09/08/99

TIP PROJECT: U-3110B

CONTRACT: C202557

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

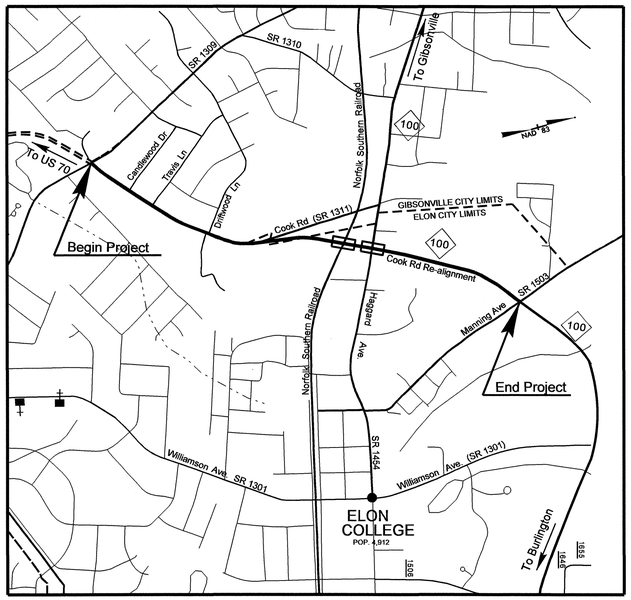
ALAMANCE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3110B		

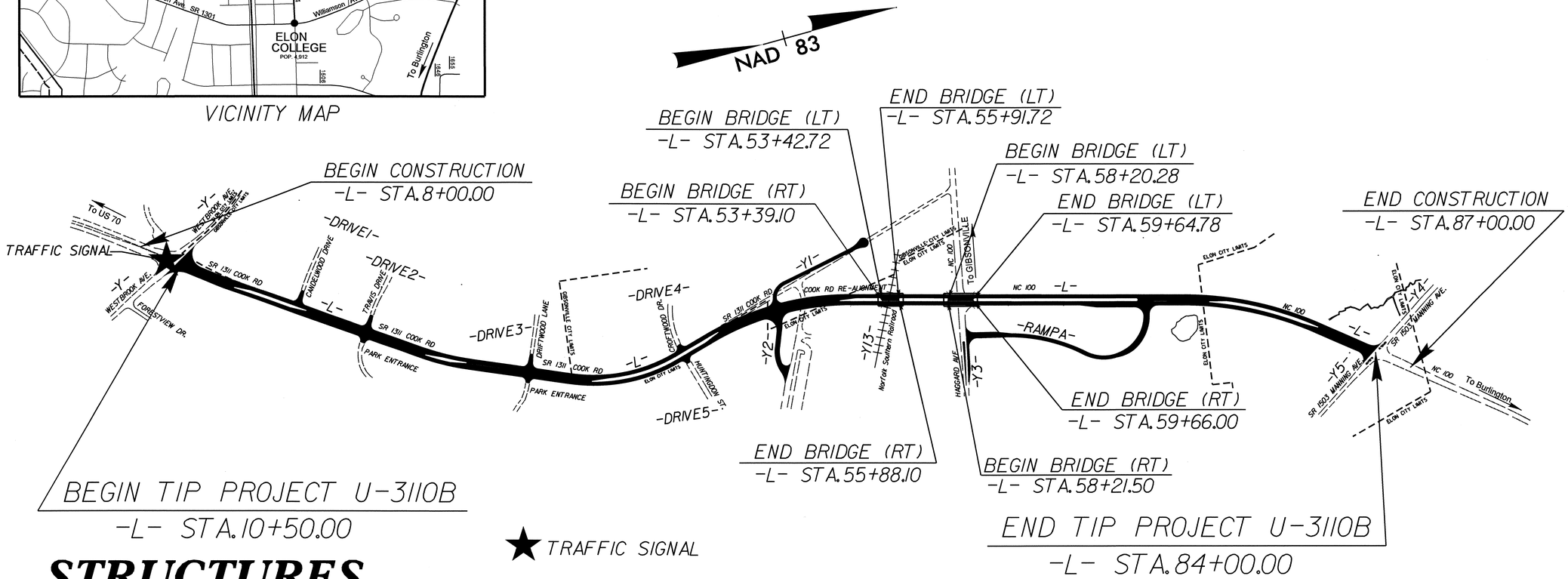
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34901.1.1	STP-0701(7)	P.E.
34901.2.4	STP-1311(5)	R/W, UTIL.
34901.3.4	STP-1311(10)	CONST.

LOCATION: SR 1311 (COOK RD.) WIDENING AND EXTENSION FROM SR 1309 (WESTBROOK AVE.) TO NC 100

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES AND SIGNALS



VICINITY MAP



STRUCTURES

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN DATA

ADT 2010 = 9,367
ADT 2030 = 16,200
DHV = 12 %
D ≐ 65 %
T = 7 % *
V = 50 MPH
* TTST 2% DUAL 5%
FUNC CLASS = URBAN COLLECTOR

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT U-3110B = 1.319 MILES
LENGTH OF STRUCTURES TIP PROJECT U-3110B = 0.075 MILES
TOTAL LENGTH OF TIP PROJECT U-3110B = 1.392 MILES

Prepared in the Office of:
DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

LETTING DATE:
OCTOBER 19, 2010

R. M. GIROLAMI, PE
PROJECT ENGINEER

L. E. SUTTON, PE
PROJECT DESIGN ENGINEER

STRUCTURE DESIGN UNIT
1000 Birch Ridge Dr., Raleigh NC, 27610

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

27-AUG-2010 13:02
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lsutton

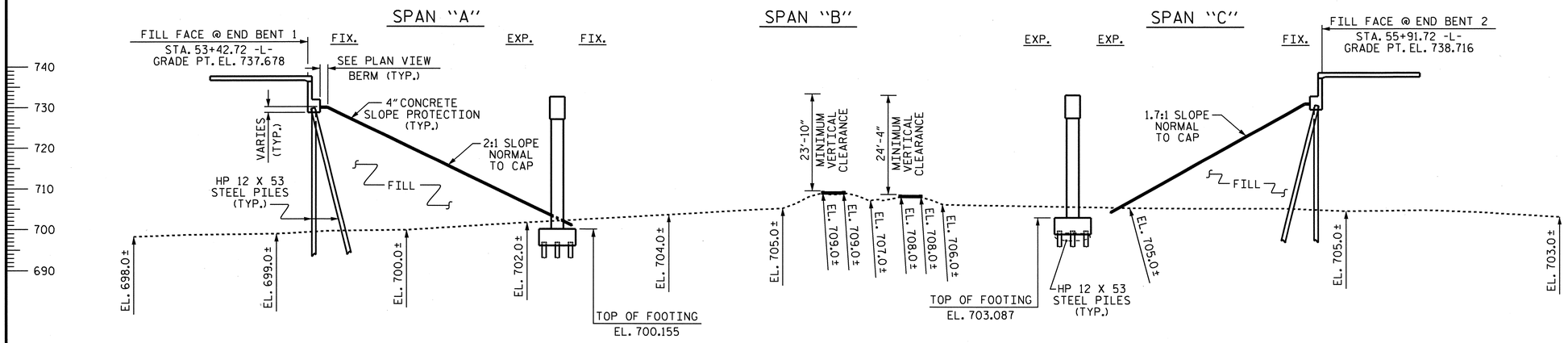
F.A. PROJ. NO. STP-1311(10)

53+00 53+50 54+00 54+50 55+00 55+50 56+00 56+50

+4.9051% -3.4242%

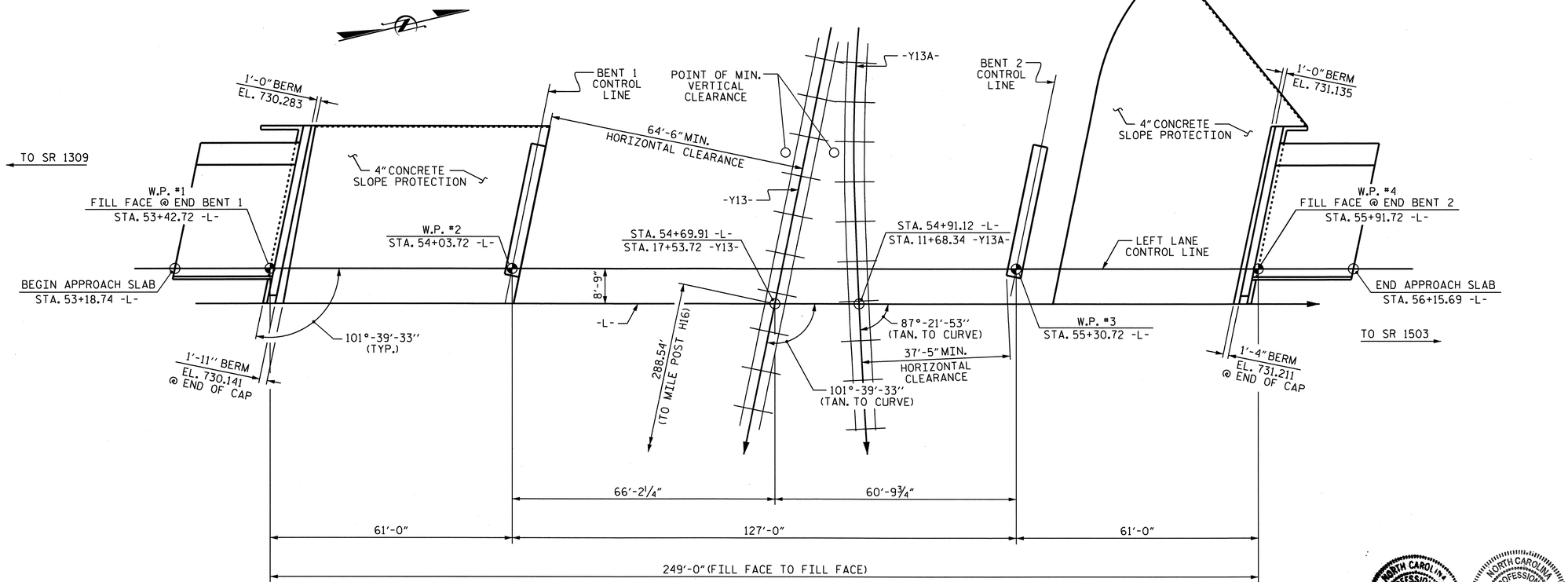
PI = 54+40.00 -L-LT.
EL. = 746.25
VC = 700.00

GRADE DATA



SECTION ALONG LEFT LANE CONTROL LINE

(SECTIONS AT END BENTS AND BENTS ARE TAKEN AT RIGHT ANGLES)



PLAN

(PILES NOT SHOWN FOR CLARITY)
(FOR TRACK PROFILE ELEVATIONS, SEE SHEET 3 OF 4)

NORTH CAROLINA PROFESSIONAL SEAL 9804 ENGINEER ROY M. GIROUARD
7-29-10

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/6/10

27-JUL-2010 14:51
R:\Structures\str01\scallaway\Microstation\U3110B_SD_GD_01.dgn
LSUTTON

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-
17+53.72 -Y13-

SHEET 1 OF 4

BRIDGE NO. 427
MILE POST H15.9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100
REALIGNMENT OVER
NORFOLK SOUTHERN RAILROAD
BETWEEN SR 1309 AND SR 1503
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			146

STR. #1

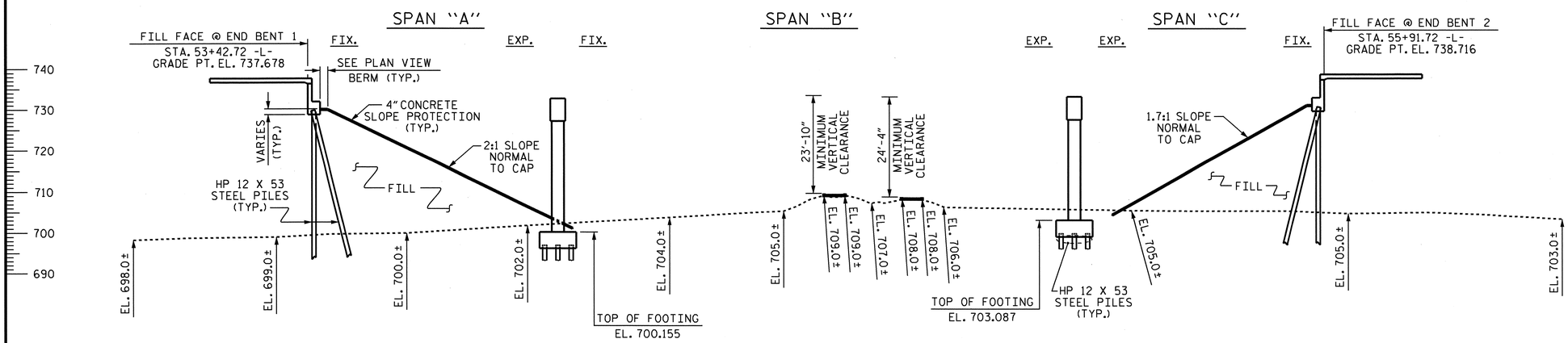
F.A. PROJ. NO. STP-1311(10)

53+00 53+50 54+00 54+50 55+00 55+50 56+00 56+50

+4.9051% -3.4242%

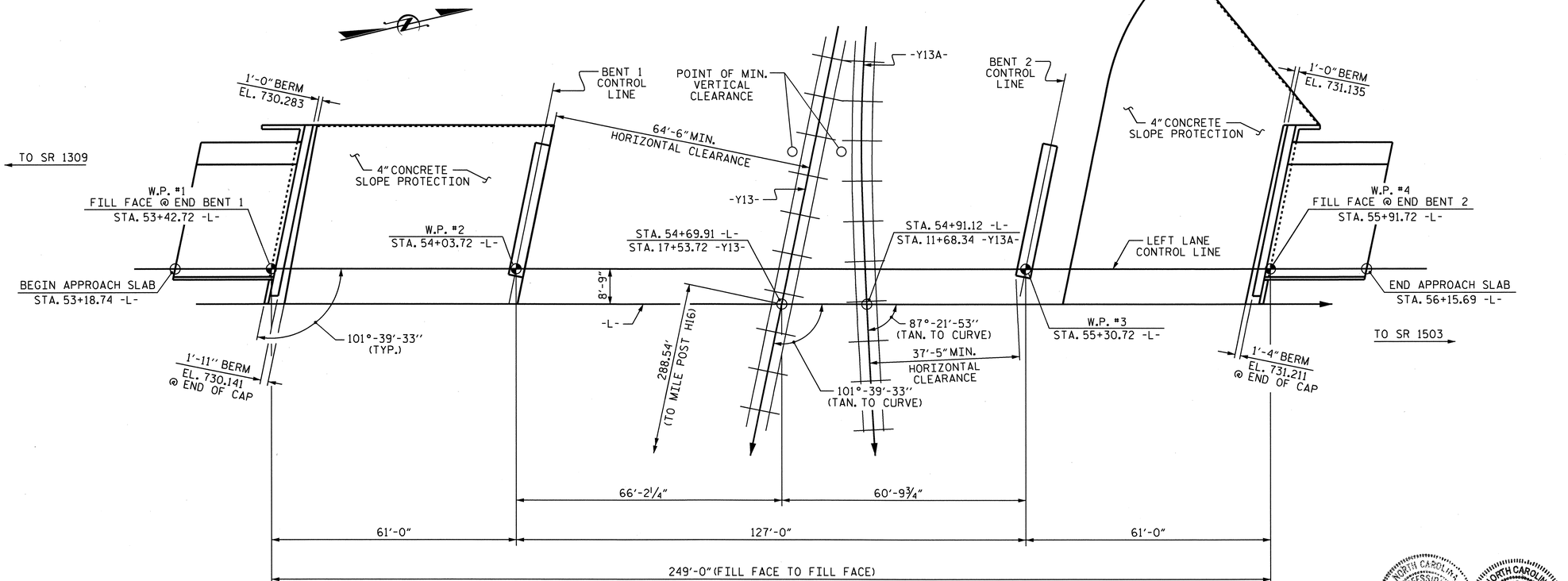
PI = 54+40.00 -L-LT.
EL. = 746.25
VC = 700.00

GRADE DATA



SECTION ALONG LEFT LANE CONTROL LINE

(SECTIONS AT END BENTS AND BENTS ARE TAKEN AT RIGHT ANGLES)



PLAN

(PILES NOT SHOWN FOR CLARITY)
(FOR TRACK PROFILE ELEVATIONS, SEE SHEET 3 OF 4)

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/6/10

30-JUL-2010 11:10
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lsutton

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-
17+53.72 -Y13-

SHEET 1 OF 4

BRIDGE NO. 427
MILE POST H15.9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100
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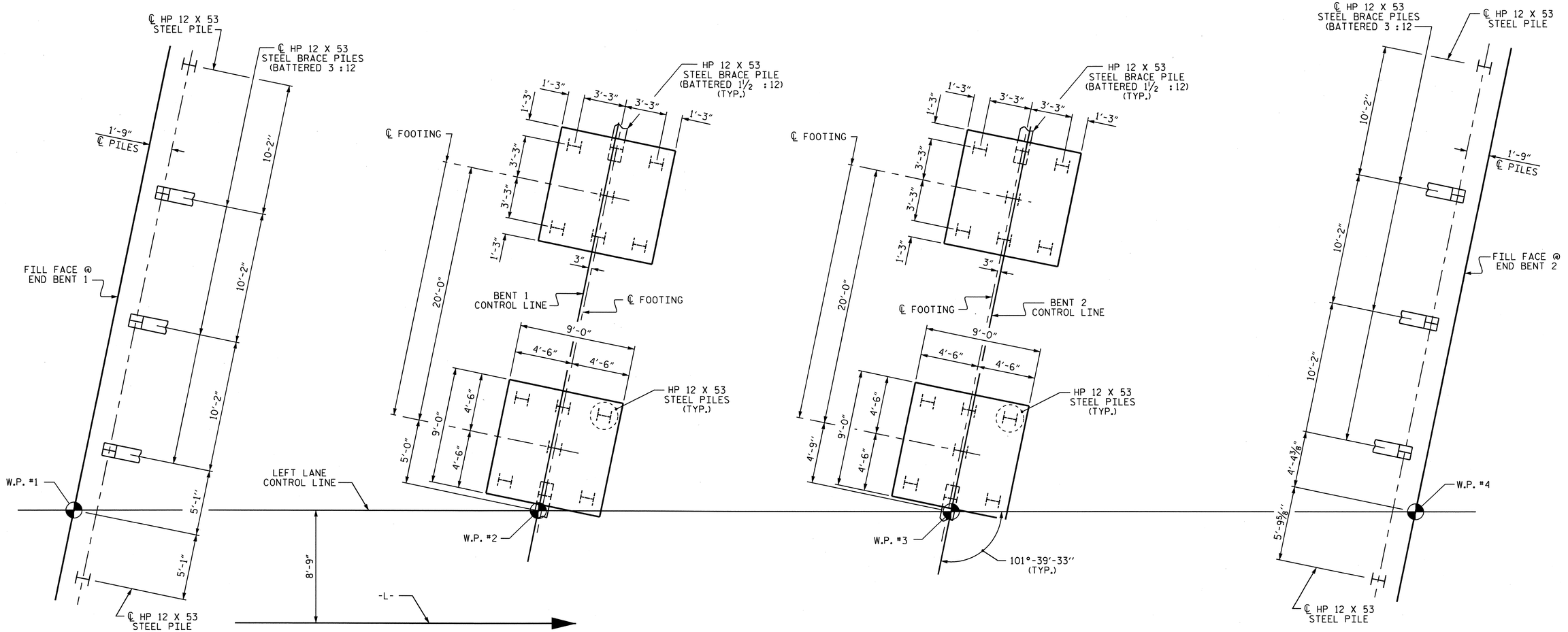
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			146

STR. #1



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

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE TO THE CENTERLINE OF THE PILE AT THE BOTTOM OF CAP OR FOOTING.

NOTES

(CONTINUED ON SHEET 4 OF 4)

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.

PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 185 TONS PER PILE.

PILES AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE.

TESTING PILES WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PILE DRIVING ANALYZER, SEE PILES SPECIAL PROVISIONS.

DRIVING PILES AT END BENT 2 MAY REQUIRE PENETRATION OF GEOGRID REINFORCEMENT. FOR GEOGRID REINFORCEMENT AND PAY ITEM, SEE ROADWAY PLANS.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100 REALIGNMENT OVER NORFOLK SOUTHERN RAILROAD BETWEEN SR 1309 AND SR 1503 — LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

STR. #1

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/6/10

27-JUL-2010 14:51
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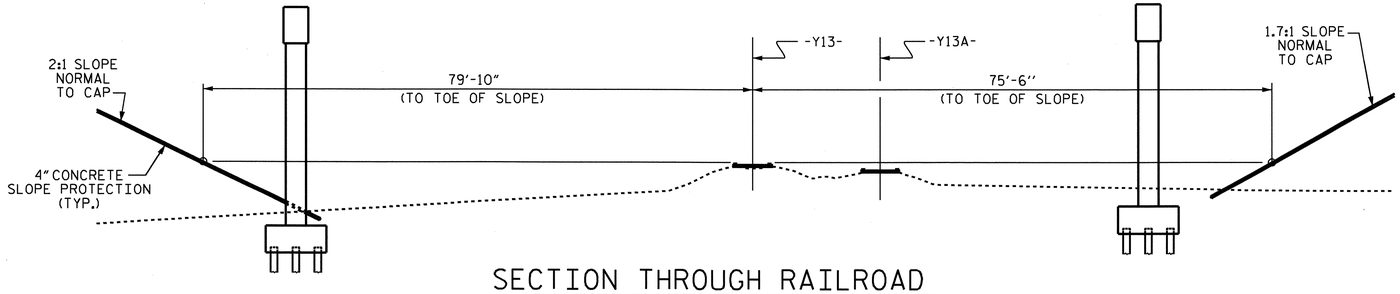
LSUTTON

NOTE

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 VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.



SECTION THROUGH RAILROAD

(TAKEN AT RIGHT ANGLE TO RAILROAD)

TOP OF RAIL ELEVATIONS			
STATION -Y13-	LT. RAIL	STATION -Y13-	RT. RAIL
		10+00.01	705.050
10+73.54	705.840	10+73.50	705.490
11+44.74	706.230	11+44.92	705.890
12+16.68	706.630	12+16.57	706.300
12+64.99	706.990	12+67.38	706.670
12+95.01	707.150	12+95.05	706.820
13+33.29	707.190	13+33.46	706.890
14+15.28	707.520	14+15.52	707.190
14+98.15	707.830	14+98.17	707.580
15+78.99	708.150	15+78.93	708.010
16+14.28	708.310	16+14.40	708.200
16+52.87	708.570	16+52.91	708.510
16+91.78	708.800	16+91.84	708.790
17+22.61	708.970	17+22.54	708.970
17+58.52	709.180	17+58.56	709.180
17+98.97	709.440	17+98.88	709.440
18+36.33	709.690	18+36.20	709.690
18+83.54	710.040	18+83.47	710.040
19+32.40	710.400	19+32.40	710.400
19+82.07	710.760	19+82.11	710.760
20+31.09	711.110	20+31.18	711.100
20+82.26	711.470	20+82.13	711.460
21+29.84	711.730	21+29.88	711.730
21+80.27	711.980	21+80.21	711.970
22+31.23	712.125	22+31.14	712.140
22+80.95	712.270	22+80.83	712.250
23+33.49	712.330	23+33.49	712.350
23+77.26	712.330	23+77.24	712.420
24+28.48	712.280	24+28.45	712.420
24+77.44	712.290	24+77.43	712.470
25+25.19	712.210	25+25.13	712.470
25+73.03	712.090	25+72.88	712.410

TOP OF RAIL ELEVATIONS			
STATION -Y13A-	LT. RAIL	STATION -Y13A-	RT. RAIL
10+07.64	708.200	10+00.00	708.020
10+69.04	708.657	10+61.82	708.496
10+75.45	708.710	10+74.46	708.590
		10+80.29	708.649
		10+82.42	708.667
11+02.97	708.670	11+10.79	708.719
11+30.62	708.465	11+39.09	708.427
11+49.50	708.230	11+49.70	708.230
12+43.04	708.620	12+42.92	708.620
12+93.25	708.970	12+93.62	708.950
13+49.83	709.390	13+50.17	709.390
14+08.09	709.710	14+08.13	709.730

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100
REALIGNMENT OVER
NORFOLK SOUTHERN RAILROAD
BETWEEN SR 1309 AND SR 1503
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/6/10

27-JUL-2010 14:51
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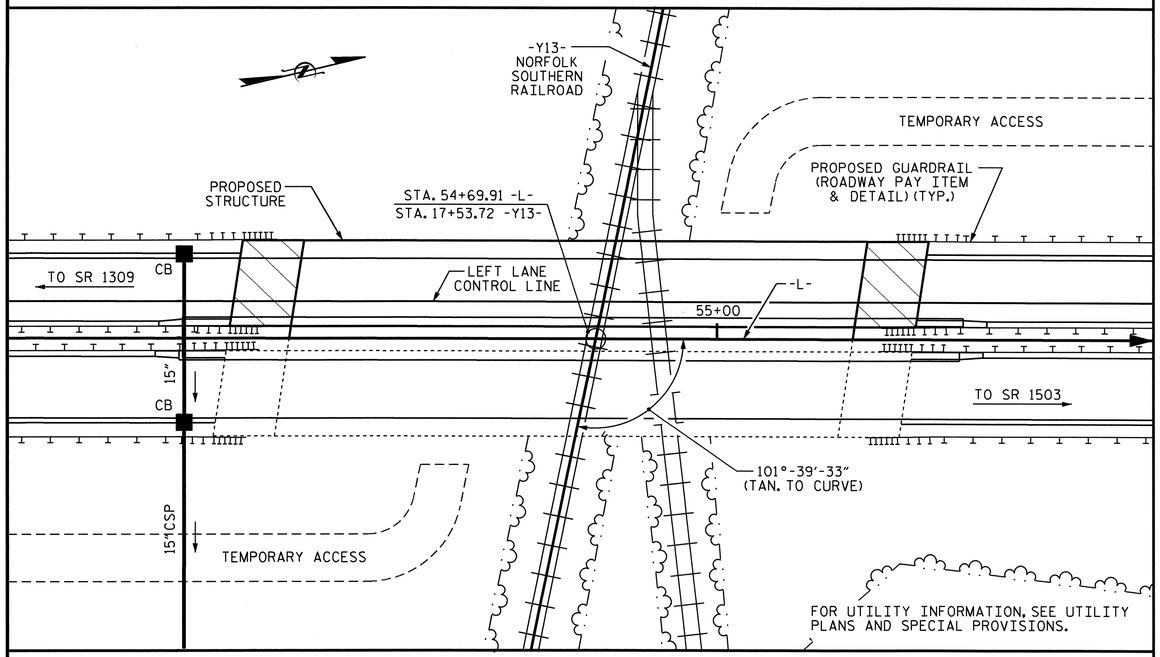
LSUTTON

BM #3: RR SPIKE SET IN BASE OF 30" MAPLE, 129' RT. OF STA. 43+10 -L-, ELEV. 708.75



LOCATION SKETCH

NOTES (CONTINUED FROM SHEET 2 OF 4)

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

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.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.

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

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR FORMS FOR CONCRETE BRIDGES DECKS, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION	PDA TESTING	PDA ASSISTANCE	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	STRUCTURAL STEEL	HP 12 X 53 STEEL PILES		PILE REDRIVES	THREE BAR METAL RAIL	CONCRETE BARRIER RAIL	104" CHAIN LINK FENCE	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS
	LUMP SUM	EACH	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	APPROX. LBS.	NO.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE				8,990	7,253		LUMP SUM			281,500				239.06	246.88	120.00		LUMP SUM	LUMP SUM
END BENT 1						24.9		3,525			5	450	3				329		
BENT 1	LUMP SUM					61.8		7,803	1,235		14	840	7						
BENT 2	LUMP SUM					60.7		7,631	1,124		14	1,050	7						
END BENT 2						23.7		3,410			5	400	3				372		
TOTAL	LUMP SUM	1	1	8,990	7,253	171.1	LUMP SUM	22,369	2,359	281,500	38	2,740	20	239.06	246.88	120.00	701	LUMP SUM	LUMP SUM

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100
REALIGNMENT OVER
NORFOLK SOUTHERN RAILROAD
BETWEEN SR 1309 AND SR 1503
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
8/27/10

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/6/10

27-AUG-2010 11:17
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lsutton

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE										SERVICE II LIMIT STATE						COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT					SHEAR						MOMENT						
								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)	1.29	--	1.75	0.867	1.31	B	EL	62.66	0.899	1.34	B	EL	125.33	1.30	0.867	1.29	B	EL	62.66	
		HL-93 (OPERATING)	N/A		1.68	--	1.35	0.867	1.70	B	EL	62.66	0.899	1.73	B	EL	125.33	1.00	0.867	1.68	B	EL	62.66	
		HS-20 (INVENTORY)	36.00	(2)	1.91	68.8	1.75	0.867	1.94	B	EL	62.66	0.899	1.94	B	EL	125.33	1.30	0.867	1.91	B	EL	62.66	
		HS-20 (OPERATING)	36.00		2.48	89.3	1.35	0.867	2.51	B	EL	62.66	0.899	2.51	B	EL	125.33	1.00	0.867	2.48	B	EL	62.66	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.66	62.9	1.40	0.867	5.90	B	EL	62.66	0.899	6.11	B	EL	125.33	1.30	0.867	4.66	B	EL	62.66	
		SNGARBS2	20.000		3.32	66.4	1.40	0.867	4.20	B	EL	62.66	0.899	4.23	B	EL	125.33	1.30	0.867	3.32	B	EL	62.66	
		SNAGRIS2	22.000		3.09	68.0	1.40	0.867	3.90	B	EL	62.66	0.899	3.89	B	EL	125.33	1.30	0.867	3.09	B	EL	62.66	
		SNCOTTS3	27.250		2.32	63.2	1.40	0.867	2.93	B	EL	62.66	0.899	3.04	B	EL	125.33	1.30	0.867	2.32	B	EL	62.66	
		SNAGGRS4	34.925		1.88	65.7	1.40	0.867	2.37	B	EL	62.66	0.899	2.45	B	EL	125.33	1.30	0.867	1.88	B	EL	62.66	
		SNS5A	35.550		1.84	65.4	1.40	0.867	2.33	B	EL	62.66	0.899	2.44	B	EL	125.33	1.30	0.867	1.84	B	EL	62.66	
		SNS6A	39.950		1.66	66.3	1.40	0.867	2.10	B	EL	62.66	0.899	2.20	B	EL	125.33	1.30	0.867	1.66	B	EL	62.66	
		SNS7B	42.000		1.58	66.4	1.40	0.867	2.00	B	EL	62.66	0.899	2.12	B	EL	125.33	1.30	0.867	1.58	B	EL	62.66	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.02	66.7	1.40	0.867	2.56	B	EL	62.66	0.899	2.64	B	EL	125.33	1.30	0.867	2.02	B	EL	62.66	
		TNT4A	33.075		2.02	66.8	1.40	0.867	2.56	B	EL	62.66	0.899	2.60	B	EL	125.33	1.30	0.867	2.02	B	EL	62.66	
		TNT6A	41.600		1.63	67.8	1.40	0.867	2.07	B	EL	62.66	0.899	2.20	B	EL	125.33	1.30	0.867	1.63	B	EL	62.66	
		TNT7A	42.000		1.63	68.5	1.40	0.867	2.06	B	EL	62.66	0.899	2.16	B	EL	125.33	1.30	0.867	1.63	B	EL	62.66	
		TNT7B	42.000		1.66	69.7	1.40	0.867	2.10	B	EL	62.66	0.899	2.10	B	EL	125.33	1.30	0.867	1.66	B	EL	62.66	
		TNAGRIT4	43.000		1.60	68.8	1.40	0.867	2.02	B	EL	62.66	0.899	2.04	B	EL	125.33	1.30	0.867	1.60	B	EL	62.66	
		TNAGT5A	45.000		1.52	68.4	1.40	0.867	1.92	B	EL	62.66	0.899	1.99	B	EL	125.33	1.30	0.867	1.52	B	EL	62.66	
		TNAGT5B	45.000	(3)	1.51	68.0	1.40	0.867	1.91	B	EL	62.66	0.899	1.95	B	EL	125.33	1.30	0.867	1.51	B	EL	62.66	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75																				

LOAD FACTORS:

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

	YEAR	ADTT
CURRENT	2010	426
FUTURE	2030	737

NOTES:

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

ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.

2.

3.

4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93) **

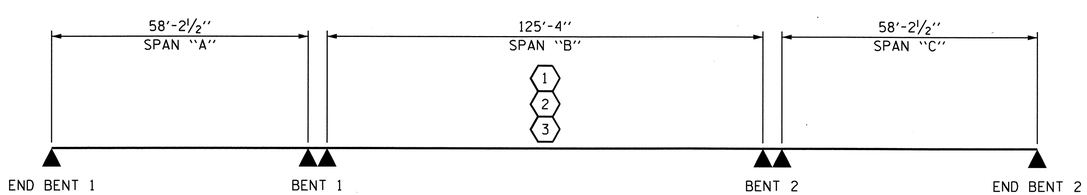
(2) DESIGN LOAD RATING (HS-20) **

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)
— LEFT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			146

STR. #1 STD. NO. LRFR3

ASSEMBLED BY : A.S. CALLAWAY DATE : 5/13/10
CHECKED BY : T.L. CLELLAND DATE : 5/14/10
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08
REV. 11/12/08RR MAA/GM

27-JUL-2010 14:51
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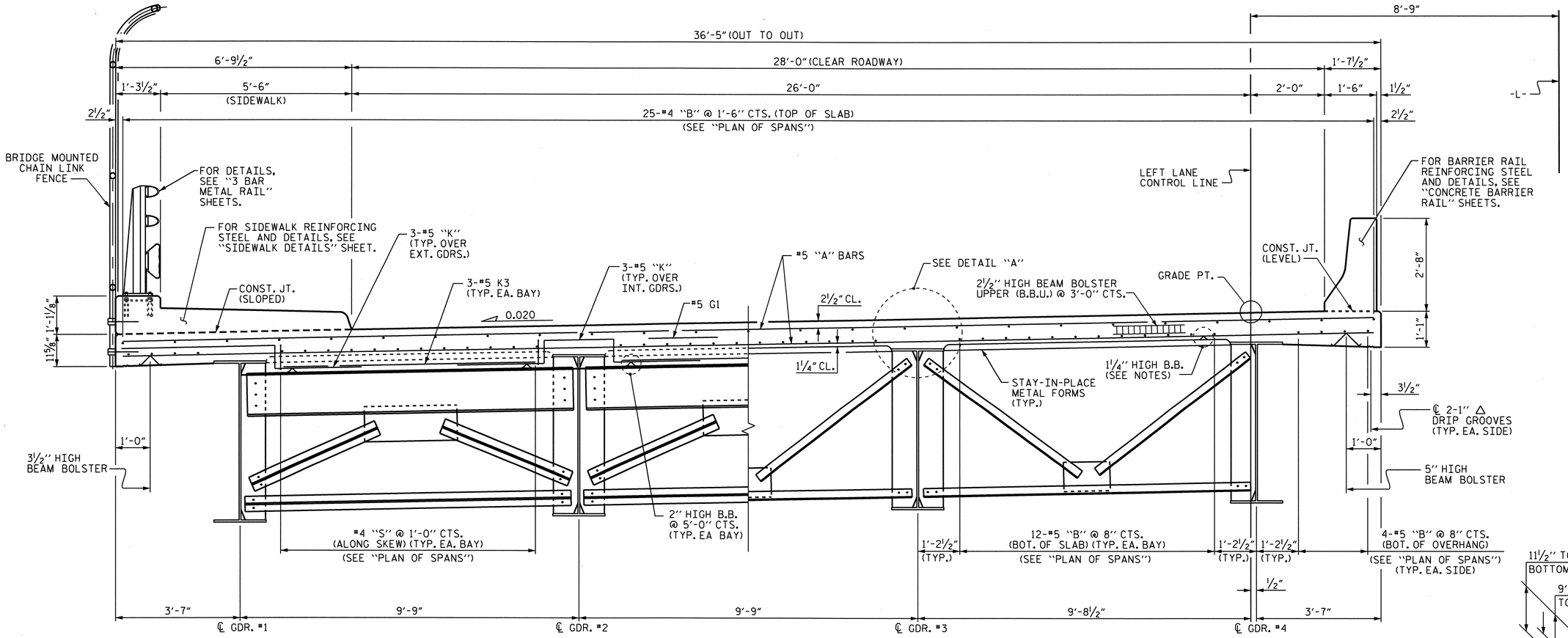
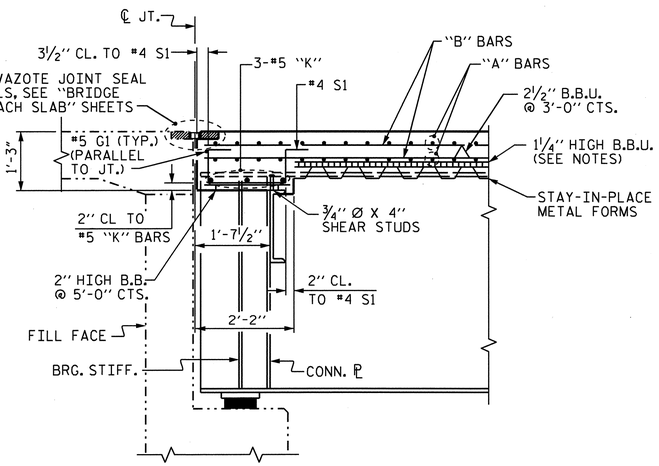


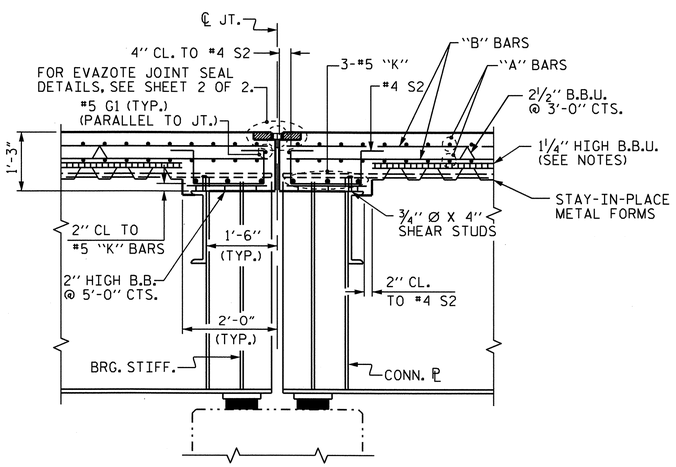
AT END BENT & BENT DIAPHRAGMS

AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION



SECTION @ END BENTS



SECTION @ BENTS

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.

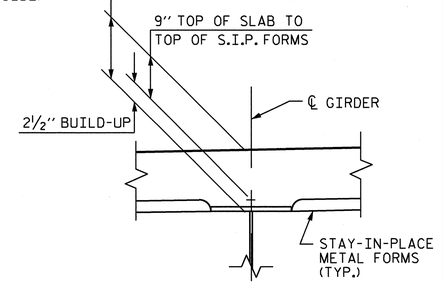
BARRIER RAIL AND SIDEWALK IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

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

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND BEAM/GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

FOR BRIDGE MOUNTED CHAIN LINK FENCE DETAILS AND LOCATION, SEE "BRIDGE MOUNTED CHAIN LINK FENCE" SHEET.



DETAIL "A"
(TYP. EACH GIRDER)

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTIONS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 6/5/09
CHECKED BY : T.L. CLELLAND DATE : 12/31/09

27-JUL-2010 14:51
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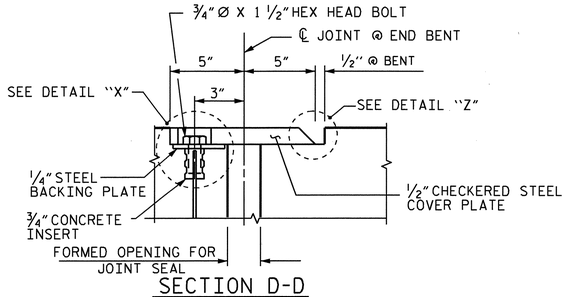
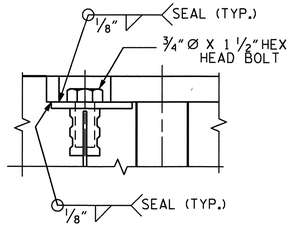
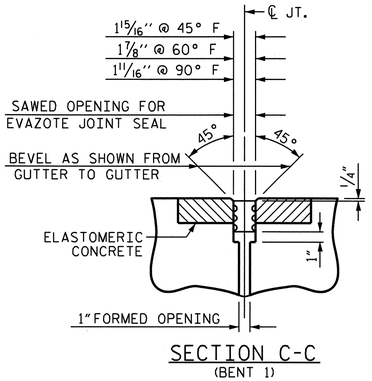


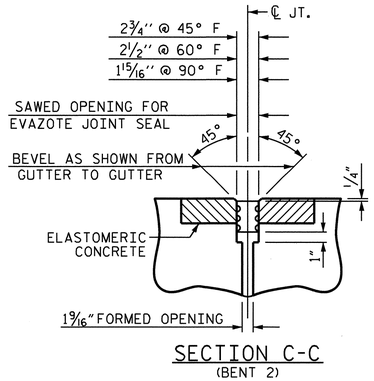
SECTION D-D



DETAIL "X"



SECTION C-C
(BENT 1)



SECTION C-C
(BENT 2)

NOTES

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALLY BLAST CLEANED AND COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. AT THE CONTRACTORS OPTION, THESE SURFACES MAY BE METALLIZED TO A MINIMUM THICKNESS OF 6 MILS. SEE SPECIAL PROVISIONS FOR THERMAL SPRAYED COATINGS (METALLIZATION).

THE ¾" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

THE ¾" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.

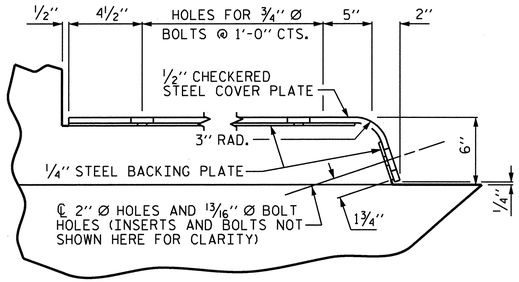
NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "EVAZOTE JOINT SEALS".

THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.

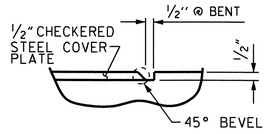
THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2½" AT BENT 1 AND 3 3/16" AT BENT 2. FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

DURING THE JOINT INSTALLATION PROCEDURE, THE JOINT AND SURROUNDING AREA SHALL BE KEPT CLEAN AND FREE OF DEBRIS.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.



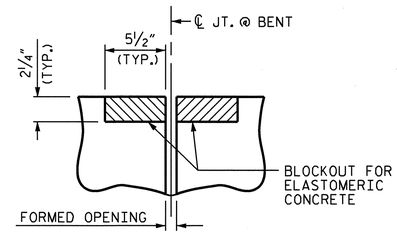
SECTION B-B



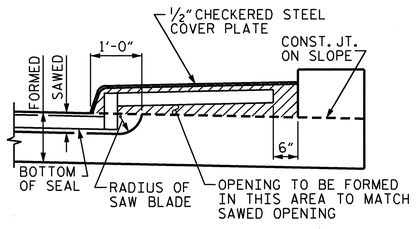
DETAIL "Z"

ELASTOMERIC CONCRETE	
BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	4.9
2	4.9
TOTAL	9.8

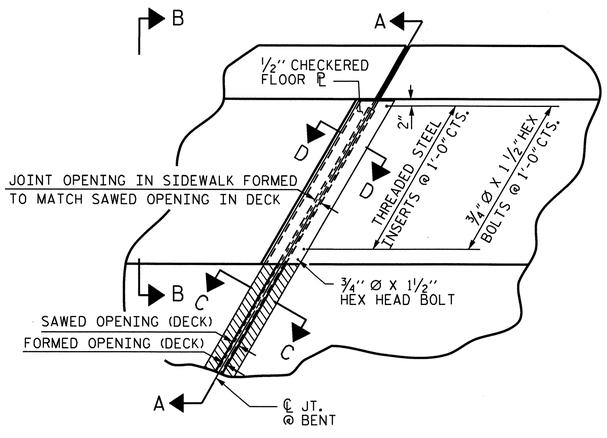
* BASED ON THE MINIMUM BLOCKOUT SHOWN.



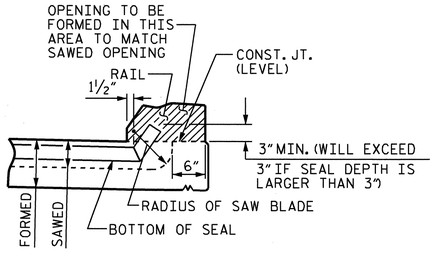
SECTION C-C
EVAZOTE JOINT SEAL
(PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)



SECTION A-A

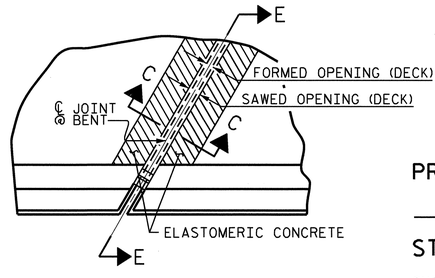


PLAN LEFT SIDE



SECTION E-E

EVAZOTE JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.



PLAN RIGHT SIDE

JOINT SEAL DETAILS @ BENT

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
TYPICAL SECTIONS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 6/8/09
CHECKED BY : T.L. CLELLAND DATE : 12/31/09

27-JUL-2010 14:51
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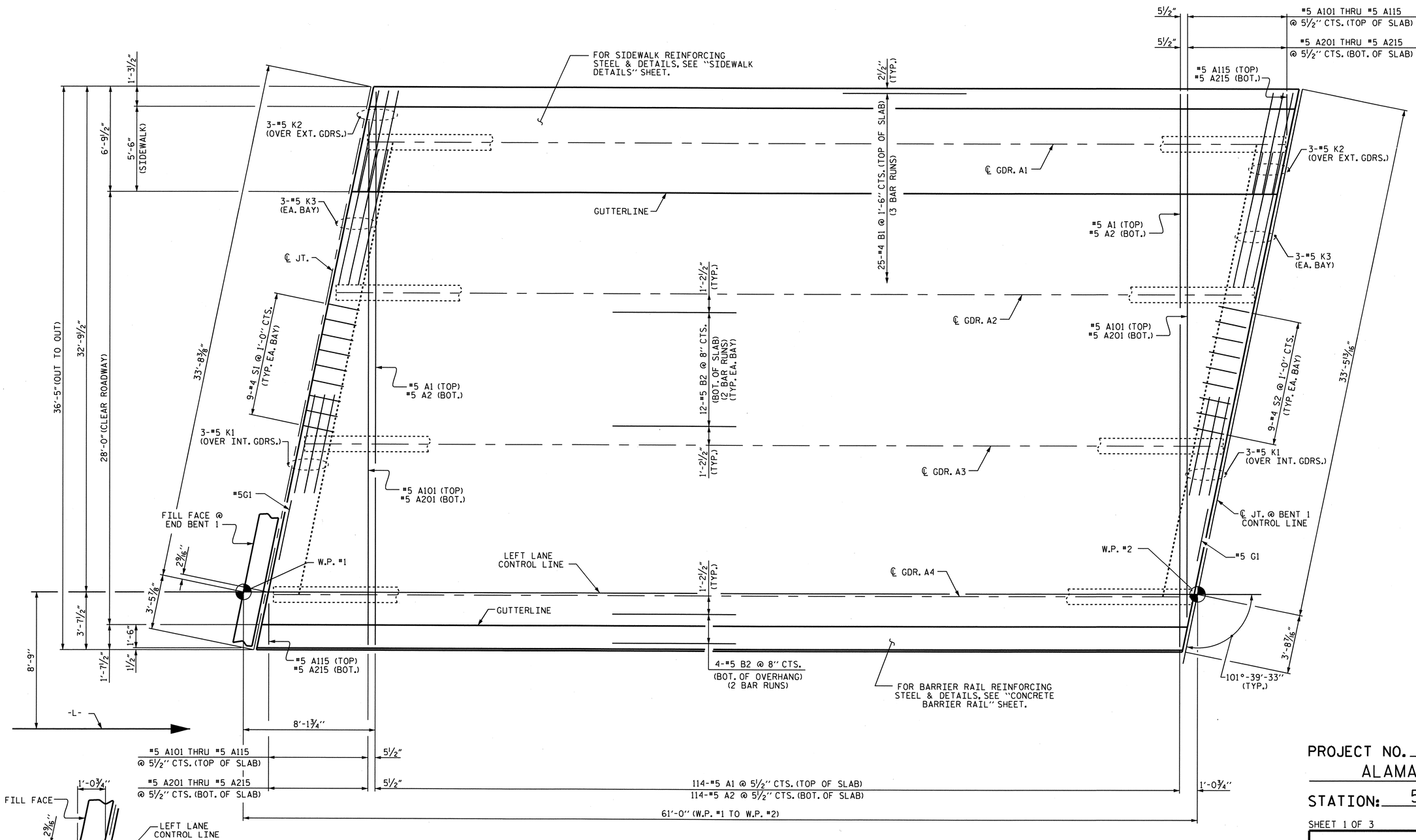
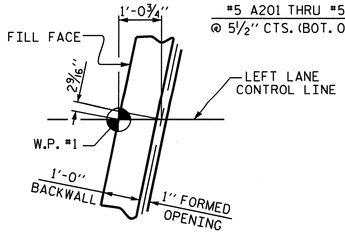


PLAN OF SPAN "A"



END BENT DETAIL
(END BENT 1)

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CHECKED BY : T.L. CLELLAND DATE : 1/4/10

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LSUTTON

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

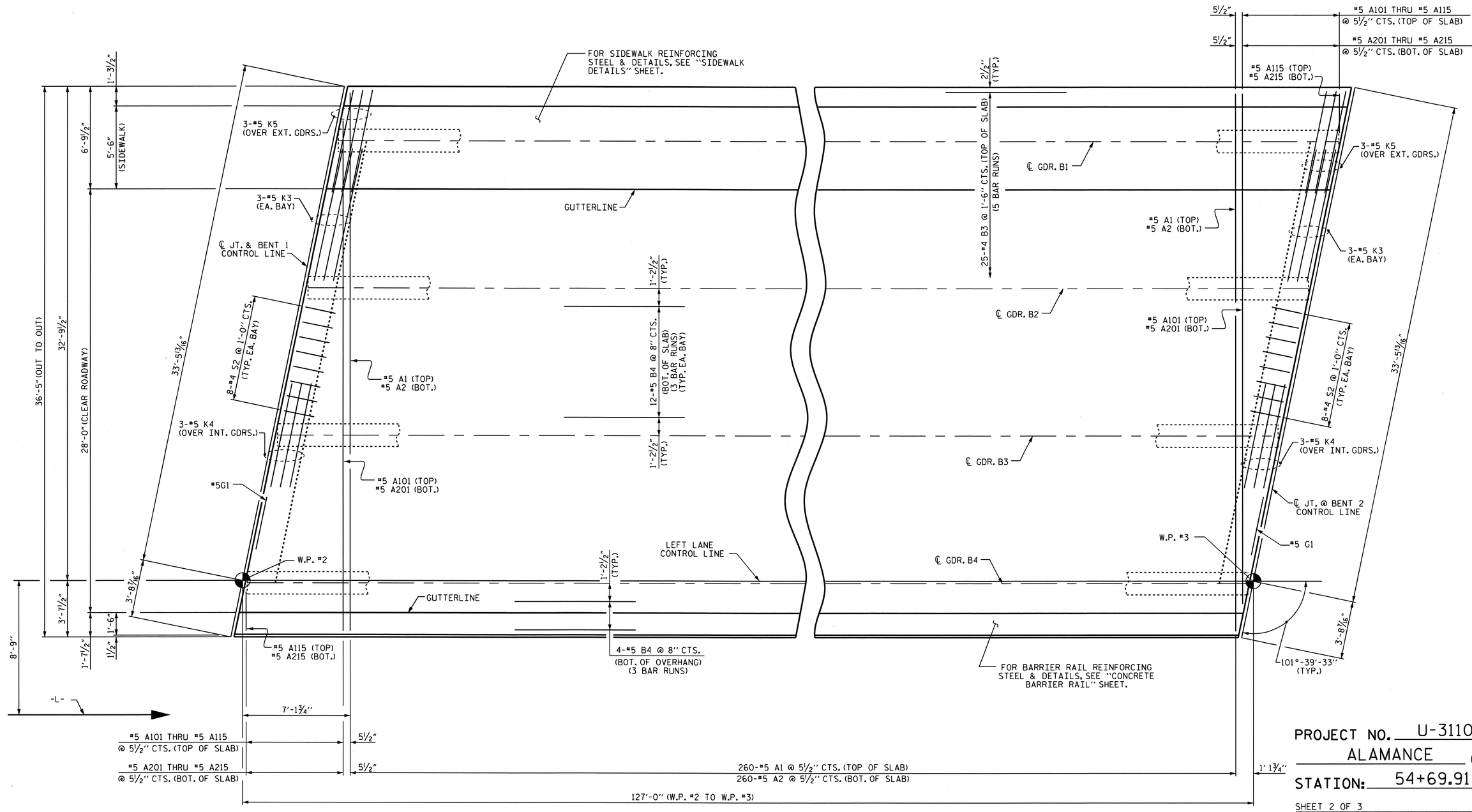
SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			146

STR. #1



PLAN OF SPAN "B"

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 6/3/09
CHECKED BY : T.L. CLELLAND DATE : 1/4/10

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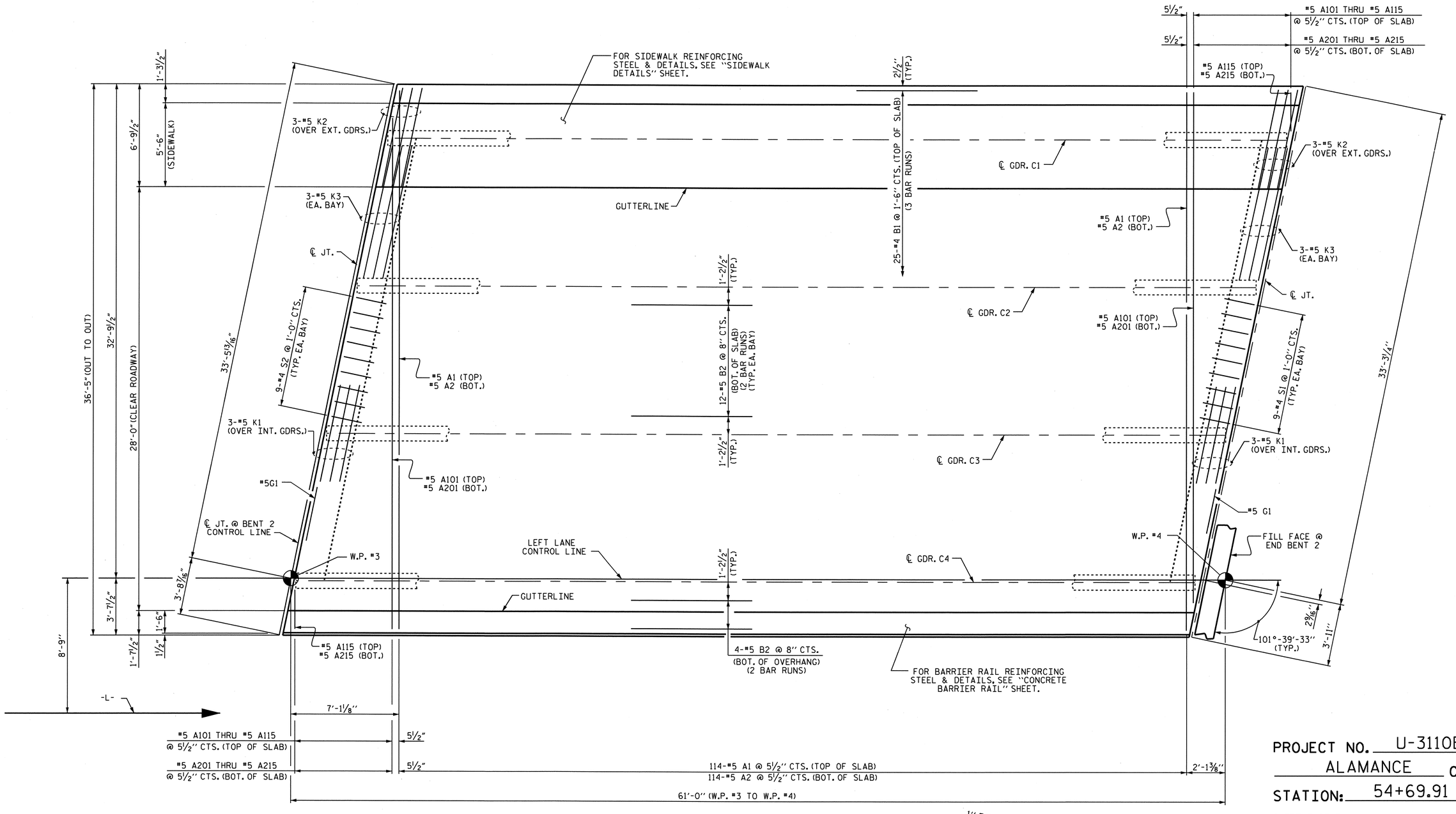
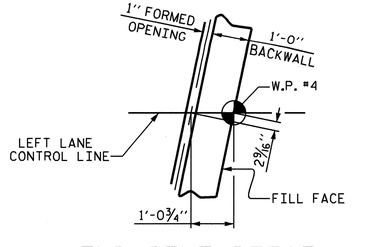


PLAN OF SPAN "C"



END BENT DETAIL

(END BENT 2)

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 6/3/09
CHECKED BY : T.L. CLELLAND DATE : 1/4/10

27-JUL-2010 14:51
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LSUTTON

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 3 OF 3

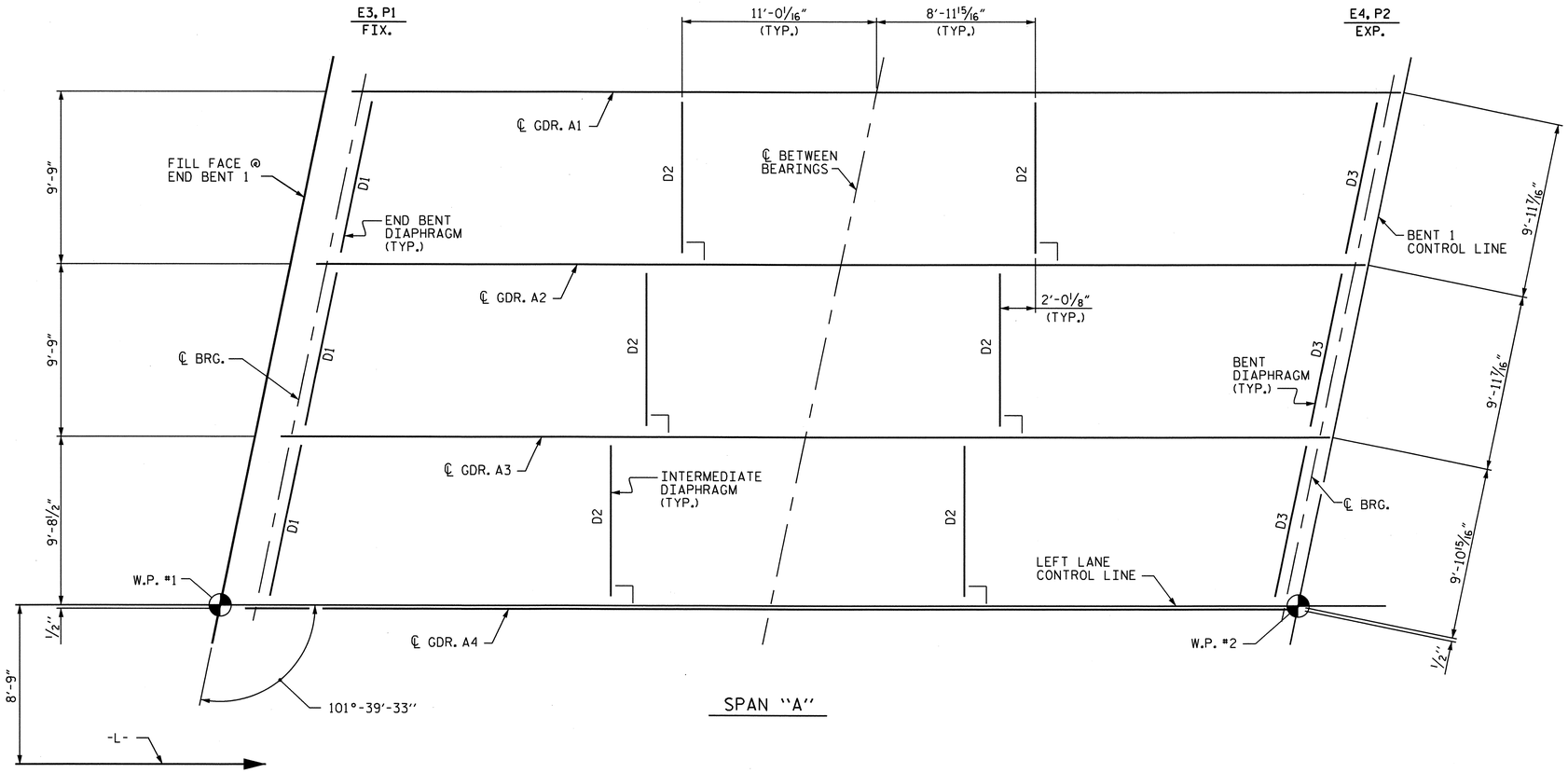
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			146

STR. #1



SPAN "A"

FRAMING PLAN

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 5/26/09
CHECKED BY : T.L. CLELLAND DATE : 1/5/10

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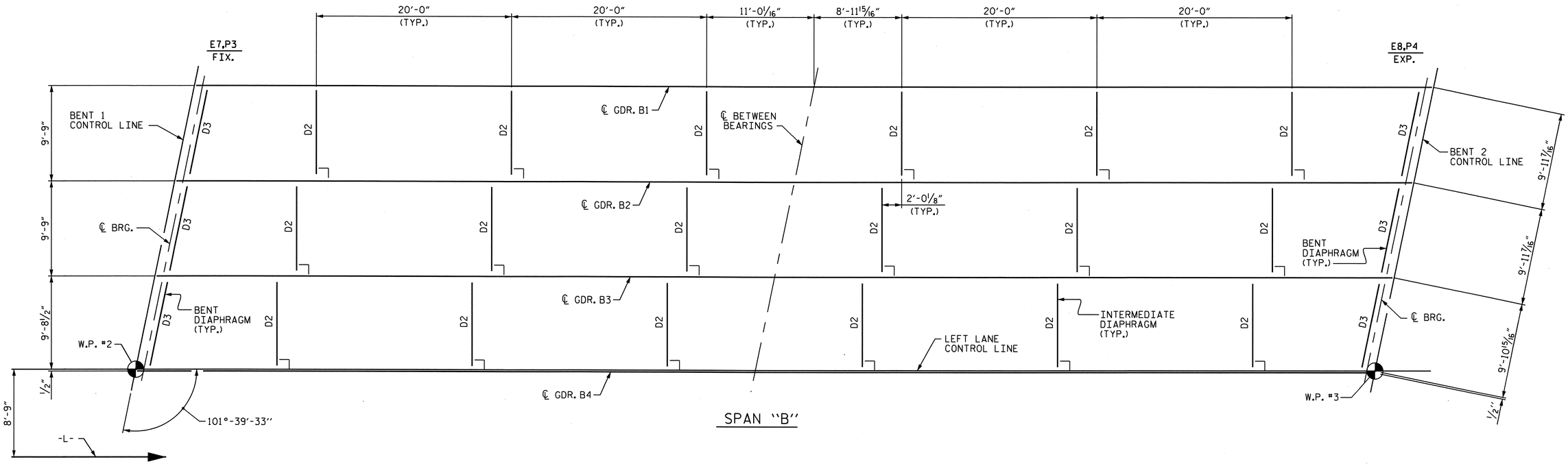

SPAN "B"

FRAMING PLAN

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 5/26/09
CHECKED BY : T.L. CLELLAND DATE : 1/5/10

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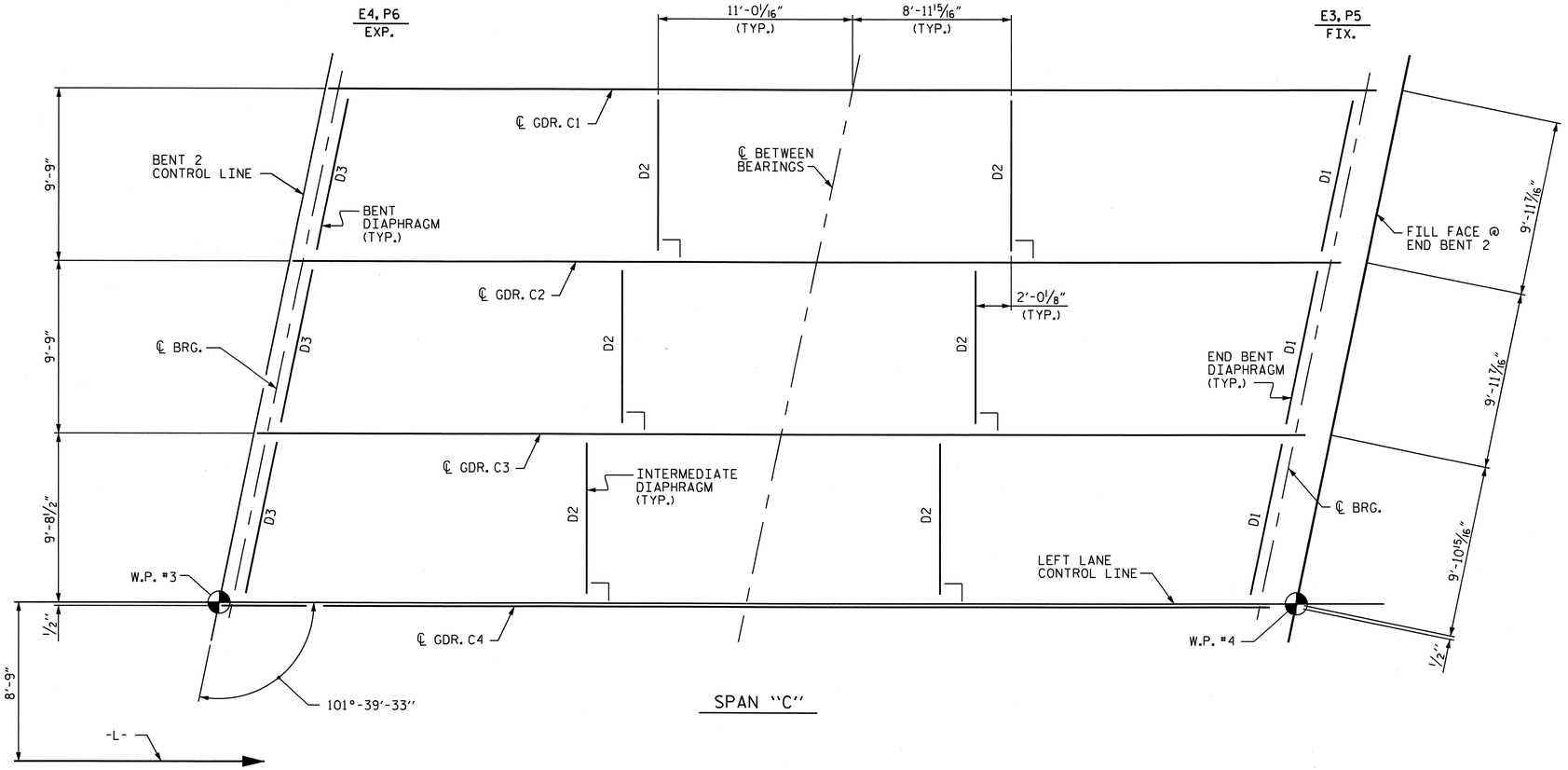

SPAN "C"

FRAMING PLAN

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 5/26/09
CHECKED BY : T.L. CLELLAND DATE : 1/5/10

27-JUL-2010 14:51
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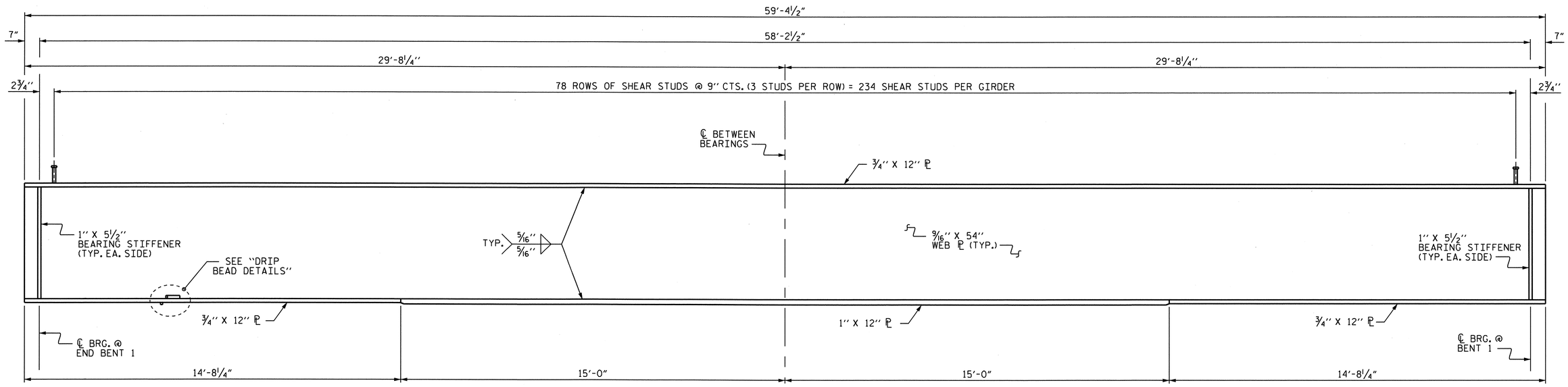
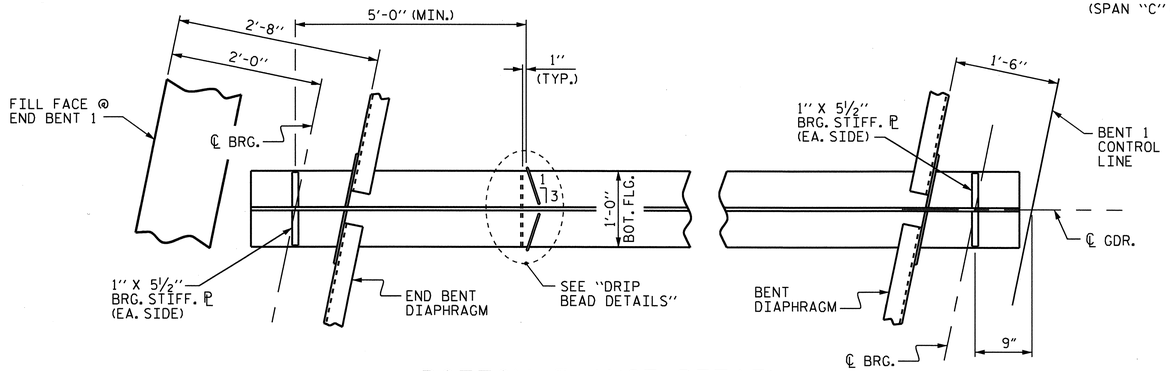


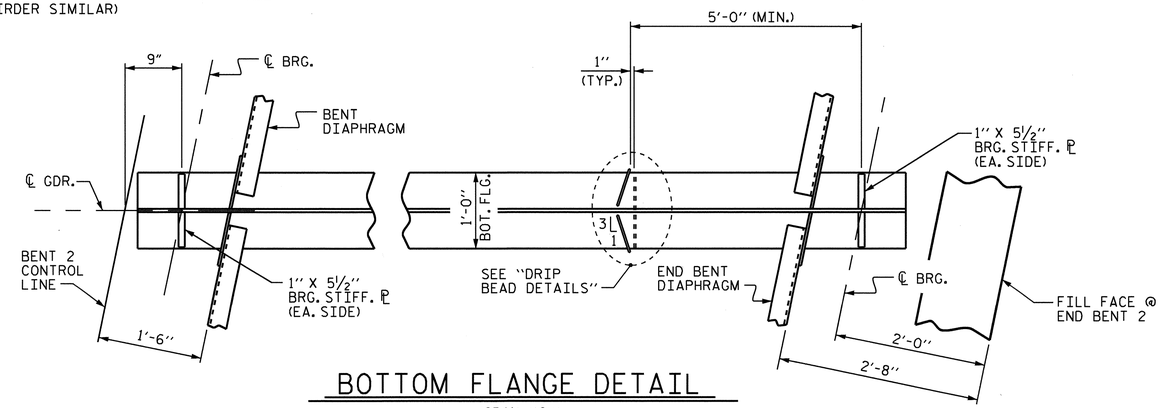
GIRDER ELEVATION-SPAN "A"

(SPAN "C" GIRDER SIMILAR)



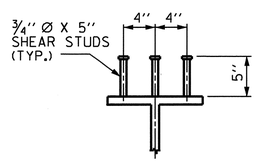
BOTTOM FLANGE DETAIL

(SPAN "A")
(FOR CLARITY, INTERMEDIATE DIAPHRAGMS NOT SHOWN.)

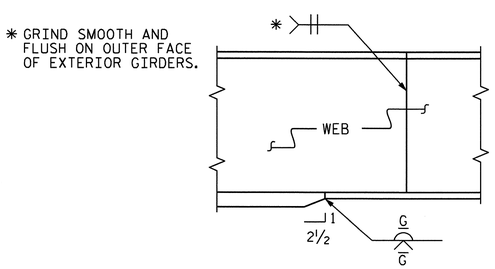


BOTTOM FLANGE DETAIL

(SPAN "C")
(FOR CLARITY, INTERMEDIATE DIAPHRAGMS NOT SHOWN.)

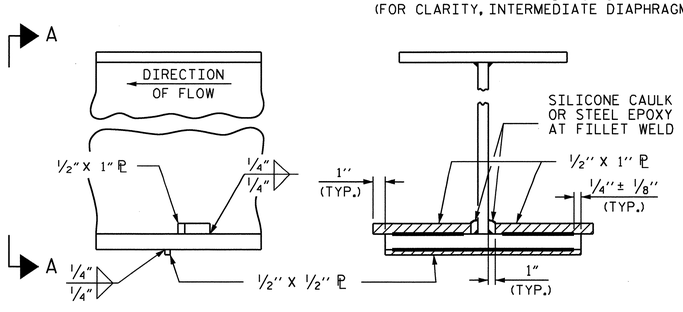


SHEAR STUD DETAILS



ELEVATION

TYPICAL FLANGE AND WEB BUTT JOINT



SECTION VIEW A-A

DRIP BEAD DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— LEFT LANE —

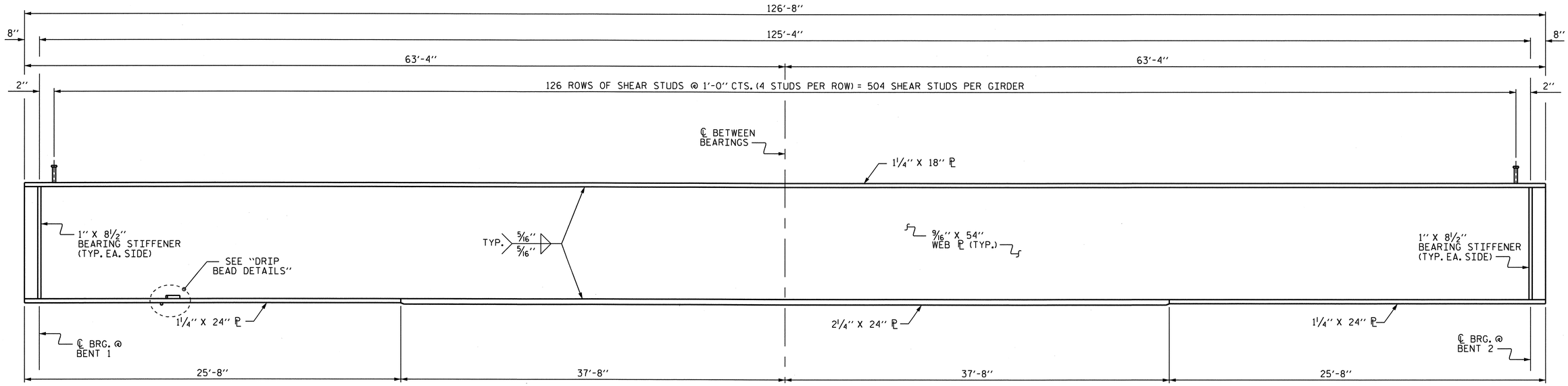
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/29/10

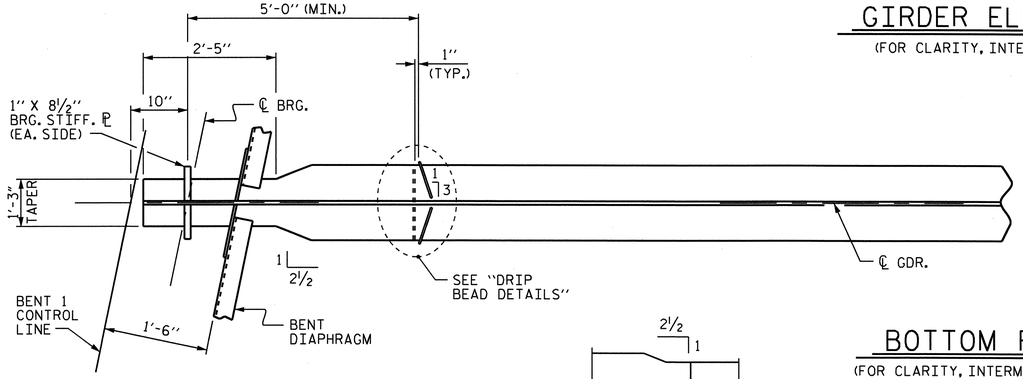
DRAWN BY : A.S. CALLAWAY DATE : 6/1/09
CHECKED BY : T.L. CLELLAND DATE : 1/6/10

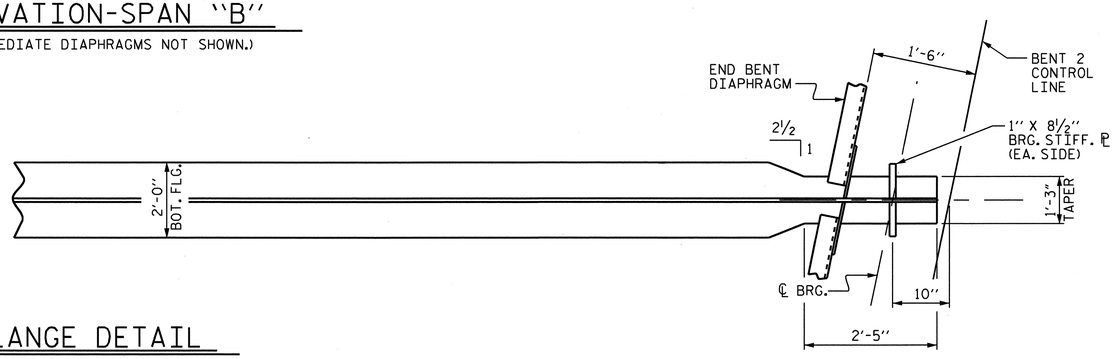
27-JUL-2010 14:51
R:\Structures\str01\scallaway\Microstation\U3110b_sd_SS_01.dgn
LSUTTON



GIRDER ELEVATION-SPAN ''B''

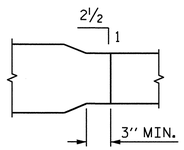
(FOR CLARITY, INTERMEDIATE DIAPHRAGMS NOT SHOWN.)



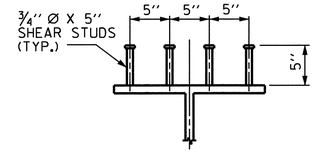


BOTTOM FLANGE DETAIL

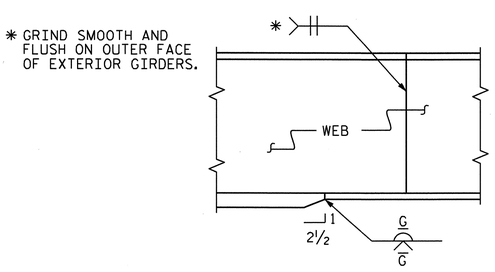
(FOR CLARITY, INTERMEDIATE DIAPHRAGMS NOT SHOWN.)



PLAN-FLANGE SPLICE

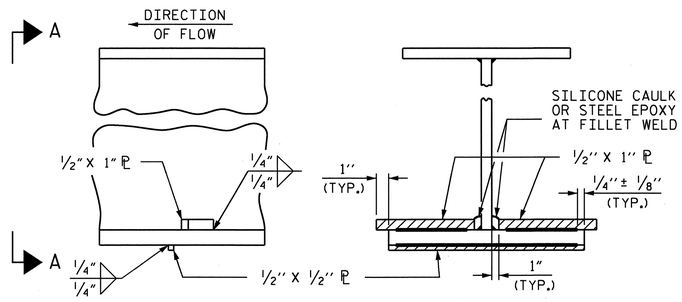


SHEAR STUD DETAILS



ELEVATION

TYPICAL FLANGE AND WEB BUTT JOINT



SECTION VIEW A-A

DRIP BEAD DETAILS

DRAWN BY : A.S. CALLAWAY DATE : 6/1/09
CHECKED BY : T.L. CLELLAND DATE : 1/6/10

27-JUL-2010 14:51
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LSUTTON

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

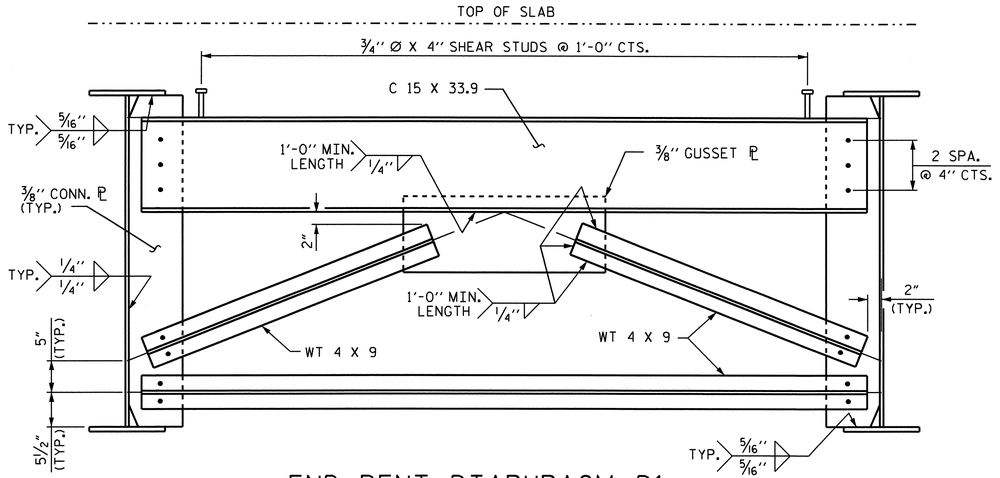
SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

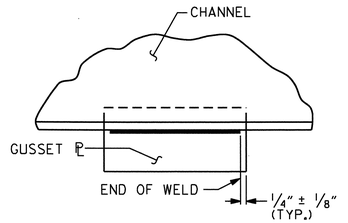
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			146

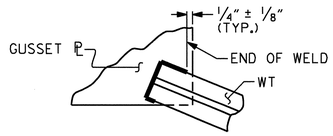
STR. #1



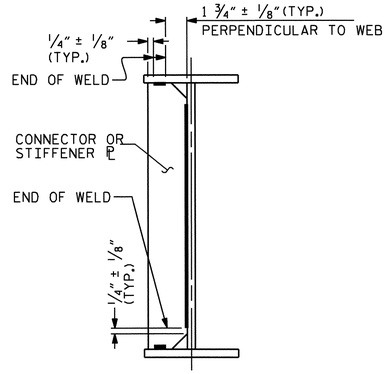
END BENT DIAPHRAGM D1



TYP. GUESSET PL CONNECTION



TYP. "TEE" TO GUESSET PL CONNECTION



TYP. STIFFENER OR CONNECTOR PL CONNECTION

WELD TERMINATION DETAILS

NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED. FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

A CHARPY V-NOTCH TEST IS REQUIRED FOR WEB PLATES AND BOTTOM FLANGE PLATES FOR ALL GIRDERS AND IN ACCORDANCE WITH ARTICLE 1072-9 OF THE STANDARD SPECIFICATIONS.

CAMBERED GIRDER LENGTHS SHALL BE ADJUSTED AND BEARINGS ARE TO BE PLACED ON THE CAMBERED GIRDER SO AS TO BE ALIGNED WITH THE ANCHORS AFTER THE DEAD LOAD DEFLECTION HAS OCCURRED. SHOP DRAWINGS SHALL BE PREPARED ACCORDINGLY.

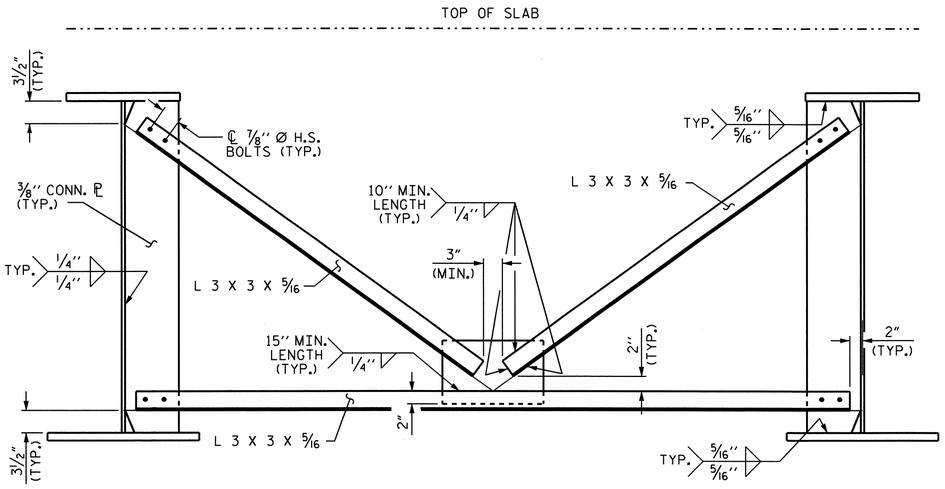
SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

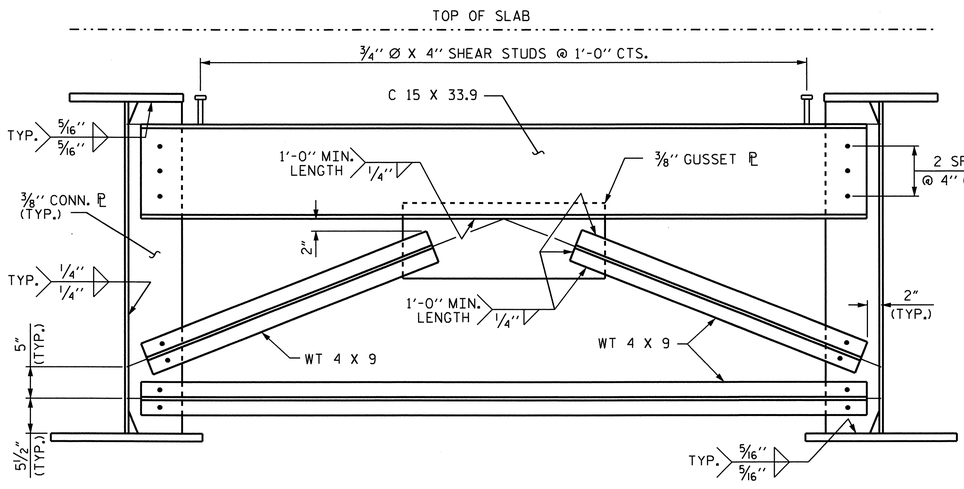
TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS. FOR DIRECT TENSION INDICATORS, SEE SPECIAL PROVISIONS.

END OF GIRDERS SHALL BE PLUMB.

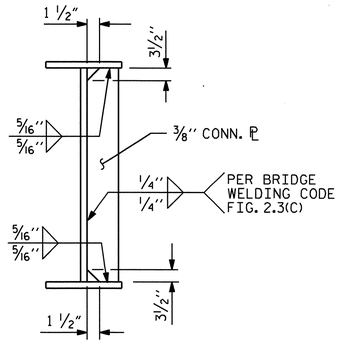
BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE TO AVOID INTERFERENCE WITH THE ANCHOR BOLT.



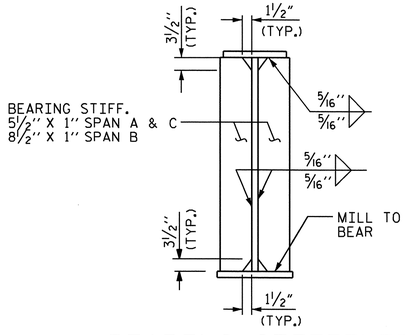
INTERMEDIATE DIAPHRAGM D2



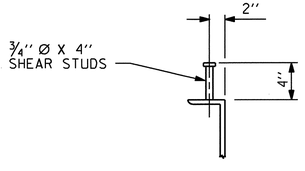
BENT DIAPHRAGM D3



CONNECTOR PLATE



BEARING STIFFENER



SHEAR STUD DETAILS

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
8/27/10

DRAWN BY : A.S. CALLAWAY DATE : 6/1/09
CHECKED BY : T.L. CLELLAND DATE : 1/6/10

27-AUG-2010 11:17
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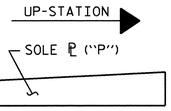
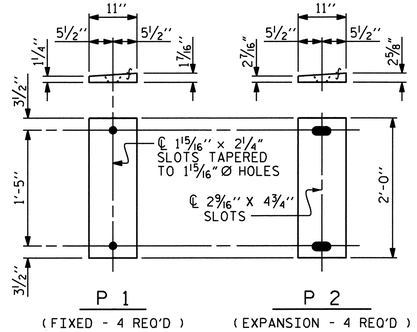
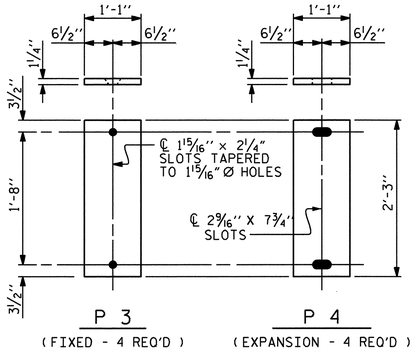
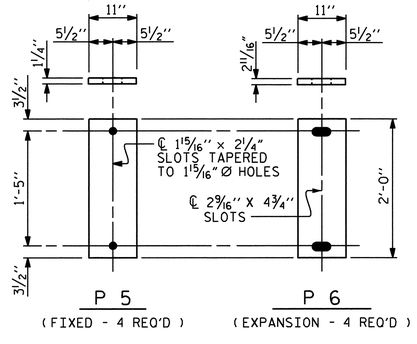


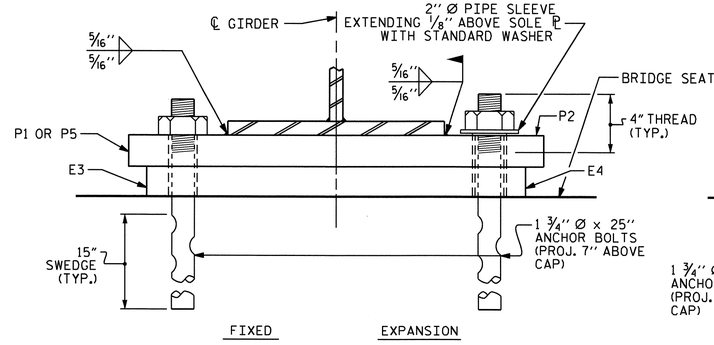
SOLE ℄ PLACEMENT DETAIL



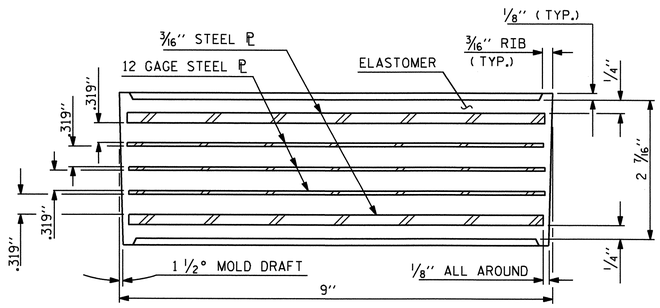




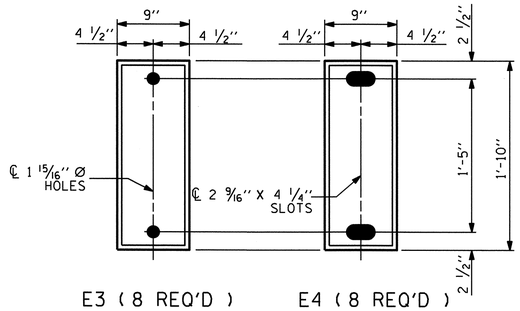
SOLE PLATE DETAILS ("P")



END VIEW



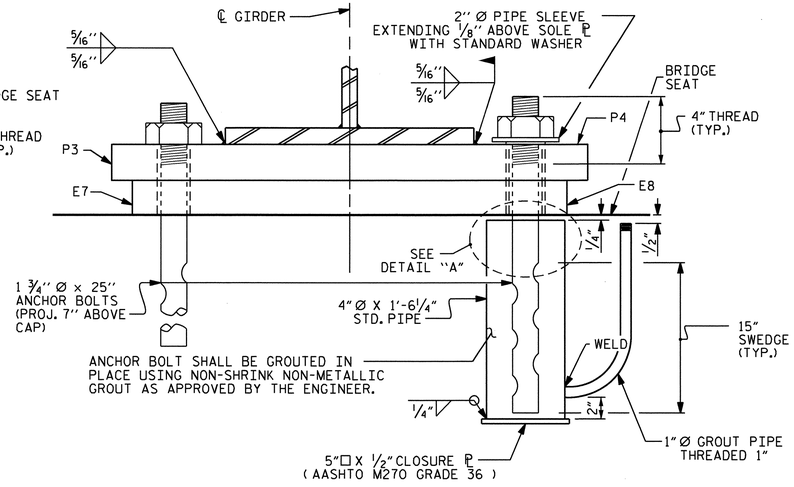
TYPICAL SECTION OF ELASTOMERIC BEARINGS



PLAN VIEW OF ELASTOMERIC BEARING

TYPE II

(60 DUROMETER HARDNESS)



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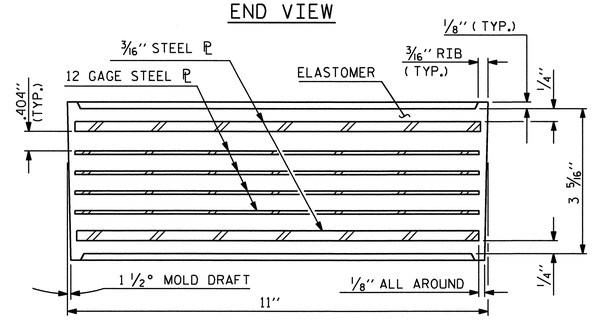
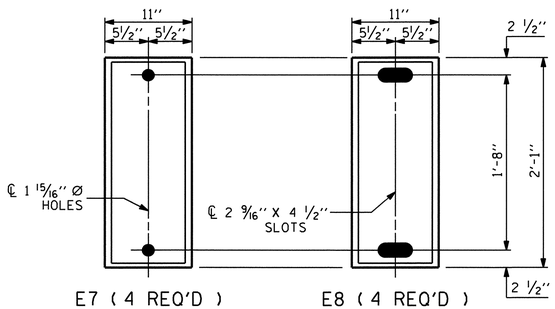


TYPICAL SECTION OF ELASTOMERIC BEARING

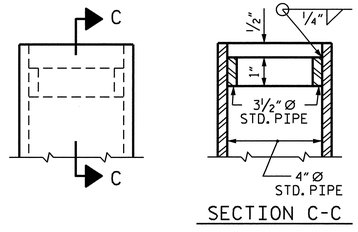


PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV

(60 DUROMETER HARDNESS)

—LOAD RATINGS—	
	MAX.D.L.+L.L.
TYPE II	179 K
TYPE IV	255 K



SECTION C-C

DETAIL "A"

NOTES

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

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

THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE CLOSURE PLATE, GROUT PIPE AND STANDARD PIPE FOR THE EXPANSION ASSEMBLY NEED NOT BE GALVANIZED.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

1. ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED THEN THE ANCHOR BOLTS AND ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60° F.
2. AFTER CENTERING THE ELASTOMERIC BEARING SLOTS AND ANCHOR BOLTS, THE ANCHOR BOLTS SHALL BE GROUTED.

THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

(STEEL SUPERSTRUCTURE)

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
6/27/10

DRAWN BY : A.S. CALLAWAY DATE : 5/26/09
CHECKED BY : T.L. CLELLAND DATE : 1/6/10

27-AUG-2010 11:17
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lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPANS "A" & "C"																																
	GIRDER 1											GIRDERS 2 & 3												GIRDER 4										
TENTH POINTS	BRG.	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	BRG.	BRG.	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	BRG.	BRG.	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.002	0.004	0.005	0.006	0.006	0.006	0.005	0.004	0.002	0	0	0.002	0.004	0.005	0.006	0.006	0.006	0.005	0.004	0.002	0	0	0.002	0.004	0.005	0.006	0.006	0.006	0.005	0.004	0.002	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.000	0.011	0.019	0.025	0.027	0.025	0.019	0.011	0.000	0	0	0.000	0.012	0.021	0.027	0.029	0.027	0.021	0.012	0.000	0	0	0.000	0.011	0.019	0.025	0.027	0.025	0.019	0.011	0.000	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK AND/OR BARRIER RAIL	0	0.002	0.003	0.004	0.005	0.006	0.005	0.004	0.003	0.002	0	0	0.002	0.003	0.004	0.005	0.005	0.005	0.004	0.003	0.002	0	0	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0
TOTAL DEAD LOAD DEFLECTION	0	0.004	0.018	0.028	0.036	0.039	0.036	0.028	0.018	0.004	0	0	0.004	0.019	0.030	0.038	0.040	0.038	0.030	0.019	0.004	0	0	0.003	0.016	0.026	0.033	0.035	0.033	0.026	0.016	0.003	0
VERTICAL CURVE ORDINATE	0	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0	0	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0	0	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0
ORDINATE DUE TO SUPERELEVATION	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
REQUIRED CAMBER	0	1/4"	5/8"	13/16"	1"	1 1/16"	1"	13/16"	5/8"	1/4"	0	0	1/4"	5/8"	7/8"	1"	1 1/16"	1"	7/8"	5/8"	1/4"	0	0	1/4"	9/16"	13/16"	1"	1"	1"	13/16"	9/16"	1/4"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " REQUIRED CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN "B"																					
	GIRDER 1																					
TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.045	0.058	0.069	0.079	0.087	0.092	0.096	0.097	0.096	0.092	0.087	0.079	0.069	0.058	0.045	0.031	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.051	0.114	0.173	0.226	0.272	0.312	0.343	0.366	0.380	0.385	0.380	0.366	0.343	0.312	0.272	0.226	0.173	0.114	0.051	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK	0	0.011	0.021	0.031	0.040	0.048	0.054	0.060	0.063	0.066	0.066	0.066	0.063	0.060	0.054	0.048	0.040	0.031	0.021	0.011	0
TOTAL DEAD LOAD DEFLECTION	0	0.078	0.166	0.249	0.324	0.389	0.445	0.490	0.521	0.542	0.548	0.542	0.521	0.490	0.445	0.389	0.324	0.249	0.166	0.078	0
VERTICAL CURVE ORDINATE	0	0.044	0.084	0.119	0.150	0.175	0.196	0.213	0.224	0.231	0.234	0.231	0.224	0.213	0.196	0.175	0.150	0.119	0.084	0.044	0
ORDINATE DUE TO SUPERELEVATION	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
REQUIRED CAMBER	0	1 7/16"	3"	4 7/16"	5 11/16"	6 3/4"	7 11/16"	8 7/16"	8 15/16"	9 1/4"	9 3/8"	9 1/4"	8 15/16"	8 7/16"	7 11/16"	6 3/4"	5 11/16"	4 7/16"	3"	1 7/16"	0
	GIRDERS 2 & 3																					
TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.032	0.047	0.060	0.071	0.081	0.089	0.095	0.098	0.099	0.098	0.095	0.089	0.081	0.071	0.060	0.047	0.032	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.052	0.115	0.174	0.227	0.274	0.314	0.345	0.368	0.383	0.387	0.383	0.368	0.345	0.314	0.274	0.227	0.174	0.115	0.052	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK AND BARRIER RAIL	0	0.011	0.021	0.031	0.040	0.047	0.054	0.059	0.063	0.065	0.066	0.065	0.063	0.059	0.054	0.047	0.040	0.031	0.021	0.011	0
TOTAL DEAD LOAD DEFLECTION	0	0.079	0.168	0.252	0.327	0.392	0.449	0.493	0.526	0.546	0.552	0.546	0.526	0.493	0.449	0.392	0.327	0.252	0.168	0.079	0
VERTICAL CURVE ORDINATE	0	0.044	0.084	0.119	0.150	0.175	0.196	0.213	0.224	0.231	0.234	0.231	0.224	0.213	0.196	0.175	0.150	0.119	0.084	0.044	0
ORDINATE DUE TO SUPERELEVATION	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
REQUIRED CAMBER	0	1 1/2"	3"	4 7/16"	5 3/4"	6 13/16"	7 3/4"	8 1/2"	9"	9 5/16"	9 7/16"	9 5/16"	9"	8 1/2"	7 3/4"	6 13/16"	5 3/4"	4 7/16"	3"	1 1/2"	0
	GIRDER 4																					
TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.046	0.058	0.070	0.079	0.087	0.092	0.096	0.097	0.096	0.092	0.087	0.079	0.070	0.058	0.046	0.031	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.051	0.114	0.173	0.226	0.272	0.312	0.343	0.366	0.380	0.385	0.380	0.366	0.343	0.312	0.272	0.226	0.173	0.114	0.051	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.004	0.008	0.012	0.015	0.018	0.020	0.022	0.023	0.024	0.025	0.024	0.023	0.022	0.020	0.018	0.015	0.012	0.008	0.004	0
TOTAL DEAD LOAD DEFLECTION	0	0.071	0.153	0.231	0.299	0.360	0.411	0.452	0.481	0.500	0.507	0.500	0.481	0.452	0.411	0.360	0.299	0.231	0.153	0.071	0
VERTICAL CURVE ORDINATE	0	0.044	0.084	0.119	0.150	0.175	0.196	0.213	0.224	0.231	0.234	0.231	0.224	0.213	0.196	0.175	0.150	0.119	0.084	0.044	0
ORDINATE DUE TO SUPERELEVATION	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
REQUIRED CAMBER	0	1 3/8"	2 7/8"	4 3/16"	5 3/8"	6 7/16"	7 5/16"	8"	8 7/16"	8 3/4"	8 7/8"	8 3/4"	8 7/16"	8"	7 5/16"	6 7/16"	5 3/8"	4 3/16"	2 7/8"	1 3/8"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
DEAD LOAD DEFLECTIONS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			146

STR. #1

DRAWN BY : A.S. CALLAWAY DATE : 5/28/09
CHECKED BY : T.L. CLELLAND DATE : 1/6/10

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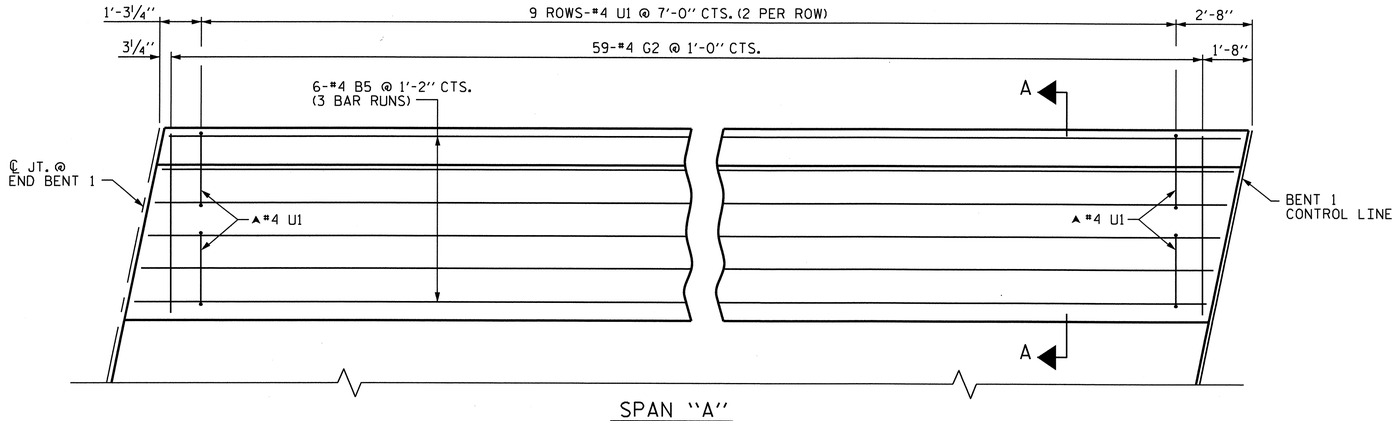
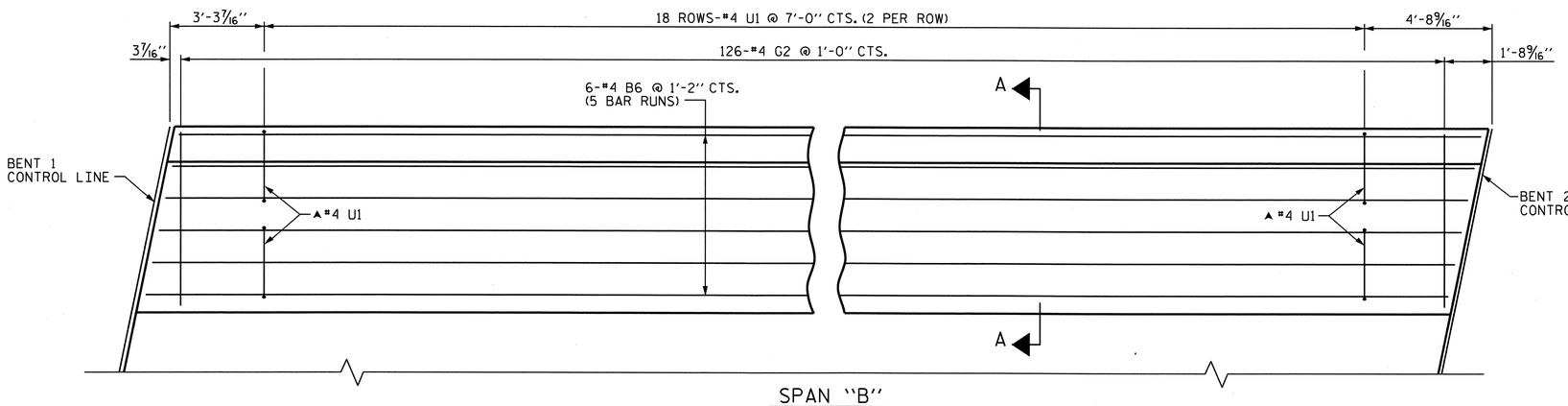
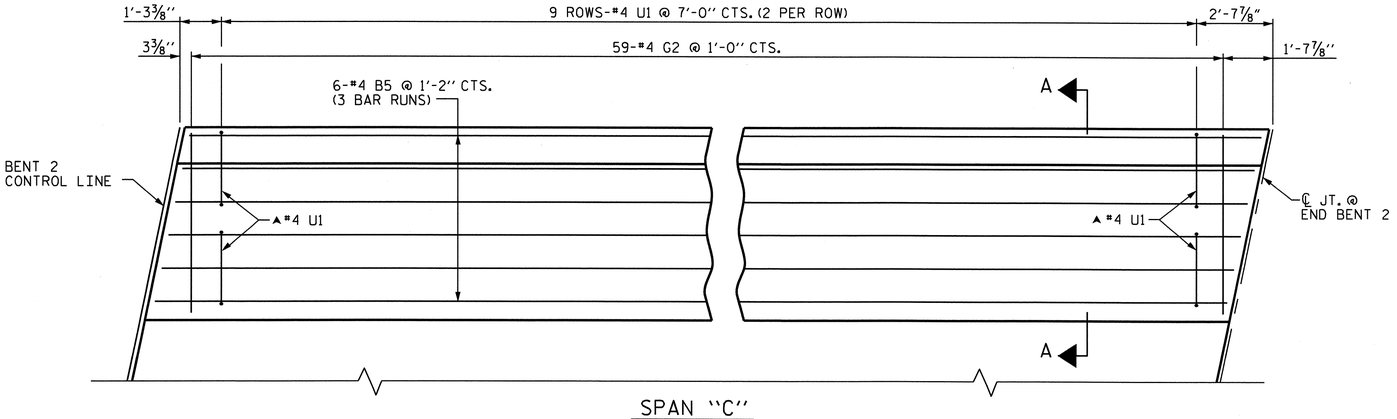


SPAN ''A''



SPAN ''B''



SPAN ''C''

PLAN OF SIDEWALKS

NOTES

ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.

