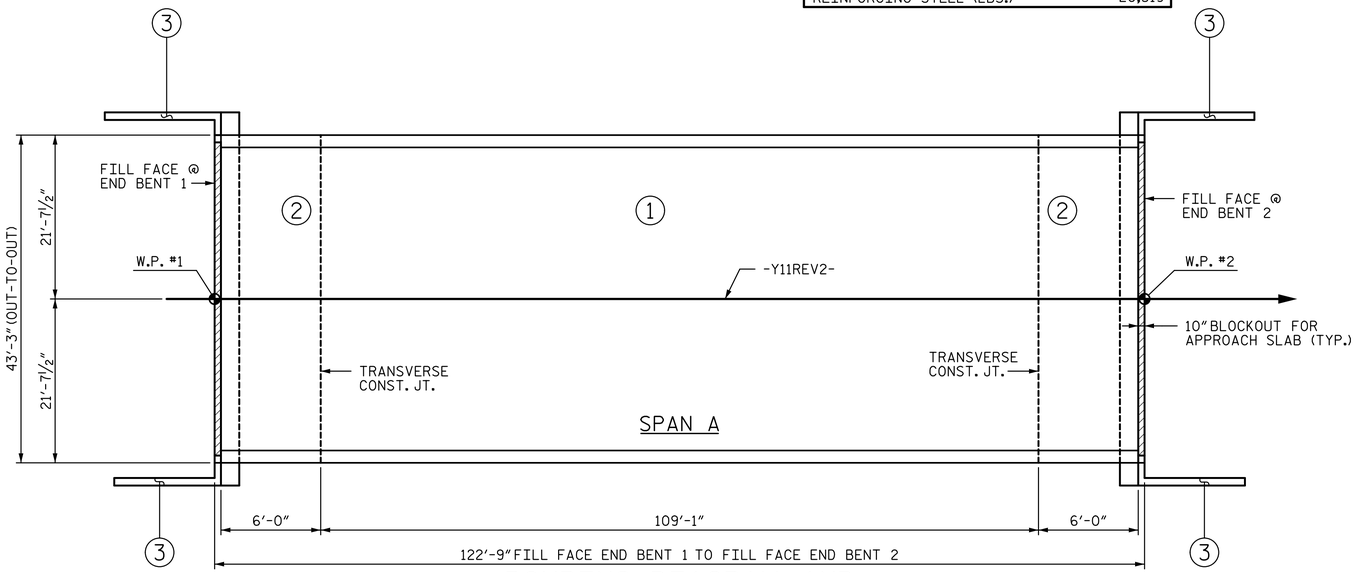
REINFORCING BAR SCHEDULE

MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	194	#5	STR	42′-10″	8,667
A2	194	#5	STR	42′-10″	8,667
✳B1	150	#4	STR	25′-9″	2,580
✳B2	54	#6	STR	27′-6″	2,230
✳B3	54	#6	STR	24′-6″	1,987
B4	34	#5	STR	41′-9″	1,481
B5	68	#6	STR	41′-9″	4,264
H1	54	#7	③	16′-4″	1,803
H2	54	#7	③	15′-1″	1,665
K1	28	#4	STR	22′-4″	418
K2	40	#4	STR	8′-1″	216
K3	8	#4	STR	6′-6″	35
K4	8	#4	STR	5′-1″	27
K5	20	#4	STR	3′-0″	40
K6	4	#4	STR	2′-2″	6
K7	4	#4	STR	1′-6″	4
K8	58	#4	STR	2′-8″	103
✳S1	60	#4	②	11′-11″	478
✳S2	56	#4	②	10′-4″	387
U1	60	#4	①	12′-11″	518
U2	8	#4	①	8′-11″	48
V1	38	#5	STR	6′-4″	251
V2	38	#5	STR	6′-3″	248
V3	38	#5	STR	6′-8″	264
V4	38	#5	STR	6′-7″	261
✳EPOXY COATED REINF. STEEL (LBS.)					16,329
REINFORCING STEEL (LBS.)					20,319

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.



POURING DIAGRAM AND LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 5,309)

(#) = INDICATES POUR NUMBER

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

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NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.

DocuSigned by: Tony R. Laws, JR. 3/6/2017

STV 100 Years

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NC License Number F-0991

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-19
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : MBC	DATE : 9-16	DESIGN ENGINEER OF RECORD: T. LAWS	DATE : 9-16
CHECKED BY : JTG	DATE : 9-16		

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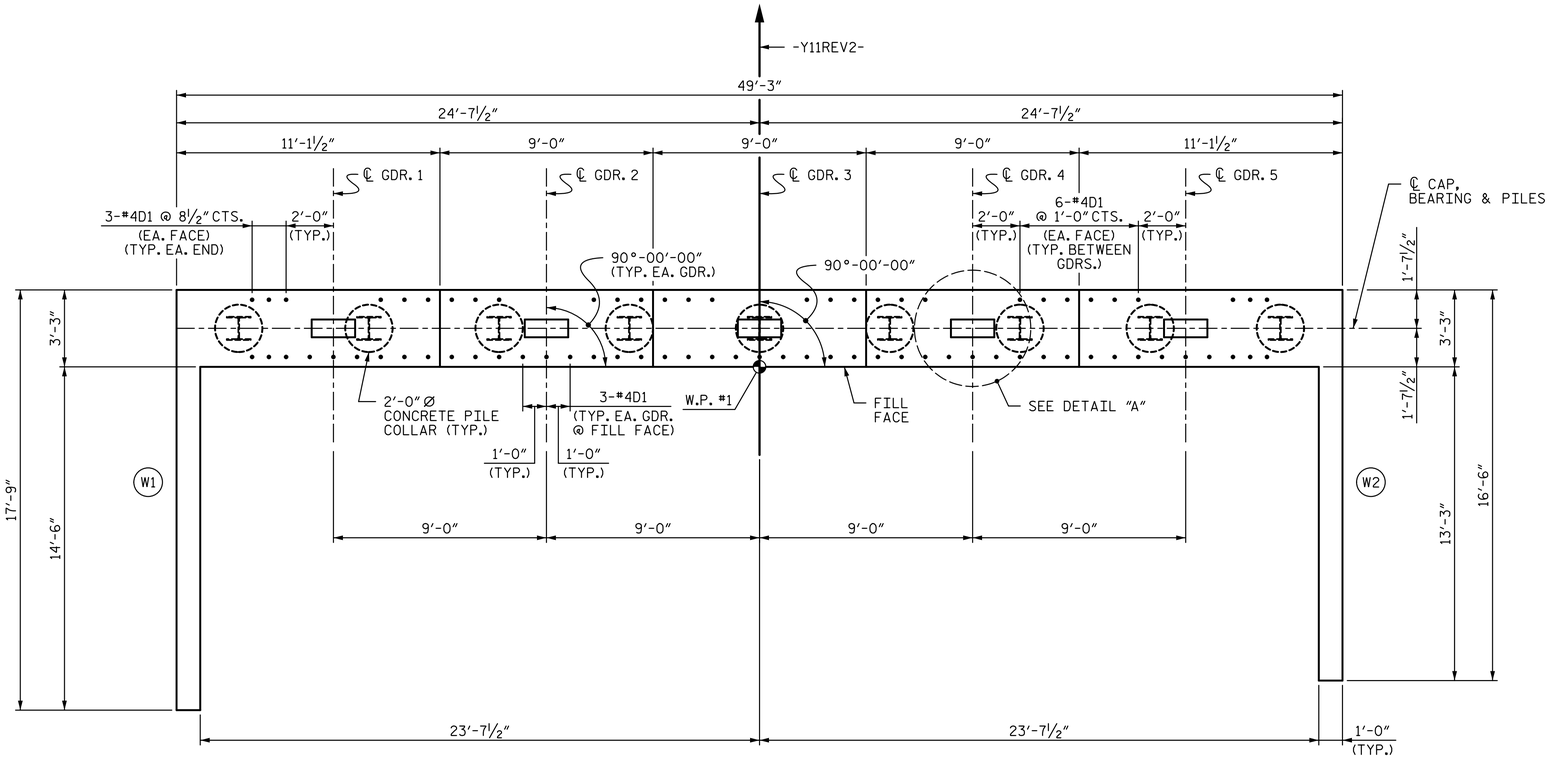
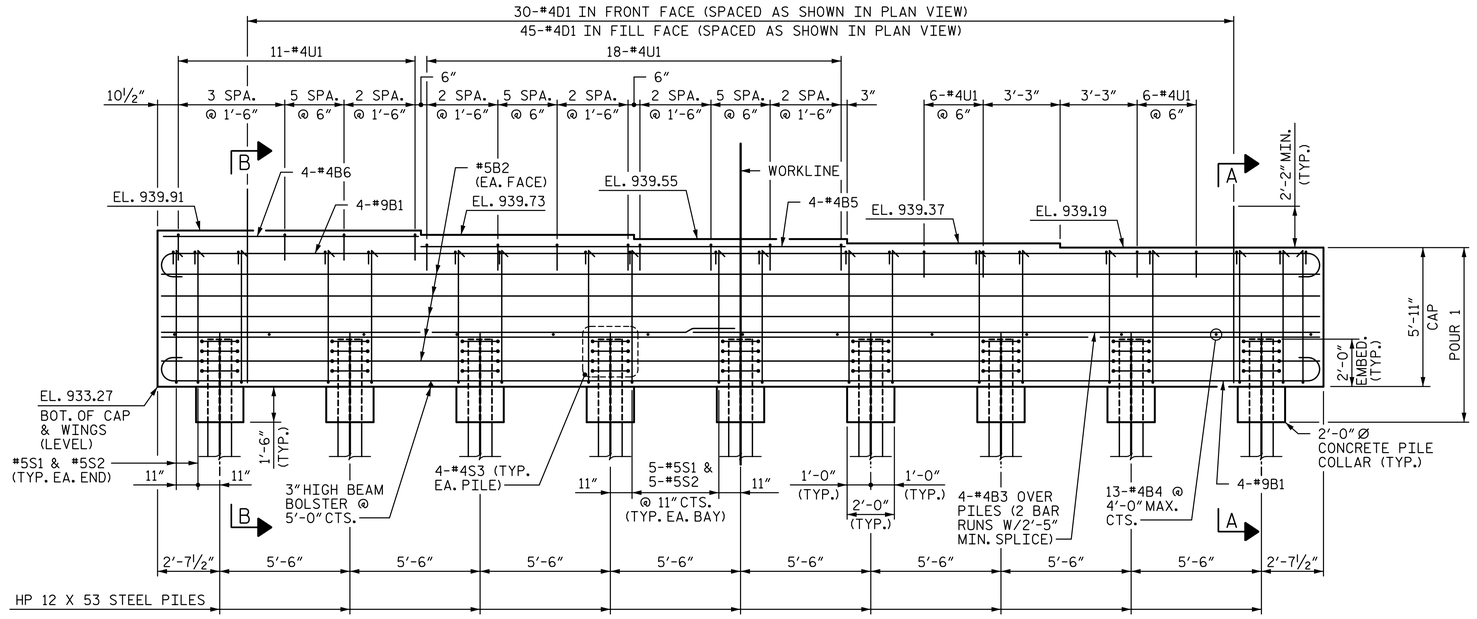