FOR SIDEWALK QUANTITIES, SEE ''SUPERSTRUCTURE BILL OF MATERIAL'' SHEET. THE PAYMENT FOR THE SIDEWALK SHALL BE INCLUDED IN THE SQUARE FOOT PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

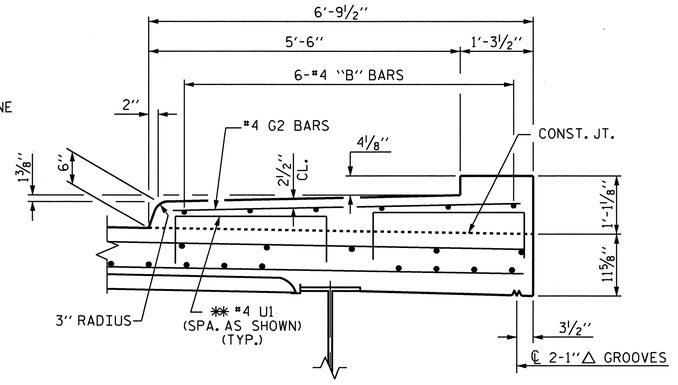
FOR SIDEWALK COVER PLATE DETAILS AT BENT 1 AND BENT 2, SEE ''TYPICAL SECTION DETAILS'' SHEETS.

FOR SIDEWALK COVER PLATE DETAILS AT END BENT 1 AND END BENT 2, SEE ''BRIDGE APPROACH SLAB DETAILS'' SHEETS.

THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.

GROOVED CONTRACTION JOINTS ½'' IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

▲ THE ''U'' BARS CLOSEST TO THE JOINTS SHALL BE PLACED AFTER THE SAWING OF THE JOINTS. THE HOLES SHALL BE DRILLED AND THE ''U'' BARS GROUTED INTO PLACE.



SECTION A-A

✱✱ #4 U1 MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SIDEWALK DETAILS

— LEFT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			146

STR. #1

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CHECKED BY : T.L. CLELLAND DATE : 6/4/09

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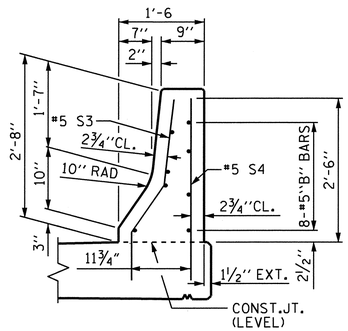
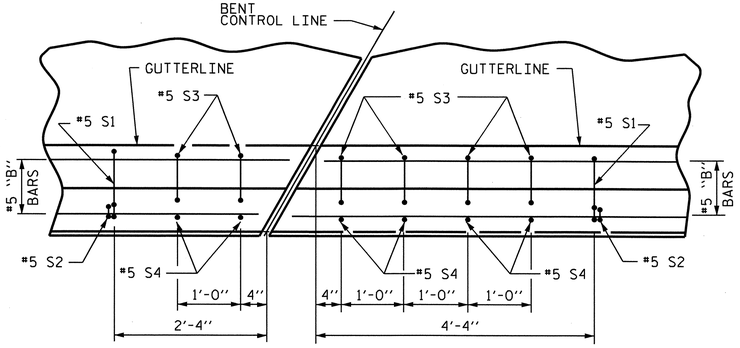


END VIEW



PLAN

END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWED JOINTS

NOTES

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

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

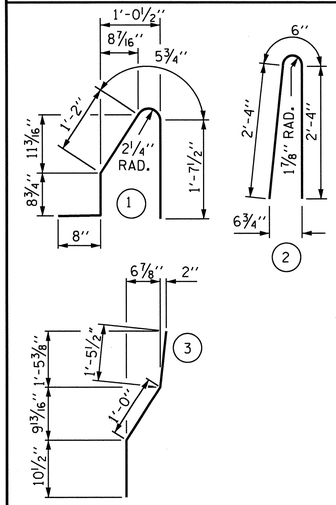
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

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 #5 S1 AND #5 S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, IN ORDER TO MAINTAIN 2'' MIN. CLEARANCE TO THE ½'' EXPANSION JOINT MATERIAL.

BAR TYPES



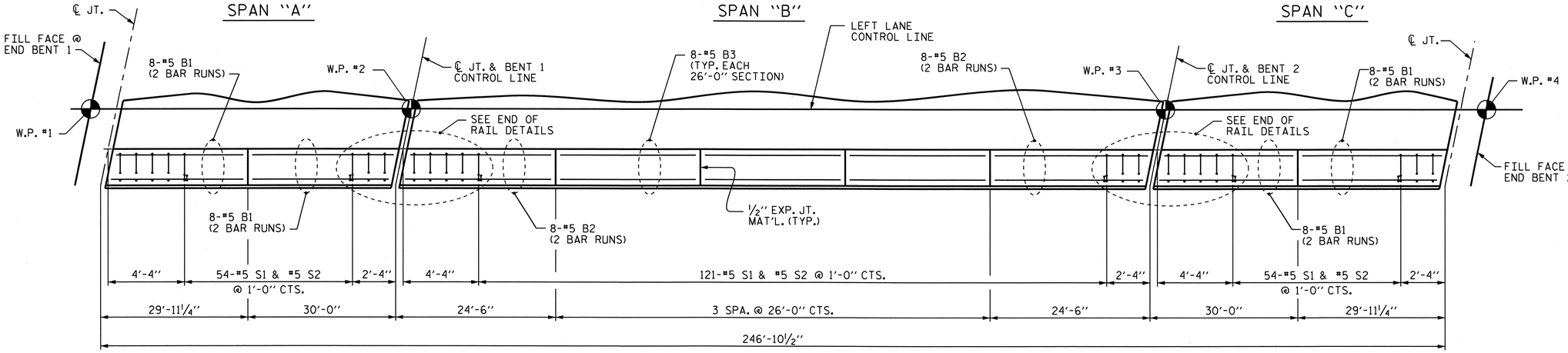
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

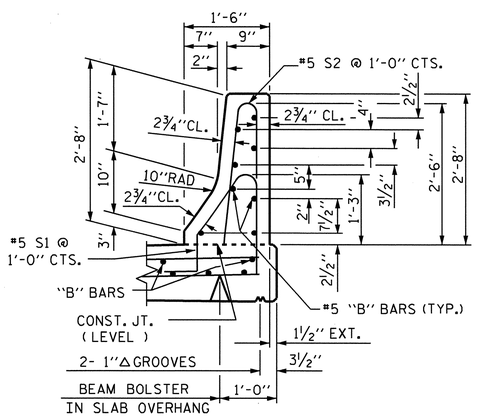
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	64	#5	STR	16'-8''	1113
* B2	32	#5	STR	13'-11''	464
* B3	24	#5	STR	25'-7''	640
* S1	229	#5	1	4'-8''	1115
* S2	229	#5	2	5'-2''	1234
* S3	18	#5	3	3'-4''	63
* S4	18	#5	STR	3'-2''	59

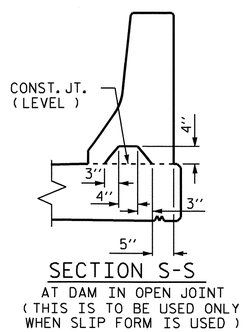
* EPOXY COATED REINFORCING STEEL	LBS.	4,688
CLASS AA CONCRETE	CU. YDS.	24.7
CONCRETE BARRIER RAIL	LIN. FT.	246.88



PLAN

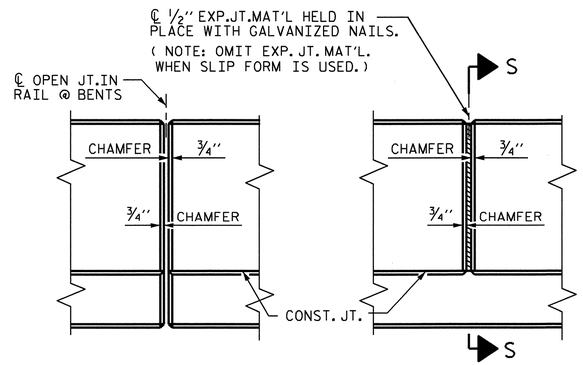


SECTION THRU RAIL



SECTION S-S

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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE
BARRIER RAIL

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			146

STR. #1

STD. NO. CBR1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

ASSEMBLED BY : A.S. CALLAWAY DATE : 5/27/09			
CHECKED BY : T.L. CLELLAND DATE : 1/6/10			
DRAWN BY : ARB 5/87	REV. 10/17/00	RWW/LES	
CHECKED BY : SJD 9/87	REV. 5/1/03R	RWW/JTE	
	REV. 5/1/06R	TLA/GM	

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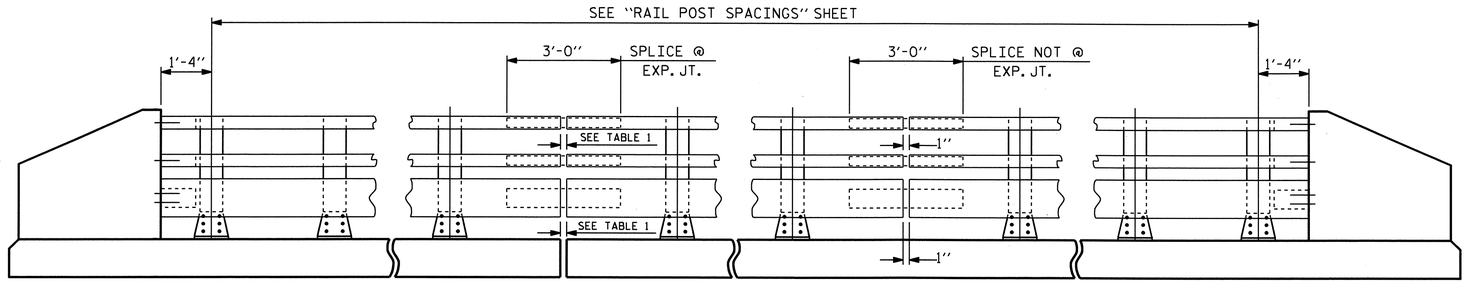
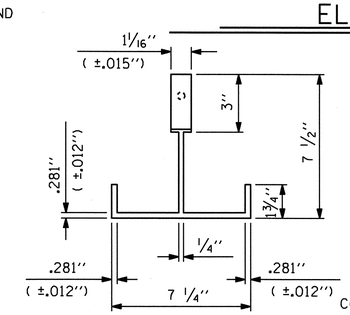


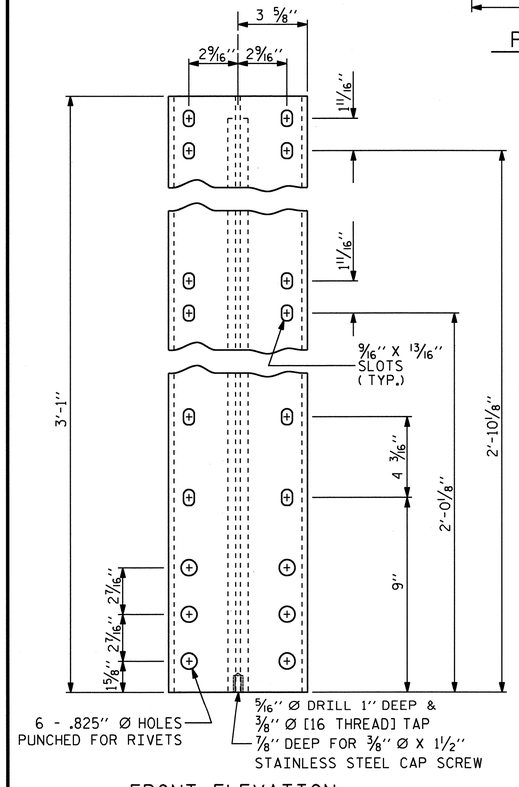
NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

ELEVATION

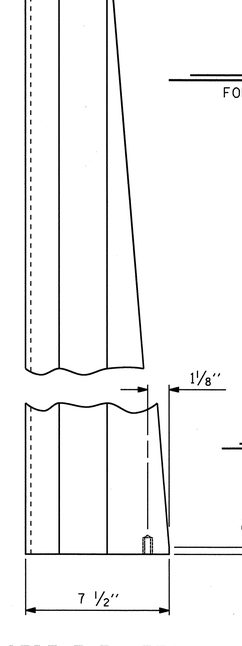
TABLE 1	
℄ EXP.JT. @ BENT	RAIL OPENING
BENT No. 1	1⅞"
BENT No. 2	2½"



PLAN

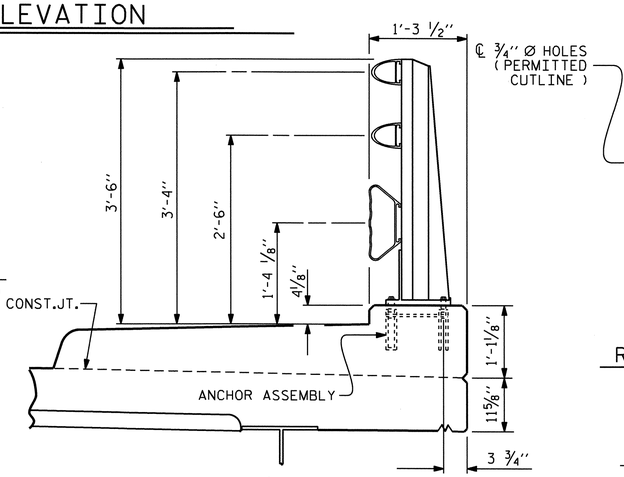


FRONT ELEVATION



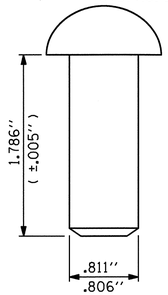
SIDE ELEVATION

DETAILS OF POST

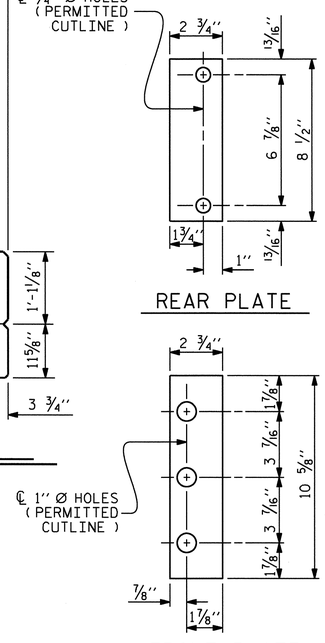


SECTION THRU RAIL

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD. No. BMR6



RIVET DETAIL

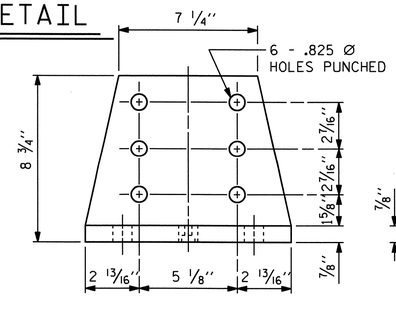


REAR PLATE

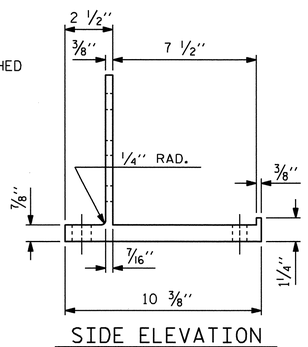
FRONT PLATE

SHIM DETAILS

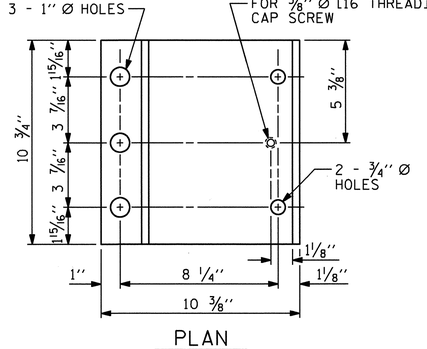
NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



FRONT ELEVATION



SIDE ELEVATION



PLAN

POST BASE DETAILS

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6.

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

PAY LENGTH = 239.06 LIN.FT.

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			146

STR. #1

STD. NO. BMR5

ASSEMBLED BY : A.S. CALLAWAY	DATE : 5/26/09	
CHECKED BY : T.L. CLELLAND	DATE : 1/7/10	
DRAWN BY : JMB 1/88	REV. 10/17/00	RWW/LES
CHECKED BY : GGH 1/88	REV. 5/7/03	RWW/JTE
	REV. 5/1/06	TLA/GM

27-JUL-2010 14:51
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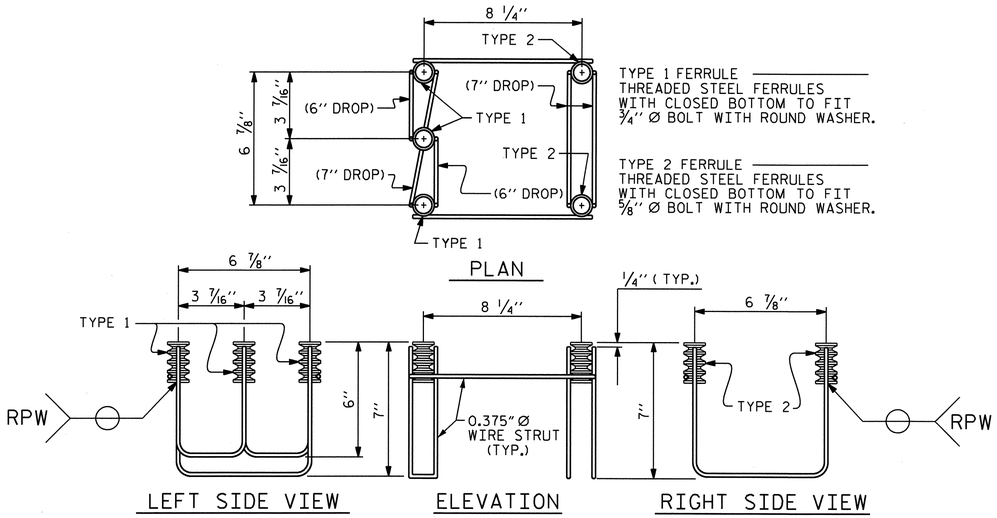
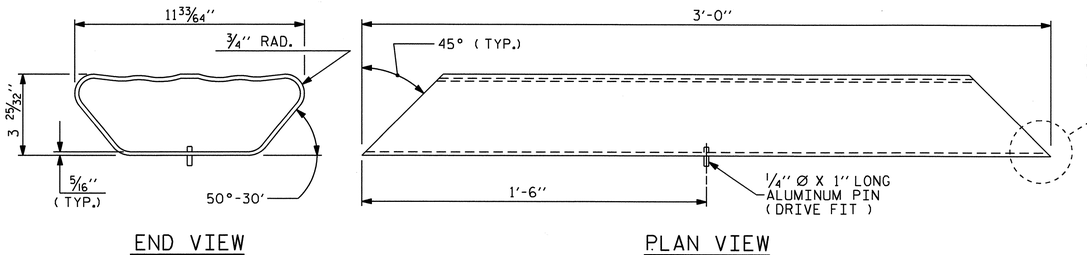
LSUTTON



5-BOLT METAL RAIL ANCHOR ASSEMBLY

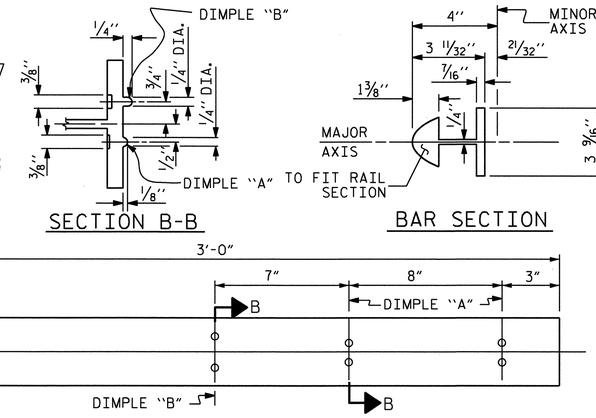
(41 ASSEMBLIES REQUIRED)



END VIEW

PLAN VIEW

BOTTOM RAIL EXPANSION BAR

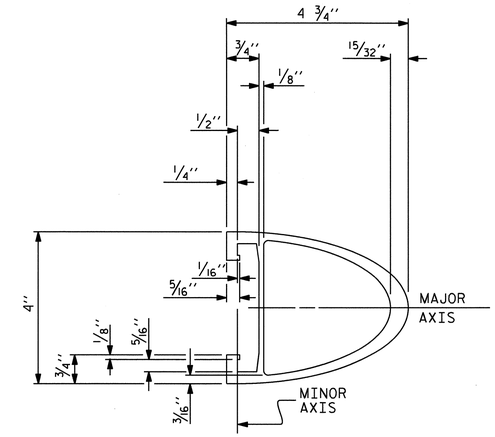


BACK ELEVATION

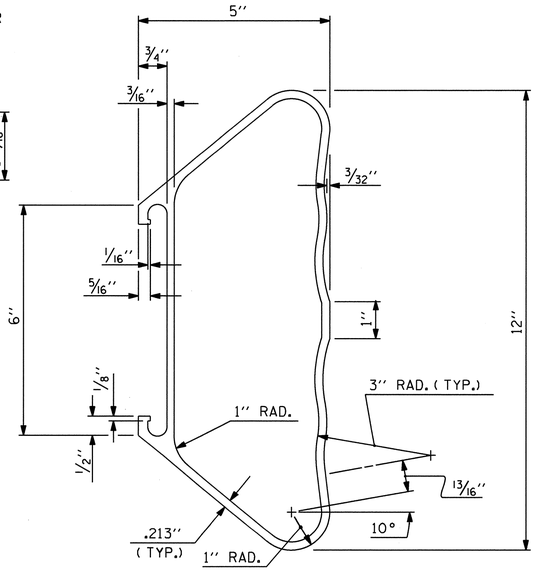
TOP & MIDDLE RAIL EXPANSION BAR

SECTION B-B

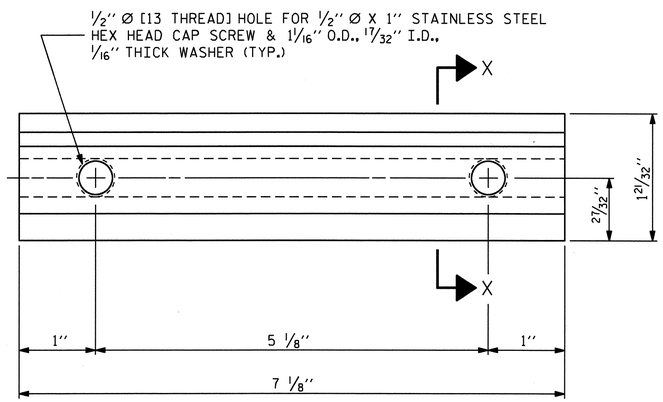
BAR SECTION



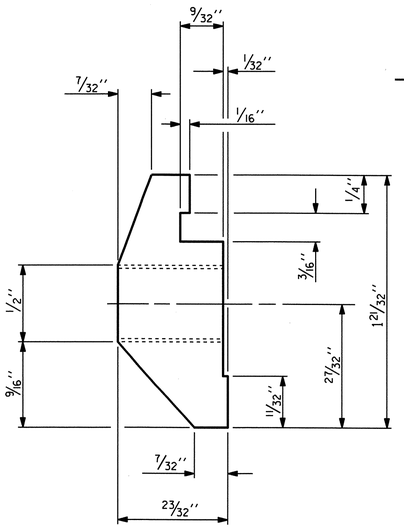
TOP & MIDDLE RAIL SECTION



BOTTOM RAIL SECTION



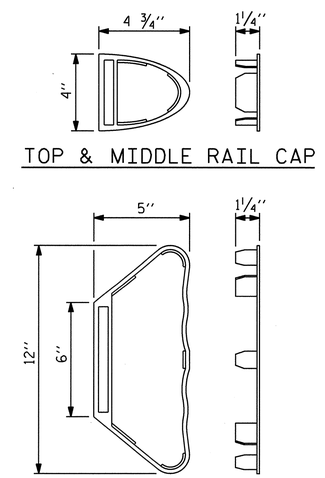
ELEVATION



SECTION X-X

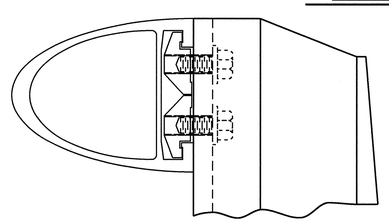
CLAMP BAR DETAIL

(6 REQUIRED PER POST)



TOP & MIDDLE RAIL CAP

BOTTOM RAIL CAP



CLAMP ASSEMBLY

TOP RAIL SHOWN
(MIDDLE & BOTTOM RAIL ARE SIMILAR)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 3/4" FOR 5/8" FERRULES.

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

C. 2 - 5/8" Ø X 2 1/4" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 5/8" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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

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

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

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

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— LEFT LANE —

ASSEMBLED BY : A.S. CALLAWAY	DATE : 5/26/09
CHECKED BY : T.L. CLELLAND	DATE : 1/7/10

DRAWN BY : JMB 1/88	REV. 7/10/01 RWW/LES
CHECKED BY : GGH 1/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

STR. #1

STD. NO. BMR6

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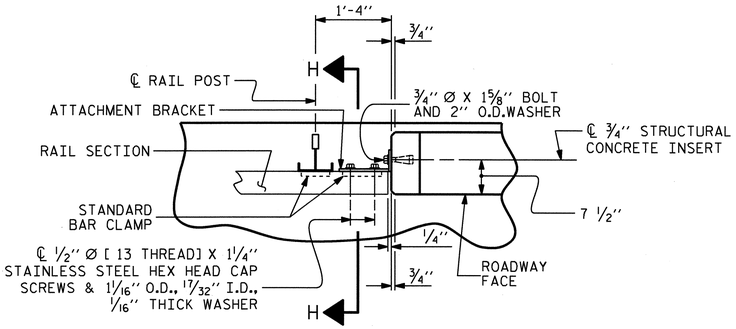
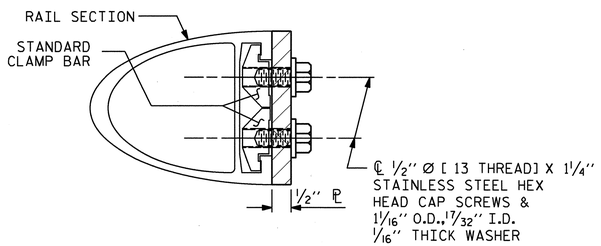


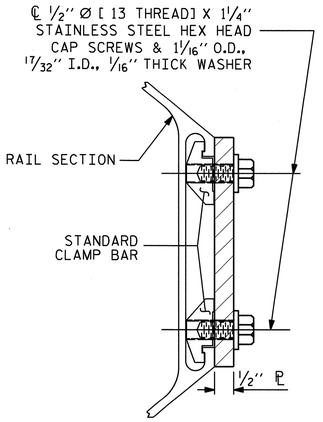
PLAN OF RAIL AND END POST

(STIFFENER ON 1/2" ℙ NOT SHOWN FOR CLARITY)



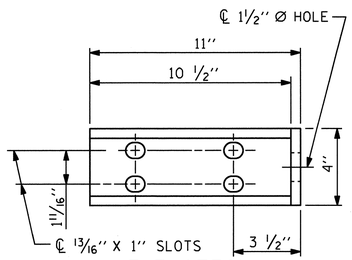
SECTION H-H

(FOR TOP & MIDDLE RAIL)

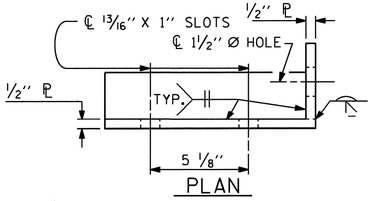


SECTION H-H

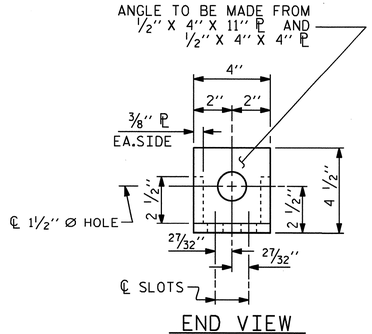
(FOR BOTTOM RAIL)



ELEVATION



PLAN

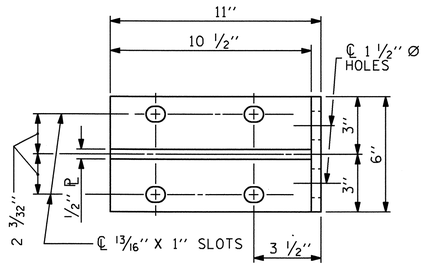


END VIEW

(FIX. AND EXP.)

DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)



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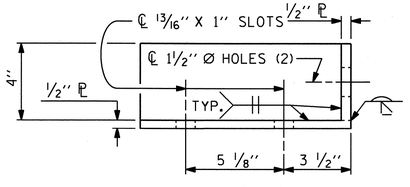

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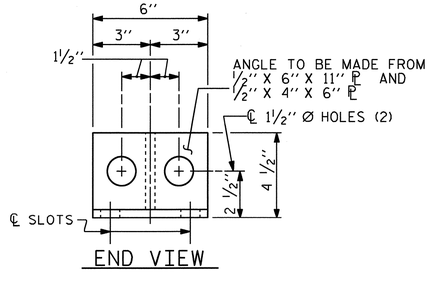


END VIEW

DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)

NOTES

METAL RAIL TO END POST CONNECTION

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

A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

D. STANDARD CLAMP BARS (STD. No. BMR6).

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D.WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

NOTES

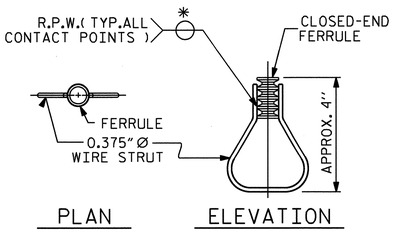
STRUCTURAL CONCRETE INSERT

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".

B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			146

STR. #1

STD. NO. BMR7

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

ASSEMBLED BY : A.S. CALLAWAY DATE : 5/26/09			
CHECKED BY : T.L. CLELLAND DATE : 1/7/10			
DRAWN BY : JMB 1/88	REV. 7/10/01	RWW/LES	
CHECKED BY : GGH 1/88	REV. 5/7/03	RWW/JTE	
	REV. 5/1/06	TLA/GM	

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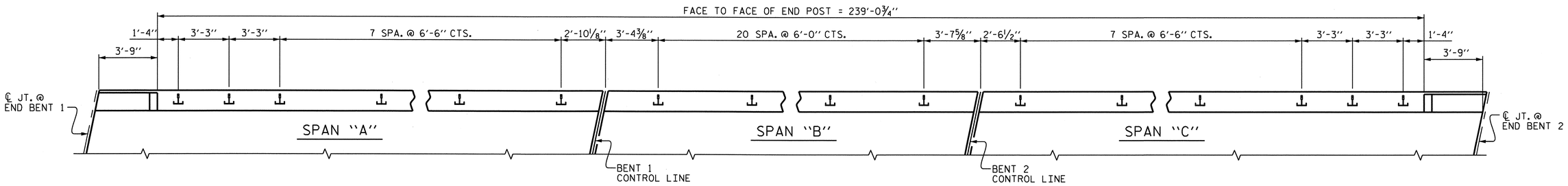
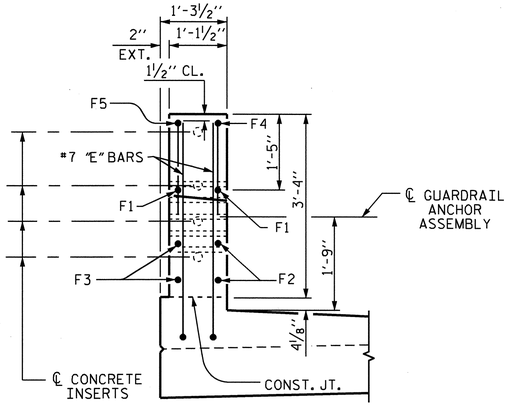
LSUTTON

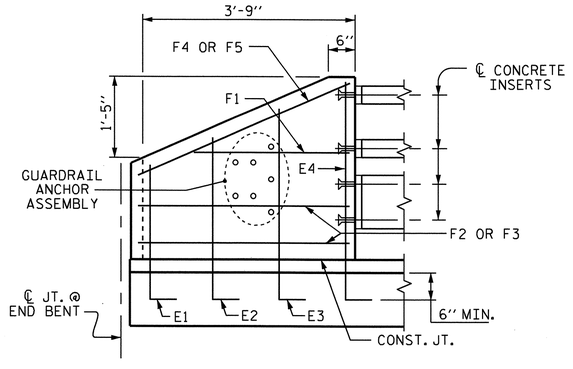
NOTE:
QUANTITIES FOR THE END POSTS ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL.



PLAN OF RAIL POST SPACING



END VIEW



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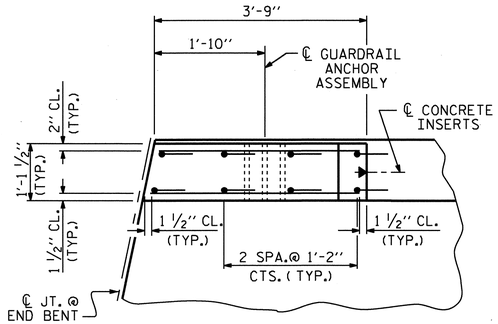

PLAN

END POST DETAILS

(END POST @ END BENT 1 SHOWN, END POST @ END BENT 2 SIMILAR.)

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
RAIL POST SPACINGS AND END OF RAIL DETAILS
— LEFT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			146

DRAWN BY : A.S. CALLAWAY DATE : 6/5/09
CHECKED BY : T.L. CELLAND DATE : 1/7/10

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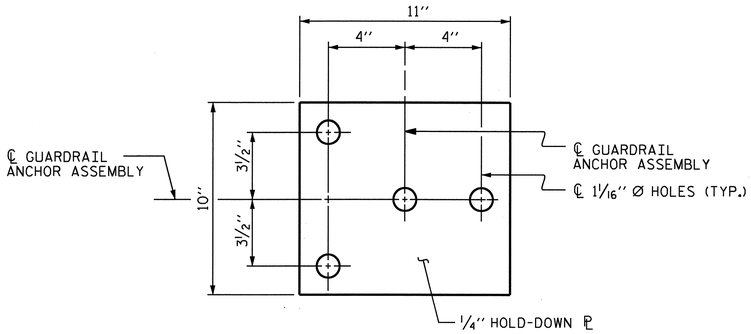
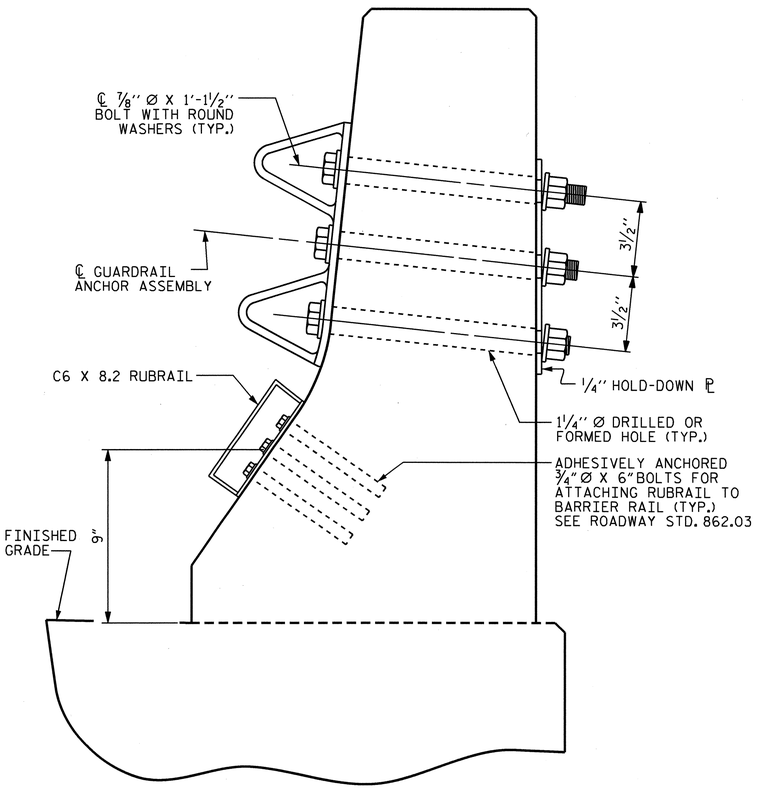
LSUTTON

STR. #1

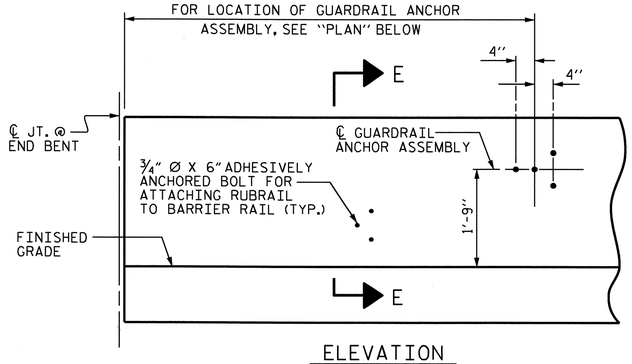


PLAN



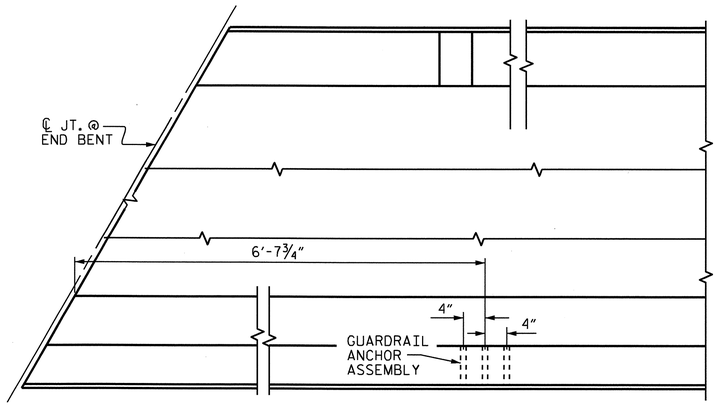
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



ELEVATION

FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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.)

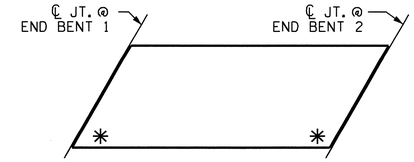
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 1 ¼'' 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 SPECIAL PROVISIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			146

STR. #1

STD. NO. GRA2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 5/27/09
CHECKED BY : T.L. CLELLAND	DATE : 1/6/10
DRAWN BY : TLA 5/06	ADDED 5/1/06R KMM/GM
CHECKED BY : GM 5/06	

27-JUL-2010 14:51
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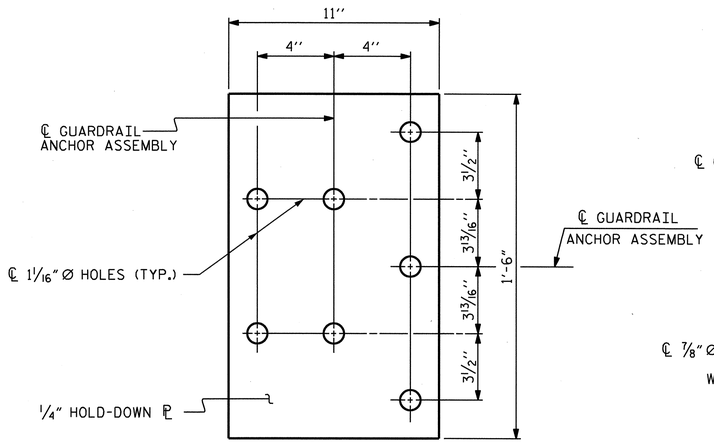
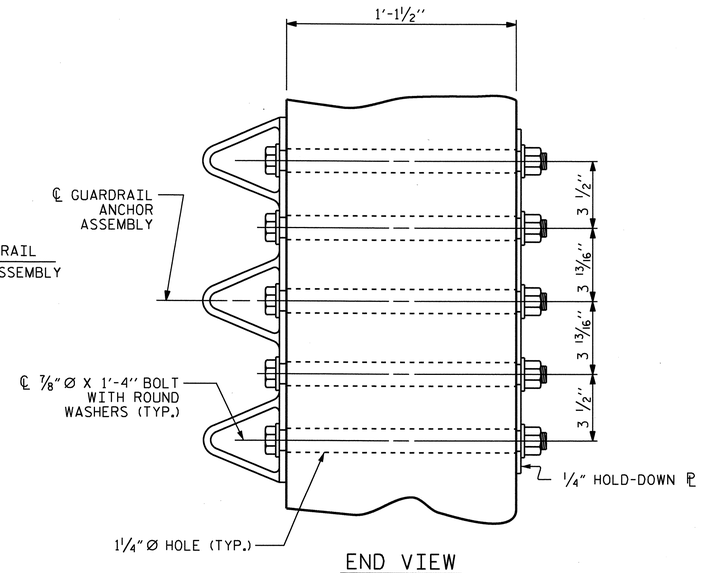
LSUTTON



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

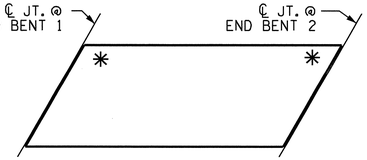
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

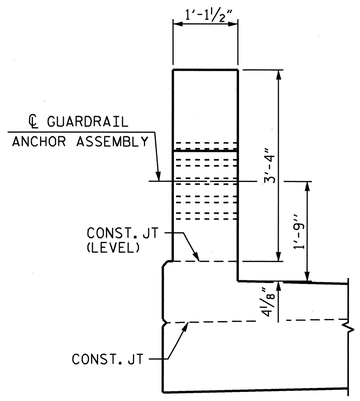
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

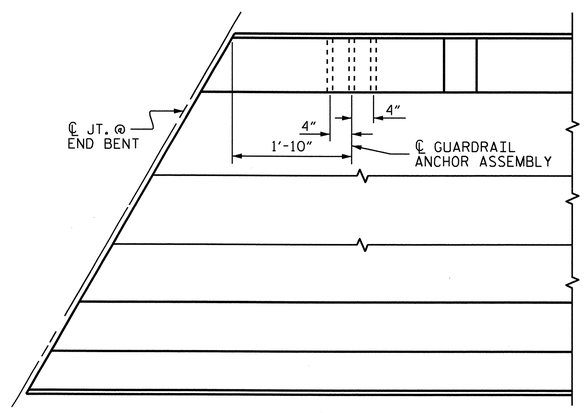


SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(THREE BAR METAL RAIL)



PLAN
END BENT 1 SHOWN, END BENT 2 SIMILAR.

LOCATION OF GUARDRAIL ANCHOR AT END POST

FOR REINFORCMENT IN END POST, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS
FOR METAL RAILS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			146

STR. #1

STD. NO. GRA3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

ASSEMBLED BY : A.S. CALLAWAY DATE : 5/26/09	
CHECKED BY : T.L. CLELLAND DATE : 1/7/10	
DRAWN BY : MAA 7/09	ADDED 4/12/10
CHECKED BY : GM 7/09	

27-JUL-2010 14:51
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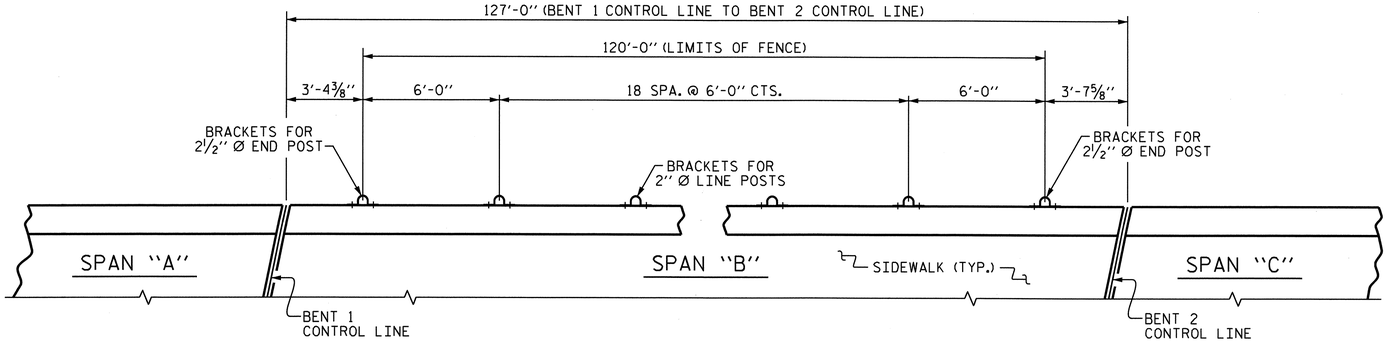
LSUTTON



PLAN OF FENCE POST SPACING

PAY LENGTH = 120.00 LIN. FT.

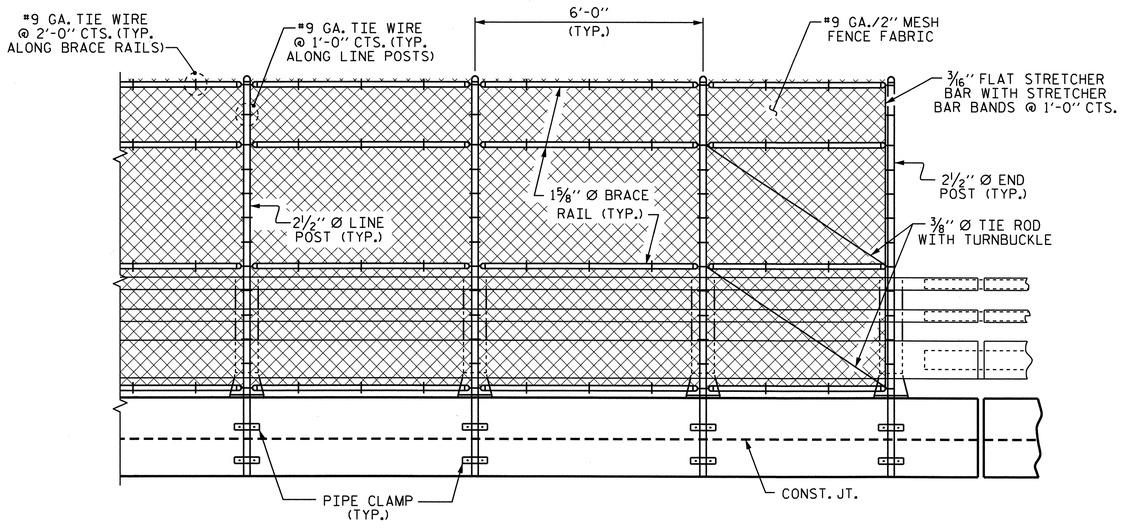
NOTES

FOR BRIDGE MOUNTED CHAIN LINK FENCE, SEE SPECIAL PROVISIONS.

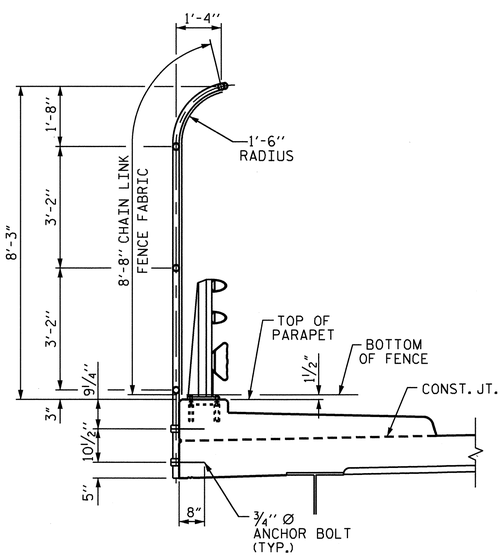
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

FOR SETTING ANCHOR BOLTS, THE CONTRACTOR SHALL USE AN ADHESIVE BONDING SYSTEM. SEE SPECIAL PROVISIONS FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS. LEVEL ONE TESTING OF BONDING SYSTEM IS REQUIRED AND THE YIELD LOAD OF THE 3/4" Ø BOLTS IS 12 KIPS.

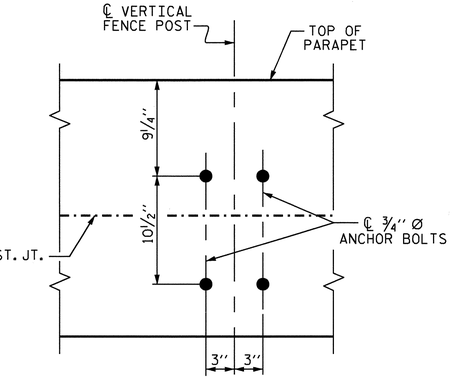
ALL FENCE MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 1050 OF THE STANDARD SPECIFICATIONS. GALVANIZE ALL STEEL PARTS AND HARDWARE IN ACCORDANCE WITH ARTICLE 1076 OF THE STANDARD SPECIFICATIONS.



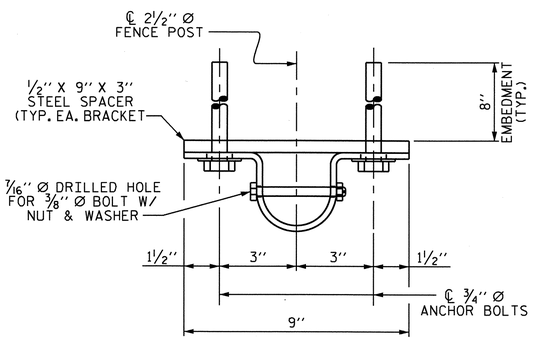
PARTIAL ELEVATION



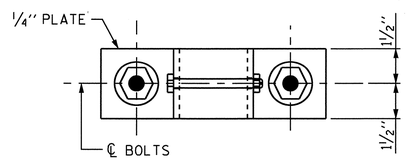
SECTION THRU FENCE



BOLT SETTING PLAN



PLAN



ELEVATION

PIPE CLAMP DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BRIDGE MOUNTED CHAIN LINK FENCE

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 4/19/10
CHECKED BY : W.F. PARKER DATE : 4/29/10

27-JUL-2010 14:51
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LSUTTON

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	1,188 SQ.FT.
BRIDGE DECK	6,065 SQ.FT.
TOTAL	7,253 SQ.FT.

BILL OF MATERIAL

SPAN "A"

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	114	#5	STR	36'-1"	4290
✱ A101	2	#5	STR	34'-6"	72
✱ A102	2	#5	STR	32'-3"	67
✱ A103	2	#5	STR	30'-0"	63
✱ A104	2	#5	STR	27'-10"	58
✱ A105	2	#5	STR	25'-7"	53
✱ A106	2	#5	STR	23'-5"	49
✱ A107	2	#5	STR	21'-2"	44
✱ A108	2	#5	STR	18'-11"	39
✱ A109	2	#5	STR	16'-9"	35
✱ A110	2	#5	STR	14'-6"	30
✱ A111	2	#5	STR	12'-3"	26
✱ A112	2	#5	STR	10'-1"	21
✱ A113	2	#5	STR	7'-10"	16
✱ A114	2	#5	STR	5'-7"	12
✱ A115	2	#5	STR	3'-5"	7
A2	114	#5	STR	36'-1"	4290
A201	2	#5	STR	34'-6"	72
A202	2	#5	STR	32'-3"	67
A203	2	#5	STR	30'-0"	63
A204	2	#5	STR	27'-10"	58
A205	2	#5	STR	25'-7"	53
A206	2	#5	STR	23'-5"	49
A207	2	#5	STR	21'-2"	44
A208	2	#5	STR	18'-11"	39
A209	2	#5	STR	16'-9"	35
A210	2	#5	STR	14'-6"	30
A211	2	#5	STR	12'-3"	26
A212	2	#5	STR	10'-1"	21
A213	2	#5	STR	7'-10"	16
A214	2	#5	STR	5'-7"	12
A215	2	#5	STR	3'-5"	7
✱ B1	75	#4	STR	21'-2"	1060
B2	88	#5	STR	30'-10"	2830
✱ B5	18	#4	STR	21'-2"	255
✱ E1	2	#7	5	3'-8"	15
✱ E2	2	#7	5	4'-1"	17
✱ E3	2	#7	5	4'-8"	19
✱ E4	2	#7	5	5'-1"	21
✱ F1	2	#6	STR	3'-0"	9
✱ F2	2	#6	STR	3'-8"	11
✱ F3	2	#6	STR	3'-6"	11
✱ F4	1	#6	STR	4'-0"	6
✱ F5	1	#6	STR	3'-10"	6
✱ G1	2	#5	STR	36'-9"	77
✱ G2	59	#4	STR	6'-4"	250
✱ K1	12	#5	1	8'-0"	100
✱ K2	12	#5	2	7'-5"	93
✱ K3	18	#5	STR	9'-6"	178
✱ S1	27	#4	3	4'-2"	75
✱ S2	27	#4	3	4'-0"	72
✱ U1	18	#4	4	3'-4"	40

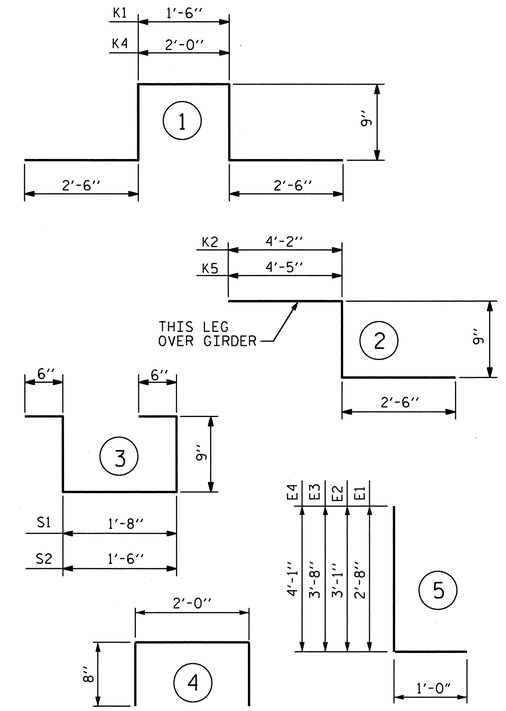
SPAN "B"

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	260	#5	STR	36'-1"	9785
✱ A101	2	#5	STR	34'-9"	72
✱ A102	2	#5	STR	32'-7"	68
✱ A103	2	#5	STR	30'-4"	63
✱ A104	2	#5	STR	28'-1"	59
✱ A105	2	#5	STR	25'-11"	54
✱ A106	2	#5	STR	23'-8"	49
✱ A107	2	#5	STR	21'-5"	45
✱ A108	2	#5	STR	19'-3"	40
✱ A109	2	#5	STR	17'-0"	35
✱ A110	2	#5	STR	14'-9"	31
✱ A111	2	#5	STR	12'-7"	26
✱ A112	2	#5	STR	10'-4"	22
✱ A113	2	#5	STR	8'-2"	17
✱ A114	2	#5	STR	5'-11"	12
✱ A115	2	#5	STR	3'-8"	8
A2	260	#5	STR	36'-1"	9785
A201	2	#5	STR	34'-9"	72
A202	2	#5	STR	32'-7"	68
A203	2	#5	STR	30'-4"	63
A204	2	#5	STR	28'-1"	59
A205	2	#5	STR	25'-11"	54
A206	2	#5	STR	23'-8"	49
A207	2	#5	STR	21'-5"	45
A208	2	#5	STR	19'-3"	40
A209	2	#5	STR	17'-0"	35
A210	2	#5	STR	14'-9"	31
A211	2	#5	STR	12'-7"	26
A212	2	#5	STR	10'-4"	22
A213	2	#5	STR	8'-2"	17
A214	2	#5	STR	5'-11"	12
A215	2	#5	STR	3'-8"	8
✱ B3	125	#4	STR	26'-11"	2248
B4	132	#5	STR	43'-7"	6000
✱ B6	30	#4	STR	26'-11"	539
✱ G1	2	#5	STR	36'-9"	77
✱ G2	126	#4	STR	6'-4"	533
✱ K3	18	#5	STR	9'-6"	178
✱ K4	12	#5	1	8'-6"	106
✱ K5	12	#5	2	7'-8"	96
✱ S2	48	#4	3	4'-0"	128
✱ U1	36	#4	4	3'-4"	80

SPAN "C"

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	114	#5	STR	36'-1"	4290
✱ A101	2	#5	STR	34'-5"	72
✱ A102	2	#5	STR	32'-2"	67
✱ A103	2	#5	STR	30'-0"	63
✱ A104	2	#5	STR	27'-9"	58
✱ A105	2	#5	STR	25'-6"	53
✱ A106	2	#5	STR	23'-4"	49
✱ A107	2	#5	STR	21'-1"	44
✱ A108	2	#5	STR	18'-11"	39
✱ A109	2	#5	STR	16'-8"	35
✱ A110	2	#5	STR	14'-5"	30
✱ A111	2	#5	STR	12'-3"	26
✱ A112	2	#5	STR	10'-0"	21
✱ A113	2	#5	STR	7'-9"	16
✱ A114	2	#5	STR	5'-7"	12
✱ A115	2	#5	STR	3'-4"	7
A2	114	#5	STR	36'-1"	4290
A201	2	#5	STR	34'-5"	72
A202	2	#5	STR	32'-2"	67
A203	2	#5	STR	30'-0"	63
A204	2	#5	STR	27'-9"	58
A205	2	#5	STR	25'-6"	53
A206	2	#5	STR	23'-4"	49
A207	2	#5	STR	21'-1"	44
A208	2	#5	STR	18'-11"	39
A209	2	#5	STR	16'-8"	35
A210	2	#5	STR	14'-5"	30
A211	2	#5	STR	12'-3"	26
A212	2	#5	STR	10'-0"	21
A213	2	#5	STR	7'-9"	16
A214	2	#5	STR	5'-7"	12
A215	2	#5	STR	3'-4"	7
✱ B1	75	#4	STR	21'-2"	1060
B2	88	#5	STR	30'-10"	2830
✱ B5	18	#4	STR	21'-2"	255
✱ E1	2	#7	5	3'-8"	15
✱ E2	2	#7	5	4'-1"	17
✱ E3	2	#7	5	4'-8"	19
✱ E4	2	#7	5	5'-1"	21
✱ F1	2	#6	STR	3'-0"	9
✱ F2	2	#6	STR	3'-8"	11
✱ F3	2	#6	STR	3'-6"	11
✱ F4	1	#6	STR	4'-0"	6
✱ F5	1	#6	STR	3'-10"	6
✱ G1	2	#5	STR	36'-9"	77
✱ G2	59	#4	STR	6'-4"	250
✱ K1	12	#5	1	8'-0"	100
✱ K2	12	#5	2	7'-5"	93
✱ K3	18	#5	STR	9'-6"	178
✱ S1	27	#4	3	4'-2"	75
✱ S2	27	#4	3	4'-0"	72
✱ U1	18	#4	4	3'-4"	40

BAR TYPES

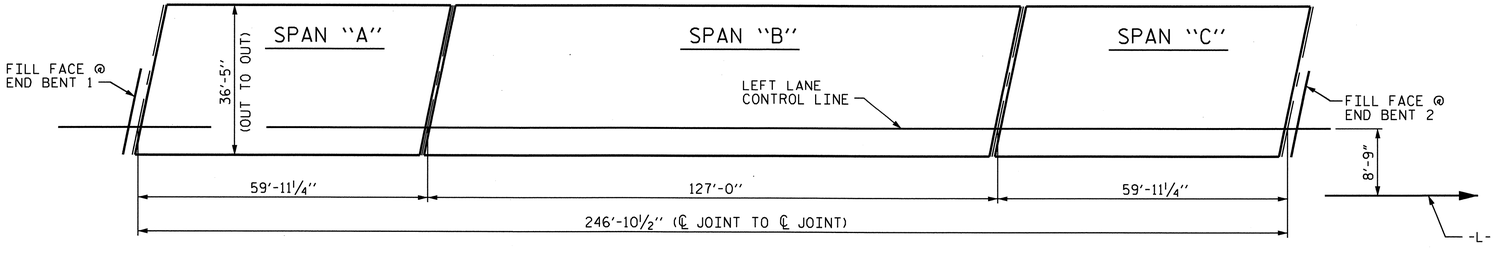


ALL BAR DIMENSIONS ARE OUT TO OUT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	✱ EPOXY COATED REINFORCING STEEL
	(CU.YDS.)	(LBS.)	(LBS.)
SPAN "A"	72.9	7,712	7,197
SPAN "B"	153.6	16,386	14,371
SPAN "C"	72.9	7,712	7,197
SIDEWALK	43.0	——	——
ENDPOSTS	1.0	——	——
TOTALS**	343.4	31,810	28,765

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ.FT. = 8,990)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

— LEFT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			146

STR. #1 STD. NO. BOM1

ASSEMBLED BY : A.S. CALLAWAY DATE : 5/29/09
CHECKED BY : T.L. CLELLAND DATE : 1/7/10

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

REV. 6/1/94 EEM/GRP
REV. 8/16/99 RWW/LES
REV. 5/1/06 TLA/GM

27-JUL-2010 14:51
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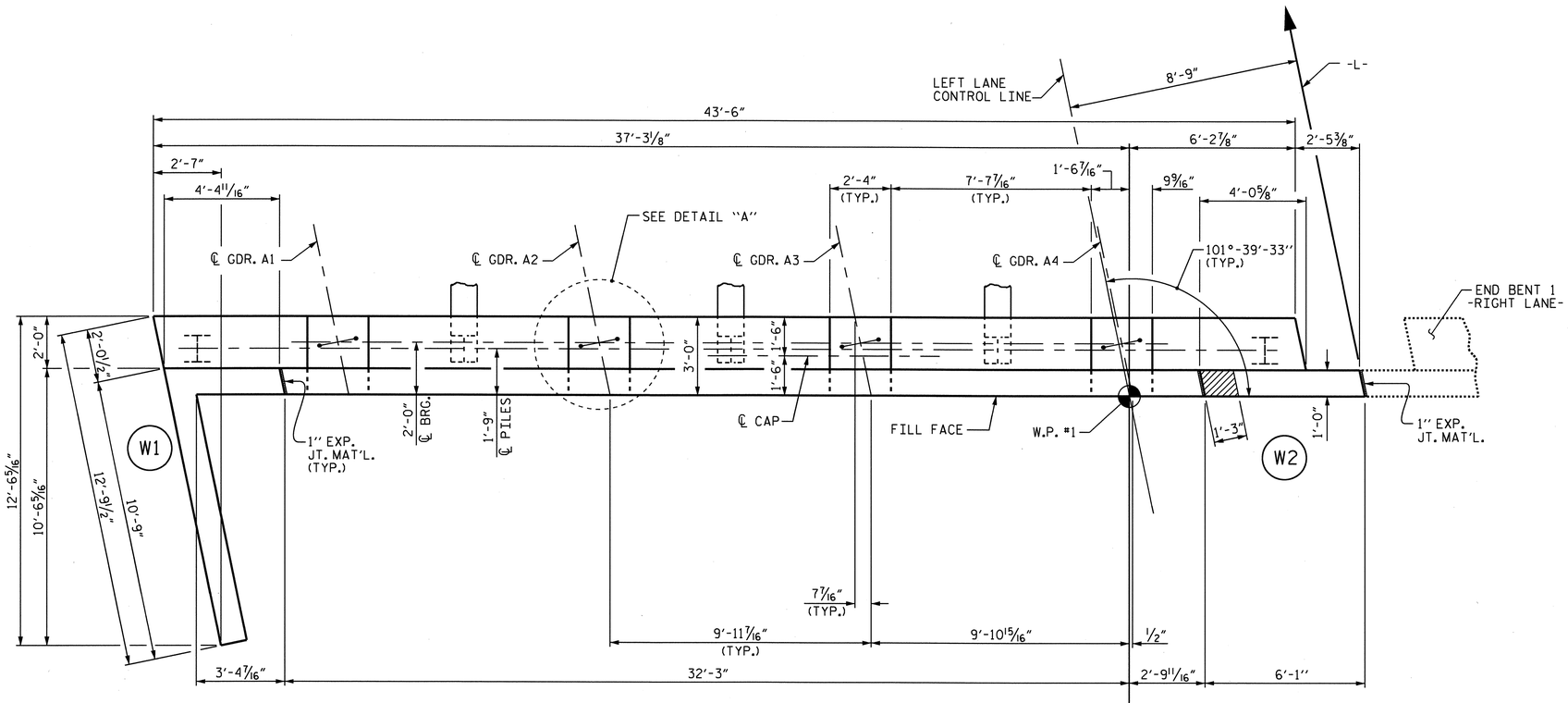
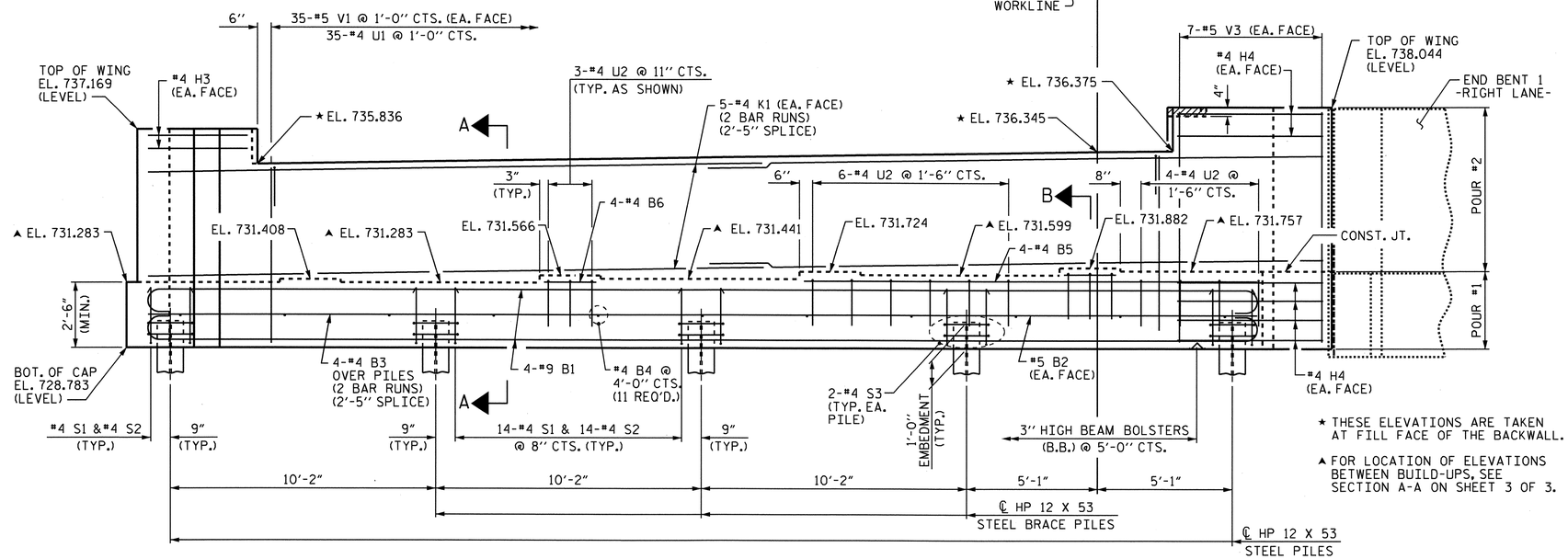
LSUTTON



PLAN



ELEVATION

★ THESE ELEVATIONS ARE TAKEN AT FILL FACE OF THE BACKWALL.

▲ FOR LOCATION OF ELEVATIONS BETWEEN BUILD-UPS, SEE SECTION A-A ON SHEET 3 OF 3.

NOTES

STIRRUPS AND U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

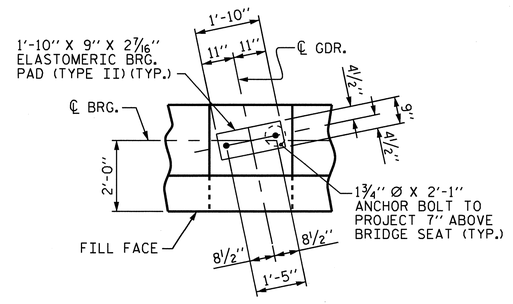
THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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

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

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER 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 #5 V1 BARS IN THE BACKWALL SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.



DETAIL "A"

(TYP. EA. GIRDER)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 11/18/09
CHECKED BY : D.R. WITHROW DATE : 6/1/10

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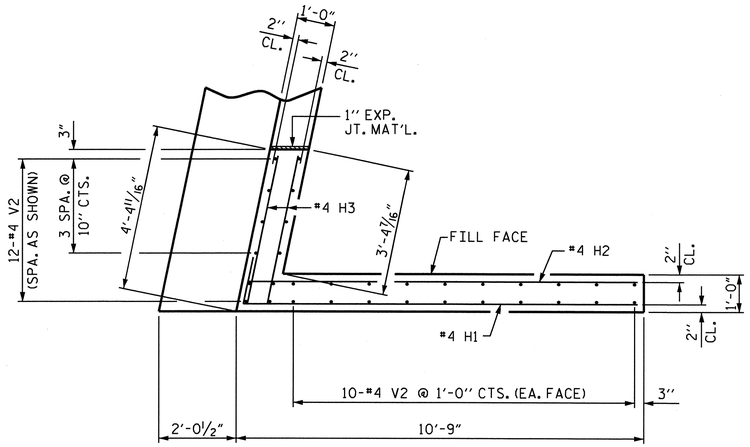
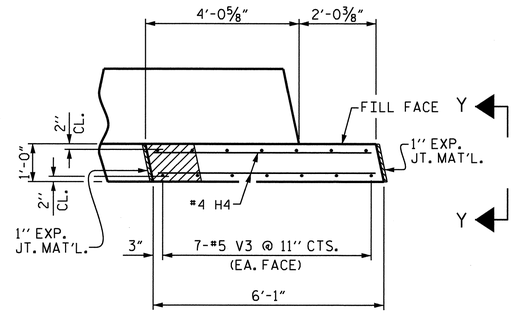
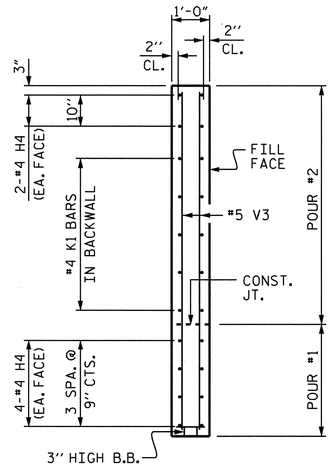
LSUTTON



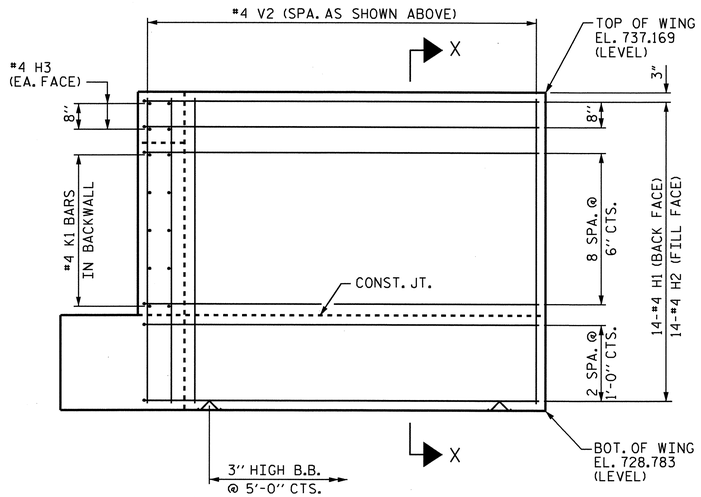
PLAN OF WING W1



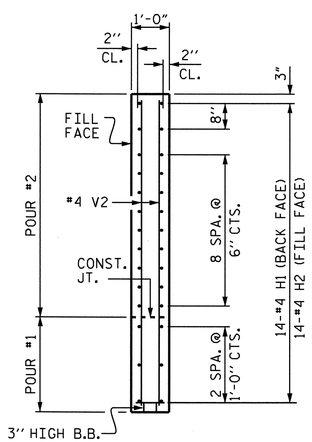
PLAN OF WING W2



END VIEW Y-Y



ELEVATION OF WING W1



SECTION X-X

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

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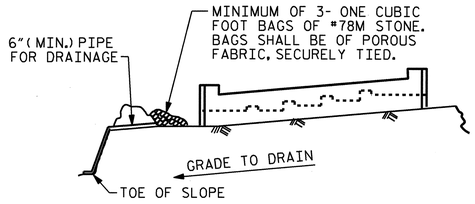
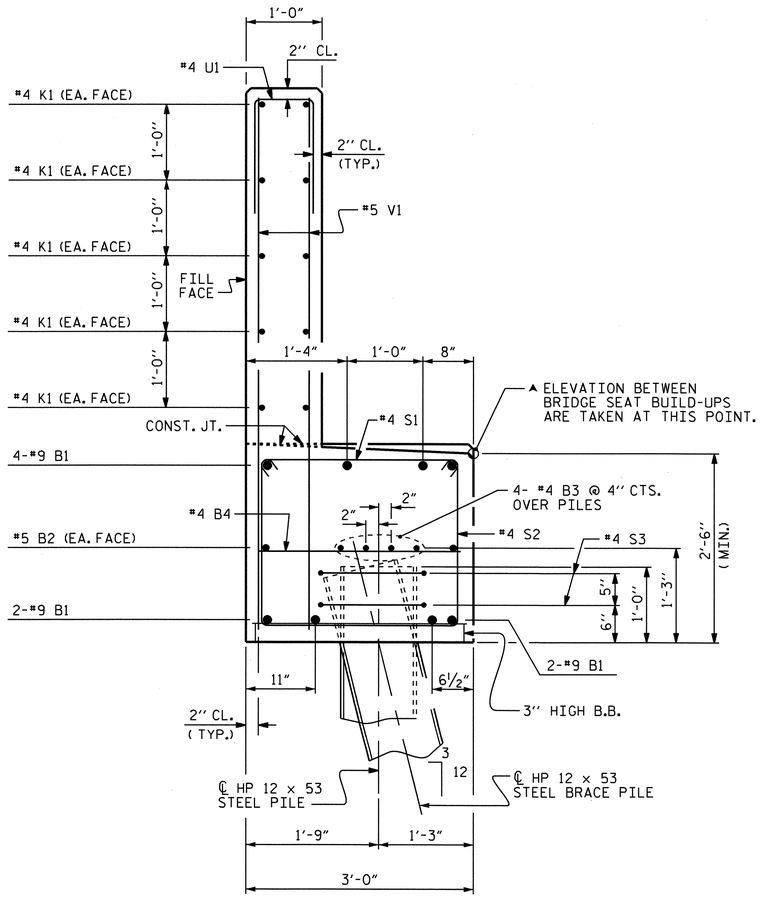


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

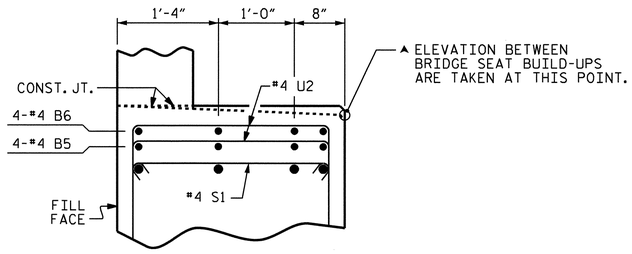
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

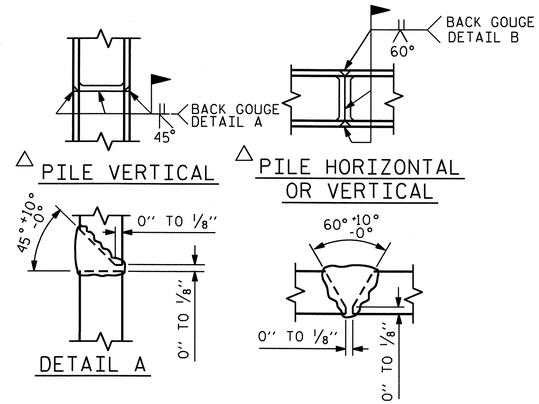
TEMPORARY DRAINAGE AT END BENT



SECTION A-A



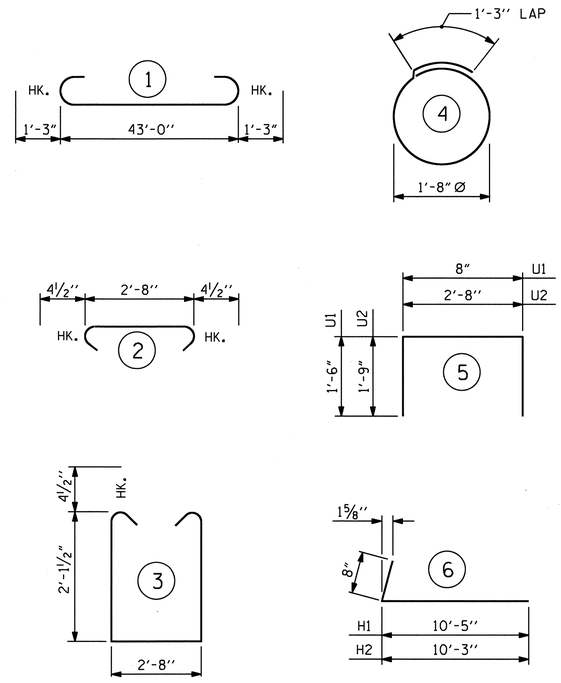
PART SECTION B



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	45'-6"	1238
B2	2	#5	STR	43'-1"	90
B3	8	#4	STR	22'-9"	122
B4	11	#4	STR	2'-8"	20
B5	4	#4	STR	17'-5"	47
B6	8	#4	STR	2'-0"	11
H1	14	#4	6	11'-1"	104
H2	14	#4	6	10'-11"	102
H3	4	#4	STR	4'-0"	11
H4	12	#4	STR	5'-9"	46
K1	20	#4	STR	23'-9"	317
S1	58	#4	2	3'-5"	132
S2	58	#4	3	7'-8"	297
S3	10	#4	4	6'-6"	43
U1	35	#4	5	3'-8"	86
U2	16	#4	5	6'-2"	66
V1	70	#5	STR	6'-9"	493
V2	32	#4	STR	8'-0"	171
V3	14	#5	STR	8'-10"	129

REINFORCING STEEL	LBS.	3,525
CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WINGS	CU. YDS.	14.2
POUR #2 - BACKWALL & UPPER WINGS	CU. YDS.	10.7
TOTAL	CU. YDS.	24.9
HP 12 x 53 STEEL PILES NO. = 5	LIN. FT.	450
PILE REDRIVES	EA.	3

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LSUTTON

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 3 OF 3

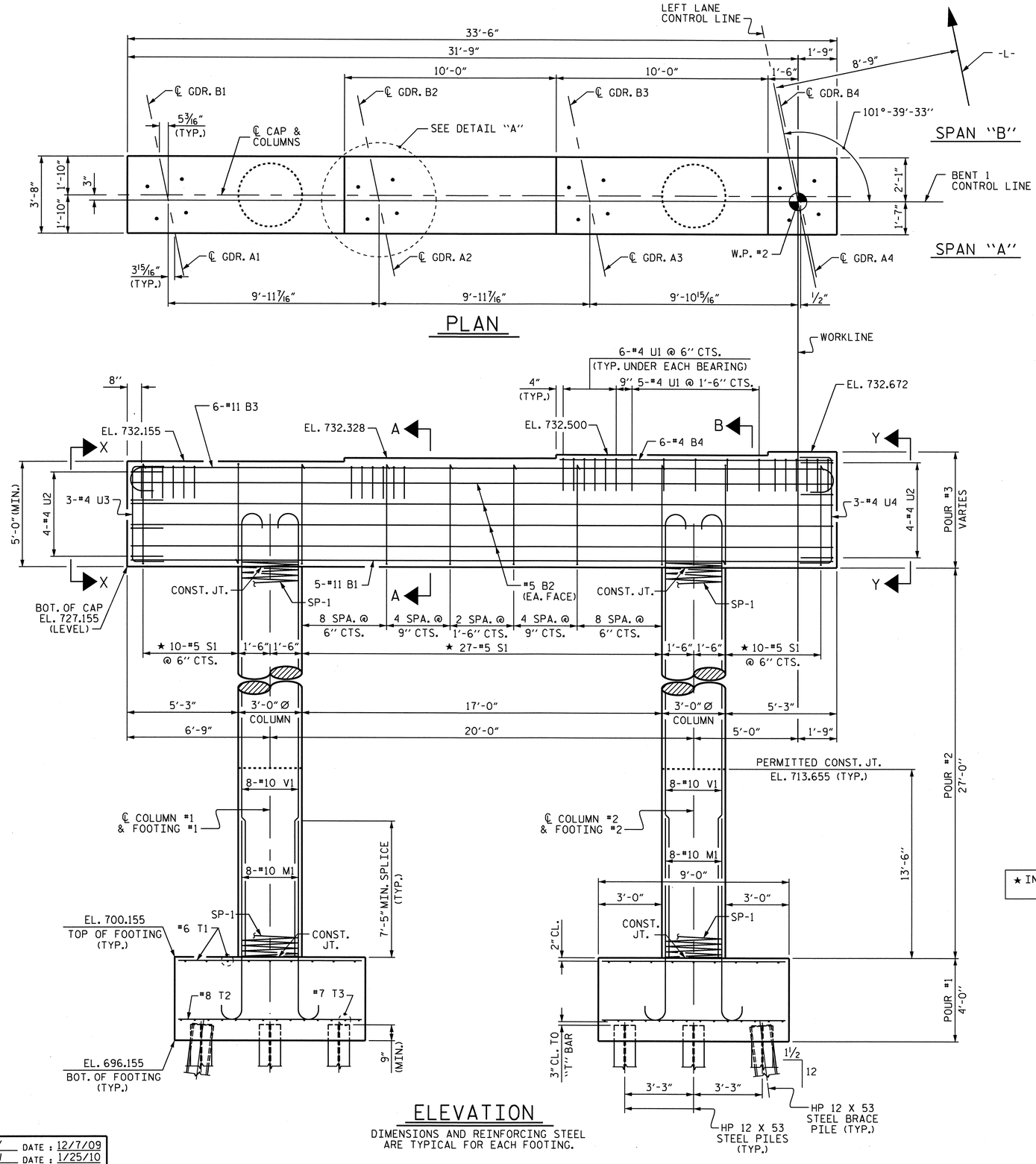
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1
— LEFT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			146

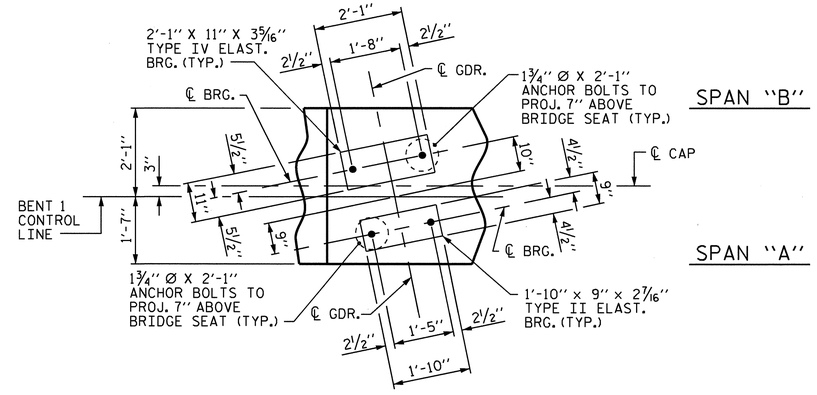
STR. #1



ELEVATION

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING.

★ INVERT ALTERNATE STIRRUPS



DETAIL "A"

NOTES

STIRRUPS AND U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

FOR PILE SPLICE DETAILS, SEE "END BENT 1" SHEETS.

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

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE CENTERLINE JOINT IN THE DECK SLAB (CONTROL LINE) IS OFFSET FROM THE CENTERLINE BENT.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

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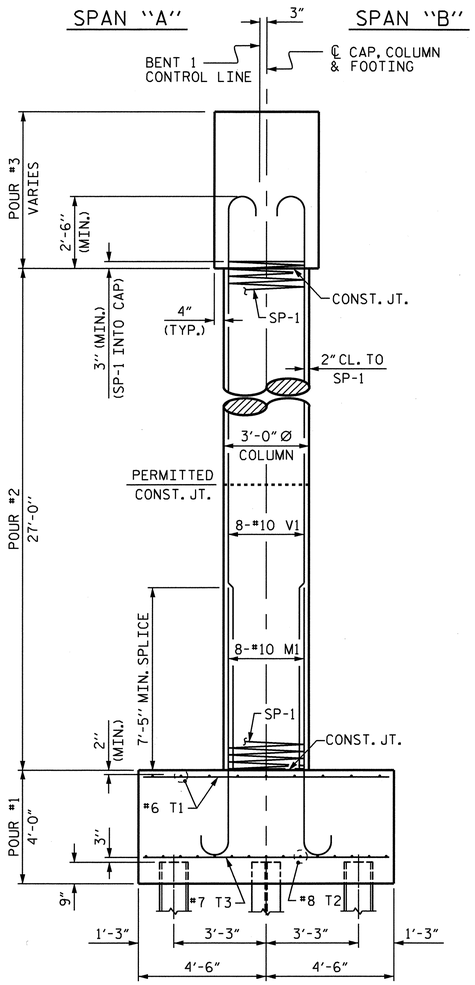
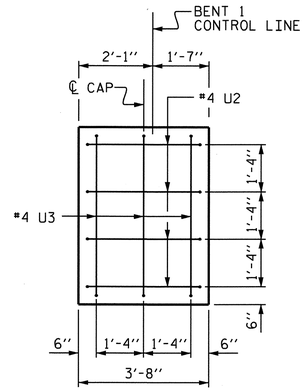
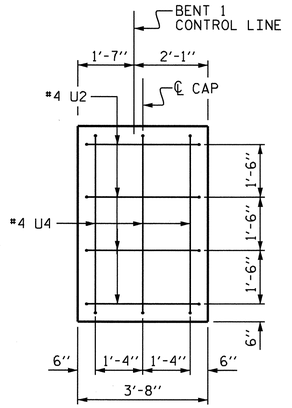
LSUTTON



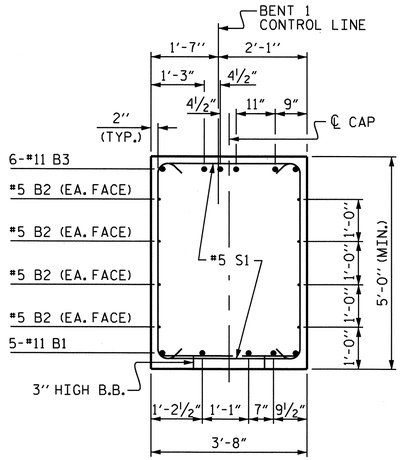
END ELEVATION



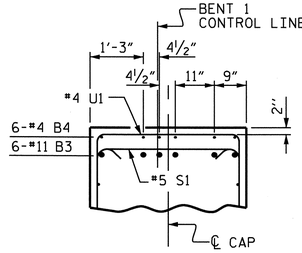
VIEW X-X



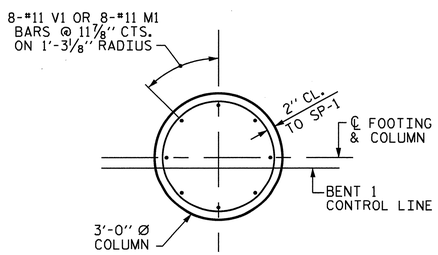
VIEW Y-Y



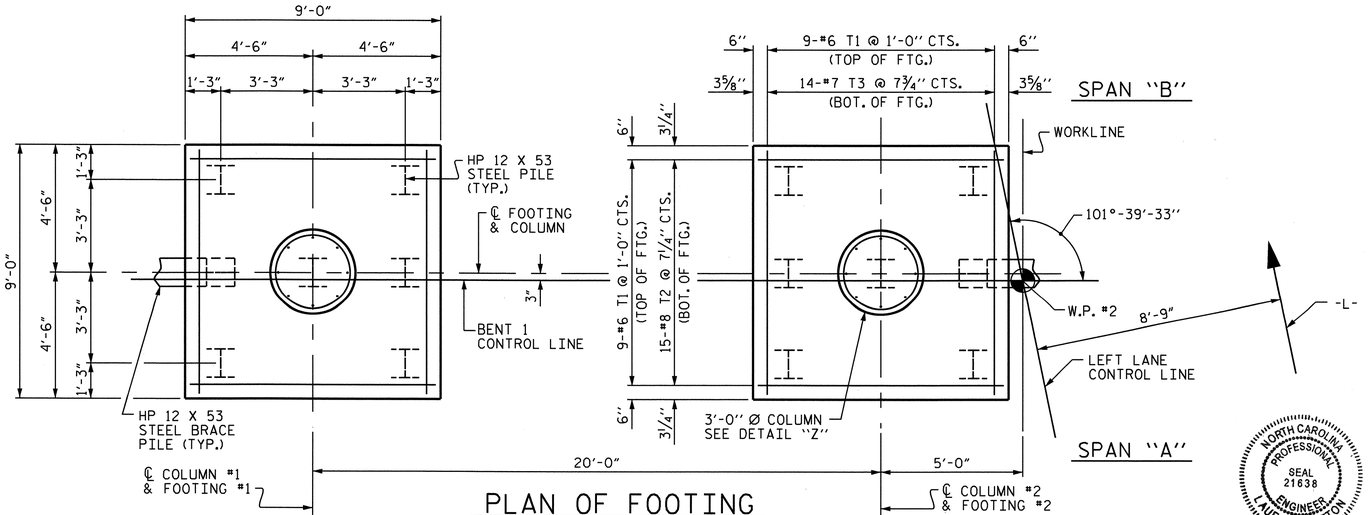
SECTION A-A



SECTION B-B



DETAIL "Z"

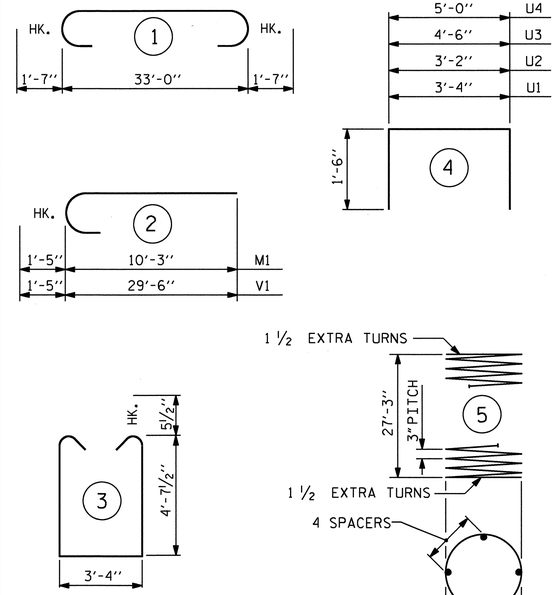


PLAN OF FOOTING

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#11	STR	33'-2"	881
B2	8	#5	STR	33'-2"	277
B3	6	#11	1	36'-2"	1153
B4	6	#4	STR	12'-11"	52
M1	16	#10	2	11'-8"	803
S1	47	#5	3	13'-6"	662
T1	36	#6	STR	8'-8"	469
T2	30	#8	STR	8'-8"	694
T3	28	#7	STR	8'-8"	496
V1	16	#10	2	30'-11"	2129
U1	29	#4	4	6'-4"	123
U2	8	#4	4	6'-2"	33
U3	3	#4	4	7'-6"	15
U4	3	#4	4	8'-0"	16
REINFORCING STEEL				LBS.	7,803
SP-1	2	**	5	924'-1"	1,235
SPIRAL COLUMN REINFORCING STEEL				LBS.	1,235

CLASS A CONCRETE BREAKDOWN:		
POUR #1 - FOOTINGS	CU. YDS.	24.0
POUR #2 - COLUMNS	CU. YDS.	14.1
POUR #3 - CAP	CU. YDS.	23.7
TOTAL	CU. YDS.	61.8
HP 12 x 53 STEEL PILES NO. = 14	LIN. FT.	840
PILE REDRIVES	EA.	7
FOUNDATION EXCAVATION		LUMP SUM

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

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/29/10

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			146

STR. #1

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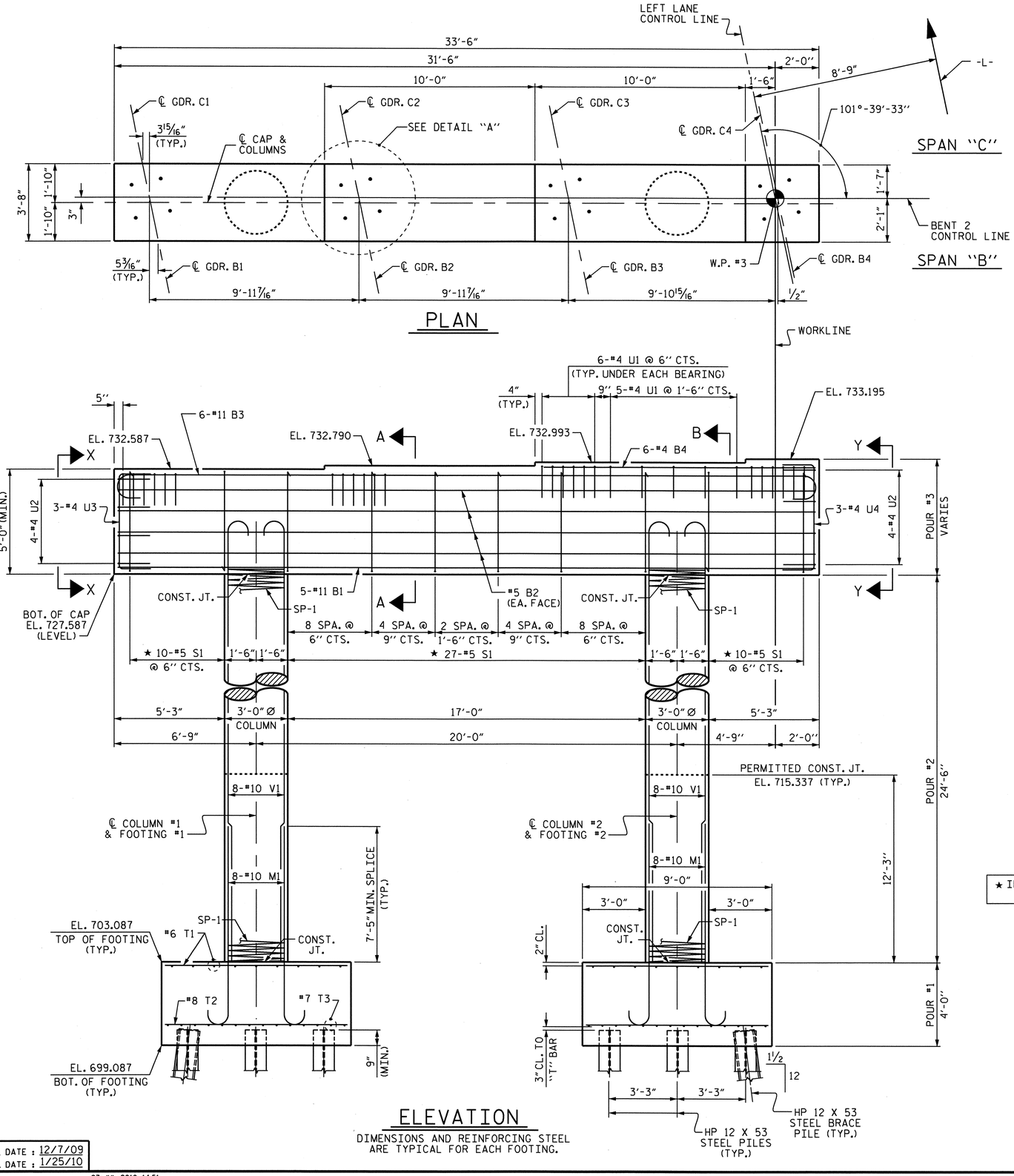


ELEVATION

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING.

★ INVERT ALTERNATE STIRRUPS

NOTES

STIRRUPS AND U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

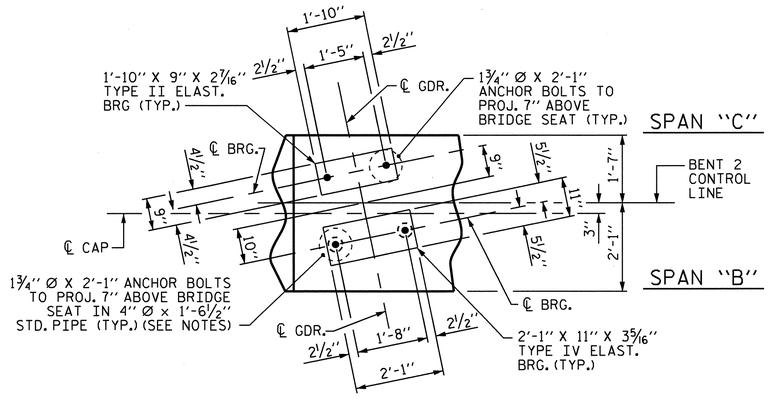
FOR PILE SPLICE DETAILS, SEE "END BENT 1" SHEETS.

FOR PIPE INSERT DETAILS, SEE "ELASTOMERIC BEARING DETAILS" SHEET.

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

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE CENTERLINE JOINT IN THE DECK SLAB (CONTROL LINE) IS OFFSET FROM THE CENTERLINE BENT.

EPOXY COAT THE BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.



DETAIL "A"

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

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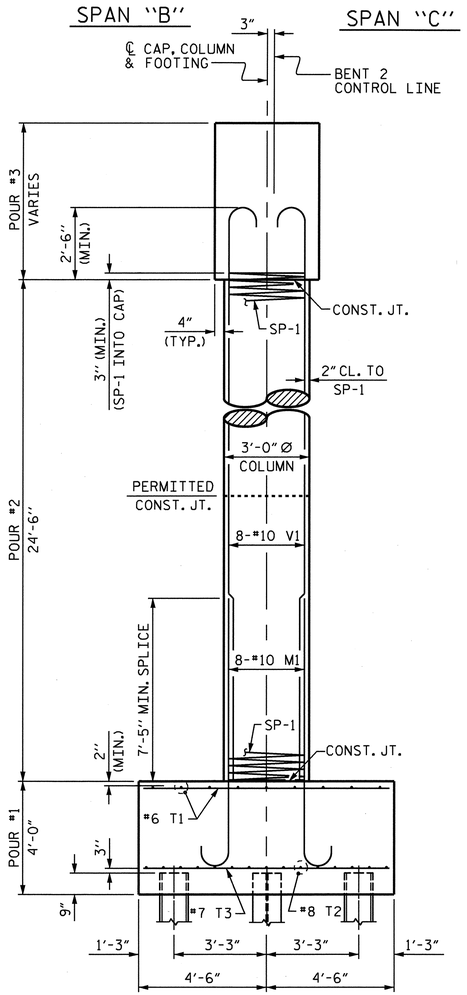
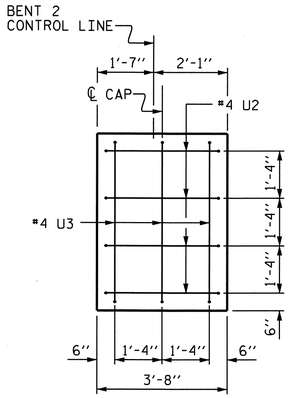
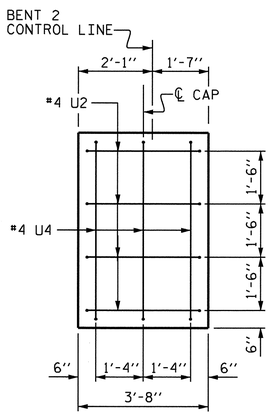


END ELEVATION



VIEW X-X



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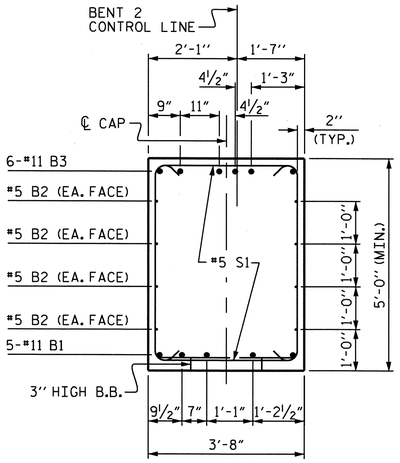
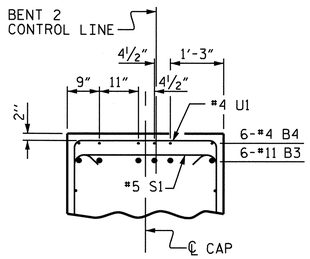
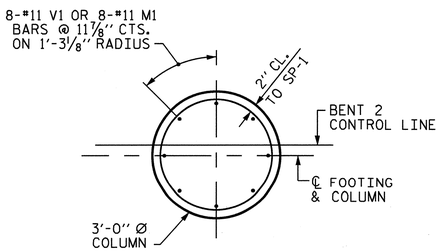


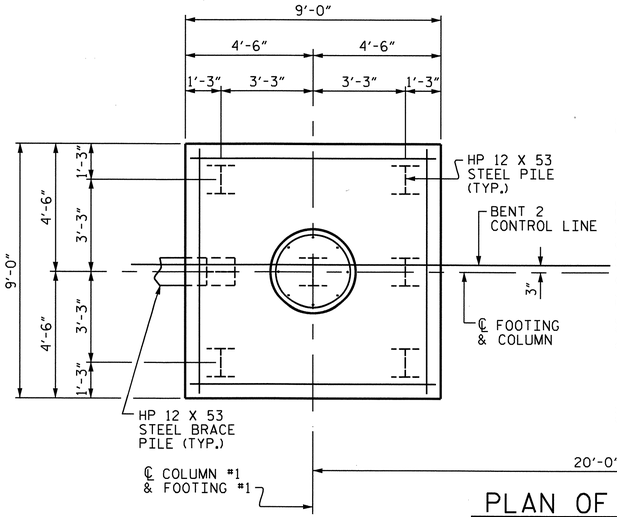
SECTION A-A



SECTION B-B

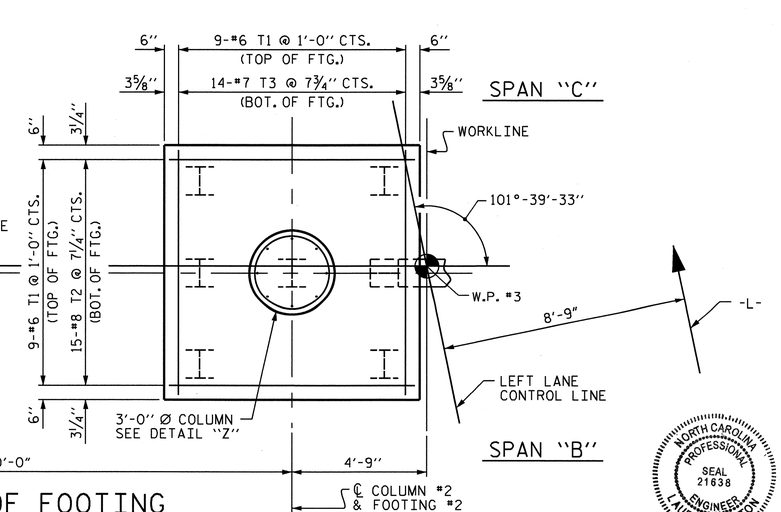


DETAIL "Z"

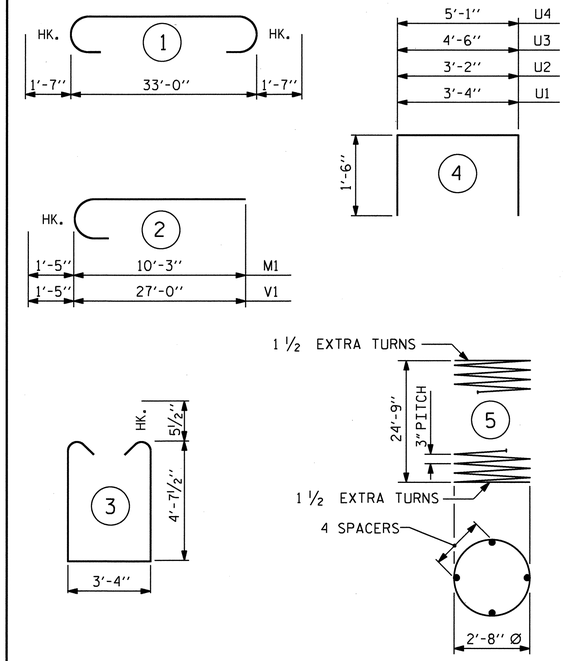


PLAN OF FOOTING

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING.



BAR TYPES



BILL OF MATERIAL

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#11	STR	33'-2"	881
B2	8	#5	STR	33'-2"	277
B3	6	#11	1	36'-2"	1153
B4	6	#4	STR	13'-2"	53
M1	16	#10	2	11'-8"	803
S1	47	#5	3	13'-6"	662
T1	36	#6	STR	8'-8"	469
T2	30	#8	STR	8'-8"	694
T3	28	#7	STR	8'-8"	496
V1	16	#10	2	28'-5"	1956
U1	29	#4	4	6'-4"	123
U2	8	#4	4	6'-2"	33
U3	3	#4	4	7'-6"	15
U4	3	#4	4	8'-1"	16
REINFORCING STEEL				LBS.	7,631
SP-1	2	**	5	841'-7"	1,124
SPIRAL COLUMN REINFORCING STEEL				LBS.	1,124

CLASS A CONCRETE BREAKDOWN:

POUR #1 - FOOTINGS	CU. YDS.	24.0
POUR #2 - COLUMNS	CU. YDS.	12.8
POUR #3 - CAP	CU. YDS.	23.9
TOTAL	CU. YDS.	60.7

HP 12 x 53 STEEL PILES
NO. = 14 — LIN. FT. 1,050

PILE REDRIVES — EA. 7

FOUNDATION EXCAVATION — LUMP SUM

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

DRAWN BY : A.S. CALLAWAY DATE : 12/7/09
CHECKED BY : D.R. WITHROW DATE : 1/25/10

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LSUTTON

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

NOTES

STIRRUPS AND U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

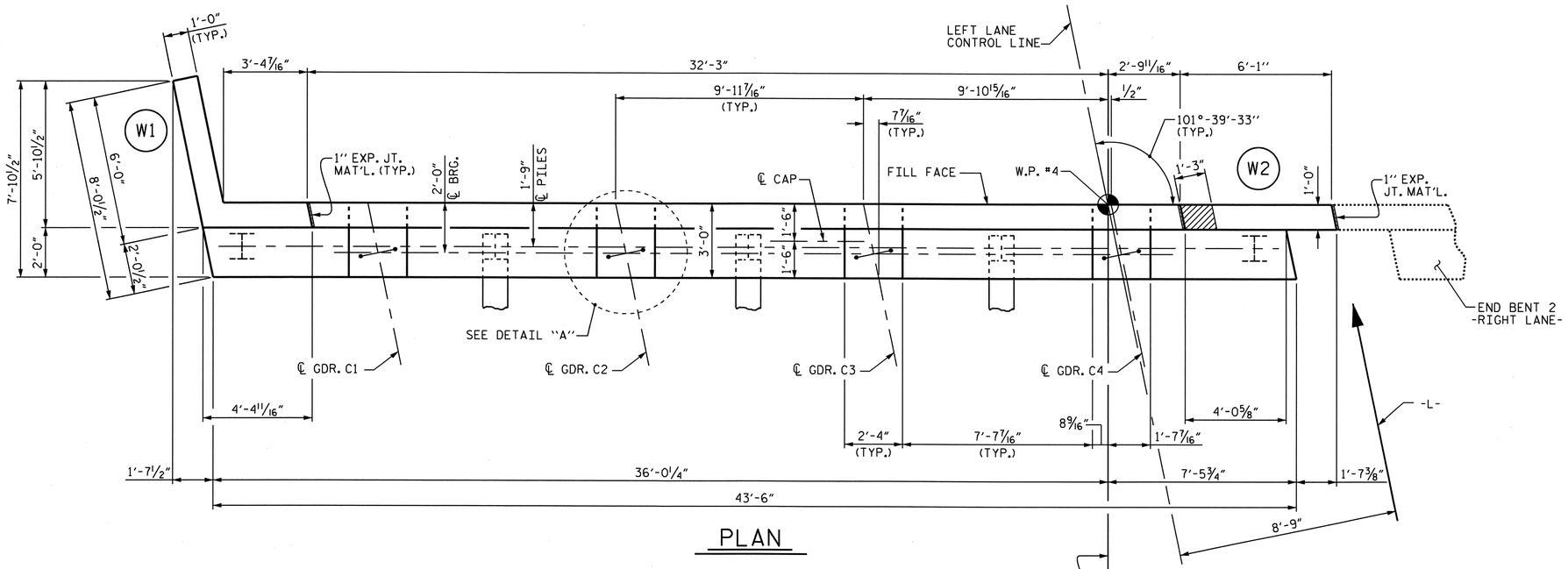
THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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

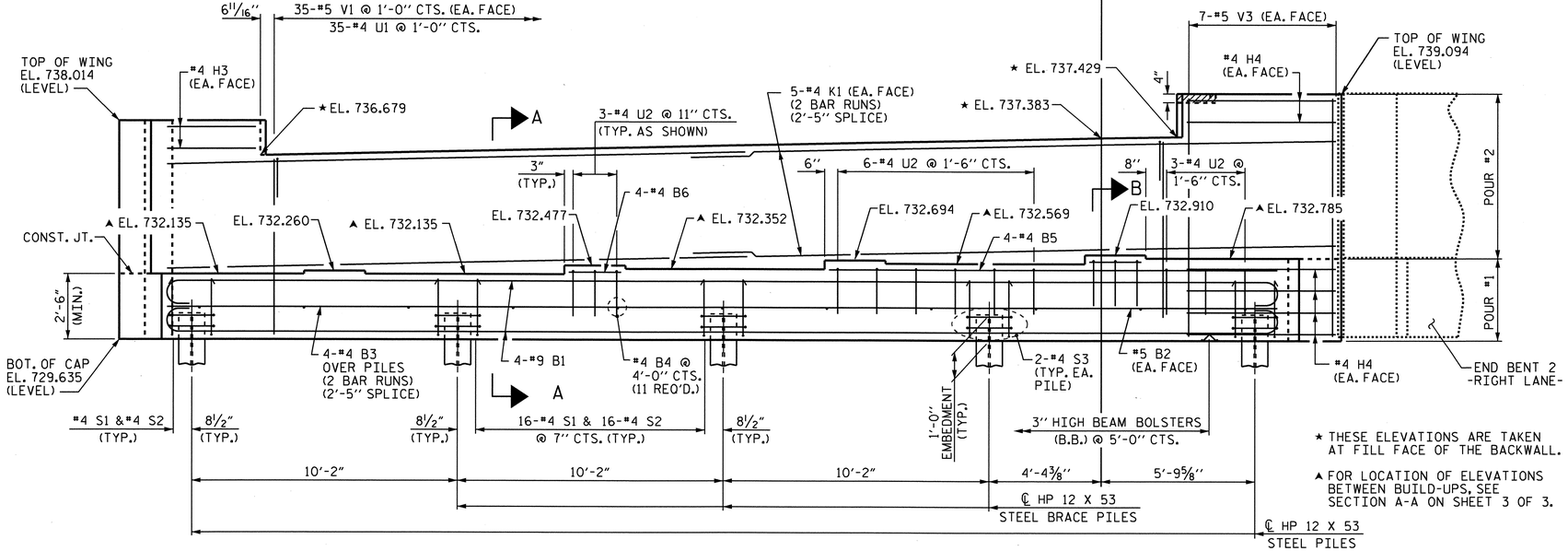
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL HAS BEEN CAST IF SLIP FORMING IS USED.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER 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 #5 V1 BARS IN THE BACKWALL SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.



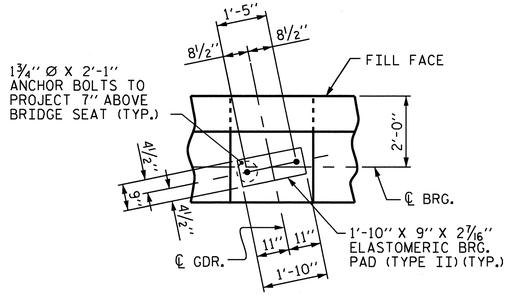
PLAN



★ THESE ELEVATIONS ARE TAKEN AT FILL FACE OF THE BACKWALL.

▲ FOR LOCATION OF ELEVATIONS BETWEEN BUILD-UPS, SEE SECTION A-A ON SHEET 3 OF 3.

ELEVATION



DETAIL "A"

(TYP. EA. GIRDER)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON 7/22/10

DRAWN BY : A.S. CALLAWAY DATE : 11/18/09
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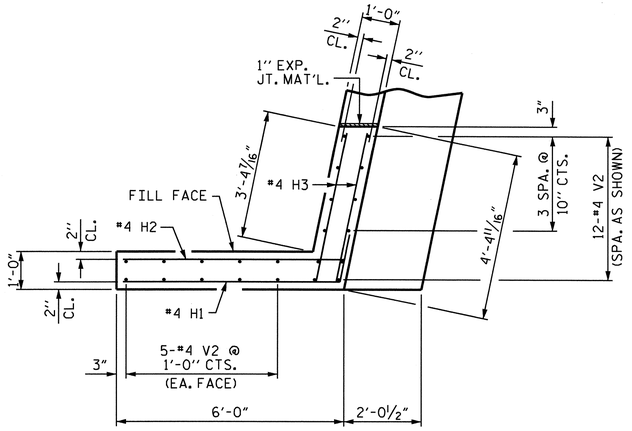
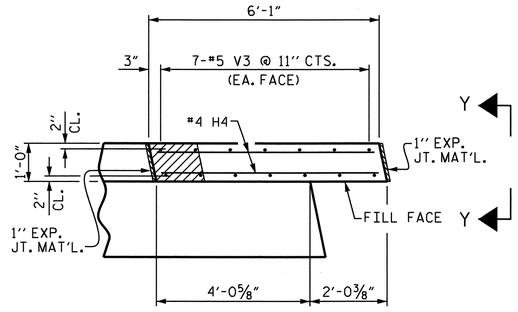
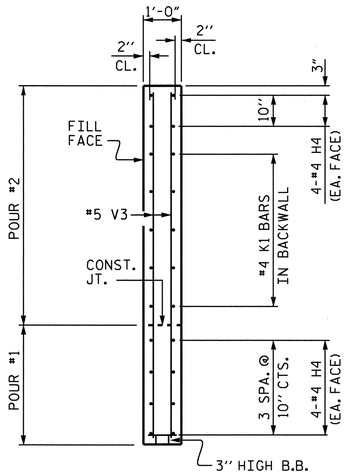
LSUTTON



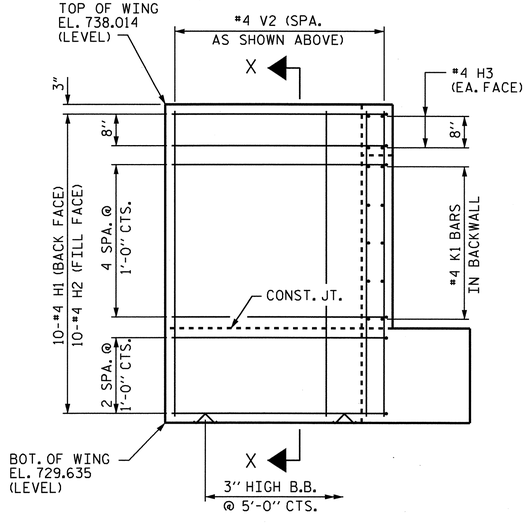
PLAN OF WING W1



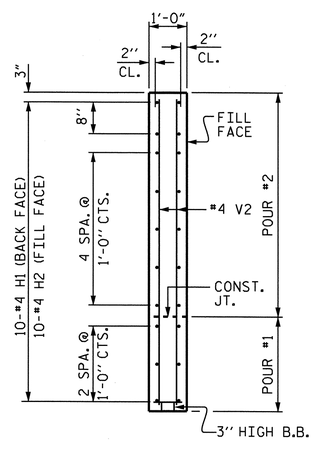
PLAN OF WING W2



END VIEW Y-Y



ELEVATION OF WING W1



SECTION X-X

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			146

STR. #1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 11/18/09
CHECKED BY : D.R. WITHROW DATE : 6/1/10

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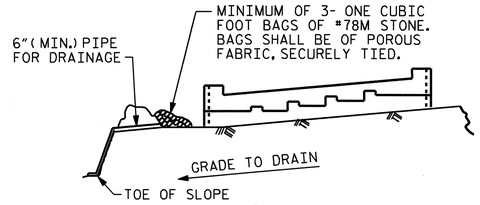
LSUTTON

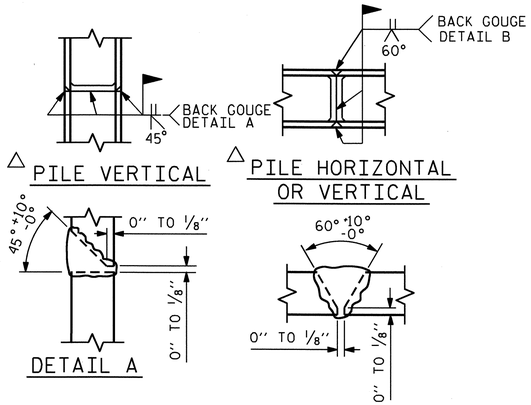


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

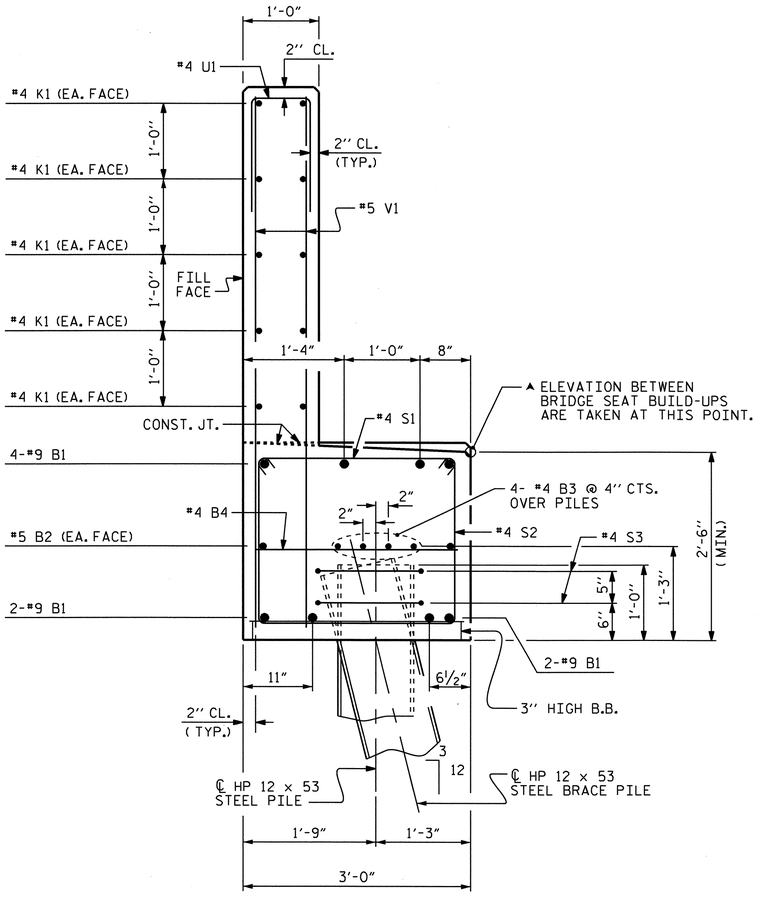
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

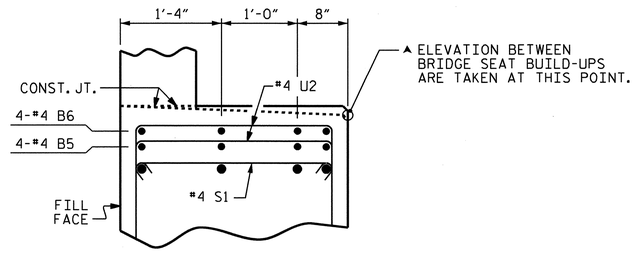


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

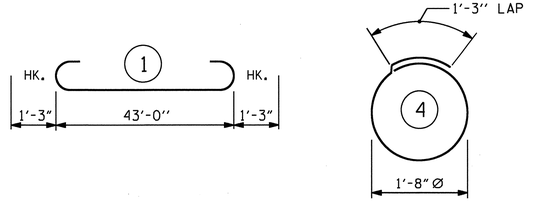


SECTION A-A



PART SECTION B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	45'-6"	1238
B2	2	#5	STR	43'-1"	90
B3	8	#4	STR	22'-9"	122
B4	11	#4	STR	2'-8"	20
B5	4	#4	STR	17'-3"	46
B6	8	#4	STR	2'-0"	11
H1	10	#4	6	6'-4"	42
H2	10	#4	6	6'-6"	43
H3	4	#4	STR	4'-0"	11
H4	12	#4	STR	5'-9"	46
K1	20	#4	STR	23'-9"	317
S1	66	#4	2	3'-5"	151
S2	66	#4	3	7'-8"	338
S3	10	#4	4	6'-6"	43
U1	35	#4	5	3'-8"	86
U2	15	#4	5	6'-2"	62
V1	70	#5	STR	6'-9"	493
V2	22	#4	STR	8'-0"	118
V3	14	#5	STR	9'-1"	133

REINFORCING STEEL	LBS.	3,410
CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WINGS	CU. YDS.	14.2
POUR #2 - BACKWALL & UPPER WINGS	CU. YDS.	9.5
TOTAL	CU. YDS.	23.7
HP 12 x 53 STEEL PILES NO. = 5	LIN. FT.	400
PILE REDRIVES	EA.	3

DRAWN BY : A.S. CALLAWAY DATE : 11/18/09
CHECKED BY : D.R. WITHROW DATE : 6/1/10

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LSUTTON

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

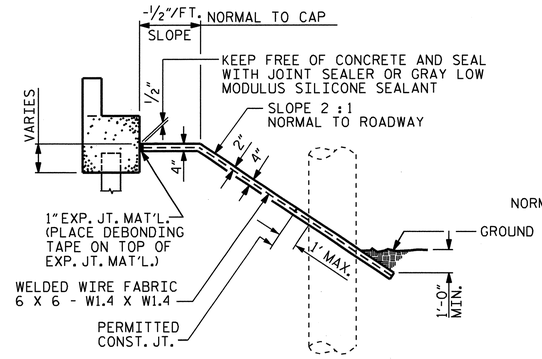
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

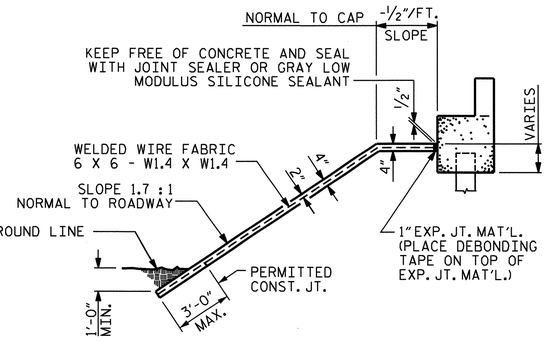
SUBSTRUCTURE
END BENT 2
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			146

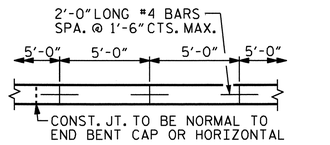
STR. #1



SECTION ALONG LEFT LANE CONTROL LINE @ END BENT 1

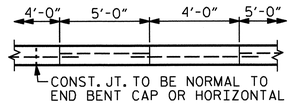


SECTION ALONG LEFT LANE CONTROL LINE @ END BENT 2



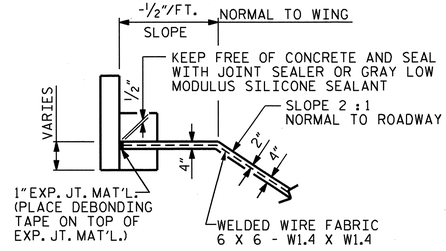
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



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

OPTIONAL POURING DETAIL



SECTION ALONG -L-

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

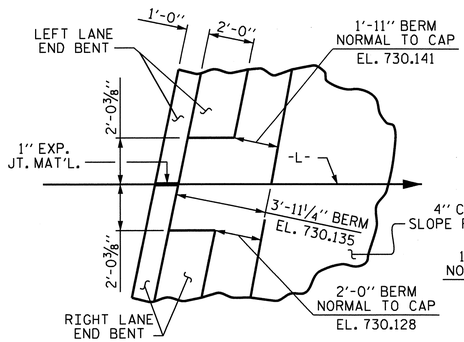
NOTES

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.

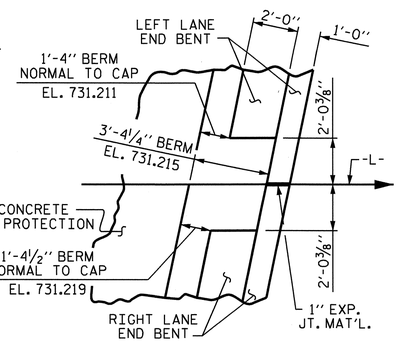
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL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

BRIDGE @ STA. 54+69.91 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	329	658
END BENT 2	372	745

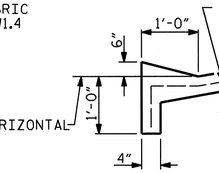
* QUANTITY SHOWN IS BASED ON 5' POURS.



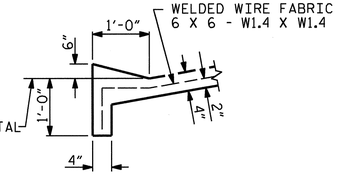
DETAIL "X"



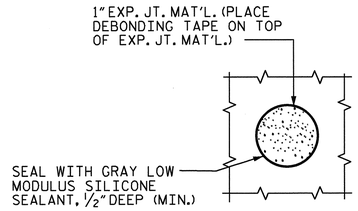
DETAIL "Y"



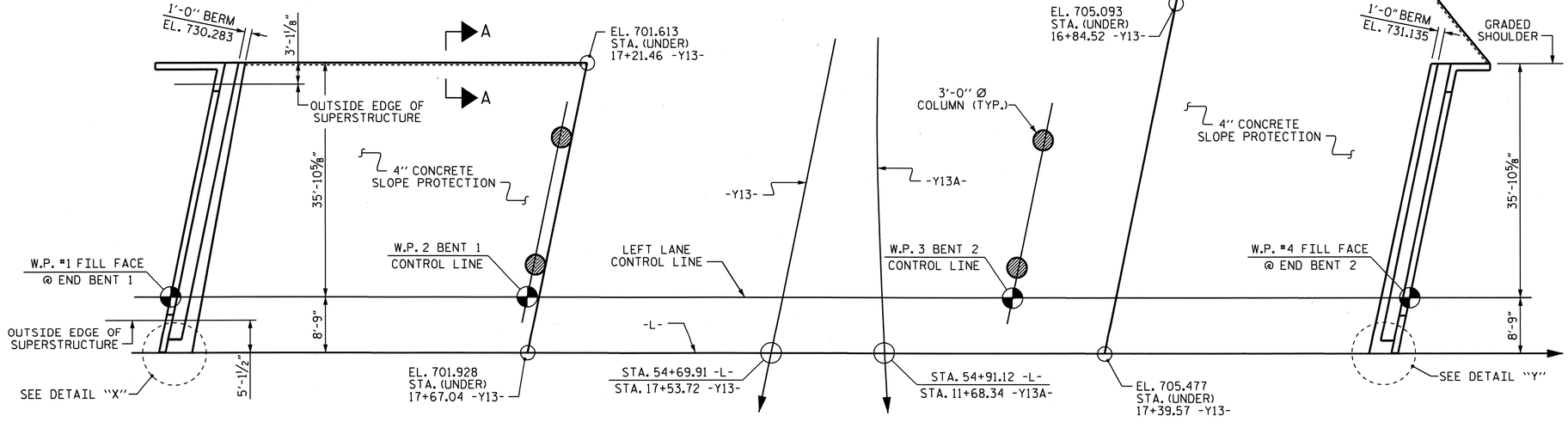
SECTION A-A



SECTION B-B



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



AT END BENT 1

PLAN

AT END BENT 2

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

— LEFT LANE —

ASSEMBLED BY : A.S. CALLAWAY	DATE : 5/13/10
CHECKED BY : D.R. WITHROW	DATE : 5/25/10
DRAWN BY : ELR 5/92	REV. 7/10/01 LES/RDR
CHECKED BY : GRP 6/92	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			146

STR. #1

STD. NO. SP1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
7/30/10

30-JUL-2010 11:10
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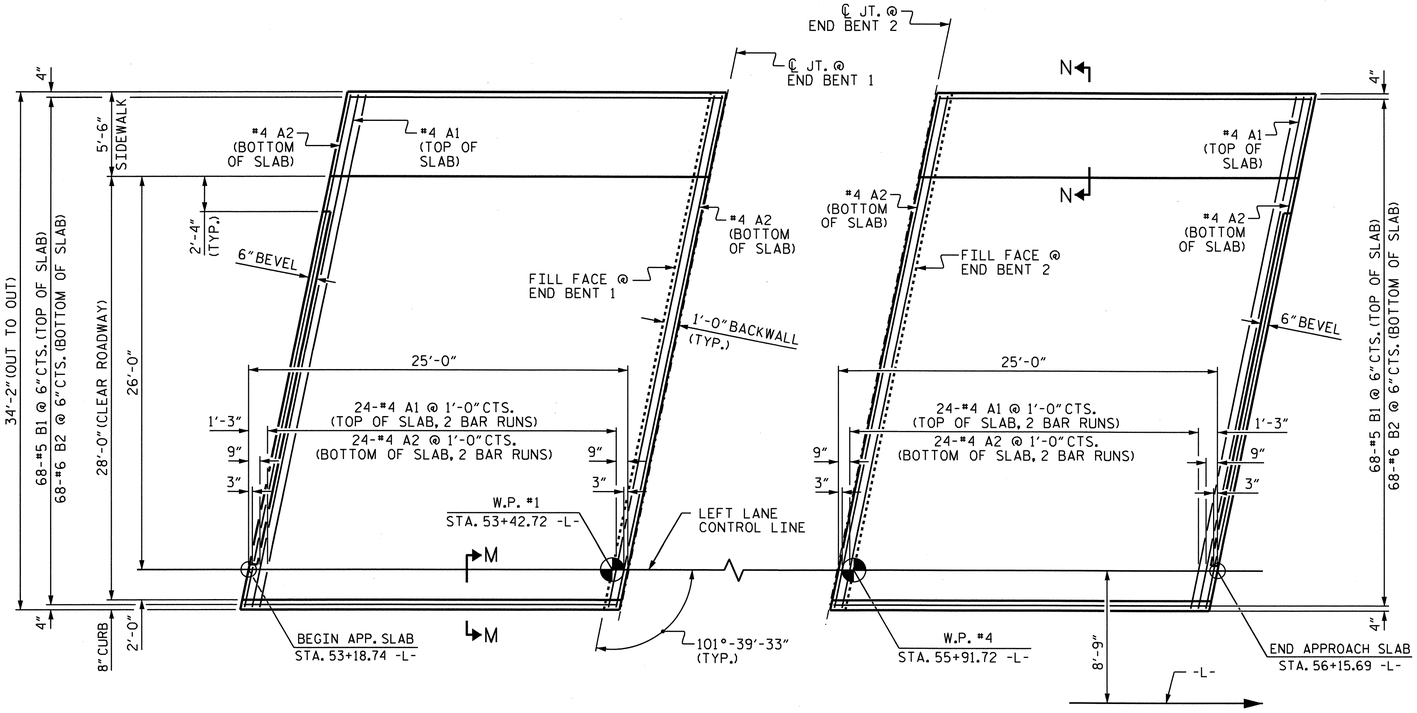
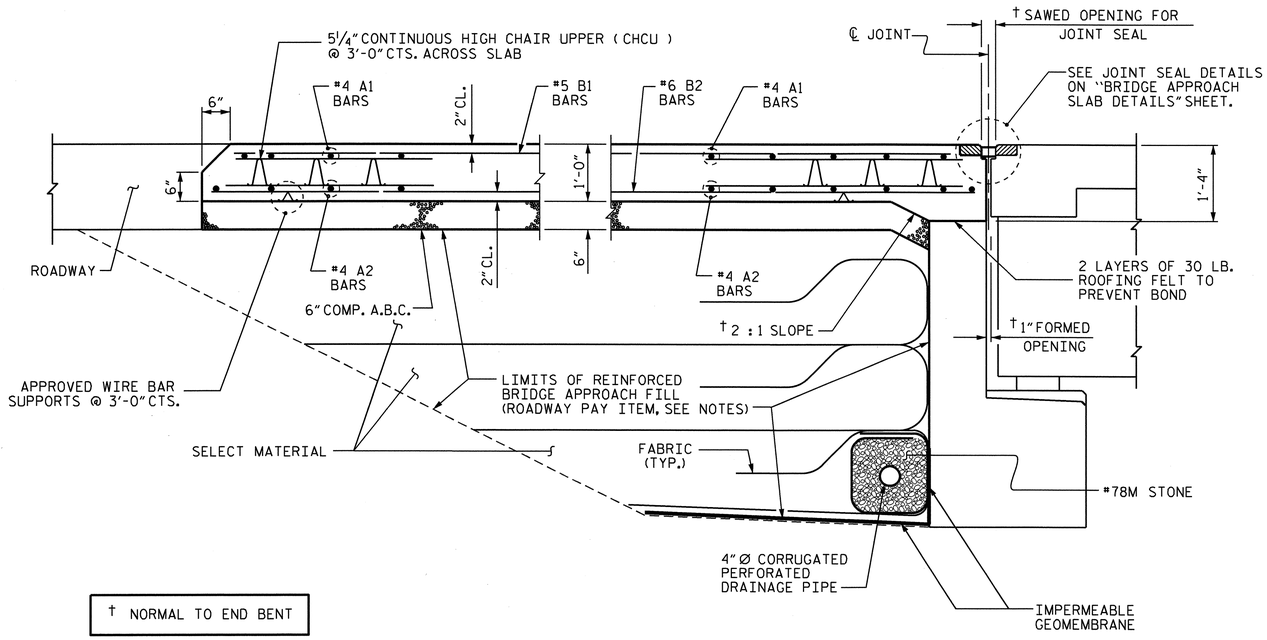
lsutton



PLAN @ END BENT 1

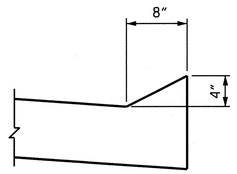
PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

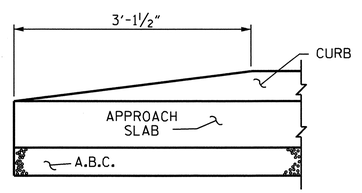


† NORMAL TO END BENT

SECTION THRU SLAB



SECTION M-M



END OF CURB WITHOUT SHOULDER BERM GUTTER

NOTES

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

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, 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 6"COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0"OUTSIDE EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 4"TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6"COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5"CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NORMAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2½".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

APPROACH SLAB AT EB 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	50	#4	STR	18'-3"	610
A2	52	#4	STR	18'-2"	631
✱B1	68	#5	STR	23'-8"	1679
B2	68	#6	STR	24'-7"	2511
✱B3	4	#4	STR	24'-7"	66
✱G1	25	#4	STR	5'-1"	85
✱U1	10	#4	1	2'-10"	19

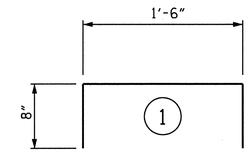
REINFORCING STEEL	LBS.	3142
✱EPOXY COATED REINFORCING STEEL	LBS.	2459
CLASS AA CONCRETE		
POUR 1 (SLAB & CURB)	C. Y.	32.1
POUR 2 (SIDEWALK)	C. Y.	3.1
TOTAL	C. Y.	35.2

APPROACH SLAB AT EB 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	50	#4	STR	18'-3"	610
A2	52	#4	STR	18'-2"	631
✱B1	68	#5	STR	23'-8"	1679
B2	68	#6	STR	24'-7"	2511
✱B3	4	#4	STR	24'-7"	66
✱G1	25	#4	STR	5'-1"	85
✱U1	10	#4	1	2'-10"	19

REINFORCING STEEL	LBS.	3142
✱EPOXY COATED REINFORCING STEEL	LBS.	2459
CLASS AA CONCRETE		
POUR 1 (SLAB & CURB)	C. Y.	32.1
POUR 2 (SIDEWALK)	C. Y.	3.1
TOTAL	C. Y.	35.2

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			146

STR. #1

STD. NO. BAS4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
7/29/10

ASSEMBLED BY : D. R. WITHROW	DATE : 7/6/09		
CHECKED BY : A.S. CALLAWAY	DATE : 7/30/09		
DRAWN BY : EEM 3/95	REV. 7/10/01	LES/RDR	
CHECKED BY : VAP 3/95	REV. 5/7/03R	RWW/JTE	
	REV. 5/1/06R	KMM/GM	

27-JUL-2010 14:51
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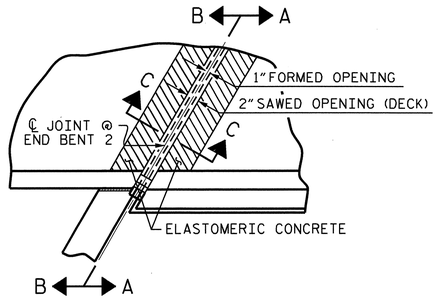
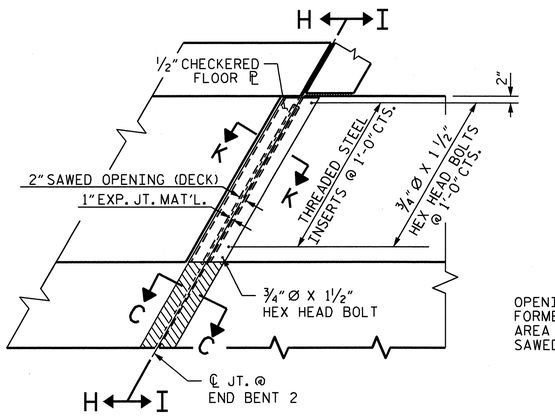
LSUTTON



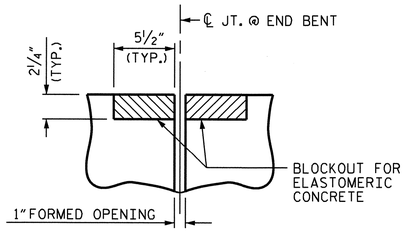
PLAN VIEW OF EVAZOTE JOINT SEAL @ END BENT FOR BARRIER RAIL

(END BENT 2 SHOWN, END BENT 1 SIMILAR)



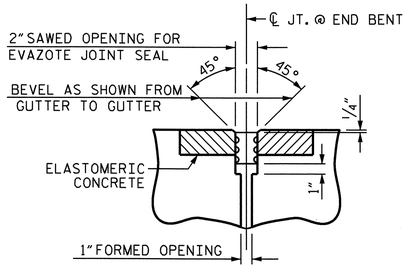
PLAN VIEW OF EVAZOTE JOINT SEAL @ END BENT FOR SIDEWALK

(END BENT 2 SHOWN, END BENT 1 SIMILAR)



SECTION C-C

EVAZOTE JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)

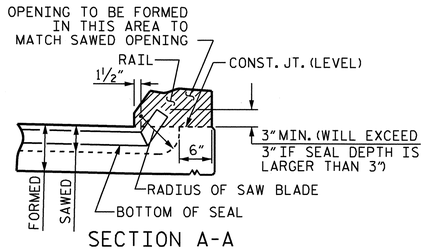


SECTION C-C

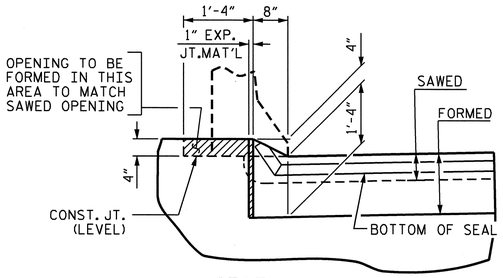
EVAZOTE JOINT SEAL (FIXED)

ELASTOMERIC CONCRETE	
APPROACH SLAB NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	4.9
2	4.9
TOTAL	9.8

* BASED ON THE MINIMUM BLOCKOUT SHOWN.



SECTION A-A

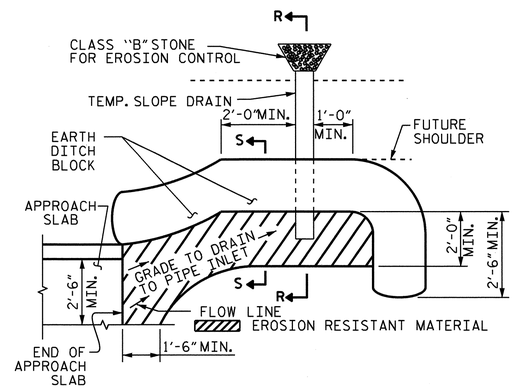


SECTION B-B

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALLY BLAST CLEANED AND EITHER COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC-RICH PAINT, GALVANIZED OR METALLIZED TO A MINIMUM THICKNESS OF 6 MILS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

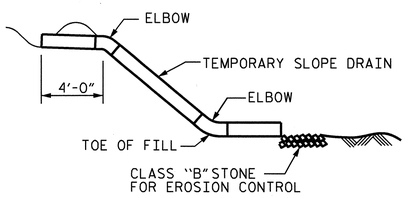
THE ¾" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "EVAZOTE JOINT SEALS".

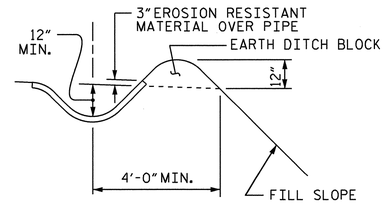


PLAN VIEW

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.



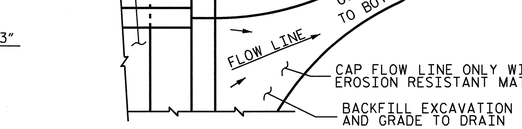
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

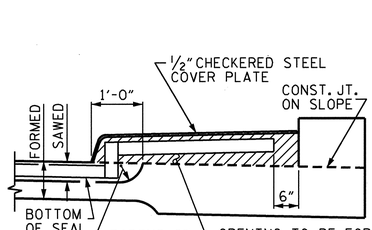
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



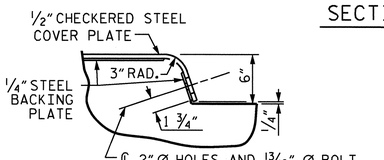
SECTION N-N

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.

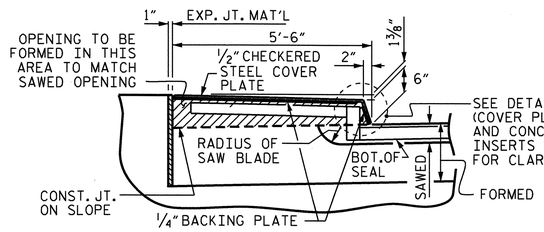
TEMPORARY DRAINAGE DETAIL



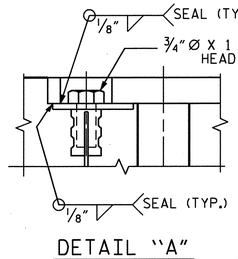
SECTION H-H



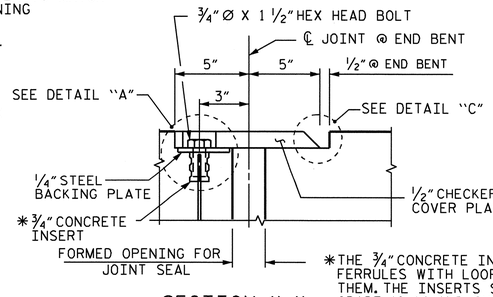
DETAIL "B"



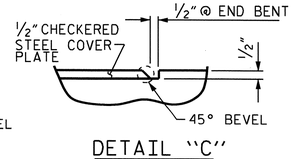
SECTION I-I



DETAIL "A"



SECTION K-K



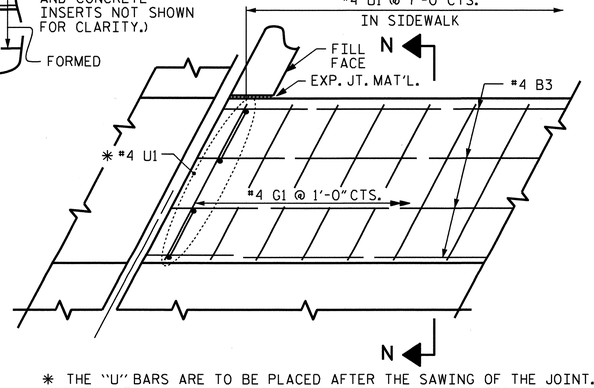
DETAIL "C"

*THE ¾" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.

JOINT SEAL DETAILS @ END BENT

EVAZOTE JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.



* THE "U" BARS ARE TO BE PLACED AFTER THE SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE "U" BARS GROUTED INTO PLACE.

PLAN

SIDEWALK DETAILS

ASSEMBLED BY :	D. R. WITHROW	DATE :	7/6/09
CHECKED BY :	A.S. CALLAWAY	DATE :	7/30/09
DRAWN BY : FCJ	11/88	REV. 10/17/00	RWW/LES
CHECKED BY : ARB	11/88	REV. 5/7/03	RWW/JTE
		REV. 5/1/06R	MAA/KMM

29-JUL-2010 15:43
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lsutton

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			146

STR. #1

STD. NO. BAS10

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

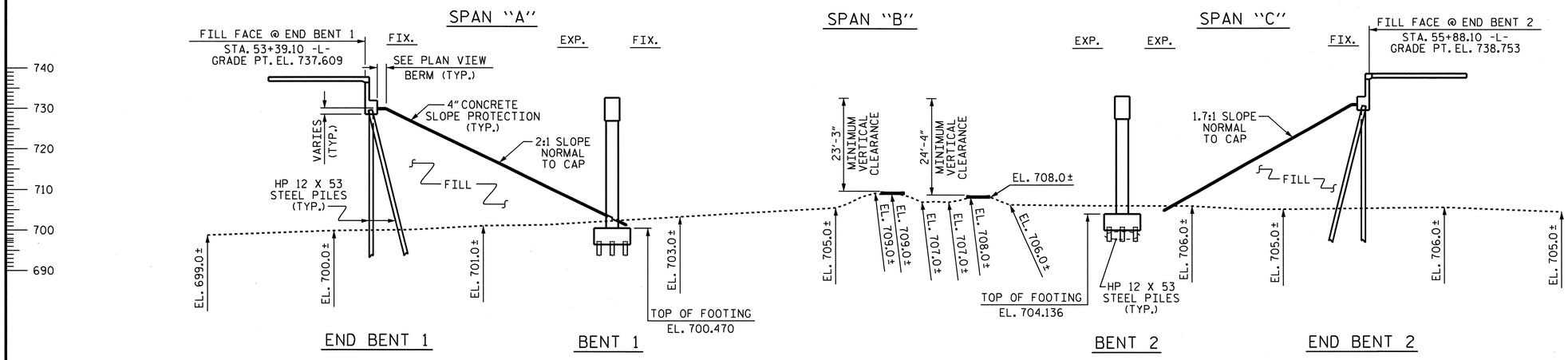
F.A. PROJ. NO. STP-1311(10)

53+00 53+50 54+00 54+50 55+00 55+50 56+00

+4.9051% -3.4242%

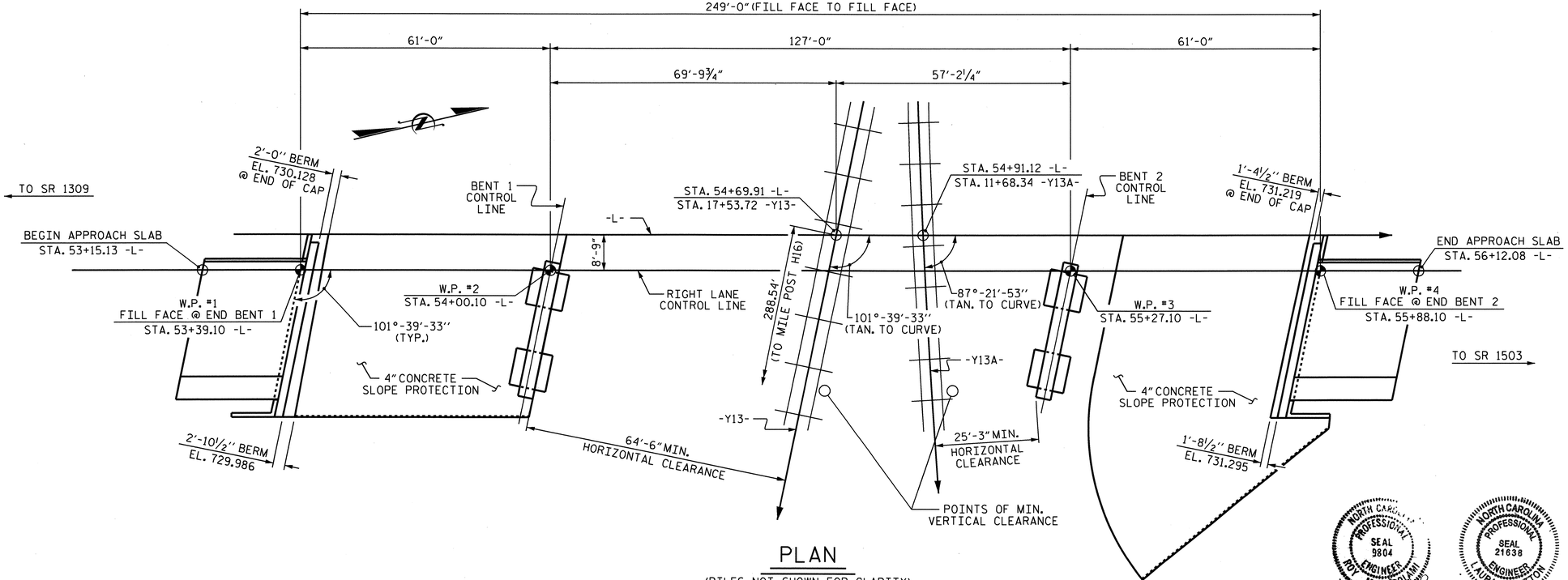
PI = 54+40.00 -L-RT.
EL. = 746.25
VC = 700.00

GRADE DATA



SECTION ALONG RIGHT LANE CONTROL LINE

(SECTIONS @ END BENTS AND BENTS ARE @ RIGHT ANGLES)



PLAN

(PILES NOT SHOWN FOR CLARITY)
(FOR TRACK PROFILE ELEVATIONS, SEE SHEET 3 OF 4)

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/12/10

30-JUL-2010 11:09
R:\Structures\str02\scallaway\Microstation\U3110B_SD_GD_02.dgn
lsutton

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-
17+53.72 -Y13-
BRIDGE NO. 428
MILE POST H15.9

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

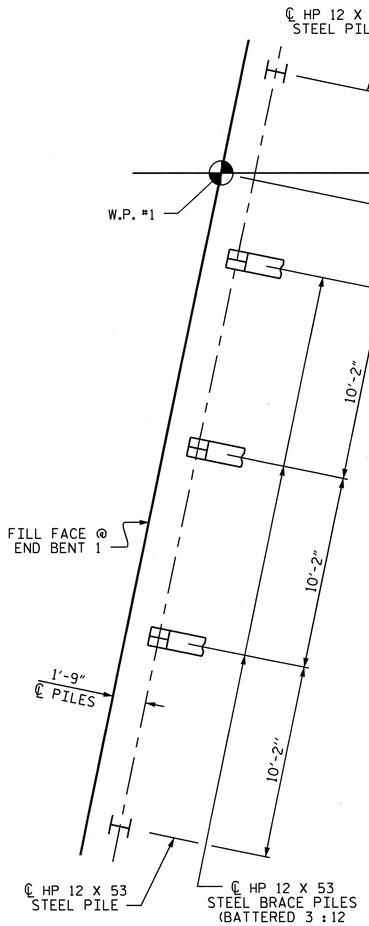
FOR BRIDGE ON NC 100
REALIGNMENT OVER
NORFOLK SOUTHERN RAILROAD
BETWEEN SR 1309 AND SR 1503
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-42
1			3			TOTAL SHEETS
2			4			146

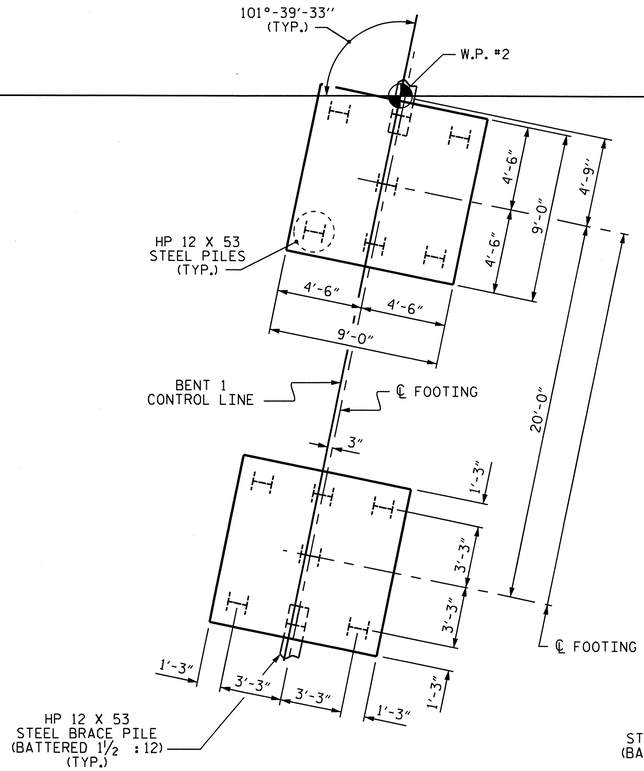
NORTH CAROLINA PROFESSIONAL SEAL 9804 ENGINEER ROY M. GIROLAMI
7-30-10

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/30/10

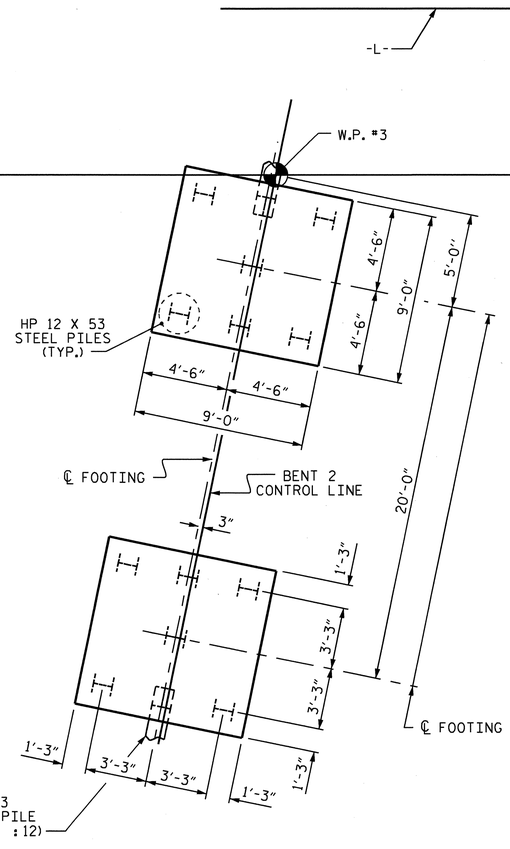
STR. #2



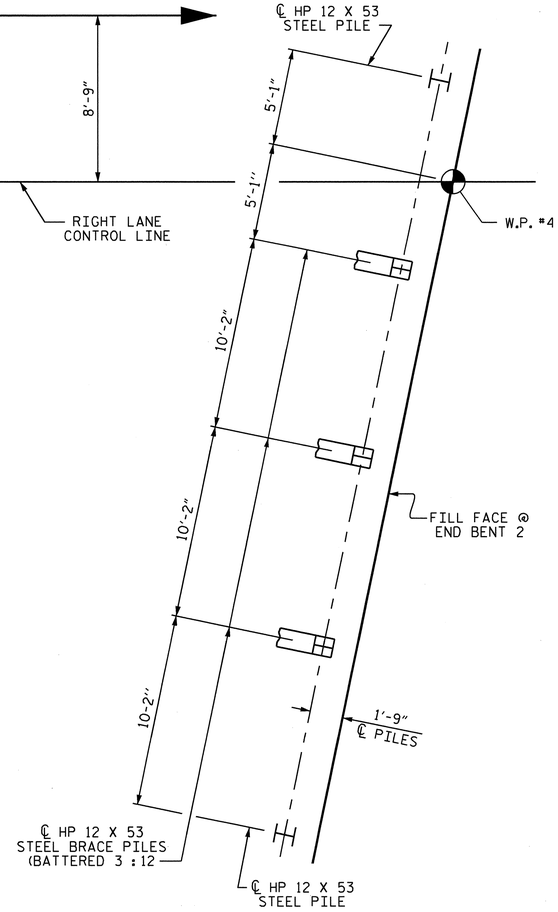
END BENT 1



BENT 1



BENT 2



END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE TO THE CENTERLINE OF THE PILE AT THE BOTTOM OF CAP OR FOOTING.

NOTES

(CONTINUED ON SHEET 4 OF 4)

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.

PILES AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 185 TONS PER PILE.

PILES AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 175 TONS PER PILE.

TESTING PILES WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PILE DRIVING ANALYZER, SEE PILES SPECIAL PROVISIONS.

DRIVING PILES AT END BENT 2 MAY REQUIRE PENETRATION OF GEOGRID REINFORCEMENT. FOR GEOGRID REINFORCEMENT AND PAY ITEM, SEE ROADWAY PLANS.

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100 REALIGNMENT OVER NORFOLK SOUTHERN RAILROAD BETWEEN SR 1309 AND SR 1503 — RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-43
1			3			TOTAL SHEETS
2			4			146

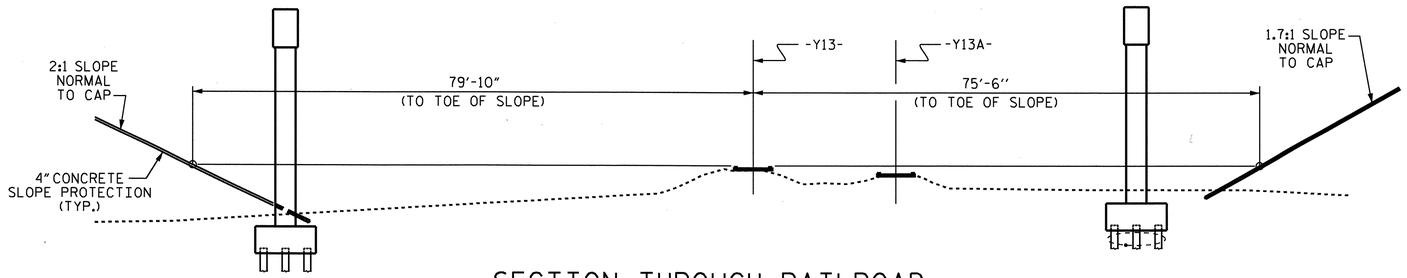
STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/12/10

27-JUL-2010 14:48
R:\Structures\str02\scallaway\Microstation\U3110B_SD_GD_02.dgn
LSUTTON

NOTE

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 VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.



SECTION THROUGH RAILROAD

(TAKEN AT RIGHT ANGLE TO RAILROAD)

TOP OF RAIL ELEVATIONS			
STATION -Y13-	LT. RAIL	STATION -Y13-	RT. RAIL
		10+00.01	705.050
10+73.54	705.840	10+73.50	705.490
11+44.74	706.230	11+44.92	705.890
12+16.68	706.630	12+16.57	706.300
12+64.99	706.990	12+67.38	706.670
12+95.01	707.150	12+95.05	706.820
13+33.29	707.190	13+33.46	706.890
14+15.28	707.520	14+15.52	707.190
14+98.15	707.830	14+98.17	707.580
15+78.99	708.150	15+78.93	708.010
16+14.28	708.310	16+14.40	708.200
16+52.87	708.570	16+52.91	708.510
16+91.78	708.800	16+91.84	708.790
17+22.61	708.970	17+22.54	708.970
17+58.52	709.180	17+58.56	709.180
17+98.97	709.440	17+98.88	709.440
18+36.33	709.690	18+36.20	709.690
18+83.54	710.040	18+83.47	710.040
19+32.40	710.400	19+32.40	710.400
19+82.07	710.760	19+82.11	710.760
20+31.09	711.110	20+31.18	711.100
20+82.26	711.470	20+82.13	711.460
21+29.84	711.730	21+29.88	711.730
21+80.27	711.980	21+80.21	711.970
22+31.23	712.125	22+31.14	712.140
22+80.95	712.270	22+80.83	712.250
23+33.49	712.330	23+33.49	712.350
23+77.26	712.330	23+77.24	712.420
24+28.48	712.280	24+28.45	712.420
24+77.44	712.290	24+77.43	712.470
25+25.19	712.210	25+25.13	712.470
25+73.03	712.090	25+72.88	712.410

TOP OF RAIL ELEVATIONS			
STATION -Y13A-	LT. RAIL	STATION -Y13A-	RT. RAIL
10+07.64	708.200	10+00.00	708.020
10+69.04	708.657	10+61.82	708.496
10+75.45	708.710	10+74.46	708.590
		10+80.29	708.649
		10+82.42	708.667
11+02.97	708.670	11+10.79	708.719
11+30.62	708.465	11+39.09	708.427
11+49.50	708.230	11+49.70	708.230
12+43.04	708.620	12+42.92	708.620
12+93.25	708.970	12+93.62	708.950
13+49.83	709.390	13+50.17	709.390
14+08.09	709.710	14+08.13	709.730

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100
REALIGNMENT OVER
NORFOLK SOUTHERN RAILROAD
BETWEEN SR 1309 AND SR 1503
— RIGHT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-44
1			3			TOTAL SHEETS
2			4			146

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/12/10

27-JUL-2010 14:48
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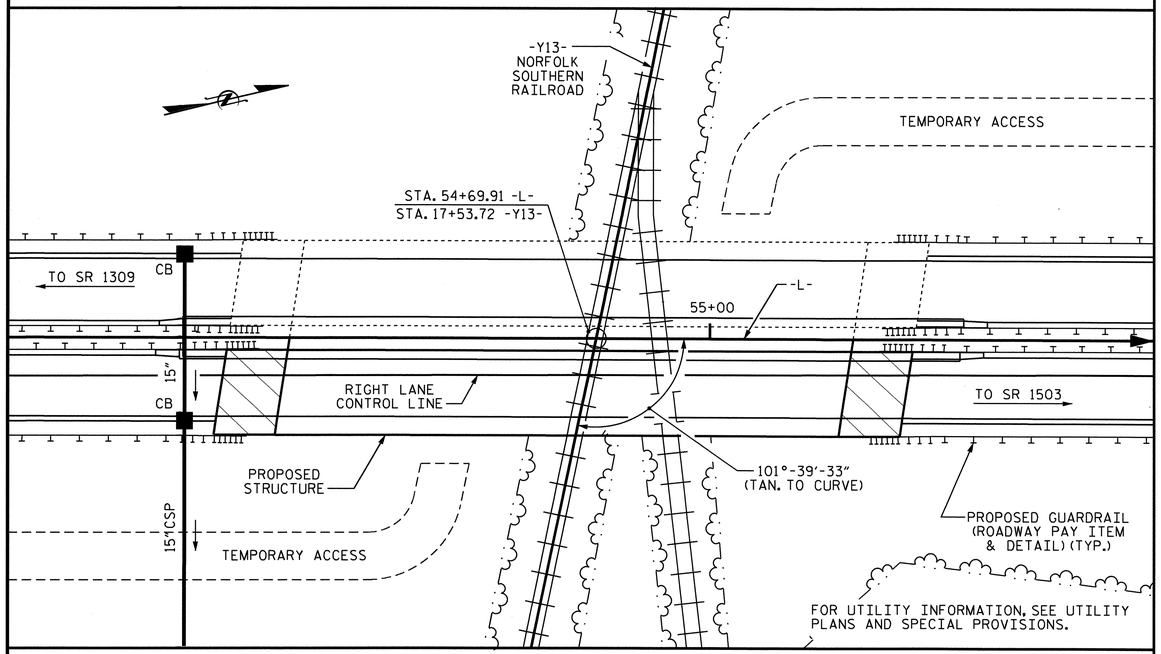
LSUTTON

BM #3: RR SPIKE SET IN BASE OF 30" MAPLE, 129' RT. OF STA. 43+10 -L-, ELEV. 708.75



LOCATION SKETCH

NOTES (CONTINUED FROM SHEET 2 OF 4)

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

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

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.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.

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

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR FORMS FOR CONCRETE BRIDGES DECKS, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION	PDA TESTING	PDA ASSISTANCE	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	STRUCTURAL STEEL	HP 12 X 53 STEEL PILES		PILE REDRIVES	THREE BAR METAL RAIL	CONCRETE BARRIER RAIL	104" CHAIN LINK FENCE	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EVAZOTE JOINT SEALS
	LUMP SUM	EACH	EACH	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	APPROX. LBS.	NO.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE				8,990	7,253		LUMP SUM			281,500				239.06	246.88	120.00		LUMP SUM	LUMP SUM
END BENT 1						24.7		3,517			5	500	3				329		
BENT 1	LUMP SUM					61.9		7,769	1,213		14	1,085	7						
BENT 2	LUMP SUM					60.1		7,562	1,080		14	840	7						
END BENT 2						24.8		3,583			5	430	3				408		
TOTAL	LUMP SUM	1	1	8,990	7,253	171.5	LUMP SUM	22,431	2,293	281,500	38	2,855	20	239.06	246.88	120.00	737	LUMP SUM	LUMP SUM

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100
REALIGNMENT OVER
NORFOLK SOUTHERN RAILROAD
BETWEEN SR 1309 AND SR 1503
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-45
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
8/27/10

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/12/10

27-AUG-2010 11:16
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lsutton

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II 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⟩	1.29	--	1.75	0.867	1.31	B	ER	62.66	0.899	1.34	B	ER	125.33	1.30	0.867	1.29	B	ER	62.66	
		HL-93 (OPERATING)	N/A		1.68	--	1.35	0.867	1.70	B	ER	62.66	0.899	1.73	B	ER	125.33	1.00	0.867	1.68	B	ER	62.66	
		HS-20 (INVENTORY)	36.00	⟨2⟩	1.91	68.8	1.75	0.867	1.94	B	ER	62.66	0.899	1.94	B	ER	125.33	1.30	0.867	1.91	B	ER	62.66	
		HS-20 (OPERATING)	36.00		2.48	89.3	1.35	0.867	2.51	B	ER	62.66	0.899	2.51	B	ER	125.33	1.00	0.867	2.48	B	ER	62.66	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.66	62.9	1.40	0.867	5.90	B	ER	62.66	0.899	6.11	B	ER	125.33	1.30	0.867	4.66	B	ER	62.66	
		SNGARBS2	20.000		3.32	66.4	1.40	0.867	4.20	B	ER	62.66	0.899	4.23	B	ER	125.33	1.30	0.867	3.32	B	ER	62.66	
		SNAGRIS2	22.000		3.09	68.0	1.40	0.867	3.90	B	ER	62.66	0.899	3.89	B	ER	125.33	1.30	0.867	3.09	B	ER	62.66	
		SNCOTTS3	27.250		2.32	63.2	1.40	0.867	2.93	B	ER	62.66	0.899	3.04	B	ER	125.33	1.30	0.867	2.32	B	ER	62.66	
		SNAGGRS4	34.925		1.88	65.7	1.40	0.867	2.37	B	ER	62.66	0.899	2.45	B	ER	125.33	1.30	0.867	1.88	B	ER	62.66	
		SNS5A	35.550		1.84	65.4	1.40	0.867	2.33	B	ER	62.66	0.899	2.44	B	ER	125.33	1.30	0.867	1.84	B	ER	62.66	
		SNS6A	39.950		1.66	66.3	1.40	0.867	2.10	B	ER	62.66	0.899	2.20	B	ER	125.33	1.30	0.867	1.66	B	ER	62.66	
		SNS7B	42.000		1.58	66.4	1.40	0.867	2.00	B	ER	62.66	0.899	2.12	B	ER	125.33	1.30	0.867	1.58	B	ER	62.66	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.02	66.7	1.40	0.867	2.56	B	ER	62.66	0.899	2.64	B	ER	125.33	1.30	0.867	2.02	B	ER	62.66	
		TNT4A	33.075		2.02	66.8	1.40	0.867	2.56	B	ER	62.66	0.899	2.60	B	ER	125.33	1.30	0.867	2.02	B	ER	62.66	
		TNT6A	41.600		1.63	67.8	1.40	0.867	2.07	B	ER	62.66	0.899	2.20	B	ER	125.33	1.30	0.867	1.63	B	ER	62.66	
		TNT7A	42.000		1.63	68.5	1.40	0.867	2.06	B	ER	62.66	0.899	2.16	B	ER	125.33	1.30	0.867	1.63	B	ER	62.66	
		TNT7B	42.000		1.66	69.7	1.40	0.867	2.10	B	ER	62.66	0.899	2.10	B	ER	125.33	1.30	0.867	1.66	B	ER	62.66	
		TNAGRIT4	43.000		1.60	68.8	1.40	0.867	2.02	B	ER	62.66	0.899	2.04	B	ER	125.33	1.30	0.867	1.60	B	ER	62.66	
		TNAGT5A	45.000		1.52	68.4	1.40	0.867	1.92	B	ER	62.66	0.899	1.99	B	ER	125.33	1.30	0.867	1.52	B	ER	62.66	
		TNAGT5B	45.000	⟨3⟩	1.51	68.0	1.40	0.867	1.91	B	ER	62.66	0.899	1.95	B	ER	125.33	1.30	0.867	1.51	B	ER	62.66	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75																				

LOAD FACTORS:

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

	YEAR	ADTT
CURRENT	2010	426
FUTURE	2030	737

NOTES:

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

ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.

2.

3.

4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93) **

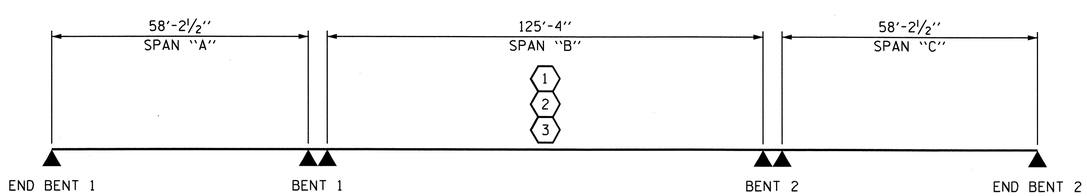
⟨2⟩ DESIGN LOAD RATING (HS-20) **

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-46
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21838 ENGINEER LAURA E SUTTON
7/29/10

STR. #2 STD. NO. LRFR3

ASSEMBLED BY : A.S. CALLAWAY DATE : 5/13/10
CHECKED BY : T.L. CELLAND DATE : 5/14/10
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08
REV. 11/12/08RR MAA/GM

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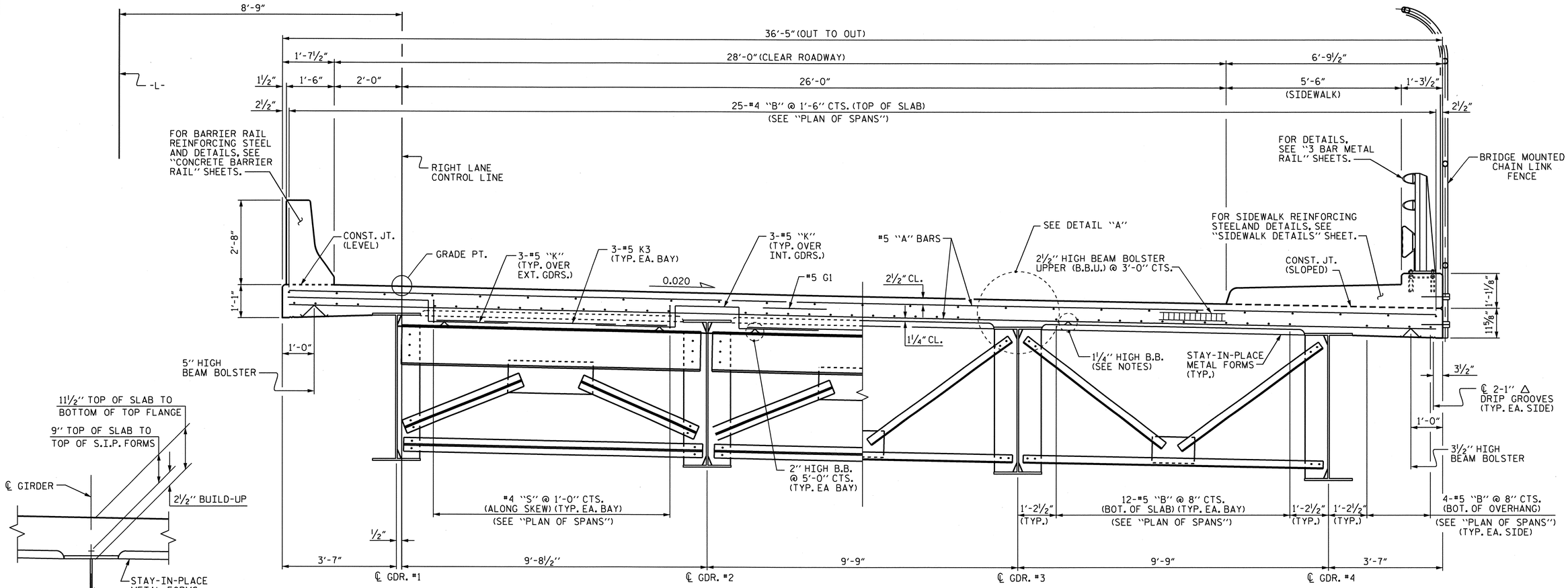
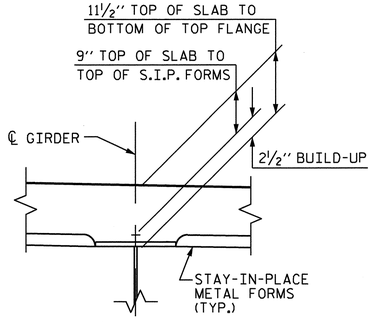
LSUTTON



AT END BENT & BENT DIAPHRAGMS

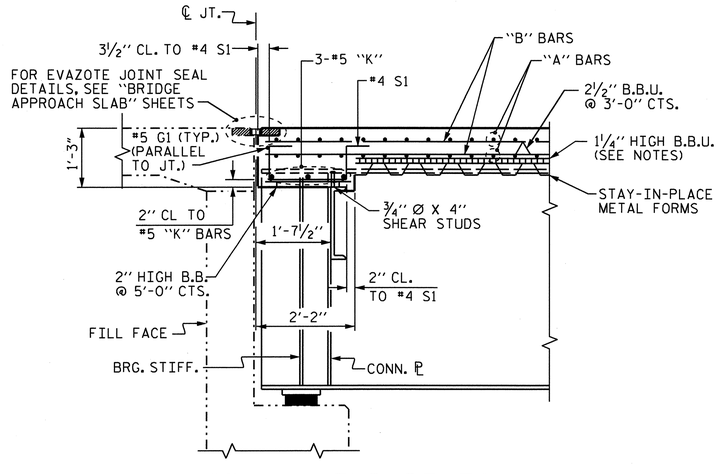
AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

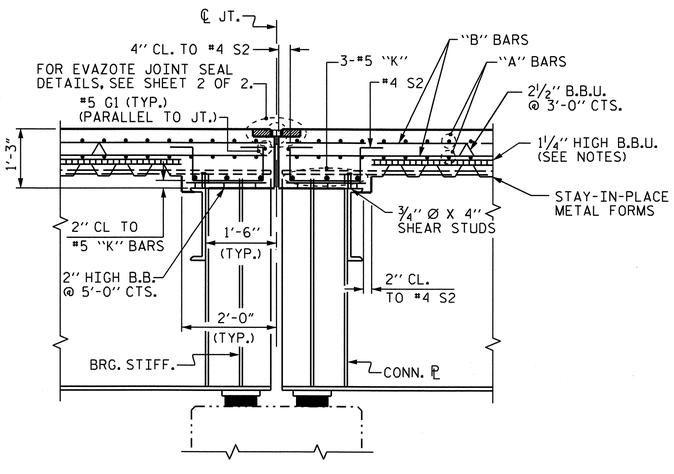


DETAIL "A"

(TYP. EACH GIRDER)



SECTION @ END BENTS



SECTION @ BENTS

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.

BARRIER RAIL AND SIDEWALK 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.

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

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

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND BEAM/GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

FOR BRIDGE MOUNTED CHAIN LINK FENCE DETAILS AND LOCATION, SEE "BRIDGE MOUNTED CHAIN LINK FENCE" SHEET.

NORTH CAROLINA PROFESSIONAL SEAL 21838 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-47
1			3			TOTAL SHEETS
2			4			146

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 6/8/09
CHECKED BY : T.L. CLELLAND DATE : 1/8/10

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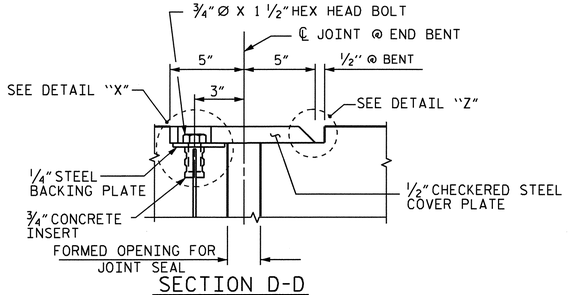
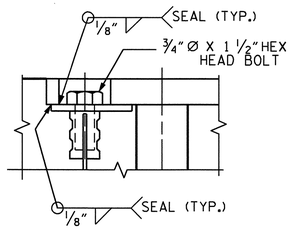
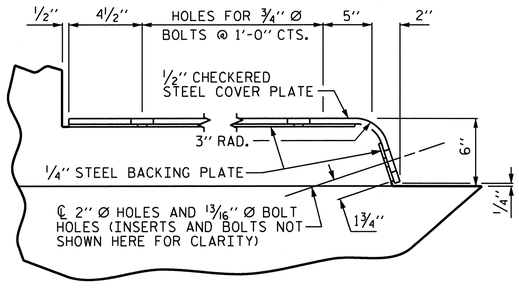
LSUTTON



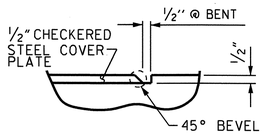
SECTION D-D



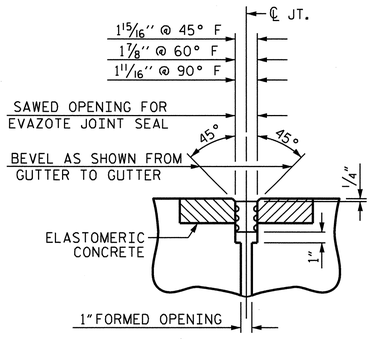
DETAIL "X"



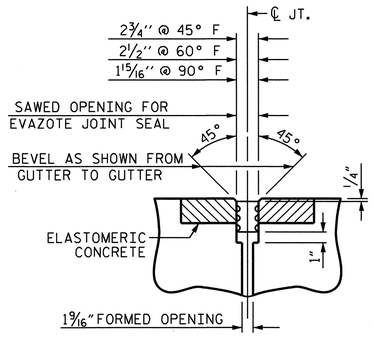
SECTION B-B



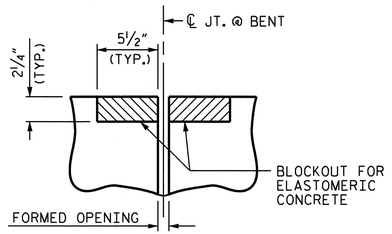
DETAIL "Z"



SECTION C-C
(BENT 1)



SECTION C-C
(BENT 2)



SECTION C-C
EVAZOTE JOINT SEAL
(PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)

ELASTOMERIC CONCRETE	
BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	4.9
2	4.9
TOTAL	9.8

* BASED ON THE MINIMUM BLOCKOUT SHOWN.

NOTES

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALLY BLAST CLEANED AND COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. AT THE CONTRACTORS OPTION, THESE SURFACES MAY BE METALLIZED TO A MINIMUM THICKNESS OF 6 MILS. SEE SPECIAL PROVISIONS FOR THERMAL SPRAYED COATINGS (METALLIZATION).

THE ¾" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

THE ¾" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.

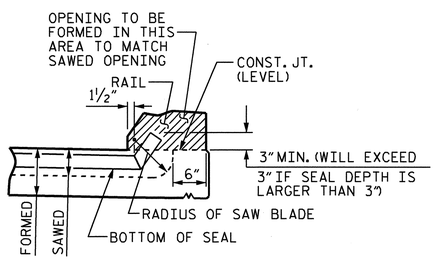
NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "EVAZOTE JOINT SEALS".

THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2½" AT BENT 1 AND 3 7/16" AT BENT 2. FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

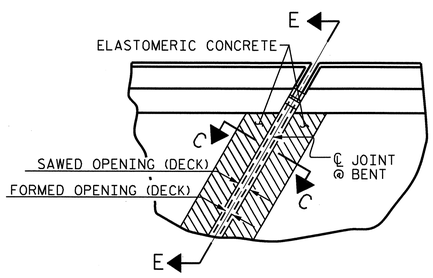
DURING THE JOINT INSTALLATION PROCEDURE, THE JOINT AND SURROUNDING AREA SHALL BE KEPT CLEAN AND FREE OF DEBRIS.

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

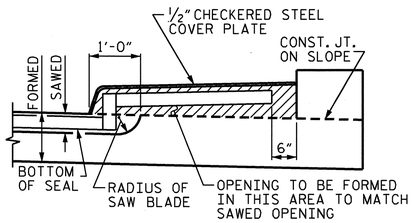


SECTION E-E

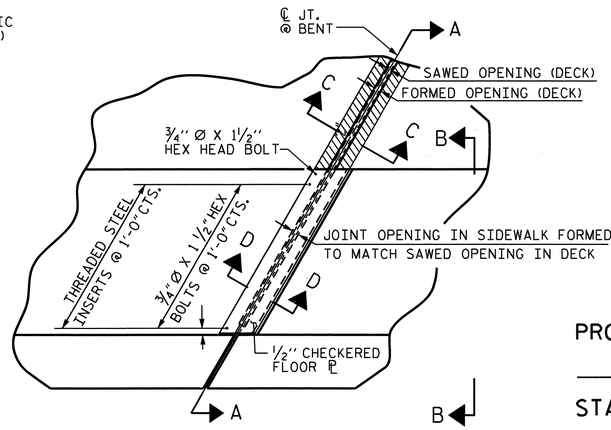
EVAZOTE JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.



PLAN LEFT SIDE



SECTION A-A



PLAN RIGHT SIDE

JOINT SEAL DETAILS @ BENT

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-48
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 6/8/09
CHECKED BY : T.L. CLELLAND DATE : 1/8/10

27-JUL-2010 14:48
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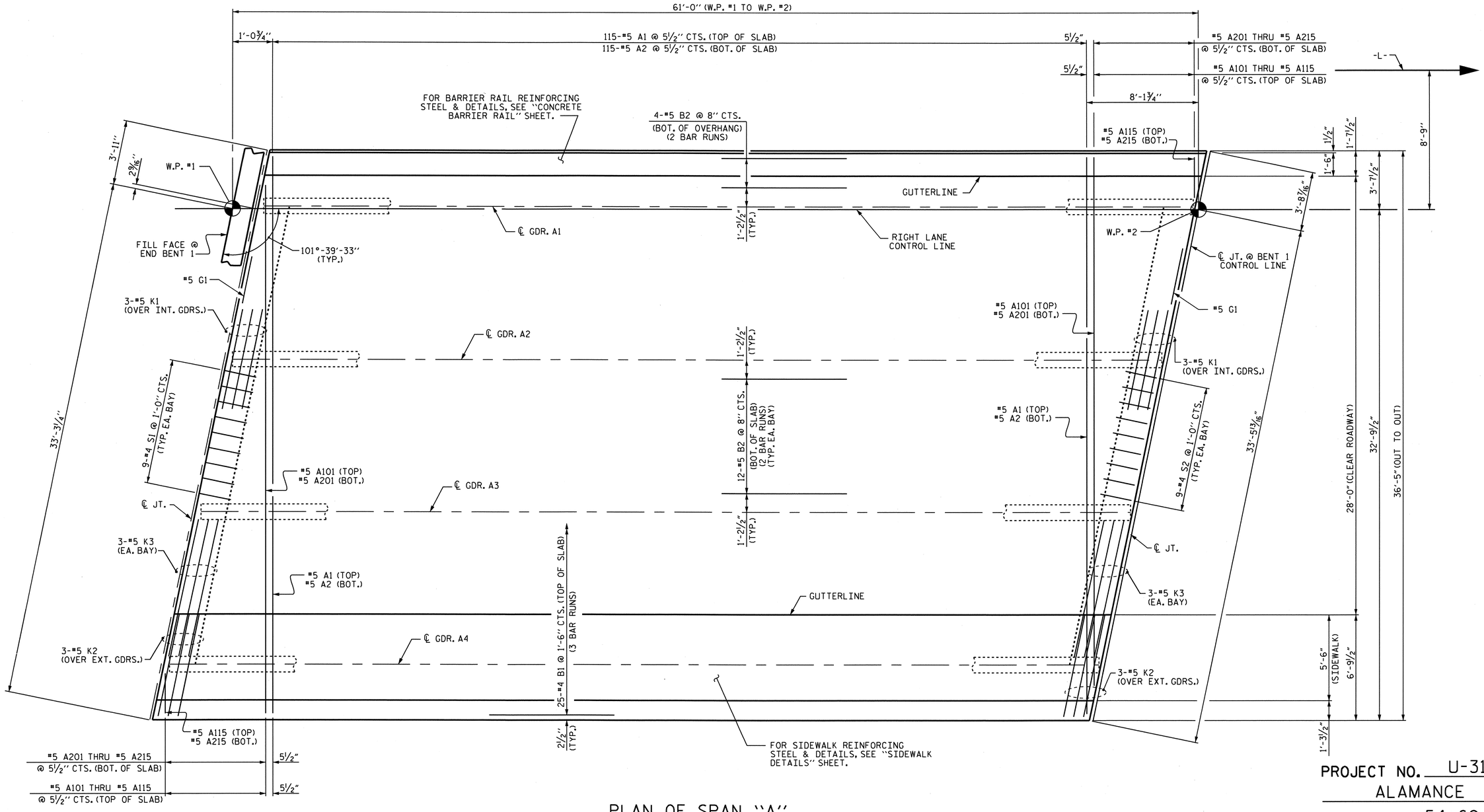
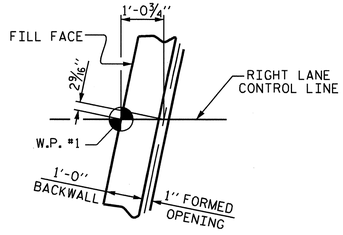


PLAN OF SPAN "A"



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(END BENT 1)

DRAWN BY : A.S. CALLAWAY DATE : 6/9/09
CHECKED BY : T.L. CLELLAND DATE : 1/8/10

27-JUL-2010 14:48
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LSUTTON

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

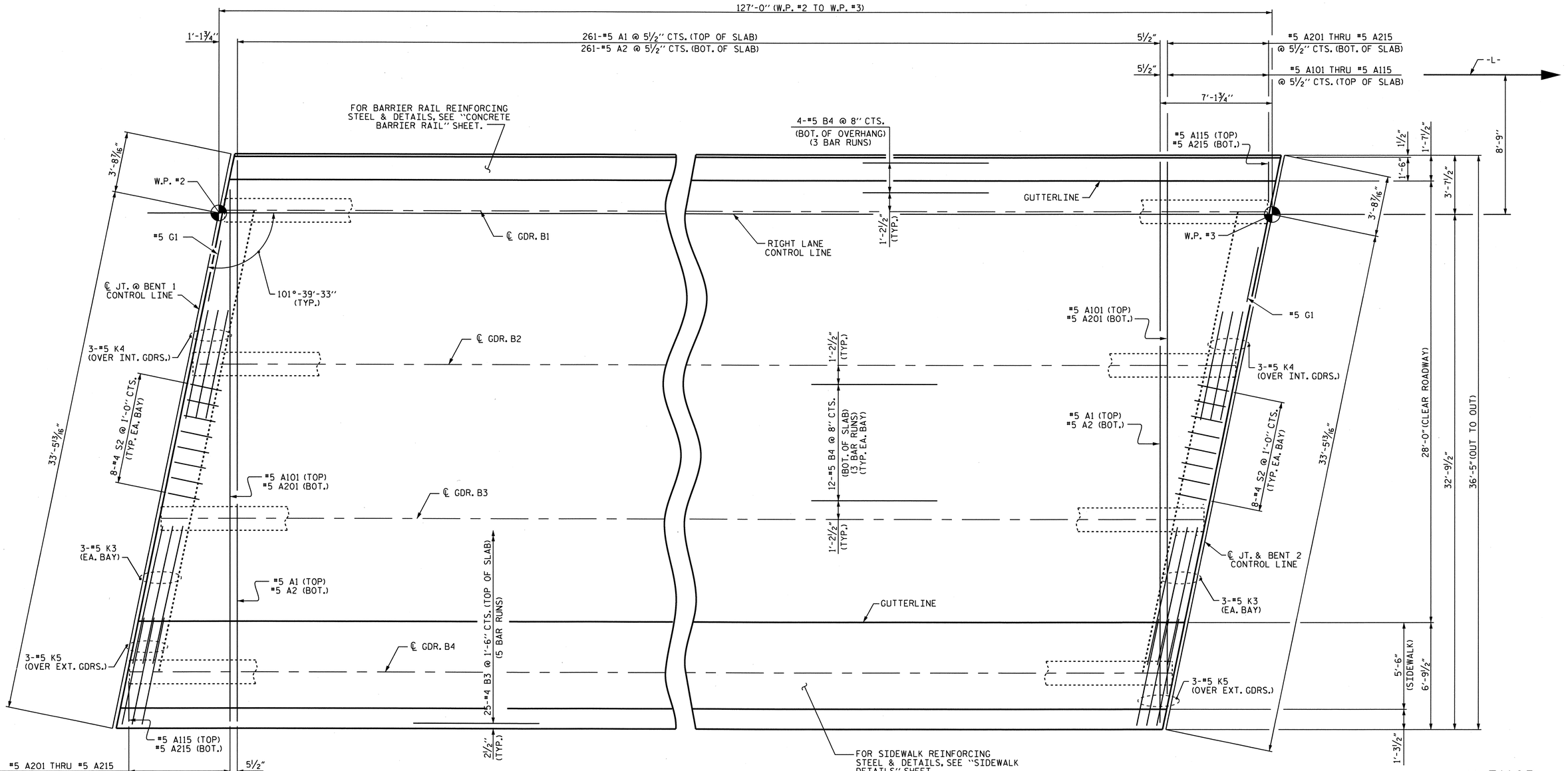
SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-49
1			3			TOTAL SHEETS
2			4			146

STR. #2



PLAN OF SPAN "B"

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-50
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 6/9/09
CHECKED BY : T.L. CLELLAND DATE : 1/8/10

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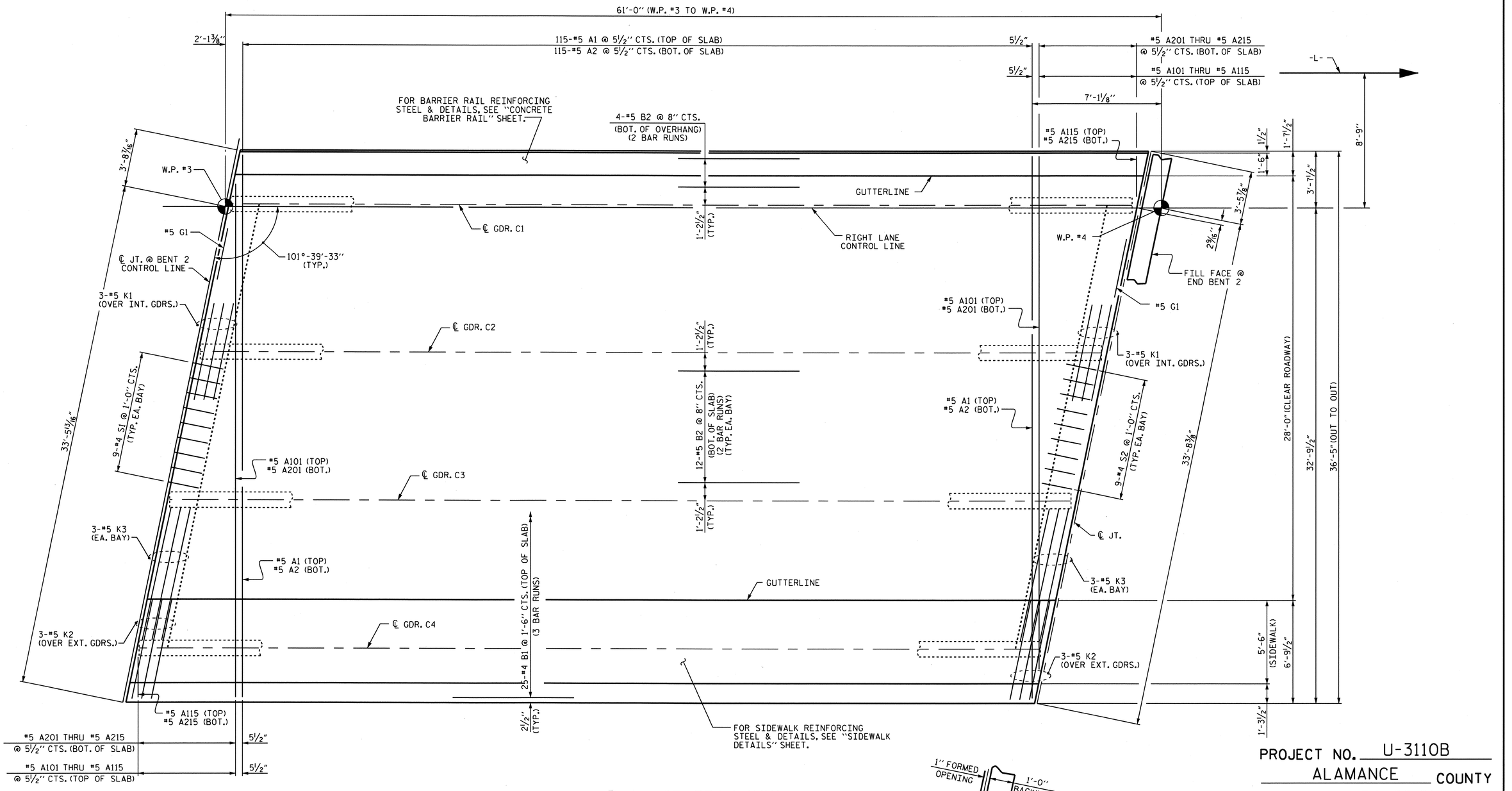

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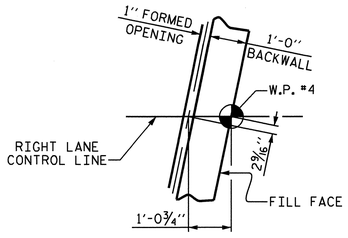

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(END BENT 2)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-51
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 6/9/09
CHECKED BY : T.L. CLELLAND DATE : 1/8/10

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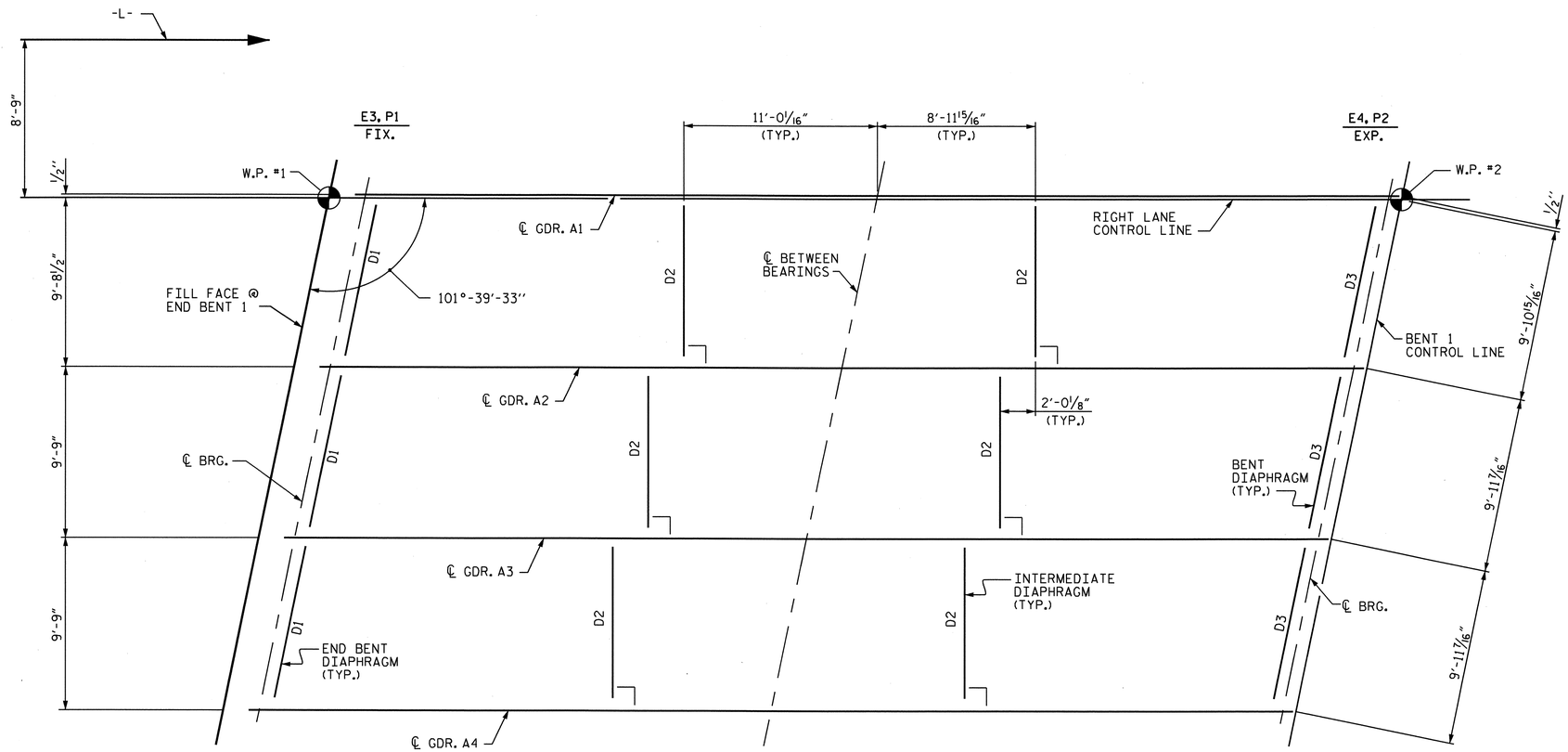

SPAN "A"

FRAMING PLAN

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-52
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 6/9/09
CHECKED BY : T.L. CLELLAND DATE : 1/8/10

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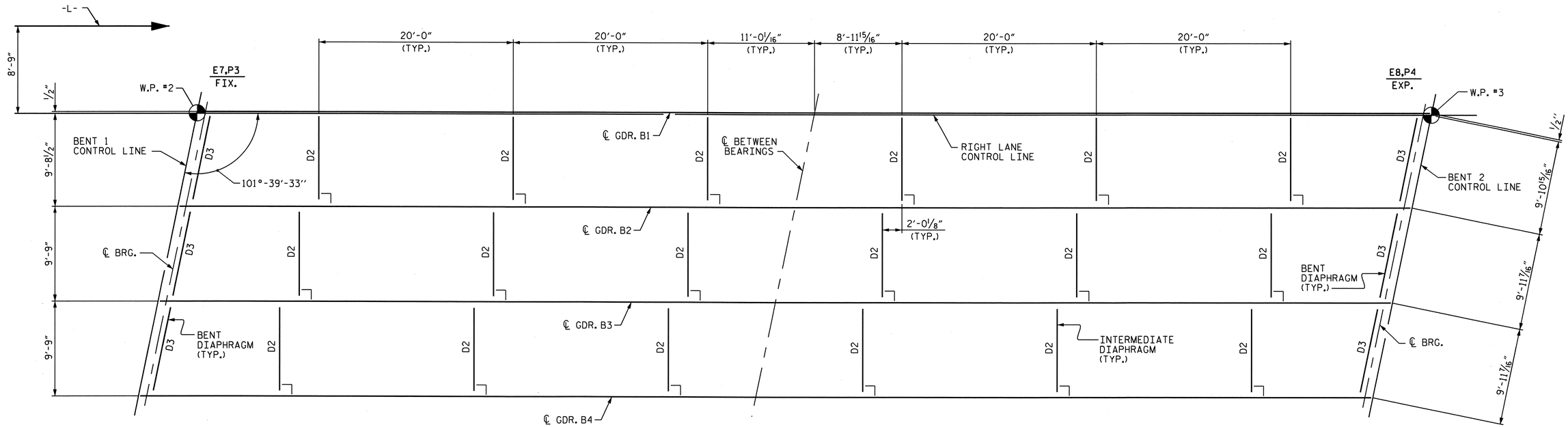

SPAN "B"

FRAMING PLAN

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-53
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 6/9/09
CHECKED BY : T.L. CLELLAND DATE : 1/8/10

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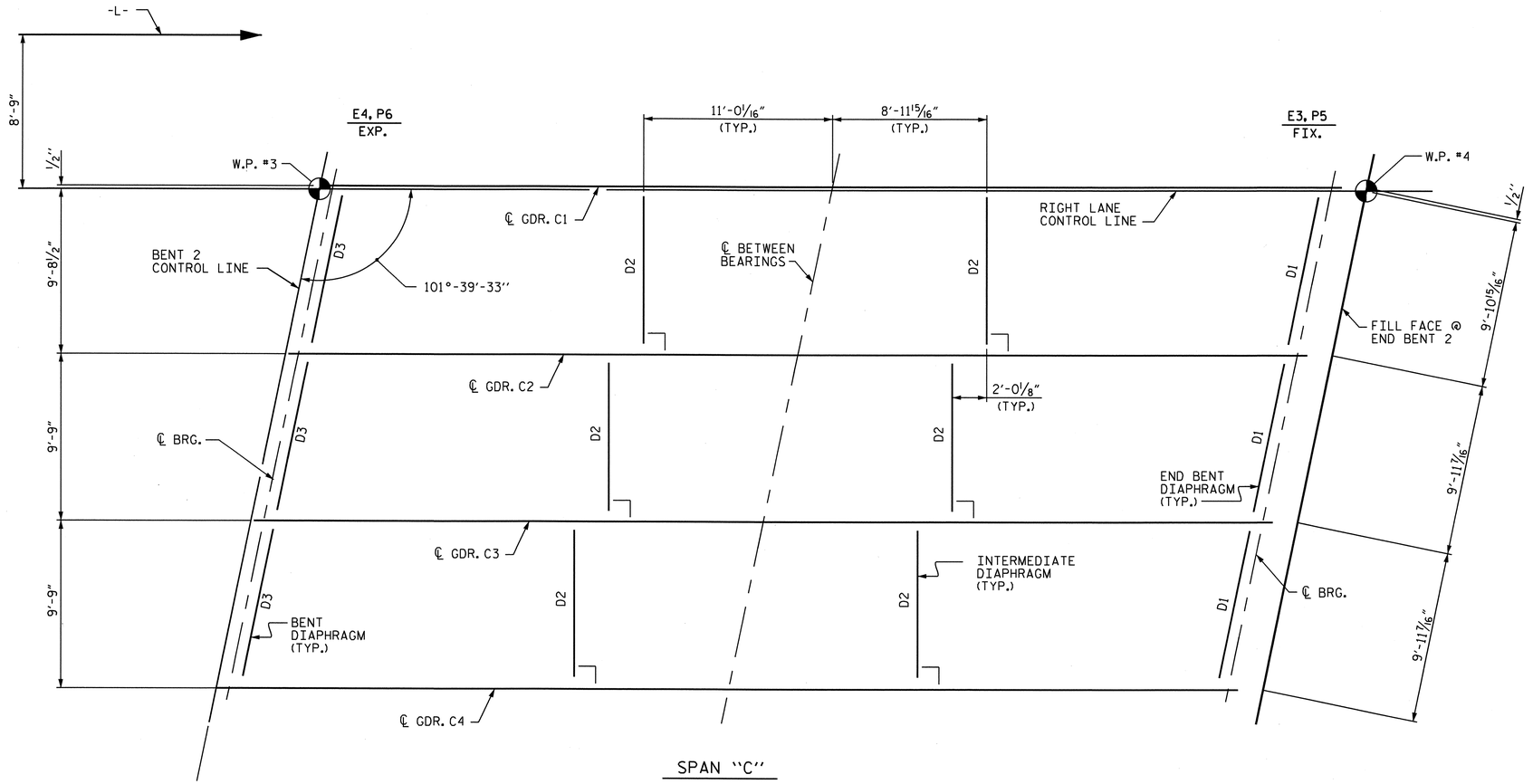

SPAN "C"

FRAMING PLAN

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-54
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 6//9/09
CHECKED BY : T.L. CLELLAND DATE : 1/8/10

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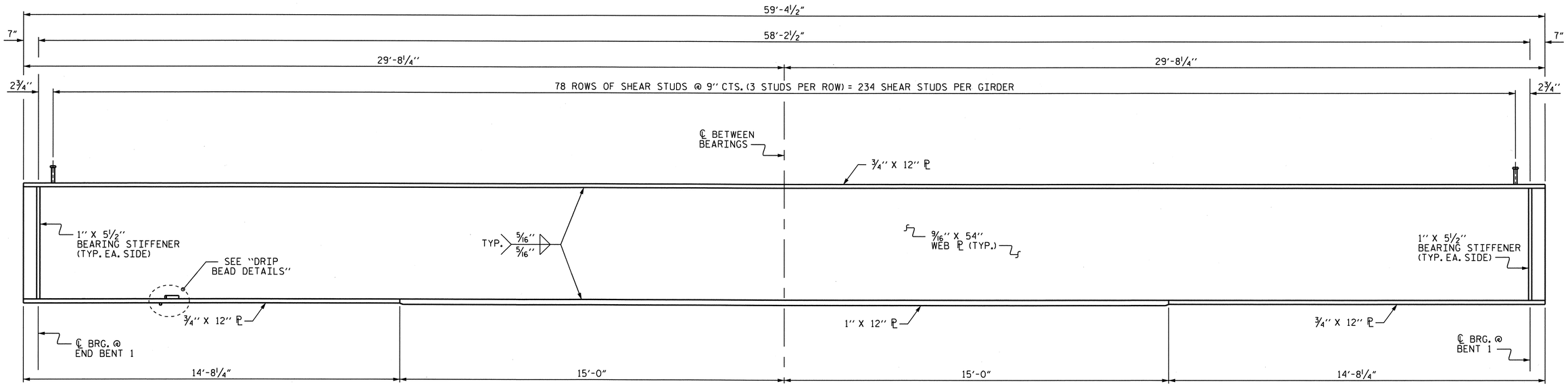
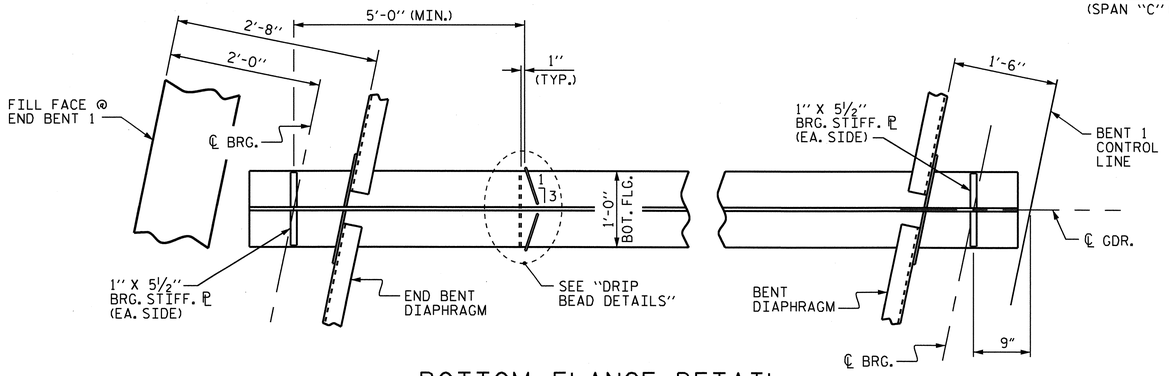


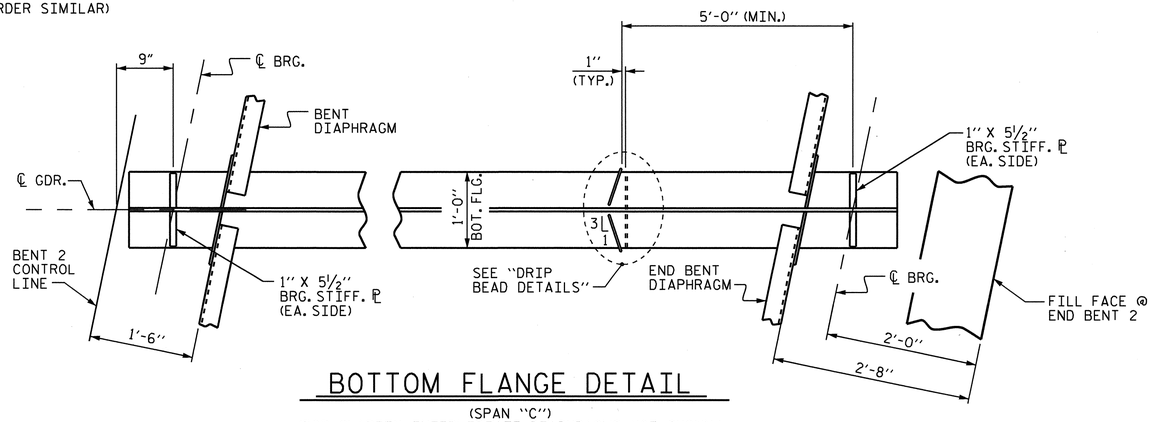
GIRDER ELEVATION-SPAN "A"

(SPAN "C" GIRDER SIMILAR)



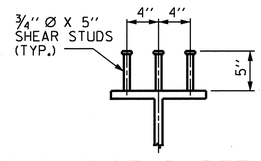
BOTTOM FLANGE DETAIL

(SPAN "A")
(FOR CLARITY, INTERMEDIATE DIAPHRAGMS NOT SHOWN.)