PLAN



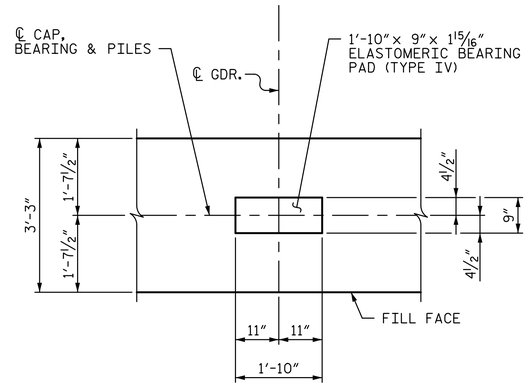
ELEVATION

(LOOKING IN THE DIRECTION OF STATIONING)

NOTES:

FOR NOTES, SEE SHEET 3 OF 3.

FOR SECTIONS A-A AND B-B, SEE SHEET 3 OF 3.



DETAIL "A"

(DETAILS AND DIMENSIONS ARE TYPICAL FOR EACH BEARING)

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

SHEET 1 OF 3

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 (INTEGRAL)

STV 100 Years

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Charlotte, NC 28202
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-20
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : MBC	DATE : 9-16	DESIGN ENGINEER OF RECORD: T. LAWS	DATE : 9-16
CHECKED BY : AJP	DATE : 9-16		

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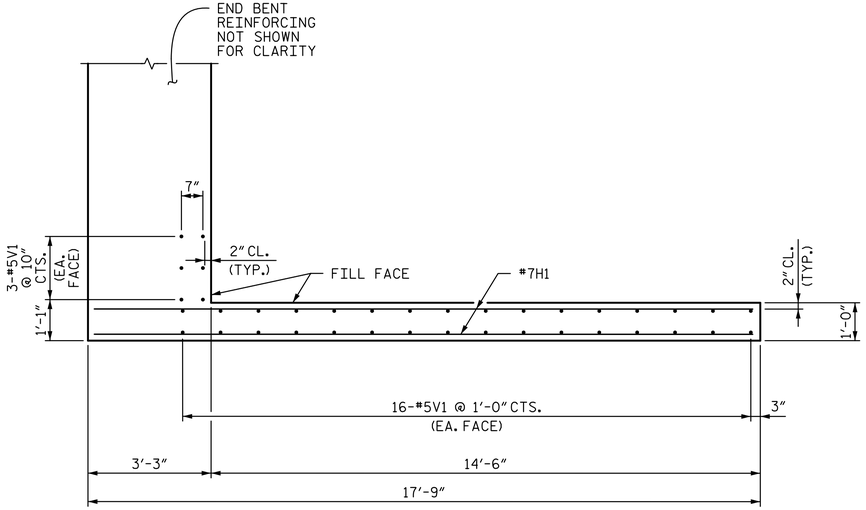
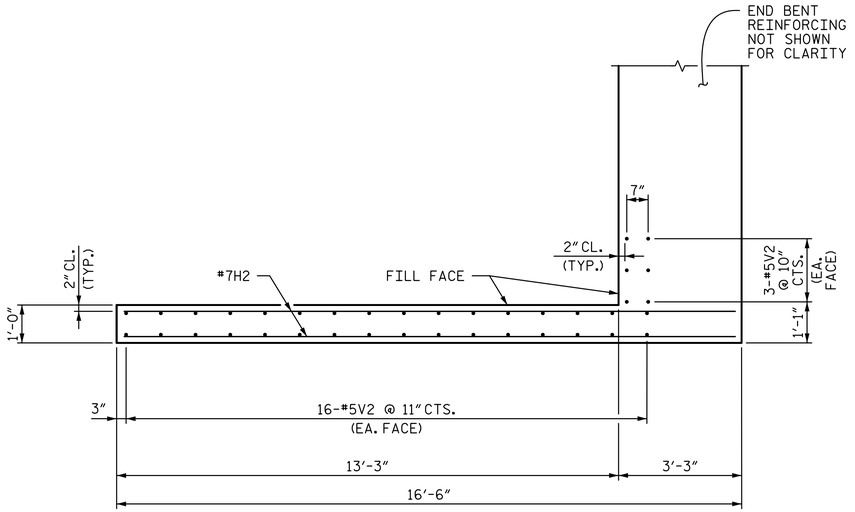
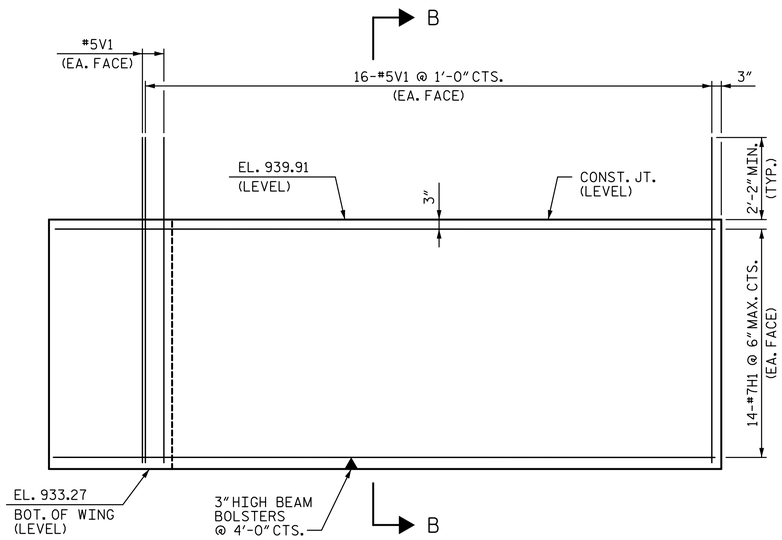


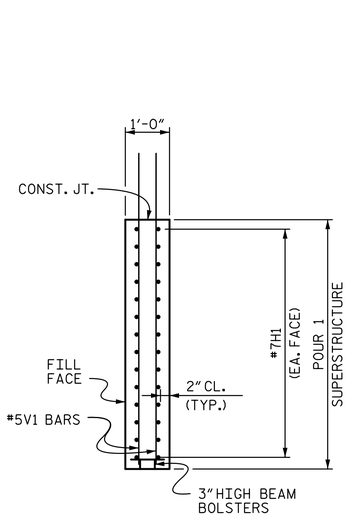
WING WALL PLAN (W1)



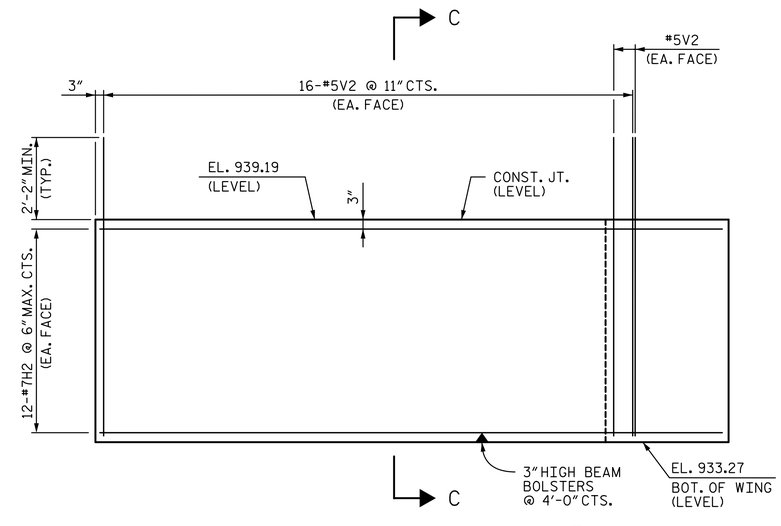
WING WALL PLAN (W2)



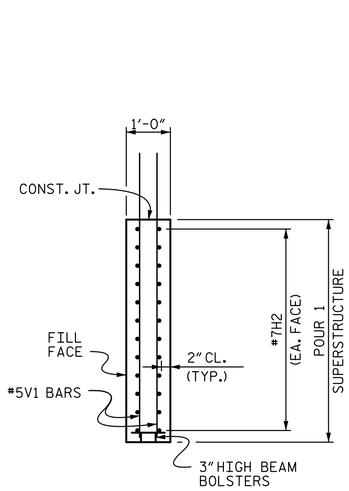
WING WALL ELEVATION (W1)



SECTION B-B



WING WALL ELEVATION (W2)



SECTION C-C

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

SHEET 2 OF 3

DRAWN BY : MBC DATE : 9-16

CHECKED BY : AJP DATE : 9-16

DESIGN ENGINEER OF RECORD: T. LAWS DATE : 9-16

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.

DocuSigned by: Tony R. Laws, JR. 3/6/2017

STV 100 Years

STV ENGINEERS, INC.
900 West Trade St. Suite 715
Charlotte, NC 28202
NC License Number F-0991

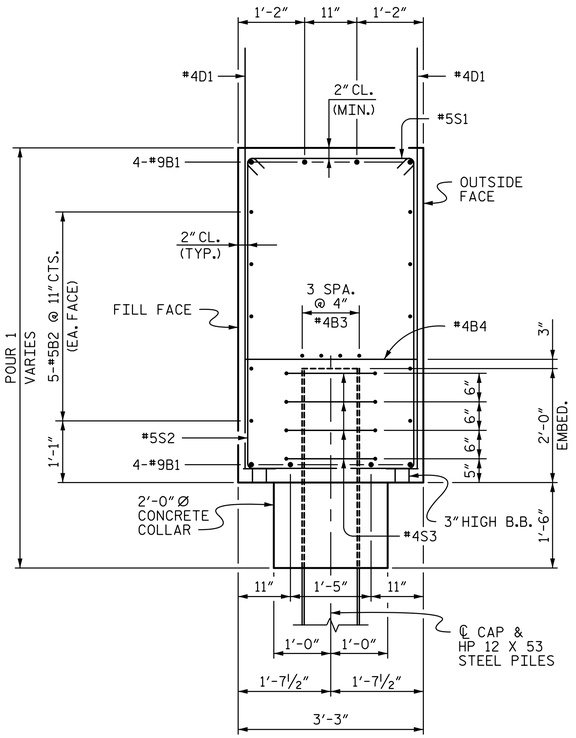
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

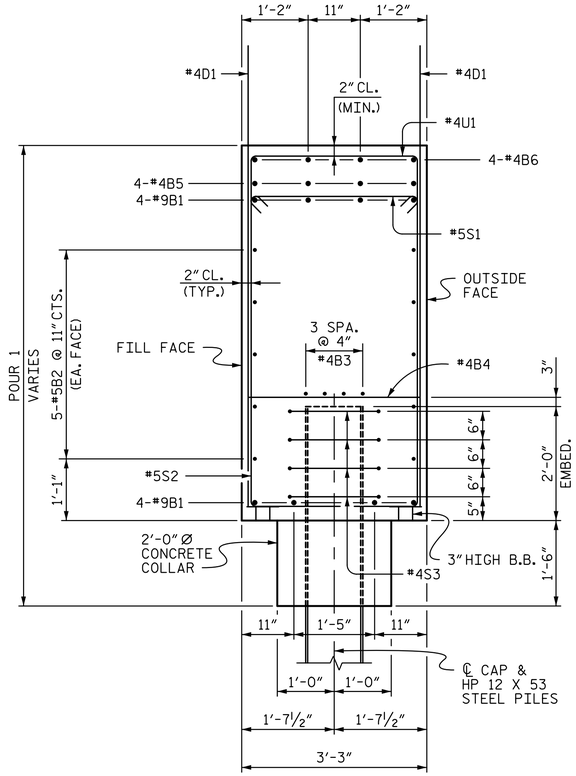
END BENT 1 (INTEGRAL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-21
1			3			TOTAL SHEETS
2			4			27

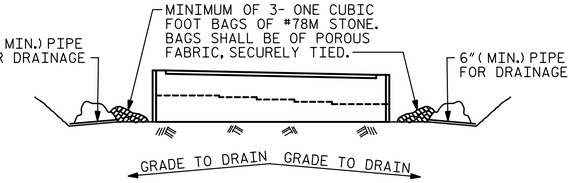
3/6/2017 12:25:46 PM R:\Ustation\411_041_R2707C_SMU_EBI_2_SII-21.dgn



SECTION A-A



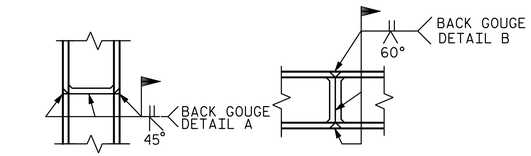
SECTION B-B



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.