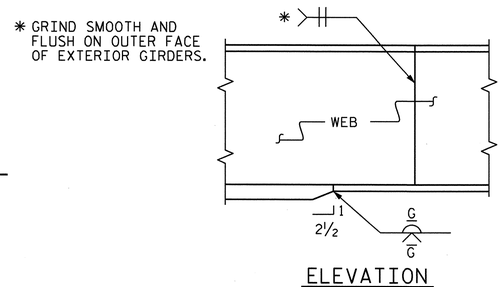


BOTTOM FLANGE DETAIL

(SPAN "C")
(FOR CLARITY, INTERMEDIATE DIAPHRAGMS NOT SHOWN.)

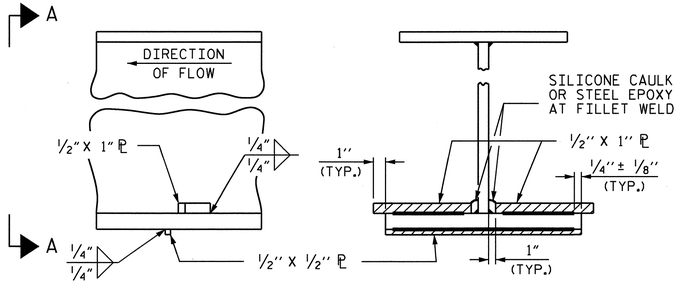


SHEAR STUD DETAILS



ELEVATION

TYPICAL FLANGE AND WEB BUTT JOINT



SECTION VIEW A-A

DRIP BEAD DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-55
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/24/10

DRAWN BY : A.S. CALLAWAY DATE : 6/9/09
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27-JUL-2010 14:48
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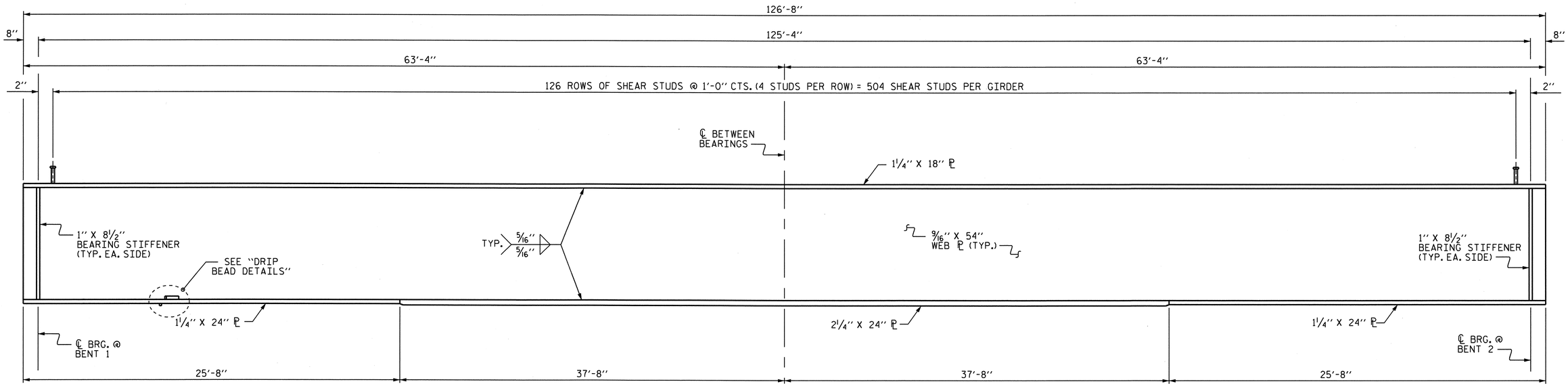

GIRDER ELEVATION-SPAN "B"

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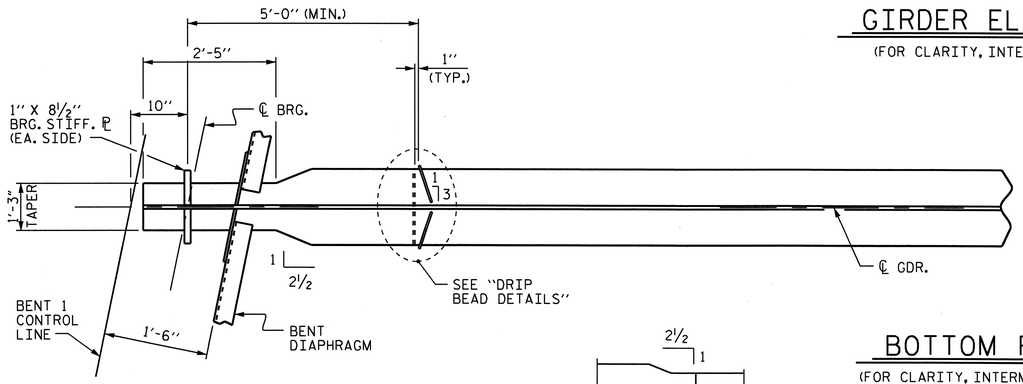

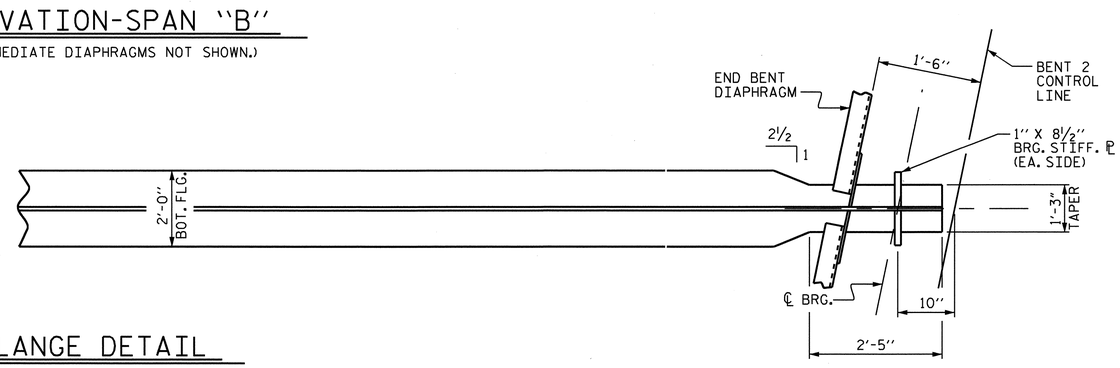

BOTTOM FLANGE DETAIL

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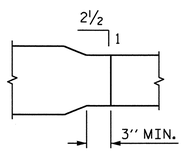
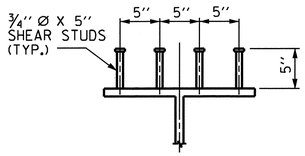
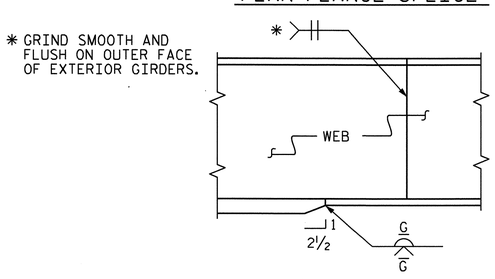


PLAN-FLANGE SPLICE

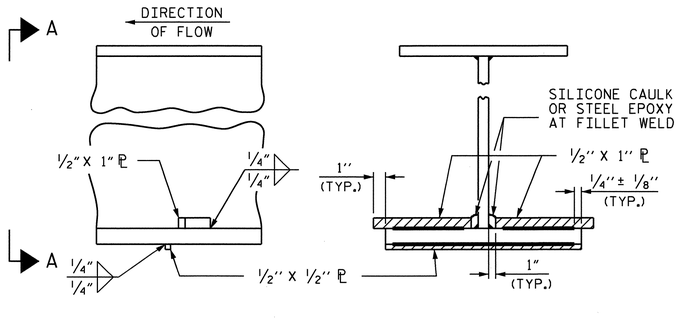


SHEAR STUD DETAILS



ELEVATION

TYPICAL FLANGE AND WEB BUTT JOINT



SECTION VIEW A-A

DRIP BEAD DETAILS

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LSUTTON

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

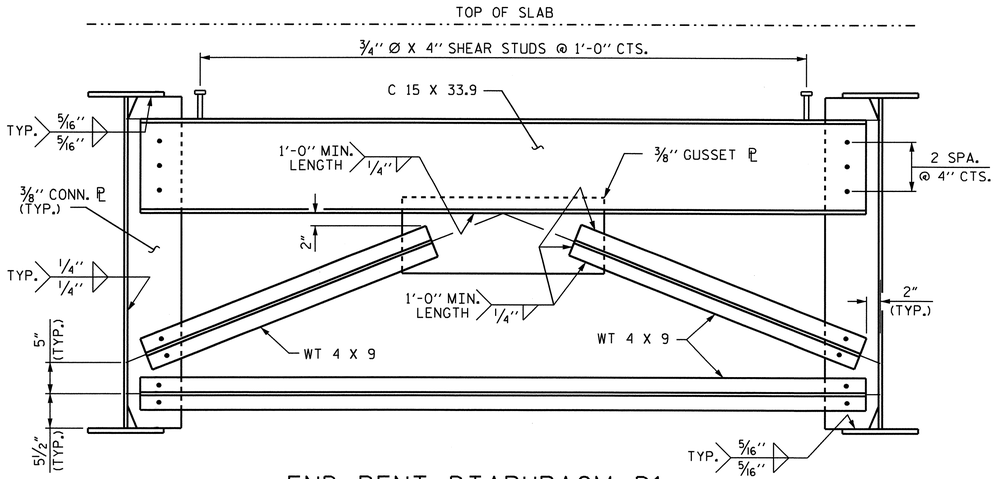
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

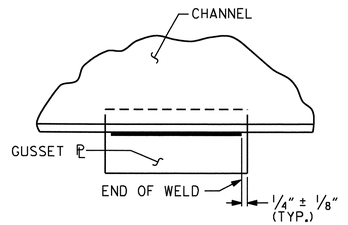
SUPERSTRUCTURE
STRUCTURAL STEEL DETAILS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-56
1			3			TOTAL SHEETS
2			4			146

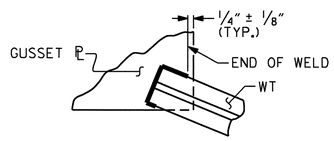
STR. #2



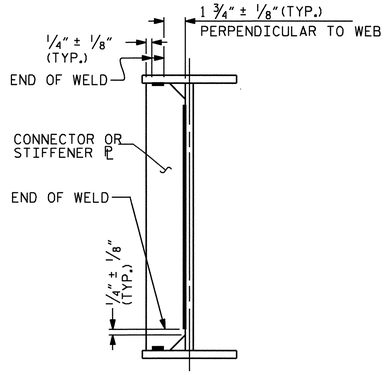
END BENT DIAPHRAGM D1



TYP. GUESSET PL CONNECTION



TYP. "TEE" TO GUESSET PL CONNECTION



TYP. STIFFENER OR CONNECTOR PL CONNECTION

WELD TERMINATION DETAILS

NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-7 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED. FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

A CHARPY V-NOTCH TEST IS REQUIRED FOR WEB PLATES AND BOTTOM FLANGE PLATES FOR ALL GIRDERS AND IN ACCORDANCE WITH ARTICLE 1072-9 OF THE STANDARD SPECIFICATIONS.

CAMBERED GIRDER LENGTHS SHALL BE ADJUSTED AND BEARINGS ARE TO BE PLACED ON THE CAMBERED GIRDER SO AS TO BE ALIGNED WITH THE ANCHORS AFTER THE DEAD LOAD DEFLECTION HAS OCCURRED. SHOP DRAWINGS SHALL BE PREPARED ACCORDINGLY.

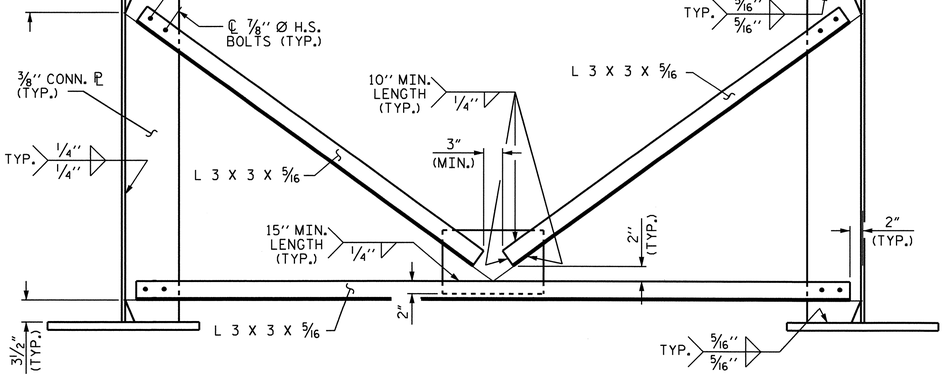
SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION (NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS). KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

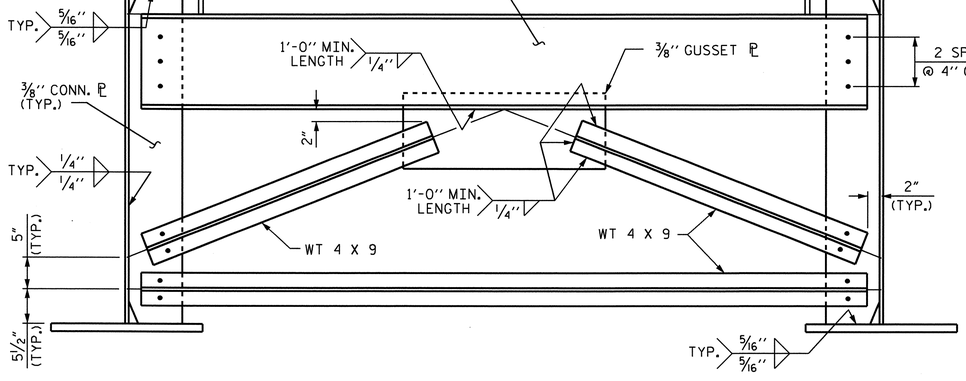
TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS. FOR DIRECT TENSION INDICATORS, SEE SPECIAL PROVISIONS.

END OF GIRDERS SHALL BE PLUMB.

BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE TO AVOID INTERFERENCE WITH THE ANCHOR BOLT.



INTERMEDIATE DIAPHRAGM D2



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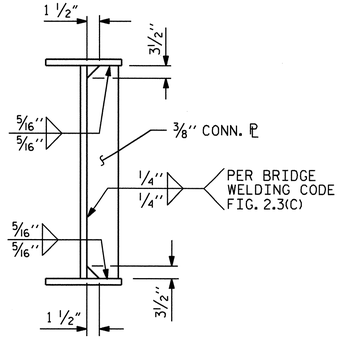
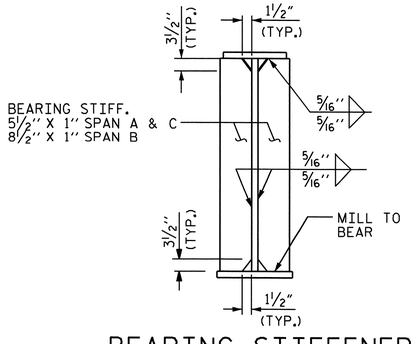
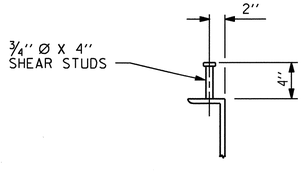


CONNECTOR PLATE



BEARING STIFFENER



SHEAR STUD DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
8/27/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
STRUCTURAL STEEL DETAILS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-57
1			3			TOTAL SHEETS
2			4			146

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 6/9/09
CHECKED BY : T.L. CLELLAND DATE : 1/8/10

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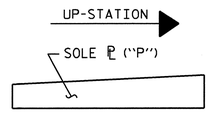
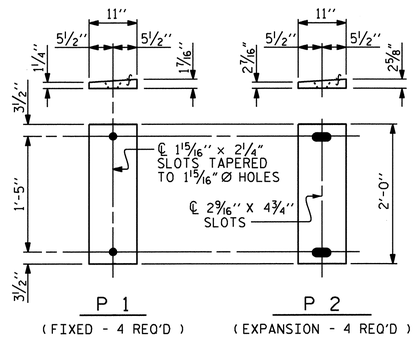
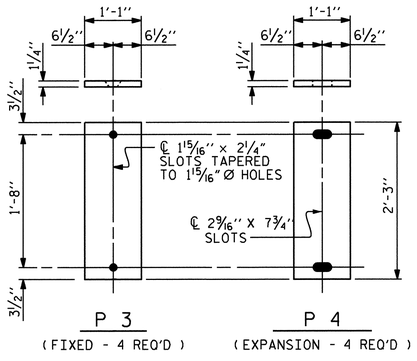


SOLE ℄ PLACEMENT DETAIL



P 1 (FIXED - 4 REQ'D) P 2 (EXPANSION - 4 REQ'D)



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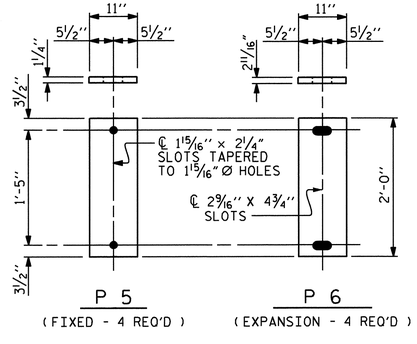
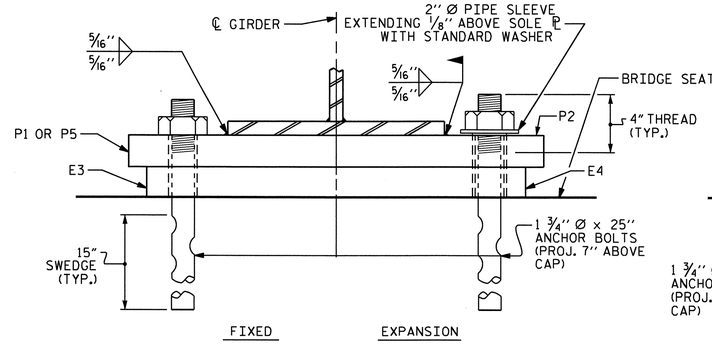
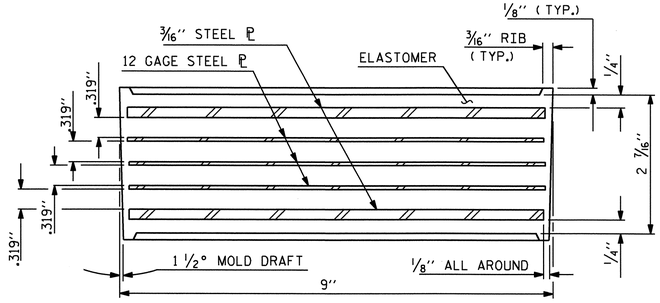


P 5 (FIXED - 4 REQ'D) P 6 (EXPANSION - 4 REQ'D)

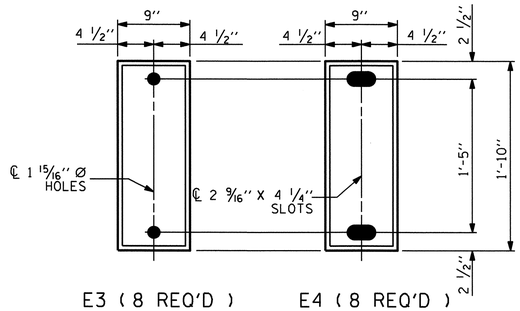
SOLE PLATE DETAILS ("P")



END VIEW



TYPICAL SECTION OF ELASTOMERIC BEARINGS

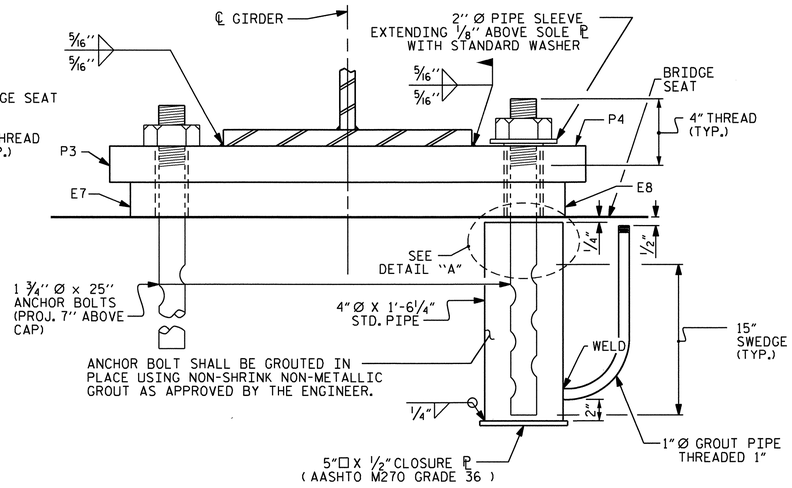


E3 (8 REQ'D) E4 (8 REQ'D)

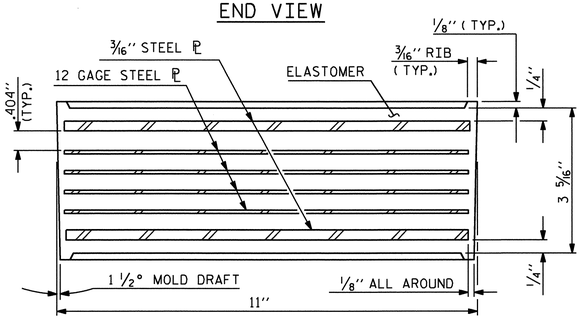
PLAN VIEW OF ELASTOMERIC BEARING

TYPE II

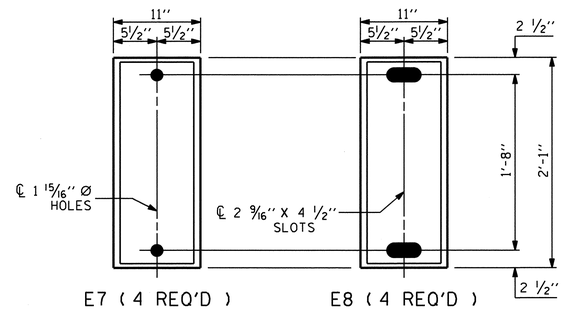
(60 DUROMETER HARDNESS)



END VIEW



TYPICAL SECTION OF ELASTOMERIC BEARING



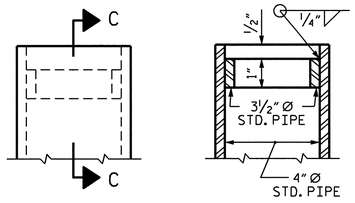
E7 (4 REQ'D) E8 (4 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV

(60 DUROMETER HARDNESS)

—LOAD RATINGS—	
	MAX.D.L.+L.L.
TYPE II	179 K
TYPE IV	255 K



SECTION C-C

DETAIL "A"

NOTES

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

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

THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE SEVERAL PAY ITEMS.

FOR AASHTO M270 GRADE 50W STRUCTURAL STEEL, SOLE PLATE SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE CLOSURE PLATE, GROUT PIPE AND STANDARD PIPE FOR THE EXPANSION ASSEMBLY NEED NOT BE GALVANIZED.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FOLLOWING PROCEDURE, WHICH MAY BE REQUIRED BY THE ENGINEER, TO RESET ELASTOMERIC BEARINGS DUE TO GIRDER TRANSLATION AND END ROTATION:

1. ONCE THE DECK HAS CURED, THE GIRDERS SHALL BE JACKED THEN THE ANCHOR BOLTS AND ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60° F.
2. AFTER CENTERING THE ELASTOMERIC BEARING SLOTS AND ANCHOR BOLTS, THE ANCHOR BOLTS SHALL BE GROUTED.

THE CONTRACTOR MAY PROPOSE ALTERNATE METHODS, PROVIDED DETAILS ARE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

(STEEL SUPERSTRUCTURE)

—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-58
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
8/27/10

DRAWN BY : A.S. CALLAWAY DATE : 6/9/09
CHECKED BY : T.L. CLELLAND DATE : 1/8/10

27-AUG-2010 11:16
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lsutton

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPANS "A" & "C"																																
	GIRDER 1											GIRDERS 2 & 3											GIRDER 4										
TENTH POINTS	BRG.	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	BRG.	BRG.	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	BRG.	BRG.	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.002	0.004	0.005	0.006	0.006	0.006	0.005	0.004	0.002	0	0	0.002	0.004	0.005	0.006	0.006	0.006	0.005	0.004	0.002	0	0	0.002	0.004	0.005	0.006	0.006	0.006	0.005	0.004	0.002	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.000	0.011	0.019	0.025	0.027	0.025	0.019	0.011	0.001	0	0	0.000	0.012	0.021	0.027	0.029	0.027	0.021	0.012	0.000	0	0	0.000	0.011	0.019	0.025	0.027	0.025	0.019	0.011	0.000	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK AND/OR BARRIER RAIL	0	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0	0	0.002	0.003	0.004	0.005	0.005	0.005	0.004	0.003	0.002	0	0	0.002	0.003	0.004	0.005	0.006	0.005	0.004	0.003	0.002	0
TOTAL DEAD LOAD DEFLECTION	0	0.003	0.016	0.026	0.033	0.035	0.033	0.026	0.016	0.002	0	0	0.004	0.019	0.030	0.038	0.040	0.038	0.030	0.019	0.004	0	0	0.004	0.018	0.028	0.036	0.039	0.036	0.028	0.018	0.004	0
VERTICAL CURVE ORDINATE	0	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0	0	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0	0	0.018	0.032	0.042	0.048	0.050	0.048	0.042	0.032	0.018	0
ORDINATE DUE TO SUPERELEVATION	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
REQUIRED CAMBER	0	1/4"	5/16"	13/16"	1"	1"	1"	13/16"	5/16"	1/4"	0	0	1/4"	5/8"	7/8"	1"	1 1/16"	1"	7/8"	5/8"	1/4"	0	0	1/4"	5/8"	13/16"	1"	1 1/16"	1"	13/16"	5/8"	1/4"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " REQUIRED CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN "B"																					
	GIRDER 1																					
TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.045	0.058	0.069	0.079	0.087	0.092	0.096	0.097	0.096	0.092	0.087	0.079	0.069	0.058	0.045	0.031	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.051	0.114	0.173	0.226	0.272	0.312	0.343	0.366	0.380	0.385	0.380	0.366	0.343	0.312	0.272	0.226	0.173	0.114	0.051	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.004	0.008	0.012	0.015	0.018	0.020	0.022	0.023	0.024	0.025	0.024	0.023	0.022	0.020	0.018	0.015	0.012	0.008	0.004	0
TOTAL DEAD LOAD DEFLECTION	0	0.071	0.153	0.230	0.299	0.359	0.411	0.452	0.481	0.500	0.507	0.500	0.481	0.452	0.411	0.359	0.299	0.230	0.153	0.071	0
VERTICAL CURVE ORDINATE	0	0.044	0.084	0.119	0.150	0.175	0.196	0.213	0.224	0.231	0.234	0.231	0.224	0.213	0.196	0.175	0.150	0.119	0.084	0.044	0
ORDINATE DUE TO SUPERELEVATION	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
REQUIRED CAMBER	0	1 3/8"	2 7/8"	4 3/16"	5 3/8"	6 7/16"	7 5/16"	8"	8 7/16"	8 3/4"	8 7/8"	8 3/4"	8 7/16"	8"	7 5/16"	6 7/16"	5 3/8"	4 3/16"	2 7/8"	1 3/8"	0
	GIRDERS 2 & 3																					
TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.032	0.047	0.060	0.071	0.081	0.089	0.095	0.098	0.099	0.098	0.095	0.089	0.081	0.071	0.060	0.047	0.032	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.052	0.115	0.174	0.227	0.274	0.314	0.345	0.368	0.383	0.387	0.383	0.368	0.345	0.314	0.274	0.227	0.174	0.115	0.052	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK AND BARRIER RAIL	0	0.011	0.021	0.031	0.040	0.047	0.054	0.059	0.063	0.065	0.066	0.065	0.063	0.059	0.054	0.047	0.040	0.031	0.021	0.011	0
TOTAL DEAD LOAD DEFLECTION	0	0.079	0.168	0.252	0.327	0.392	0.449	0.493	0.526	0.546	0.552	0.546	0.526	0.493	0.449	0.392	0.327	0.252	0.168	0.079	0
VERTICAL CURVE ORDINATE	0	0.044	0.084	0.119	0.150	0.175	0.196	0.213	0.224	0.231	0.234	0.231	0.224	0.213	0.196	0.175	0.150	0.119	0.084	0.044	0
ORDINATE DUE TO SUPERELEVATION	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
REQUIRED CAMBER	0	1 1/2"	3"	4 7/16"	5 3/4"	6 13/16"	7 3/4"	8 1/2"	9"	9 5/16"	9 7/16"	9 5/16"	9"	8 1/2"	7 3/4"	6 13/16"	5 3/4"	4 7/16"	3"	1 1/2"	0
	GIRDER 4																					
TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.045	0.058	0.069	0.079	0.087	0.092	0.096	0.097	0.096	0.092	0.087	0.079	0.069	0.058	0.045	0.031	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.051	0.114	0.173	0.226	0.272	0.312	0.343	0.366	0.380	0.385	0.380	0.366	0.343	0.312	0.272	0.226	0.173	0.114	0.051	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK	0	0.011	0.021	0.031	0.040	0.048	0.054	0.060	0.063	0.066	0.066	0.066	0.063	0.060	0.054	0.048	0.040	0.031	0.021	0.011	0
TOTAL DEAD LOAD DEFLECTION	0	0.078	0.166	0.249	0.324	0.389	0.445	0.490	0.521	0.542	0.548	0.542	0.521	0.490	0.445	0.389	0.324	0.249	0.166	0.078	0
VERTICAL CURVE ORDINATE	0	0.044	0.084	0.119	0.150	0.175	0.196	0.213	0.224	0.231	0.234	0.231	0.224	0.213	0.196	0.175	0.150	0.119	0.084	0.044	0
ORDINATE DUE TO SUPERELEVATION	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
REQUIRED CAMBER	0	1 7/16"	3"	4 7/16"	5 11/16"	6 3/4"	7 11/16"	8 7/16"	8 15/16"	9 1/4"	9 3/8"	9 1/4"	8 15/16"	8 7/16"	7 11/16"	6 3/4"	5 11/16"	4 7/16"	3"	1 7/16"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
DEAD LOAD DEFLECTIONS
—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-59
1			3			TOTAL SHEETS
2			4			146

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 6/9/09
CHECKED BY : T.L. CLELLAND DATE : 1/6/10

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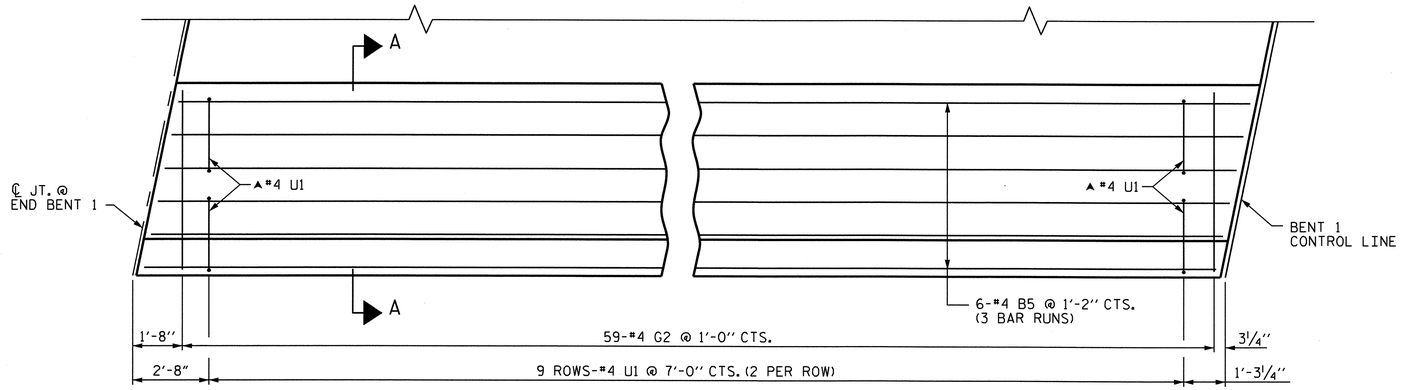
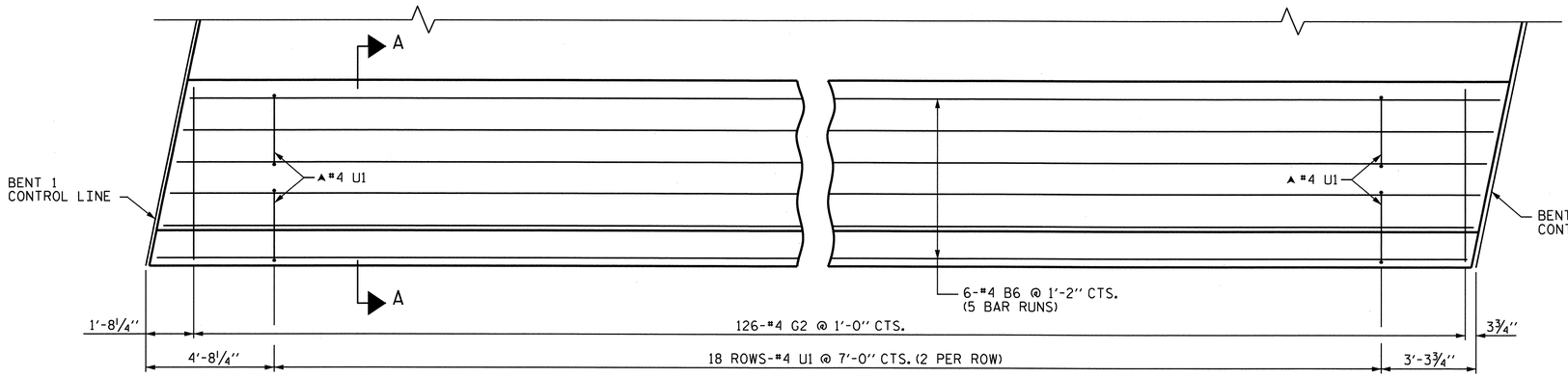
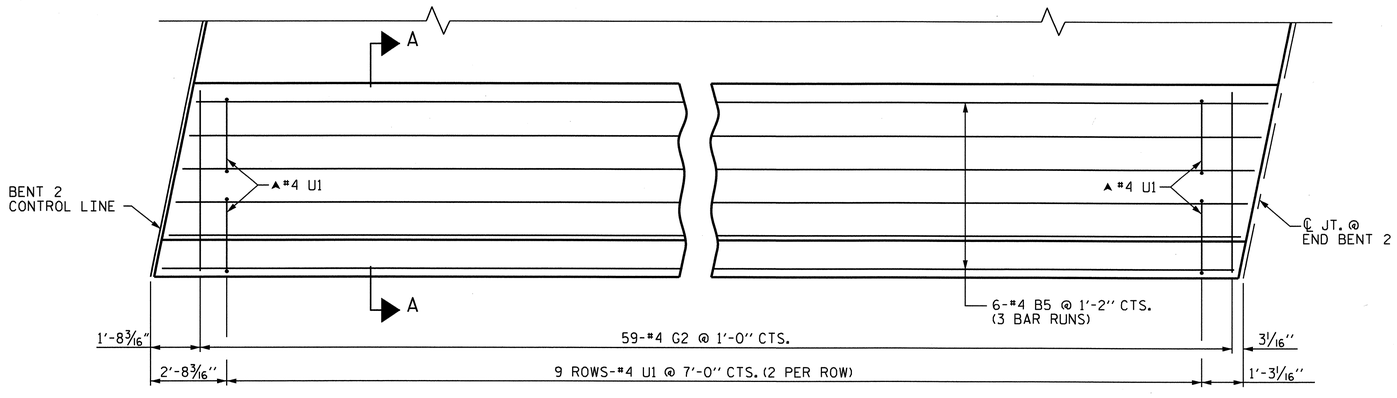


SPAN "A"



SPAN "B"



SPAN "C"

PLAN OF SIDEWALKS

NOTES

ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.

FOR SIDEWALK QUANTITIES, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET. THE PAYMENT FOR THE SIDEWALK SHALL BE INCLUDED IN THE SQUARE FOOT PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

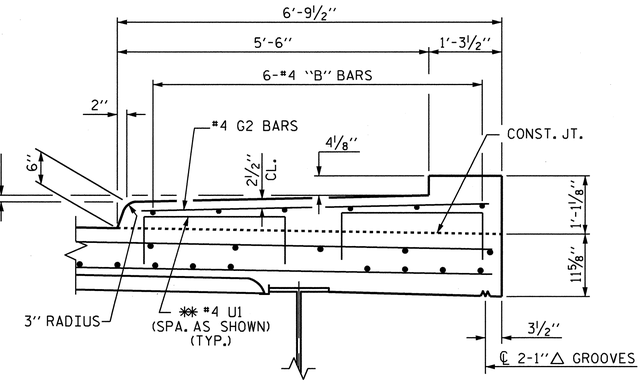
FOR SIDEWALK COVER PLATE DETAILS AT BENT 1 AND BENT 2, SEE "TYPICAL SECTION DETAILS" SHEETS.

FOR SIDEWALK COVER PLATE DETAILS AT END BENT 1 AND END BENT 2, SEE "BRIDGE APPROACH SLAB DETAILS" SHEETS.

THE JOINT IN THE DECK SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.

GROOVED CONTRACTION JOINTS ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

▲ THE "U" BARS CLOSEST TO THE JOINTS SHALL BE PLACED AFTER THE SAWING OF THE JOINTS. THE HOLES SHALL BE DRILLED AND THE "U" BARS GROUTED INTO PLACE.



SECTION A-A

✱✱ #4 U1 MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SIDEWALK DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-60
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 6/9/09
CHECKED BY : T.L. CLELLAND DATE : 1/8/10

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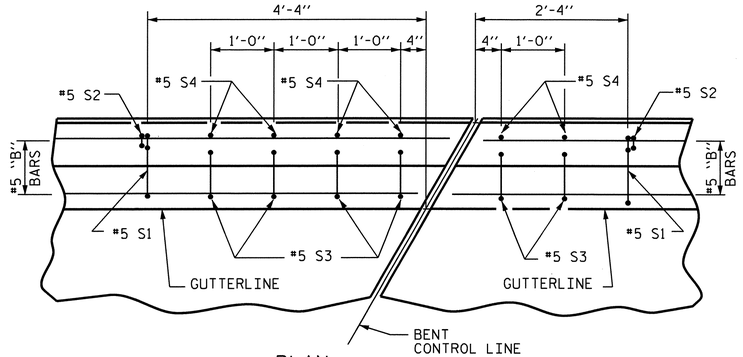
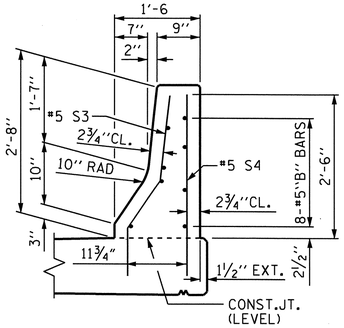
STR. #2



PLAN



END VIEW

END OF RAIL DETAILS

FOR ADHESIVE ANCHORING AT SAWED JOINTS

NOTES

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

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

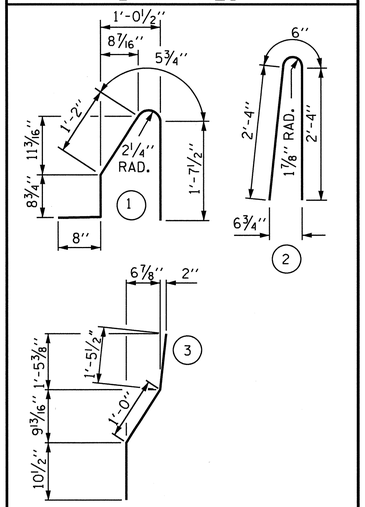
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

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 #5 S1 AND #5 S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, IN ORDER TO MAINTAIN 2" MIN. CLEARANCE TO THE ½" EXPANSION JOINT MATERIAL.

BAR TYPES



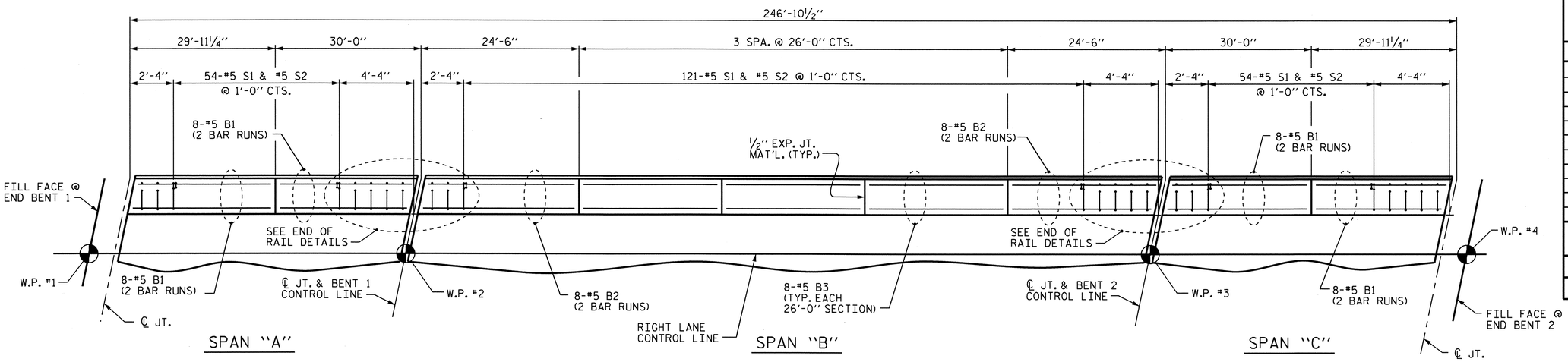
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

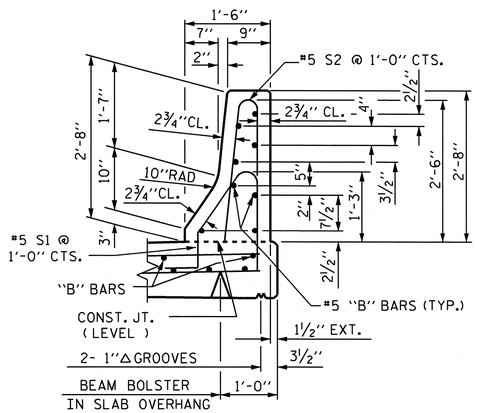
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	64	#5	STR	16'-8"	1113
* B2	32	#5	STR	13'-11"	464
* B3	24	#5	STR	25'-7"	640
* S1	229	#5	1	4'-8"	1115
* S2	229	#5	2	5'-2"	1234
* S3	18	#5	3	3'-4"	63
* S4	18	#5	STR	3'-2"	59

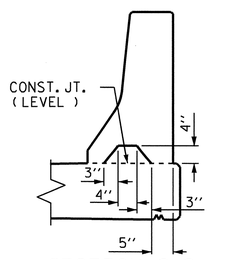
* EPOXY COATED REINFORCING STEEL	LBS.	4,688
CLASS AA CONCRETE	CU. YDS.	24.7
CONCRETE BARRIER RAIL	LIN. FT.	246.88



PLAN

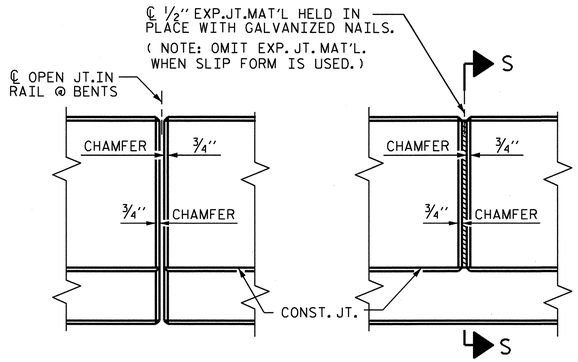


SECTION THRU RAIL



SECTION S-S

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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-61
1			3			TOTAL SHEETS
2			4			146

STR. #2

STD. NO. CBR1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 6/9/09	REV. 10/17/00	RWW/LES
CHECKED BY : T.L. CLELLAND	DATE : 1/11/10	REV. 5/7/03R	RWW/JTE
DRAWN BY : ARB 5/87		REV. 5/1/06R	TLA/GM
CHECKED BY : SJD 9/87			

27-JUL-2010 14:48
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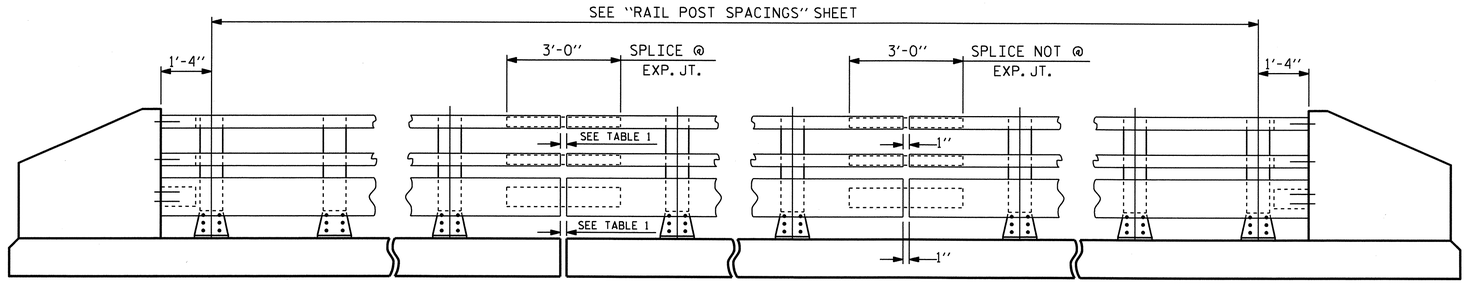
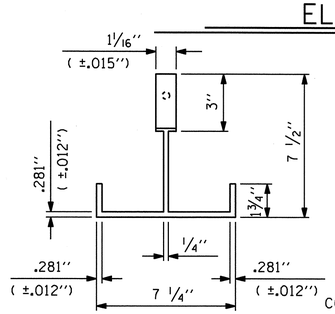
LSUTTON



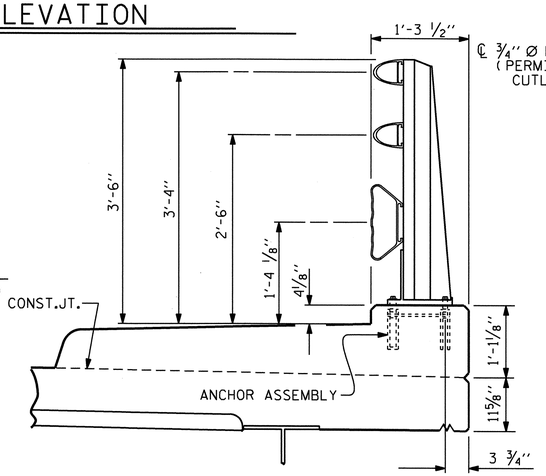
NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.

ELEVATION

TABLE 1	
℄ EXP.JT. @ BENT	RAIL OPENING
BENT No. 1	1⅞"
BENT No. 2	2½"

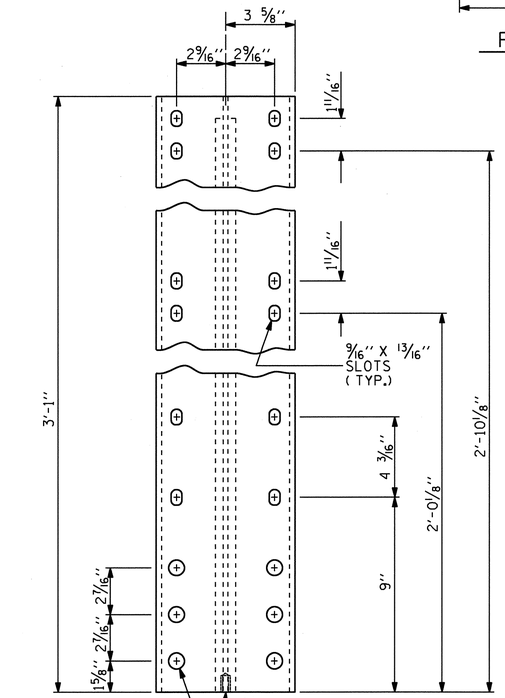


PLAN

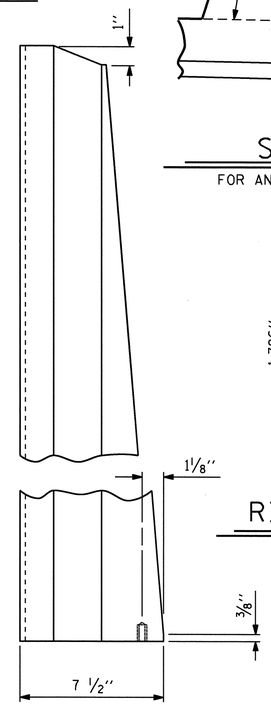


SECTION THRU RAIL

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD. No. BMR6

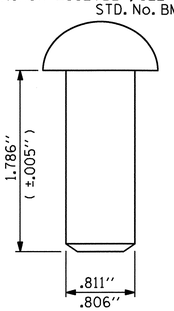


FRONT ELEVATION

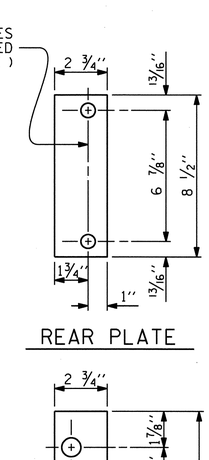


SIDE ELEVATION

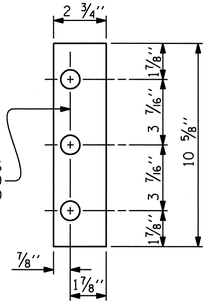
DETAILS OF POST



RIVET DETAIL



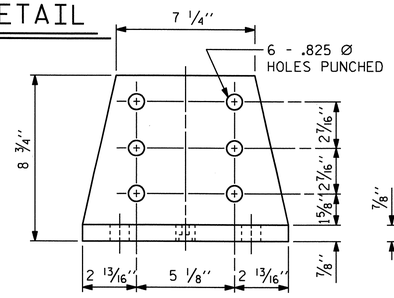
REAR PLATE



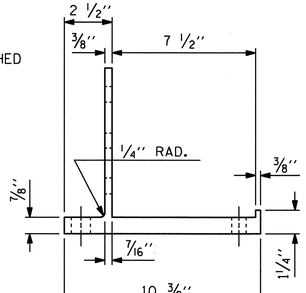
FRONT PLATE

SHIM DETAILS

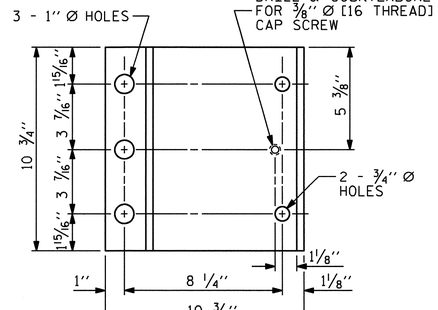
NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



FRONT ELEVATION



SIDE ELEVATION



PLAN

POST BASE DETAILS

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6.

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

PAY LENGTH = 239.06 LIN.FT.

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— RIGHT LANE —

ASSEMBLED BY : A.S. CALLAWAY DATE : 6/9/09		
CHECKED BY : T.L. CLELLAND DATE : 1/11/10		
DRAWN BY : JMB 1/88	REV. 10/17/00	RWW/LES
CHECKED BY : GGH 1/88	REV. 5/7/03	RWW/JTE
	REV. 5/1/06	TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-62
1			3			TOTAL SHEETS
2			4			146

STR. #2

STD. NO. BMR5

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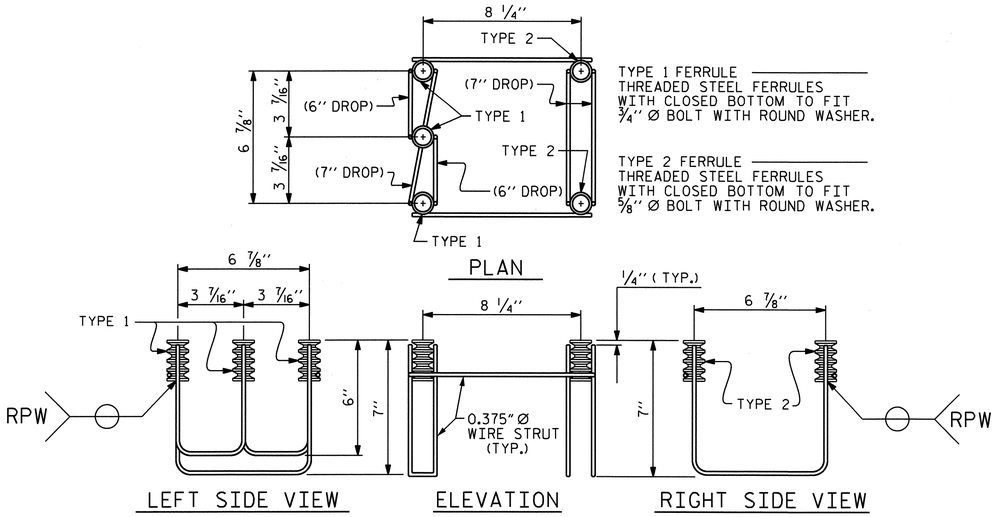
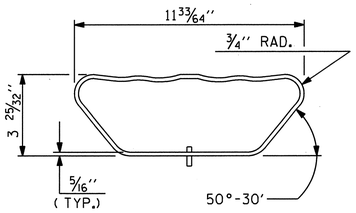
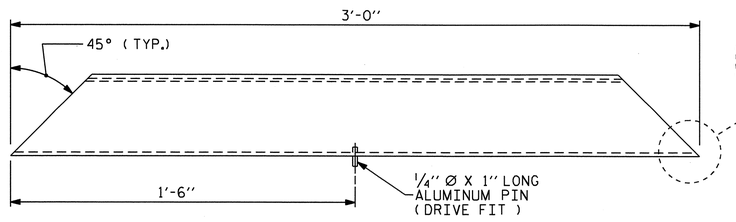


5-BOLT METAL RAIL ANCHOR ASSEMBLY

(41 ASSEMBLIES REQUIRED)

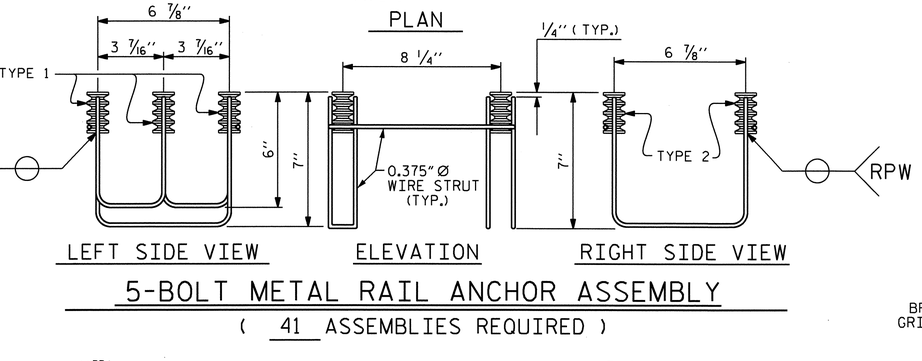


END VIEW

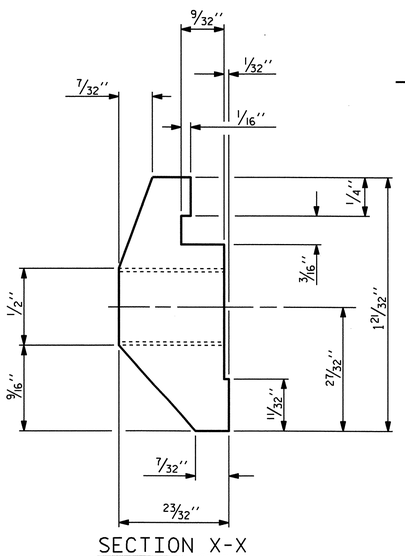


PLAN VIEW

BOTTOM RAIL EXPANSION BAR



ELEVATION



SECTION X-X

CLAMP BAR DETAIL

(6 REQUIRED PER POST)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 3/4" FOR 5/8" FERRULES.

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

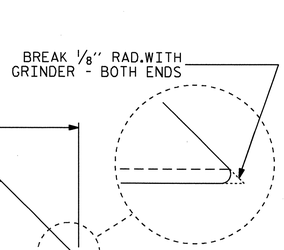
C. 2 - 5/8" Ø X 2 1/4" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 5/8" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

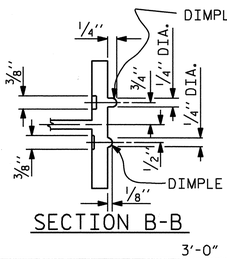
D. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

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

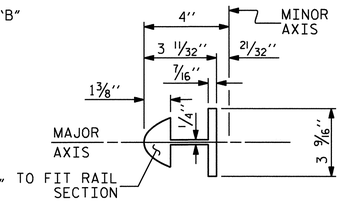
F. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

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

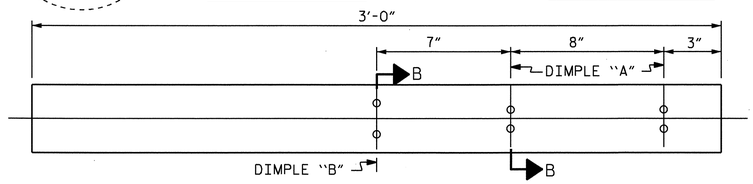




SECTION B-B

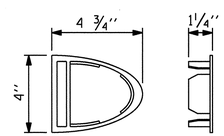


BAR SECTION

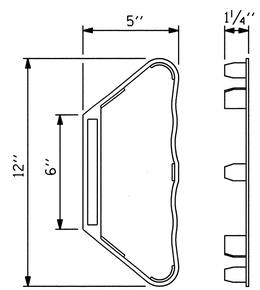


BACK ELEVATION

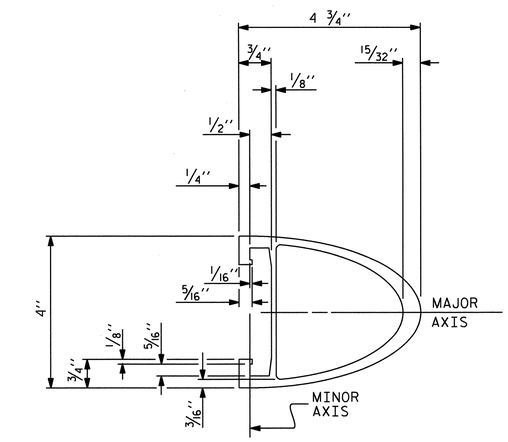
TOP & MIDDLE RAIL EXPANSION BAR



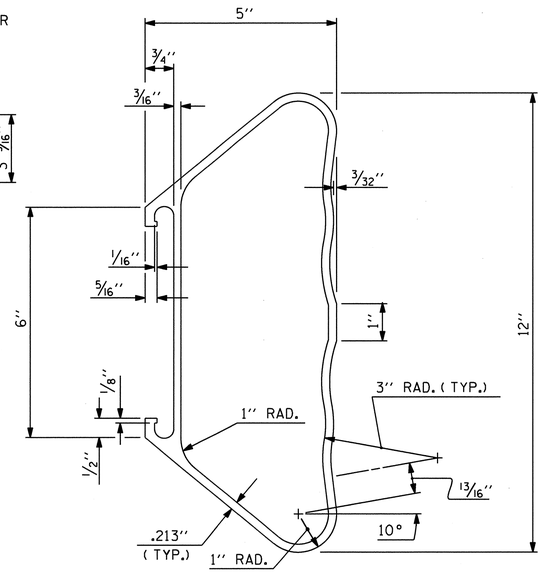
TOP & MIDDLE RAIL CAP



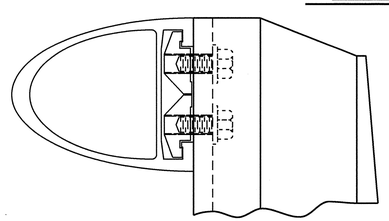
BOTTOM RAIL CAP



TOP & MIDDLE RAIL SECTION



BOTTOM RAIL SECTION



CLAMP ASSEMBLY

TOP RAIL SHOWN
(MIDDLE & BOTTOM RAIL ARE SIMILAR)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— RIGHT LANE —

ASSEMBLED BY : A.S. CALLAWAY	DATE : 6/9/09
CHECKED BY : T.L. CLELLAND	DATE : 1/11/10

DRAWN BY : JMB	1/88	REV. 7/10/01 RWW/LES
CHECKED BY : GGH	1/88	REV. 5/7/03 RWW/JTE
		REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-63
1			3			TOTAL SHEETS
2			4			146

STR. #2

STD. NO. BMR6

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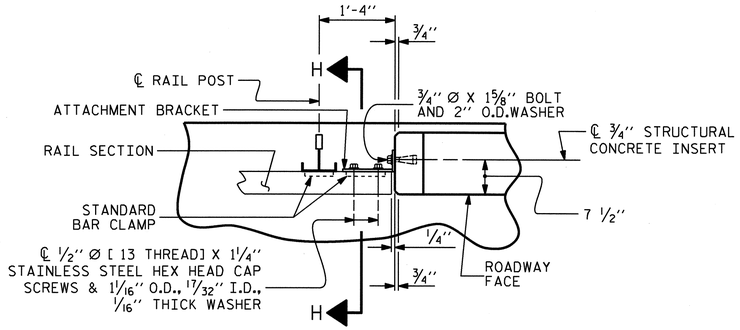
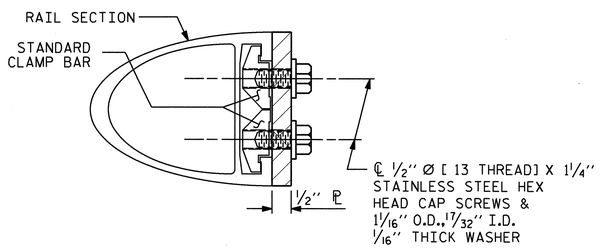


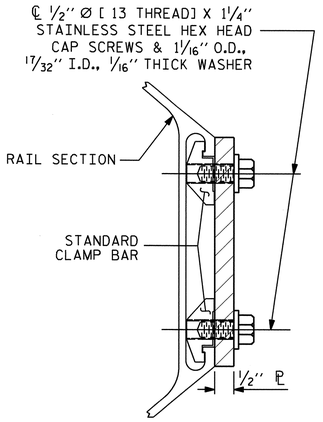
PLAN OF RAIL AND END POST

(STIFFENER ON 1/2" ℙ NOT SHOWN FOR CLARITY)



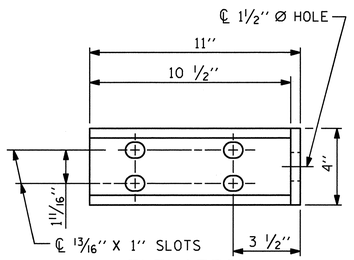
SECTION H-H

(FOR TOP & MIDDLE RAIL)

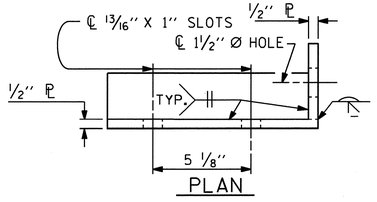


SECTION H-H

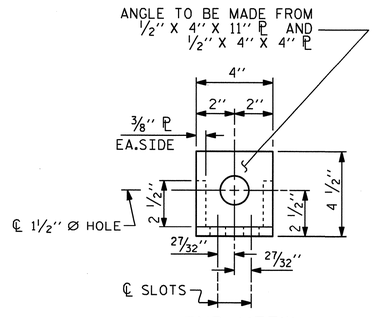
(FOR BOTTOM RAIL)



ELEVATION



PLAN

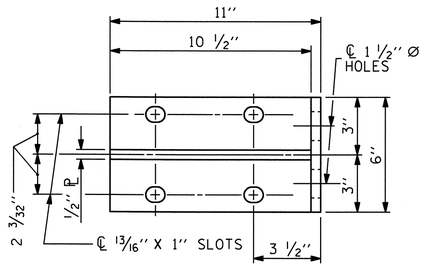


END VIEW

(FIX. AND EXP.)

DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)



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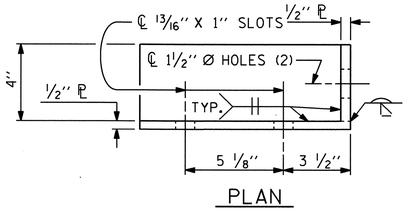

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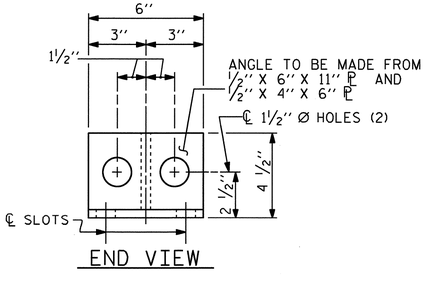


END VIEW

DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)

NOTES

METAL RAIL TO END POST CONNECTION

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

A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

D. STANDARD CLAMP BARS (STD. No. BMR6).

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D.WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

NOTES

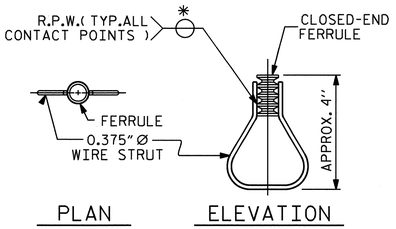
STRUCTURAL CONCRETE INSERT

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".

B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-64
1			3			TOTAL SHEETS
2			4			146

STR. #2

STD. NO. BMR7

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 6/9/09		
CHECKED BY : T.L. CLELLAND	DATE : 1/11/10		
DRAWN BY : JMB 1/88	REV. 7/10/01	RWW/LES	
CHECKED BY : GGH 1/88	REV. 5/7/03	RWW/JTE	
	REV. 5/1/06	TLA/GM	

27-JUL-2010 14:48
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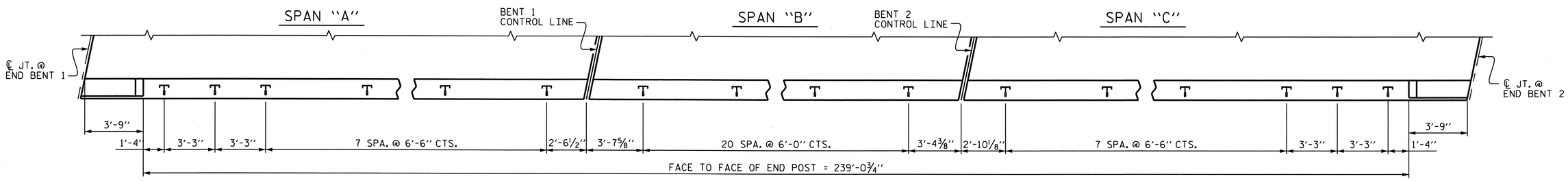
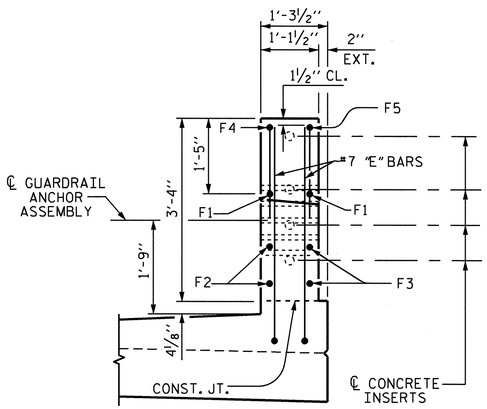
LSUTTON

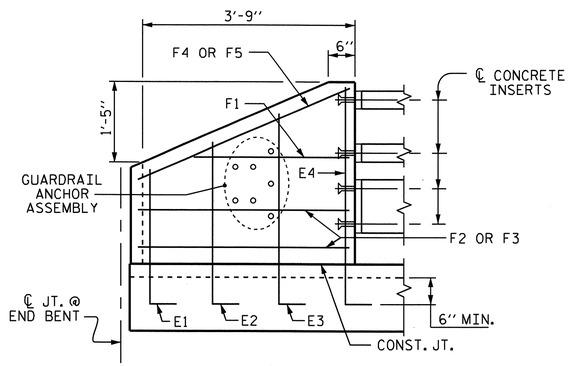
NOTE:
QUANTITIES FOR THE END POSTS ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL.



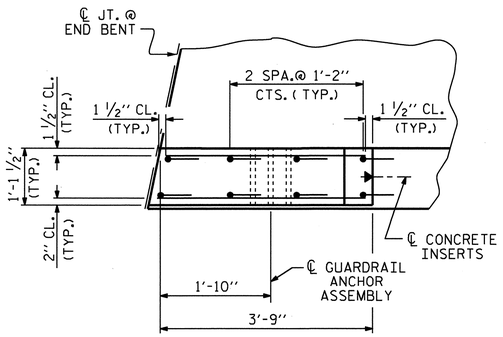
PLAN OF RAIL POST SPACING



END VIEW



ELEVATION



PLAN

END POST DETAILS

(END POST @ END BENT 1 SHOWN, END POST @ END BENT 2 SIMILAR.)

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
RAIL POST SPACINGS AND END OF RAIL DETAILS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-65
1			3			TOTAL SHEETS
2			4			146

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 6/9/09
CHECKED BY : T.L. CLELLAND DATE : 1/11/10

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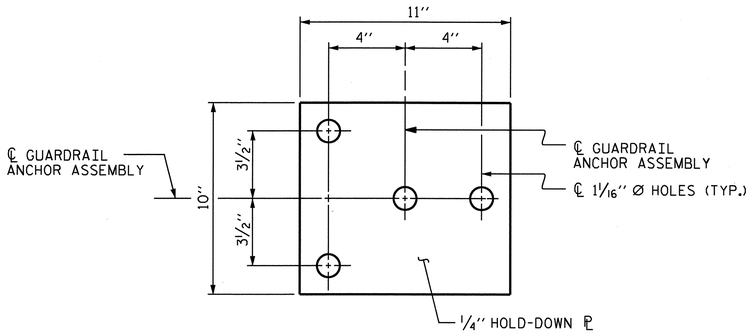
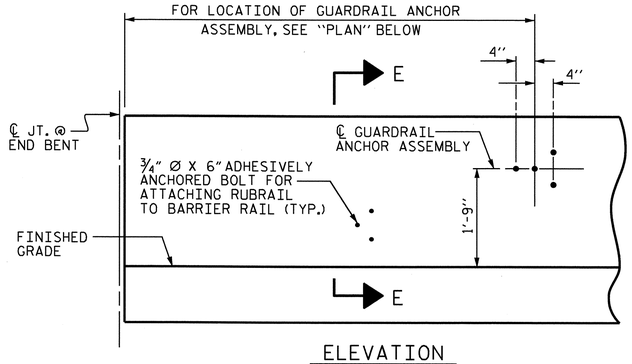
LSUTTON

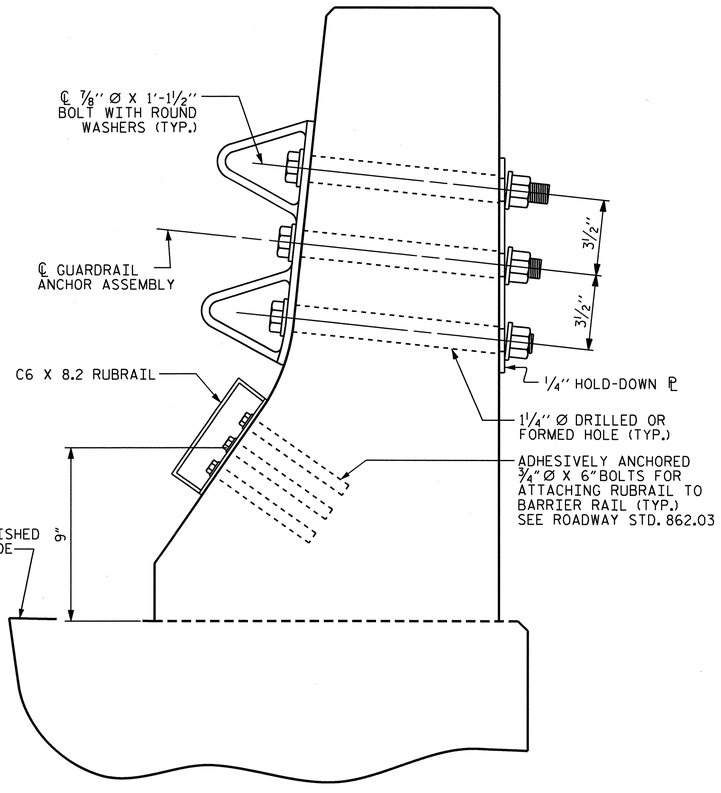


PLAN



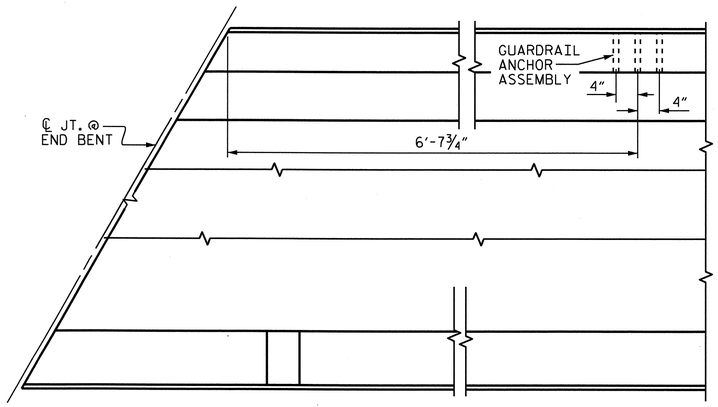
ELEVATION

FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03



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 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.)

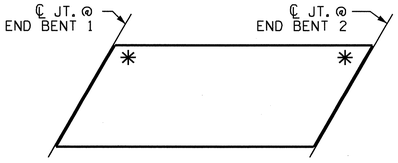
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 1 ¼'' 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 SPECIAL PROVISIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-66
1			3			TOTAL SHEETS
2			4			146

STR. #2

STD. NO. GRA2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

ASSEMBLED BY : A.S. CALLAWAY	DATE : 5/27/09
CHECKED BY : T.L. CLELLAND	DATE : 1/11/10
DRAWN BY : TLA 5/06	ADDED 5/1/06R KMM/GM
CHECKED BY : GM 5/06	

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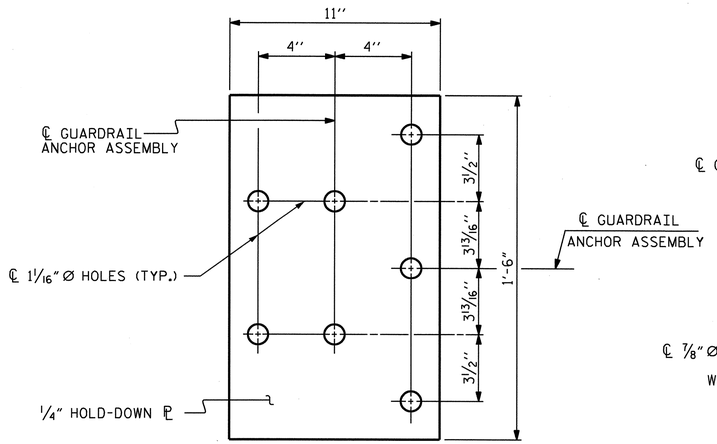
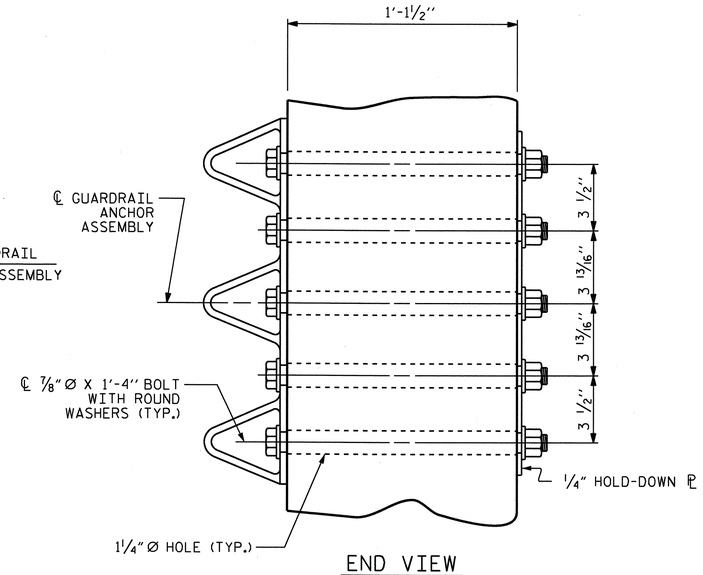
LSUTTON



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

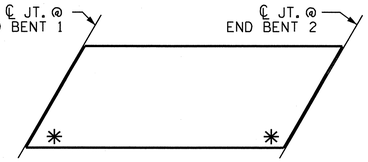
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

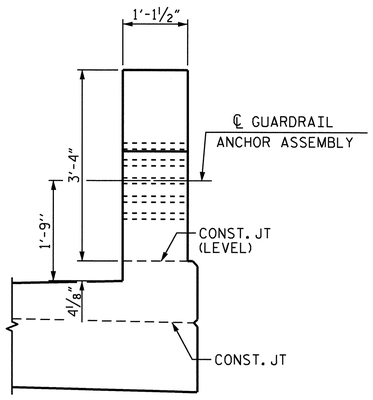
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

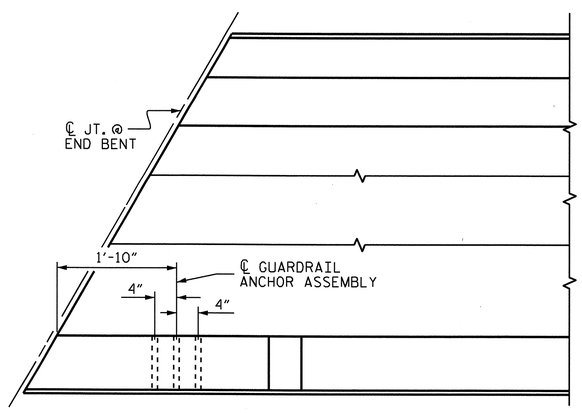


SKETCH SHOWING POINTS OF ATTACHMENT

*LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(THREE BAR METAL RAIL)



PLAN
END BENT 1 SHOWN, END BENT 2 SIMILAR.

LOCATION OF GUARDRAIL ANCHOR AT END POST

FOR REINFORCEMENT IN END POST, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS
FOR METAL RAILS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-67
1			3			TOTAL SHEETS
2			4			146

STR. #2 STD. NO. GRA3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

ASSEMBLED BY : A.S. CALLAWAY DATE : 6/9/09 CHECKED BY : T.L. CLELLAND DATE : 1/11/10	
DRAWN BY : MAA 7/09 CHECKED BY : GM 7/09	ADDED 4/12/10

27-JUL-2010 14:48
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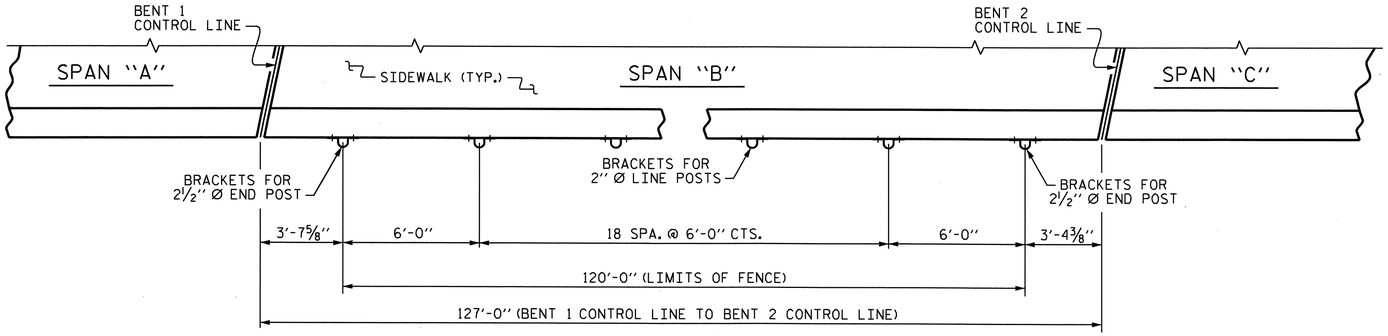
LSUTTON



PLAN OF FENCE POST SPACING

PAY LENGTH = 120.00 LIN. FT.

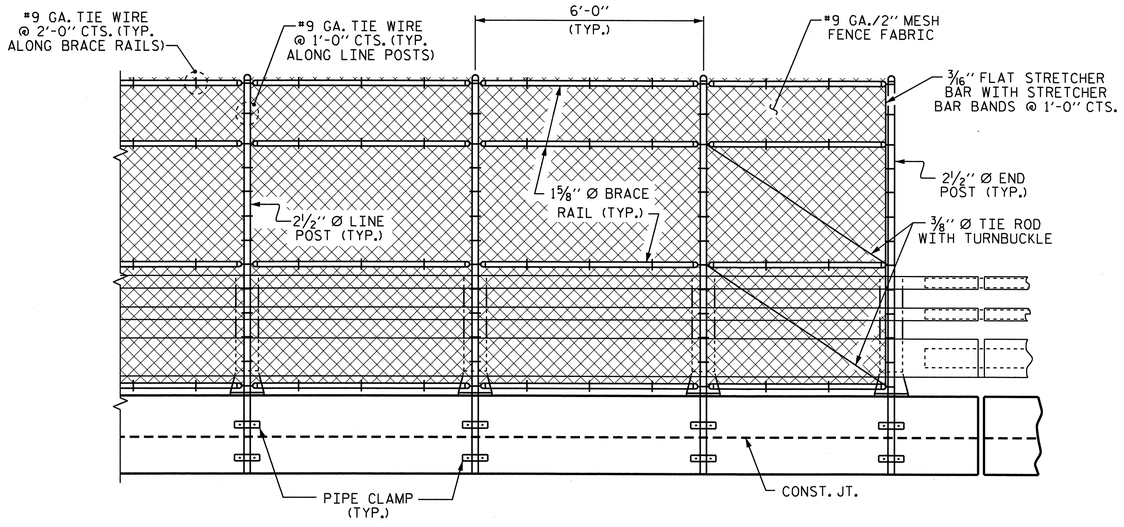
NOTES

FOR BRIDGE MOUNTED CHAIN LINK FENCE, SEE SPECIAL PROVISIONS.

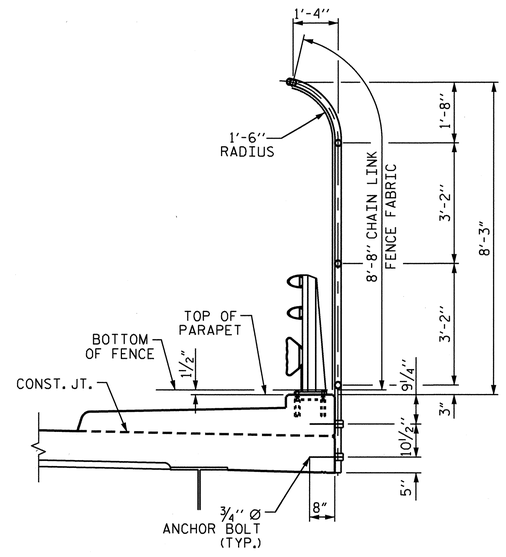
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

FOR SETTING ANCHOR BOLTS, THE CONTRACTOR SHALL USE AN ADHESIVE BONDING SYSTEM. SEE SPECIAL PROVISIONS FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS. LEVEL ONE TESTING OF BONDING SYSTEM IS REQUIRED AND THE YIELD LOAD OF THE ¾" Ø BOLTS IS 12 KIPS.

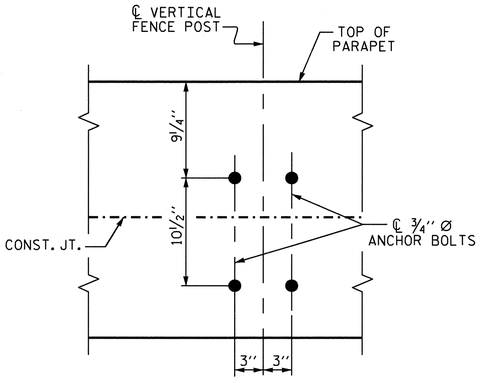
ALL FENCE MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 1050 OF THE STANDARD SPECIFICATIONS. GALVANIZE ALL STEEL PARTS AND HARDWARE IN ACCORDANCE WITH ARTICLE 1076 OF THE STANDARD SPECIFICATIONS.



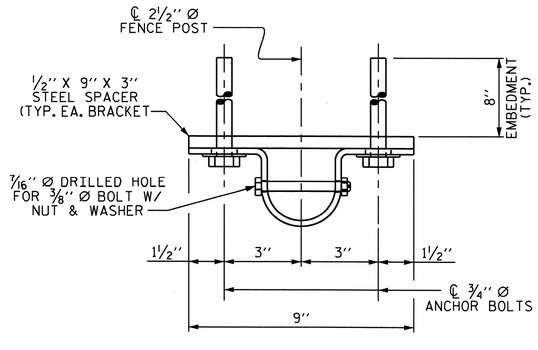
PARTIAL ELEVATION



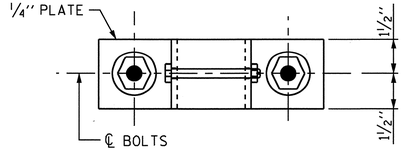
SECTION THRU FENCE



BOLT SETTING PLAN



PLAN



ELEVATION

PIPE CLAMP DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BRIDGE MOUNTED CHAIN LINK FENCE

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-68
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 4/19/10
CHECKED BY : W.F. PARKER DATE : 4/29/10

27-JUL-2010 14:48
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LSUTTON

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	1,188 SQ.FT.
BRIDGE DECK	6,065 SQ.FT.
TOTAL	7,253 SQ.FT.

BILL OF MATERIAL

SPAN "A"

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	114	#5	STR	36'-1"	4290
✱A101	2	#5	STR	34'-6"	72
✱A102	2	#5	STR	32'-3"	67
✱A103	2	#5	STR	30'-0"	63
✱A104	2	#5	STR	27'-10"	58
✱A105	2	#5	STR	25'-7"	53
✱A106	2	#5	STR	23'-5"	49
✱A107	2	#5	STR	21'-2"	44
✱A108	2	#5	STR	18'-11"	39
✱A109	2	#5	STR	16'-9"	35
✱A110	2	#5	STR	14'-6"	30
✱A111	2	#5	STR	12'-3"	26
✱A112	2	#5	STR	10'-1"	21
✱A113	2	#5	STR	7'-10"	16
✱A114	2	#5	STR	5'-7"	12
✱A115	2	#5	STR	3'-5"	7
A2	114	#5	STR	36'-1"	4290
A201	2	#5	STR	34'-6"	72
A202	2	#5	STR	32'-3"	67
A203	2	#5	STR	30'-0"	63
A204	2	#5	STR	27'-10"	58
A205	2	#5	STR	25'-7"	53
A206	2	#5	STR	23'-5"	49
A207	2	#5	STR	21'-2"	44
A208	2	#5	STR	18'-11"	39
A209	2	#5	STR	16'-9"	35
A210	2	#5	STR	14'-6"	30
A211	2	#5	STR	12'-3"	26
A212	2	#5	STR	10'-1"	21
A213	2	#5	STR	7'-10"	16
A214	2	#5	STR	5'-7"	12
A215	2	#5	STR	3'-5"	7
✱B1	75	#4	STR	21'-2"	1060
B2	88	#5	STR	30'-10"	2830
✱B5	18	#4	STR	21'-2"	255
✱E1	2	#7	5	3'-8"	15
✱E2	2	#7	5	4'-1"	17
✱E3	2	#7	5	4'-8"	19
✱E4	2	#7	5	5'-1"	21
✱F1	2	#6	STR	3'-0"	9
✱F2	2	#6	STR	3'-8"	11
✱F3	2	#6	STR	3'-6"	11
✱F4	1	#6	STR	4'-0"	6
✱F5	1	#6	STR	3'-10"	6
✱G1	2	#5	STR	36'-9"	77
✱G2	59	#4	STR	6'-4"	250
✱K1	12	#5	1	8'-0"	100
✱K2	12	#5	2	7'-5"	93
✱K3	18	#5	STR	9'-6"	178
✱S1	27	#4	3	4'-2"	75
✱S2	27	#4	3	4'-0"	72
✱U1	18	#4	4	3'-4"	40

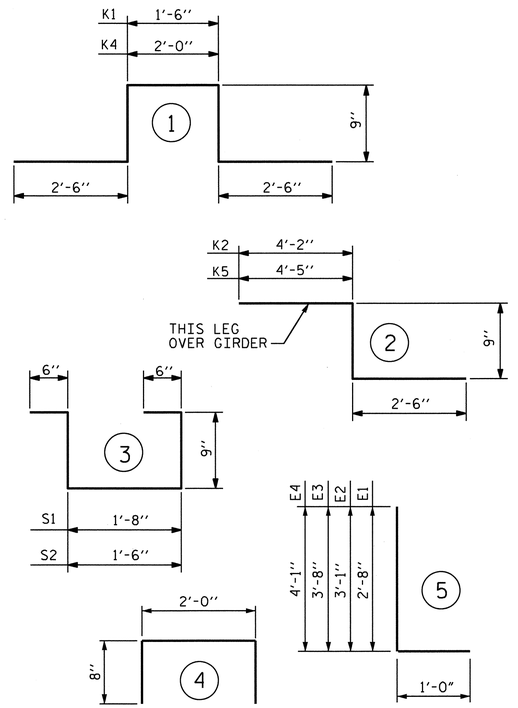
SPAN "B"

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	260	#5	STR	36'-1"	9785
✱A101	2	#5	STR	34'-9"	72
✱A102	2	#5	STR	32'-7"	68
✱A103	2	#5	STR	30'-4"	63
✱A104	2	#5	STR	28'-1"	59
✱A105	2	#5	STR	25'-11"	54
✱A106	2	#5	STR	23'-8"	49
✱A107	2	#5	STR	21'-5"	45
✱A108	2	#5	STR	19'-3"	40
✱A109	2	#5	STR	17'-0"	35
✱A110	2	#5	STR	14'-9"	31
✱A111	2	#5	STR	12'-7"	26
✱A112	2	#5	STR	10'-4"	22
✱A113	2	#5	STR	8'-2"	17
✱A114	2	#5	STR	5'-11"	12
✱A115	2	#5	STR	3'-8"	8
A2	260	#5	STR	36'-1"	9785
A201	2	#5	STR	34'-9"	72
A202	2	#5	STR	32'-7"	68
A203	2	#5	STR	30'-4"	63
A204	2	#5	STR	28'-1"	59
A205	2	#5	STR	25'-11"	54
A206	2	#5	STR	23'-8"	49
A207	2	#5	STR	21'-5"	45
A208	2	#5	STR	19'-3"	40
A209	2	#5	STR	17'-0"	35
A210	2	#5	STR	14'-9"	31
A211	2	#5	STR	12'-7"	26
A212	2	#5	STR	10'-4"	22
A213	2	#5	STR	8'-2"	17
A214	2	#5	STR	5'-11"	12
A215	2	#5	STR	3'-8"	8
✱B3	125	#4	STR	26'-11"	2248
B4	132	#5	STR	43'-7"	6000
✱B6	30	#4	STR	26'-11"	539
✱G1	2	#5	STR	36'-9"	77
✱G2	126	#4	STR	6'-4"	533
✱K3	18	#5	STR	9'-6"	178
✱K4	12	#5	1	8'-6"	106
✱K5	12	#5	2	7'-8"	96
✱S2	48	#4	3	4'-0"	128
✱U1	36	#4	4	3'-4"	80

SPAN "C"

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	114	#5	STR	36'-1"	4290
✱A101	2	#5	STR	34'-5"	72
✱A102	2	#5	STR	32'-2"	67
✱A103	2	#5	STR	30'-0"	63
✱A104	2	#5	STR	27'-9"	58
✱A105	2	#5	STR	25'-6"	53
✱A106	2	#5	STR	23'-4"	49
✱A107	2	#5	STR	21'-1"	44
✱A108	2	#5	STR	18'-11"	39
✱A109	2	#5	STR	16'-8"	35
✱A110	2	#5	STR	14'-5"	30
✱A111	2	#5	STR	12'-3"	26
✱A112	2	#5	STR	10'-0"	21
✱A113	2	#5	STR	7'-9"	16
✱A114	2	#5	STR	5'-7"	12
✱A115	2	#5	STR	3'-4"	7
A2	114	#5	STR	36'-1"	4290
A201	2	#5	STR	34'-5"	72
A202	2	#5	STR	32'-2"	67
A203	2	#5	STR	30'-0"	63
A204	2	#5	STR	27'-9"	58
A205	2	#5	STR	25'-6"	53
A206	2	#5	STR	23'-4"	49
A207	2	#5	STR	21'-1"	44
A208	2	#5	STR	18'-11"	39
A209	2	#5	STR	16'-8"	35
A210	2	#5	STR	14'-5"	30
A211	2	#5	STR	12'-3"	26
A212	2	#5	STR	10'-0"	21
A213	2	#5	STR	7'-9"	16
A214	2	#5	STR	5'-7"	12
A215	2	#5	STR	3'-4"	7
✱B1	75	#4	STR	21'-2"	1060
B2	88	#5	STR	30'-10"	2830
✱B5	18	#4	STR	21'-2"	255
✱E1	2	#7	5	3'-8"	15
✱E2	2	#7	5	4'-1"	17
✱E3	2	#7	5	4'-8"	19
✱E4	2	#7	5	5'-1"	21
✱F1	2	#6	STR	3'-0"	9
✱F2	2	#6	STR	3'-8"	11
✱F3	2	#6	STR	3'-6"	11
✱F4	1	#6	STR	4'-0"	6
✱F5	1	#6	STR	3'-10"	6
✱G1	2	#5	STR	36'-9"	77
✱G2	59	#4	STR	6'-4"	250
✱K1	12	#5	1	8'-0"	100
✱K2	12	#5	2	7'-5"	93
✱K3	18	#5	STR	9'-6"	178
✱S1	27	#4	3	4'-2"	75
✱S2	27	#4	3	4'-0"	72
✱U1	18	#4	4	3'-4"	40

BAR TYPES

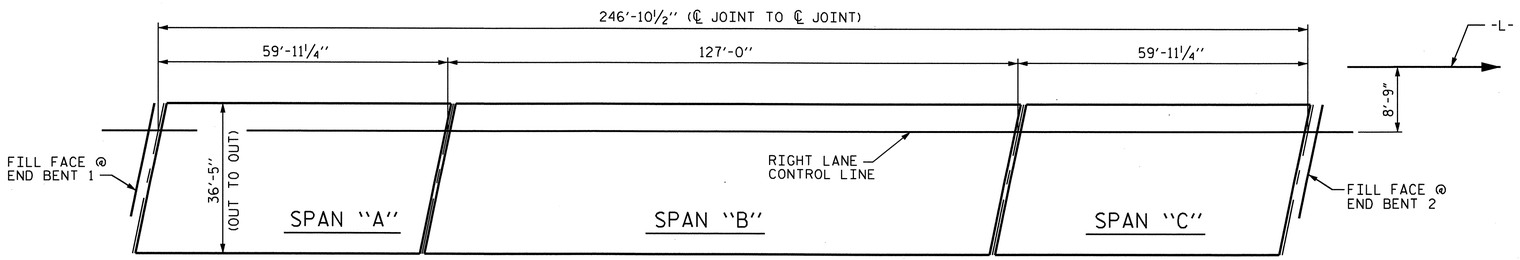


ALL BAR DIMENSIONS ARE OUT TO OUT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	✱EPOXY COATED REINFORCING STEEL
	(CU.YDS.)	(LBS.)	(LBS.)
SPAN "A"	72.9	7,712	7,197
SPAN "B"	153.6	16,386	14,371
SPAN "C"	72.9	7,712	7,197
SIDEWALK	43.0	——	——
ENDPOSTS	1.0	——	——
TOTALS**	343.4	31,810	28,765

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ.FT. = 8,990)

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

— RIGHT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-69
1			3			TOTAL SHEETS
2			4			146

STR. #2 STD. NO. BOM1

ASSEMBLED BY : A.S. CALLAWAY DATE : 6/9/09
CHECKED BY : T.L. CLELLAND DATE : 1/12/10

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

REV. 6/1/94 EEM/GRP
REV. 8/16/99 RWW/LES
REV. 5/1/06 TLA/GM

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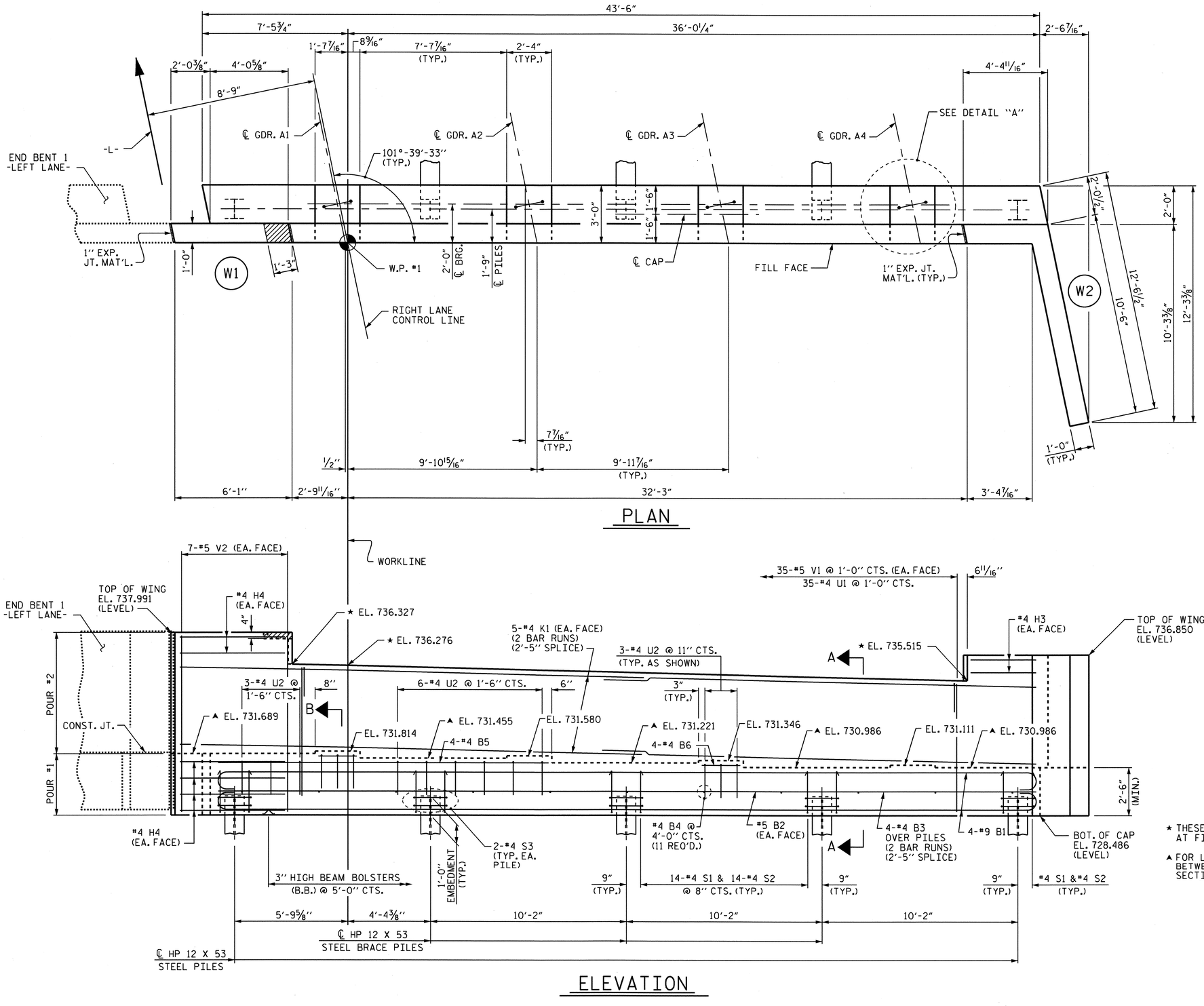
LSUTTON



PLAN

ELEVATION

★ THESE ELEVATIONS ARE TAKEN AT FILL FACE OF THE BACKWALL.

▲ FOR LOCATION OF ELEVATIONS BETWEEN BUILD-UPS, SEE SECTION A-A ON SHEET 3 OF 3.

NOTES

STIRRUPS AND U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

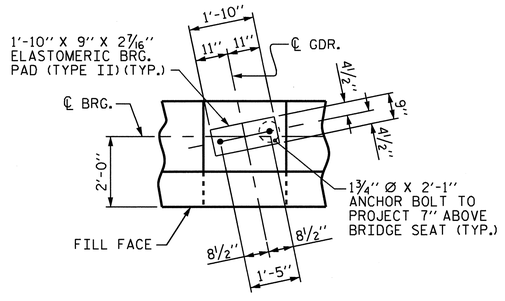
THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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

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

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4"DIAMETER 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 #5 V1 BARS IN THE BACKWALL SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.



DETAIL "A"
(TYP. EA. GIRDER)

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1
—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-70
1			3			TOTAL SHEETS
2			4			146

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 11/24/09
CHECKED BY : D.R. WITHROW DATE : 6/1/10

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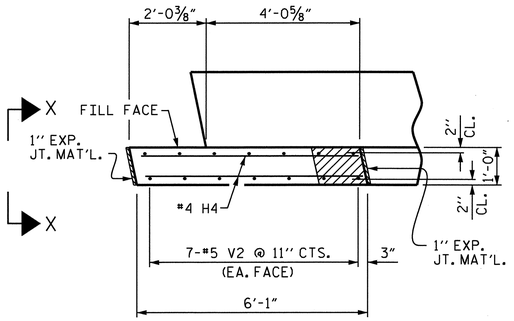
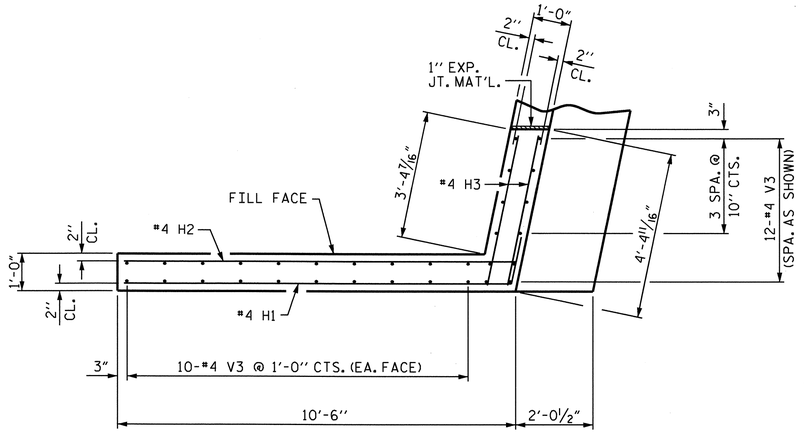
LSUTTON

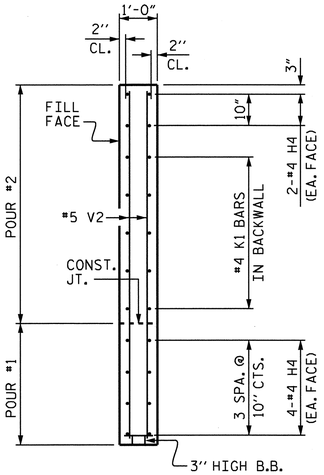
NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10



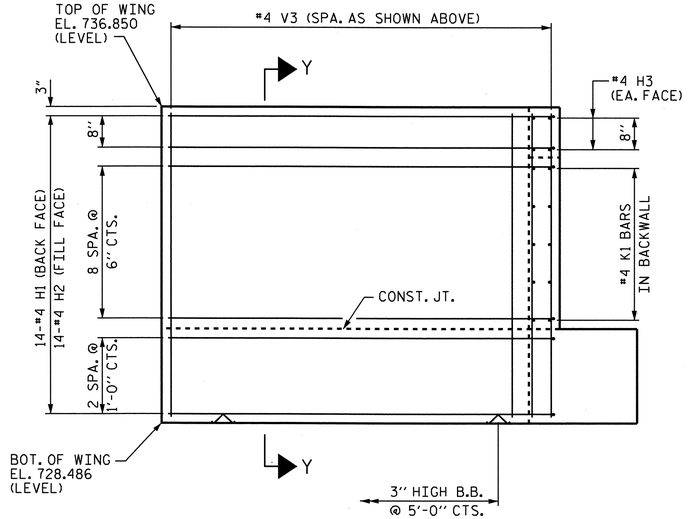
PLAN OF WING W1



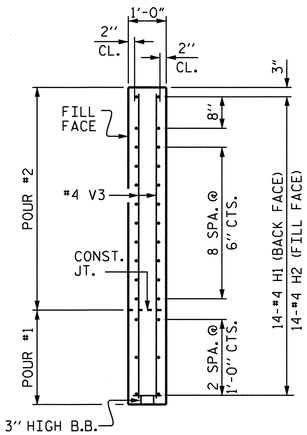
PLAN OF WING W2



END VIEW X-X



ELEVATION OF WING W2



SECTION Y-Y

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-71
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 11/24/09
CHECKED BY : D.R. WITHROW DATE : 6/1/10

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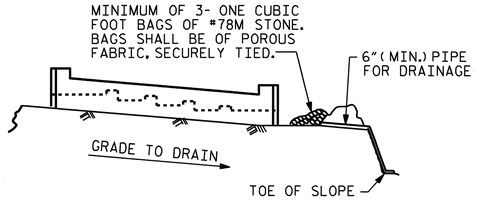
LSUTTON

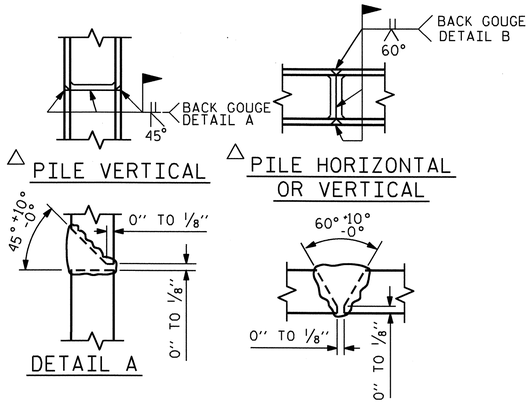


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

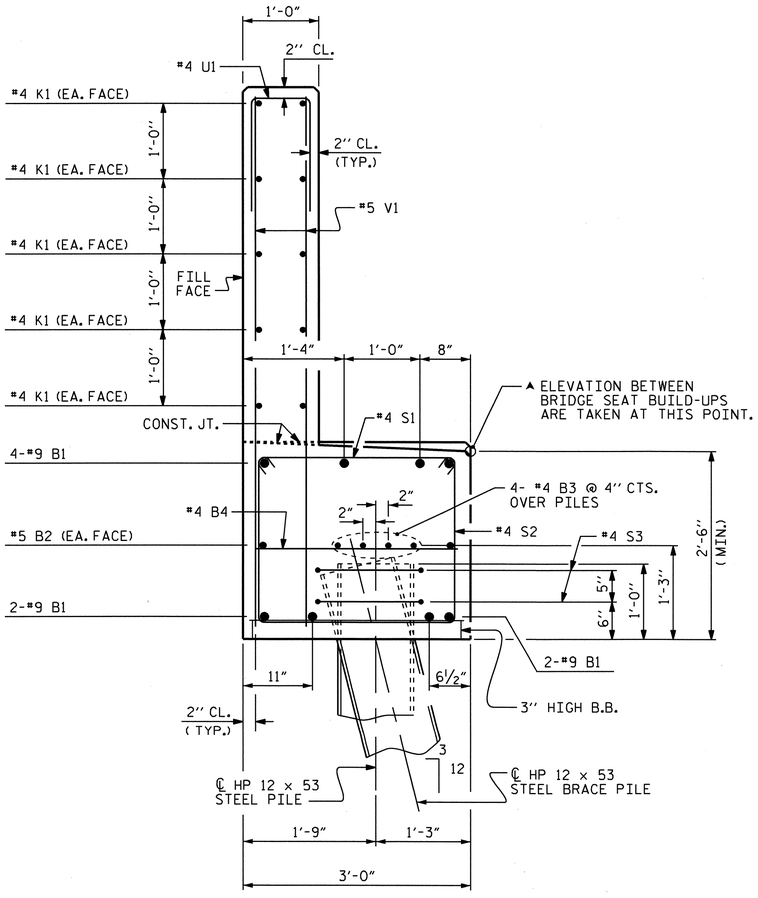
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

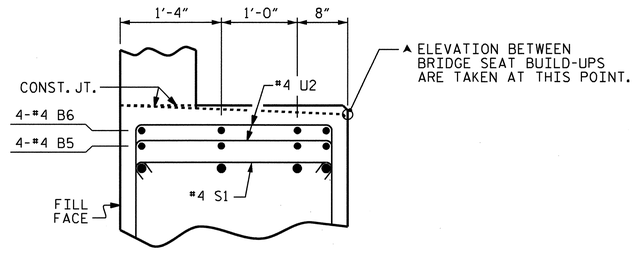


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

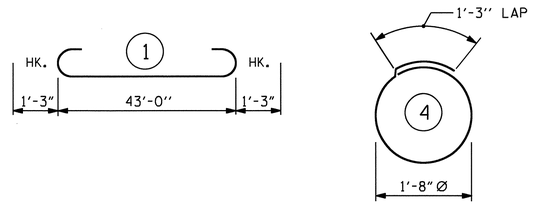


SECTION A-A



PART SECTION B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	45'-6"	1238
B2	2	#5	STR	43'-1"	90
B3	8	#4	STR	22'-9"	122
B4	11	#4	STR	2'-8"	20
B5	4	#4	STR	17'-3"	46
B6	8	#4	STR	2'-0"	11
H1	14	#4	6	10'-10"	101
H2	14	#4	6	11'-0"	103
H3	4	#4	STR	4'-0"	11
H4	12	#4	STR	5'-9"	46
K1	20	#4	STR	23'-9"	317
S1	58	#4	2	3'-5"	132
S2	58	#4	3	7'-8"	297
S3	10	#4	4	6'-6"	43
U1	35	#4	5	3'-8"	86
U2	15	#4	5	6'-2"	62
V1	70	#5	STR	6'-8"	487
V2	14	#5	STR	9'-2"	134
V3	32	#4	STR	8'-0"	171

REINFORCING STEEL	LBS.	3,517
CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WINGS	CU. YDS.	14.2
POUR #2 - BACKWALL & UPPER WINGS	CU. YDS.	10.5
TOTAL	CU. YDS.	24.7
HP 12 x 53 STEEL PILES NO. = 5	LIN. FT.	500
PILE REDRIVES	EA.	3

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-72
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 11/24/09
CHECKED BY : D.R. WITHROW DATE : 6/1/10

27-JUL-2010 14:48
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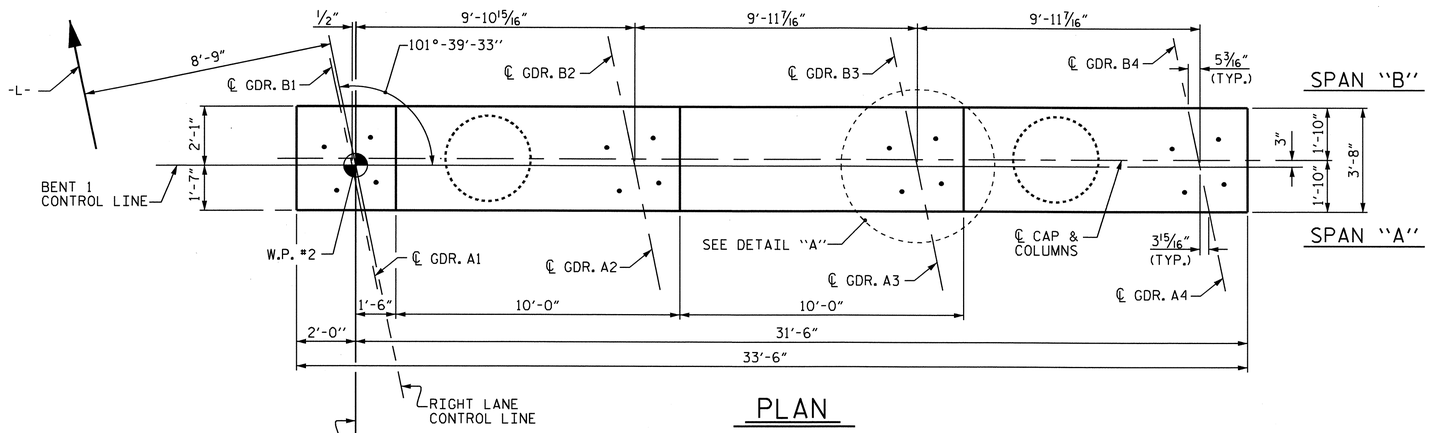
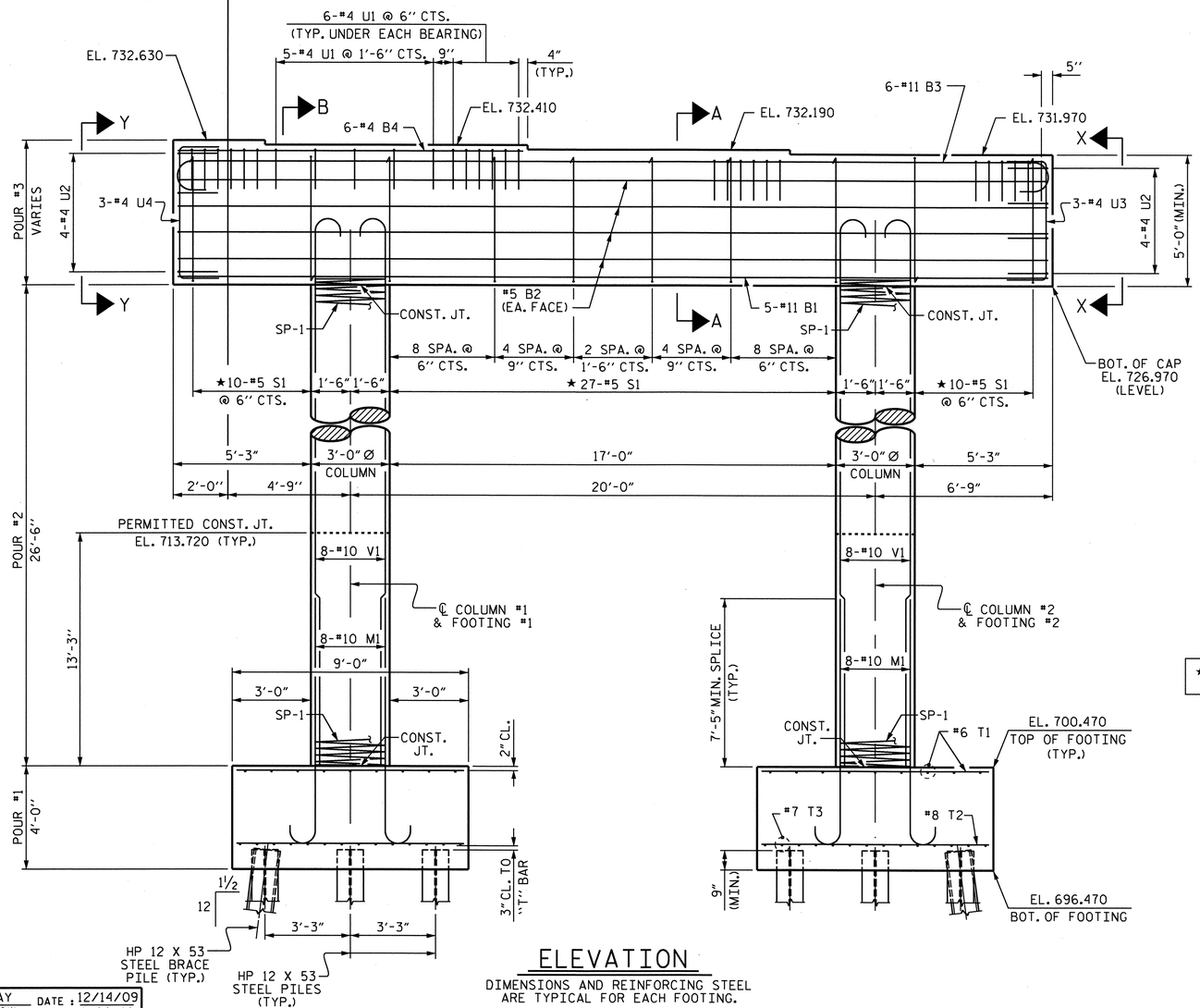
LSUTTON



PLAN



ELEVATION

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING.

★ INVERT ALTERNATE STIRRUPS

NOTES

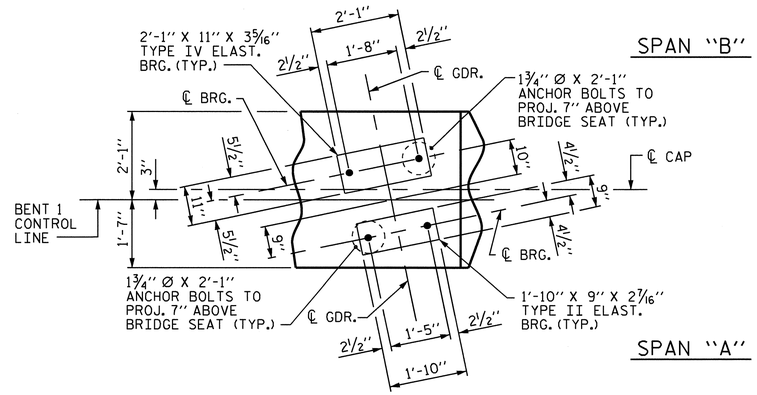
STIRRUPS AND U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

FOR PILE SPLICE DETAILS, SEE "END BENT 1" SHEETS.

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

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE CENTERLINE JOINT IN THE DECK SLAB (CONTROL LINE) IS OFFSET FROM THE CENTERLINE BENT.



DETAIL "A"

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-73
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 12/14/09
CHECKED BY : D.R. WITHROW DATE : 1/26/10

27-JUL-2010 14:48
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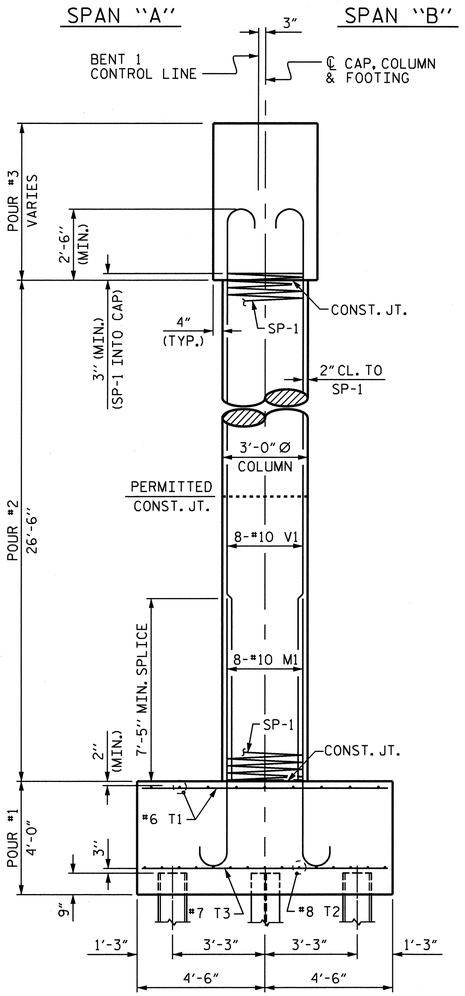
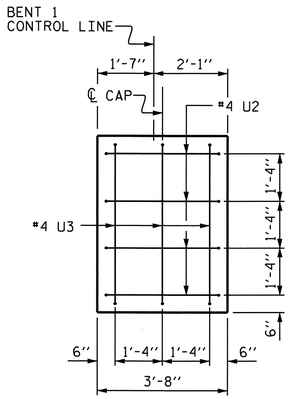
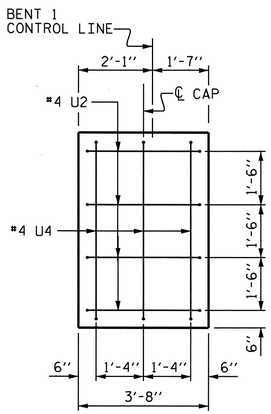
LSUTTON



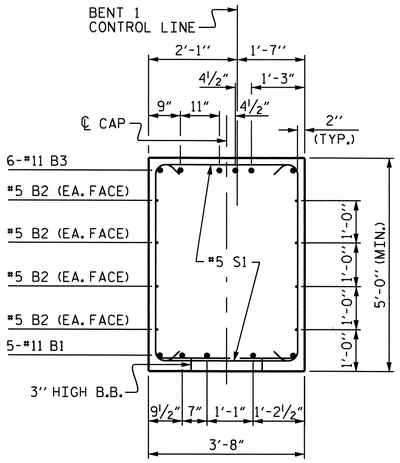
END ELEVATION



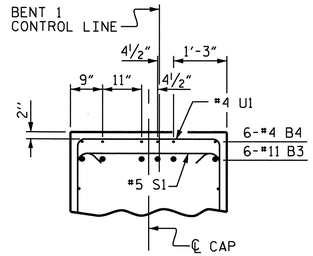
VIEW X-X



VIEW Y-Y



SECTION A-A



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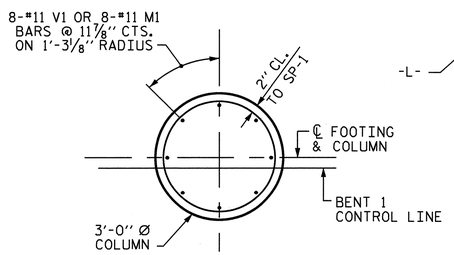
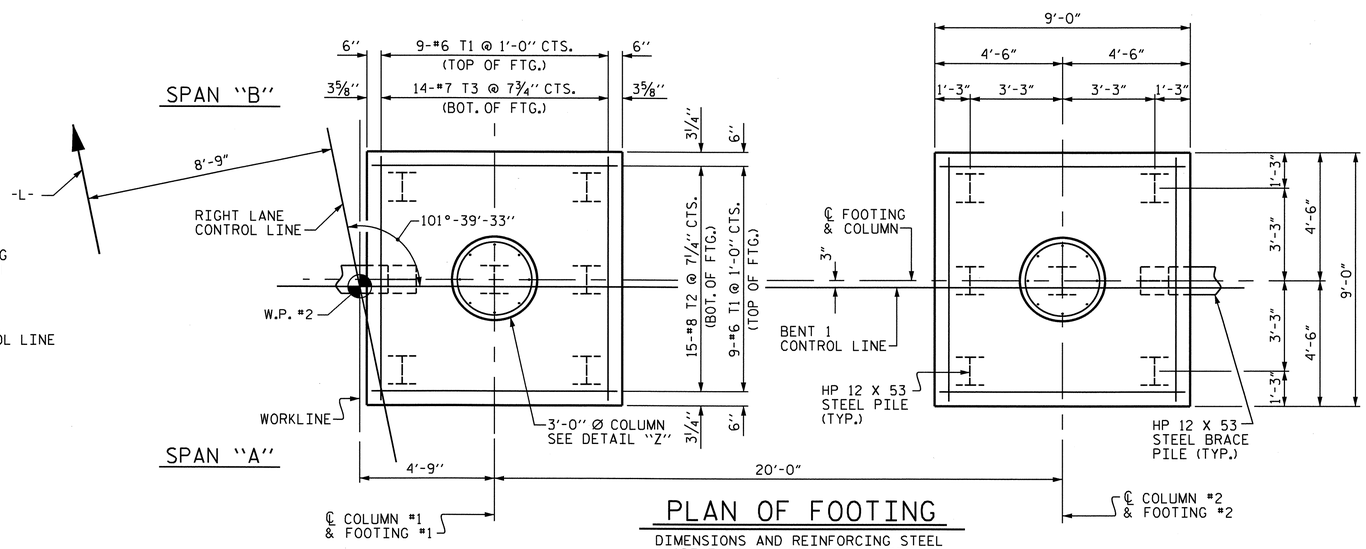


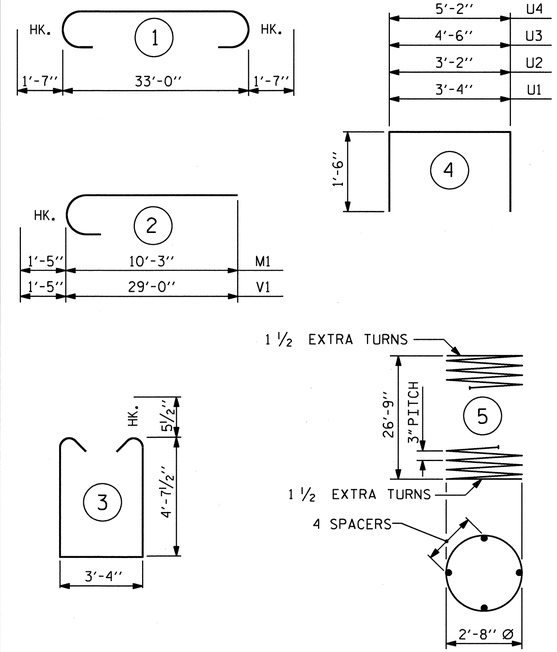
DETAIL "Z"



PLAN OF FOOTING

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING.

BAR TYPES



BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#11	STR	33'-2"	881
B2	8	#5	STR	33'-2"	277
B3	6	#11	1	36'-2"	1153
B4	6	#4	STR	13'-2"	53
M1	16	#10	2	11'-8"	803
S1	47	#5	3	13'-6"	662
T1	36	#6	STR	8'-8"	469
T2	30	#8	STR	8'-8"	694
T3	28	#7	STR	8'-8"	496
V1	16	#10	2	30'-5"	2094
U1	29	#4	4	6'-4"	123
U2	8	#4	4	6'-2"	33
U3	3	#4	4	7'-6"	15
U4	3	#4	4	8'-2"	16
REINFORCING STEEL				LBS.	7,769
SP-1	2	**	5	907'-7"	1,213
SPIRAL COLUMN REINFORCING STEEL				LBS.	1,213

CLASS A CONCRETE BREAKDOWN:		
POUR #1 - FOOTINGS	CU. YDS.	24.0
POUR #2 - COLUMNS	CU. YDS.	13.9
POUR #3 - CAP	CU. YDS.	24.0
TOTAL	CU. YDS.	61.9

HP 12 x 53 STEEL PILES NO. = 14	LIN. FT.	1,085
PILE REDRIVES	EA.	7
FOUNDATION EXCAVATION		LUMP SUM

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

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-74
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 12/14/09
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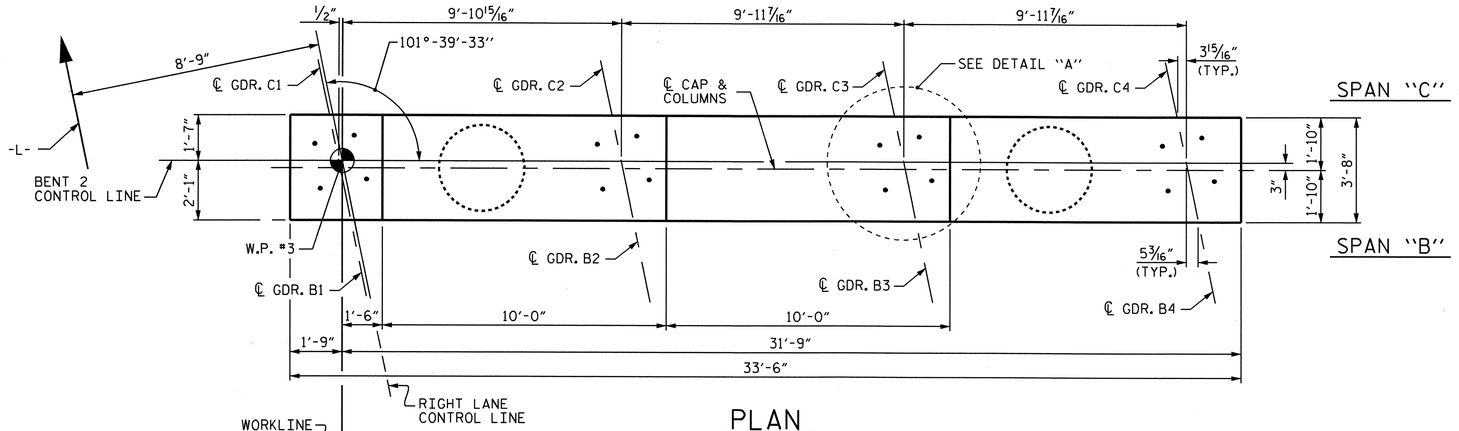
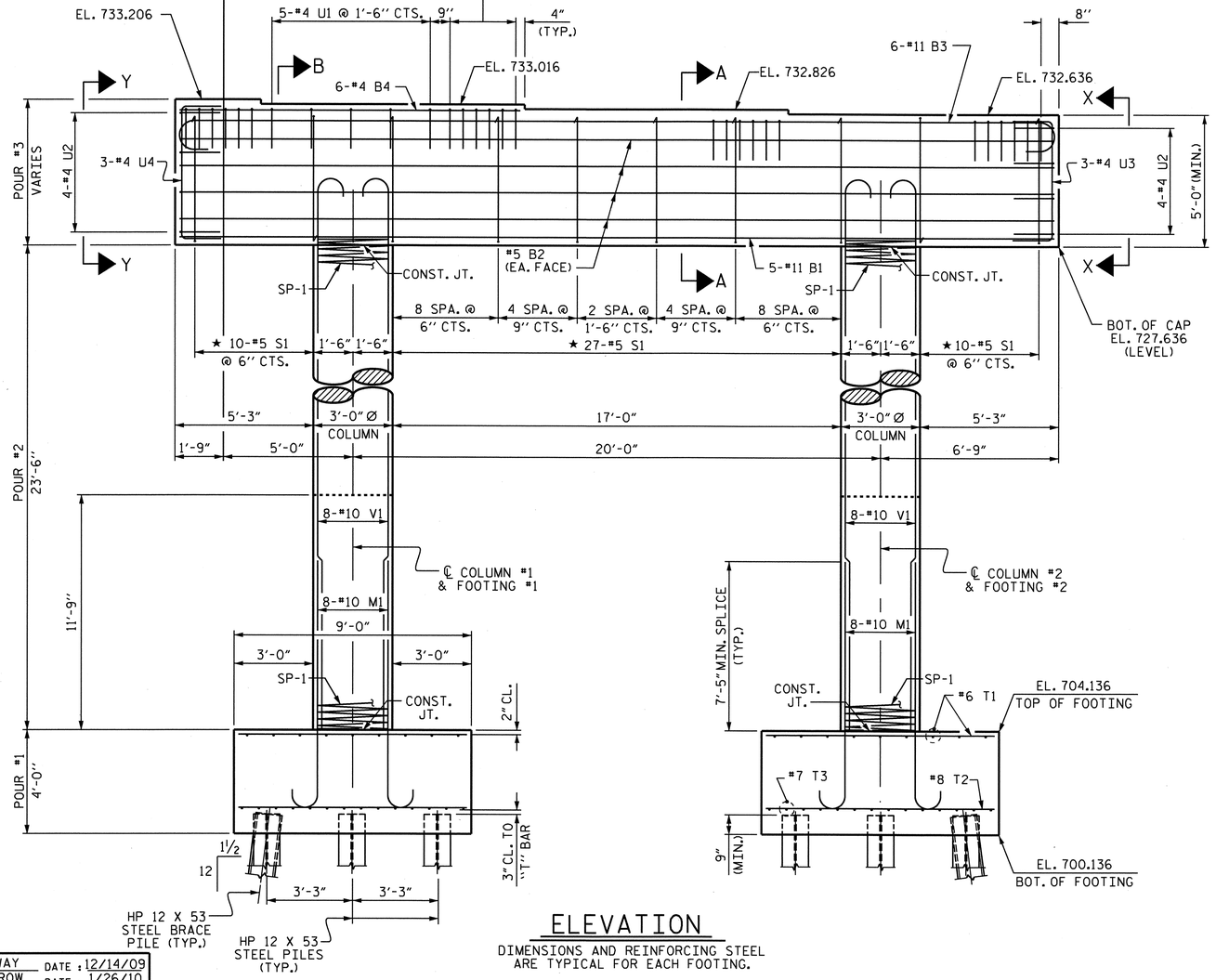
LSUTTON



PLAN



ELEVATION

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING.

NOTES

STIRRUPS AND U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

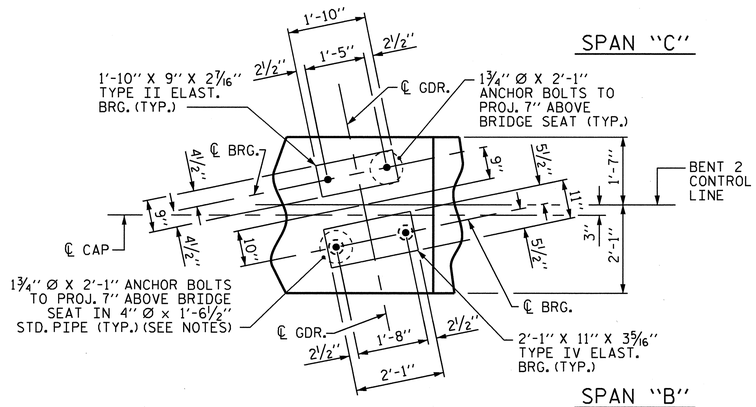
FOR PILE SPLICE DETAILS, SEE "END BENT 1" SHEETS.

FOR PIPE INSERT DETAILS, SEE "ELASTOMERIC BEARING DETAILS" SHEET.

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

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE CENTERLINE JOINT IN THE DECK SLAB (CONTROL LINE) IS OFFSET FROM THE CENTERLINE BENT.

EPOXY COAT THE BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.



DETAIL "A"

★ INVERT ALTERNATE STIRRUPS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2
—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-75
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/29/10

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CHECKED BY : D.R. WITHROW DATE : 1/26/10

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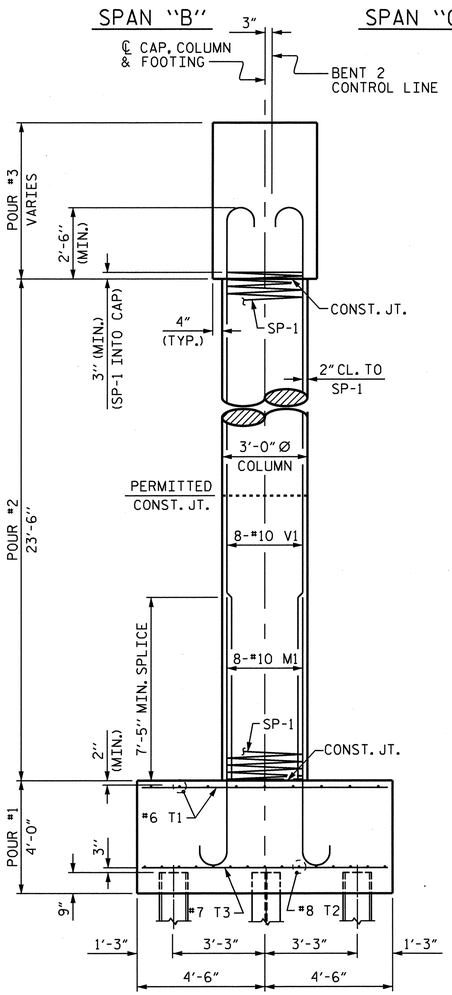
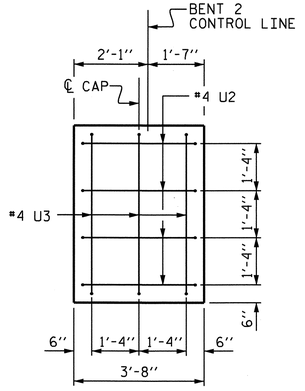
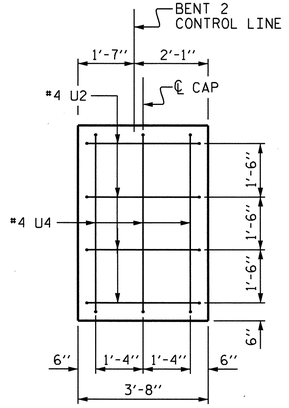


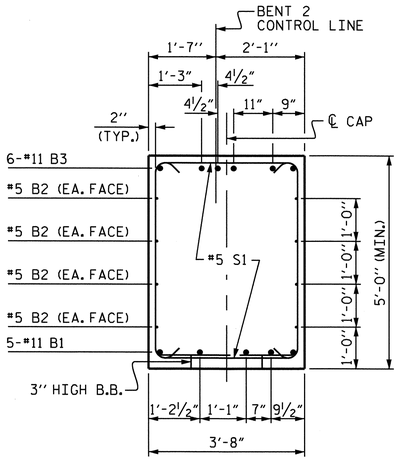
END ELEVATION



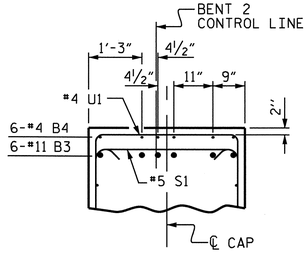
VIEW X-X



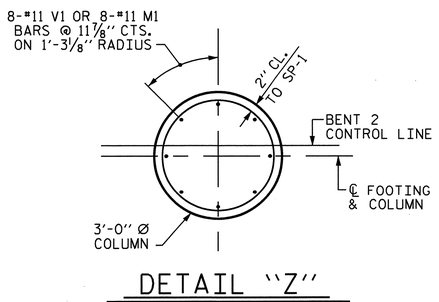
VIEW Y-Y



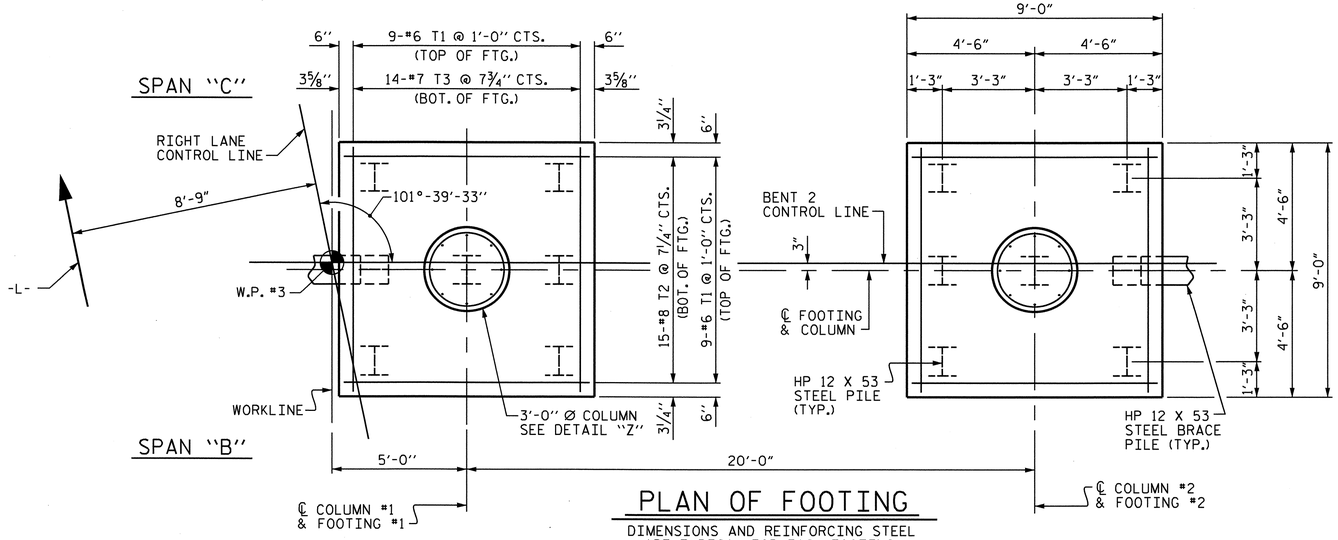
SECTION A-A



SECTION B-B



DETAIL "Z"

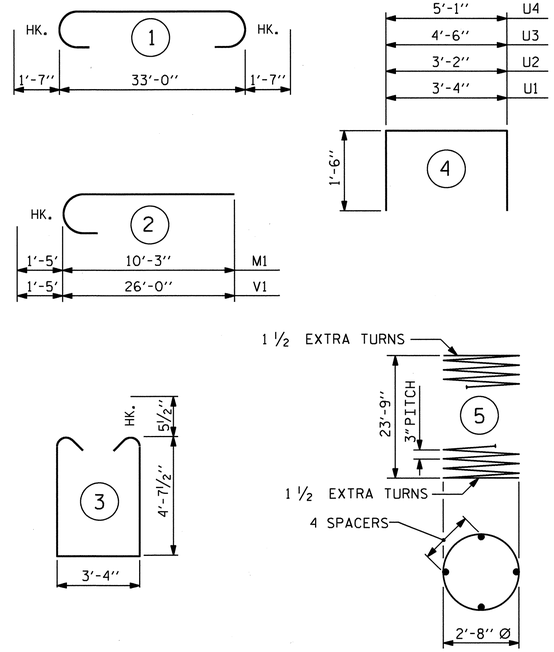


PLAN OF FOOTING

DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#11	STR	33'-2"	881
B2	8	#5	STR	33'-2"	277
B3	6	#11	1	36'-2"	1153
B4	6	#4	STR	12'-11"	52
M1	16	#10	2	11'-8"	803
S1	47	#5	3	13'-6"	662
T1	36	#6	STR	8'-8"	469
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V1	16	#10	2	27'-5'	1888
U1	29	#4	4	6'-4"	123
U2	8	#4	4	6'-2"	33
U3	3	#4	4	7'-6"	15
U4	3	#4	4	8'-1"	16
REINFORCING STEEL				LBS.	7,562
SP-1	2	**	5	808'-7"	1,080
SPIRAL COLUMN REINFORCING STEEL				LBS.	1,080

CLASS A CONCRETE BREAKDOWN:

POUR #1 - FOOTINGS	CU. YDS.	24.0
POUR #2 - COLUMNS	CU. YDS.	12.3
POUR #3 - CAP	CU. YDS.	23.8
TOTAL	CU. YDS.	60.1

HP 12 x 53 STEEL PILES NO. = 14	LIN. FT.	840
PILE REDRIVES	EA.	7
FOUNDATION EXCAVATION		LUMP SUM

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

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LSUTTON

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

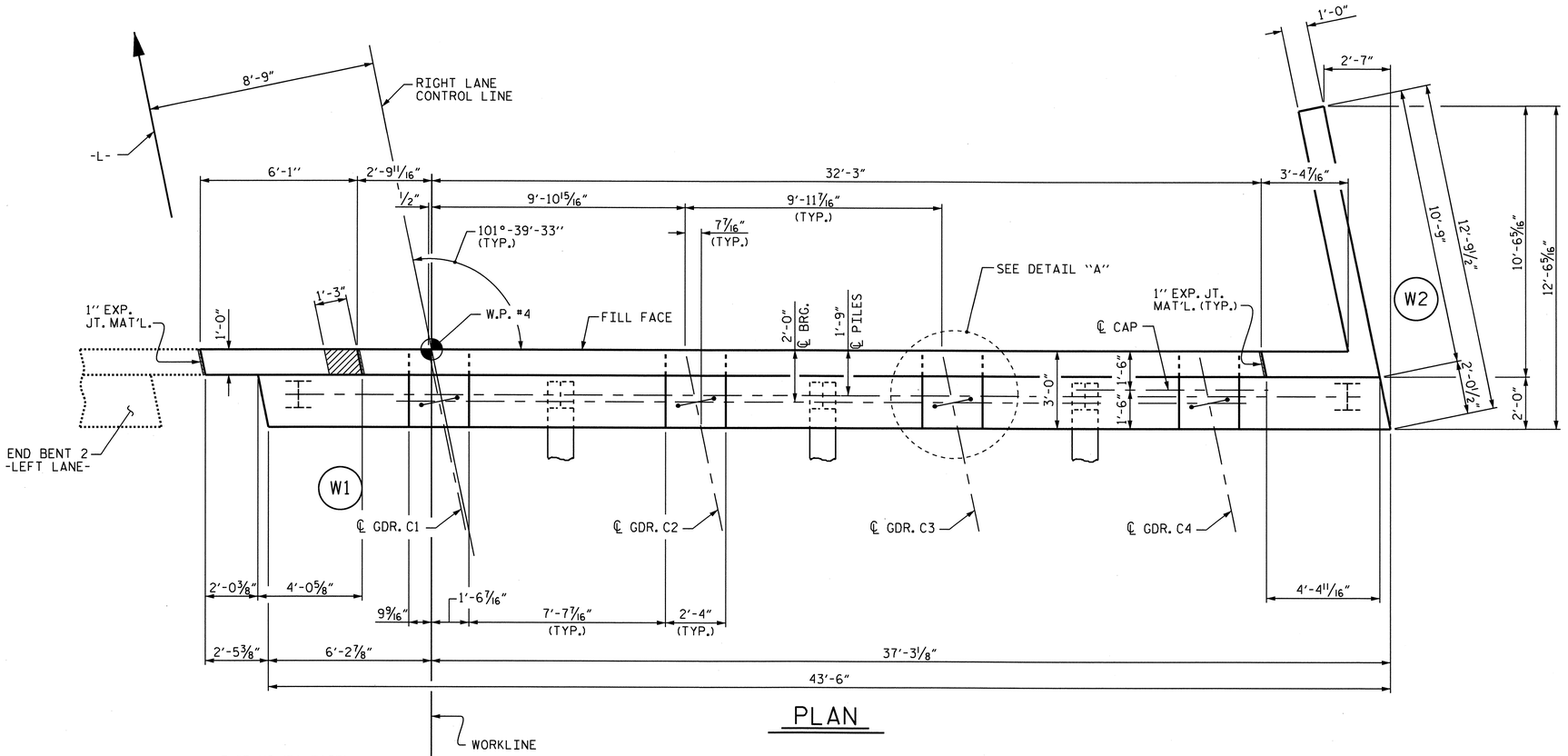
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

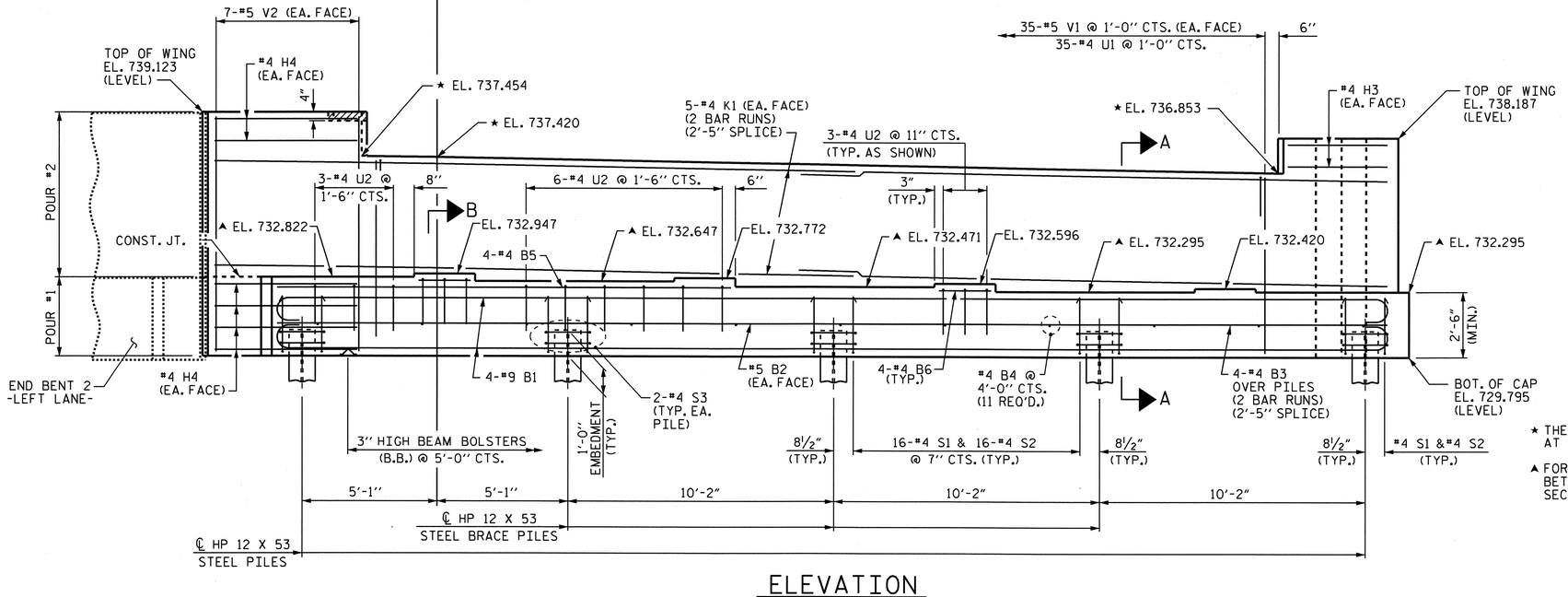
SUBSTRUCTURE
BENT 2
—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-76
1			3			TOTAL SHEETS
2			4			146

STR. #2



PLAN



ELEVATION

★ THESE ELEVATIONS ARE TAKEN AT FILL FACE OF THE BACKWALL.

▲ FOR LOCATION OF ELEVATIONS BETWEEN BUILD-UPS, SEE SECTION A-A ON SHEET 3 OF 3.

NOTES

STIRRUPS AND U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

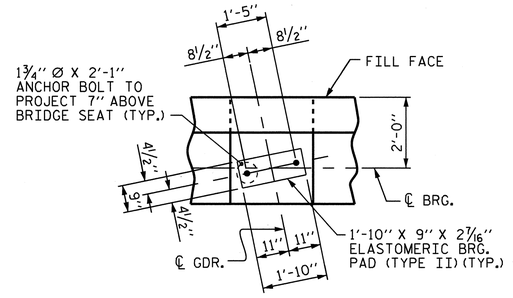
THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

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

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

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER 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 #5 V1 BARS IN THE BACKWALL SHALL BE PLACED 2" CLEAR FROM THE TOP OF THE BACKWALL.



DETAIL "A"
(TYP. EA. GIRDER)

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

SHEET 1 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:	S-77
1			3			TOTAL SHEETS
2			4			146

STR. #2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 11/24/09
CHECKED BY : D.R. WITHROW DATE : 6/1/10

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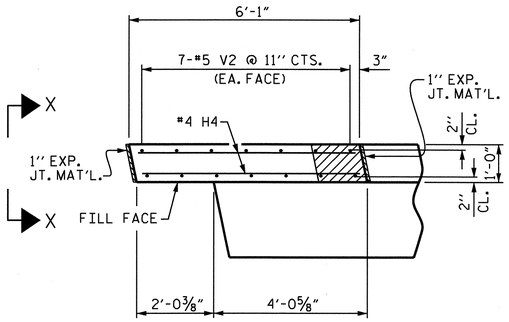
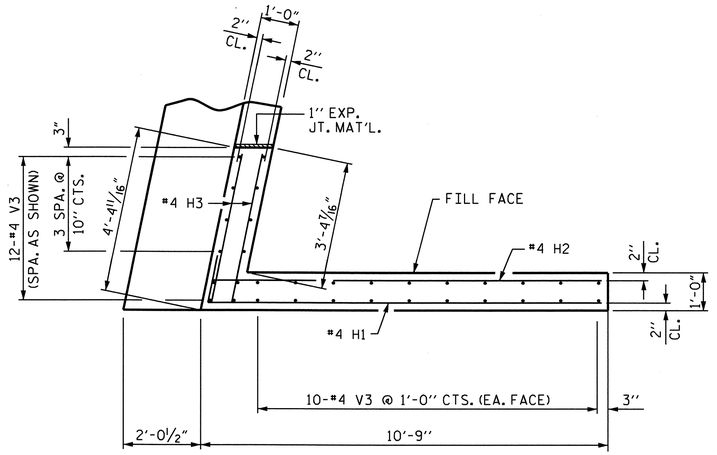
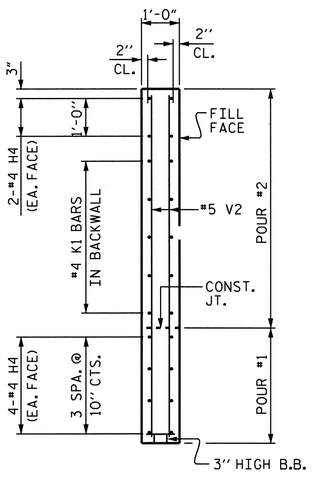
LSUTTON



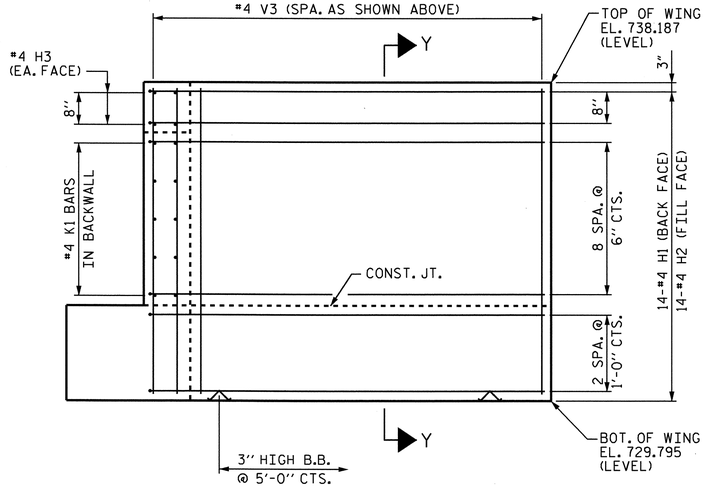
PLAN OF WING W1



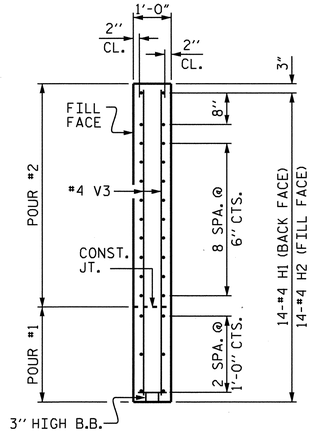
PLAN OF WING W2



END VIEW X-X



ELEVATION OF WING W2



SECTION Y-Y

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

— RIGHT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-78
1			3			TOTAL SHEETS
2			4			146

STR. #2

DRAWN BY : A.S. CALLAWAY DATE : 11/24/09
CHECKED BY : D.R. WITHROW DATE : 6/1/10

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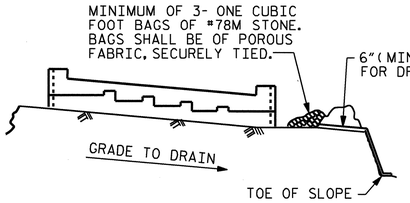
LSUTTON

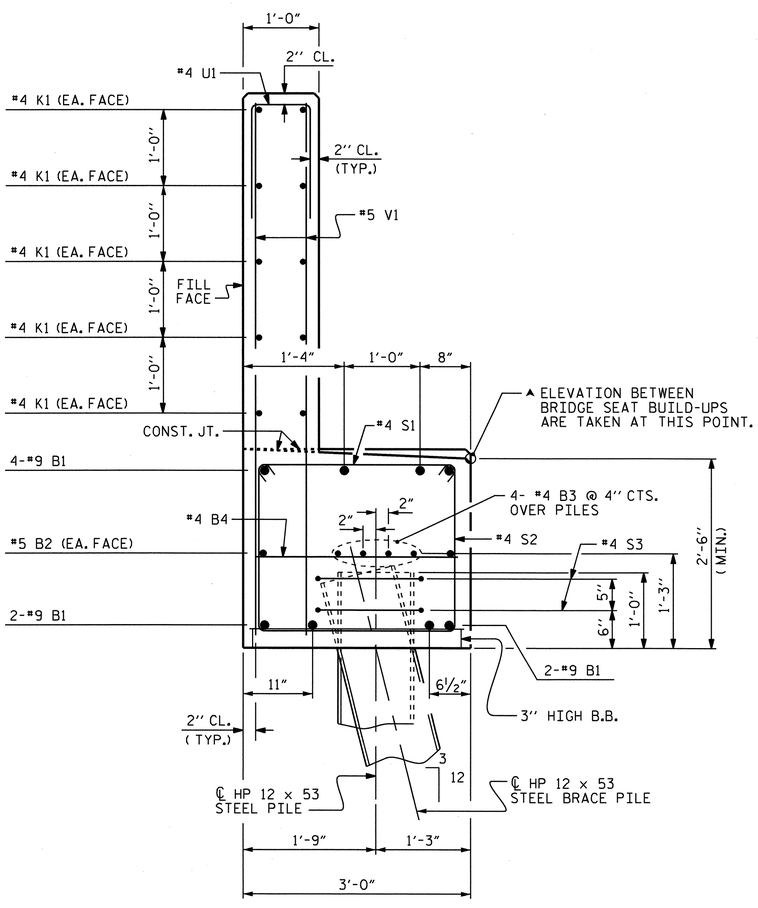


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

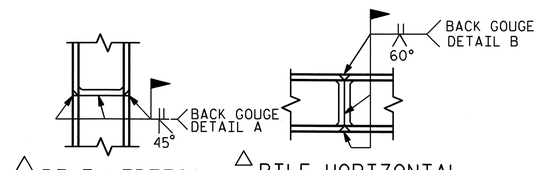
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

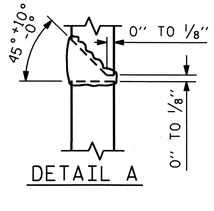


SECTION A-A

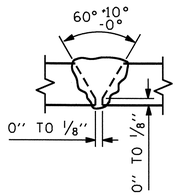


△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



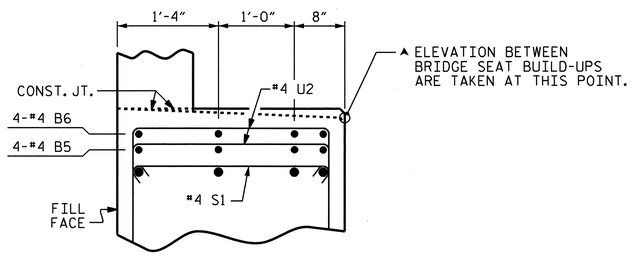
DETAIL A



DETAIL B

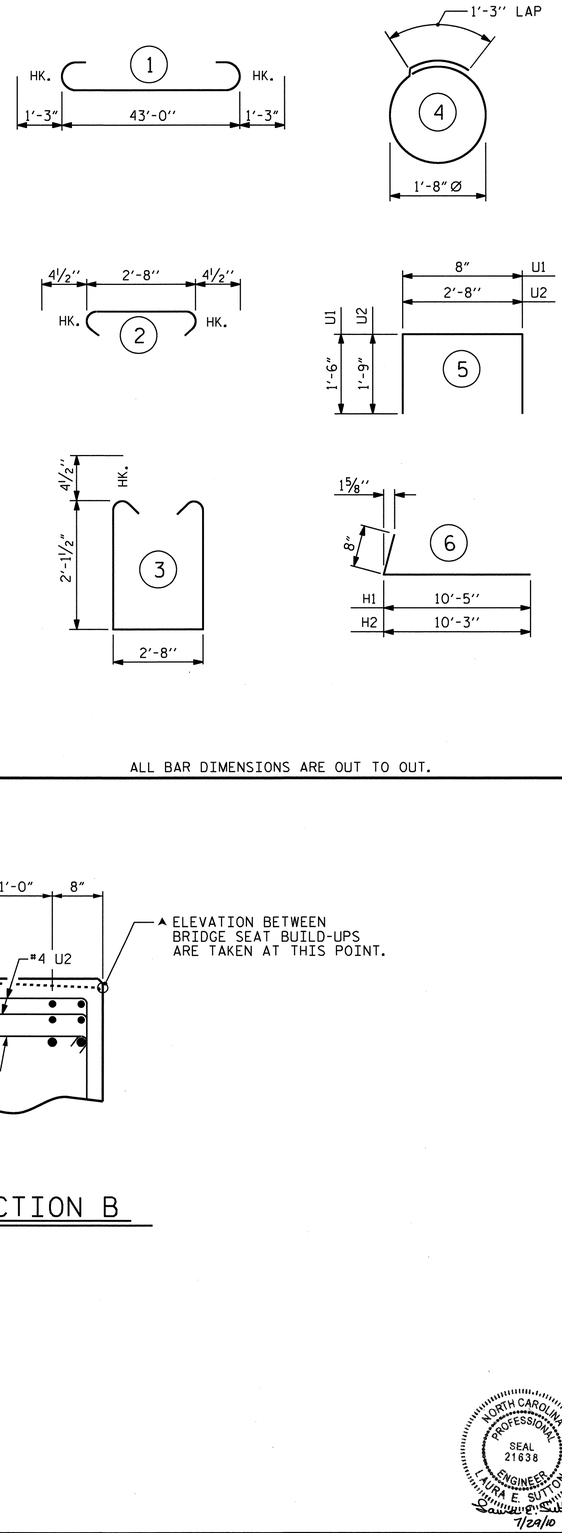
△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



PART SECTION B

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	45'-6"	1238
B2	2	#5	STR	43'-1"	90
B3	8	#4	STR	22'-9"	122
B4	11	#4	STR	2'-8"	20
B5	4	#4	STR	17'-5"	47
B6	8	#4	STR	2'-0"	11
H1	14	#4	6	11'-1"	104
H2	14	#4	6	10'-11"	102
H3	4	#4	STR	4'-0"	11
H4	12	#4	STR	5'-9"	46
K1	20	#4	STR	23'-9"	317
S1	66	#4	2	3'-5"	151
S2	66	#4	3	7'-8"	338
S3	10	#4	4	6'-6"	43
U1	35	#4	5	3'-8"	86
U2	15	#4	5	6'-2"	62
V1	70	#5	STR	6'-9"	493
V2	14	#5	STR	9'-0"	131
V3	32	#4	STR	8'-0"	171

REINFORCING STEEL	LBS.	3,583
CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WINGS	CU. YDS.	14.3
POUR #2 - BACKWALL & UPPER WINGS	CU. YDS.	10.5
TOTAL	CU. YDS.	24.8
HP 12 x 53 STEEL PILES NO. = 5	LIN. FT.	430
PILE REDRIVES	EA.	3

DRAWN BY : A.S. CALLAWAY DATE : 11/24/09
CHECKED BY : D.R. WITHROW DATE : 6/1/10

27-JUL-2010 14:48
R:\Structures\str02\scallaway\Microstation\U3110B_SD_E2_02.dgn
LSUTTON

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 54+69.91 -L-

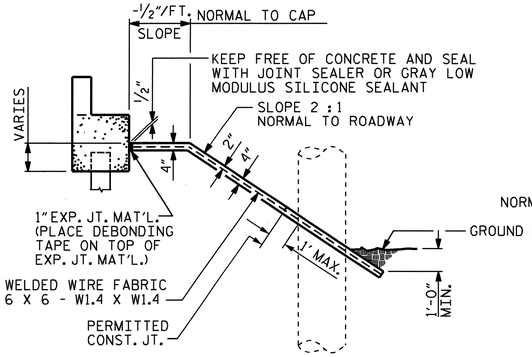
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

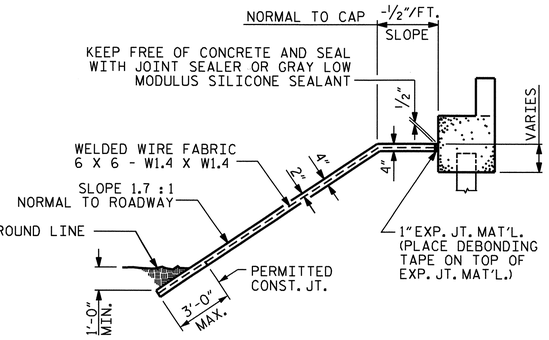
SUBSTRUCTURE
END BENT 2
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-79
1			3			TOTAL SHEETS
2			4			146

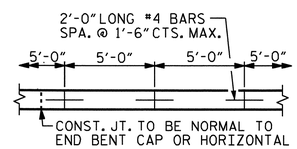
STR. #2



SECTION ALONG RIGHT LANE CONTROL LINE @ END BENT 1

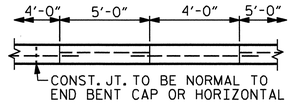


SECTION ALONG RIGHT LANE CONTROL LINE @ END BENT 2



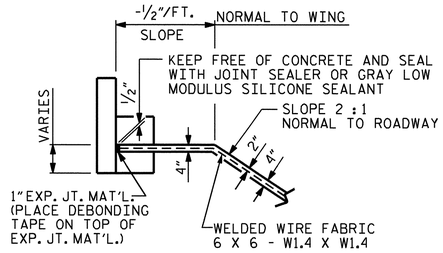
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



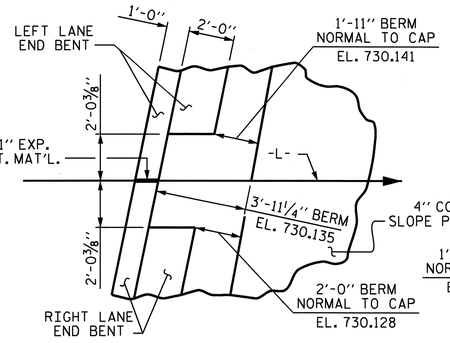
POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL

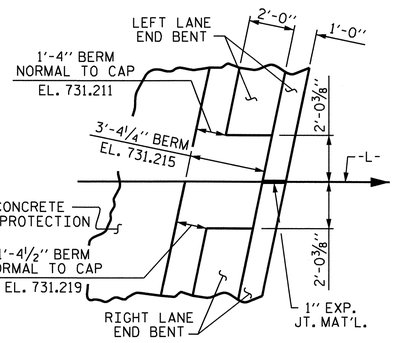


SECTION ALONG -L-

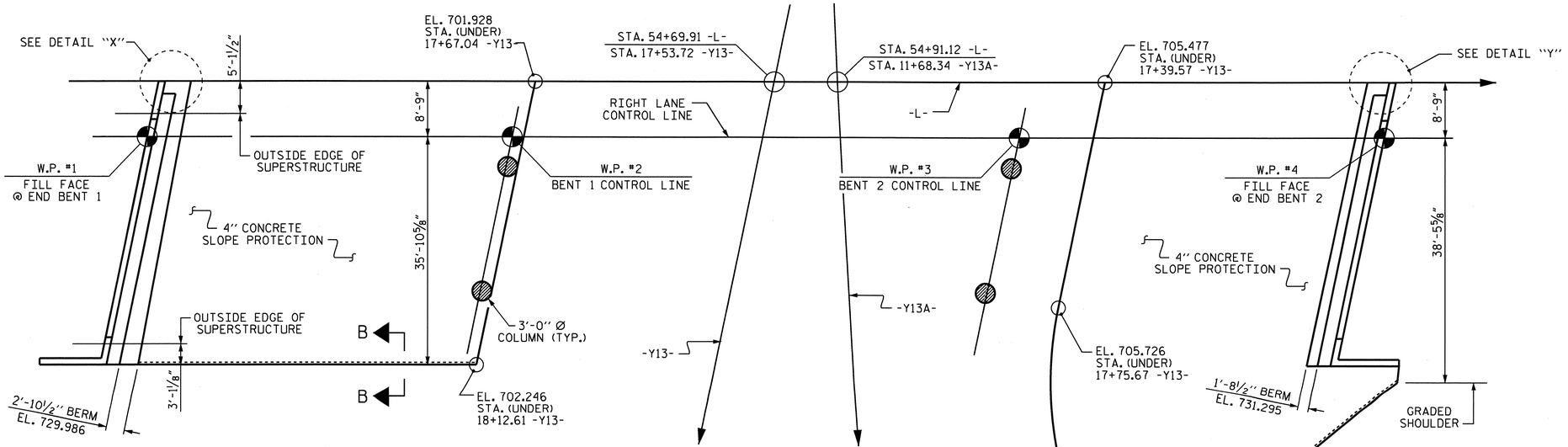
(END BENT 1 SHOWN, END BENT 2 SIMILAR)



DETAIL "X"



DETAIL "Y"



AT END BENT 1

PLAN

AT END BENT 2

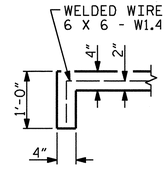
NOTES

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.

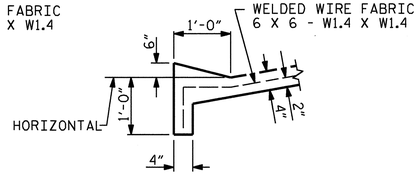
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL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

BRIDGE @ STA. 54+69.91 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	329	658
END BENT 2	408	817

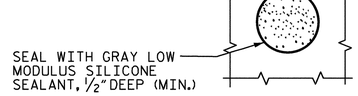
* QUANTITY SHOWN IS BASED ON 5' POURS.



SECTION A-A



SECTION B-B



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

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS

— RIGHT LANE —

ASSEMBLED BY : A.S. CALLAWAY	DATE : 5/13/10
CHECKED BY : D.R. WITHROW	DATE : 5/25/10
DRAWN BY : ELR 5/92	REV. 7/10/01 LES/RDR
CHECKED BY : GRP 6/92	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-80
1			3			TOTAL SHEETS
2			4			146

STR. #2

STD. NO. SP1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/20/10

30-JUL-2010 11:39
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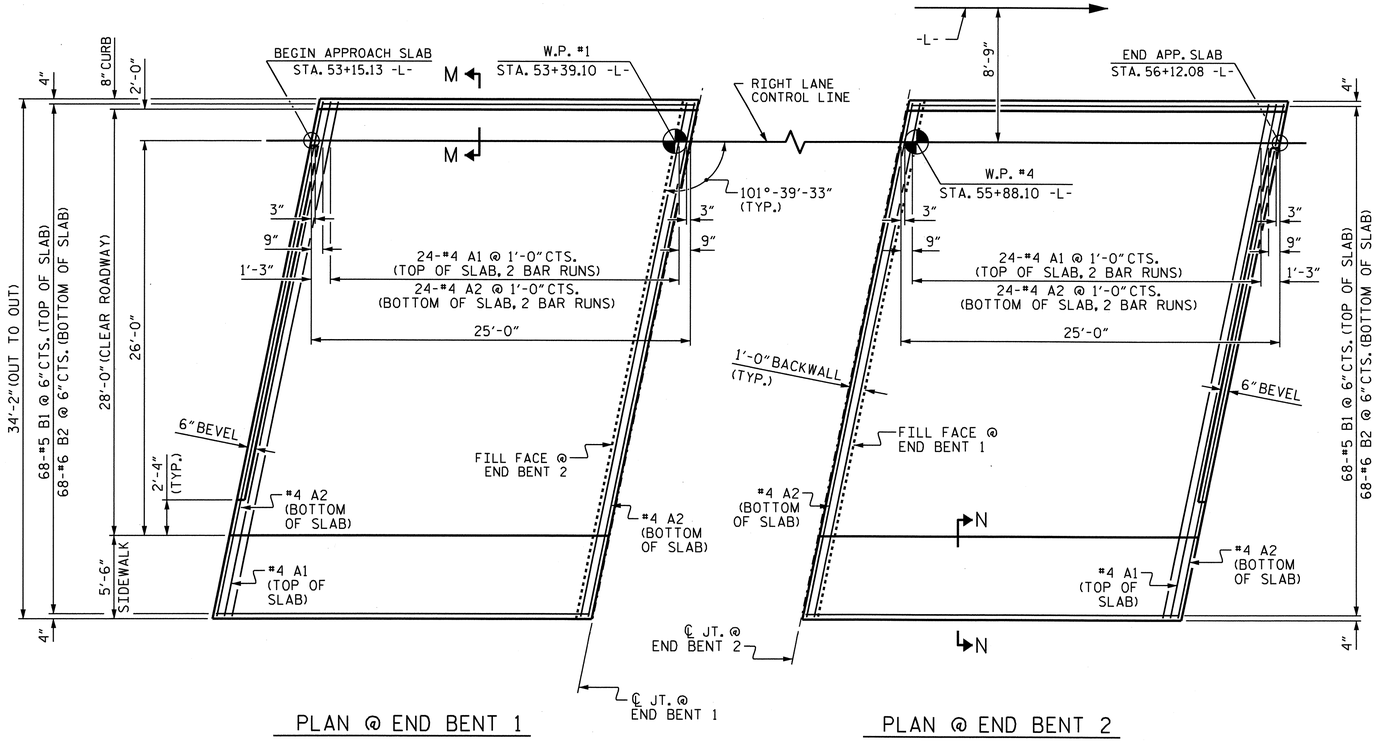
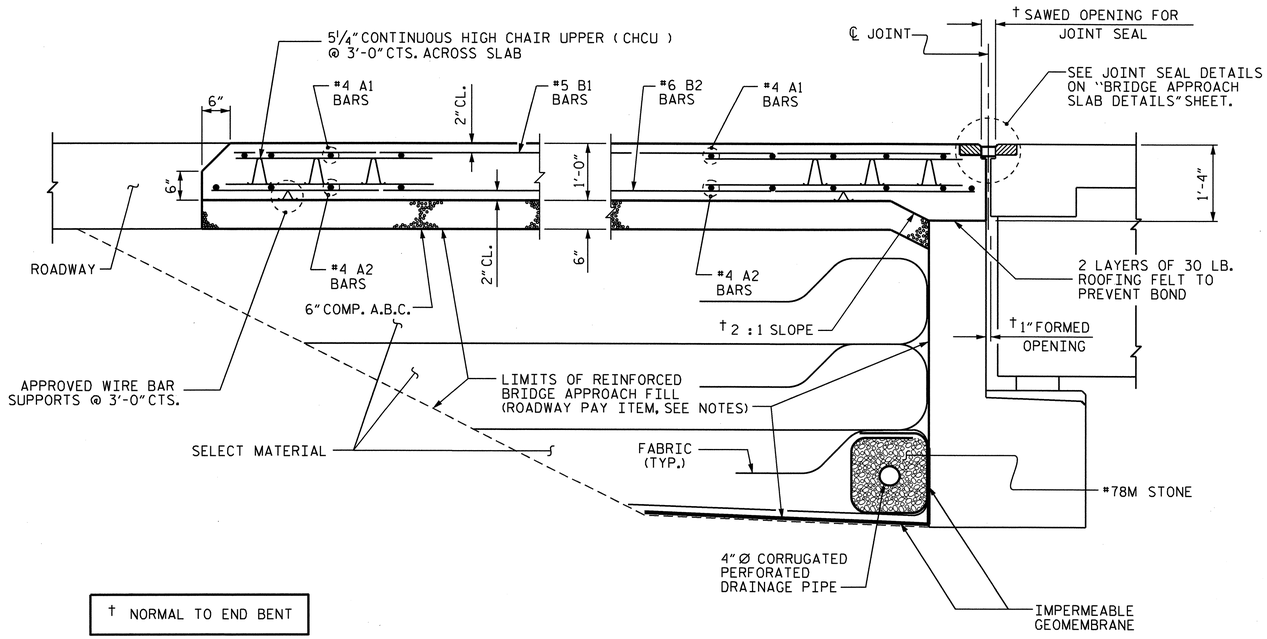
lsutton



PLAN @ END BENT 1

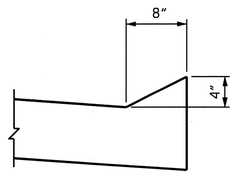
PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

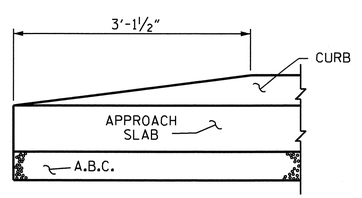


† NORMAL TO END BENT

SECTION THRU SLAB



SECTION M-M



END OF CURB WITHOUT
SHOULDER BERM GUTTER

NOTES

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

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, 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 6" COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE SIDEWALK.

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NORMAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2½".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

APPROACH SLAB AT EB 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	50	#4	STR	18'-3"	610
A2	52	#4	STR	18'-2"	631
✱B1	68	#5	STR	23'-8"	1679
B2	68	#6	STR	24'-7"	2511
✱B3	4	#4	STR	24'-7"	66
✱G1	25	#4	STR	5'-1"	85
✱U1	10	#4	1	2'-10"	19

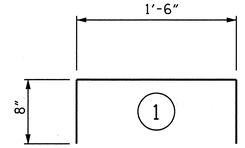
REINFORCING STEEL	LBS.	3142
✱EPOXY COATED REINFORCING STEEL	LBS.	2459
CLASS AA CONCRETE		
POUR 1 (SLAB & CURB)	C. Y.	32.1
POUR 2 (SIDEWALK)	C. Y.	3.1
TOTAL	C. Y.	35.2

APPROACH SLAB AT EB 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	50	#4	STR	18'-3"	610
A2	52	#4	STR	18'-2"	631
✱B1	68	#5	STR	23'-8"	1679
B2	68	#6	STR	24'-7"	2511
✱B3	4	#4	STR	24'-7"	66
✱G1	25	#4	STR	5'-1"	85
✱U1	10	#4	1	2'-10"	19

REINFORCING STEEL	LBS.	3142
✱EPOXY COATED REINFORCING STEEL	LBS.	2459
CLASS AA CONCRETE		
POUR 1 (SLAB & CURB)	C. Y.	32.1
POUR 2 (SIDEWALK)	C. Y.	3.1
TOTAL	C. Y.	35.2

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-81
1			3			TOTAL SHEETS
2			4			146

STR. #2

STD. NO. BAS4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

ASSEMBLED BY : D. R. WITHROW	DATE : 7/7/09		
CHECKED BY : A.S. CALLAWAY	DATE : 7/30/09		
DRAWN BY : EEM 3/95	REV. 7/10/01	LES/RDR	
CHECKED BY : VAP 3/95	REV. 5/7/03R	RWW/JTE	
	REV. 5/1/06R	KMM/GM	

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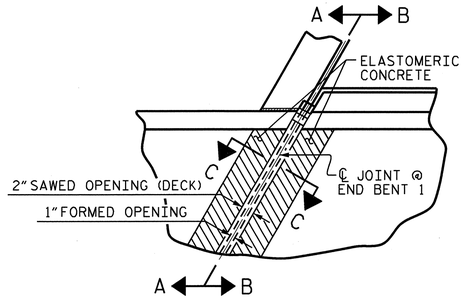
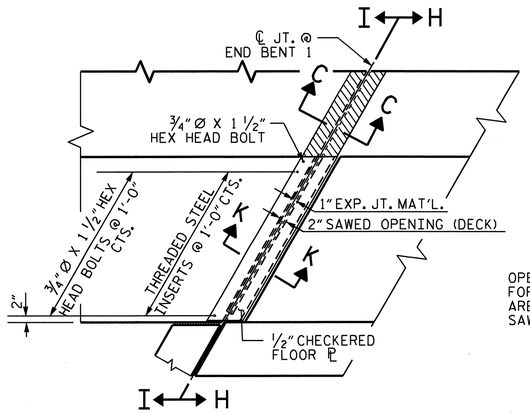
LSUTTON



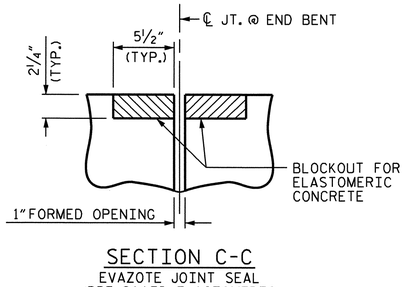
PLAN VIEW OF EVAZOTE JOINT SEAL @ END BENT FOR BARRIER RAIL

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



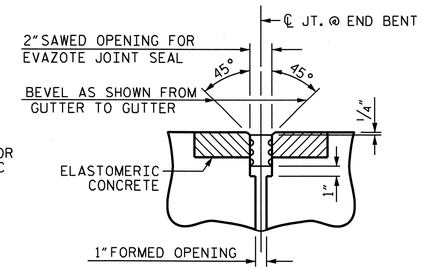
PLAN VIEW OF EVAZOTE JOINT SEAL @ END BENT FOR SIDEWALK

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



SECTION C-C

EVAZOTE JOINT SEAL (PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)

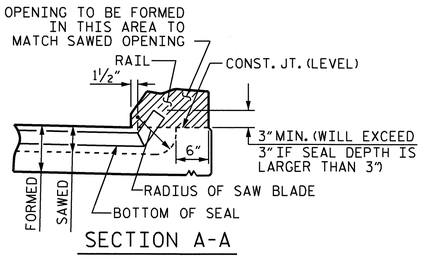


SECTION C-C

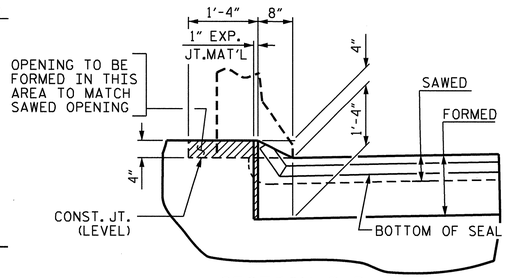
EVAZOTE JOINT SEAL (FIXED)

ELASTOMERIC CONCRETE	
APPROACH SLAB NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	4.9
2	4.9
TOTAL	9.8

* BASED ON THE MINIMUM BLOCKOUT SHOWN.



SECTION A-A

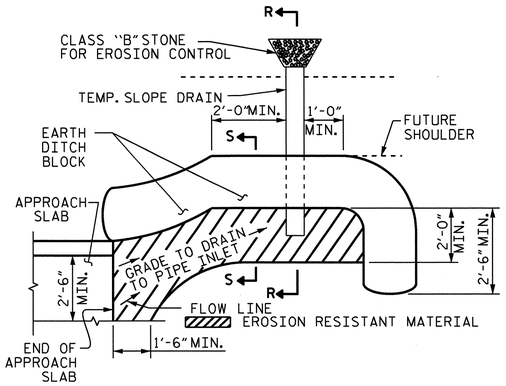


SECTION B-B

THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALLY BLAST CLEANED AND EITHER COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC-RICH PAINT, GALVANIZED OR METALLIZED TO A MINIMUM THICKNESS OF 6 MILS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

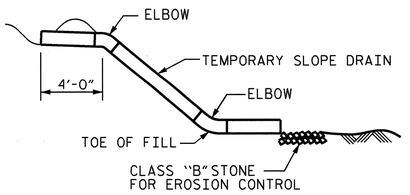
THE ¾" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "EVAZOTE JOINT SEALS".

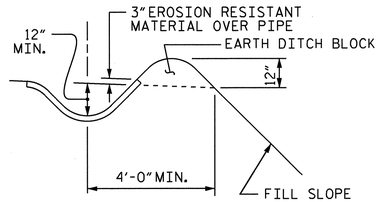


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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



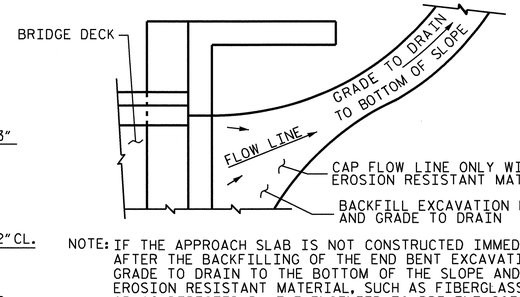
SECTION R-R



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

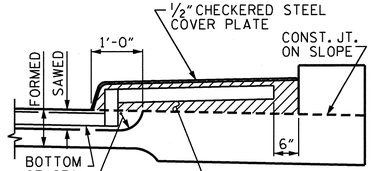
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



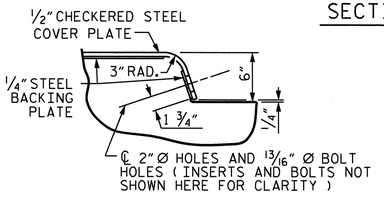
SECTION N-N

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.

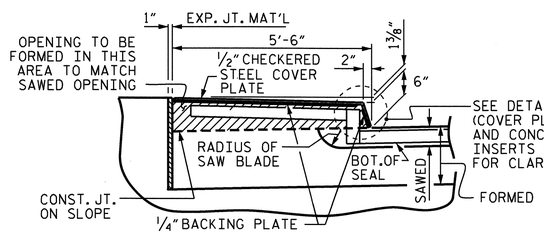
TEMPORARY DRAINAGE DETAIL



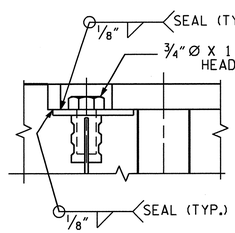
SECTION H-H



DETAIL "B"



SECTION I-I



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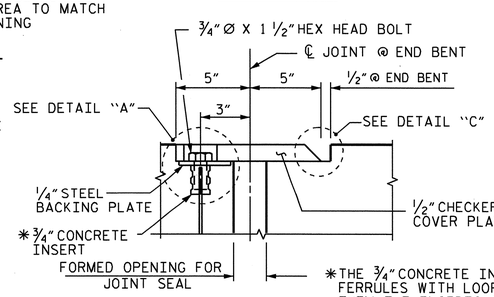
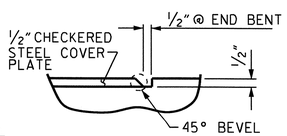


SECTION K-K



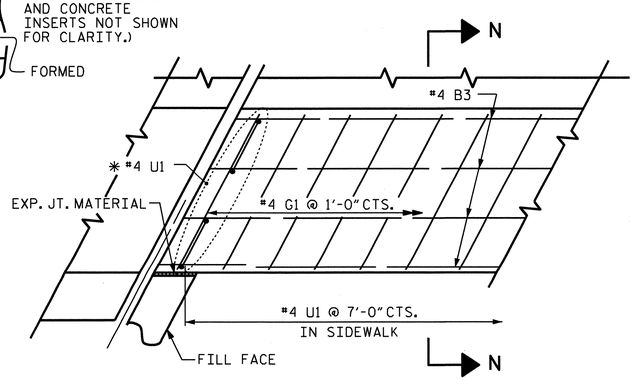
DETAIL "C"

*THE ¾" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.

JOINT SEAL DETAILS @ END BENT

EVAZOTE JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.



* THE "U" BARS ARE TO BE PLACED AFTER THE SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE "U" BARS GROUTED INTO PLACE.

PLAN

SIDEWALK DETAILS

ASSEMBLED BY :	D. R. WITHROW	DATE :	7/6/09		
CHECKED BY :	A.S. CALLAWAY	DATE :	7/30/09		
DRAWN BY : FCJ	11/88	REV. 10/17/00		RWW/LES	
CHECKED BY : ARB	11/88	REV. 5/17/03		RWW/JTE	
		REV. 5/1/06R		MAA/KMM	

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PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 54+69.91 -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:	S-82
1			3			TOTAL SHEETS
2			4			146

STR. #2

STD. NO. BAS10

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

F.A. PROJ. NO. STP-1311(10)

+4.9051% △ -3.4242%

PI = 54+40.00 -L-LT.
EL. = 746.25
VC = 700.00

GRADE DATA

58+00 58+50 59+00 59+50 60+00

740 730 720 710 700 690

FILL FACE @ END BENT 1
STA. 58+20.28 -L-
GRADE PT. EL. 733.228

FIX.

SEE PLAN VIEW
BERM (TYP.)

VARIES (TYP.)

1½:1 SLOPE (TYP.)

FILL

℄ DITCH

EL. 700.0±
EL. 699.0±
EL. 698.0±
EL. 697.0±
EL. 698.0±

INTEGRAL
END BENT 1

SPAN "A"

FILL FACE @ END BENT 2
STA. 59+64.78 -L-
GRADE PT. EL. 728.280

FIX.

4" CONCRETE
SLOPE PROTECTION

24'-5"
MIN. VERTICAL
CLEARANCE

℄ DITCH

HP 12 X 53
STEEL PILES
(TYP.)

FILL

EL. 699.0±
EL. 699.0±
EL. 699.0±
EL. 698.0±
EL. 697.0±
EL. 696.0±
EL. 696.0±

INTEGRAL
END BENT 2

SECTION ALONG -L-

(SECTIONS @ END BENTS ARE @ RIGHT ANGLES)

℄ DITCH

1'-3" BERM
EL. 723.483

-Y3-
HAGGARD
AVE.

℄ DITCH

1'-1" BERM
EL. 718.638

POINT OF MIN.
VERTICAL CLEARANCE

4" CONCRETE
SLOPE PROTECTION

W.P. #1
FILL FACE @ END BENT 1
STA. 58+20.28 -L-

TO SR 1311

14'-0" 18'-0" EX. PAVEMENT 18'-0" EX. PAVEMENT 14'-0"

4" CONCRETE
SLOPE PROTECTION

W.P. #2
FILL FACE @ END BENT 2
STA. 59+64.78 -L-

BEGIN APPROACH SLAB
STA. 57+96.12 -L-

LEFT LANE
CONTROL LINE

END APPROACH SLAB
STA. 59+88.95 -L-

STA. 58+97.14 -L-
STA. 19+26.32 -Y3-

8'-9"

86°-01'-32" (TYP.)

-L-

3'-9½" BERM
EL. 723.397
@ END OF CAP

3'-7" BERM
EL. 718.552
@ END OF CAP

TO SR 1503

76'-10⅝"

67'-7¹¹/₁₆"

144'-6" TOTAL LENGTH OF BRIDGE (FILL FACE TO FILL FACE)

PLAN

(PILES NOT SHOWN FOR CLARITY)

NORTH CAROLINA PROFESSIONAL SEAL 9804 ENGINEER ROY M. GIORDANO
7-30-10

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/30/10

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/6/10

30-JUL-2010 11:09
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PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-
19+26.32 -Y3-

SHEET 1 OF 3 BRIDGE NO. 429

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

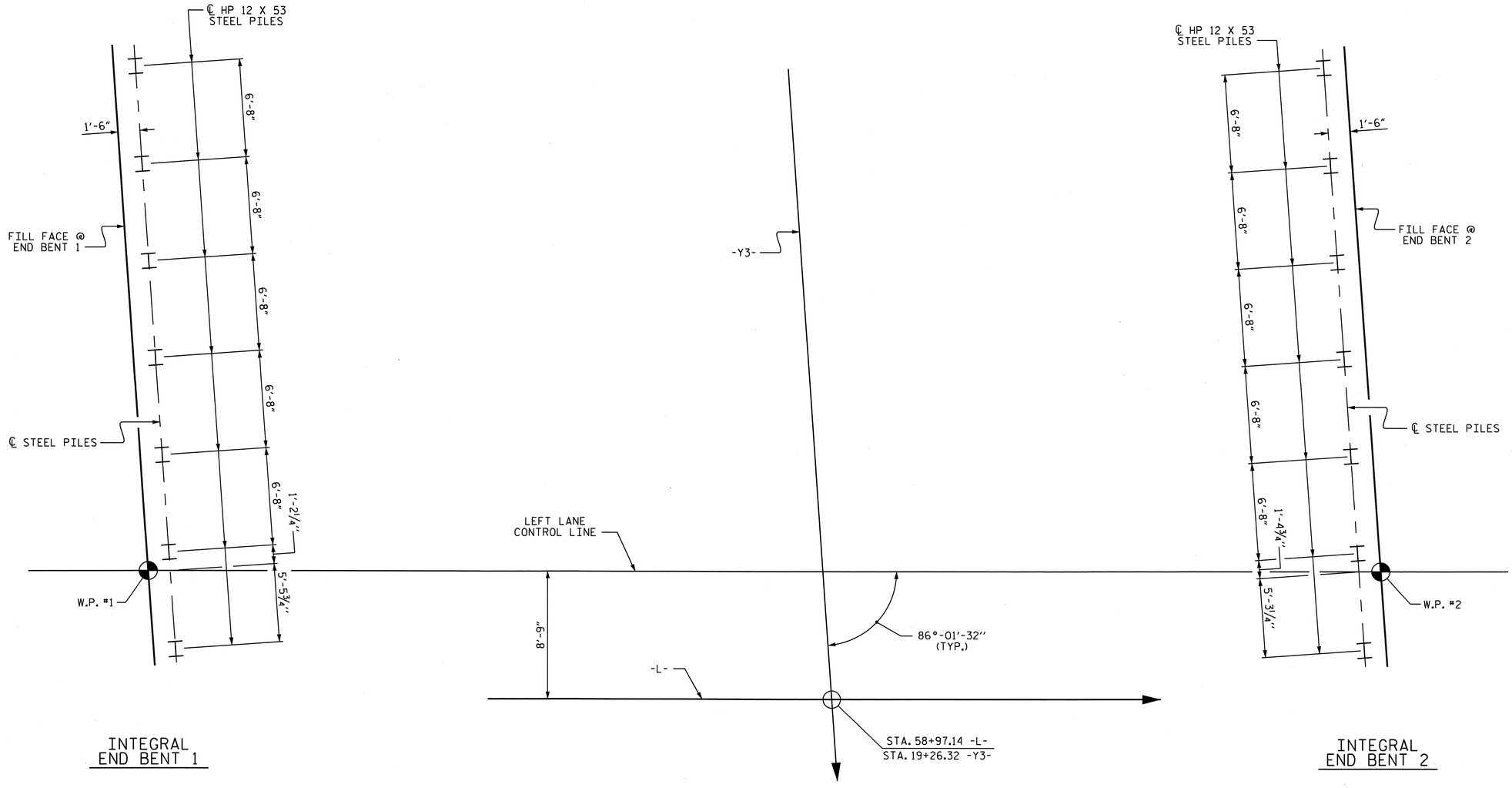
GENERAL DRAWING

FOR BRIDGE ON NC 100
OVER HAGGARD AVE. BETWEEN
SR 1311 AND SR 1503

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-83
1			3			TOTAL SHEETS
2			4			146

STR. #3



INTEGRAL END BENT 1

INTEGRAL END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE TO THE CENTERLINE OF THE PILE AT THE BOTTOM OF CAP.

NOTES (CONTINUED ON SHEET 3 OF 3)

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40 TO 60 FT-KIP PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1 AND END BENT 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH THE PILES PROVISIONS.

DRIVING PILES AT END BENT 1 MAY REQUIRE PENETRATION OF GEOGRID REINFORCEMENT. FOR GEOGRID REINFORCEMENT AND PAY ITEM, SEE ROADWAY PLANS.

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100 OVER HAGGARD AVE. BETWEEN SR 1311 AND SR 1503

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-84
1			3			TOTAL SHEETS
2			4			146

STR. #3

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/6/10

28-JUL-2010 15:26
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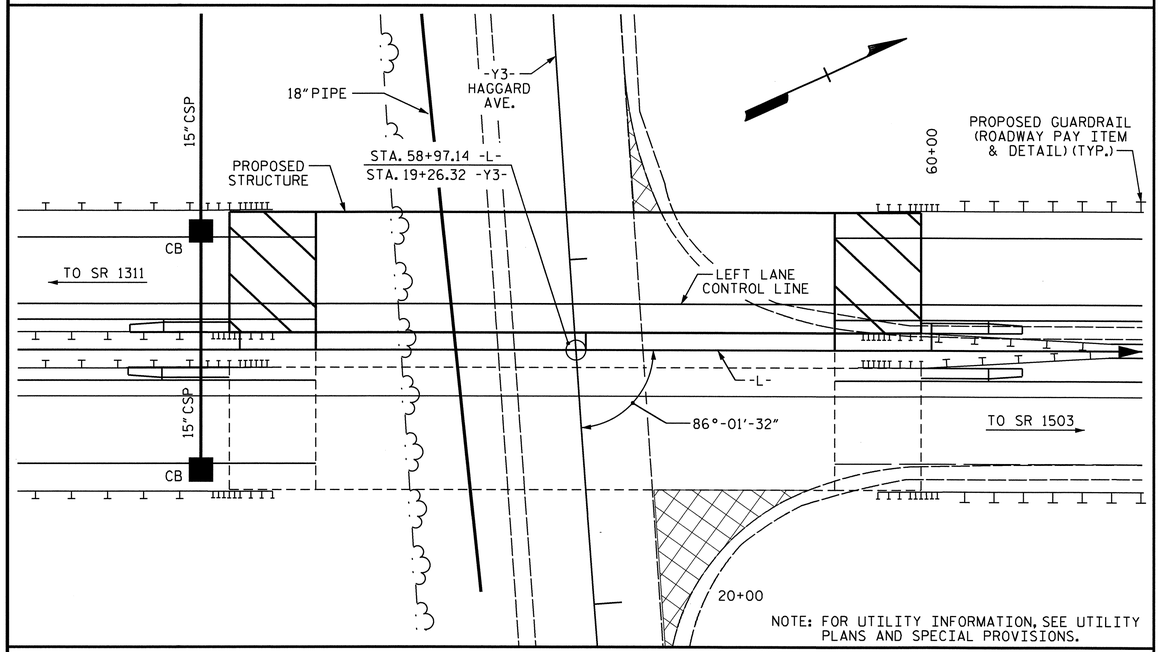
BM #3: RR SPIKE SET IN BASE OF 30" MAPLE, 129' RT. OF STA. 43+10 -L-, ELEV. 708.75



LOCATION SKETCH

NOTES (CONTINUED FROM SHEET 2 OF 3)

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W.

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

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

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.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.