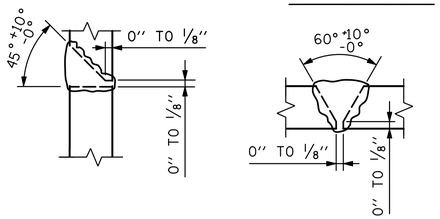
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

TEMPORARY DRAINAGE AT END BENT



▲ PILE VERTICAL

▲ PILE HORIZONTAL OR VERTICAL



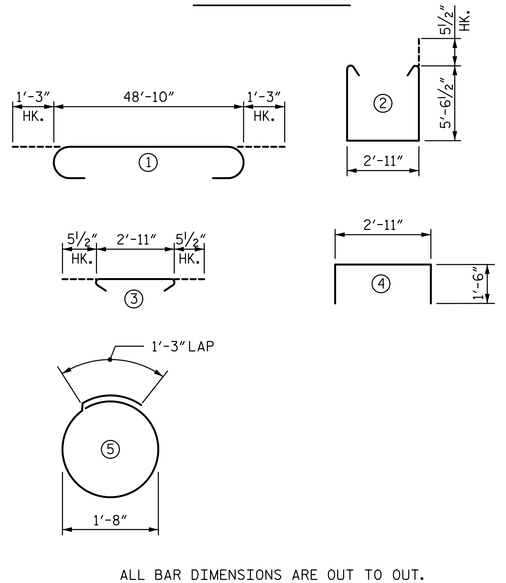
DETAIL A

DETAIL B

▲ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF REINFORCING

MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	①	51'-4"	1,396
B2	10	#5	STR	48'-11"	510
B3	8	#4	STR	25'-8"	137
B4	13	#4	STR	2'-11"	25
B5	4	#4	STR	17'-6"	47
B6	4	#4	STR	10'-7"	28
D1	75	#4	STR	8'-6"	426
H1	28	#7	STR	17'-5"	997
H2	24	#7	STR	16'-2"	793
S1	44	#5	②	14'-11"	685
S2	44	#5	③	3'-10"	176
S3	36	#4	⑤	6'-5"	154
U1	41	#4	④	5'-11"	162
V1	38	#5	STR	8'-8"	343
V2	38	#5	STR	7'-11"	314

QUANTITIES

		END BENT 1
REINFORCING STEEL	LBS.	6,193
CLASS A CONCRETE		
POUR 1 (CAP, COLLARS & LOWER WING): CU. YARDS		45.3
HP 12 X 53 STEEL PILES	NO.	9
	LIN. FEET	495.0
PILE DRIVING EQUIP. SETUP FOR HP 12x53 STEEL PILES	EA.	9

NOTES:

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4D1 BARS.

FOR INTEGRAL BACKWALL REINFORCEMENT, SEE "TYPICAL SECTION AND INTEGRAL BACKWALL" SHEET.

FOR FOUNDATION NOTES, SEE "FOUNDATION LAYOUT" SHEET.

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

INSTALL THE 4"DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

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.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

SHEET 3 OF 3

DRAWN BY : MBC DATE : 9-16

CHECKED BY : AJP DATE : 9-16

DESIGN ENGINEER OF RECORD: T. LAWS DATE : 9-16

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NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.

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STV 100 years

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 (INTEGRAL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-22
1			3			TOTAL SHEETS
2			4			27

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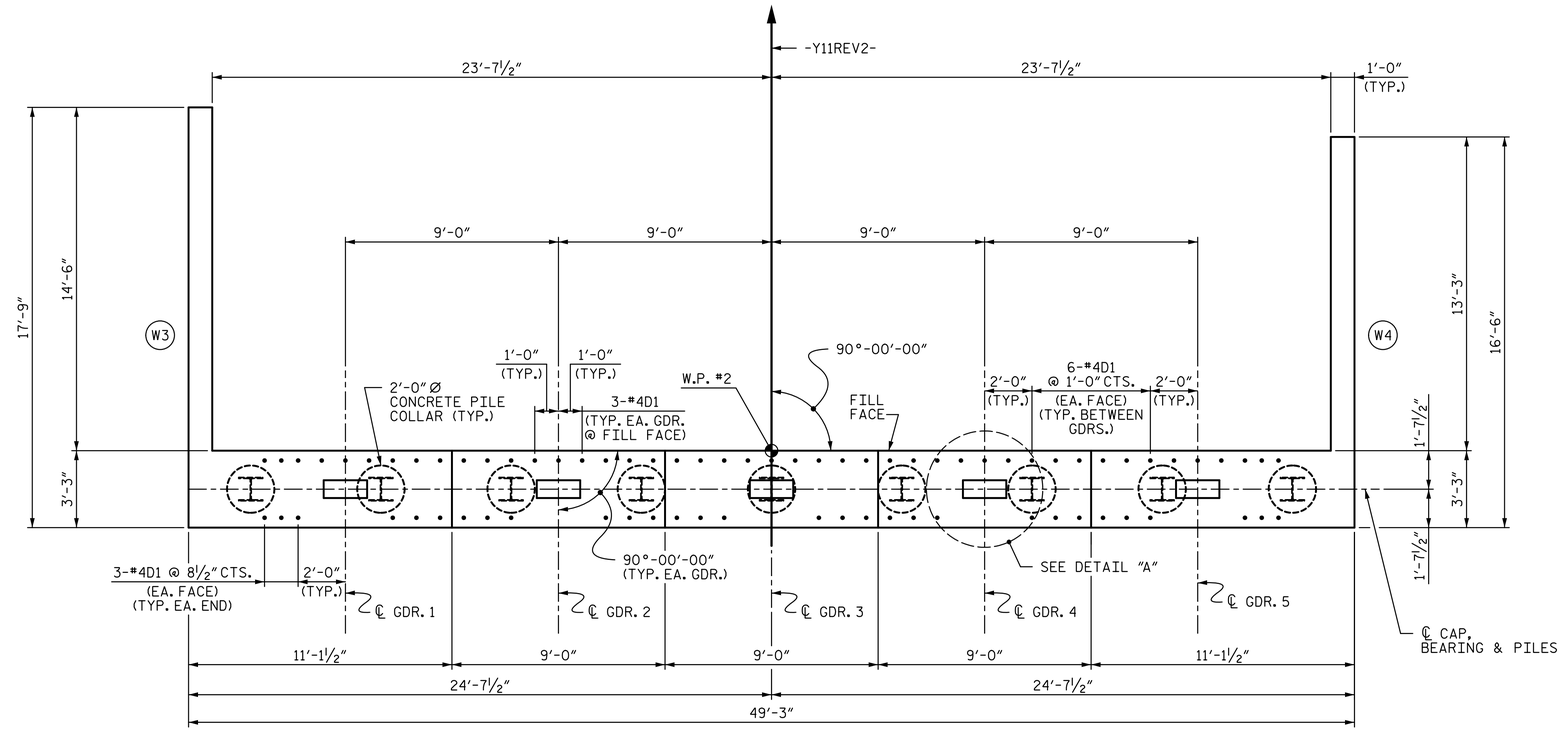
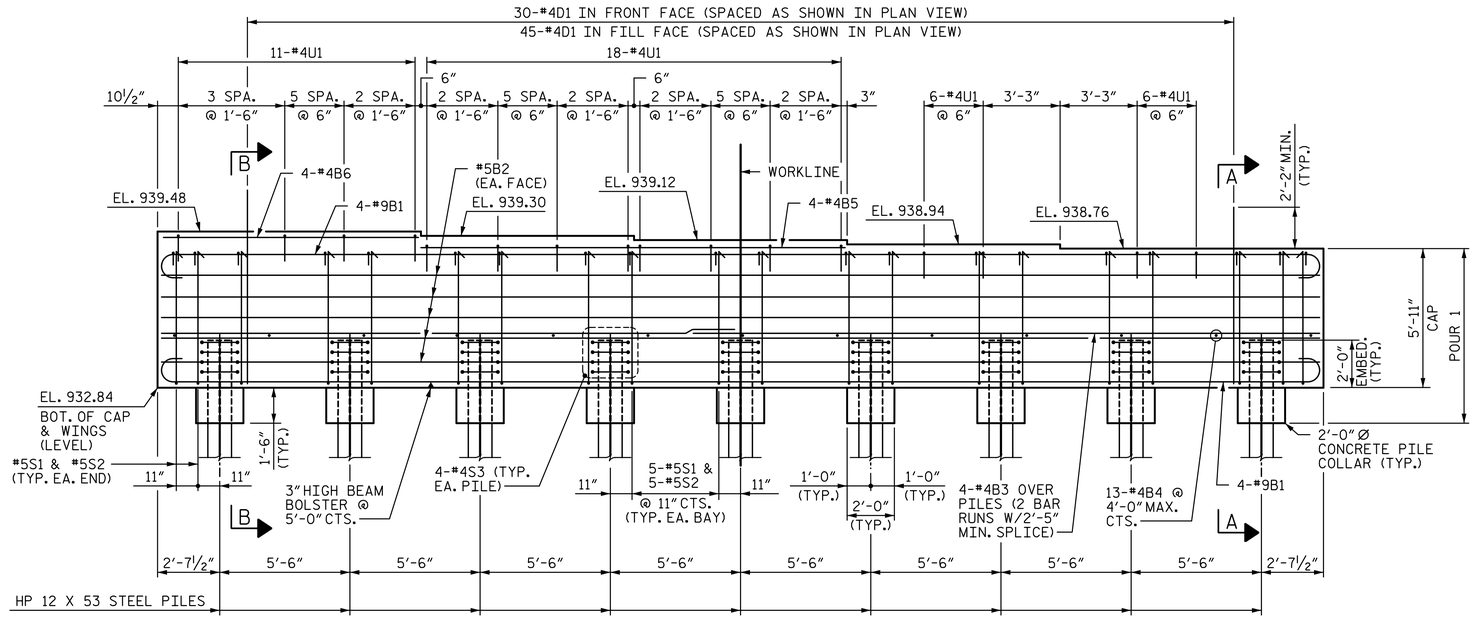
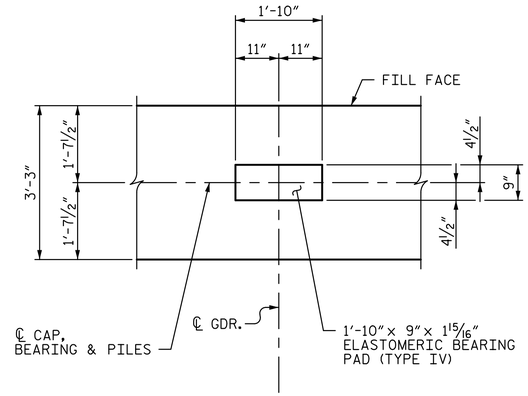