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

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR FORMS FOR CONCRETE BRIDGES DECKS, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	STRUCTURAL STEEL	HP 12 X 53 STEEL PILES		PILE REDRIVES	THREE BAR METAL RAIL	CONCRETE BARRIER RAIL	104" CHAIN LINK FENCE	4" SLOPE PROTECTION	EVAZOTE JOINT SEALS
	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	APPROX. LBS.	NO.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE	5,262	4,715		LUMP SUM		225,900				136.92	144.50	91.00		LUMP SUM
END BENT 1			22.2		3,787		7	540	4				323	
END BENT 2			22.2		3,783		7	595	4				260	
TOTAL	5,262	4,715	44.4	LUMP SUM	7,570	225,900	14	1,135	8	136.92	144.50	91.00	583	LUMP SUM

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100
OVER HAGGARD AVE. BETWEEN
SR 1311 AND SR 1503

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-85
1			3			TOTAL SHEETS
2			4			146

STR. #3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
8/27/10

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/6/10

27-AUG-2010 11:16
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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II 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	1.24	--	1.75	0.867	1.92	A	EL	70.75	0.876	1.24	A	EL	141.49	1.30	0.867	1.85	A	EL	70.75	
		HL-93 (OPERATING)	N/A		1.60	--	1.35	0.867	2.49	A	EL	70.75	0.876	1.60	A	EL	141.49	1.00	0.867	2.40	A	EL	70.75	
		HS-20 (INVENTORY)	36.00	2	1.86	67.0	1.75	0.867	2.94	A	EL	70.75	0.876	1.86	A	EL	141.49	1.30	0.867	2.83	A	EL	70.75	
		HS-20 (OPERATING)	36.00		2.42	87.1	1.35	0.867	3.82	A	EL	70.75	0.876	2.42	A	EL	141.49	1.00	0.867	3.68	A	EL	70.75	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		5.90	79.7	1.40	0.867	9.06	A	EL	70.75	0.876	5.90	A	EL	141.49	1.30	0.867	6.97	A	EL	70.75	
		SNGARBS2	20.000		4.08	81.6	1.40	0.867	6.41	A	EL	70.75	0.876	4.08	A	EL	141.49	1.30	0.867	4.94	A	EL	70.75	
		SNAGRIS2	22.000		3.74	82.3	1.40	0.867	5.94	A	EL	70.75	0.876	3.74	A	EL	141.49	1.30	0.867	4.57	A	EL	70.75	
		SNCOTTS3	27.250		2.93	79.8	1.40	0.867	4.50	A	EL	70.75	0.876	2.93	A	EL	141.49	1.30	0.867	3.46	A	EL	70.75	
		SNAGGRS4	34.925		2.35	82.1	1.40	0.867	3.63	A	EL	70.75	0.876	2.35	A	EL	141.49	1.30	0.867	2.79	A	EL	70.75	
		SNS5A	35.550		2.34	83.2	1.40	0.867	3.56	A	EL	70.75	0.876	2.34	A	EL	141.49	1.30	0.867	2.74	A	EL	70.75	
		SNS6A	39.950		2.11	84.3	1.40	0.867	3.21	A	EL	70.75	0.876	2.11	A	EL	141.49	1.30	0.867	2.47	A	EL	70.75	
		SNS7B	42.000		2.03	85.3	1.40	0.867	3.06	A	EL	70.75	0.876	2.03	A	EL	141.49	1.30	0.867	2.35	A	EL	70.75	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.53	83.5	1.40	0.867	3.90	A	EL	70.75	0.876	2.53	A	EL	141.49	1.30	0.867	3.00	A	EL	70.75	
		TNT4A	33.075		2.50	82.7	1.40	0.867	3.90	A	EL	70.75	0.876	2.50	A	EL	141.49	1.30	0.867	3.00	A	EL	70.75	
		TNT6A	41.600		2.10	87.4	1.40	0.867	3.14	A	EL	70.75	0.876	2.10	A	EL	141.49	1.30	0.867	2.42	A	EL	70.75	
		TNT7A	42.000		2.07	86.9	1.40	0.867	3.14	A	EL	70.75	0.876	2.07	A	EL	141.49	1.30	0.867	2.41	A	EL	70.75	
		TNT7B	42.000		2.01	84.4	1.40	0.867	3.18	A	EL	70.75	0.876	2.01	A	EL	141.49	1.30	0.867	2.45	A	EL	70.75	
		TNAGRIT4	43.000		1.96	84.3	1.40	0.867	3.07	A	EL	70.75	0.876	1.96	A	EL	141.49	1.30	0.867	2.37	A	EL	70.75	
		TNAGT5A	45.000		1.90	85.5	1.40	0.867	2.92	A	EL	70.75	0.876	1.90	A	EL	141.49	1.30	0.867	2.25	A	EL	70.75	
		TNAGT5B	45.000	3	1.87	84.2	1.40	0.867	2.90	A	EL	70.75	0.876	1.87	A	EL	141.49	1.30	0.867	2.23	A	EL	70.75	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75																				

LOAD FACTORS:

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

	YEAR	ADTT
CURRENT	2010	426
FUTURE	2030	737

NOTES:

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

ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93) **

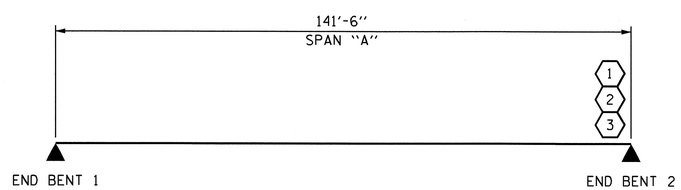
(2) DESIGN LOAD RATING (HS-20) **

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-86
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
7/29/10

STR. #3 STD. NO. LRFR3

ASSEMBLED BY : A.S. CALLAWAY DATE : 5/13/10
CHECKED BY : T.L. CLELLAND DATE : 5/14/10
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08
REV. 11/12/08RR MAA/GM

28-JUL-2010 15:26
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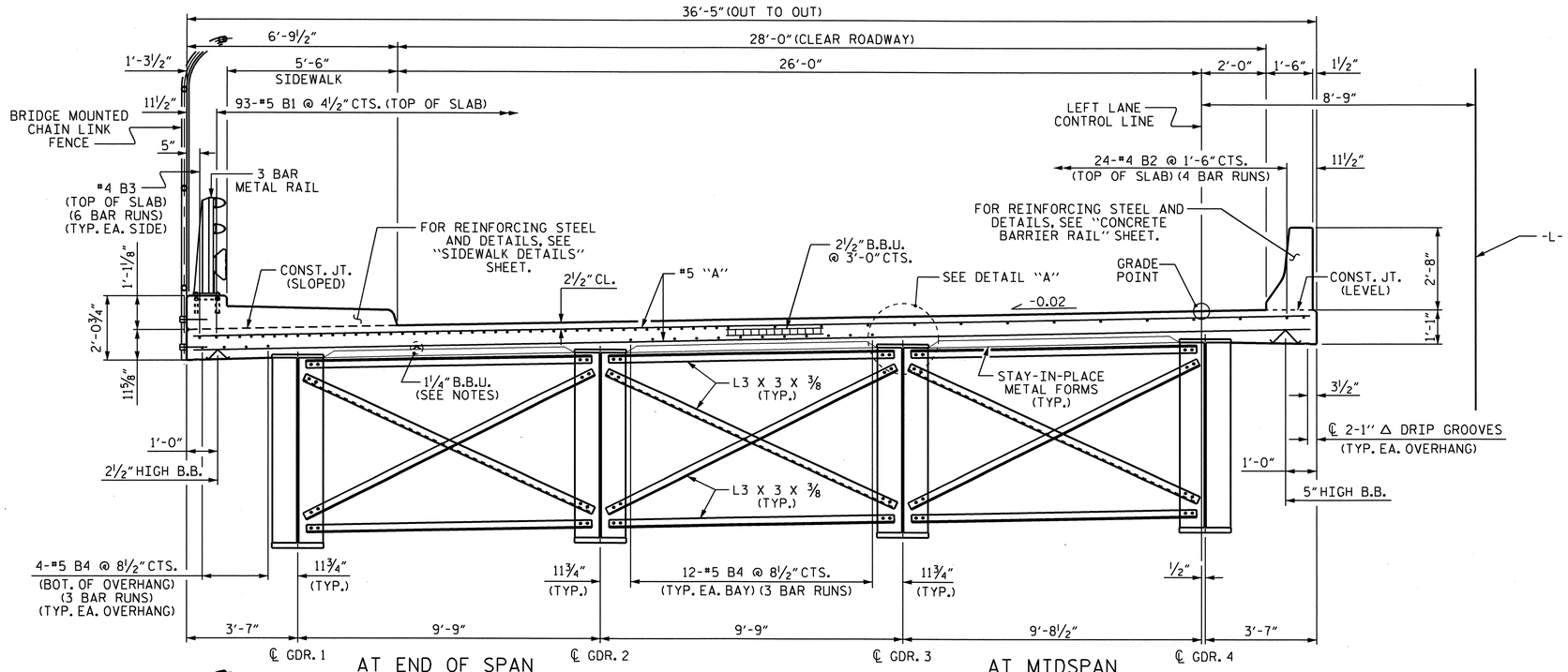
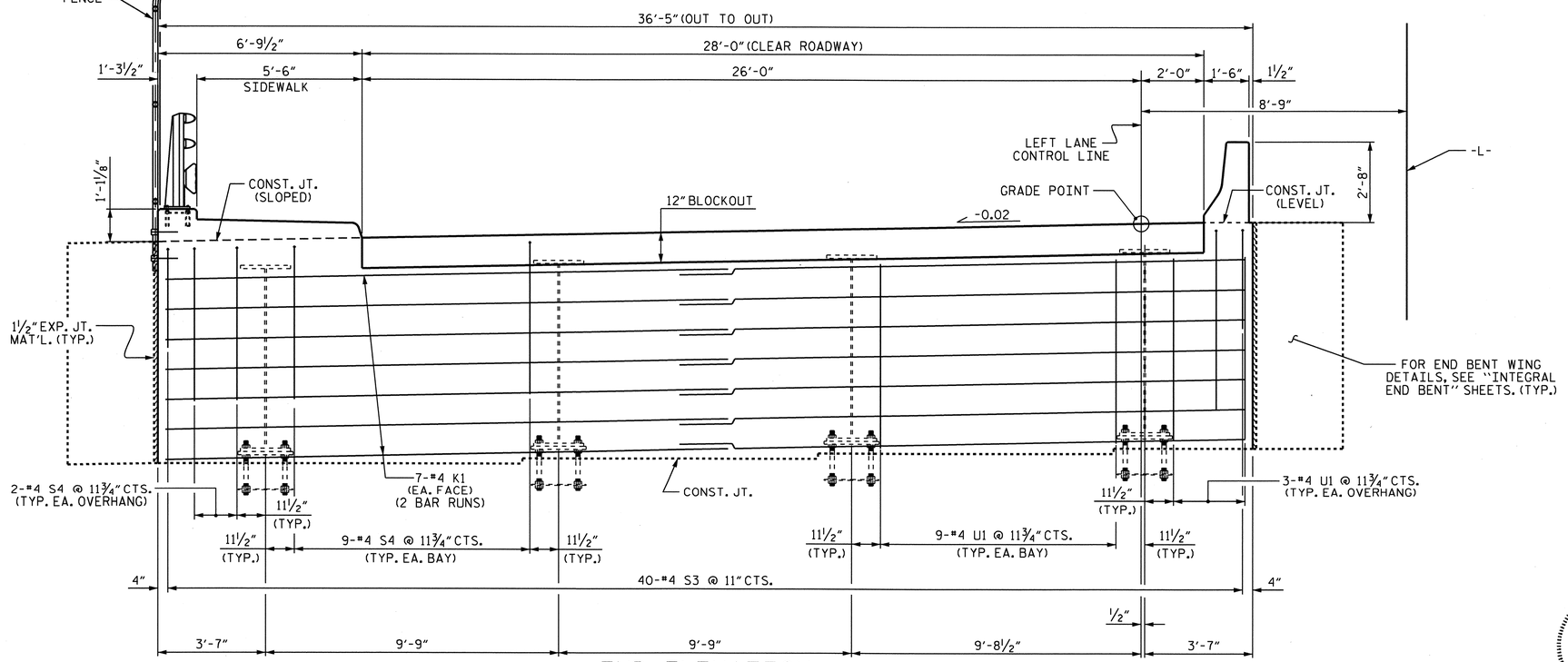


TYPICAL SECTION



END ELEVATION

(END BENT 1 SHOWN, END BENT 2 SIMILAR) (FOR CLARITY, DECK REINFORCING STEEL NOT SHOWN)

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.

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

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

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

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

ALL REINFORCING STEEL IN BARRIER RAIL, SIDEWALK & END POST SHALL BE EXPOXY COATED.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-87
1			3			TOTAL SHEETS
2			4			146

STR. #3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : M.K. BEARD DATE : 5/12/09
CHECKED BY : A.S. CALLAWAY DATE : 7/19/09

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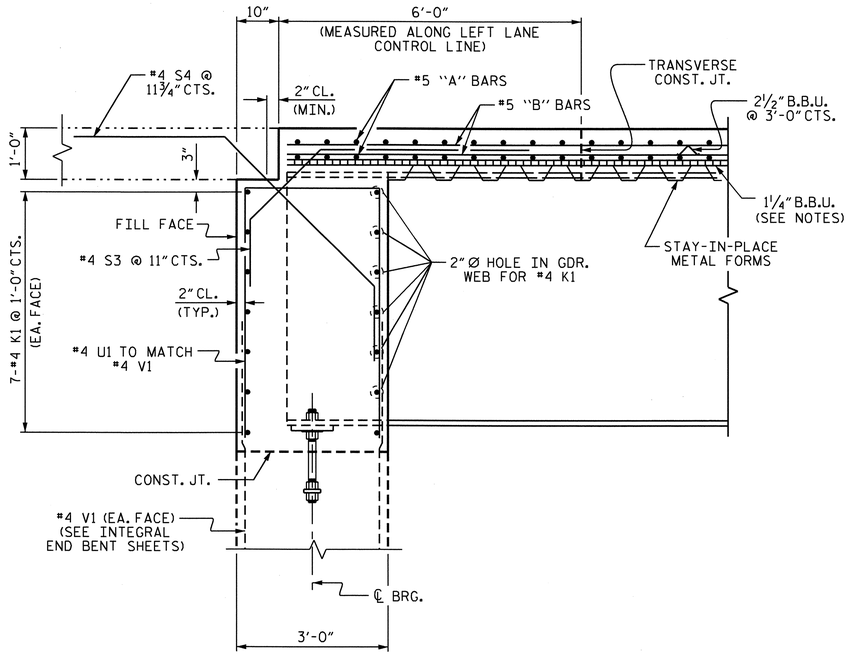
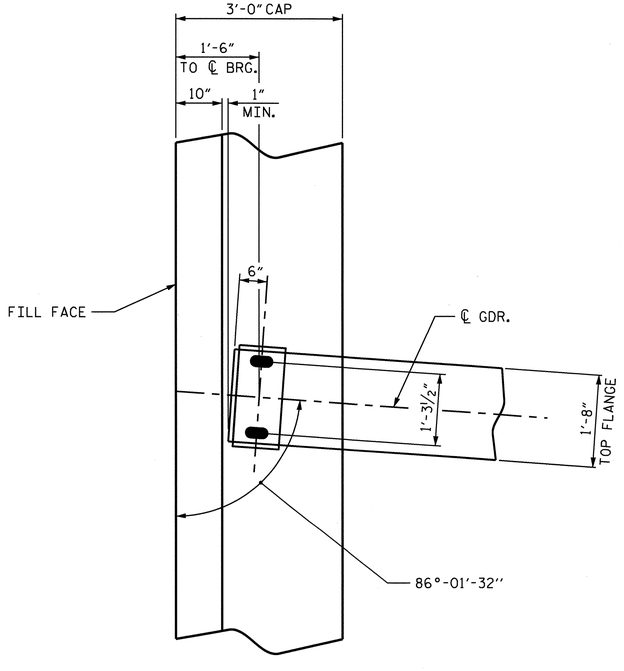
lsutton

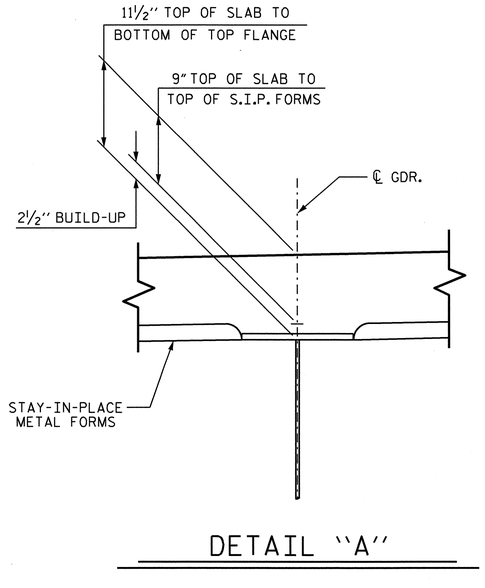


SECTION A-A

(SEE "PLAN OF SPAN" FOR LOCATION)



END BENT LAYOUT



DETAIL "A"

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NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

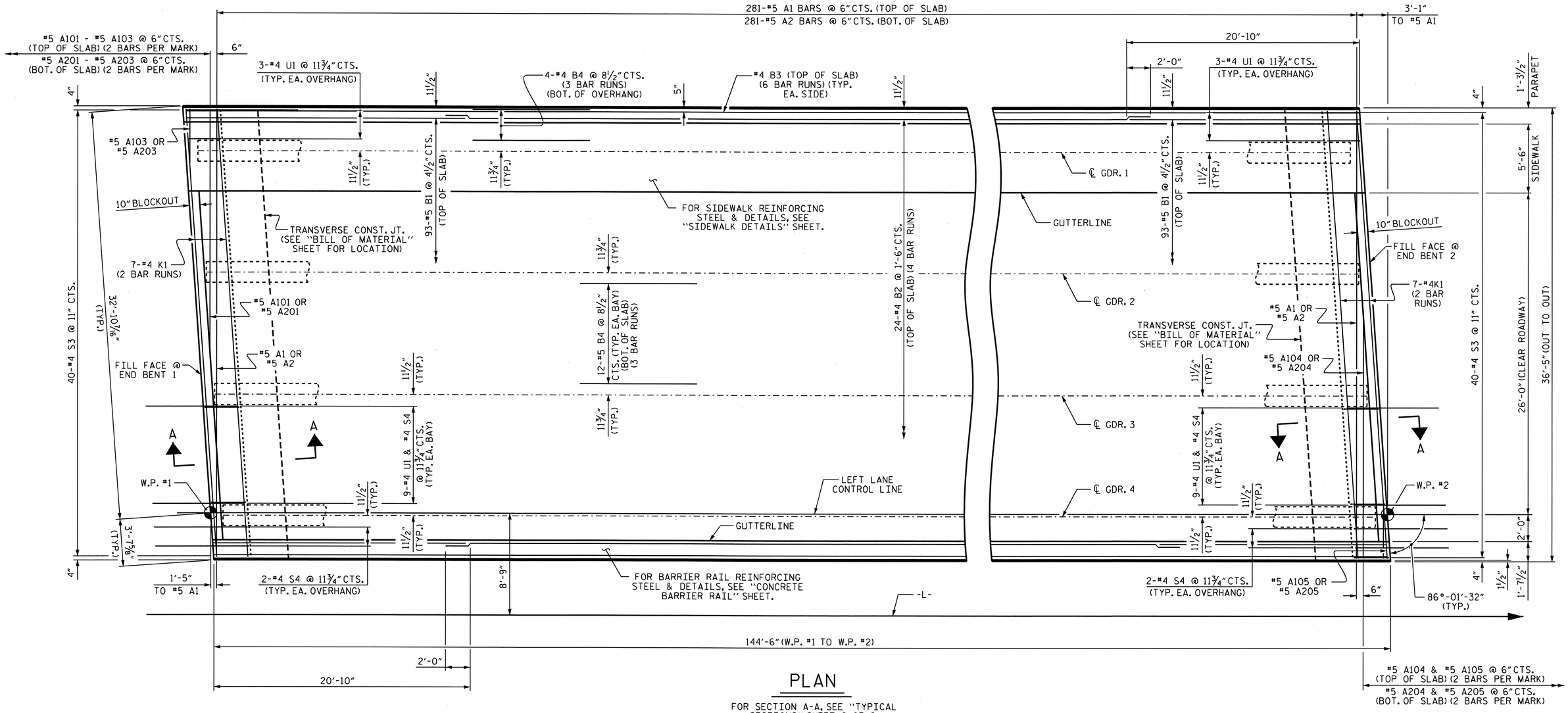
SUPERSTRUCTURE

TYPICAL SECTIONS

— LEFT LANE —

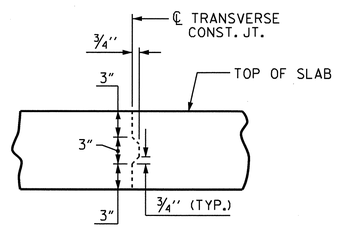
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-88
1			3			TOTAL SHEETS
2			4			146

STR. #3



PLAN

FOR SECTION A-A, SEE "TYPICAL SECTIONS" SHEET 2 OF 2.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-89
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

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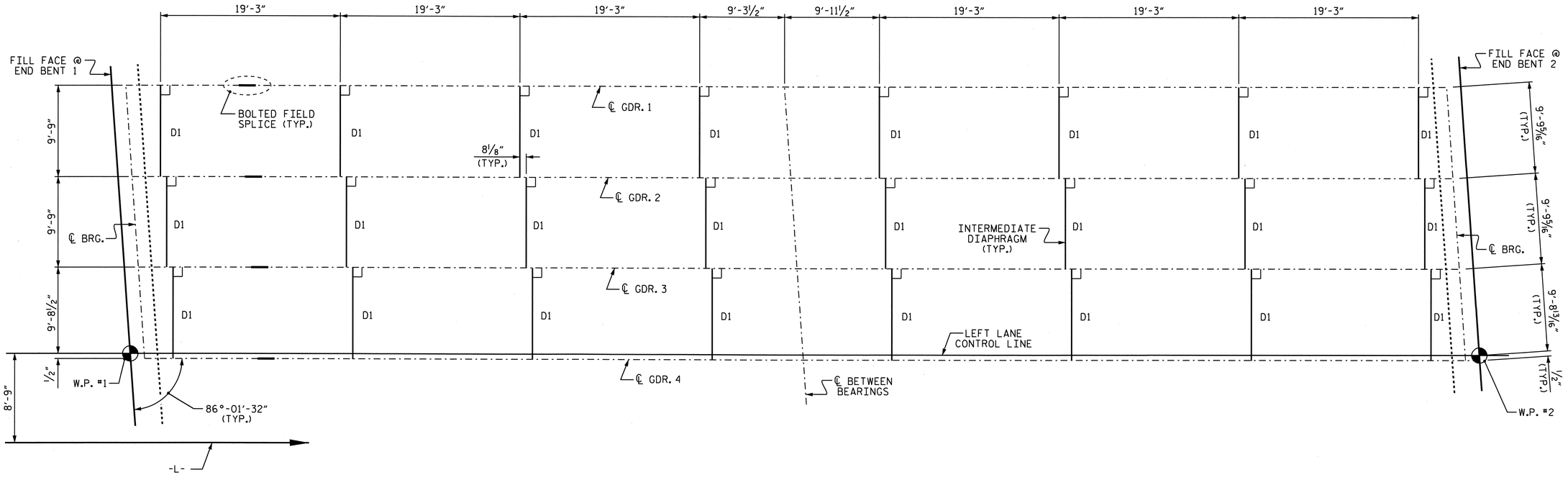
STR. #3

FIX.
P1, P2



FRAMING PLAN

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-90
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

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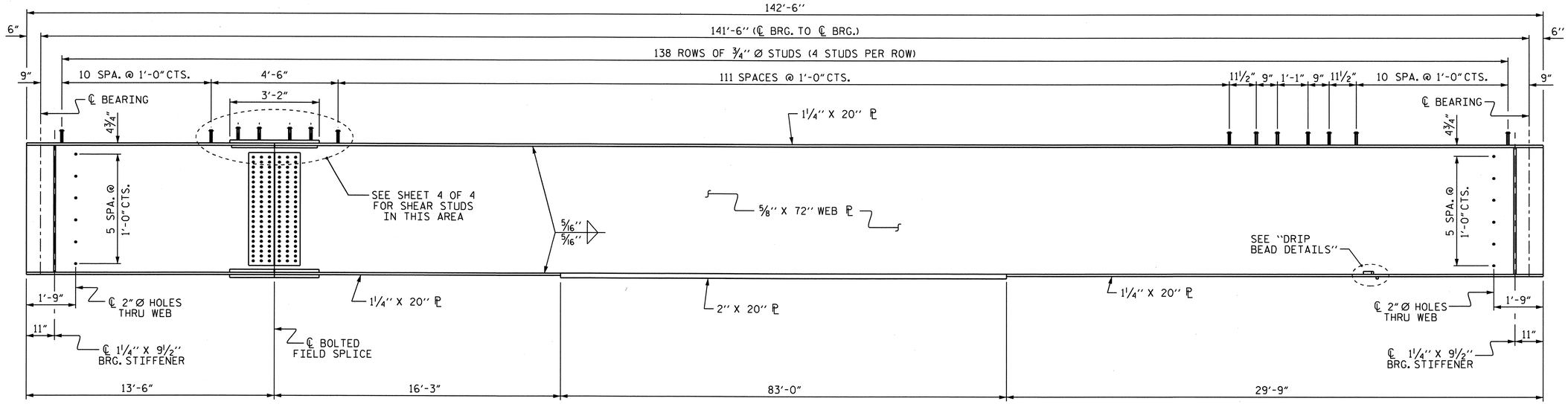
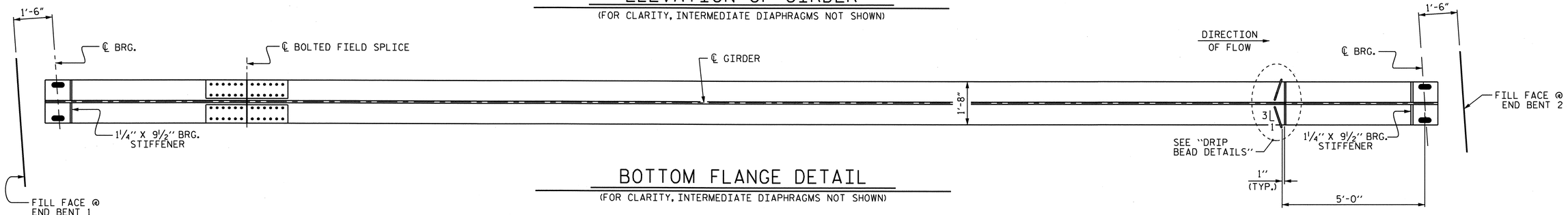


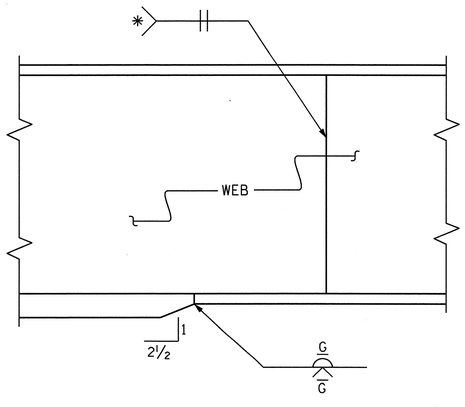
ELEVATION OF GIRDER

(FOR CLARITY, INTERMEDIATE DIAPHRAGMS NOT SHOWN)



BOTTOM FLANGE DETAIL

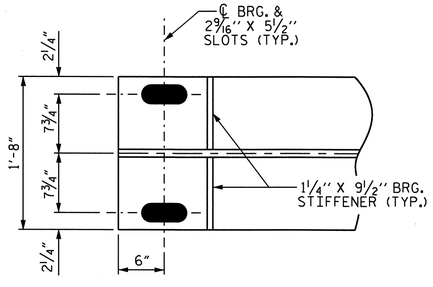
(FOR CLARITY, INTERMEDIATE DIAPHRAGMS NOT SHOWN)



ELEVATION

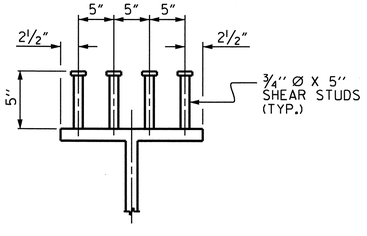
TYPICAL FLANGE AND WEB BUTT JOINT

* GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR GIRDERS

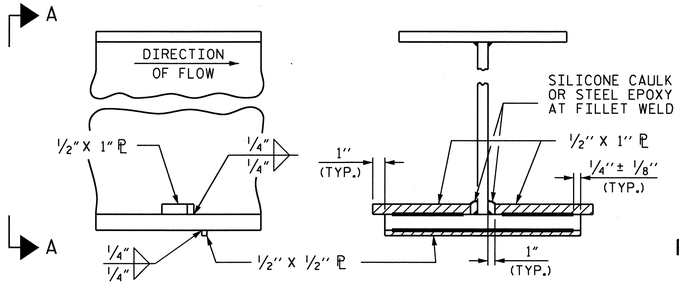


END OF GIRDER DETAIL

(BOTTOM FLANGE ONLY)



SHEAR STUD DETAIL



SECTION VIEW A-A

DRIP BEAD DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— LEFT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-91
1			3			TOTAL SHEETS
2			4			146

STR. #3

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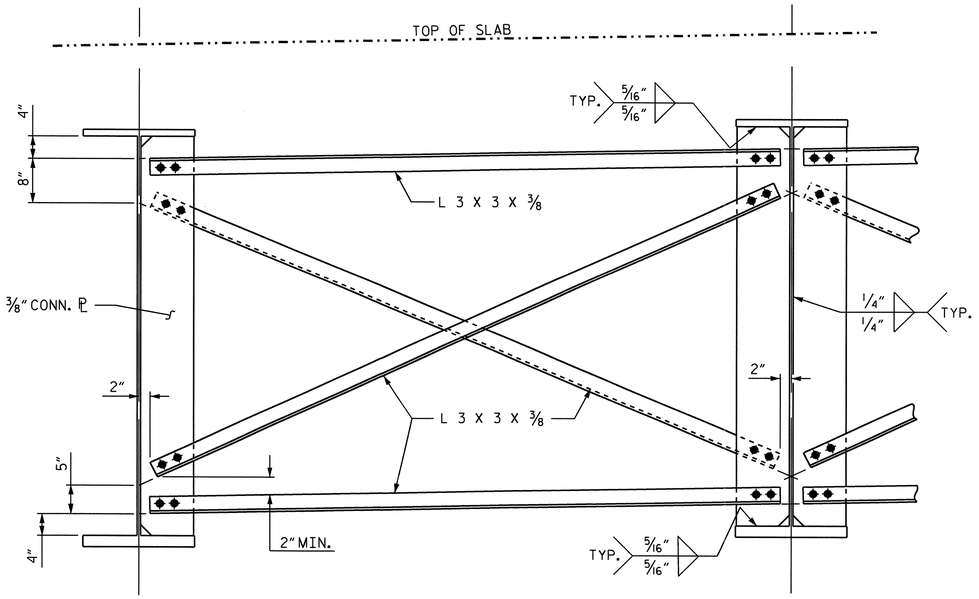
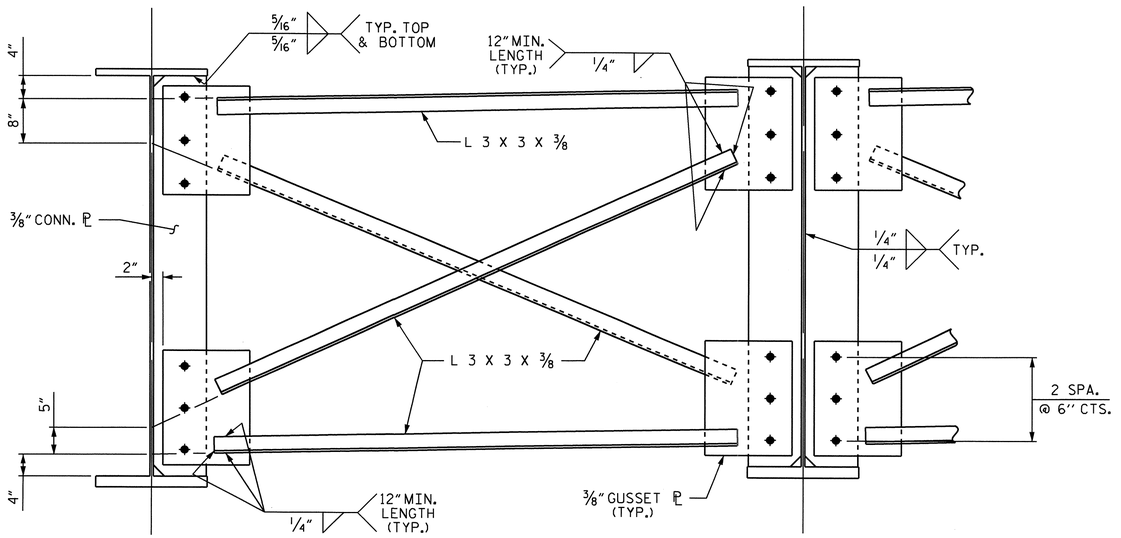


INTERMEDIATE CROSSFRAME (D1)



"OPTIONAL" INTERMEDIATE CROSSFRAME

NOTES:

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" Ø HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED. FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

A CHARPY V-NOTCH TEST IS REQUIRED FOR WEB PLATES, TOP FLANGE PLATES WITHIN 15' OF THE END OF THE GIRDER, BOTTOM FLANGE PLATES, BOTTOM FLANGE SPLICE PLATES AND WEB SPLICE PLATES (IF USED) FOR ALL GIRDERS AND IN ACCORDANCE WITH ARTICLE 1072-9 OF THE STANDARD SPECIFICATIONS.

SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS. FOR DIRECT TENSION INDICATORS, SEE SPECIAL PROVISIONS.

END OF GIRDERS SHALL BE PLUMB.

SOLE PLATES, ANCHORAGE PLATES, AND STRUCTURAL PLATE WASHERS SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND STANDARD WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

TOP NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AFTER SETTING THE GIRDERS, AND SUBSEQUENTLY FULLY TIGHTENED JUST PRIOR TO THE FINAL POUR.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— LEFT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 9804 ENGINEER M.K. GIRDLEY
9-30-10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-92
1			3			TOTAL SHEETS
2			4			146

STR. #3

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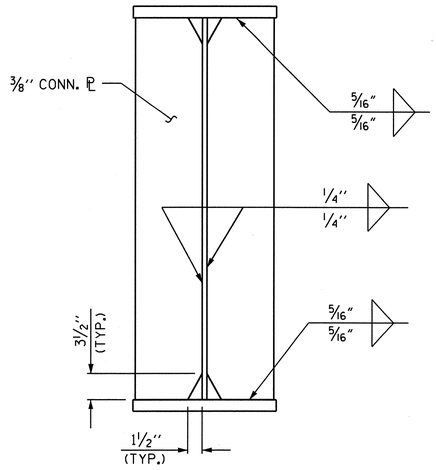
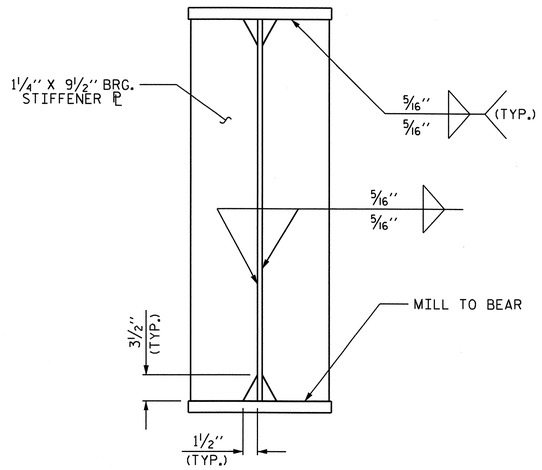
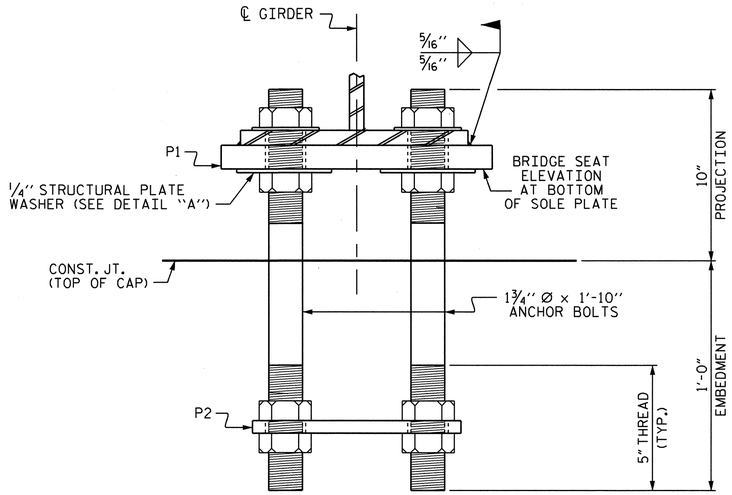


CONNECTOR PLATE

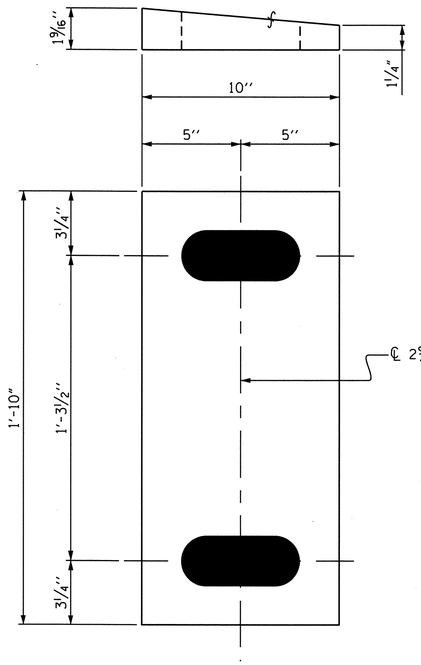


BEARING STIFFENER PLATE

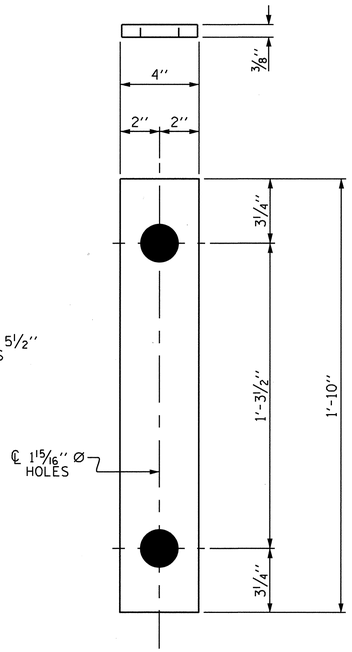


END VIEW
FIXED

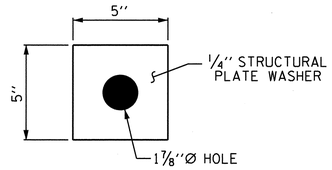
UP-STATION



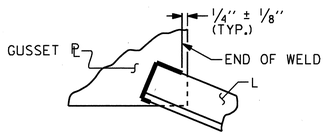
SOLE PLATE (P1)
(8 REQ'D)



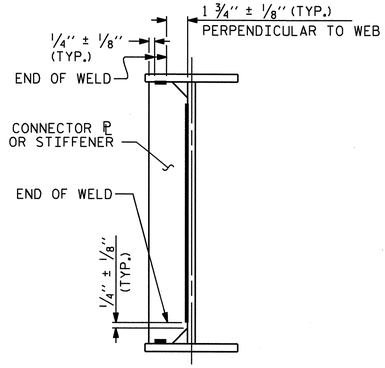
ANCHORAGE PLATE (P2)
(8 REQ'D)



DETAIL "A"



TYPICAL ANGLE TO GUSSET PLATE CONNECTION



TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS

WELD TERMINATION DETAILS

BEARING DETAILS

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
STRUCTURAL STEEL DETAILS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-93
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/30/10

STR. #3

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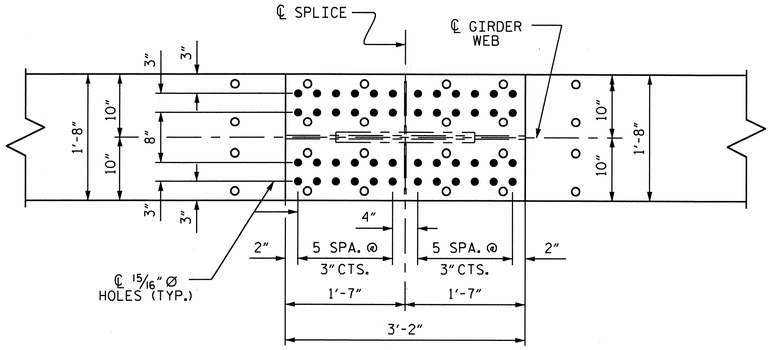
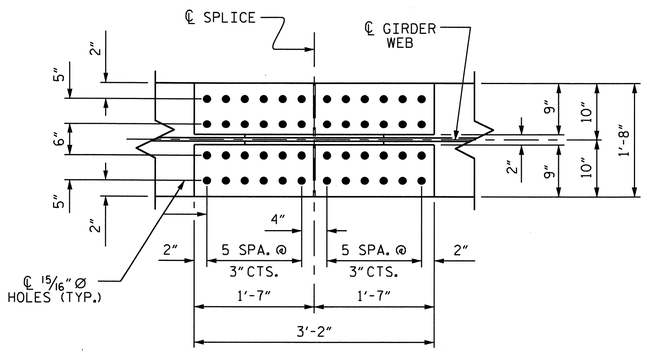
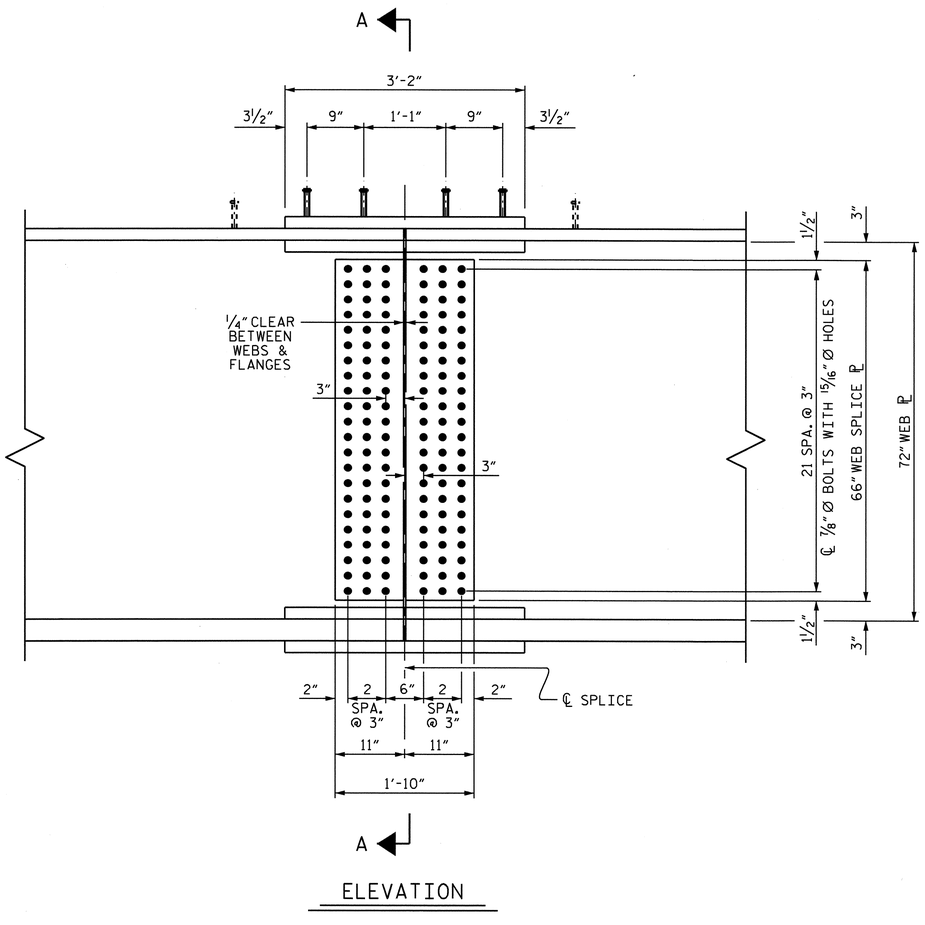


PLAN (TOP OF TOP FLANGE)

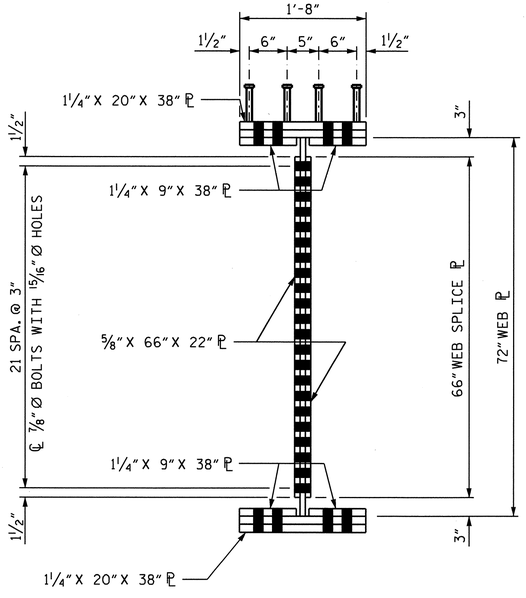


PLAN (TOP OF BOTTOM FLANGE)

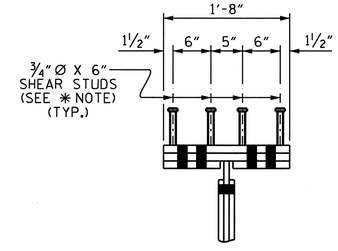
DESCRIPTION	SIZE	NO. REQ'D. FOR ONE FIELD SPLICE	TOTAL REQ'D.
WEB SPLICE ℄	5/8" X 66" X 22"	2	8
TOP FLANGE SPLICE ℄ (TOP OF FLANGE)	1 1/4" X 20" X 38"	1	4
TOP FLANGE SPLICE ℄ (BOTTOM OF FLANGE)	1 1/4" X 9" X 38"	2	8
BOTTOM FLANGE SPLICE ℄ (TOP OF FLANGE)	1 1/4" X 9" X 38"	2	8
BOTTOM FLANGE SPLICE ℄ (BOTTOM OF FLANGE)	1 1/4" X 20" X 38"	1	4



ELEVATION



SECTION A-A



SHEAR STUD DETAIL
FOR TOP FLANGE SPLICE PLATE

* NOTE: SHEAR STUDS ARE TO BE WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY.

BOLTED FIELD SPLICE DETAILS

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
STRUCTURAL STEEL DETAILS
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-94
1			3			TOTAL SHEETS
2			4			146

STR. #3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

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DEAD LOAD DEFLECTION TABLE FOR GIRDERS

SPAN A

GIRDER 1

TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.045	0.057	0.068	0.078	0.085	0.091	0.094	0.095	0.094	0.091	0.085	0.078	0.068	0.057	0.045	0.031	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.034	0.085	0.133	0.175	0.213	0.244	0.270	0.288	0.299	0.303	0.299	0.288	0.270	0.244	0.213	0.175	0.133	0.085	0.034	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK	0	0.009	0.018	0.027	0.034	0.041	0.047	0.051	0.055	0.057	0.057	0.057	0.055	0.051	0.047	0.041	0.034	0.027	0.018	0.009	0
TOTAL DEAD LOAD DEFLECTION	0	0.059	0.134	0.205	0.266	0.322	0.369	0.406	0.434	0.450	0.455	0.450	0.434	0.406	0.369	0.322	0.266	0.205	0.134	0.059	0
REQUIRED CAMBER	0	11/16"	1 5/8"	2 7/16"	3 3/16"	3 7/8"	4 7/16"	4 7/8"	5 3/16"	5 3/8"	5 7/16"	5 3/8"	5 3/16"	4 7/8"	4 7/16"	3 7/8"	3 3/16"	2 7/16"	1 5/8"	11/16"	0

GIRDERS 2 & 3

TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.046	0.059	0.070	0.080	0.088	0.093	0.097	0.098	0.097	0.093	0.088	0.080	0.070	0.059	0.046	0.031	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.035	0.087	0.136	0.179	0.217	0.250	0.275	0.294	0.306	0.309	0.306	0.294	0.275	0.250	0.217	0.179	0.136	0.087	0.035	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK & BARRIER RAIL	0	0.009	0.018	0.027	0.034	0.041	0.047	0.051	0.054	0.056	0.057	0.056	0.054	0.051	0.047	0.041	0.034	0.027	0.018	0.009	0
TOTAL DEAD LOAD DEFLECTION	0	0.060	0.136	0.209	0.272	0.328	0.377	0.414	0.441	0.459	0.464	0.459	0.441	0.414	0.377	0.328	0.272	0.209	0.136	0.060	0
REQUIRED CAMBER	0	3/4"	1 5/8"	2 1/2"	3 1/4"	3 15/16"	4 1/2"	4 15/16"	5 5/16"	5 1/2"	5 9/16"	5 1/2"	5 5/16"	4 15/16"	4 1/2"	3 15/16"	3 1/4"	2 1/2"	1 5/8"	3/4"	0

GIRDER 4

TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.045	0.057	0.068	0.078	0.085	0.091	0.094	0.095	0.094	0.091	0.085	0.078	0.068	0.057	0.045	0.031	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.034	0.085	0.133	0.175	0.213	0.244	0.270	0.288	0.299	0.303	0.299	0.288	0.270	0.244	0.213	0.175	0.133	0.085	0.034	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.004	0.007	0.010	0.013	0.015	0.017	0.019	0.020	0.021	0.021	0.021	0.020	0.019	0.017	0.015	0.013	0.010	0.007	0.004	0
TOTAL DEAD LOAD DEFLECTION	0	0.054	0.123	0.188	0.245	0.296	0.339	0.374	0.399	0.414	0.419	0.414	0.399	0.374	0.339	0.296	0.245	0.188	0.123	0.054	0
REQUIRED CAMBER	0	5/8"	1 1/2"	2 1/4"	2 15/16"	3 9/16"	4 1/16"	4 1/2"	4 13/16"	4 15/16"	5"	4 15/16"	4 13/16"	4 1/2"	4 1/16"	3 9/16"	2 15/16"	2 1/4"	1 1/2"	5/8"	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— LEFT LANE —

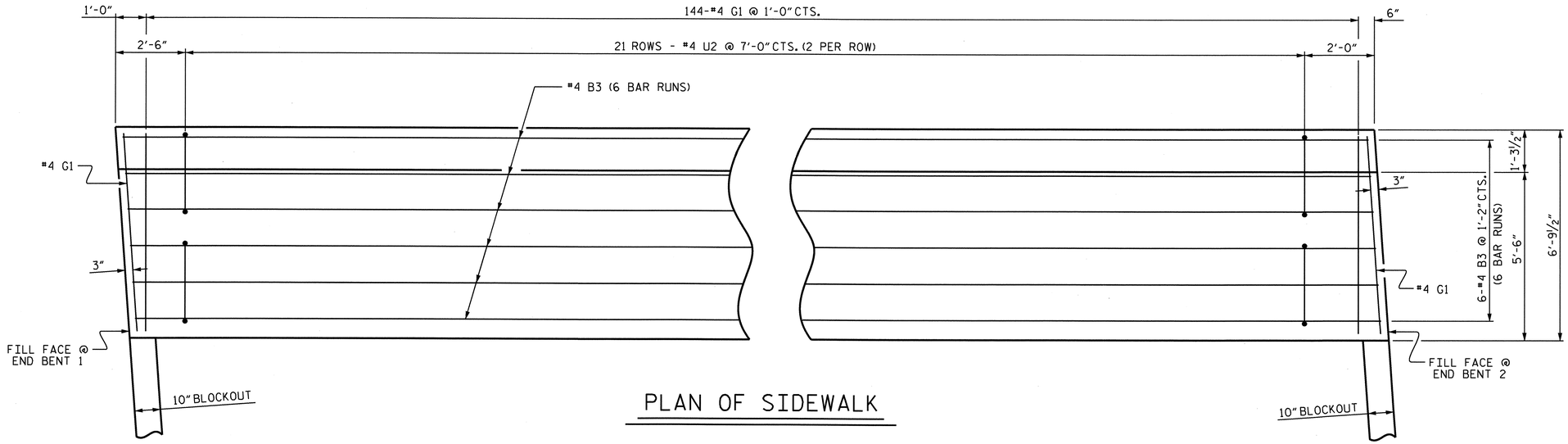
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-95
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

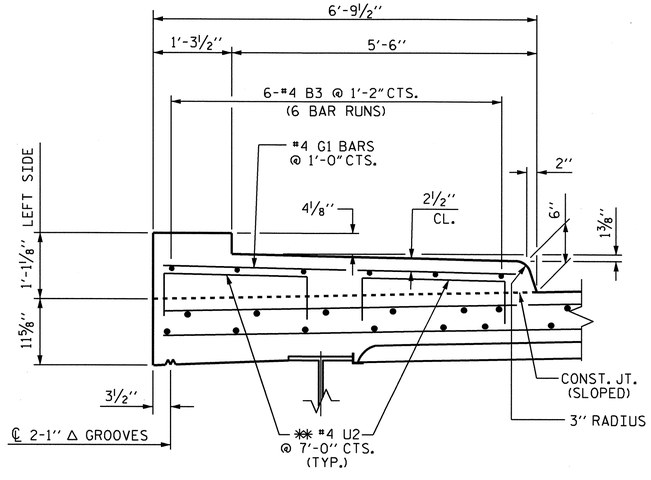
DRAWN BY : M.K. BEARD DATE : 4/27/09
CHECKED BY : A.S. CALLAWAY DATE : 7/19/09

28-JUL-2010 15:26
R:\Structures\str03\scallaway\Microstation\U3110B_sd_DL_03.dgn
lsutton

STR. #3



PLAN OF SIDEWALK



SECTION THRU SIDEWALK

** #4 U2 MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

NOTES

ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.

FOR SIDEWALK QUANTITIES, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET. THE PAYMENT FOR THE SIDEWALK SHALL BE INCLUDED IN THE SQUARE FOOT PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

FOR SIDEWALK COVER PLATE DETAILS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEETS.

GROOVED CONTRACTION JOINTS ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SIDEWALK DETAILS

— LEFT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-96
1			3			TOTAL SHEETS
2			4			146

STR. #3

DRAWN BY : M.K. BEARD DATE : 5/12/09
CHECKED BY : A.S. CALLAWAY DATE : 7/19/09

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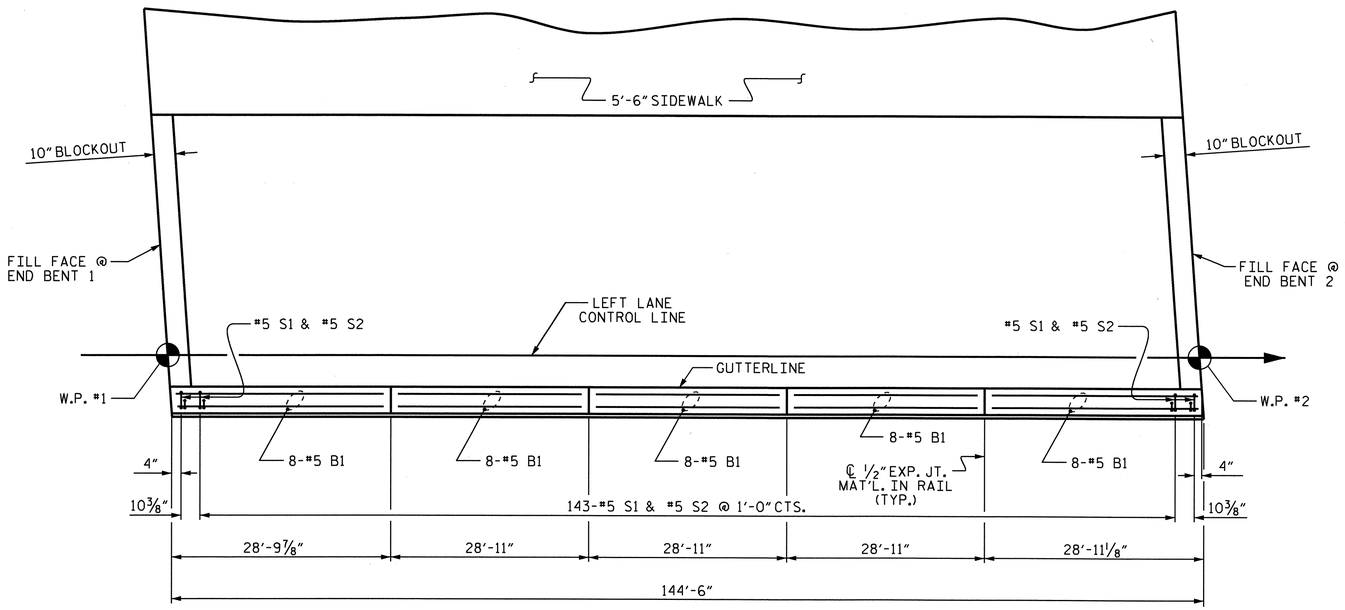


PLAN

NOTES

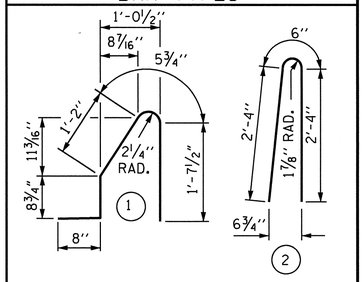
THE BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 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.

THE #5 S1 AND #5 S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, IN ORDER TO MAINTAIN 2" MIN. CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL.

BAR TYPES

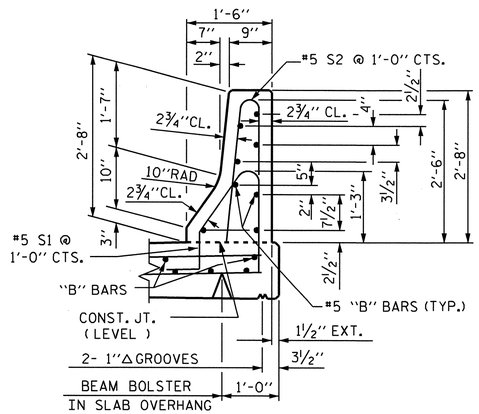


ALL BAR DIMENSIONS ARE OUT TO OUT.

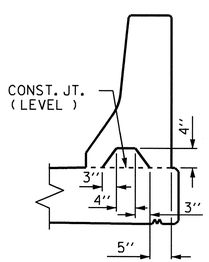
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

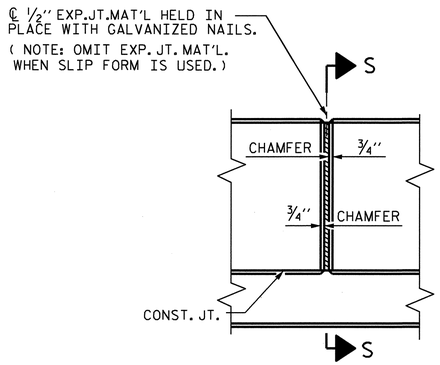
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	40	#5	STR	28'-6"	1189
* S1	145	#5	1	4'-8"	706
* S2	145	#5	2	5'-2"	781
* EPOXY COATED REINFORCING STEEL				LBS.	2,676
CLASS AA CONCRETE				CU. YDS.	14.5
CONCRETE BARRIER RAIL				LIN. FT.	144.50



SECTION THRU RAIL



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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE BARRIER RAIL
— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-97
1			3			TOTAL SHEETS
2			4			146

STR. #3 STD. NO. CBR1

ASSEMBLED BY : M.K. BEARD		DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY		DATE : 7/19/09
DRAWN BY : ARB 5/87	REV. 10/17/00	RWW/LES
CHECKED BY : SJD 9/87	REV. 5/7/03R	RWW/JTE
	REV. 5/1/06R	TLA/GM

28-JUL-2010 15:26
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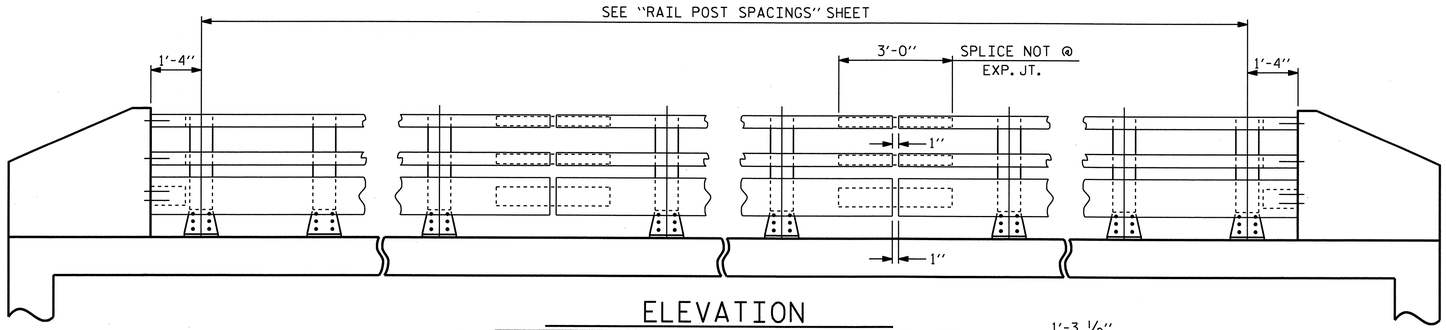
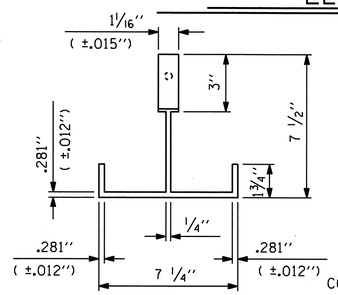
lsutton

NORTH CAROLINA PROFESSIONAL SEAL 21838 ENGINEER LAURA E. SUTTON
7/29/10

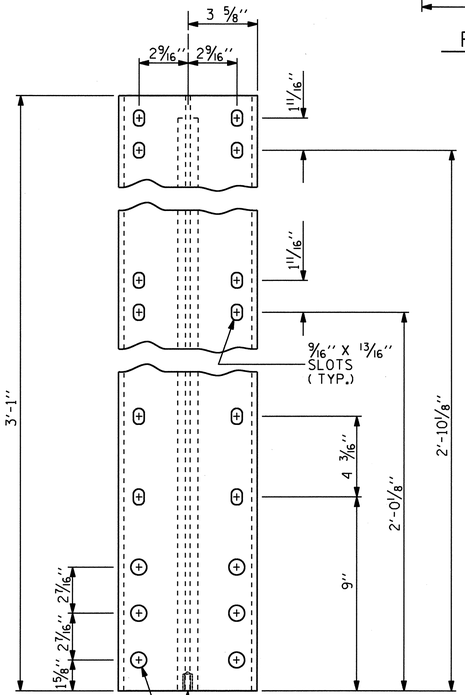


ELEVATION

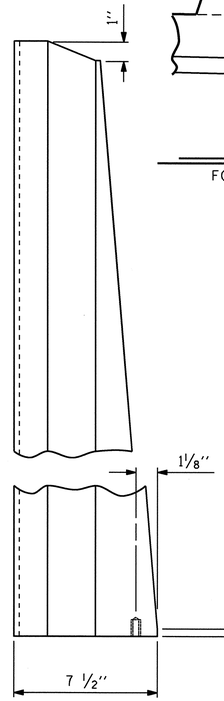
NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.



PLAN

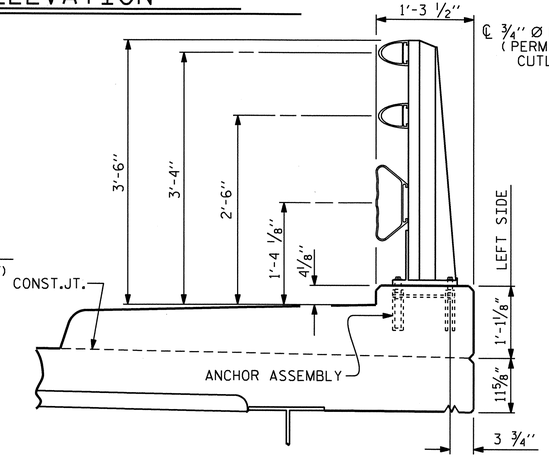


FRONT ELEVATION



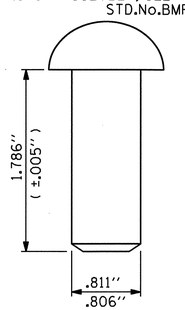
SIDE ELEVATION

DETAILS OF POST

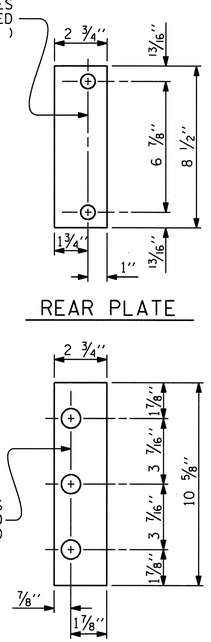


SECTION THRU RAIL

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6



RIVET DETAIL

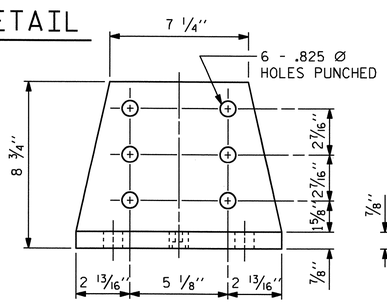


REAR PLATE

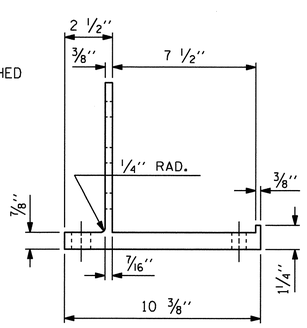
FRONT PLATE

SHIM DETAILS

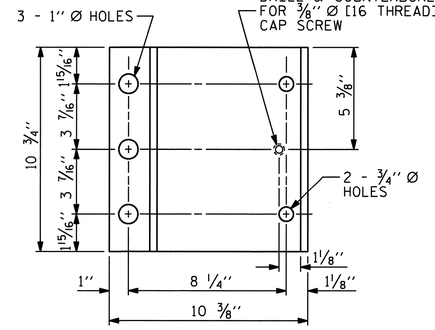
NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



FRONT ELEVATION



SIDE ELEVATION



PLAN

POST BASE DETAILS

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6.

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

PAY LENGTH = 136.92 LIN. FT.

NORTH CAROLINA PROFESSIONAL SEAL 21838 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-98
1			3			TOTAL SHEETS
2			4			146

STR. #3

STD. NO. BMR5

ASSEMBLED BY : M.K. BEARD		DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY		DATE : 7/19/09
DRAWN BY : JMB 1/88	REV. 10/17/00	RWW/LES
CHECKED BY : GGH 1/88	REV. 5/7/03	RWW/JTE
	REV. 5/1/06	TLA/GM

28-JUL-2010 15:26
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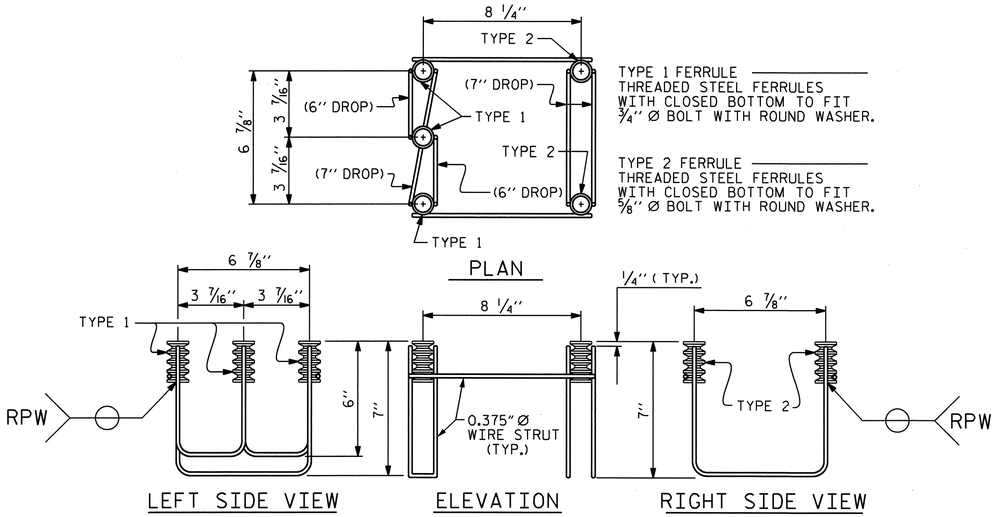
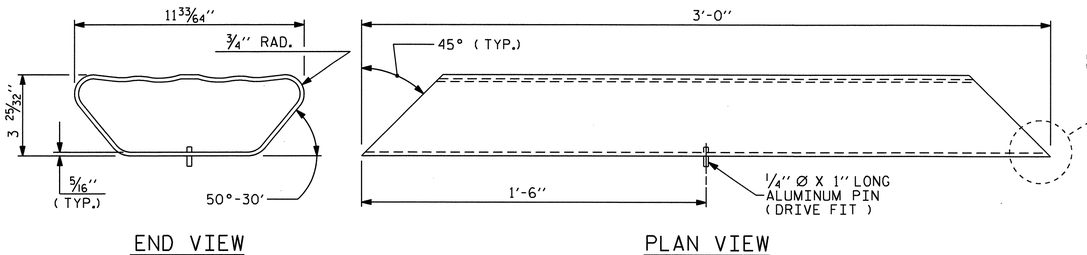
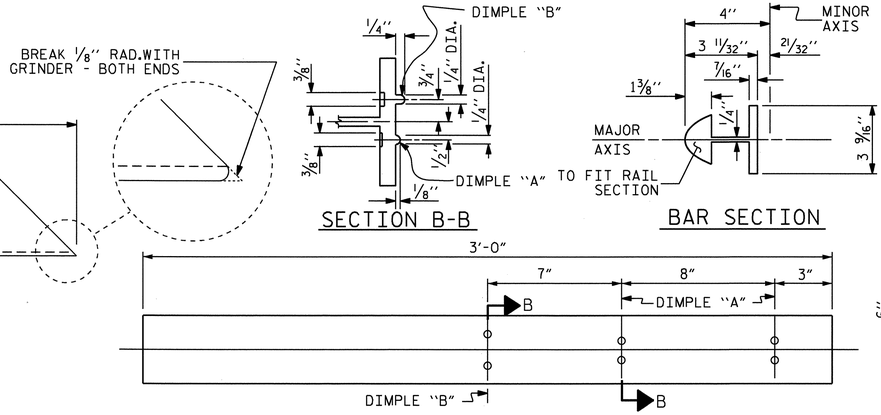


5-BOLT METAL RAIL ANCHOR ASSEMBLY

(24 ASSEMBLIES REQUIRED)

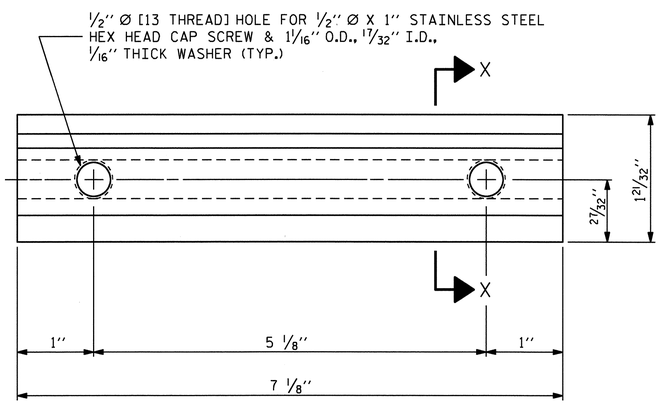


BOTTOM RAIL EXPANSION BAR

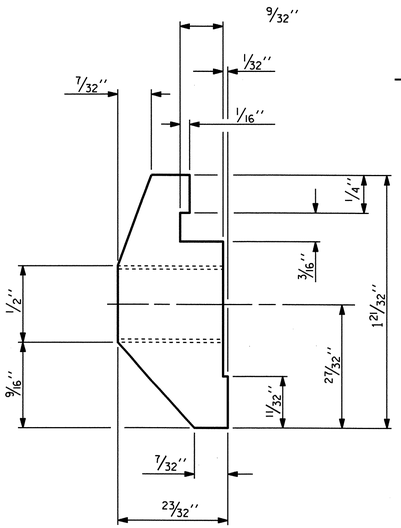


BACK ELEVATION

TOP & MIDDLE RAIL EXPANSION BAR



ELEVATION



SECTION X-X

CLAMP BAR DETAIL

(6 REQUIRED PER POST)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 3/4" FOR 5/8" FERRULES.

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

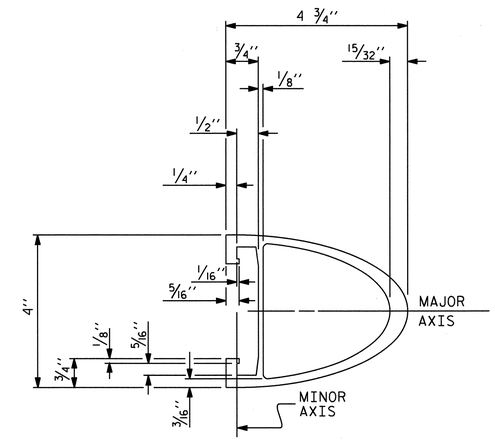
C. 2 - 5/8" Ø X 2 1/4" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 5/8" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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

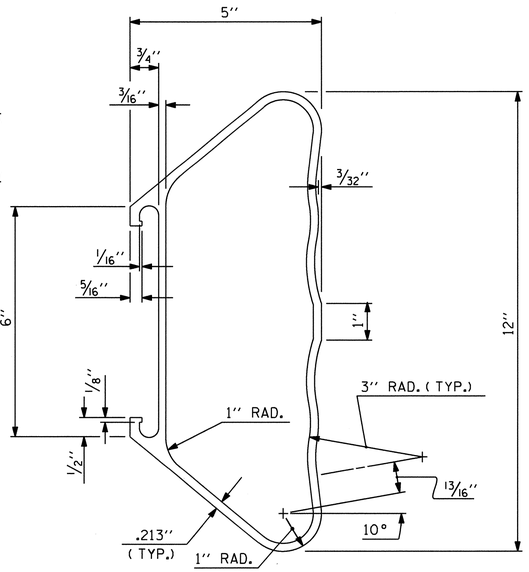
E. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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

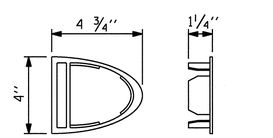
G. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.



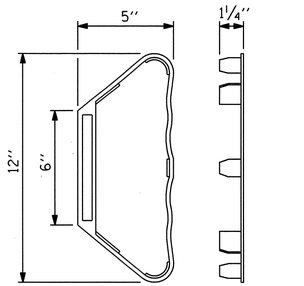
TOP & MIDDLE RAIL SECTION



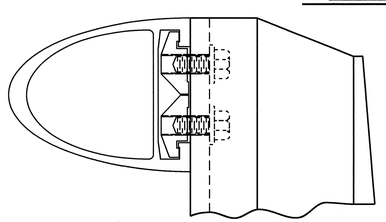
BOTTOM RAIL SECTION



TOP & MIDDLE RAIL CAP



BOTTOM RAIL CAP



CLAMP ASSEMBLY

TOP RAIL SHOWN
(MIDDLE & BOTTOM RAIL ARE SIMILAR)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— LEFT LANE —

ASSEMBLED BY : M.K. BEARD	DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY	DATE : 7/19/09
DRAWN BY : JMB 1/88	REV. 7/10/01 RWW/LES
CHECKED BY : GGH 1/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-99
1			3			TOTAL SHEETS
2			4			146

STR. #3

STD. NO. BMR6

29-JUL-2010 15:42
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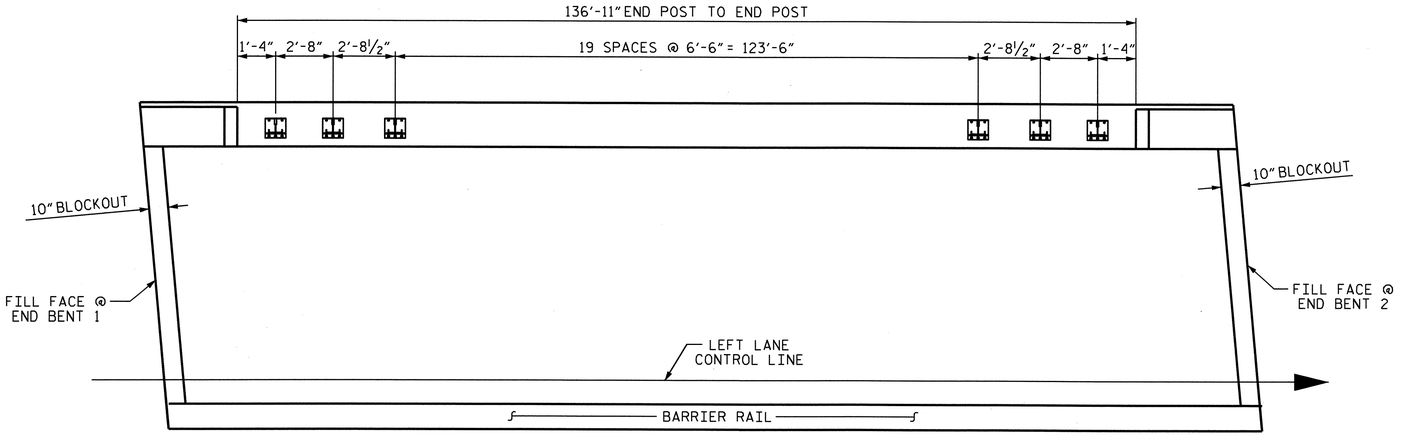
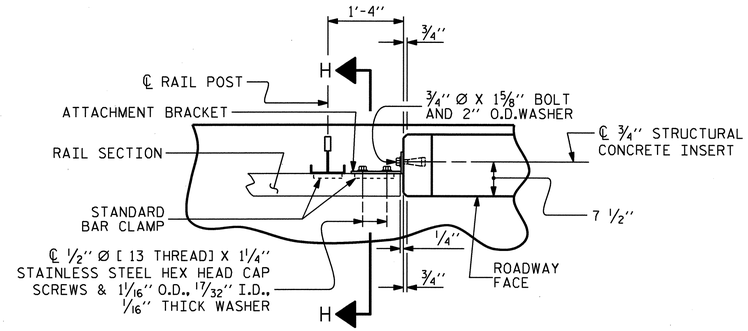
lsutton

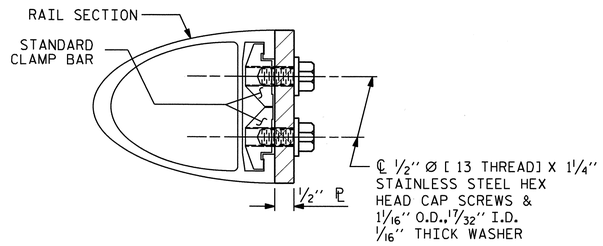


PLAN OF RAIL POST SPACING



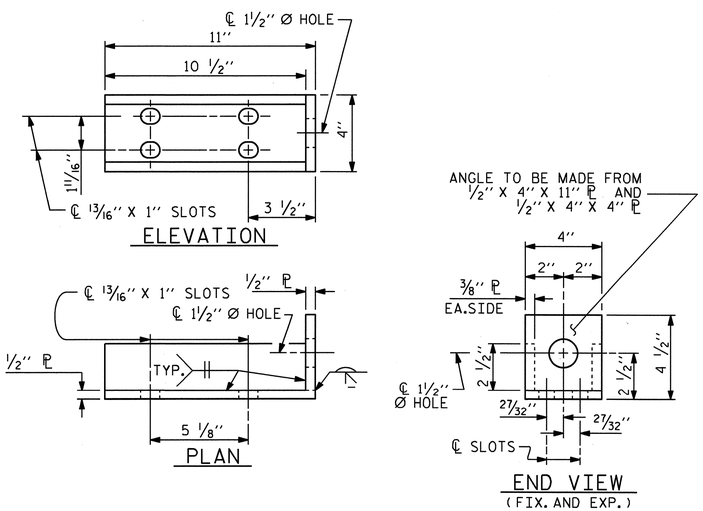
PLAN OF RAIL AND END POST

(STIFFENER ON ½" ℙ NOT SHOWN FOR CLARITY)



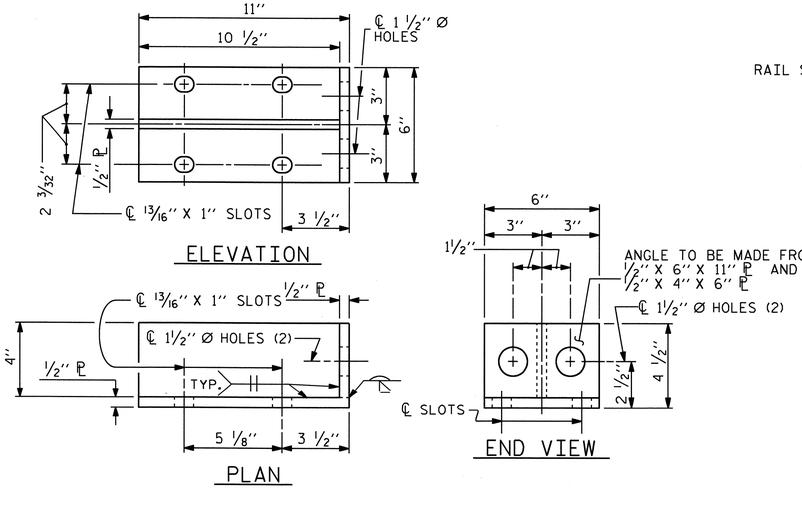
SECTION H-H

(FOR TOP & MIDDLE RAIL)



DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)



DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)

NOTES

METAL RAIL TO END POST CONNECTION

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

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

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

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

D. STANDARD CLAMP BARS (STD. No. BMR6).

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.

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

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

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

NOTES

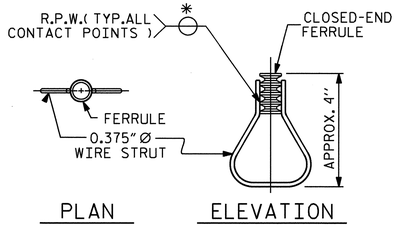
STRUCTURAL CONCRETE INSERT

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

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

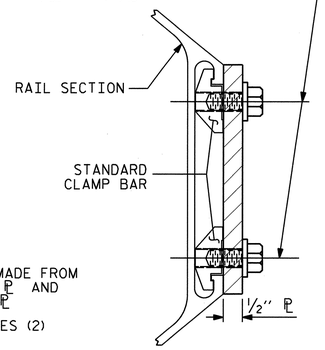
B. 1 - ¾" Ø X 1⅝" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø X 1⅝" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL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

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



STRUCTURAL CONCRETE INSERT

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



SECTION H-H

(FOR BOTTOM RAIL)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-100
1			3			TOTAL SHEETS
2			4			146

STR. #3

STD. NO. BMR7

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/21/10

ASSEMBLED BY : M.K. BEARD		DATE : 5/5/09	
CHECKED BY : A.S. CALLAWAY		DATE : 7/19/09	
DRAWN BY : JMB	1/88	REV. 7/10/01	RWW/LES
CHECKED BY : GGH	1/88	REV. 5/7/03	RWW/JTE
		REV. 5/1/06	TLA/GM

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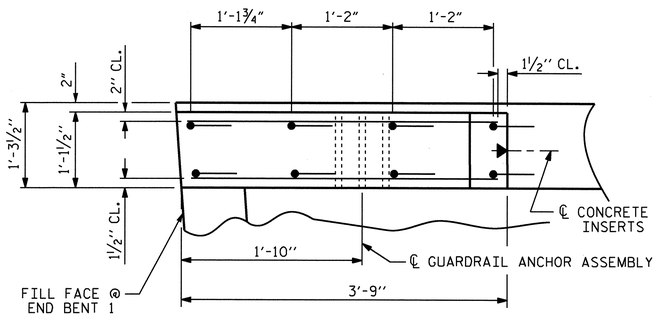
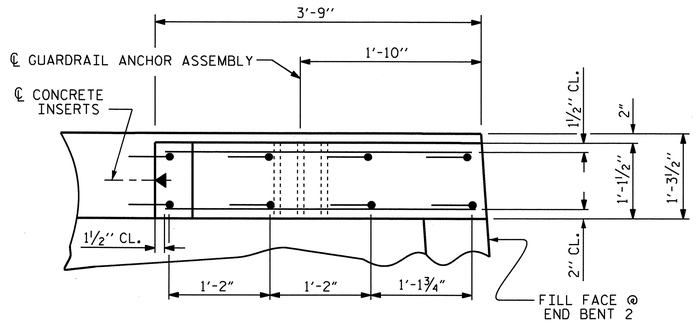
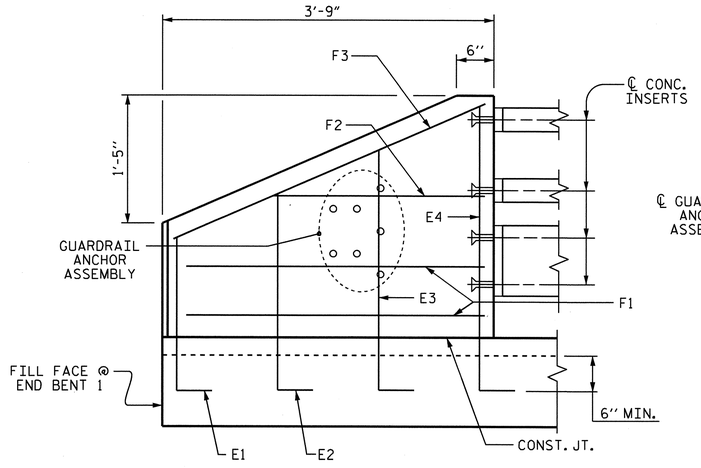
NOTE:

QUANTITIES FOR THE END POSTS ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL.

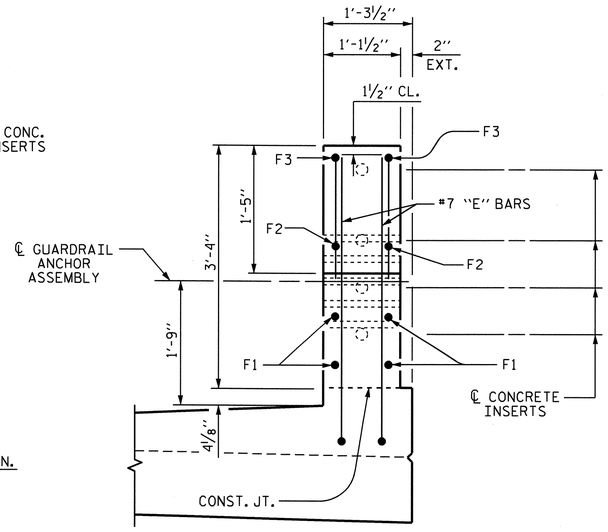




PLAN



ELEVATION



END VIEW

END POST DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

RAIL POST SPACINGS AND END OF RAIL DETAILS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-101
1			3			TOTAL SHEETS
2			4			146

STR. #3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : M.K. BEARD DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY DATE : 7/19/09

28-JUL-2010 15:26
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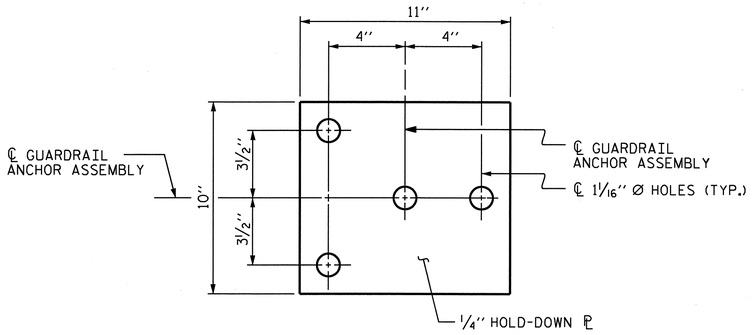
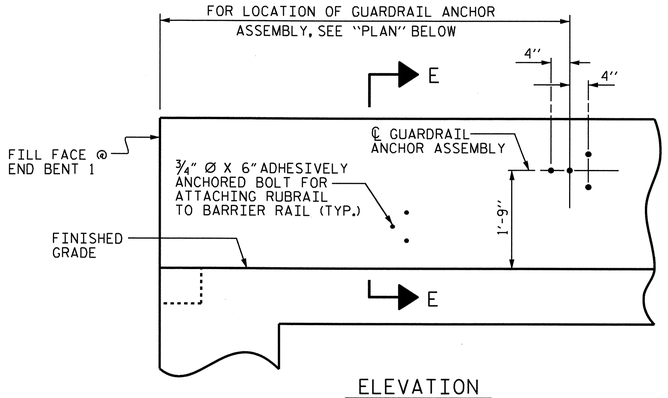
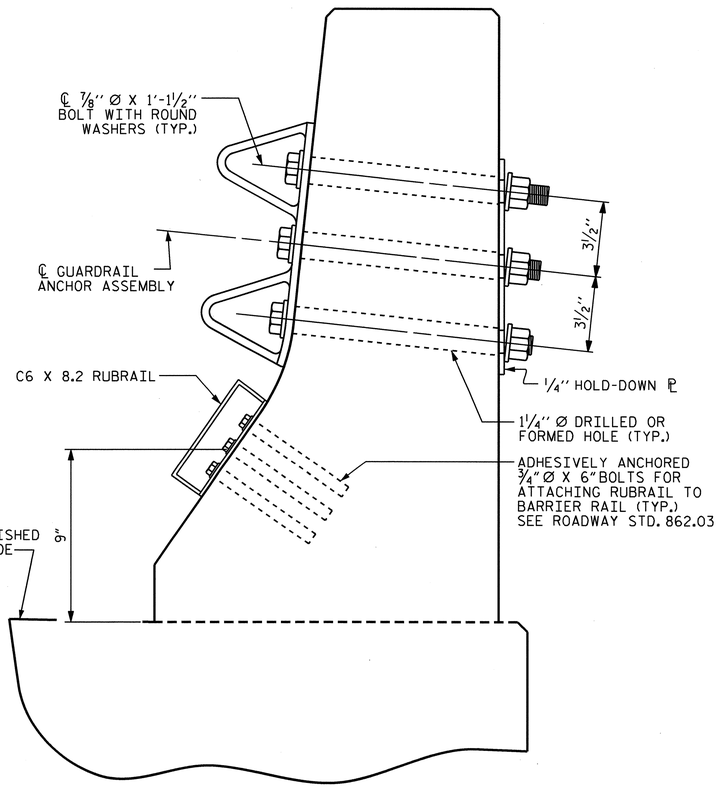


PLAN



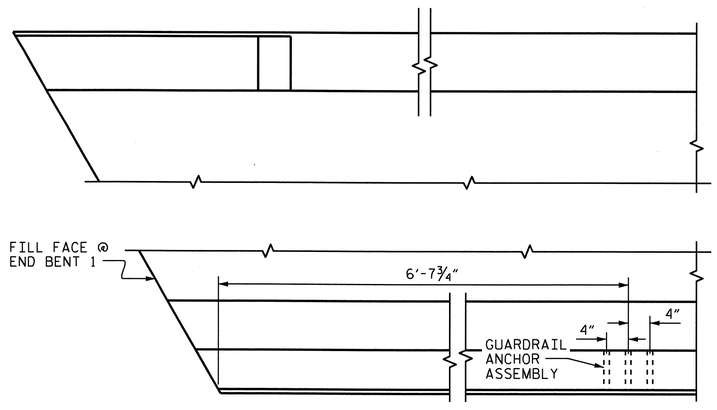
ELEVATION

FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03



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.)

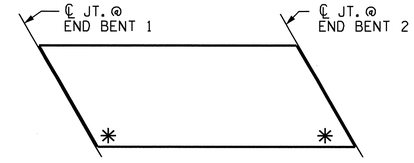
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 SPECIAL PROVISIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-102
1			3			TOTAL SHEETS
2			4			146

STR. #3

STD. NO. GRA2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
7/28/10

ASSEMBLED BY : M.K. BEARD	DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY	DATE : 7/19/09
DRAWN BY : TLA 5/06	ADDED 5/1/06R KMM/GM
CHECKED BY : GM 5/06	

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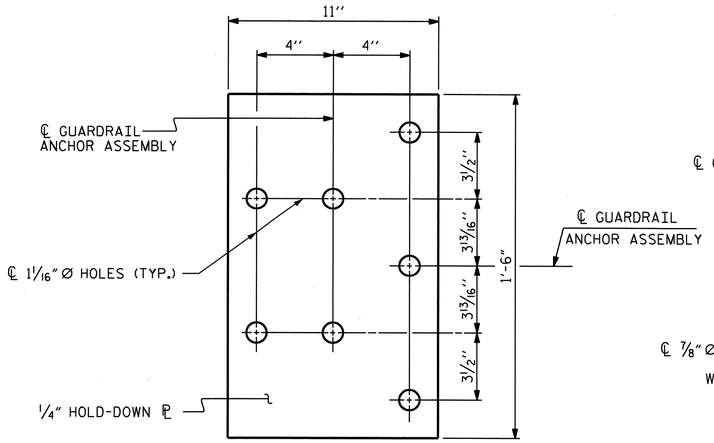
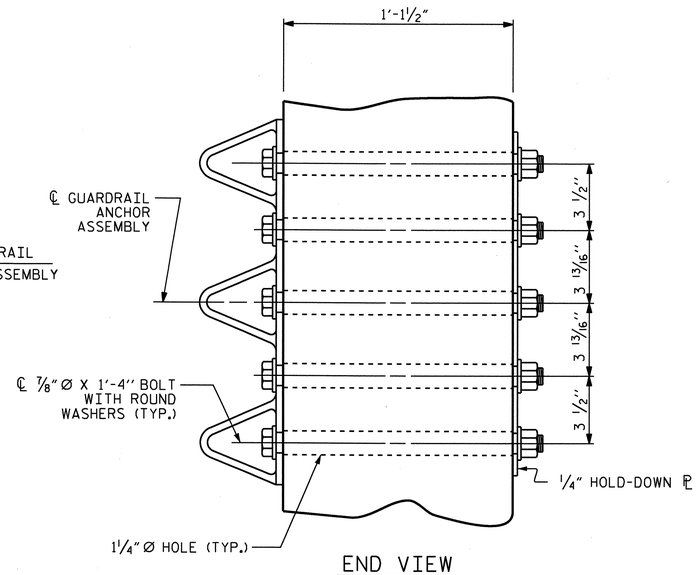


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

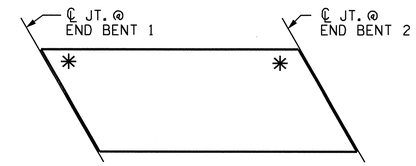
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

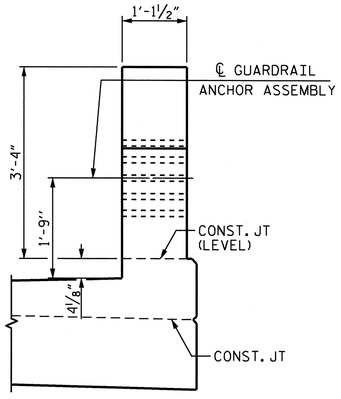
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

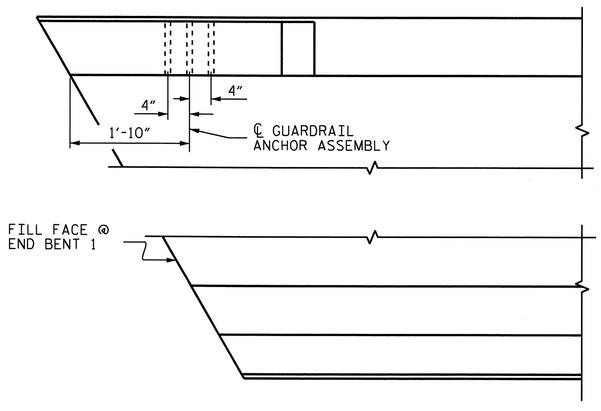


SKETCH SHOWING POINTS OF ATTACHMENT

*LOCATION OF GUARDRAIL ATTACHMENT



END VIEW



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

ASSEMBLED BY : M.K. BEARD	DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY	DATE : 7/19/09
DRAWN BY : MAA 5/10	ADDED 5/6/10
CHECKED BY : GM 5/10	

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NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 2 OF 2

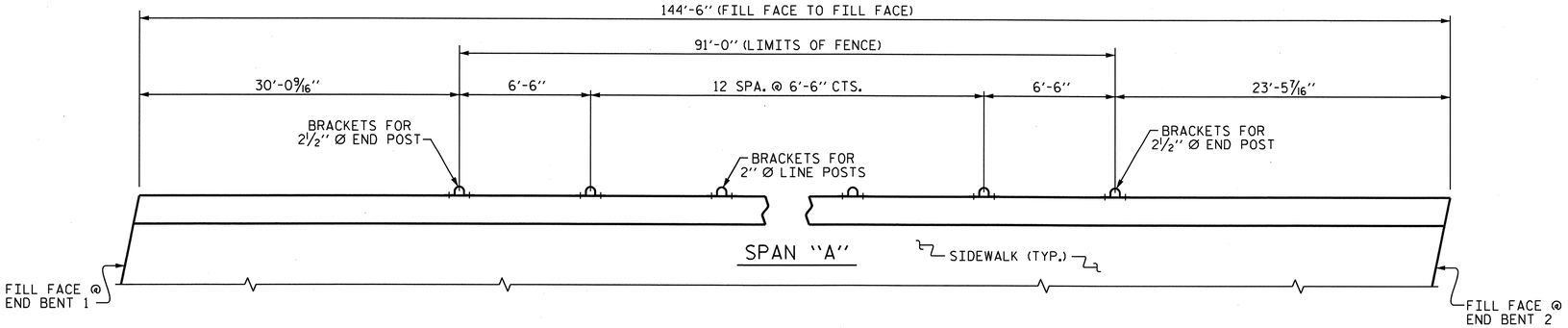
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS
FOR METAL RAILS
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-103
1			3			TOTAL SHEETS
2			4			146

STR. #3

STD. NO. GRA3



PLAN OF FENCE POST SPACING

PAY LENGTH = 91.00 LIN. FT.

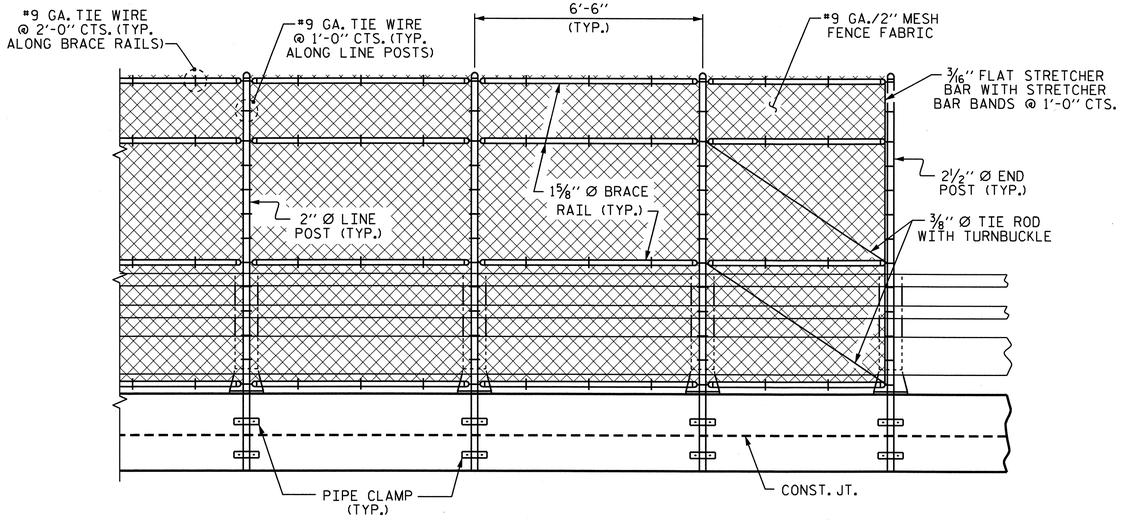
NOTES

FOR BRIDGE MOUNTED CHAIN LINK FENCE, SEE SPECIAL PROVISIONS.

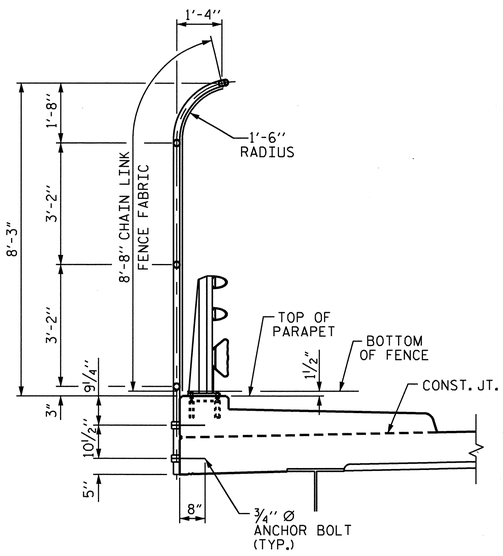
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

FOR SETTING ANCHOR BOLTS, THE CONTRACTOR SHALL USE AN ADHESIVE BONDING SYSTEM. SEE SPECIAL PROVISIONS FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS. LEVEL ONE TESTING OF BONDING SYSTEM IS REQUIRED AND THE YIELD LOAD OF THE 3/4" Ø BOLTS IS 12 KIPS.

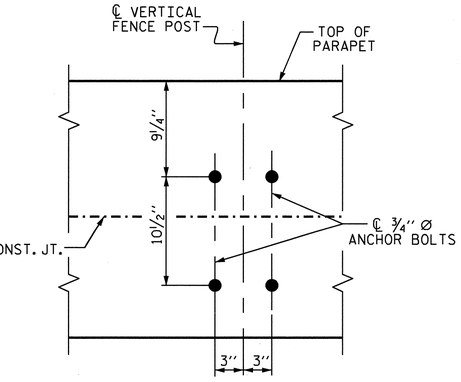
ALL FENCE MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 1050 OF THE STANDARD SPECIFICATIONS. GALVANIZE ALL STEEL PARTS AND HARDWARE IN ACCORDANCE WITH ARTICLE 1076 OF THE STANDARD SPECIFICATIONS.