PLAN



ELEVATION

(LOOKING IN THE DIRECTION OF STATIONING)



DETAIL "A"

(DETAILS AND DIMENSIONS ARE TYPICAL FOR EACH BEARING)

NOTES:

FOR NOTES, SEE SHEET 3 OF 3.

FOR SECTIONS A-A AND B-B, SEE SHEET 3 OF 3.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

SHEET 1 OF 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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RALEIGH

SUBSTRUCTURE

END BENT 2 (INTEGRAL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-23
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : MBC DATE : 9-16

CHECKED BY : AJP DATE : 9-16

DESIGN ENGINEER OF RECORD: T. LAWS DATE : 9-16

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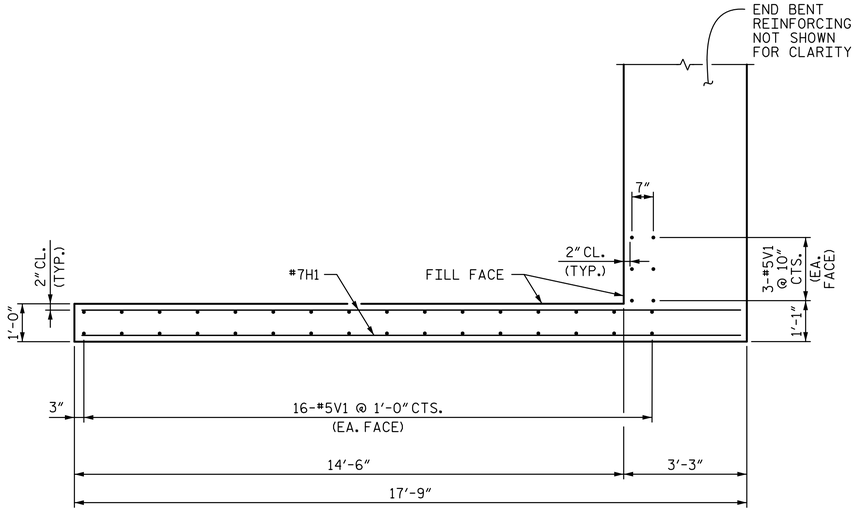
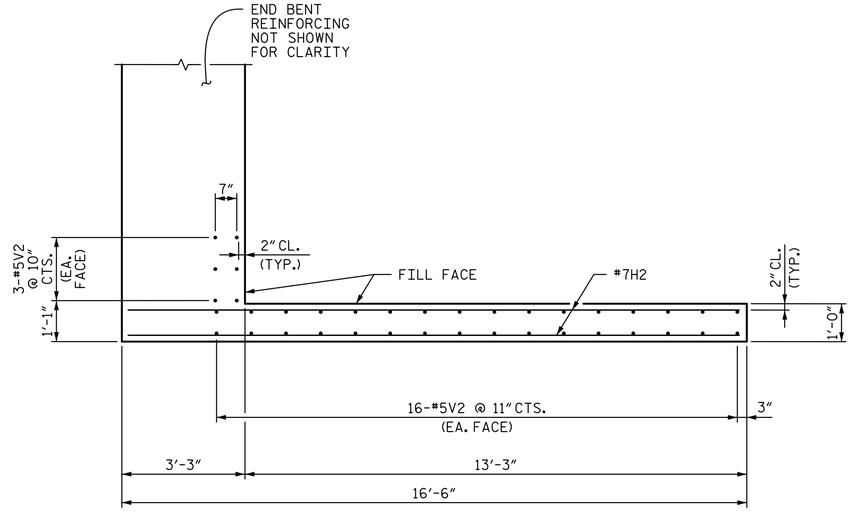
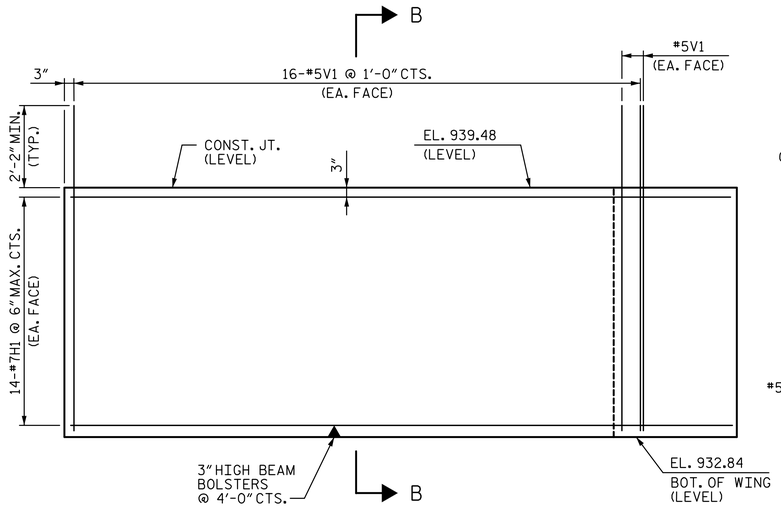


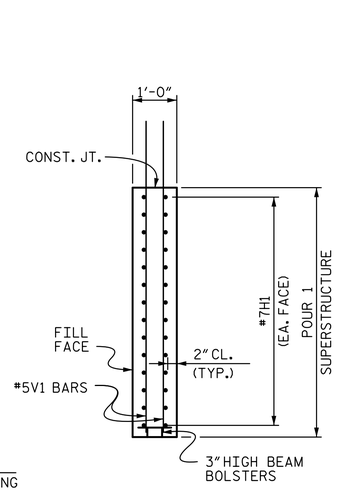
WING WALL PLAN (W3)



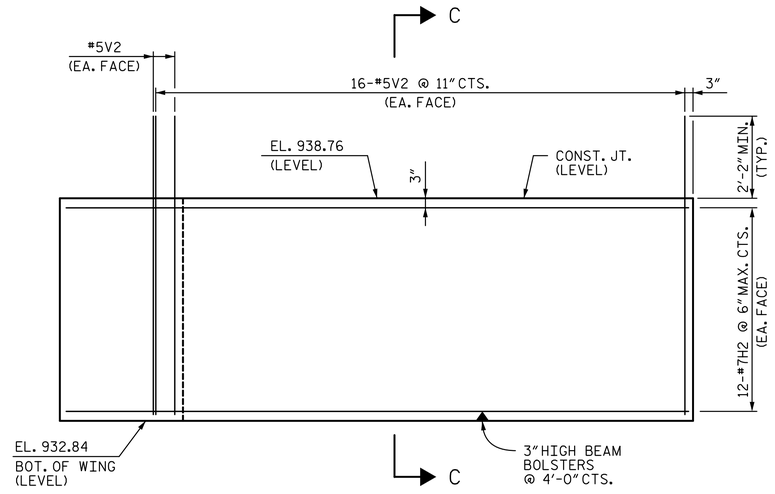
WING WALL PLAN (W4)



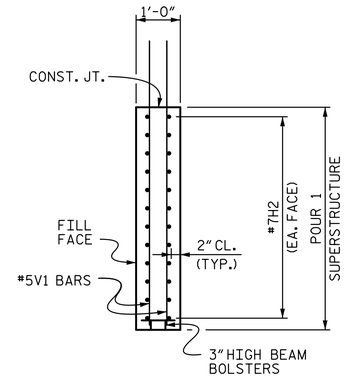
WING WALL ELEVATION (W3)



SECTION B-B



WING WALL ELEVATION (W4)



SECTION C-C

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

SHEET 2 OF 3

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
(INTEGRAL)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-24
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : MBC	DATE : 9-16	DESIGN ENGINEER OF RECORD: T. LAWS	DATE : 9-16
CHECKED BY : AJP	DATE : 9-16		

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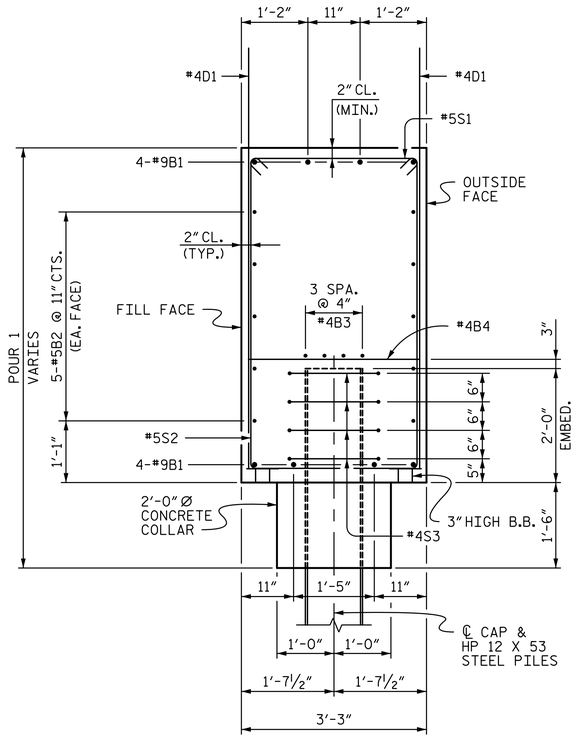
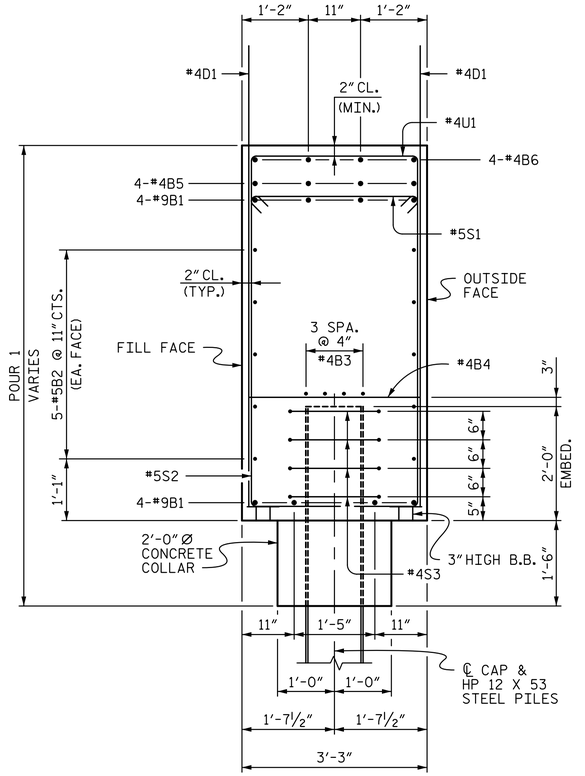
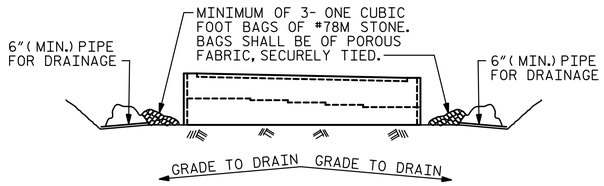


SECTION A-A



SECTION B-B



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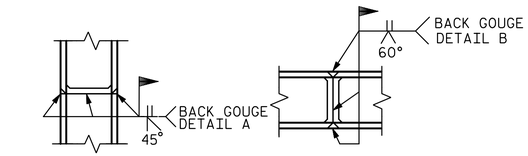
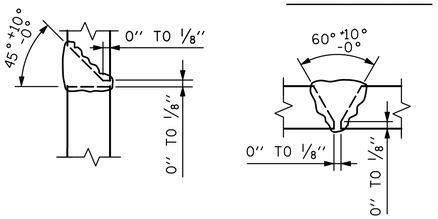
TEMPORARY DRAINAGE AT END BENT



▲PILE VERTICAL

▲PILE HORIZONTAL OR VERTICAL

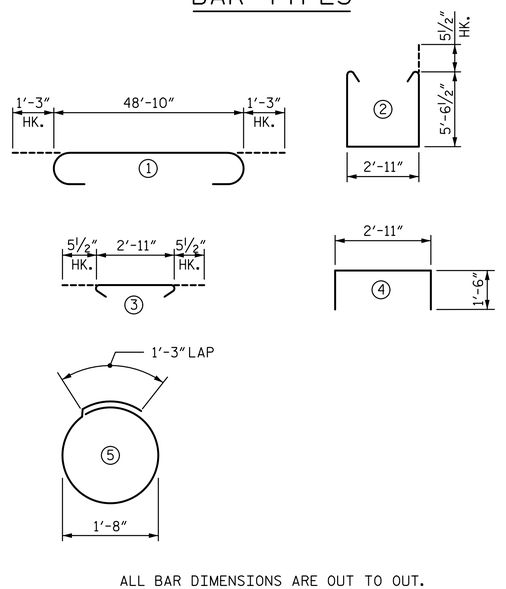


DETAIL A DETAIL B

▲ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF REINFORCING

MARK	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	①	51'-4"	1,396
B2	10	#5	STR	48'-11"	510
B3	8	#4	STR	25'-8"	137
B4	13	#4	STR	2'-11"	25
B5	4	#4	STR	17'-6"	47
B6	4	#4	STR	10'-7"	28
D1	75	#4	STR	8'-6"	426
H1	28	#7	STR	17'-5"	997
H2	24	#7	STR	16'-2"	793
S1	44	#5	②	14'-11"	685
S2	44	#5	③	3'-10"	176
S3	36	#4	⑤	6'-5"	154
U1	41	#4	④	5'-11"	162
V1	38	#5	STR	8'-8"	343
V2	38	#5	STR	7'-11"	314

QUANTITIES

		END BENT 2
REINFORCING STEEL	LBS.	6,193
CLASS A CONCRETE		
POUR 1 (CAP, COLLARS & LOWER WING): CU. YARDS		45.3
HP 12 X 53 STEEL PILES	NO.	9
	LIN. FEET	360.0
PILE DRIVING EQUIP. SETUP FOR HP12x53 STEEL PILES	EA.	9

NOTES:

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4D1 BARS.

FOR INTEGRAL BACKWALL REINFORCEMENT, SEE "TYPICAL SECTION AND INTEGRAL BACKWALL" SHEET.

FOR FOUNDATION NOTES, SEE "FOUNDATION LAYOUT" SHEET.

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

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.

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

SHEET 3 OF 3

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
(INTEGRAL)

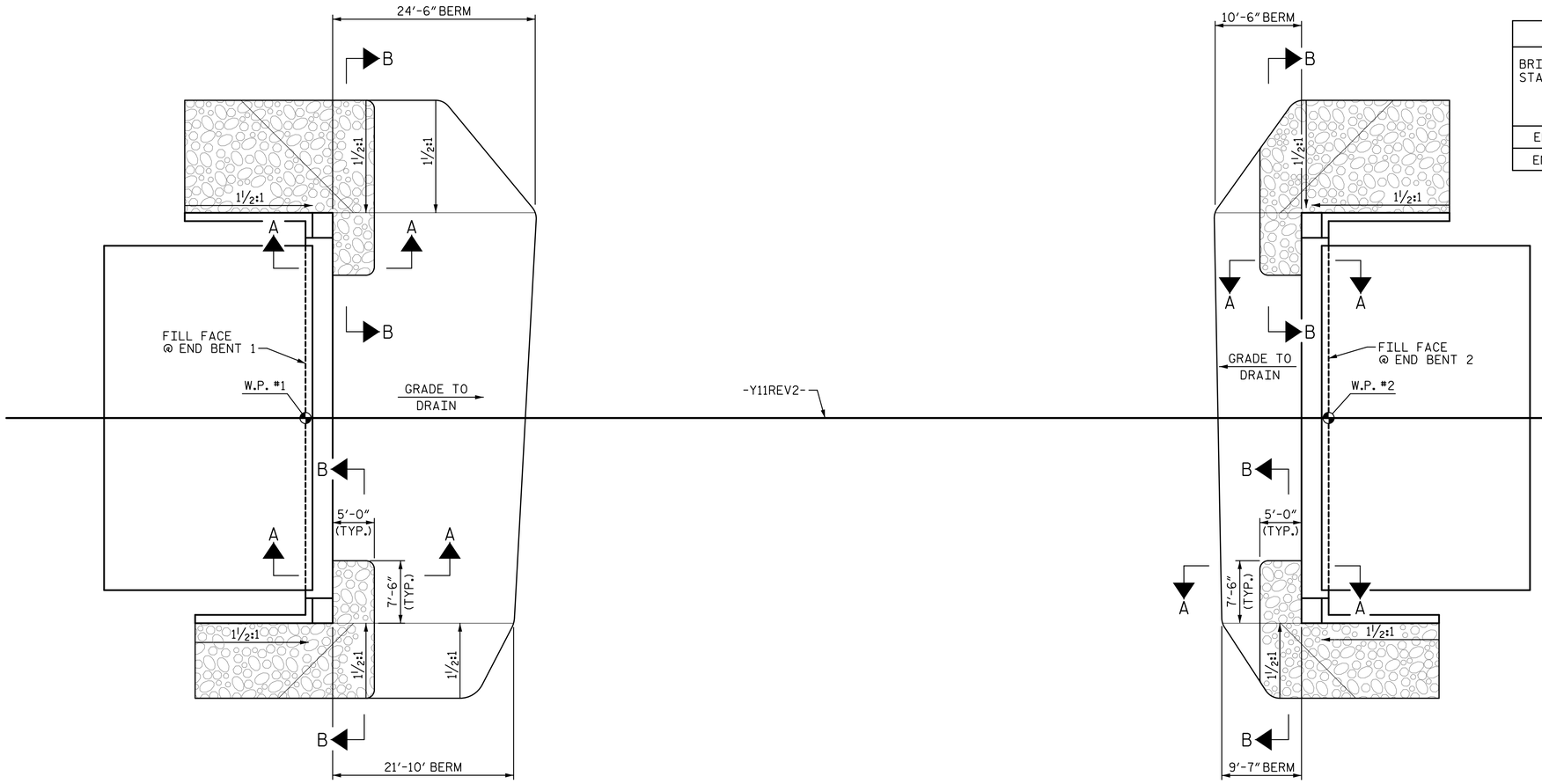
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-25
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : MBC	DATE : 9-16	DESIGN ENGINEER OF RECORD: T. LAWS	DATE : 9-16
CHECKED BY : AJP	DATE : 9-16		

3/6/2017 12:25:48 PM R:\Station\411_049_R2707C_SMU_EB2_3_S11-25.dgn

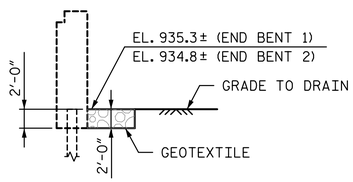
ESTIMATED QUANTITIES		
BRIDGE @ STA. 32+31.41 -Y11REV2-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	68	75
END BENT 2	68	75

END BENT 1

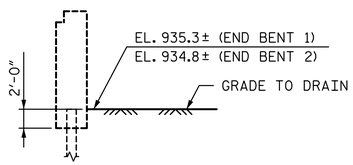


PLAN

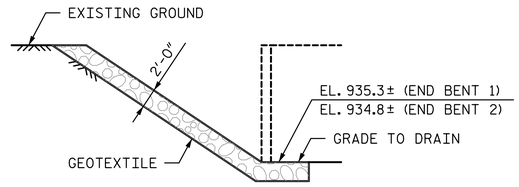
END BENT 2



SECTION A-A
(END BENT 1 SHOWN, END BENT 2 SIMILAR)



℄ SECTION
(END BENT 1 SHOWN, END BENT 2 SIMILAR)



SECTION B-B
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PROJECT NO. R-2707C
CLEVELAND COUNTY
STATION: 32+31.41 -Y11REV2-

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NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.
DocuSigned by: Tony R. Laws, JR.
3/6/2017

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NC License Number F-0991

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS AND GRADING PLAN

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S11-26
1			3			TOTAL SHEETS
2			4			27

DRAWN BY : MBC	DATE : 9-16	DESIGN ENGINEER OF RECORD: T. LAWS	DATE : 9-16
CHECKED BY : AJP	DATE : 9-16		

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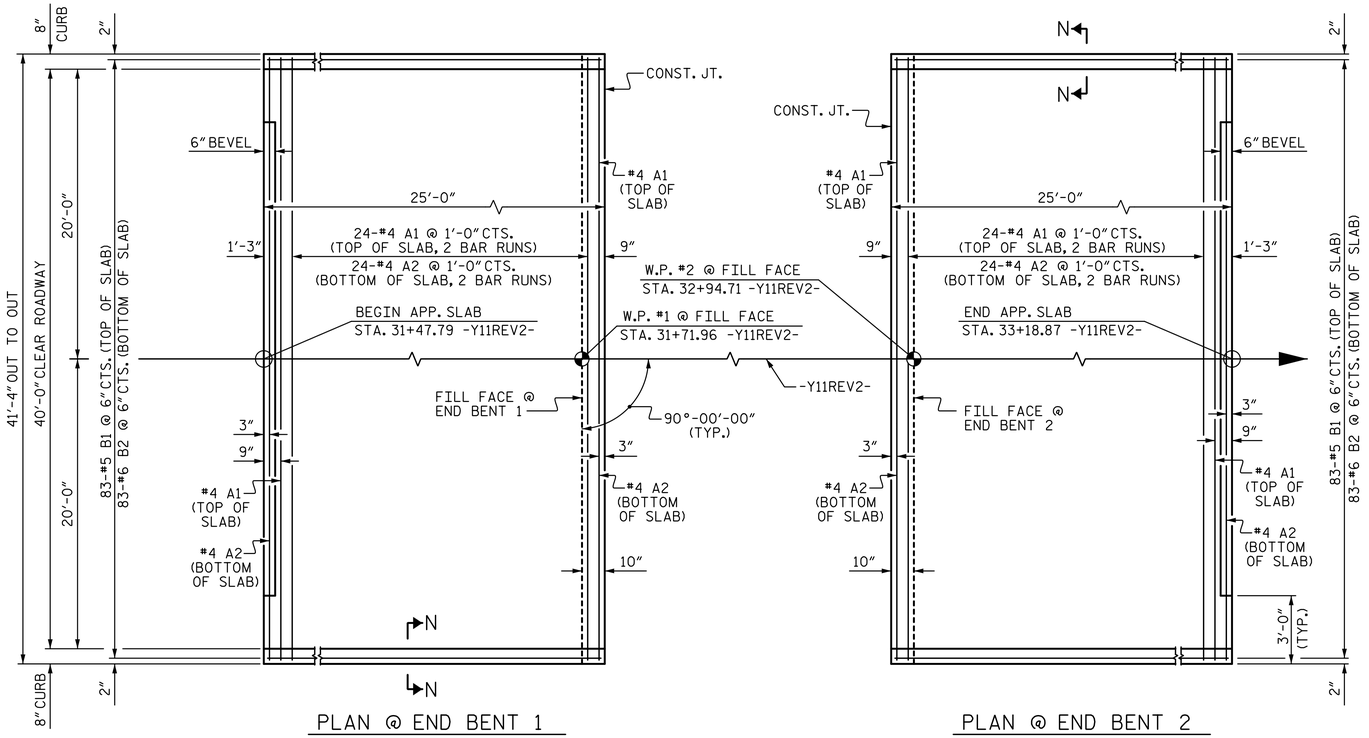


PLAN @ END BENT 1

PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

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.

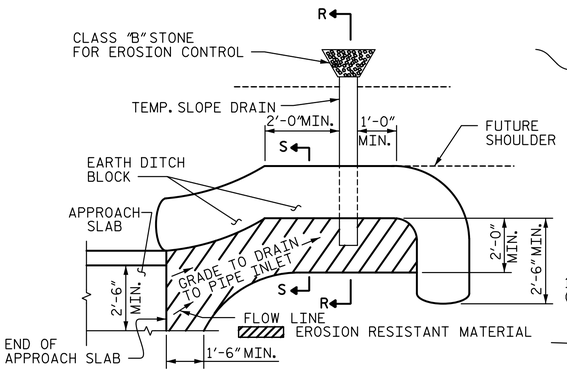
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

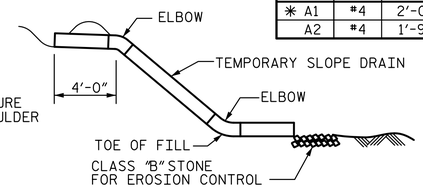
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	52	#4	STR	21'-6"	747
A2	52	#4	STR	21'-5"	744
✱ B1	83	#5	STR	24'-1"	2,085
B2	83	#6	STR	24'-7"	3,065
REINFORCING STEEL				LBS.	3,809
✱ EPOXY COATED REINFORCING STEEL				LBS.	2,832
CLASS AA CONCRETE				C.Y.	44.7

SPLICE CHART

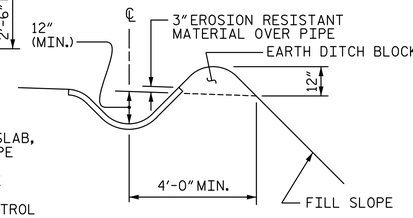
BAR	SIZE	SPLICE
✱ A1	#4	2'-0"
A2	#4	1'-9"



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.



SECTION R-R

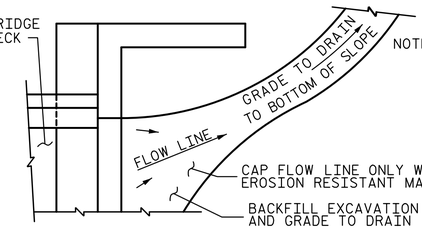


SECTION S-S

PLAN VIEW

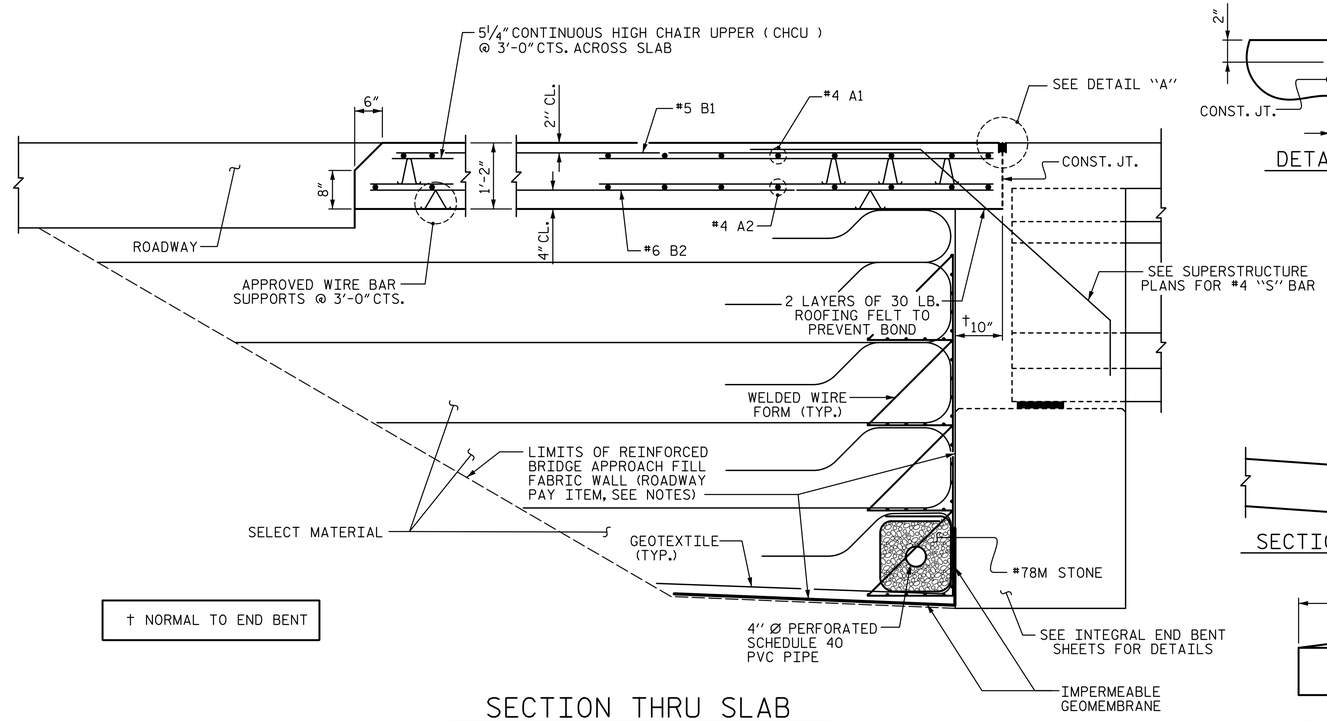
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



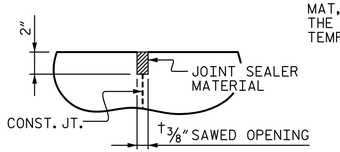
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

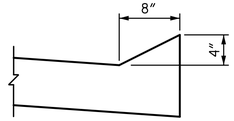


† NORMAL TO END BENT

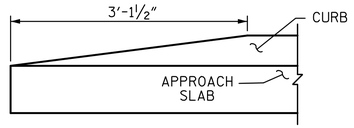
SECTION THRU SLAB



DETAIL "A"



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

PROJECT NO. R-2707C

CLEVELAND COUNTY

STATION: 32+31.41 -Y11REV2-

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 40317 ENGINEER TONY R. LAWS, JR.

DocuSigned by: Tony R. Laws, Jr. 3/6/2017

STV 100 Years

STV ENGINEERS, INC.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

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

SHEET NO. S11-27

TOTAL SHEETS 27

DRAWN BY : MBC	DATE : 9-16	DESIGN ENGINEER OF RECORD: T. LAWS	DATE : 9-16
CHECKED BY : AJP	DATE : 9-16		

3/6/2017 12:25:53 PM R:\Station\411_053_R2707C_SMU_BAS_SII-27.dgn

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 2012 "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 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 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 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 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

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