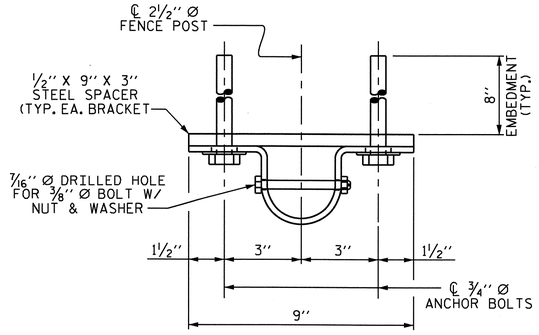
PARTIAL ELEVATION



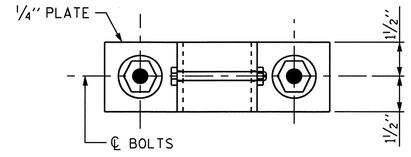
SECTION THRU FENCE



BOLT SETTING PLAN



PLAN



ELEVATION

PIPE CLAMP DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BRIDGE MOUNTED CHAIN LINK FENCE

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-104
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/30/10

STR. #3

DRAWN BY : A.S. CALLAWAY DATE : 5/5/10
CHECKED BY : W.F. PARKER DATE : 5/6/10

30-JUL-2010 11:09
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lsutton

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″			

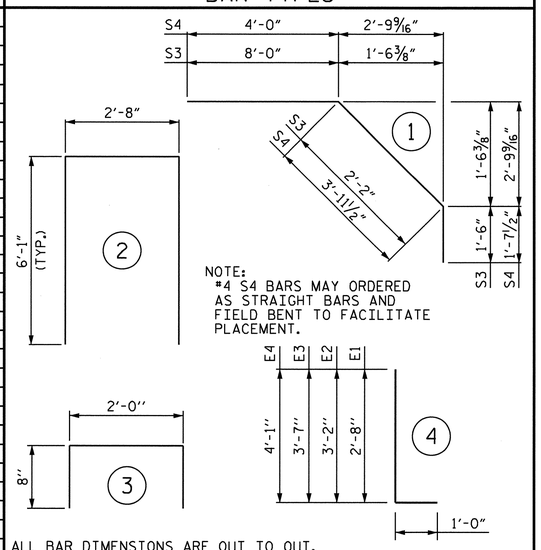
GROOVING BRIDGE FLOORS

APPROACH SLABS	1,152	SQ.FT.
BRIDGE DECK	3,563	SQ.FT.
TOTAL	4,715	SQ.FT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱A1	281	#5	STR	36′-0″	10551
A2	281	#5	STR	36′-0″	10551
✱A101	2	#5	STR	24′-2″	50
✱A102	2	#5	STR	9′-9″	20
✱A103	2	#5	STR	6′-5″	13
✱A104	2	#5	STR	19′-0″	40
✱A105	2	#5	STR	4′-7″	10
A201	2	#5	STR	24′-2″	50
A202	2	#5	STR	9′-9″	20
A203	2	#5	STR	6′-5″	13
A204	2	#5	STR	19′-0″	40
A205	2	#5	STR	4′-7″	10
✱B1	186	#5	STR	20′-8″	4009
✱B2	96	#4	STR	28′-3″	1812
✱B3	48	#4	STR	25′-8″	823
B4	132	#5	STR	49′-6″	6815
✱E1	4	#7	4	3′-8″	30
✱E2	4	#7	4	4′-2″	34
✱E3	4	#7	4	4′-7″	37
✱E4	4	#7	4	5′-1″	42
✱F1	8	#6	STR	3′-6″	42
✱F2	4	#6	STR	2′-6″	15
✱F3	4	#6	STR	3′-8″	22
✱G1	146	#4	STR	6′-4″	618
K1	56	#4	STR	18′-10″	705
✱S3	80	#4	1	11′-8″	623
✱S4	62	#4	1	9′-7″	397
U1	66	#4	2	14′-10″	654
✱U2	42	#4	3	3′-4″	94

BAR TYPES

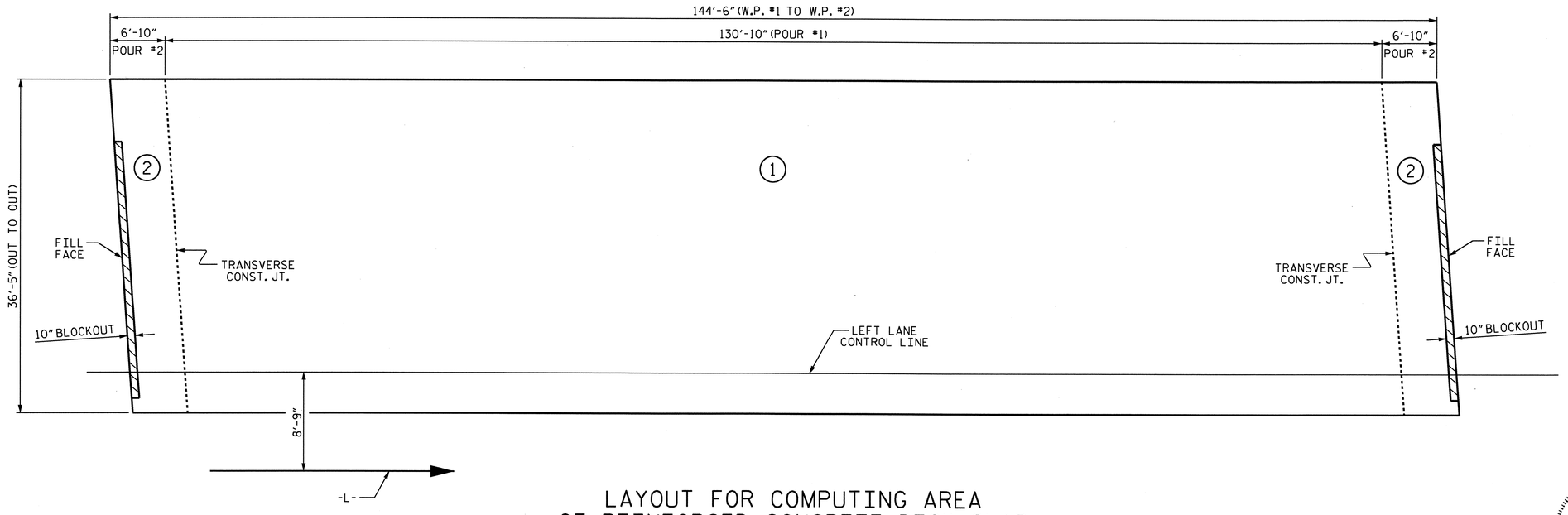


ALL BAR DIMENSIONS ARE OUT TO OUT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	✱EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	145.5	——	——
POUR #2	67.7	——	——
SIDEWALK	25.2	——	——
END POSTS	0.8	——	——
TOTALS ✱✱	239.2	18,858	19,282

✱✱QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB AND POURING SEQUENCE (SQ. FT. = 5,262)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-105
1			3			TOTAL SHEETS
2			4			146

STR. #3

STD. NO. BOM1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
7/29/10

DRAWN BY : M.K. BEARD DATE : 5/09
CHECKED BY : A.S. CALLAWAY DATE : 7/19/09

28-JUL-2010 15:25
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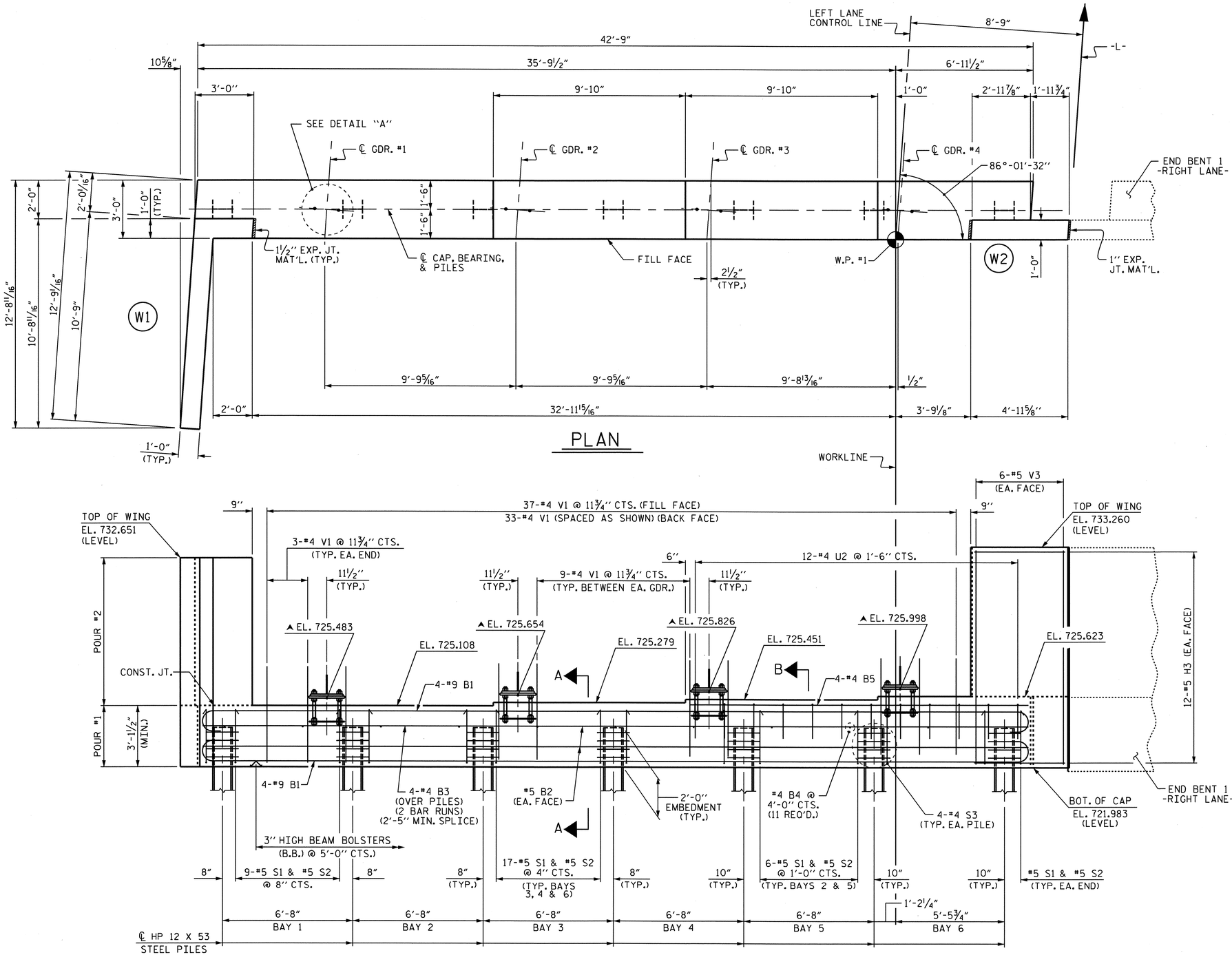
lsutton



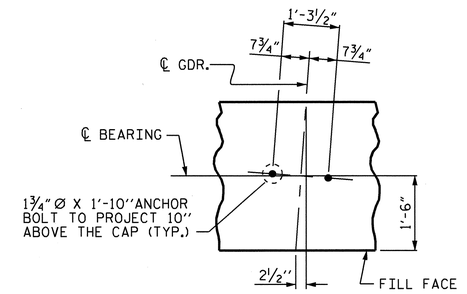
ELEVATION

V1 BARS ON BACK FACE ARE DIMENSIONED FROM ℄ GIRDER.

NOTES

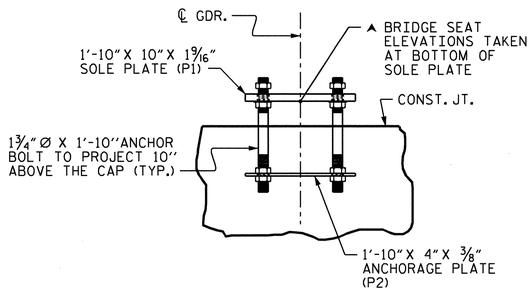
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER 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.



DETAIL "A"

(TYP. EA. GIRDER)



ANCHORAGE DETAILS

(TYP. EA. GIRDER)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-106
1			3			TOTAL SHEETS
2			4			146

STR. #3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 9/28/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

29-JUL-2010 15:42
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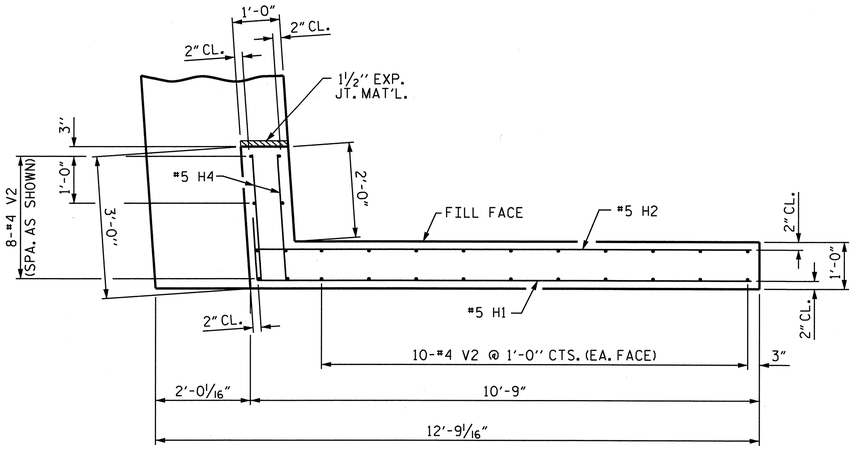
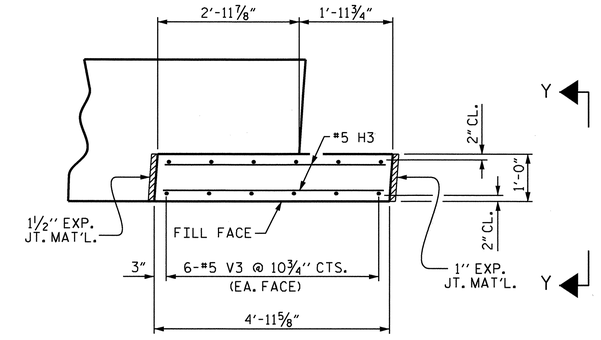
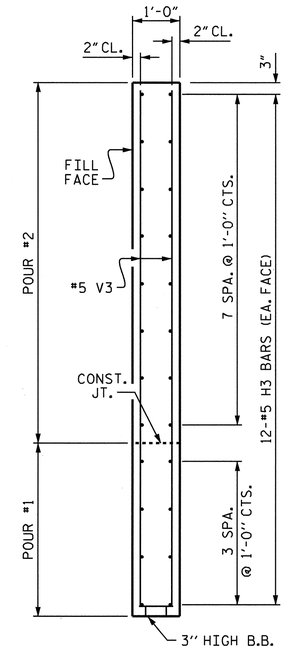


PLAN OF WING W1



PLAN OF WING W2



SECTION Y-Y

ELEVATION OF WING W1

SECTION X-X

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 1

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-107
1			3			TOTAL SHEETS
2			4			146

STR. #3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 9/25/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

28-JUL-2010 15:25
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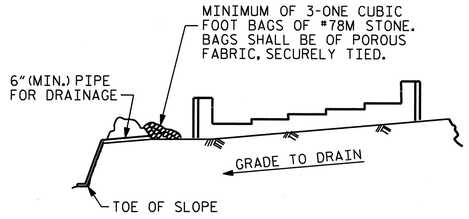
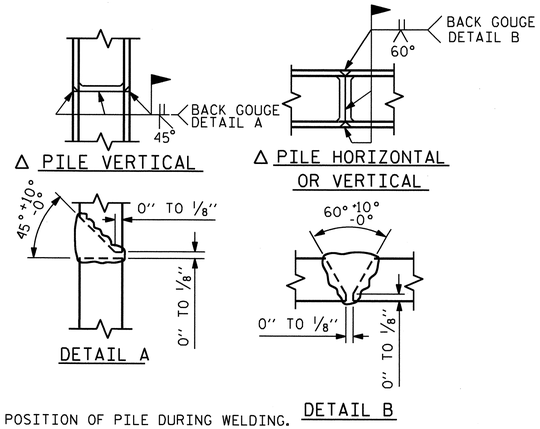


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

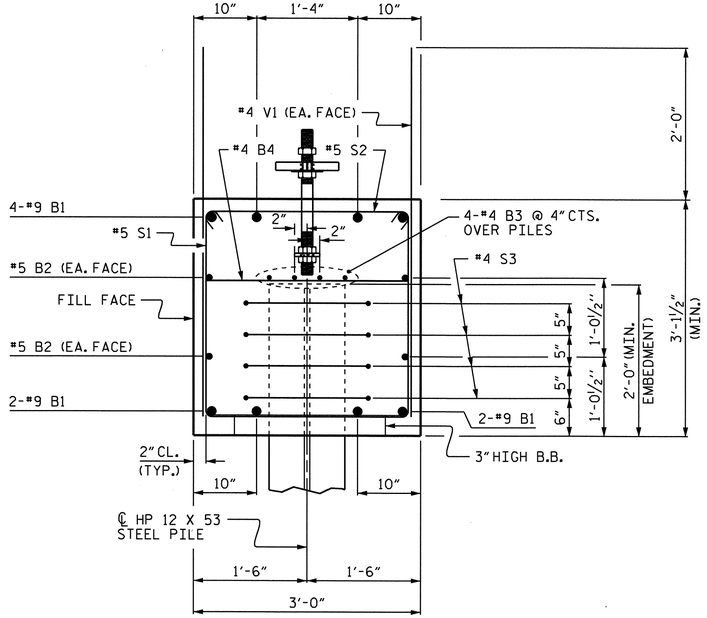
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

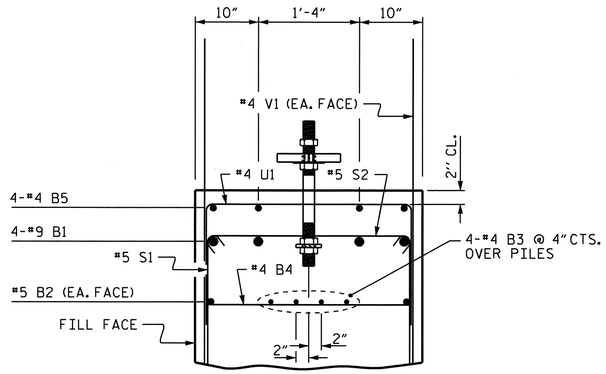


Δ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



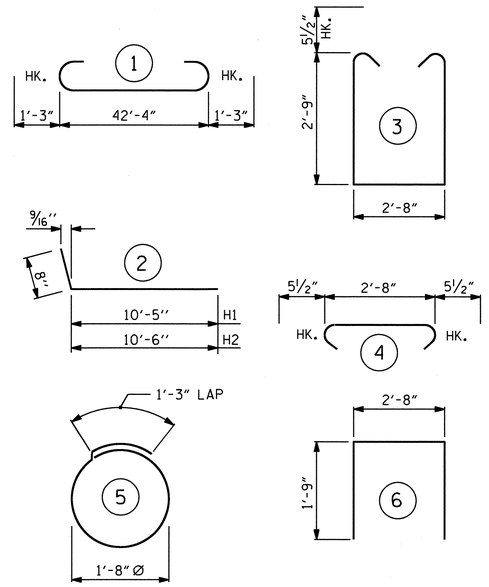
SECTION A-A



PART SECTION B

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.



BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	44'-10"	1219
B2	4	#5	STR	42'-5"	177
B3	8	#4	STR	22'-5"	120
B4	11	#4	STR	2'-8"	20
B5	4	#4	STR	17'-3"	46
H1	14	#5	2	11'-1"	162
H2	14	#5	2	11'-2"	163
H3	24	#5	STR	4'-7"	115
H4	20	#5	STR	2'-8"	56
S1	74	#5	3	9'-1"	701
S2	74	#5	4	3'-7"	277
S3	28	#4	5	6'-6"	122
U1	12	#4	6	6'-2"	49
V1	70	#4	STR	4'-11"	230
V2	28	#4	STR	10'-4"	193
V3	12	#5	STR	10'-11"	137

REINFORCING STEEL	LBS.	3,787
CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WINGS	CU. YDS.	17.3
POUR #2 - UPPER WINGS	CU. YDS.	4.9
TOTAL	CU. YDS.	22.2
HP 12 x 53 STEEL PILES NO. = 7	LIN. FT.	540
PILE REDRIVES	EA.	4

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 1

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-108
1			3			TOTAL SHEETS
2			4			146

STR. #3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 9/24/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

28-JUL-2010 15:25
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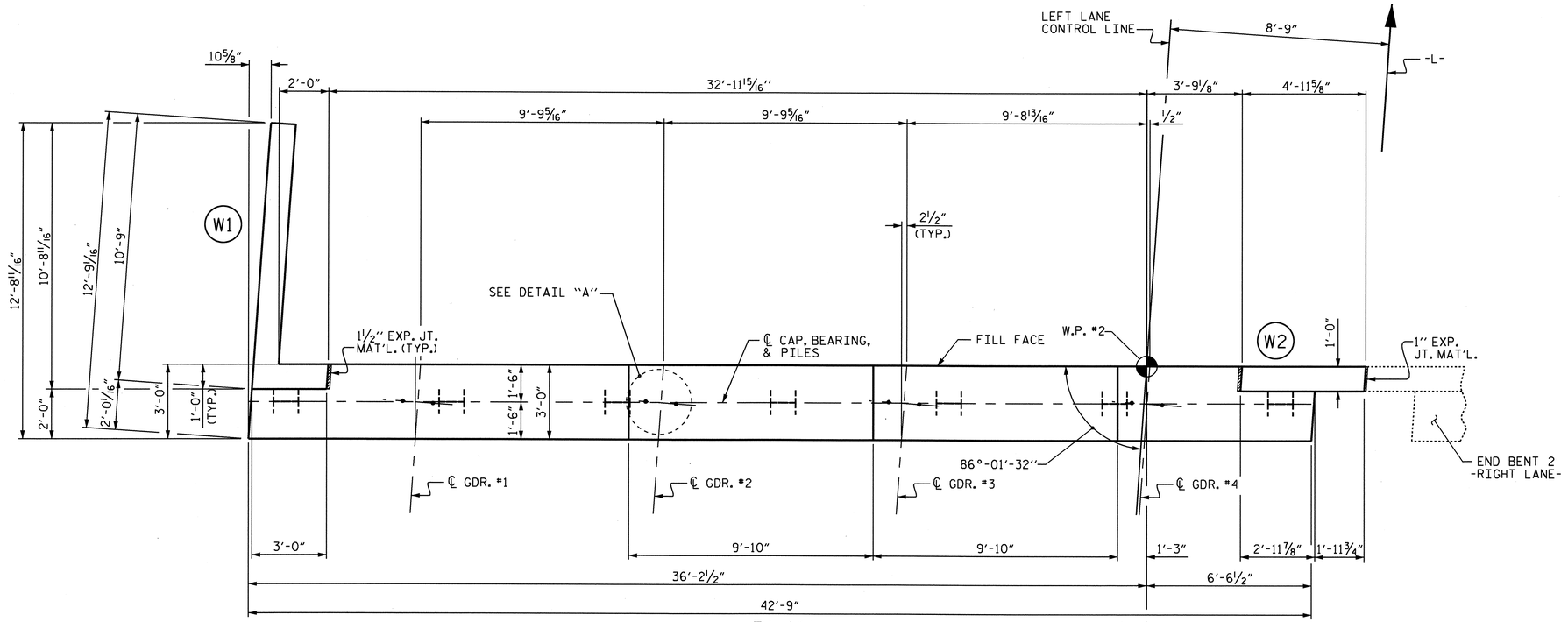
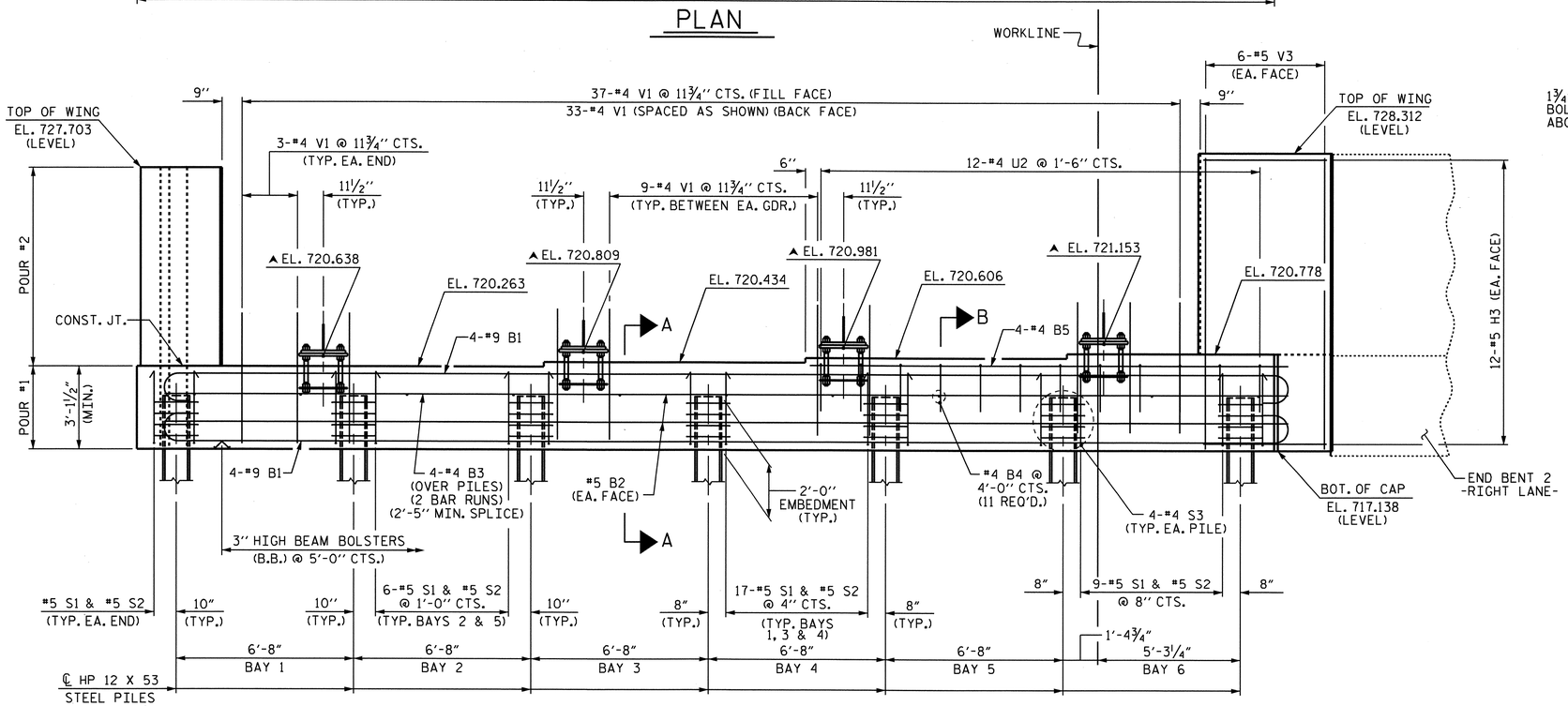


PLAN



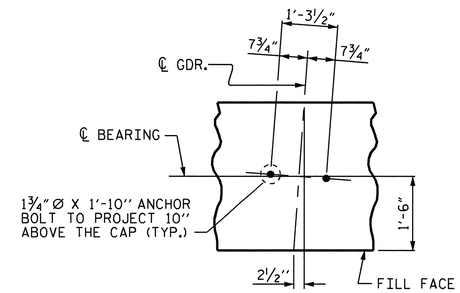
ELEVATION

V1 BARS ON BACK FACE ARE DIMENSIONED FROM ℄ GIRDER.

NOTES

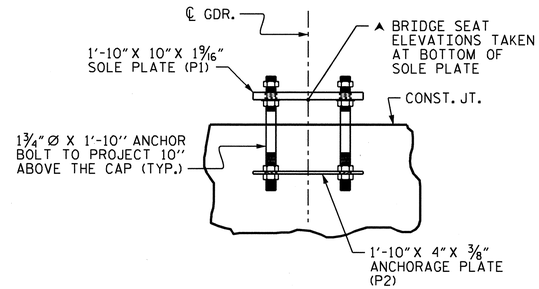
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER 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.



DETAIL "A"

(TYP. EA. GIRDER)



ANCHORAGE DETAILS

(TYP. EA. GIRDER)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-109
1			3			TOTAL SHEETS
2			4			146

STR. #3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 9/28/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

28-JUL-2010 15:25
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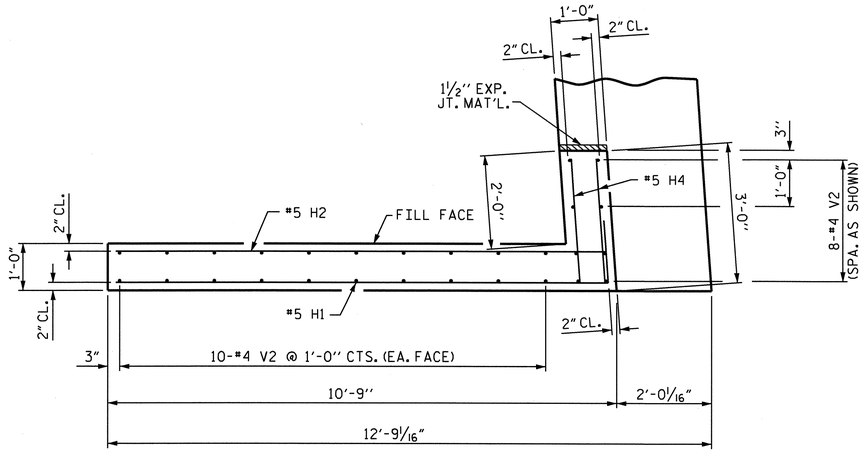
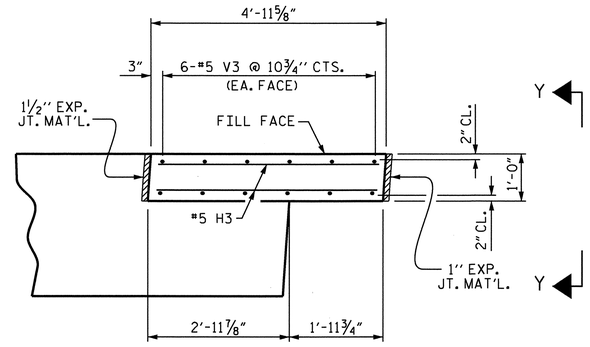
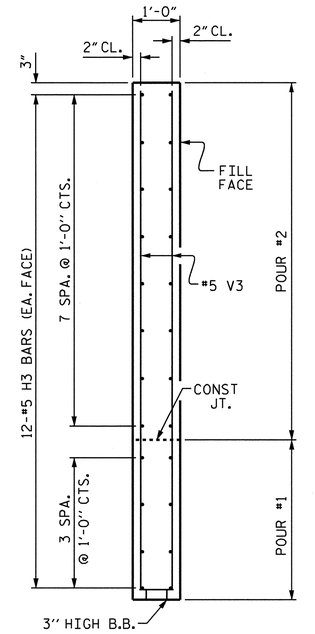
lsutton



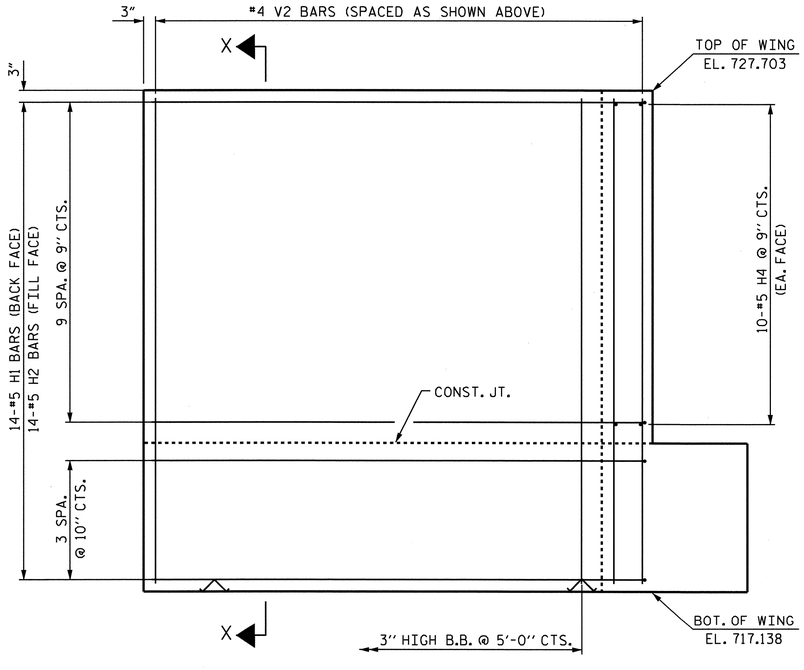
PLAN OF WING W1



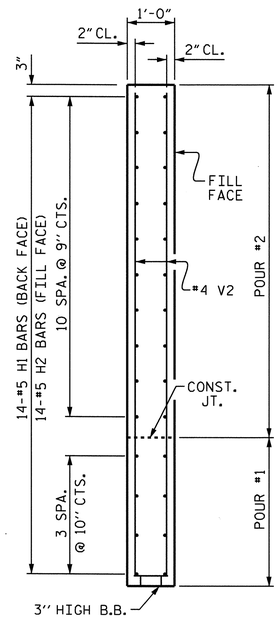
PLAN OF WING W2



SECTION Y-Y



ELEVATION OF WING W1



SECTION X-X

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 2

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-110
1			3			TOTAL SHEETS
2			4			146

STR. #3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 9/25/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

28-JUL-2010 15:25
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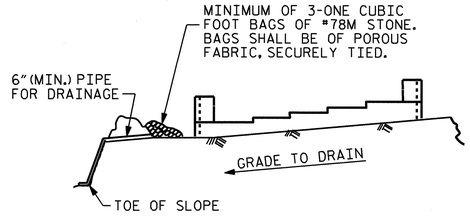
lsutton

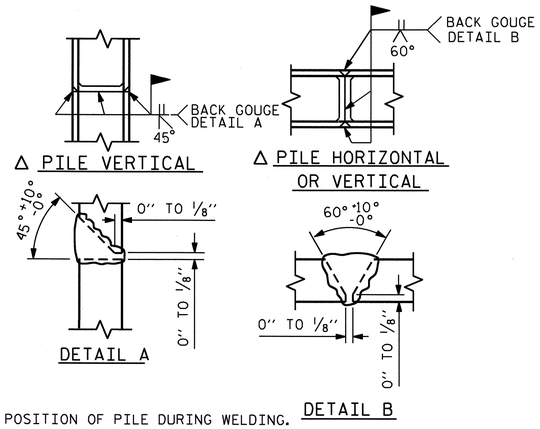


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

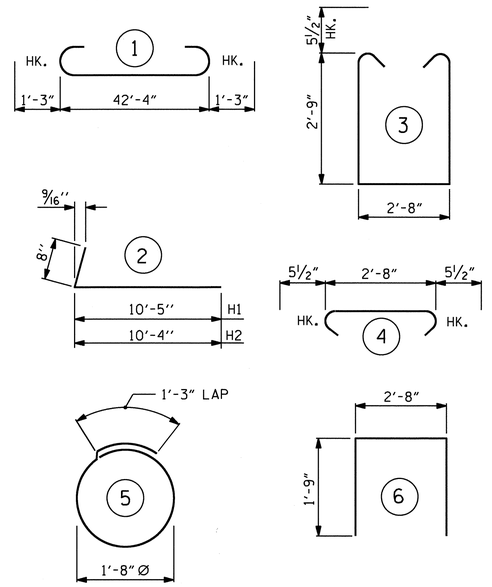


Δ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

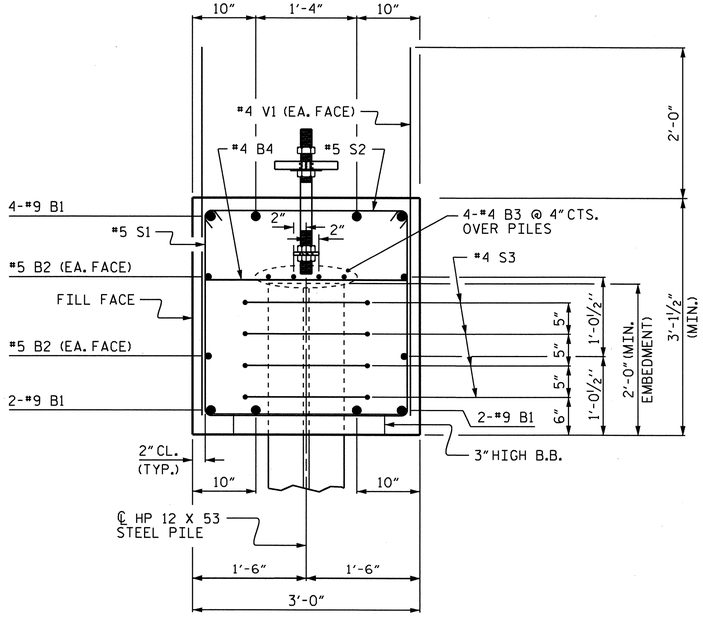


BILL OF MATERIAL

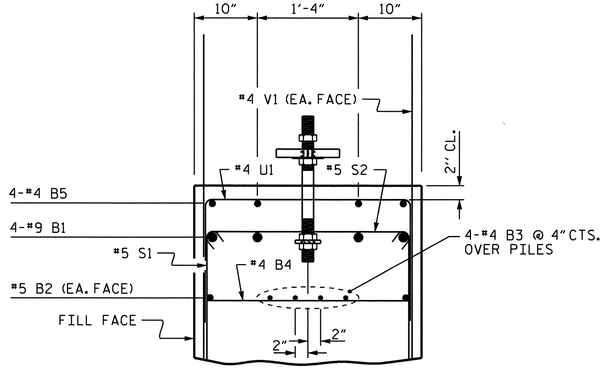
END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	44'-10"	1219
B2	4	#5	STR	42'-5"	177
B3	8	#4	STR	22'-5"	120
B4	11	#4	STR	2'-8"	20
B5	4	#4	STR	17'-3"	46
H1	14	#5	2	11'-1"	162
H2	14	#5	2	11'-0"	161
H3	24	#5	STR	4'-7"	115
H4	20	#5	STR	2'-8"	56
S1	74	#5	3	9'-1"	701
S2	74	#5	4	3'-7"	277
S3	28	#4	5	6'-6"	122
U1	12	#4	6	6'-2"	49
V1	70	#4	STR	4'-11"	230
V2	28	#4	STR	10'-3"	192
V3	12	#5	STR	10'-10"	136

REINFORCING STEEL	LBS.	3,783
CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WINGS	CU. YDS.	17.3
POUR #2 - UPPER WINGS	CU. YDS.	4.9
TOTAL	CU. YDS.	22.2
HP 12 x 53 STEEL PILES NO. = 7	LIN. FT.	595
PILE REDRIVES	EA.	4



SECTION A-A



PART SECTION B

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 2

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-111
1			3			TOTAL SHEETS
2			4			146

STR. #3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 9/24/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

28-JUL-2010 15:25
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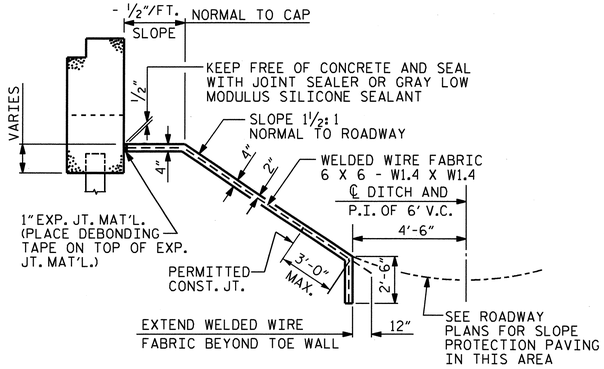
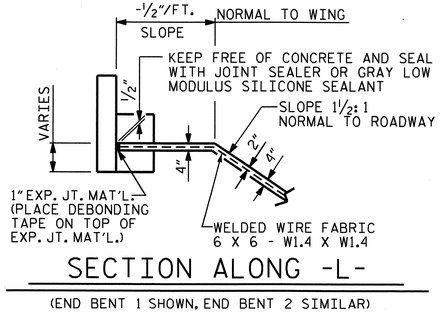


SECTION ALONG LEFT LANE CONTROL LINE

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



SECTION ALONG -L-

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

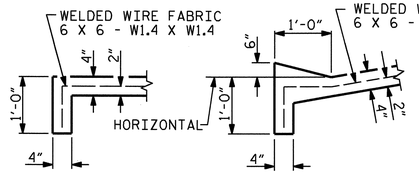
BRIDGE @ STA. 58+97.14 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	323	646
END BENT 2	260	520

* QUANTITY SHOWN IS BASED ON 5' POURS.

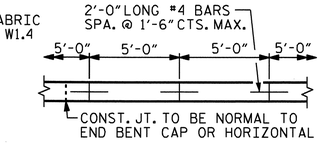
NOTES

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, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

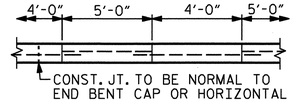


SECTION A-A SECTION B-B



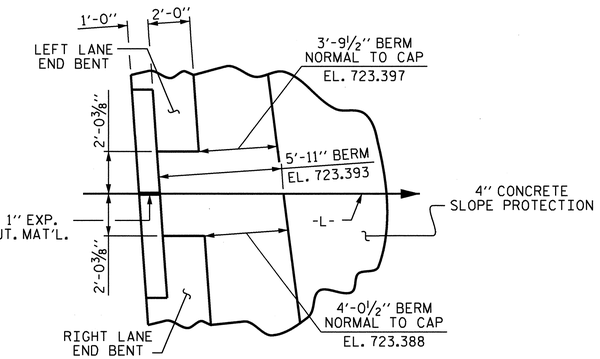
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL

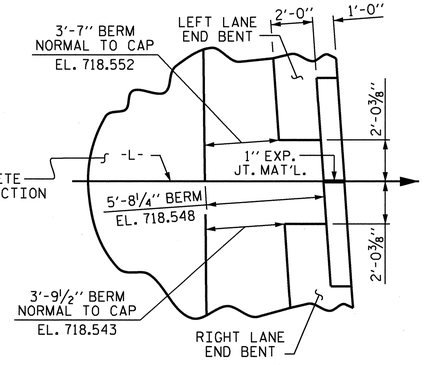


POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

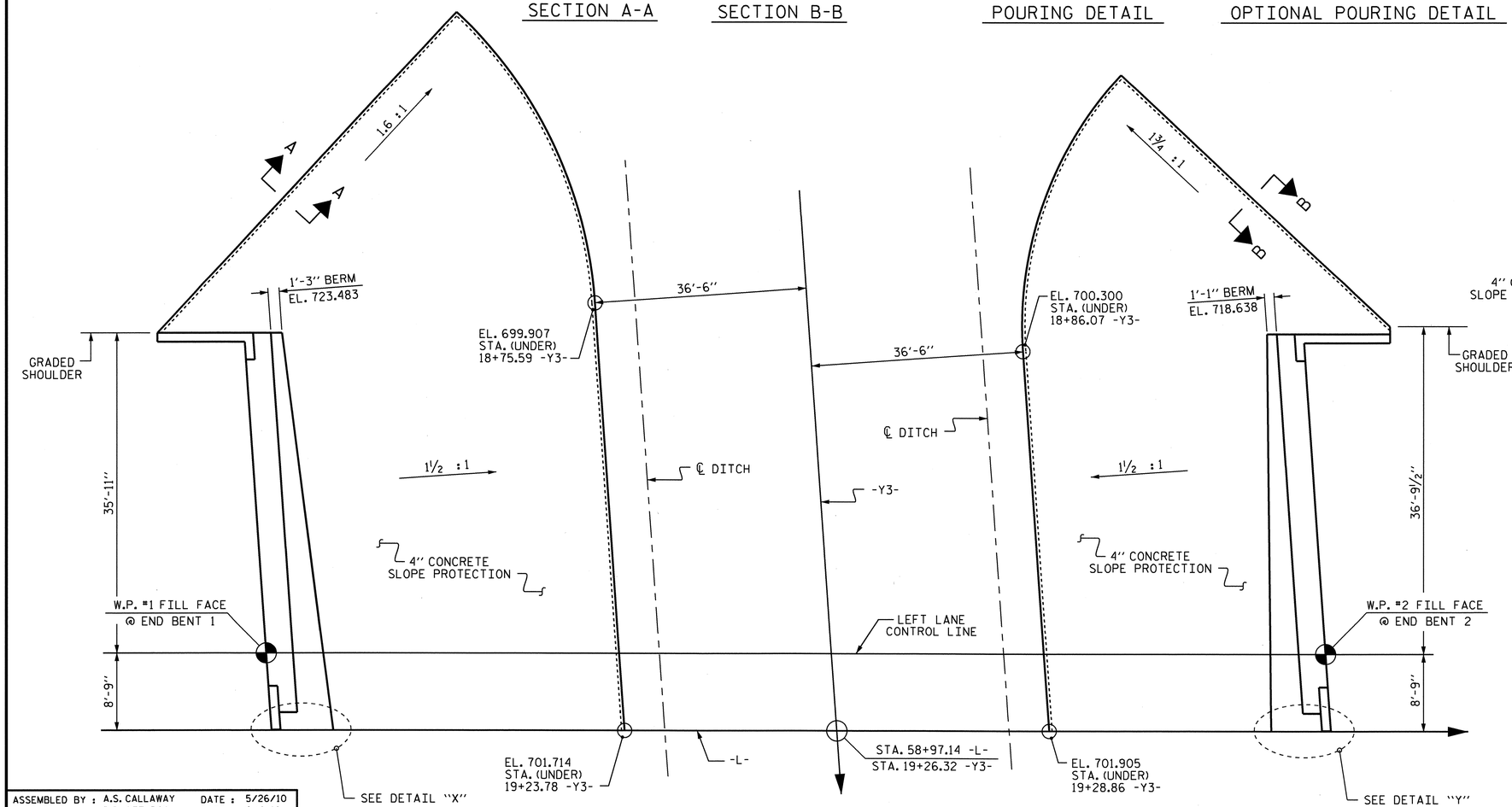
OPTIONAL POURING DETAIL



DETAIL "X"



DETAIL "Y"



PLAN

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS
LEFT LANE

ASSEMBLED BY : A.S. CALLAWAY	DATE : 5/26/10
CHECKED BY : D.R. WITHROW	DATE : 6/4/10
DRAWN BY : ELR 5/92	REV. 7/10/01 LES/RDR
CHECKED BY : GRP 6/92	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-112
1			3			TOTAL SHEETS
2			4			146

STR. #3 STD. NO. SP1

NORTH CAROLINA PROFESSIONAL SEAL 21038 ENGINEER LAURA E. SUTTON
7/30/10

30-JUL-2010 11:38
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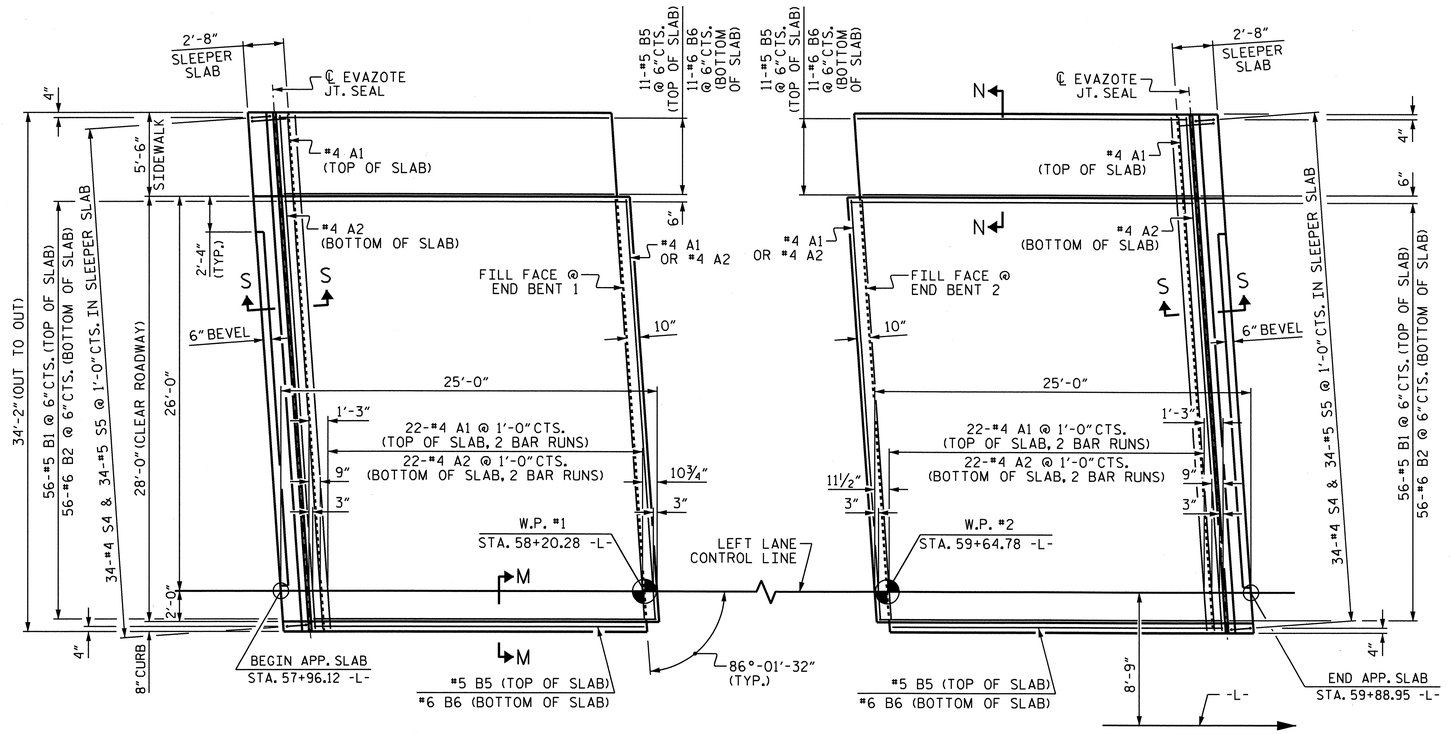
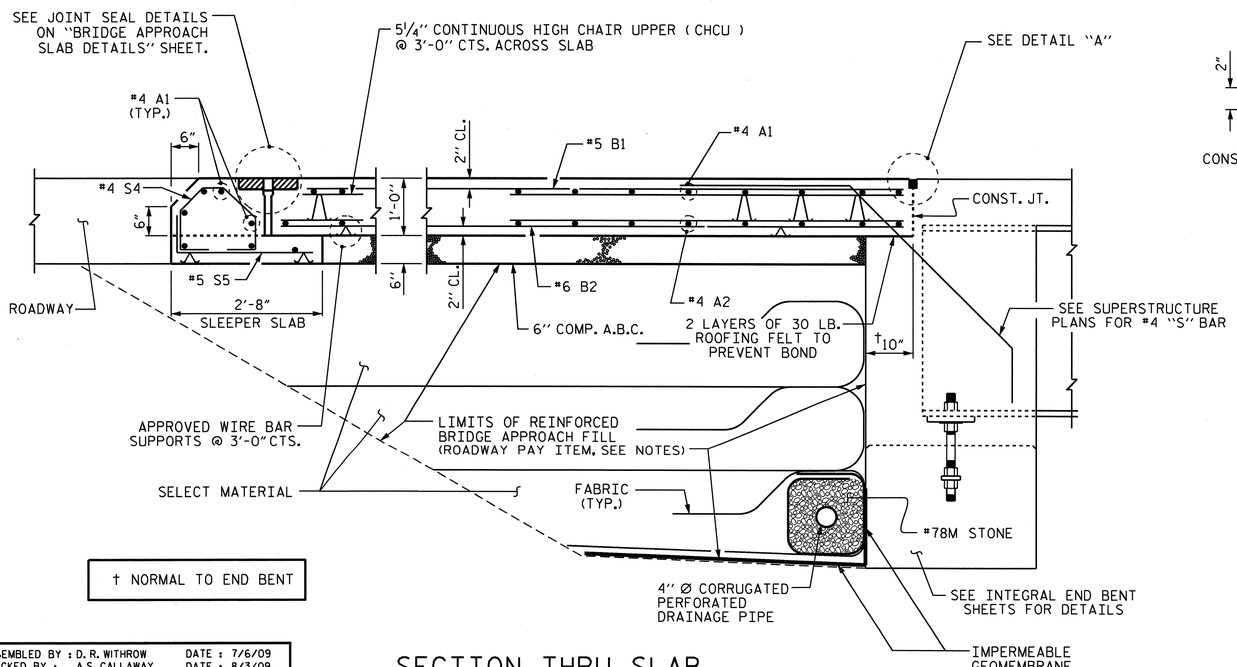


PLAN @ END BENT 1

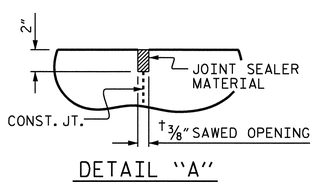
PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

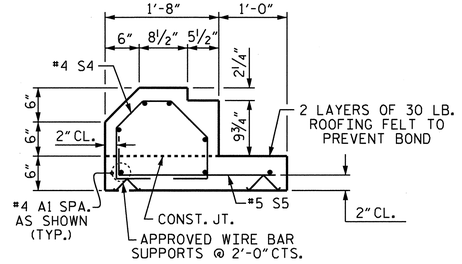


† NORMAL TO END BENT

SECTION THRU SLAB

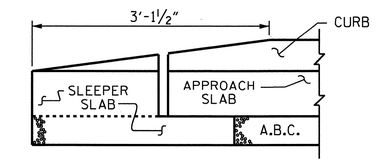


DETAIL "A"

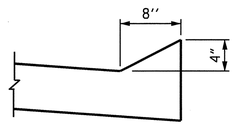


SECTION S-S

SHOWING SLEEPER SLAB



END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION M-M

NOTES

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

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, 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 6" COMP. A.B.C. SHALL BE FLUSH WITH THE SLEEPER SLAB AND SHALL EXTEND 1'-0" OUTSIDE OF EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE SLEEPER SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE SLEEPER SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

THE VERTICAL JOINT ON THE RIGHT AND LEFT SIDE OF THE APPROACH SLAB AT THE ENDS OF THE EVAZOTE JOINT SHALL BE FILLED WITH SILICONE OR OTHER APPROVED MATERIAL IN ORDER TO PREVENT BACKFILL FROM ENTERING THE JOINT OPENING.

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 TYPE SL LOW MODULUS SILICONE SEALANT.

WITH EVAZOTE JOINT SEAL

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2½".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

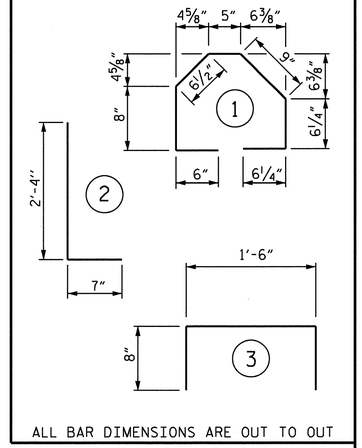
FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	62	#4	STR	17'-11"	742
A2	48	#4	STR	17'-10"	572
* B1	56	#5	STR	22'-4"	1304
B2	56	#6	STR	22'-10"	1921
* B3	4	#4	STR	22'-0"	59
* B4	4	#4	STR	1'-3"	3
* B5	11	#5	STR	21'-6"	247
B6	11	#6	STR	22'-0"	363
* G1	23	#4	STR	5'-0"	77
* S4	34	#4	1	3'-11"	89
S5	34	#5	2	2'-11"	103
* U1	10	#4	3	2'-10"	19

REINFORCING STEEL	LBS.	2959
* EPOXY COATED REINFORCING STEEL	LBS.	2290

CLASS AA CONCRETE		
POUR #1 - SLAB & CURB	C.Y.	29.2
POUR #2 - SLEEPER SLAB	C.Y.	3.6
POUR #3 - SIDEWALK	C.Y.	3.0
TOTAL	C.Y.	35.8

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-113
1			3			TOTAL SHEETS
2			4			146

STR. #3

STD. NO. BAS11

ASSEMBLED BY : D. R. WITHROW	DATE : 7/6/09
CHECKED BY : A.S. CALLAWAY	DATE : 8/3/09
DRAWN BY : TLA 10/05	ADDED 5/1/06R KMM/GM
CHECKED BY : GM 5/06	

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/30/10

30-JUL-2010 12:00
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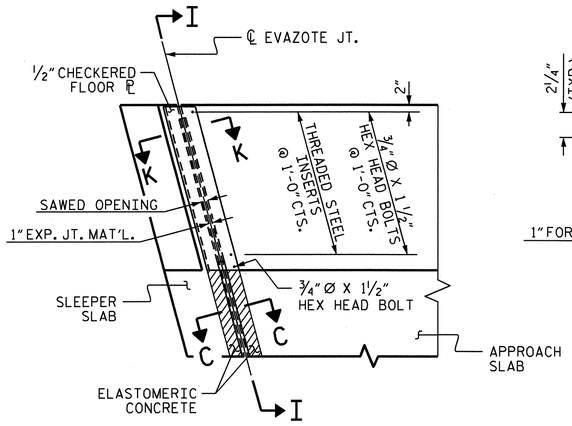
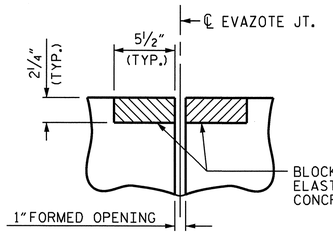
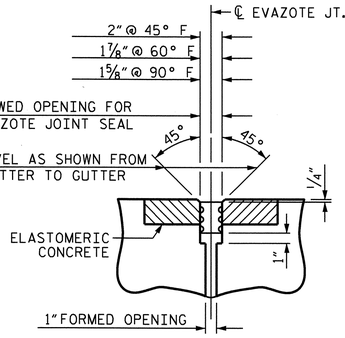


PLAN
(AT SIDEWALK - LEFT)



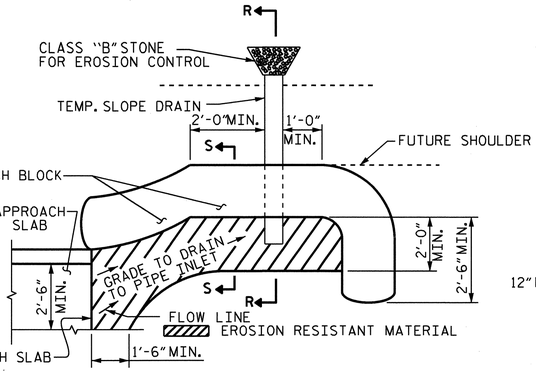
SECTION C-C
EVAZOTE JOINT SEAL
(PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)



SECTION C-C
EVAZOTE JOINT SEAL
(EXPANSION)

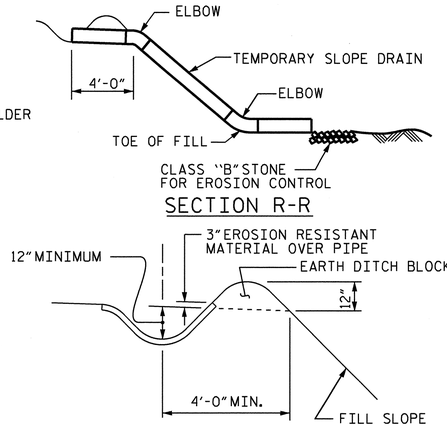
ELASTOMERIC CONCRETE	
APPROACH SLAB NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	4.8
2	4.8
TOTAL	9.6

* BASED ON THE MINIMUM BLOCKOUT SHOWN.



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

PLAN VIEW

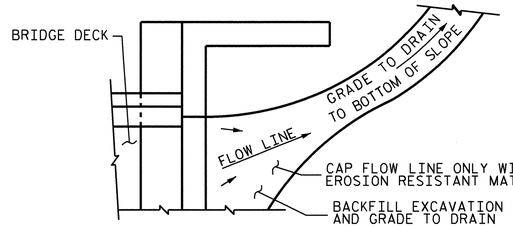


SECTION R-R

SECTION S-S

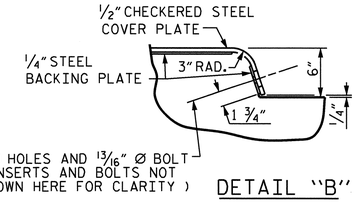
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

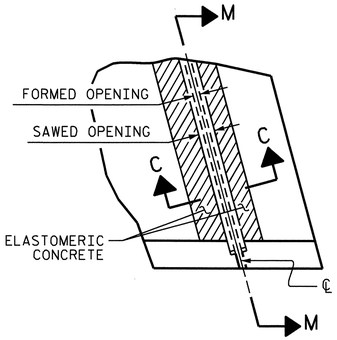


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

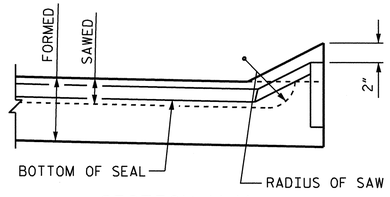
TEMPORARY DRAINAGE DETAIL



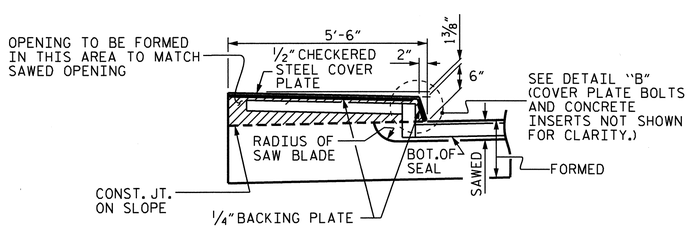
DETAIL "B"



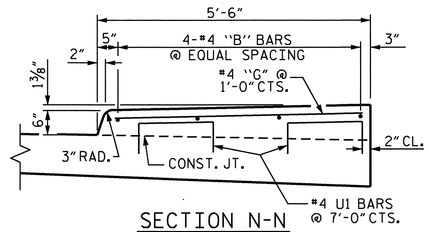
PLAN
(AT CURB - RIGHT)



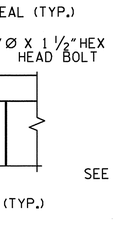
SECTION M-M



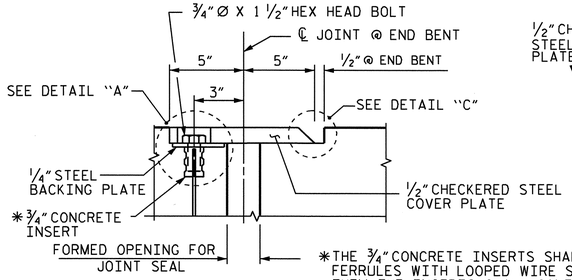
SECTION I-I



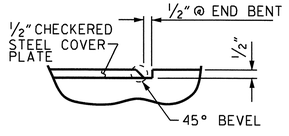
SECTION N-N



DETAIL "A"



SECTION K-K

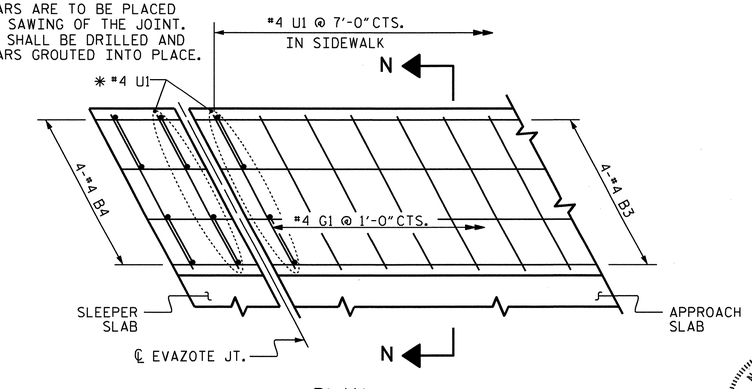


DETAIL "C"

* THE ¾" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.

JOINT SEAL DETAILS @ SLEEPER SLAB

* THE "U" BARS ARE TO BE PLACED AFTER THE SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE "U" BARS GROUTED INTO PLACE.



PLAN

SIDEWALK DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/30/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

— LEFT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-114
1			3			TOTAL SHEETS
2			4			146

STR. #3

STD. NO. BAS10

ASSEMBLED BY :	D. R. WITHROW	DATE :	7/6/09
CHECKED BY :	A.S. CALLAWAY	DATE :	8/3/09
DRAWN BY : FCJ	11/88	REV. 10/17/00	RWW/LES
CHECKED BY : ARB	11/88	REV. 5/7/03	RWW/JTE
		REV. 5/1/06R	MAA/KMM

30-JUL-2010 12:00
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lsutton

F.A. PROJ. NO. STP-1311(10)

+4.9051% ∆ -3.4242%

PI = 54+40.00 -L-RT.
EL. = 746.25
VC = 700.00

GRADE DATA

58+00 58+50 59+00 59+50 60+00

740 730 720 710 700 690

FILL FACE @ END BENT 1
STA. 58+21.50 -L-
GRADE PT. EL. 733.187

FIX.

SEE PLAN VIEW
BERM (TYP.)

VARIES (TYP.)

1½:1 SLOPE (TYP.)

FILL

℄ DITCH

SPAN "A"

FILL FACE @ END BENT 2
STA. 59+66.00 -L-
GRADE PT. EL. 728.239

FIX.

21'-8" MIN. VERTICAL CLEARANCE

℄ DITCH

4" CONCRETE SLOPE PROTECTION

STEEL PILES (TYP.)

FILL

EL. 700.0± EL. 699.0± EL. 698.0± EL. 697.0± EL. 698.0± EL. 699.0± EL. 699.0± EL. 699.0± EL. 698.0± EL. 697.0± EL. 696.0± EL. 696.0±

INTEGRAL END BENT 1

INTEGRAL END BENT 2

SECTION ALONG -L-

(SECTIONS @ END BENTS ARE @ RIGHT ANGLES)

144'-6" TOTAL LENGTH OF BRIDGE (FILL FACE TO FILL FACE)

75'-7 11/16" 68'-10 5/16"

℄ DITCH

STA. 58+97.14 -L-
STA. 19+26.32 -Y3-

℄ DITCH

4'-0½" BERM
EL. 723.388
@ END OF CAP

3'-9½" BERM
EL. 718.543
@ END OF CAP

TO SR 1311

-L-

8'-9"

BEGIN APPROACH SLAB
STA. 57+97.33 -L-

RIGHT LANE CONTROL LINE

END APPROACH SLAB
STA. 59+90.16 -L-

86°-01'-32" (TYP.)

-Y3- HAGGARD AVE.

W.P. #1
FILL FACE @ END BENT 1
STA. 58+21.50 -L-

4" CONCRETE SLOPE PROTECTION

14'-0" 18'-0" EX. PAVEMENT 18'-0" EX. PAVEMENT 14'-0"

4" CONCRETE SLOPE PROTECTION

W.P. #2
FILL FACE @ END BENT 2
STA. 59+66.00 -L-

TO SR 1503

POINT OF MINIMUM VERTICAL CLEARANCE

6'-7" BERM
EL. 723.302

6'-3½" BERM
EL. 718.456

PLAN

(PILES NOT SHOWN FOR CLARITY)

NORTH CAROLINA PROFESSIONAL SEAL 9804 ENGINEER ROBERT W. SCALLOWAY 7-30-10

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/30/10

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/12/10

30-JUL-2010 11:08
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PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-
19+26.32 -Y3-

SHEET 1 OF 3 BRIDGE NO. 430

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

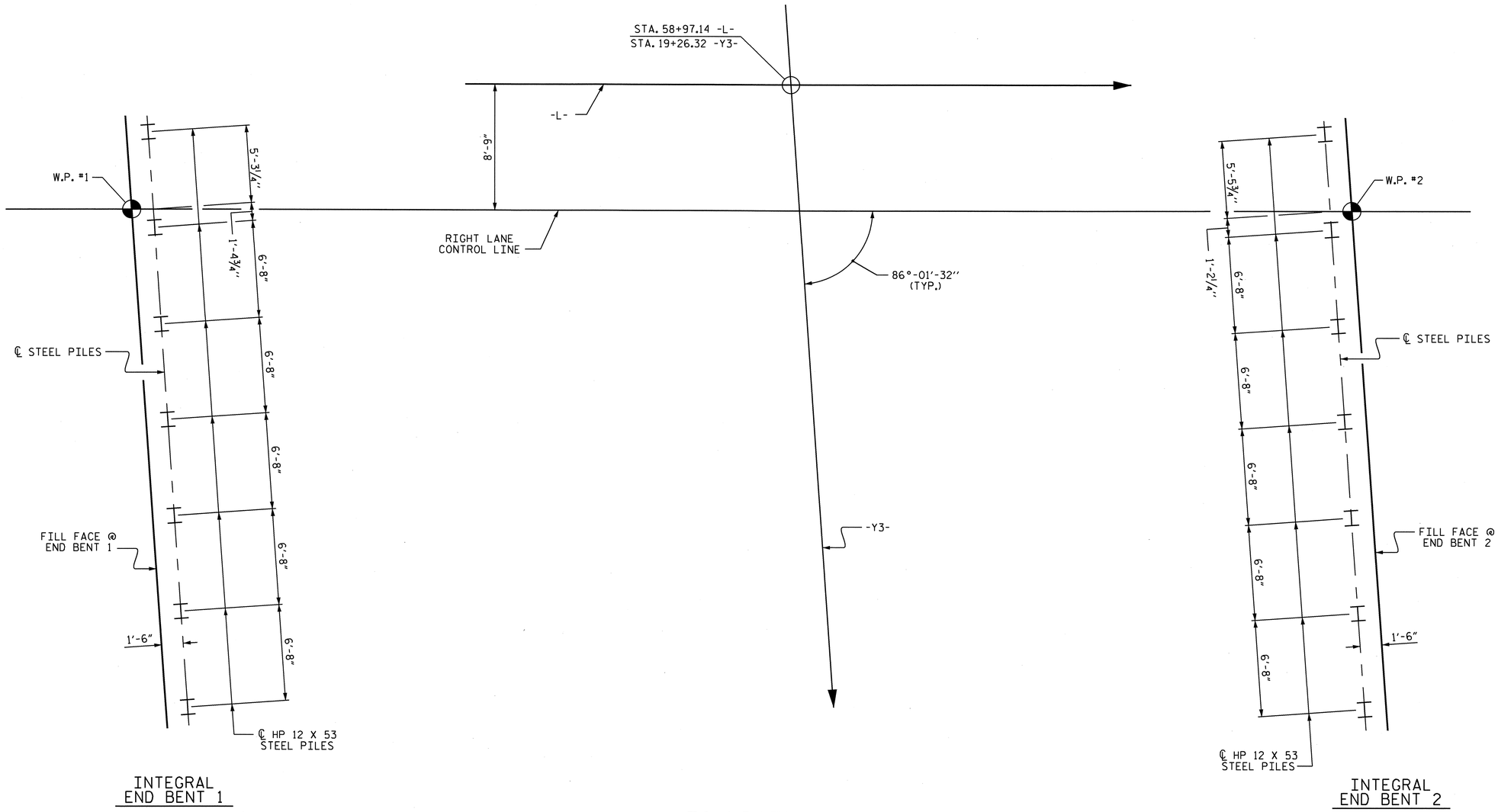
GENERAL DRAWING

FOR BRIDGE ON NC 100
OVER HAGGARD AVE. BETWEEN
SR 1311 AND SR 1503

—— RIGHT LANE ——

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-115
1			3			TOTAL SHEETS
2			4			146

STR. #4



INTEGRAL
END BENT 1

INTEGRAL
END BENT 2

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE TO THE CENTERLINE OF THE PILE AT THE BOTTOM OF CAP.

NOTES (CONTINUED ON SHEET 3 OF 3)

FOR PILES, SEE SPECIAL PROVISIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE. DRIVE PILES TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40 TO 60 FT-KIP PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1 AND END BENT 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH THE PILES PROVISIONS.

DRIVING PILES AT END BENT 1 MAY REQUIRE PENETRATION OF GEOGRID REINFORCEMENT. FOR GEOGRID REINFORCEMENT AND PAY ITEM, SEE ROADWAY PLANS.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100
OVER HAGGARD AVE. BETWEEN
SR 1311 AND SR 1503

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-116
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/28/10

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/12/10

28-JUL-2010 15:25
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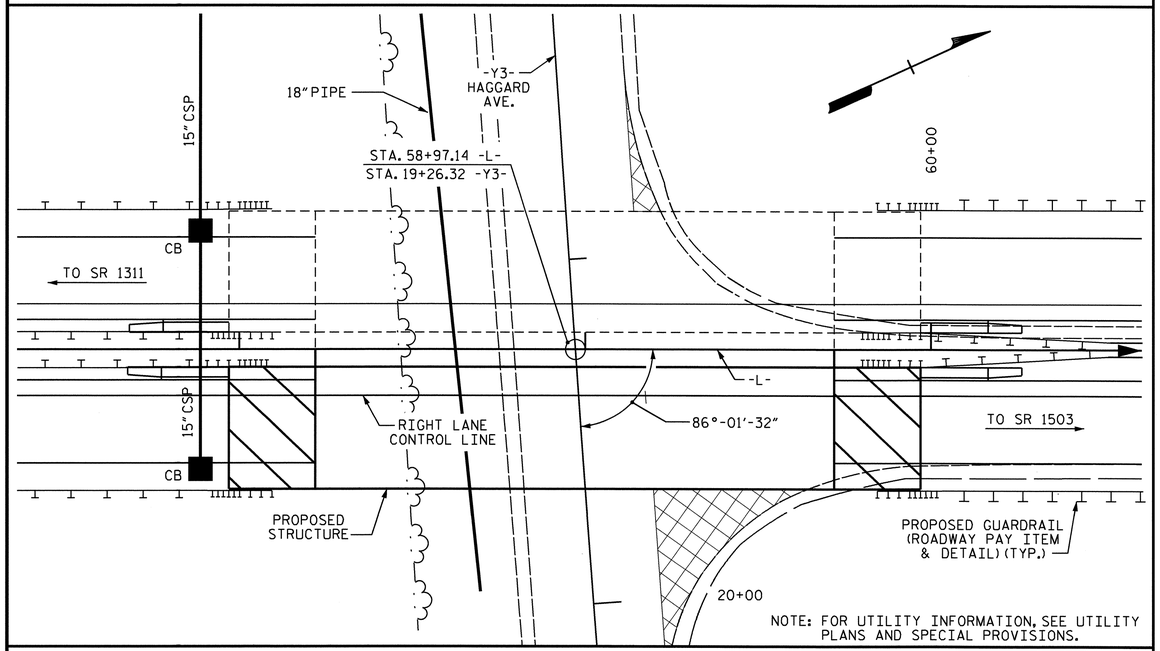
lsutton

BM #3: RR SPIKE SET IN BASE OF 30" MAPLE, 129' RT. OF STA. 43+10 -L-, ELEV. 708.75



LOCATION SKETCH

NOTES (CONTINUED FROM SHEET 2 OF 3)

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W.

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

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

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.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS.

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

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR SHIPPING STEEL STRUCTURAL MEMBERS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR CURING CONCRETE, SEE SPECIAL PROVISIONS.

FOR FORMS FOR CONCRETE BRIDGES DECKS, SEE SPECIAL PROVISIONS.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	STRUCTURAL STEEL	HP 12 X 53 STEEL PILES		PILE REDRIVES	THREE BAR METAL RAIL	CONCRETE BARRIER RAIL	104" CHAIN LINK FENCE	4" SLOPE PROTECTION	EVAZOTE JOINT SEALS
	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	APPROX. LBS.	NO.	LIN. FT.	EACH	LIN. FT.	LIN. FT.	LIN. FT.	SQ. YDS.	LUMP SUM
SUPERSTRUCTURE	5,262	4,715		LUMP SUM		225,900				136.92	144.50	91.00		LUMP SUM
END BENT 1			20.6		3,542		7	560	4				316	
END BENT 2			20.6		3,540		7	560	4				238	
TOTAL	5,262	4,715	41.2	LUMP SUM	7,082	225,900	14	1,120	8	136.92	144.50	91.00	554	LUMP SUM

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON NC 100
OVER HAGGARD AVE. BETWEEN
SR 1311 AND SR 1503

—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-117
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
8/27/10

DRAWN BY : A.S. CALLAWAY DATE : 3/25/10
CHECKED BY : W.F. PARKER DATE : 4/12/10

27-AUG-2010 11:16
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LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE II 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⟩	1.24	--	1.75	0.867	1.92	A	ER	70.75	0.876	1.24	A	ER	141.49	1.30	0.867	1.85	A	ER	70.75	
		HL-93 (OPERATING)	N/A		1.60	--	1.35	0.867	2.49	A	ER	70.75	0.876	1.60	A	ER	141.49	1.00	0.867	2.40	A	ER	70.75	
		HS-20 (INVENTORY)	36.00	⟨2⟩	1.86	67.0	1.75	0.867	2.94	A	ER	70.75	0.876	1.86	A	ER	141.49	1.30	0.867	2.83	A	ER	70.75	
		HS-20 (OPERATING)	36.00		2.42	87.1	1.35	0.867	3.82	A	ER	70.75	0.876	2.42	A	ER	141.49	1.00	0.867	3.68	A	ER	70.75	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		5.90	79.7	1.40	0.867	9.06	A	ER	70.75	0.876	5.90	A	ER	141.49	1.30	0.867	6.97	A	ER	70.75	
		SNGARBS2	20.000		4.08	81.6	1.40	0.867	6.41	A	ER	70.75	0.876	4.08	A	ER	141.49	1.30	0.867	4.94	A	ER	70.75	
		SNAGRIS2	22.000		3.74	82.3	1.40	0.867	5.94	A	ER	70.75	0.876	3.74	A	ER	141.49	1.30	0.867	4.57	A	ER	70.75	
		SNCOTTS3	27.250		2.93	79.8	1.40	0.867	4.50	A	ER	70.75	0.876	2.93	A	ER	141.49	1.30	0.867	3.46	A	ER	70.75	
		SNAGGRS4	34.925		2.35	82.1	1.40	0.867	3.63	A	ER	70.75	0.876	2.35	A	ER	141.49	1.30	0.867	2.79	A	ER	70.75	
		SNS5A	35.550		2.34	83.2	1.40	0.867	3.56	A	ER	70.75	0.876	2.34	A	ER	141.49	1.30	0.867	2.74	A	ER	70.75	
		SNS6A	39.950		2.11	84.3	1.40	0.867	3.21	A	ER	70.75	0.876	2.11	A	ER	141.49	1.30	0.867	2.47	A	ER	70.75	
		SNS7B	42.000		2.03	85.3	1.40	0.867	3.06	A	ER	70.75	0.876	2.03	A	ER	141.49	1.30	0.867	2.35	A	ER	70.75	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.53	83.5	1.40	0.867	3.90	A	ER	70.75	0.876	2.53	A	ER	141.49	1.30	0.867	3.00	A	ER	70.75	
		TNT4A	33.075		2.50	82.7	1.40	0.867	3.90	A	ER	70.75	0.876	2.50	A	ER	141.49	1.30	0.867	3.00	A	ER	70.75	
		TNT6A	41.600		2.10	87.4	1.40	0.867	3.14	A	ER	70.75	0.876	2.10	A	ER	141.49	1.30	0.867	2.42	A	ER	70.75	
		TNT7A	42.000		2.07	86.9	1.40	0.867	3.14	A	ER	70.75	0.876	2.07	A	ER	141.49	1.30	0.867	2.41	A	ER	70.75	
		TNT7B	42.000		2.01	84.4	1.40	0.867	3.18	A	ER	70.75	0.876	2.01	A	ER	141.49	1.30	0.867	2.45	A	ER	70.75	
		TNAGRIT4	43.000		1.96	84.3	1.40	0.867	3.07	A	ER	70.75	0.876	1.96	A	ER	141.49	1.30	0.867	2.37	A	ER	70.75	
		TNAGT5A	45.000		1.90	85.5	1.40	0.867	2.92	A	ER	70.75	0.876	1.90	A	ER	141.49	1.30	0.867	2.25	A	ER	70.75	
		TNAGT5B	45.000	⟨3⟩	1.87	84.2	1.40	0.867	2.90	A	ER	70.75	0.876	1.87	A	ER	141.49	1.30	0.867	2.23	A	ER	70.75	
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75																				

LOAD FACTORS:

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

	YEAR	ADTT
CURRENT	2010	426
FUTURE	2030	737

NOTES:

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

ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93) **

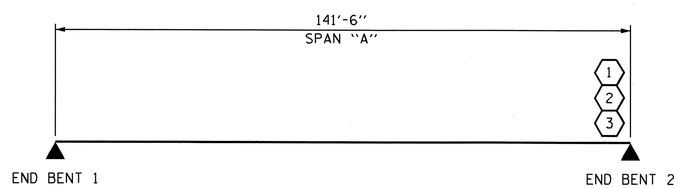
⟨2⟩ DESIGN LOAD RATING (HS-20) **

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-118
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

STR. #4 STD. NO. LRFR3

ASSEMBLED BY : A.S. CALLAWAY DATE : 5/13/10
CHECKED BY : T.L. CLELLAND DATE : 5/14/10
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08
REV. 11/12/08RR MAA/GM

28-JUL-2010 15:25
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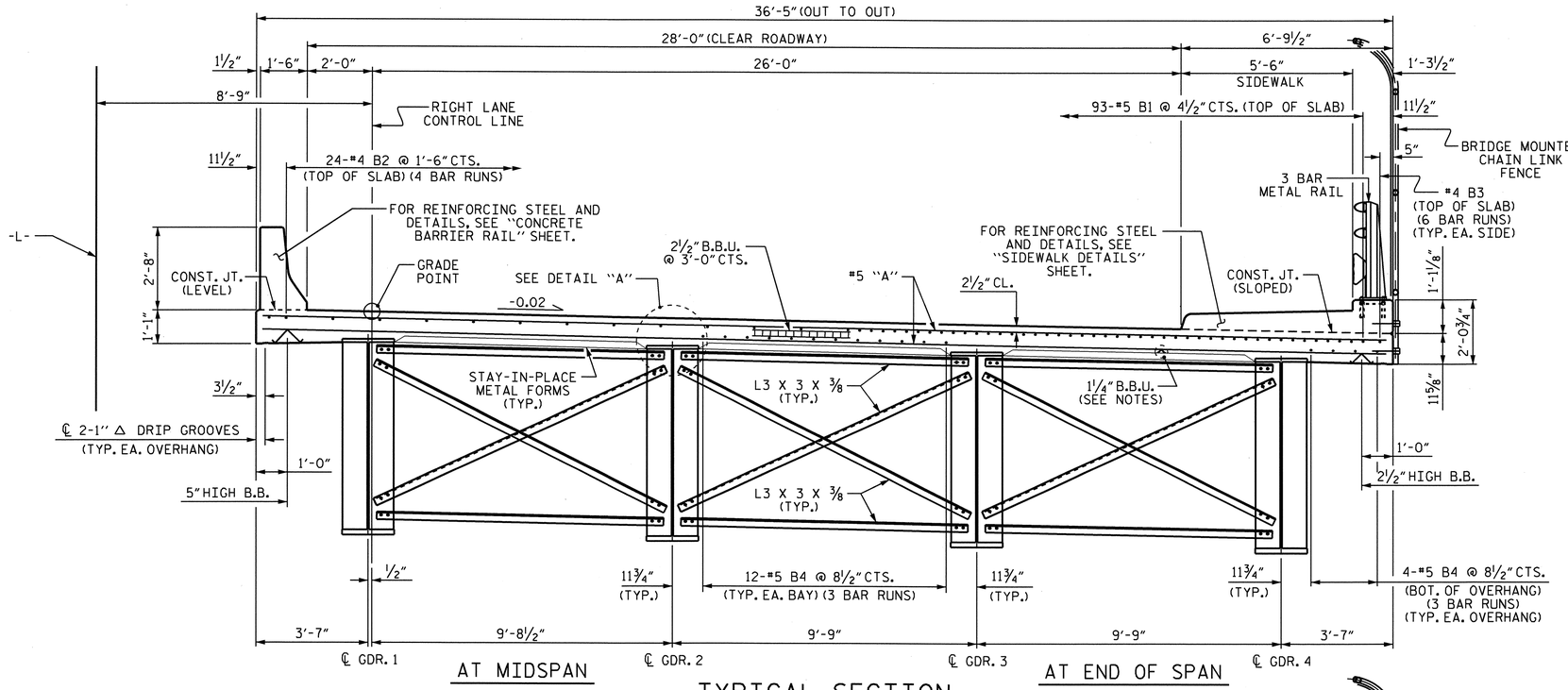
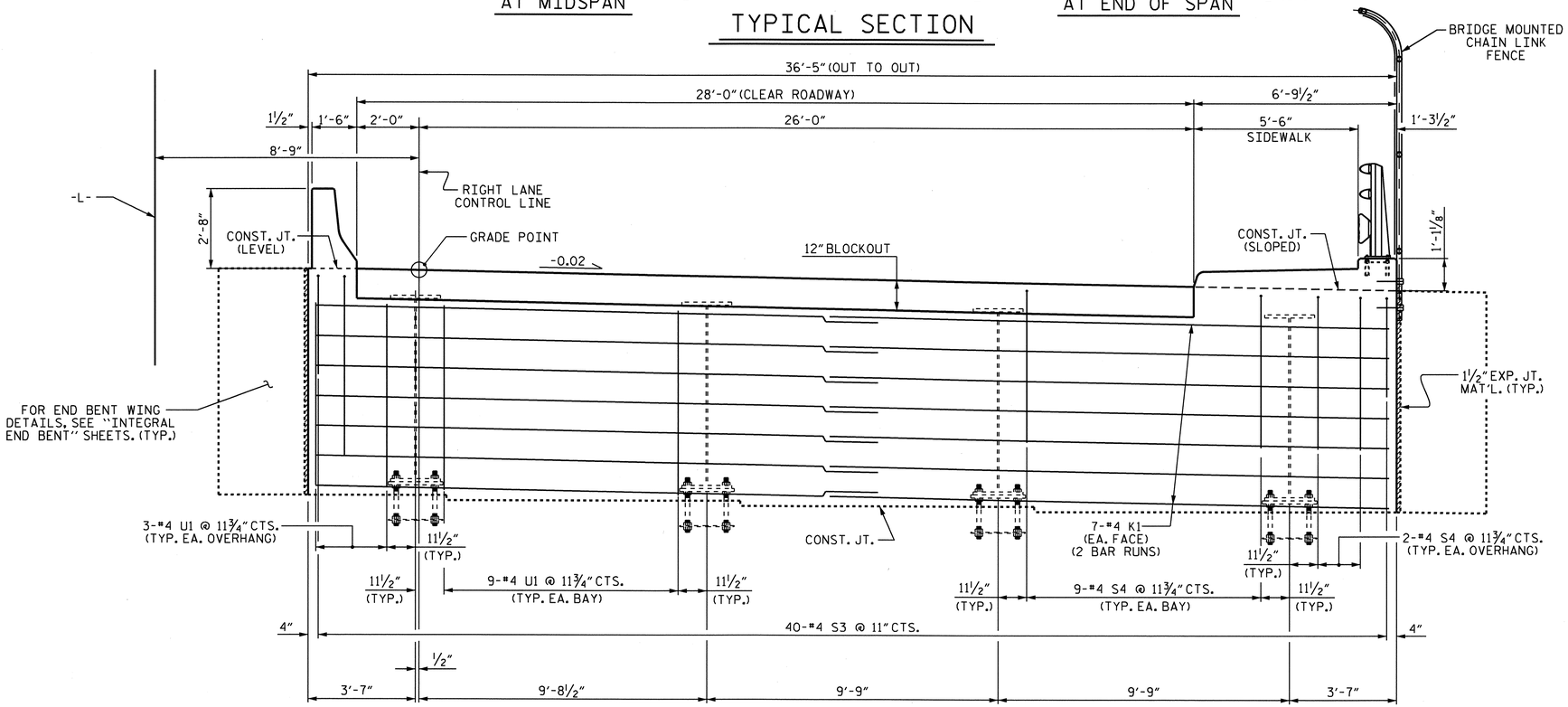
lsutton



TYPICAL SECTION



END ELEVATION

(END BENT 1 SHOWN, END BENT 2 SIMILAR) (FOR CLARITY, DECK REINFORCING STEEL NOT SHOWN)

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.

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

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

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

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

ALL REINFORCING STEEL IN BARRIER RAIL, SIDEWALK & END POST SHALL BE EXPOXY COATED.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-119
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/9/10

DRAWN BY : M.K. BEARD DATE : 5/12/09
CHECKED BY : A.S. CALLAWAY DATE : 8/20/09

28-JUL-2010 15:25
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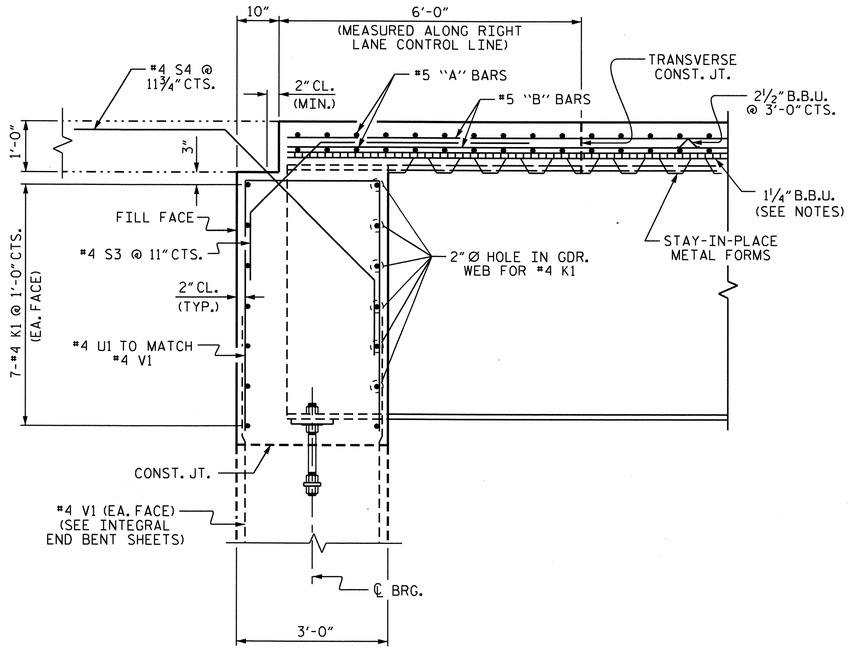
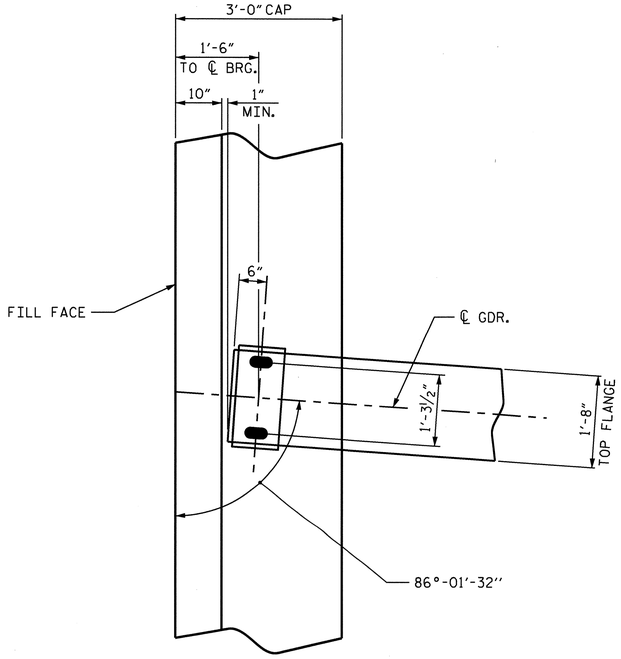
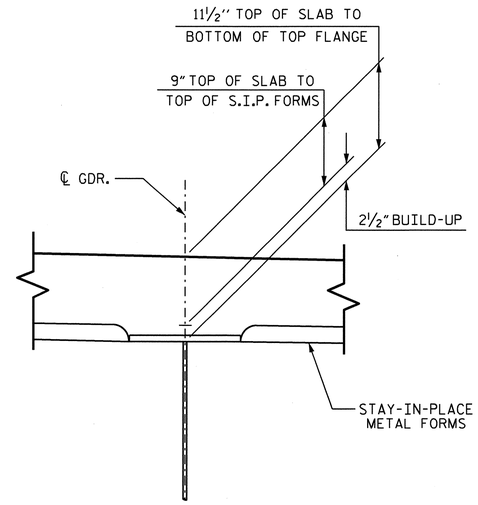


SECTION A-A

(SEE "PLAN OF SPAN" FOR LOCATION)



END BENT LAYOUT



DETAIL "A"

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-120
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON

DRAWN BY : M.K. BEARD DATE : 5/12/09
CHECKED BY : A.S. CALLAWAY DATE : 8/20/09

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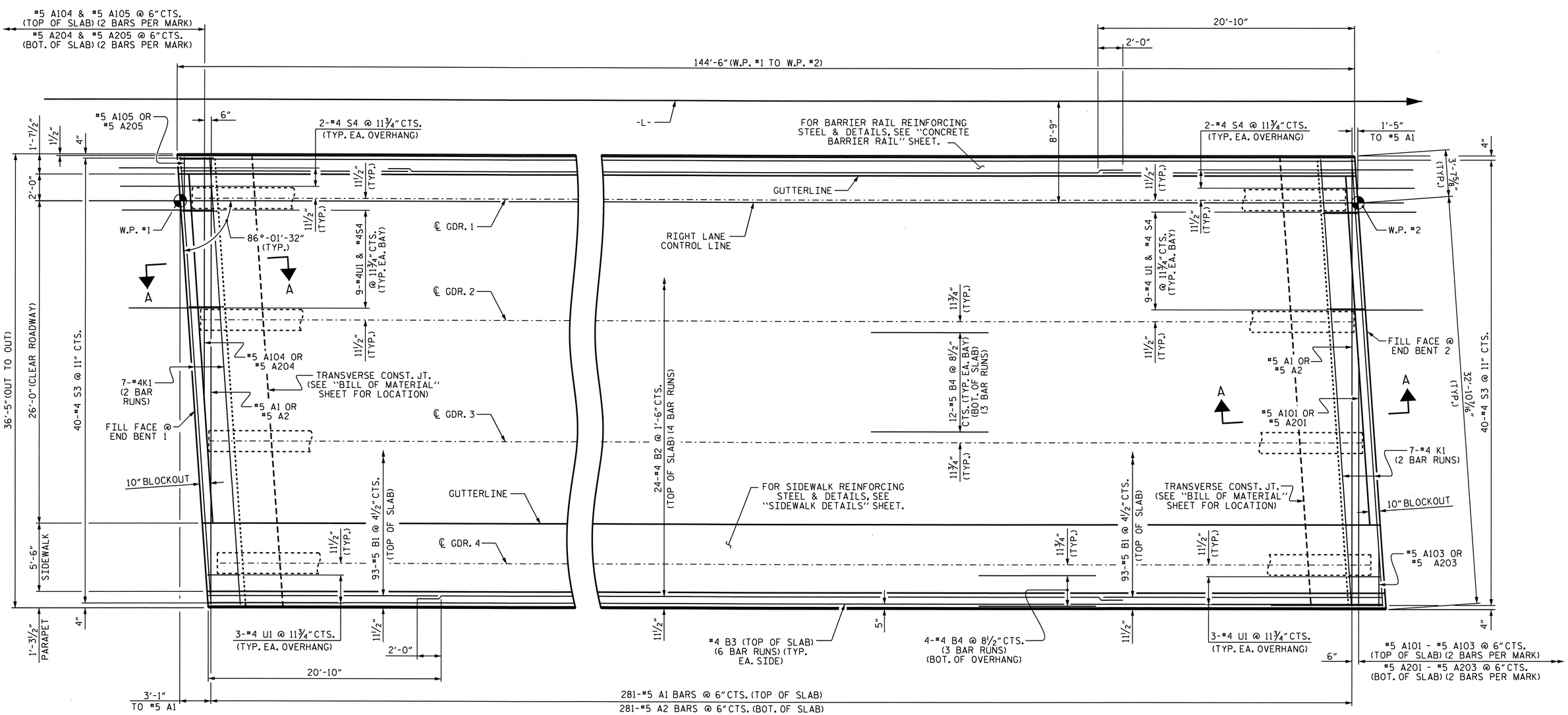
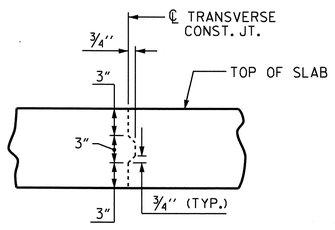


PLAN

FOR SECTION A-A, SEE "TYPICAL SECTIONS" SHEET 2 OF 2.



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

— RIGHT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-121
1			3			TOTAL SHEETS
2			4			146

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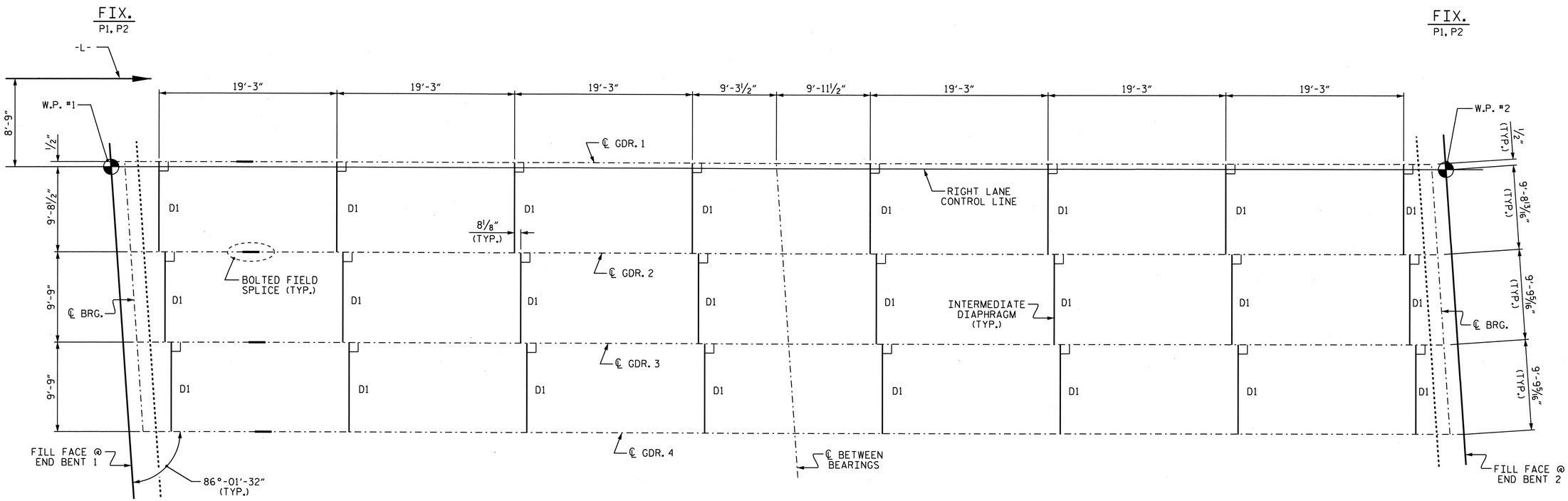
STR. #4



FRAMING PLAN

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-122
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : M.K. BEARD DATE : 4/29/09
CHECKED BY : A.S. CALLAWAY DATE : 8/20/09

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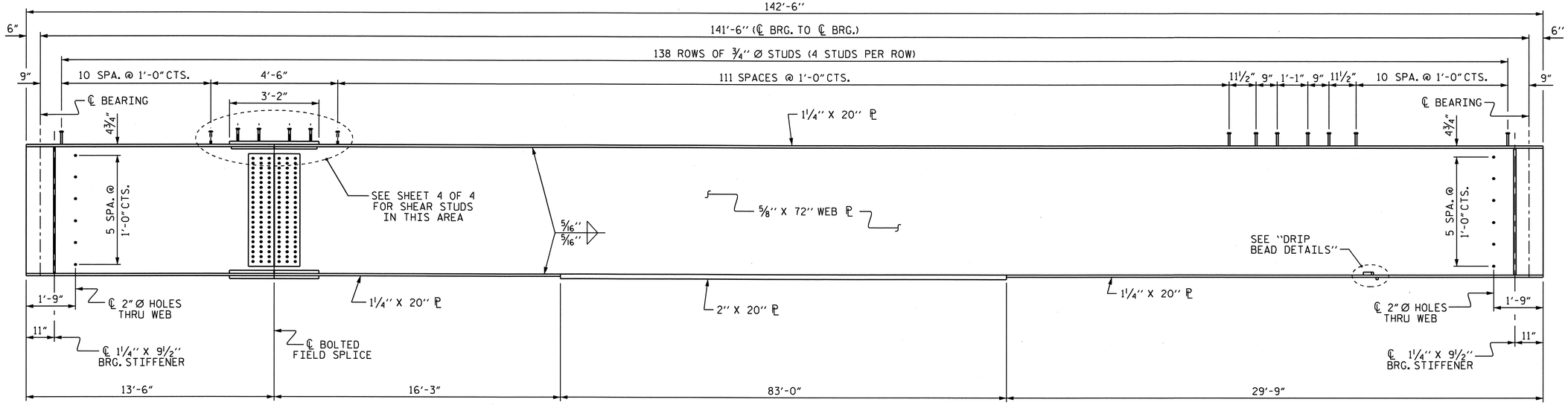
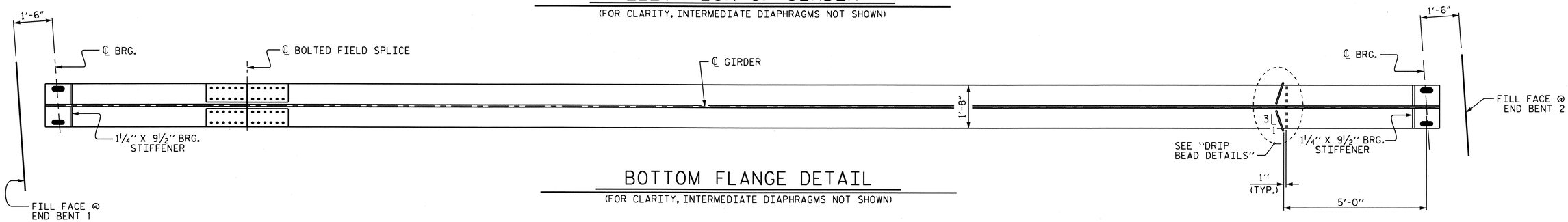


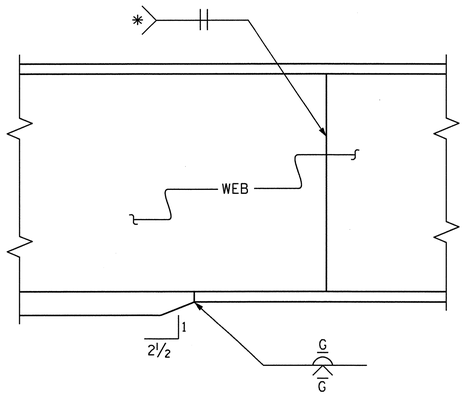
ELEVATION OF GIRDER

(FOR CLARITY, INTERMEDIATE DIAPHRAGMS NOT SHOWN)



BOTTOM FLANGE DETAIL

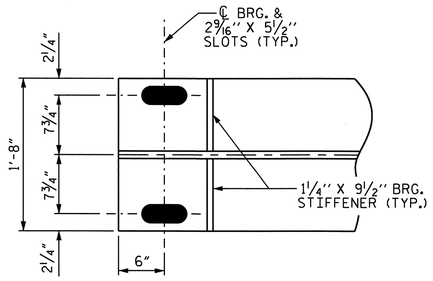
(FOR CLARITY, INTERMEDIATE DIAPHRAGMS NOT SHOWN)



ELEVATION

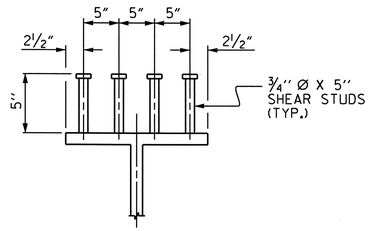
TYPICAL FLANGE AND WEB BUTT JOINT

*GRIND SMOOTH AND FLUSH ON OUTER FACE OF EXTERIOR GIRDERS

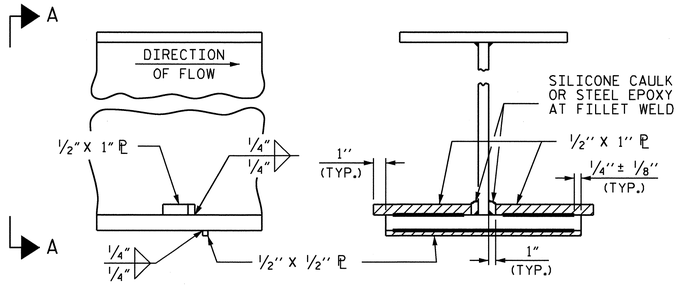


END OF GIRDER DETAIL

(BOTTOM FLANGE ONLY)



SHEAR STUD DETAIL



SECTION VIEW A-A

DRIP BEAD DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-123
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
Laura E. Sutton 7/23/10

DRAWN BY : M.K. BEARD DATE : 4/21/09
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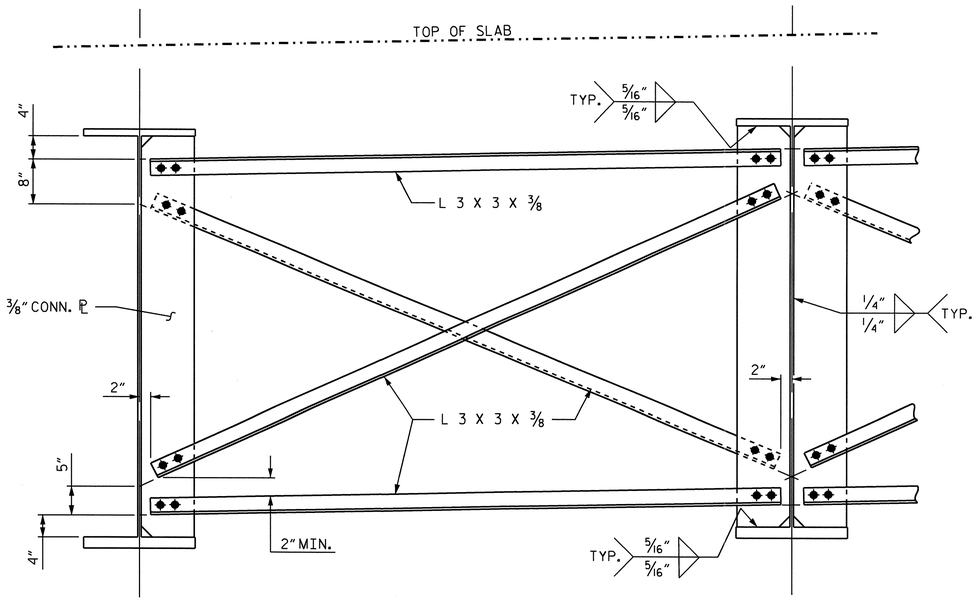
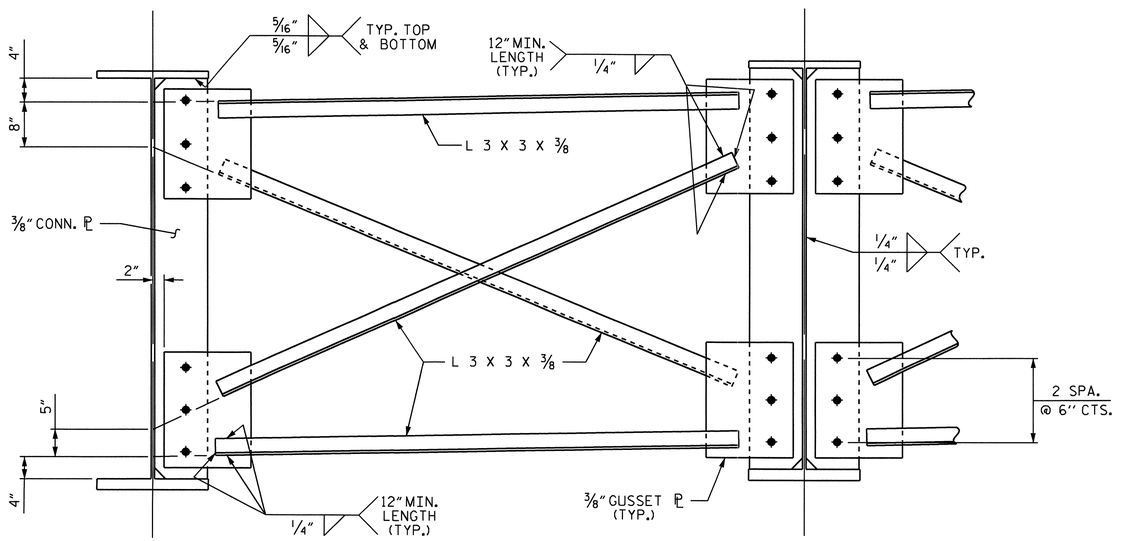


INTERMEDIATE CROSSFRAME (D1)



"OPTIONAL" INTERMEDIATE CROSSFRAME

NOTES:

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" Ø HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED. FOR HIGH STRENGTH BOLTS, SEE SPECIAL PROVISIONS.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

A CHARPY V-NOTCH TEST IS REQUIRED FOR WEB PLATES, TOP FLANGE PLATES WITHIN 15' OF THE END OF THE GIRDER, BOTTOM FLANGE PLATES, BOTTOM FLANGE SPLICE PLATES AND WEB SPLICE PLATES (IF USED) FOR ALL GIRDERS AND IN ACCORDANCE WITH ARTICLE 1072-9 OF THE STANDARD SPECIFICATIONS.

SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES. KEEP 6" MINIMUM BETWEEN CONNECTOR PLATE OR TRANSVERSE STIFFENER WELDS AND WEB OR FLANGE SHOP SPLICES.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

TENSION ON THE AASHTO M164 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS. FOR DIRECT TENSION INDICATORS, SEE SPECIAL PROVISIONS.

END OF GIRDERS SHALL BE PLUMB.

SOLE PLATES, ANCHORAGE PLATES, AND STRUCTURAL PLATE WASHERS SHALL BE AASHTO M270 GRADE 50W AND SHALL NOT BE GALVANIZED. ANCHOR BOLTS, NUTS AND STANDARD WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

TOP NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AFTER SETTING THE GIRDERS, AND SUBSEQUENTLY FULLY TIGHTENED JUST PRIOR TO THE FINAL POUR.

NORTH CAROLINA PROFESSIONAL SEAL 9804 ENGINEER R. M. GIROLAMI
9-30-10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SUPERSTRUCTURE
STRUCTURAL STEEL DETAILS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-124
1			3			TOTAL SHEETS
2			4			146

STR. #4

DRAWN BY : M.K. BEARD DATE : 4/21/09
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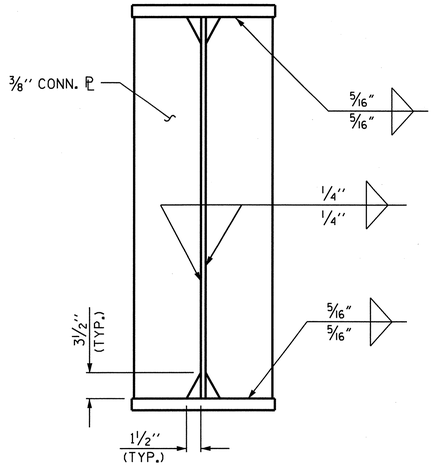
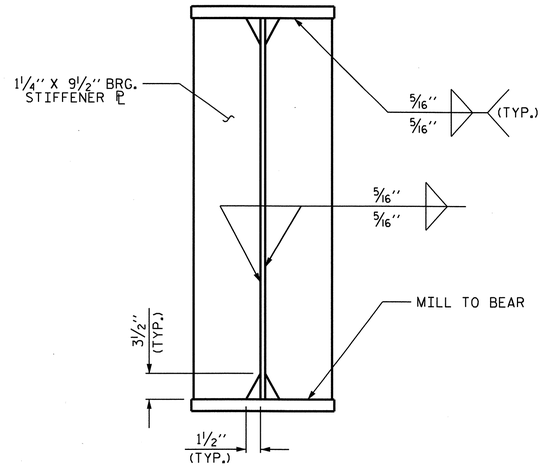
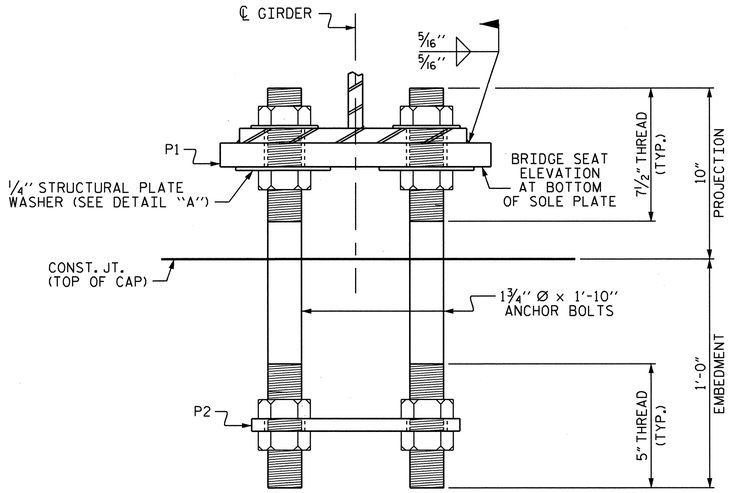


CONNECTOR PLATE



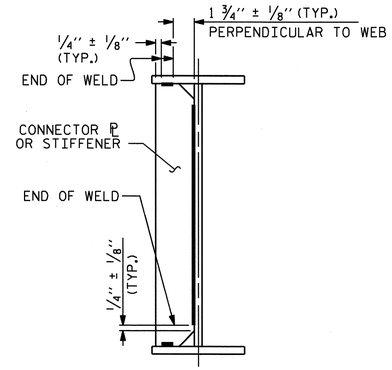
BEARING STIFFENER PLATE



END VIEW
FIXED

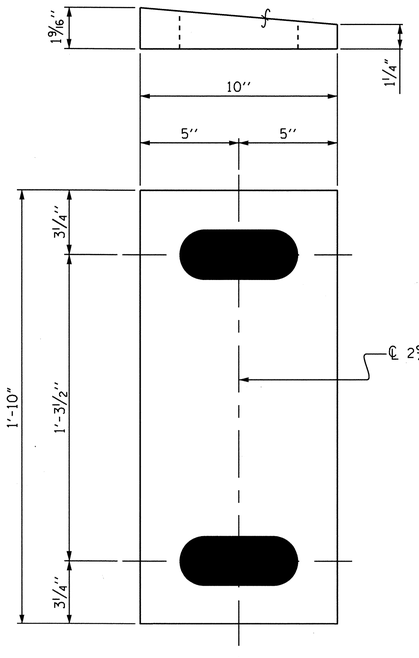
UP-STATION

TYPICAL ANGLE TO GUSSET PLATE CONNECTION

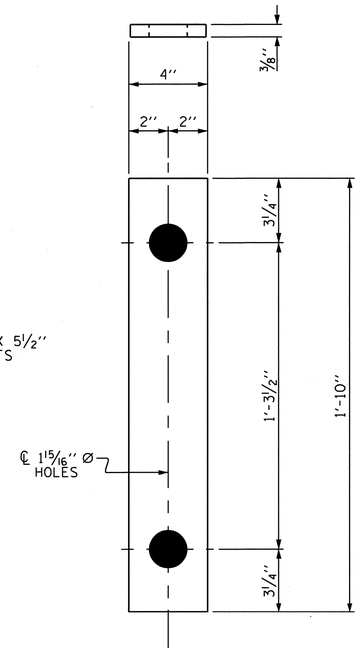


TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS

WELD TERMINATION DETAILS

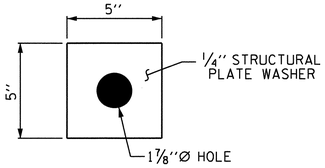


SOLE PLATE (P1)
(8 REQ'D)



ANCHORAGE PLATE (P2)
(8 REQ'D)

BEARING DETAILS



DETAIL "A"

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
STRUCTURAL STEEL DETAILS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-125
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/28/10

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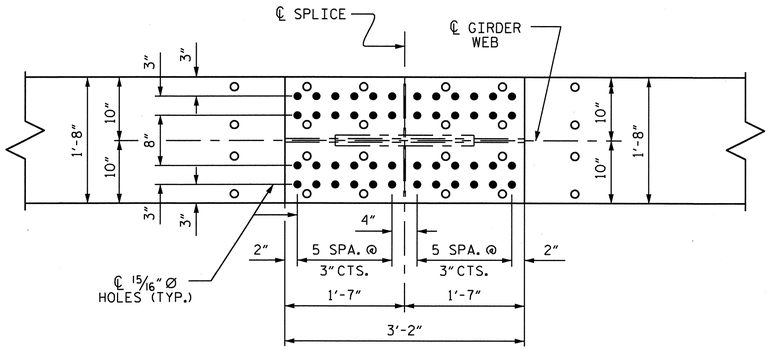
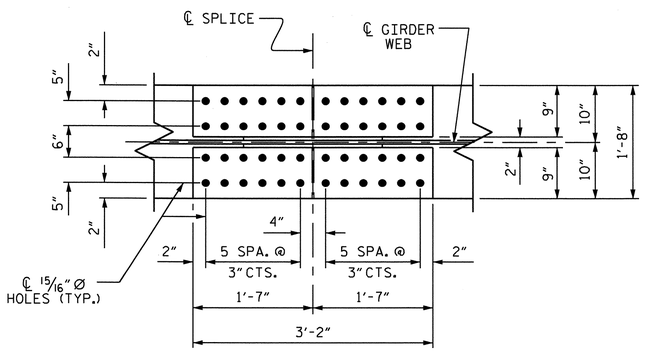
STR. #4

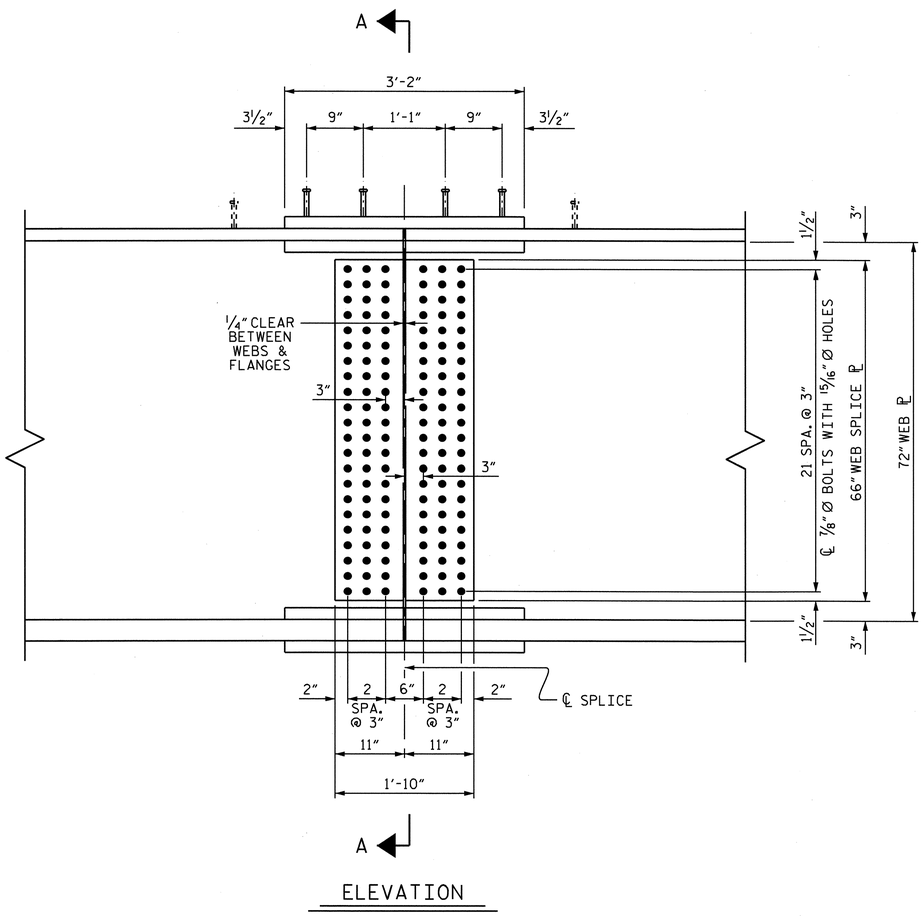


PLAN (TOP OF TOP FLANGE)

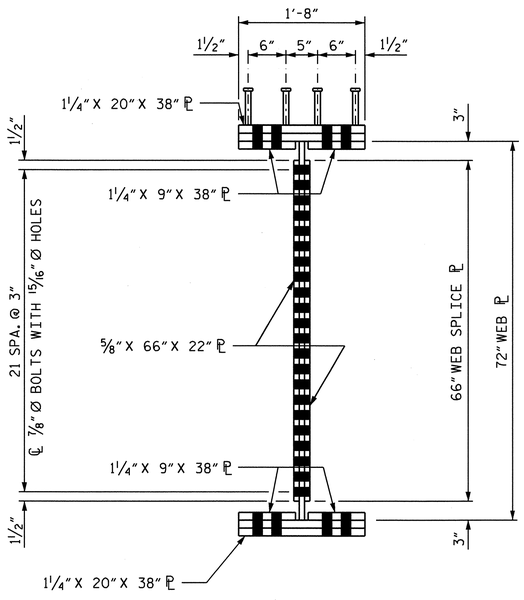


PLAN (TOP OF BOTTOM FLANGE)

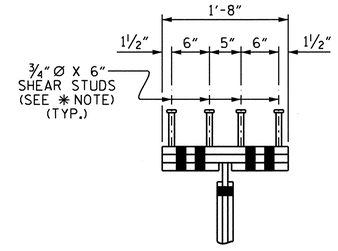
DESCRIPTION	SIZE	NO. REQ'D. FOR ONE FIELD SPLICE	TOTAL REQ'D.
WEB SPLICE ℙ	5/8" X 66" X 22"	2	8
TOP FLANGE SPLICE ℙ (TOP OF FLANGE)	1 1/4" X 20" X 38"	1	4
TOP FLANGE SPLICE ℙ (BOTTOM OF FLANGE)	1 1/4" X 9" X 38"	2	8
BOTTOM FLANGE SPLICE ℙ (TOP OF FLANGE)	1 1/4" X 9" X 38"	2	8
BOTTOM FLANGE SPLICE ℙ (BOTTOM OF FLANGE)	1 1/4" X 20" X 38"	1	4



ELEVATION



SECTION A-A



SHEAR STUD DETAIL
FOR TOP FLANGE SPLICE PLATE

✳ NOTE: SHEAR STUDS ARE TO BE WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY.

BOLTED FIELD SPLICE DETAILS

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
STRUCTURAL STEEL DETAILS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-126
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/20/10

DRAWN BY : M.K. BEARD DATE : 4/21/09
CHECKED BY : A.S. CALLAWAY DATE : 8/20/09

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DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN A																				
	GIRDER 1																				
TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.045	0.057	0.068	0.078	0.085	0.091	0.094	0.095	0.094	0.091	0.085	0.078	0.068	0.057	0.045	0.031	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.034	0.085	0.133	0.175	0.213	0.244	0.270	0.288	0.299	0.303	0.299	0.288	0.270	0.244	0.213	0.175	0.133	0.085	0.034	0
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0	0.004	0.007	0.010	0.013	0.015	0.017	0.019	0.020	0.021	0.021	0.021	0.020	0.019	0.017	0.015	0.013	0.010	0.007	0.004	0
TOTAL DEAD LOAD DEFLECTION	0	0.054	0.123	0.188	0.245	0.296	0.339	0.3874	0.399	0.414	0.419	0.414	0.399	0.374	0.339	0.296	0.245	0.188	0.123	0.054	0
REQUIRED CAMBER	0	5/8''	1 1/2''	2 1/4''	2 15/16''	3 9/16''	4 1/16''	4 1/2''	4 13/16''	4 15/16''	5''	4 15/16''	4 13/16''	4 1/2''	4 1/16''	3 9/16''	2 15/16''	2 1/4''	1 1/2''	5/8''	0
	GIRDERS 2 & 3																				
TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.046	0.059	0.070	0.080	0.088	0.093	0.097	0.098	0.097	0.093	0.088	0.080	0.070	0.059	0.046	0.031	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.035	0.087	0.136	0.179	0.217	0.250	0.275	0.294	0.306	0.309	0.306	0.294	0.275	0.250	0.217	0.179	0.136	0.087	0.035	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK AND BARRIER RAIL	0	0.009	0.018	0.027	0.034	0.041	0.047	0.051	0.054	0.056	0.057	0.056	0.054	0.051	0.047	0.041	0.034	0.027	0.018	0.009	0
TOTAL DEAD LOAD DEFLECTION	0	0.060	0.136	0.209	0.272	0.328	0.377	0.414	0.441	0.459	0.464	0.459	0.441	0.414	0.377	0.328	0.272	0.209	0.136	0.060	0
REQUIRED CAMBER	0	3/4''	1 5/8''	2 1/2''	3 1/4''	3 15/16''	4 1/2''	4 15/16''	5 5/16''	5 1/2''	5 9/16''	5 1/2''	5 5/16''	4 15/16''	4 1/2''	3 15/16''	3 1/4''	2 1/2''	1 5/8''	3/4''	0
	GIRDER 4																				
TWENTIETH POINTS	BRG.	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	BRG.
DEFLECTION DUE TO WEIGHT OF GIRDER	0	0.016	0.031	0.045	0.057	0.068	0.078	0.085	0.091	0.094	0.095	0.094	0.091	0.085	0.078	0.068	0.057	0.045	0.031	0.016	0
DEFLECTION DUE TO WEIGHT OF SLAB *	0	0.034	0.085	0.133	0.175	0.213	0.244	0.270	0.288	0.299	0.303	0.299	0.288	0.270	0.244	0.213	0.175	0.133	0.085	0.034	0
DEFLECTION DUE TO WEIGHT OF SIDEWALK	0	0.009	0.018	0.027	0.034	0.041	0.047	0.051	0.055	0.057	0.057	0.057	0.055	0.051	0.047	0.041	0.034	0.027	0.018	0.009	0
TOTAL DEAD LOAD DEFLECTION	0	0.059	0.134	0.205	0.266	0.322	0.369	0.406	0.434	0.450	0.455	0.450	0.434	0.406	0.369	0.322	0.266	0.205	0.134	0.059	0
REQUIRED CAMBER	0	1/16''	1 5/8''	2 7/16''	3 3/16''	3 7/8''	4 7/16''	4 7/8''	5 3/16''	5 3/8''	5 7/16''	5 3/8''	5 3/16''	4 7/8''	4 7/16''	3 7/8''	3 3/16''	2 7/16''	1 5/8''	1/16''	0

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
— RIGHT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/28/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-127
1			3			TOTAL SHEETS
2			4			146

DRAWN BY : M.K. BEARD DATE : 4/27/09
CHECKED BY : A.S. CALLAWAY DATE : 8/20/09

28-JUL-2010 15:24
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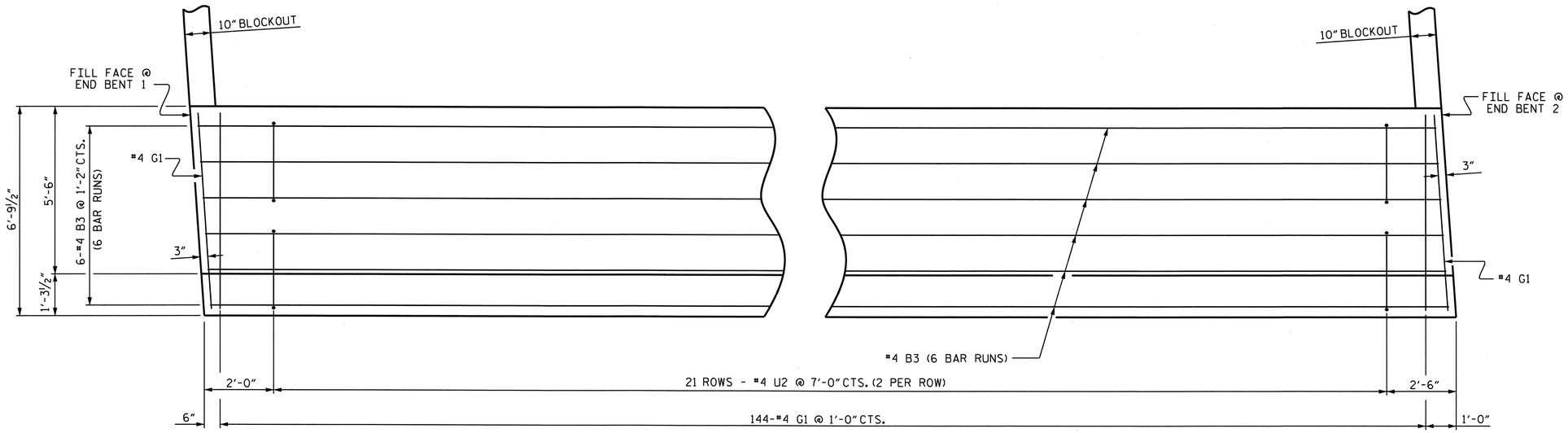
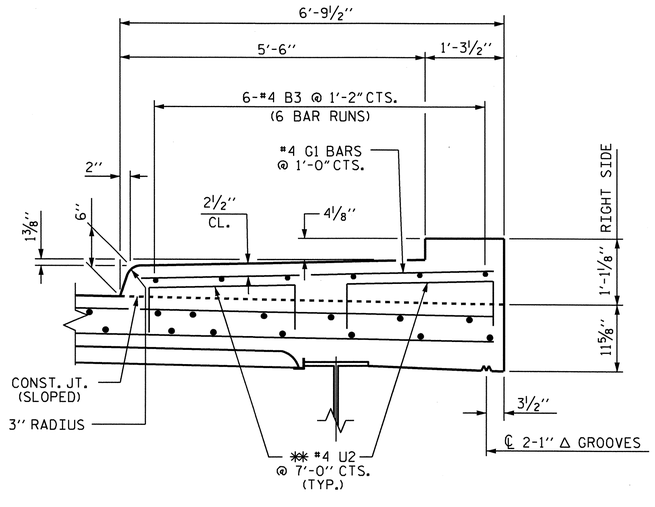
lsutton

STR. #4



PLAN OF SIDEWALK



SECTION THRU SIDEWALK

✱✱ #4 U2 MAY BE PUSHED INTO GREEN CONCRETE AFTER SPAN HAS BEEN SCREEDED OFF.

NOTES

ALL REINFORCING STEEL IN THE SIDEWALK SHALL BE EPOXY COATED.

FOR SIDEWALK QUANTITIES, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET. THE PAYMENT FOR THE SIDEWALK SHALL BE INCLUDED IN THE SQUARE FOOT PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

FOR SIDEWALK COVER PLATE DETAILS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEETS.

GROOVED CONTRACTION JOINTS ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SIDEWALK DETAILS

— RIGHT LANE —

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/30/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-128
1			3			TOTAL SHEETS
2			4			146

STR. #4

DRAWN BY : M.K. BEARD DATE : 5/18/09
CHECKED BY : A.S. CALLAWAY DATE : 8/20/09

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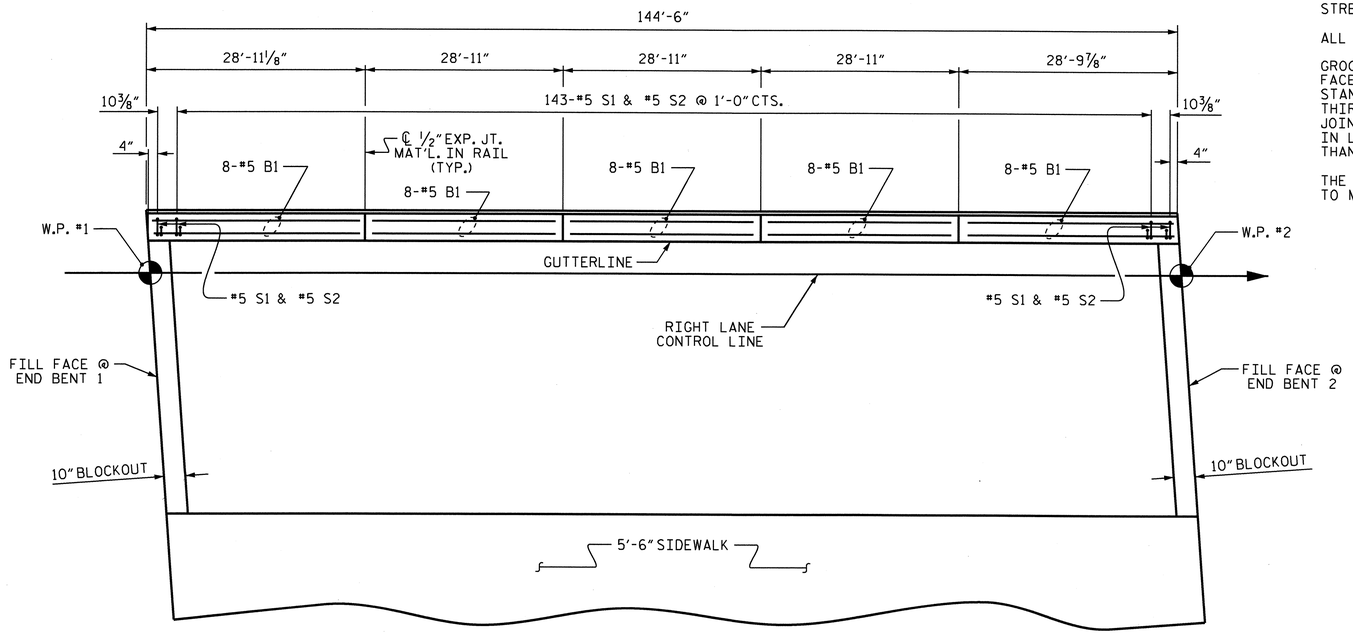


PLAN

NOTES

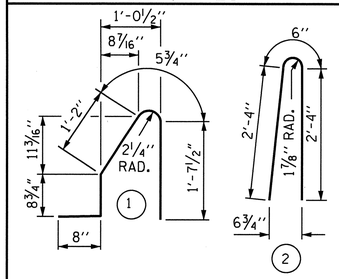
THE BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

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 #5 S1 AND #5 S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, IN ORDER TO MAINTAIN 2" MIN. CLEARANCE TO THE ½" EXPANSION JOINT MATERIAL.

BAR TYPES

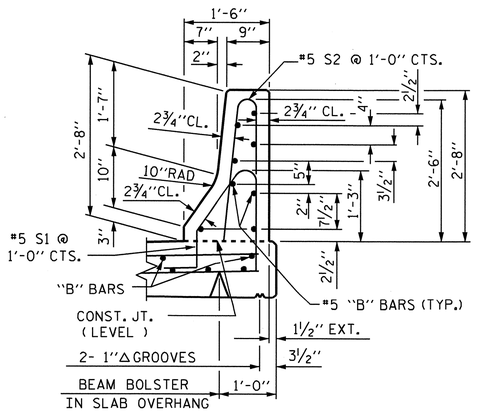


ALL BAR DIMENSIONS ARE OUT TO OUT.

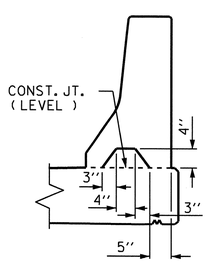
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

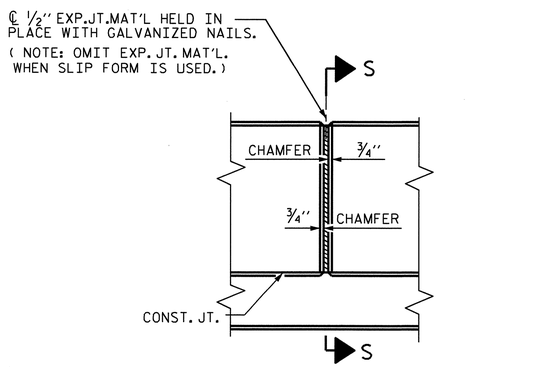
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B1	40	#5	STR	28'-6"	1189
✱ S1	145	#5	1	4'-8"	706
✱ S2	145	#5	2	5'-2"	781
✱ EPOXY COATED REINFORCING STEEL				LBS.	2,676
CLASS AA CONCRETE				CU. YDS.	14.5
CONCRETE BARRIER RAIL				LIN. FT.	144.50



SECTION THRU RAIL



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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE BARRIER RAIL
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-129
1			3			TOTAL SHEETS
2			4			146

STR. #4

STD. NO. CBR1

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/29/10

ASSEMBLED BY : M.K. BEARD		DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY		DATE : 8/20/09
DRAWN BY : ARB 5/87	REV. 10/17/00	RWW/LES
CHECKED BY : SJD 9/87	REV. 5/7/03R	RWW/JTE
	REV. 5/1/06R	TLA/GM

28-JUL-2010 15:24
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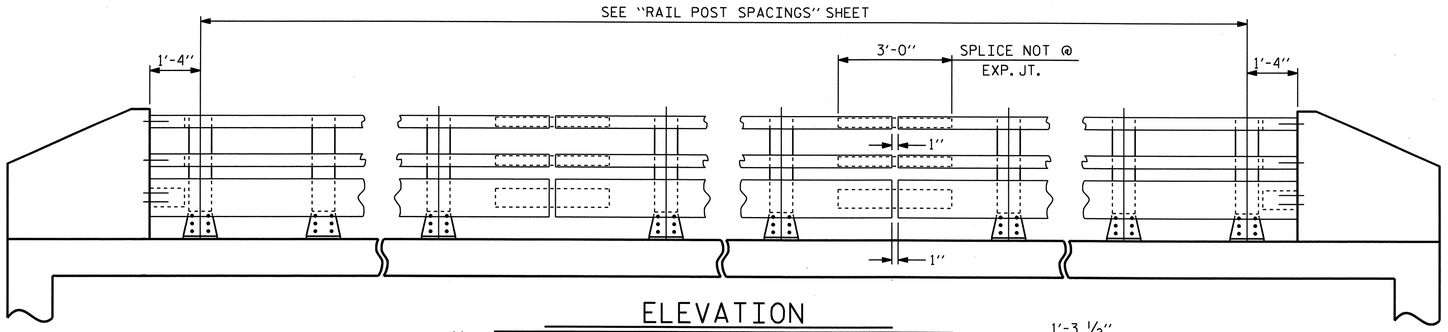
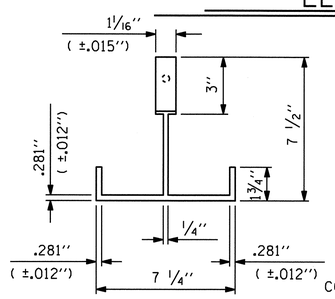
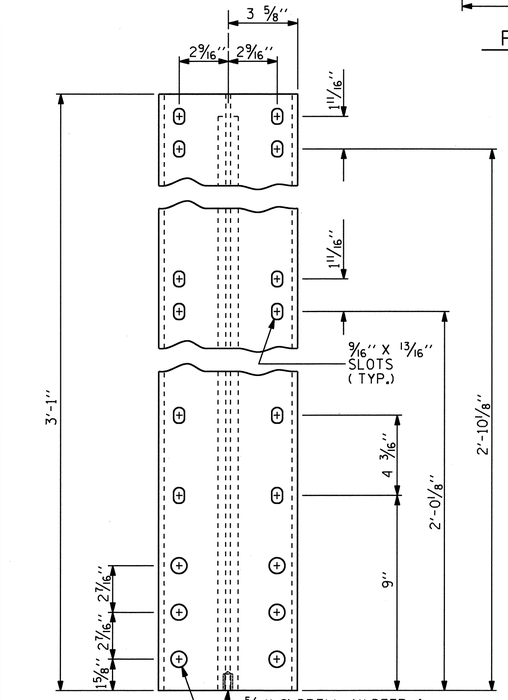


ELEVATION

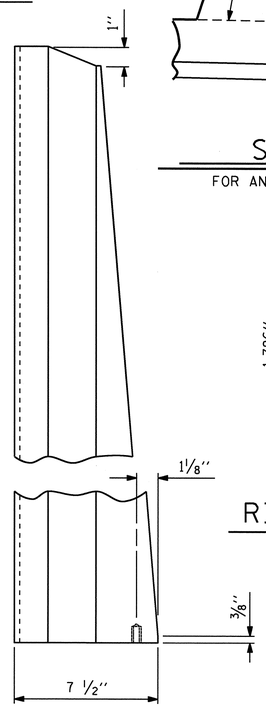
NOTE:
FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR7.



PLAN

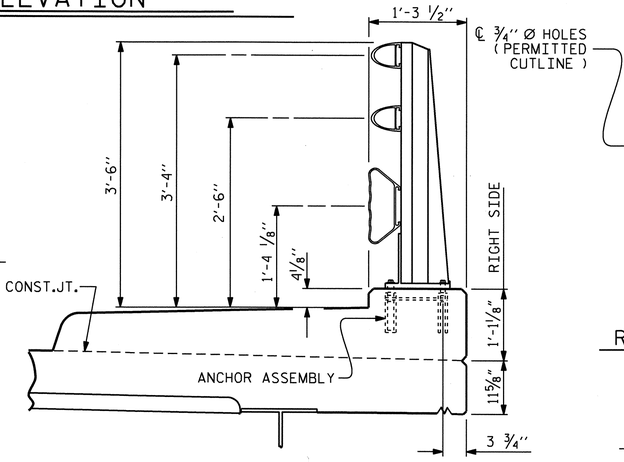


FRONT ELEVATION



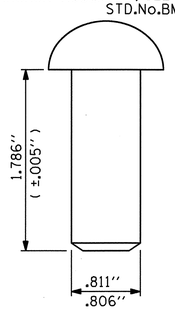
SIDE ELEVATION

DETAILS OF POST

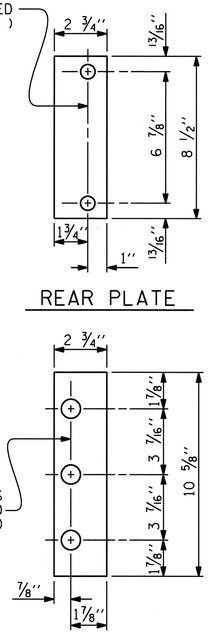


SECTION THRU RAIL

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6



RIVET DETAIL

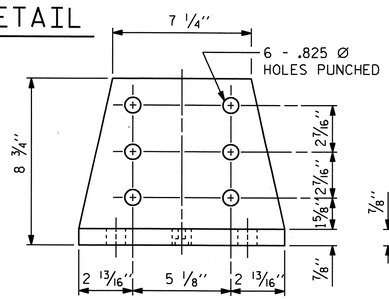


REAR PLATE

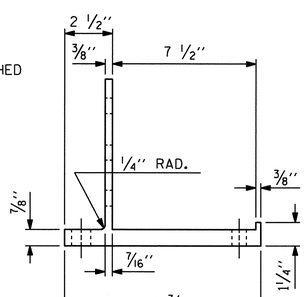
FRONT PLATE

SHIM DETAILS

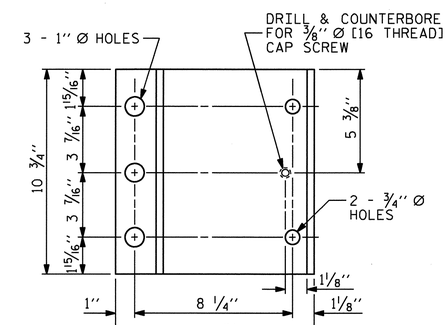
NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



FRONT ELEVATION



SIDE ELEVATION



PLAN

POST BASE DETAILS

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6.

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

PAY LENGTH = 136.92 LIN. FT.

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-130
1			3			TOTAL SHEETS
2			4			146

STR. #4

STD. NO. BMR5

ASSEMBLED BY : M.K. BEARD	DATE : 5/5/09		
CHECKED BY : A.S. CALLAWAY	DATE : 8/20/09		
DRAWN BY : JMB 1/88	REV. 10/17/00	RWW/LES	
CHECKED BY : GGH 1/88	REV. 5/7/03	RWW/JTE	
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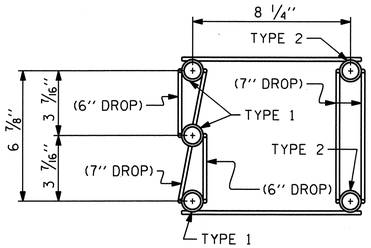
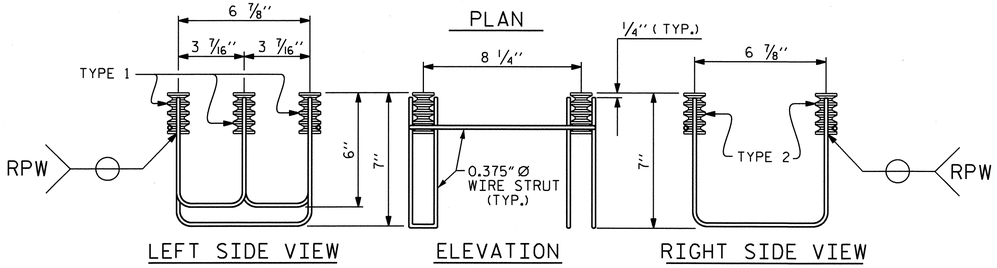


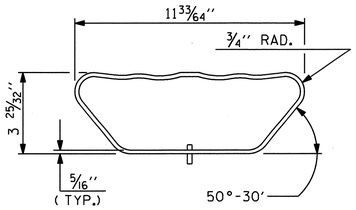
TYPE 1 FERRULE
THREADED STEEL FERRULES WITH CLOSED BOTTOM TO FIT 3/4" Ø BOLT WITH ROUND WASHER.

TYPE 2 FERRULE
THREADED STEEL FERRULES WITH CLOSED BOTTOM TO FIT 5/8" Ø BOLT WITH ROUND WASHER.

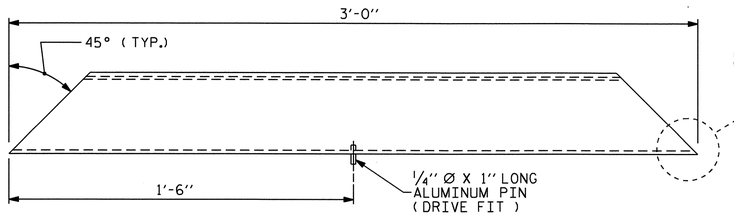


5-BOLT METAL RAIL ANCHOR ASSEMBLY

(24 ASSEMBLIES REQUIRED)

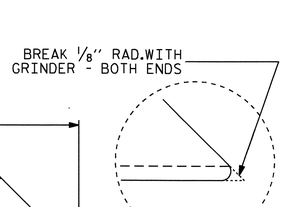


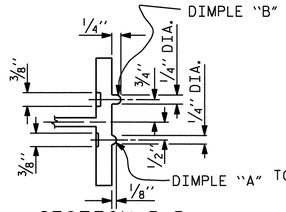
END VIEW



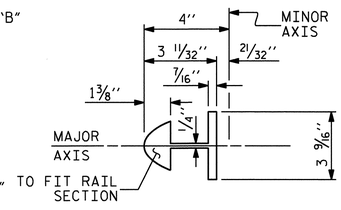
PLAN VIEW

BOTTOM RAIL EXPANSION BAR

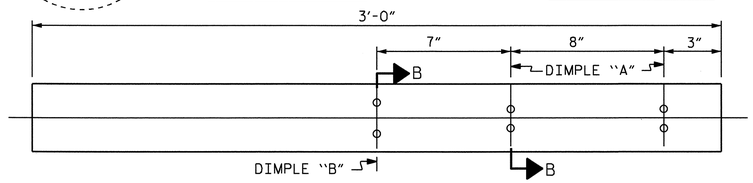




SECTION B-B

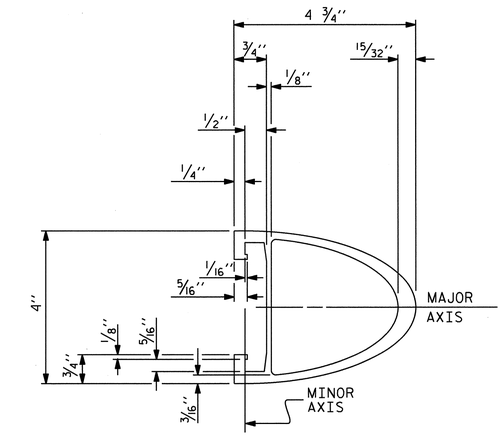


BAR SECTION

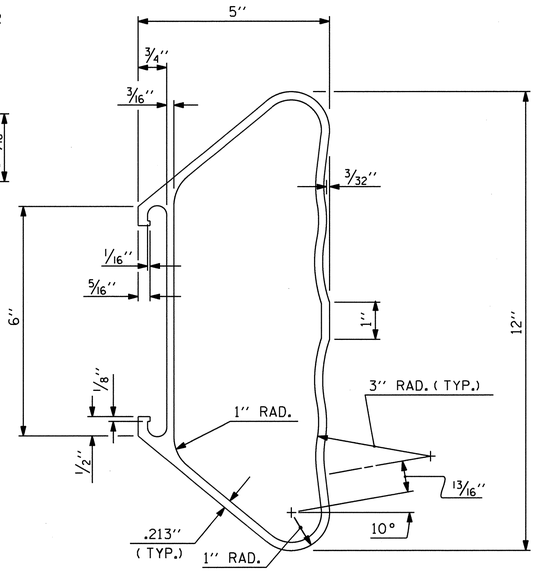


BACK ELEVATION

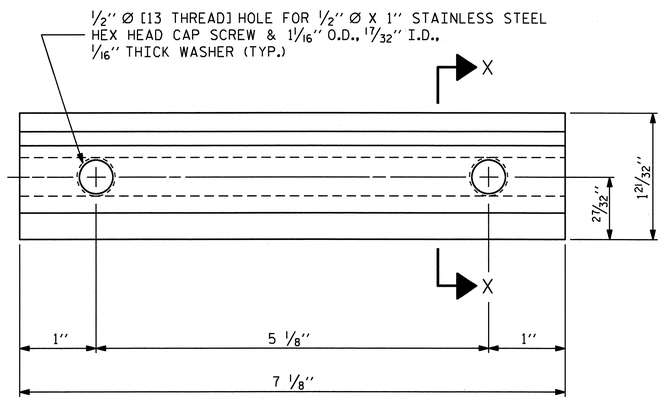
TOP & MIDDLE RAIL EXPANSION BAR



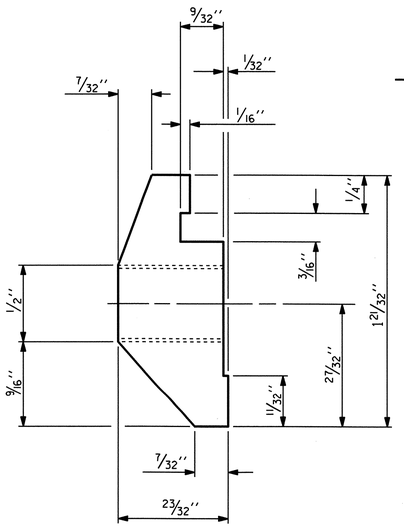
TOP & MIDDLE RAIL SECTION



BOTTOM RAIL SECTION



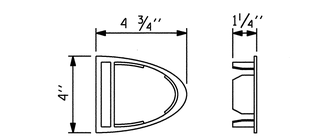
ELEVATION



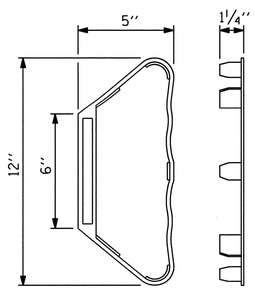
SECTION X-X

CLAMP BAR DETAIL

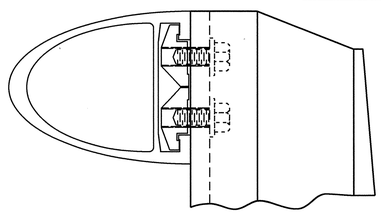
(6 REQUIRED PER POST)



TOP & MIDDLE RAIL CAP



BOTTOM RAIL CAP



CLAMP ASSEMBLY

TOP RAIL SHOWN
(MIDDLE & BOTTOM RAIL ARE SIMILAR)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES AND 1 3/4" FOR 5/8" FERRULES.

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

C. 2 - 5/8" Ø X 2 1/4" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 5/8" Ø X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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

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

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

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

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— RIGHT LANE —

ASSEMBLED BY : M.K. BEARD	DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY	DATE : 8/20/09

DRAWN BY : JMB 1/88	REV. 7/10/01 RWW/LES
CHECKED BY : GGH 1/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-131
1			3			TOTAL SHEETS
2			4			146

STR. #4

STD. NO. BMR6

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/29/10

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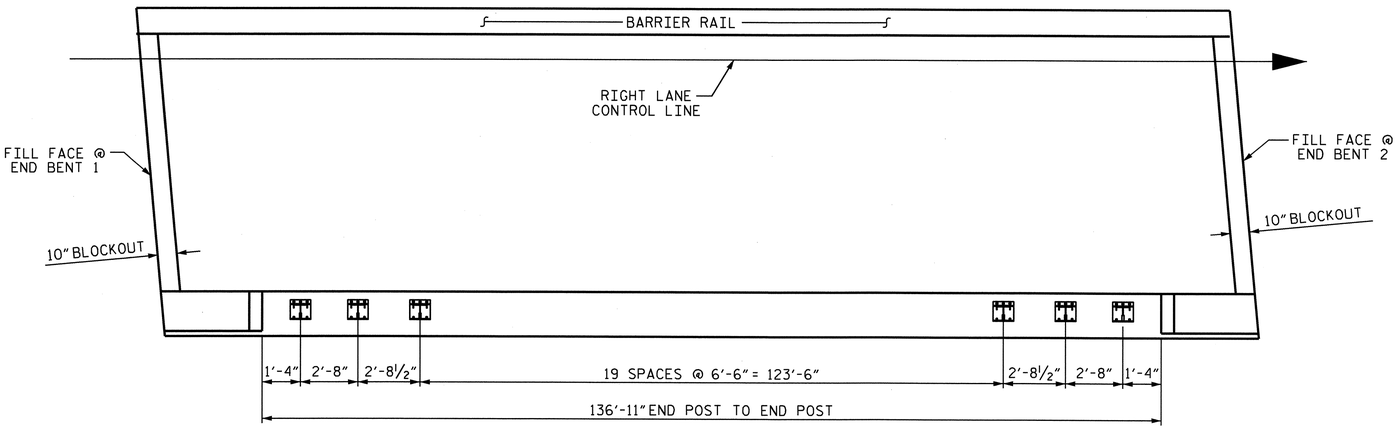
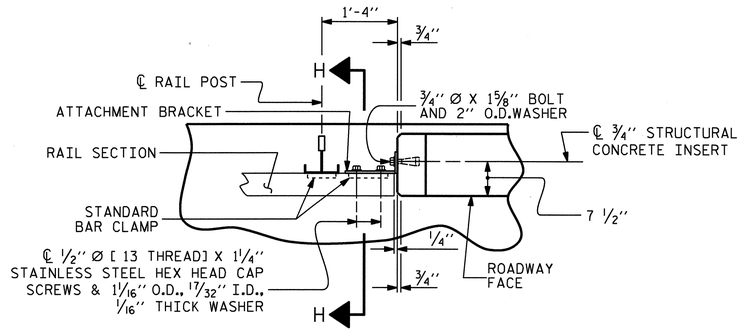
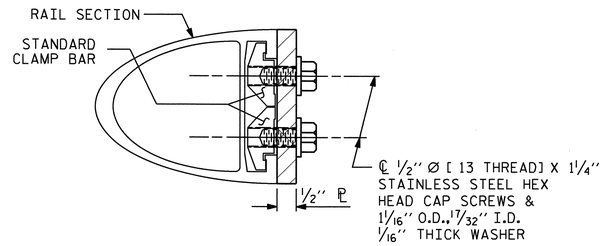


PLAN OF RAIL POST SPACING



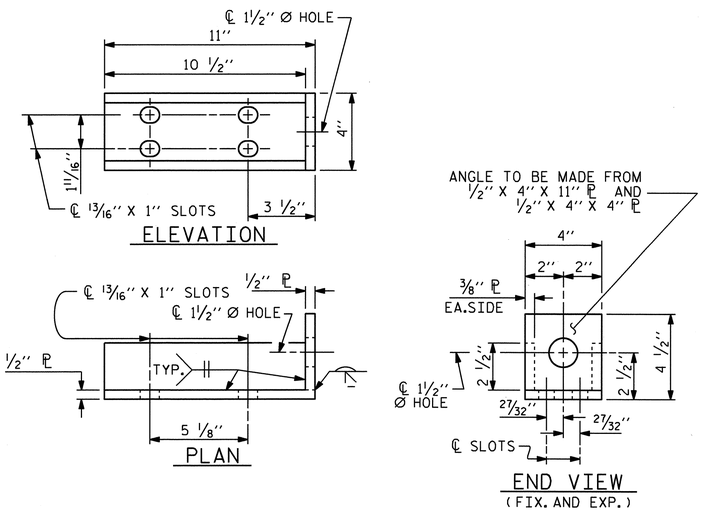
PLAN OF RAIL AND END POST

(STIFFENER ON ½" ℙ NOT SHOWN FOR CLARITY)



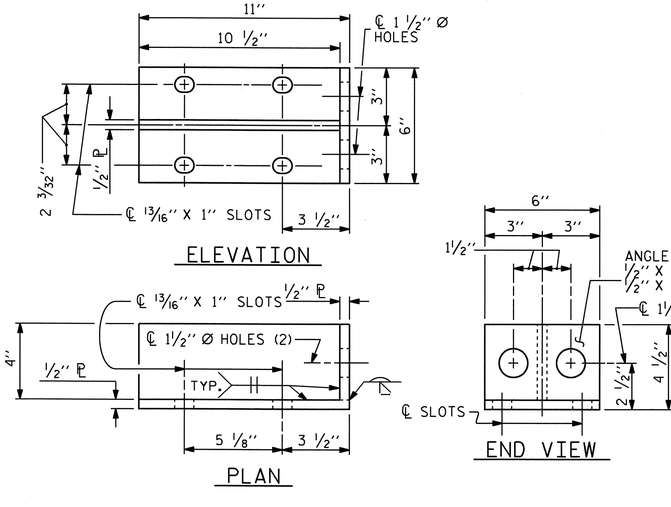
SECTION H-H

(FOR TOP & MIDDLE RAIL)



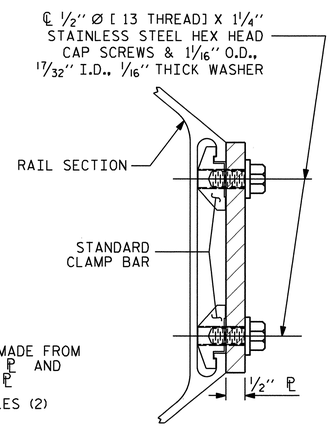
DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)



DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)



SECTION H-H

(FOR BOTTOM RAIL)

NOTES

METAL RAIL TO END POST CONNECTION

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

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

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

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

D. STANDARD CLAMP BARS (STD. No. BMR6).

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.

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

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

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

NOTES

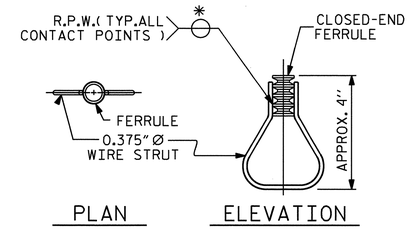
STRUCTURAL CONCRETE INSERT

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

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

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

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



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

— RIGHT LANE —

ASSEMBLED BY : M.K. BEARD	DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY	DATE : 8/20/09

DRAWN BY : JMB 1/88	REV. 7/10/01 RWW/LES
CHECKED BY : GGH 1/88	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-132
1			3			TOTAL SHEETS
2			4			146

STR. #4

STD. NO. BMR7

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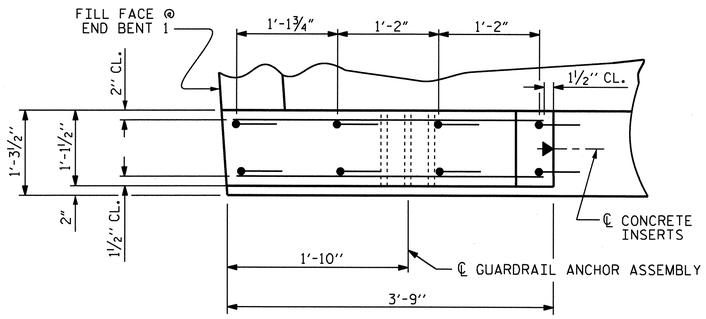
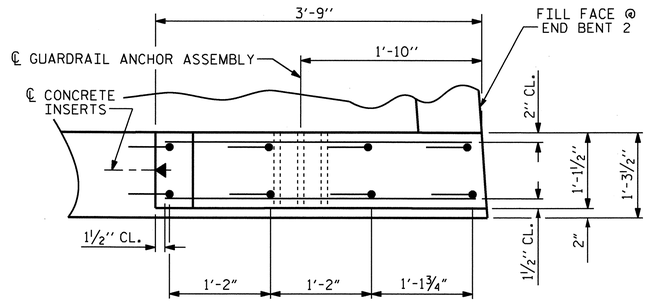
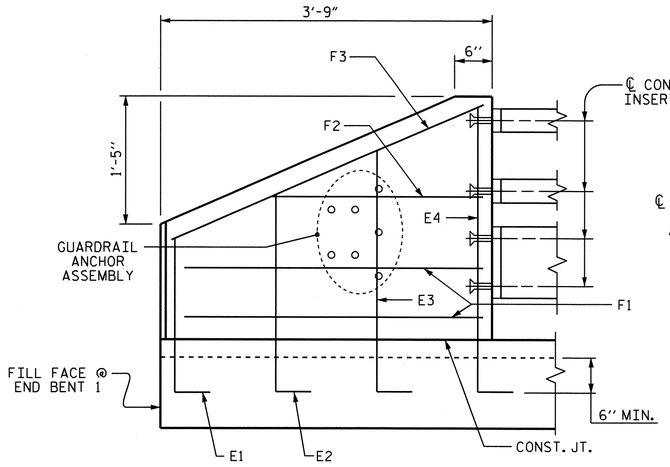
NOTE:

QUANTITIES FOR THE END POSTS ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL.

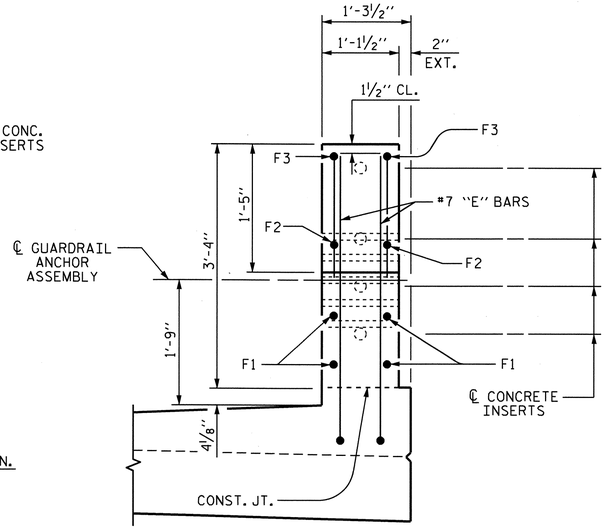




PLAN



ELEVATION



END VIEW

END POST DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

RAIL POST SPACINGS AND END OF RAIL DETAILS

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-133
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : M.K. BEARD DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY DATE : 8/20/09

28-JUL-2010 15:24
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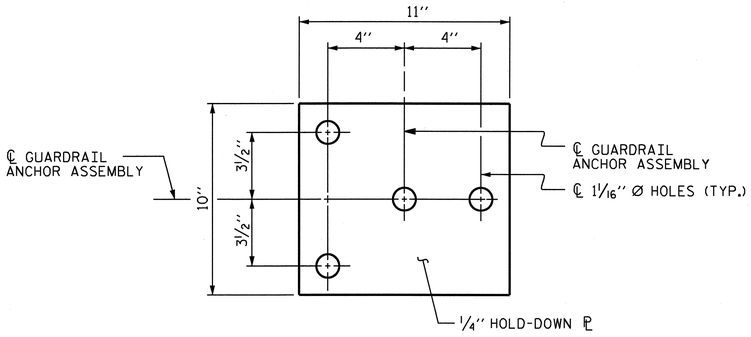
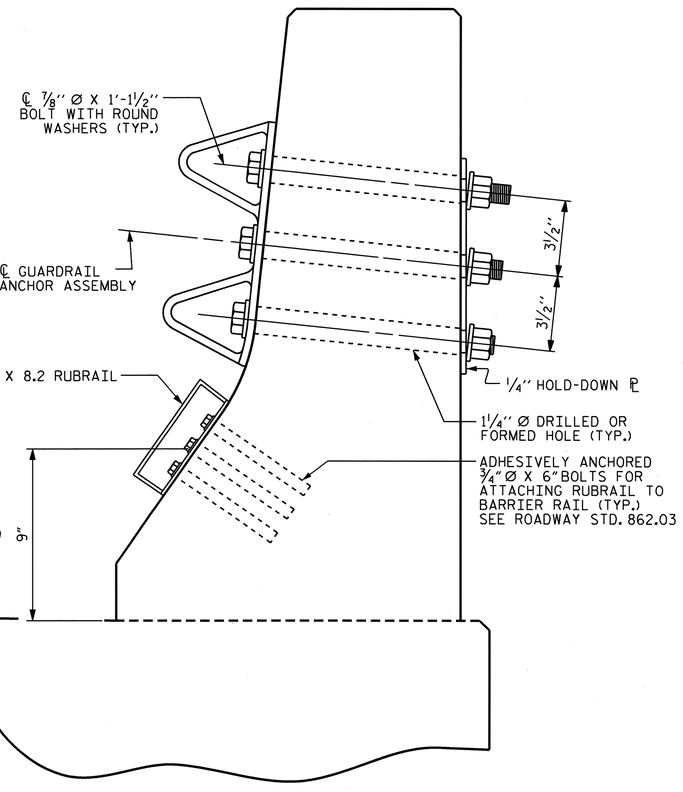
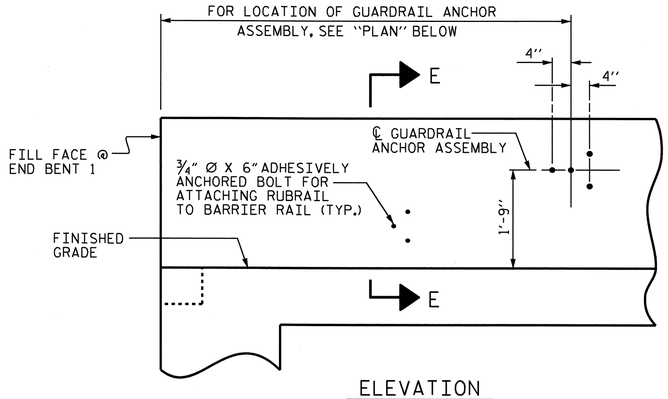


PLAN



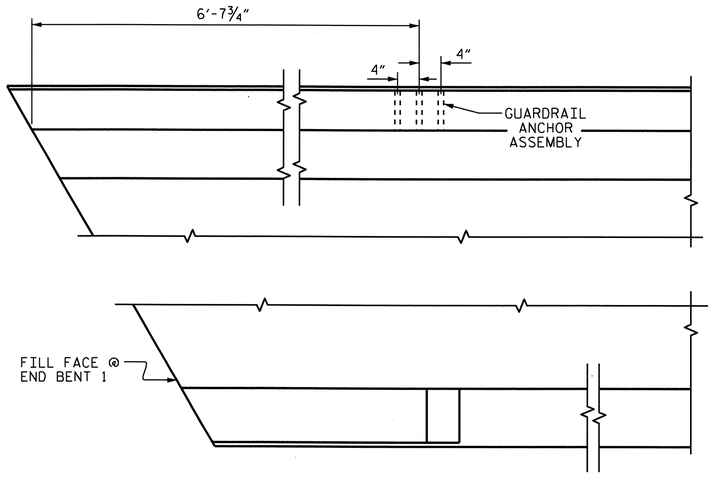
SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



ELEVATION

FOR LOCATION OF RUBRAIL, SEE ROADWAY STD. 862.03



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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.)

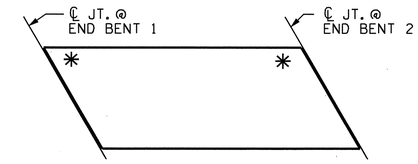
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 1 ¼'' 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 SPECIAL PROVISIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-134
1			3			TOTAL SHEETS
2			4			146

STR. #4

STD. NO. GRA2

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
7/29/10

ASSEMBLED BY : M.K. BEARD	DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY	DATE : 8/20/09
DRAWN BY : TLA 5/06	ADDED 5/1/06R KMM/GM
CHECKED BY : GM 5/06	

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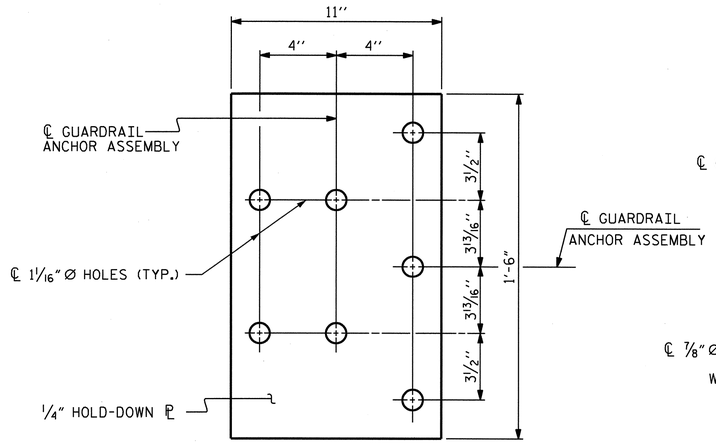
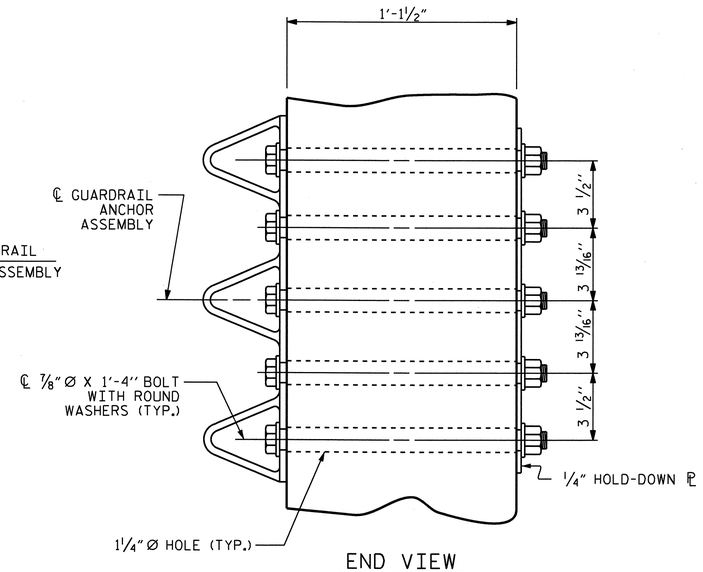


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

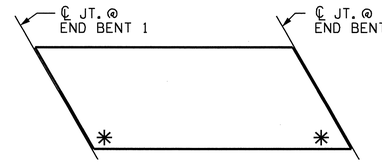
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

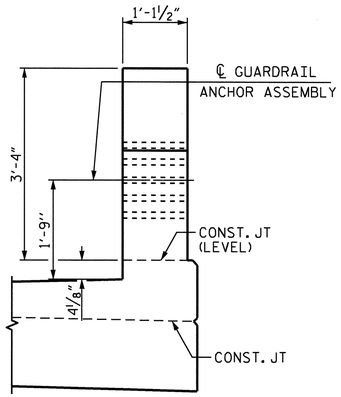
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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

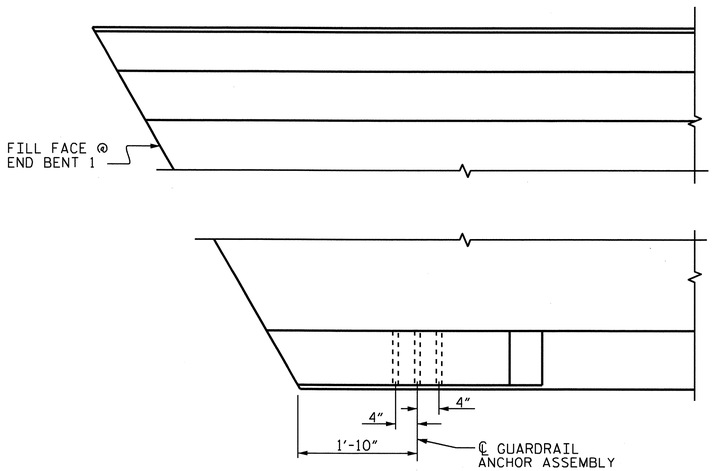


SKETCH SHOWING POINTS OF ATTACHMENT

*LOCATION OF GUARDRAIL ATTACHMENT



END VIEW



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE DETAILS
FOR METAL RAILS
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-135
1			3			TOTAL SHEETS
2			4			146

STR. #4

STD. NO. GRA3

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/29/10

ASSEMBLED BY : M.K. BEARD	DATE : 5/5/09
CHECKED BY : A.S. CALLAWAY	DATE : 8/20/09
DRAWN BY : MAA 5/10	ADDED 5/6/10
CHECKED BY : GM 5/10	

28-JUL-2010 15:24
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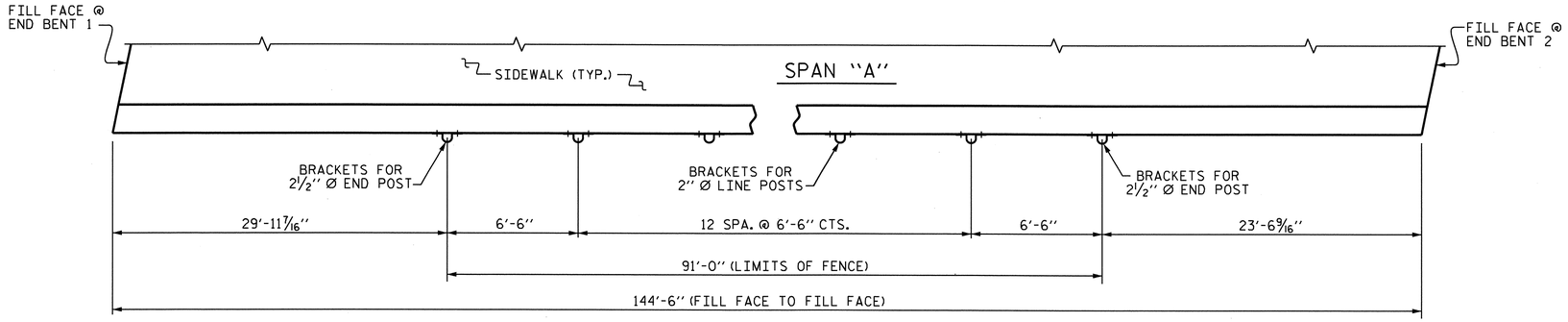


PLAN OF FENCE POST SPACING

PAY LENGTH = 91.00 LIN. FT.

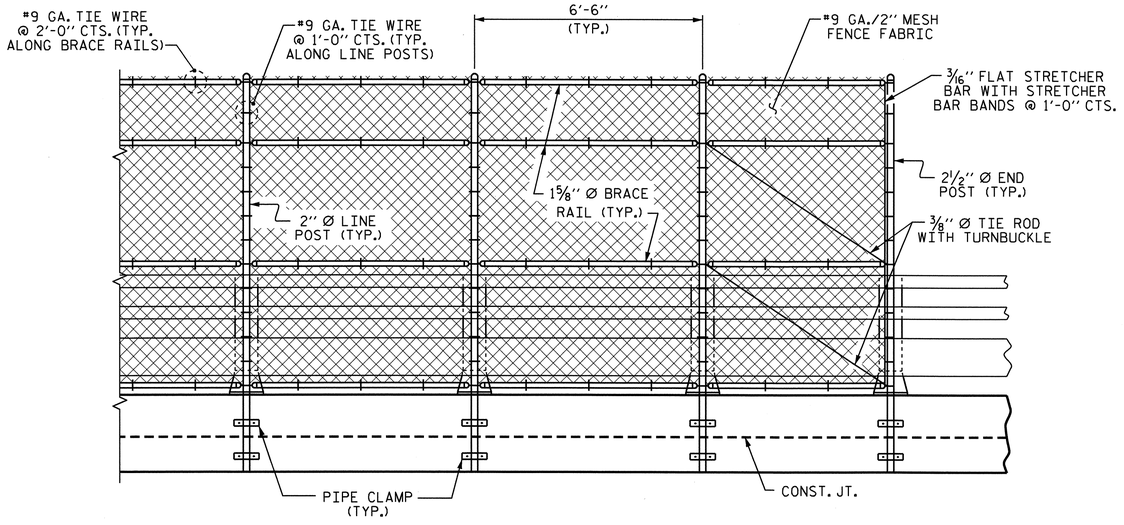
NOTES

FOR BRIDGE MOUNTED CHAIN LINK FENCE, SEE SPECIAL PROVISIONS.

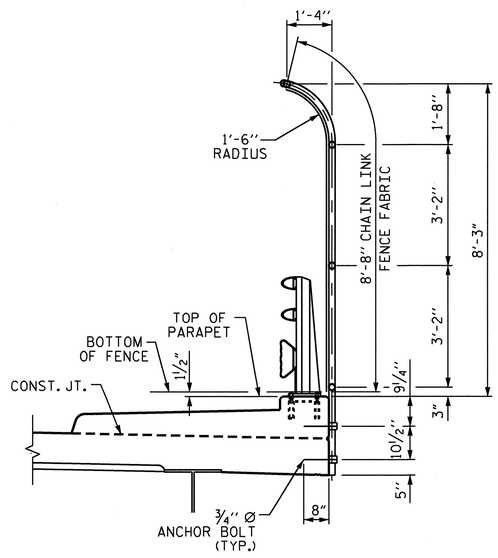
BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

FOR SETTING ANCHOR BOLTS, THE CONTRACTOR SHALL USE AN ADHESIVE BONDING SYSTEM. SEE SPECIAL PROVISIONS FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS. LEVEL ONE TESTING OF BONDING SYSTEM IS REQUIRED AND THE YIELD LOAD OF THE ¾" Ø BOLTS IS 12 KIPS.

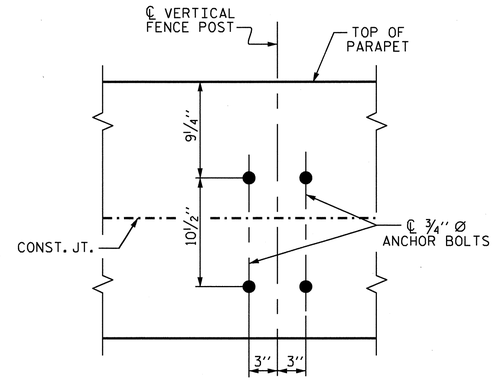
ALL FENCE MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 1050 OF THE STANDARD SPECIFICATIONS. GALVANIZE ALL STEEL PARTS AND HARDWARE IN ACCORDANCE WITH ARTICLE 1076 OF THE STANDARD SPECIFICATIONS.



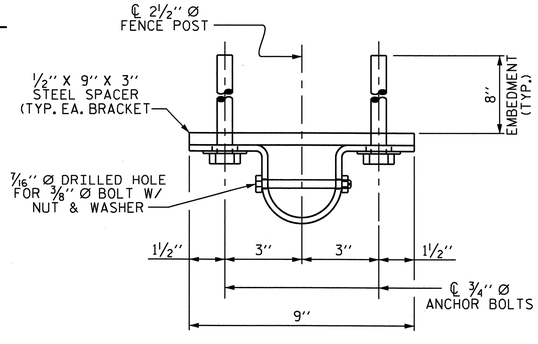
PARTIAL ELEVATION



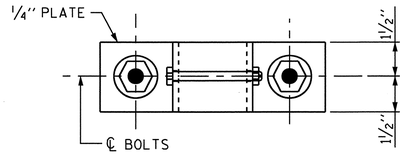
SECTION THRU FENCE



BOLT SETTING PLAN



PLAN



ELEVATION

PIPE CLAMP DETAILS

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BRIDGE MOUNTED CHAIN LINK FENCE

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-136
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E SUTTON
7/30/10

DRAWN BY : A.S. CALLAWAY DATE : 5/5/10
CHECKED BY : W.F. PARKER DATE : 5/6/10

30-JUL-2010 11:08
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lsutton

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"			

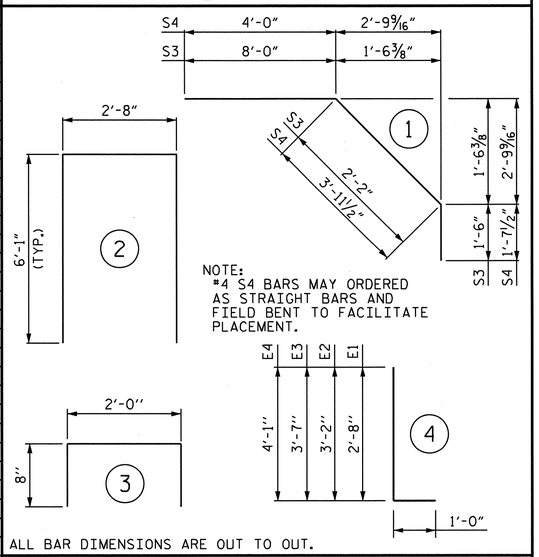
GROOVING BRIDGE FLOORS

APPROACH SLABS	1,152	SQ.FT.
BRIDGE DECK	3,563	SQ.FT.
TOTAL	4,715	SQ.FT.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	281	#5	STR	36'-0"	10551
A2	281	#5	STR	36'-0"	10551
*A101	2	#5	STR	24'-2"	50
*A102	2	#5	STR	9'-9"	20
*A103	2	#5	STR	6'-5"	13
*A104	2	#5	STR	19'-0"	40
*A105	2	#5	STR	4'-7"	10
A201	2	#5	STR	24'-2"	50
A202	2	#5	STR	9'-9"	20
A203	2	#5	STR	6'-5"	13
A204	2	#5	STR	19'-0"	40
A205	2	#5	STR	4'-7"	10
*B1	186	#5	STR	20'-8"	4009
*B2	96	#4	STR	28'-3"	1812
*B3	48	#4	STR	25'-8"	823
B4	132	#5	STR	49'-6"	6815
*E1	4	#7	4	3'-8''	30
*E2	4	#7	4	4'-2''	34
*E3	4	#7	4	4'-7''	37
*E4	4	#7	4	5'-1''	42
*F1	8	#6	STR	3'-6''	42
*F2	4	#6	STR	2'-6''	15
*F3	4	#6	STR	3'-8''	22
*G1	146	#4	STR	6'-4''	618
K1	56	#4	STR	18'-10"	705
*S3	80	#4	1	11'-8''	623
*S4	62	#4	1	9'-7''	397
U1	66	#4	2	14'-10''	654
*U2	42	#4	3	3'-4''	94

BAR TYPES



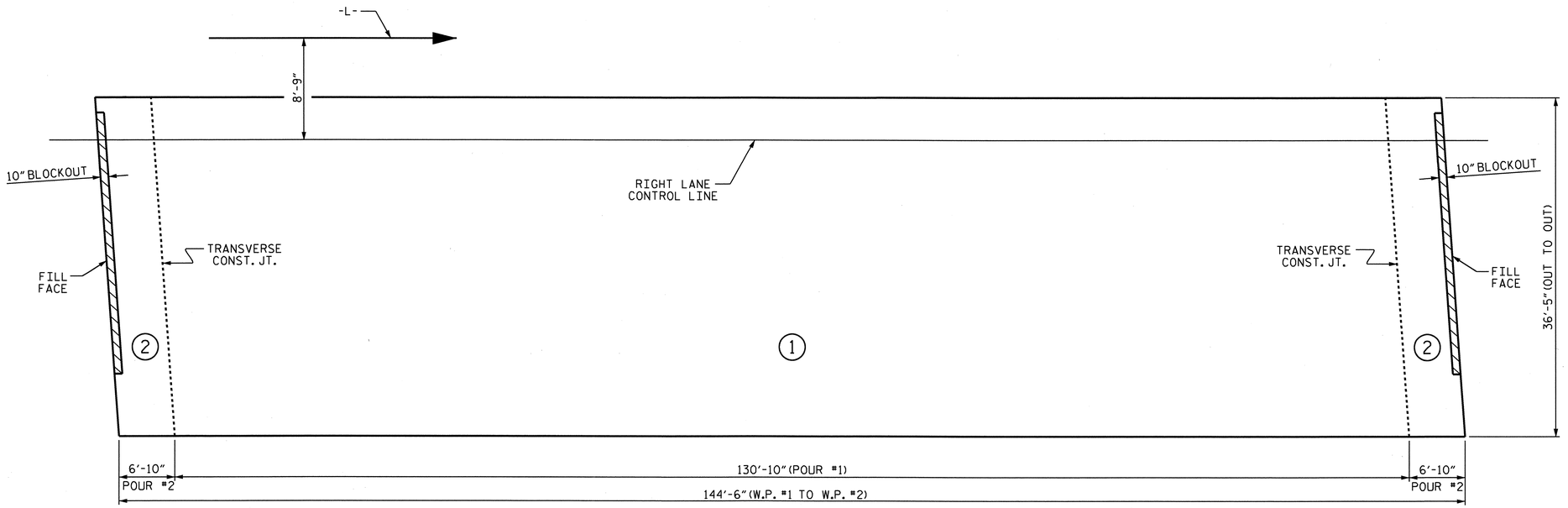
NOTE:
#4 S4 BARS MAY ORDERED AS STRAIGHT BARS AND FIELD BENT TO FACILITATE PLACEMENT.

ALL BAR DIMENSIONS ARE OUT TO OUT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1	145.5	——	——
POUR #2	67.7	——	——
SIDEWALK	25.2	——	——
END POSTS	0.8	——	——
TOTALS **	239.2	18,858	19,282

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB AND POURING SEQUENCE (SQ. FT. = 5,262)

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON 7/29/10

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SUPERSTRUCTURE BILL OF MATERIAL
— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-137
1			3			TOTAL SHEETS
2			4			146

STR. #4 STD. NO. BOM1

DRAWN BY : M.K. BEARD DATE : 5/19/09
CHECKED BY : A.S. CALLAWAY DATE : 8/20/09

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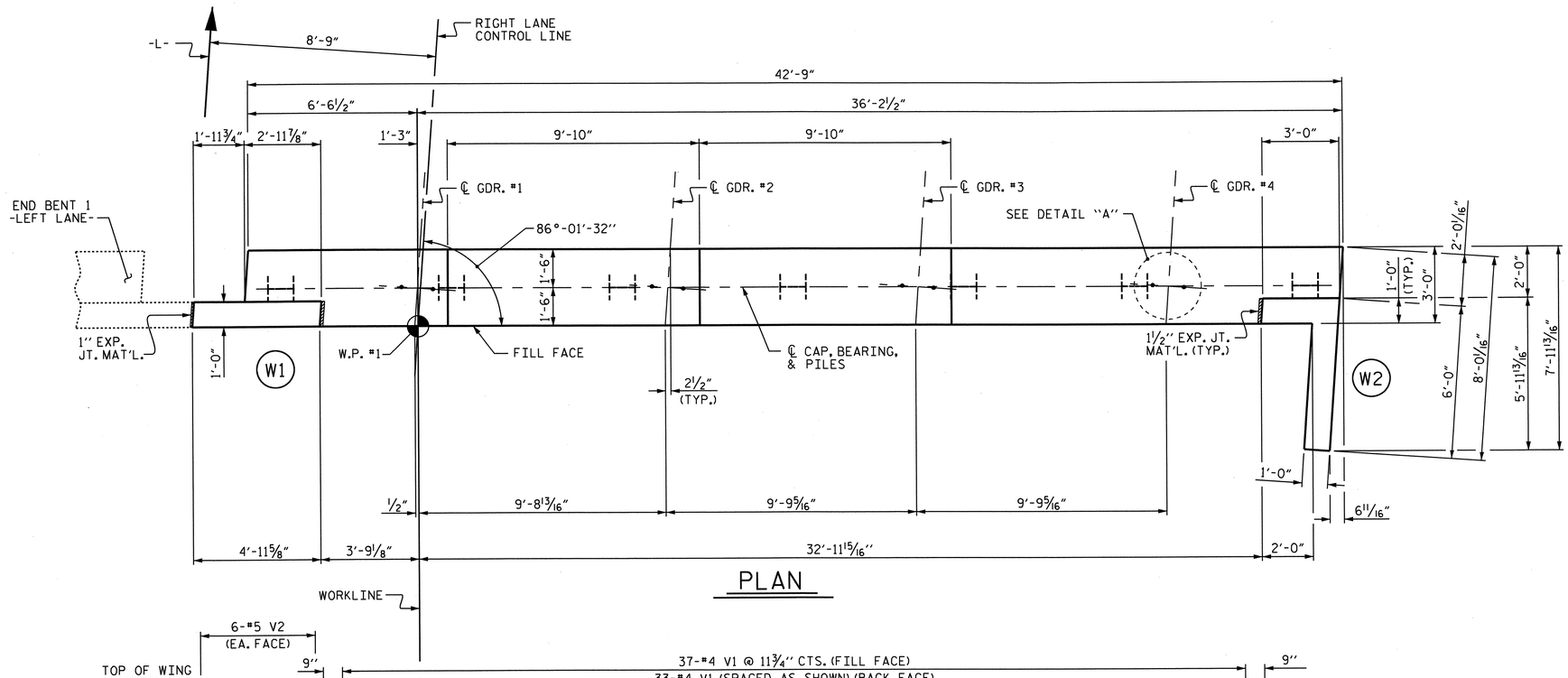
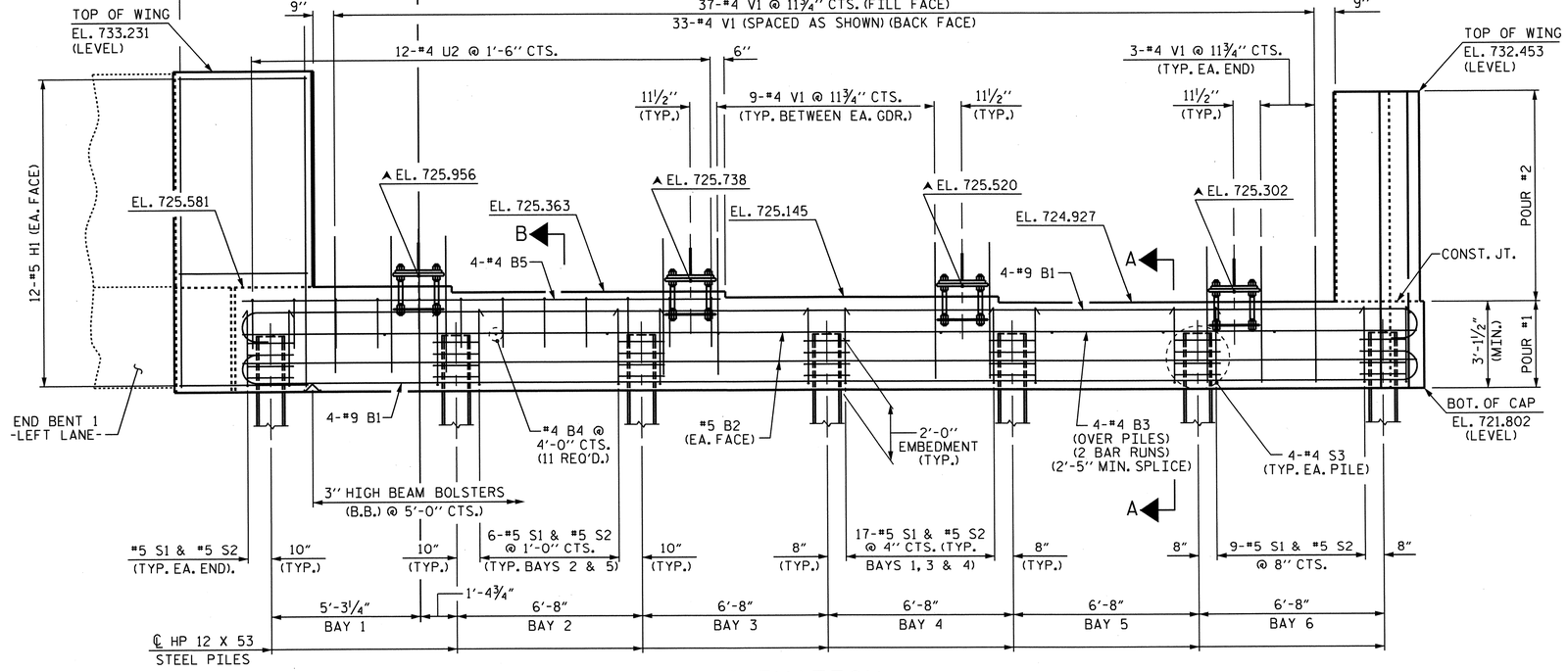


PLAN



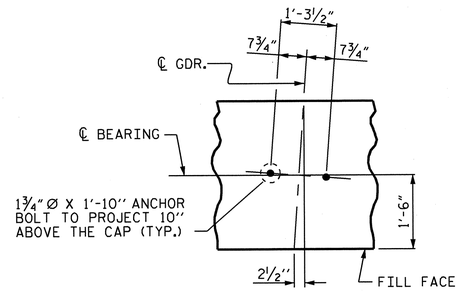
ELEVATION

V1 BARS ON BACK FACE ARE DIMENSIONED FROM ℄ GIRDER.

NOTES

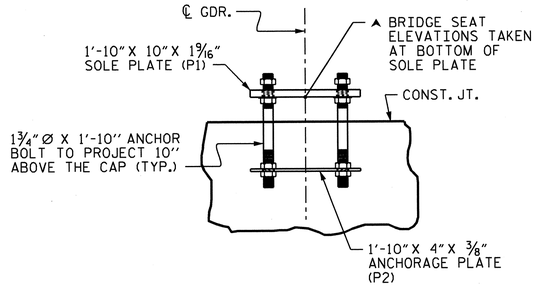
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4" DIAMETER 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.



DETAIL "A"

(TYP. EA. GIRDER)



ANCHORAGE DETAILS

(TYP. EA. GIRDER)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 1

—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-138
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 10/15/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

28-JUL-2010 15:24
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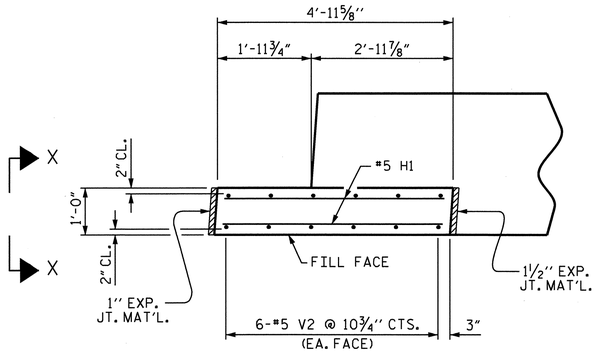
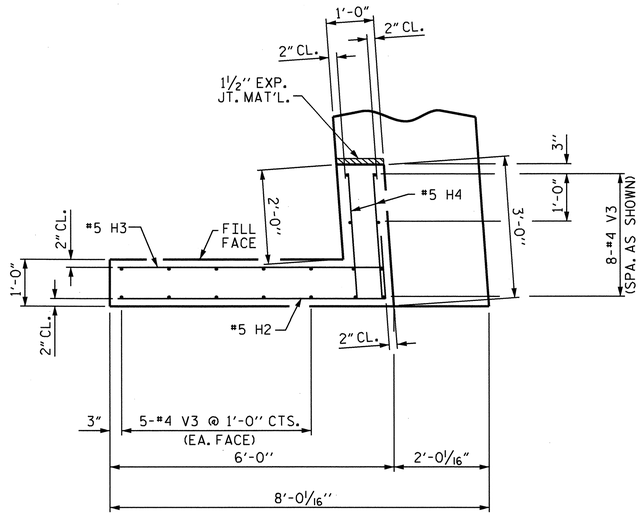
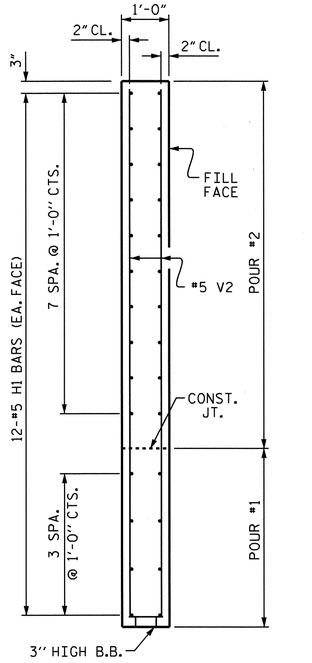


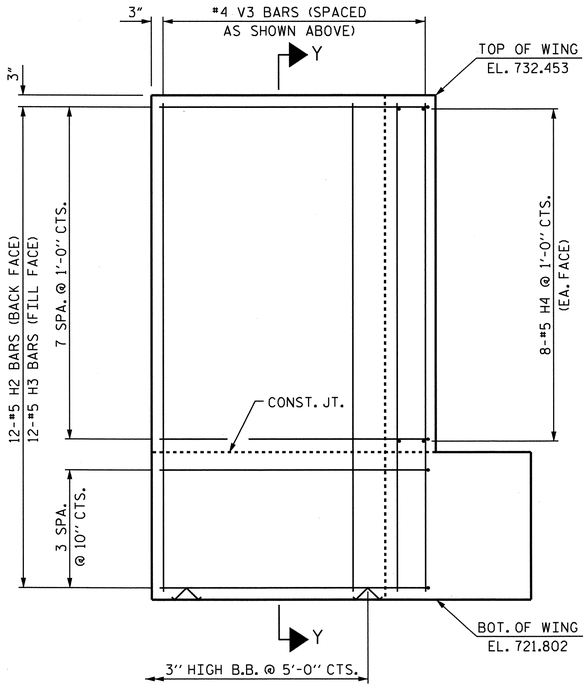
PLAN OF WING W1



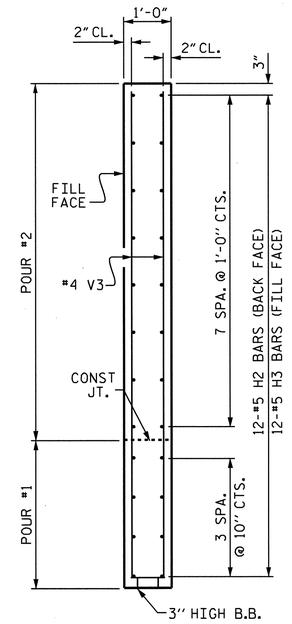
PLAN OF WING W2



SECTION X-X



ELEVATION OF WING W2



SECTION Y-Y

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 1

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-139
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 10/15/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

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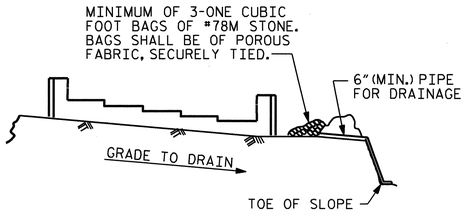
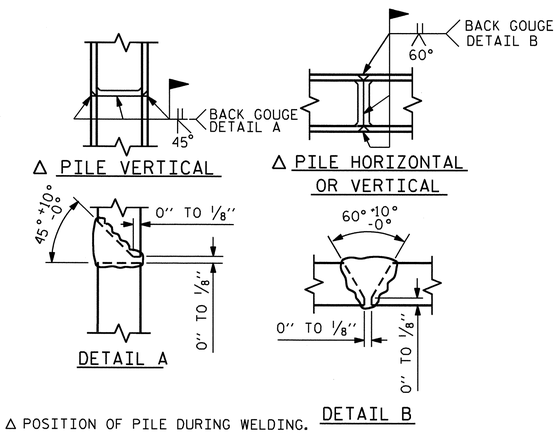


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

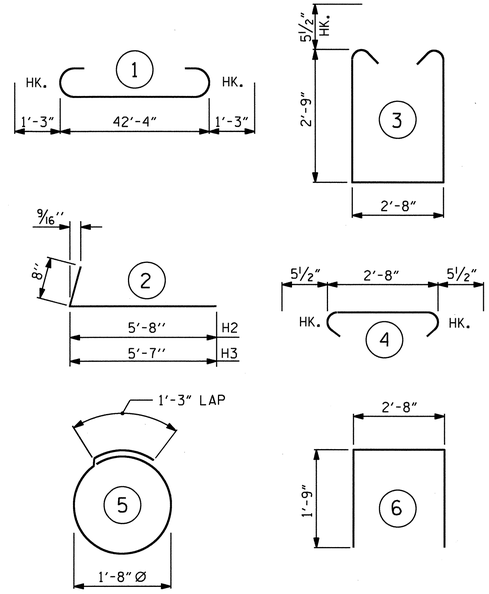


Δ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

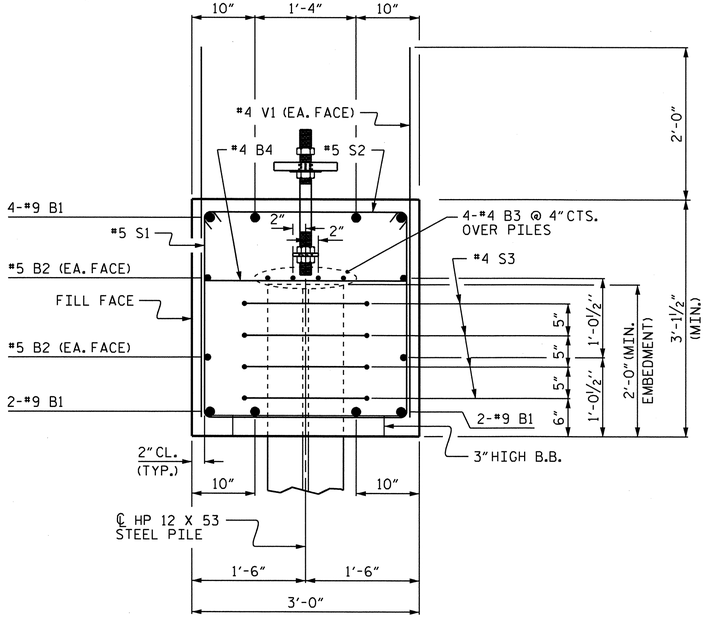


BILL OF MATERIAL

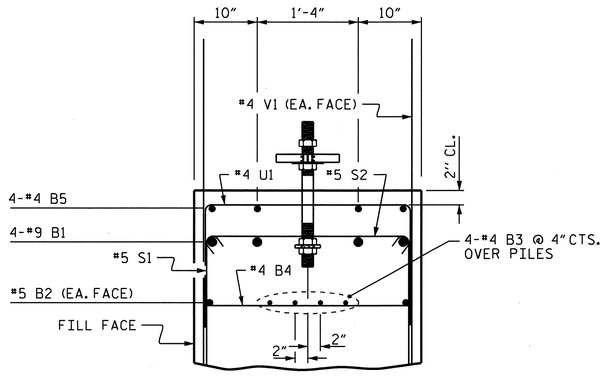
END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	44'-10"	1219
B2	4	#5	STR	42'-5"	177
B3	8	#4	STR	22'-5"	120
B4	11	#4	STR	2'-8"	20
B5	4	#4	STR	17'-3"	46
H1	24	#5	STR	4'-7"	115
H2	12	#5	2	6'-4"	79
H3	12	#5	2	6'-3"	78
H4	16	#5	STR	2'-8"	45
S1	74	#5	3	9'-1"	701
S2	74	#5	4	3'-7"	277
S3	28	#4	5	6'-6"	122
U1	12	#4	6	6'-2"	49
V1	70	#4	STR	4'-11"	230
V2	12	#5	STR	11'-2"	140
V3	18	#4	STR	10'-4"	124

REINFORCING STEEL	LBS.	3,542
CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WINGS	CU. YDS.	17.0
POUR #2 - UPPER WINGS	CU. YDS.	3.6
TOTAL	CU. YDS.	20.6
HP 12 x 53 STEEL PILES NO. = 7	LIN. FT.	560
PILE REDRIVES	EA.	4



SECTION A-A



PART SECTION B

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 1

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-140
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 10/15/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

28-JUL-2010 15:24
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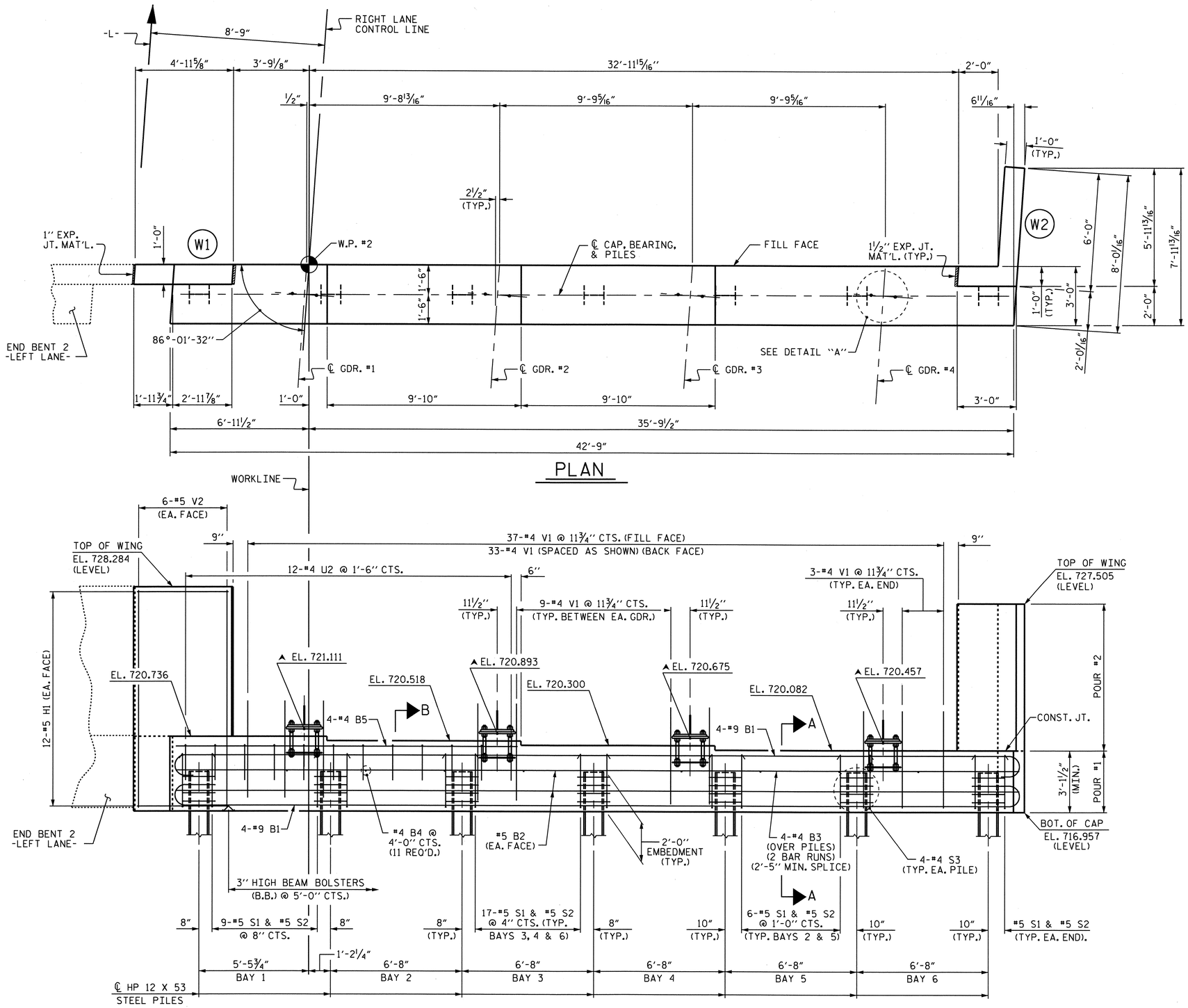


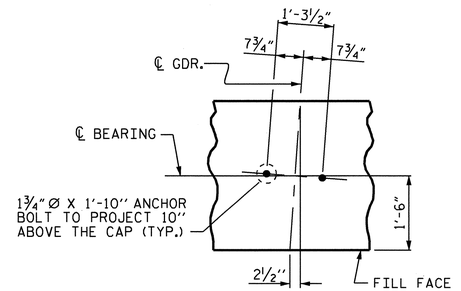
ELEVATION

V1 BARS ON BACK FACE ARE DIMENSIONED FROM ℄ GIRDER.

NOTES

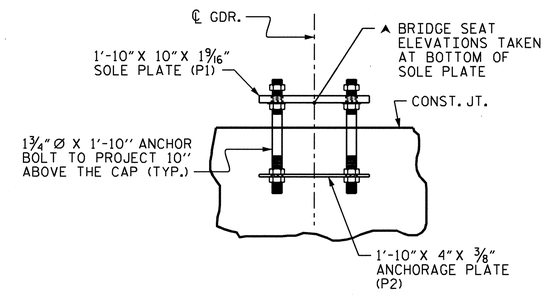
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

THE CONTRACTOR SHALL PROVIDE FOR INSTALLATION OF THE 4"DIAMETER 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.



DETAIL "A"

(TYP. EA. GIRDER)



ANCHORAGE DETAILS

(TYP. EA. GIRDER)

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

INTEGRAL END BENT 2

—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-141
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/24/10

DRAWN BY : A.S. CALLAWAY DATE : 10/15/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

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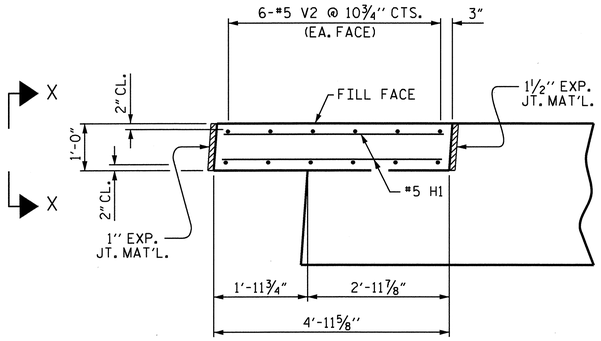
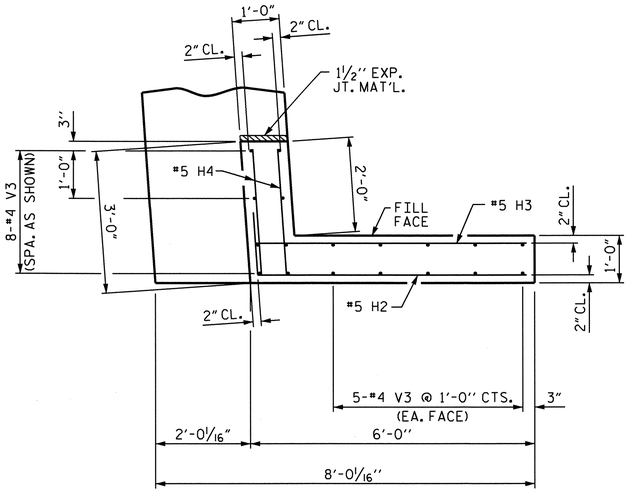
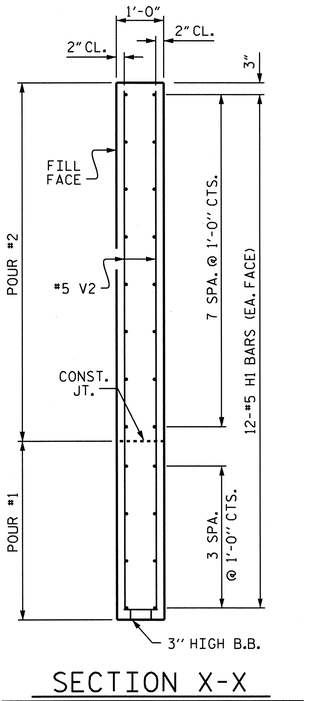


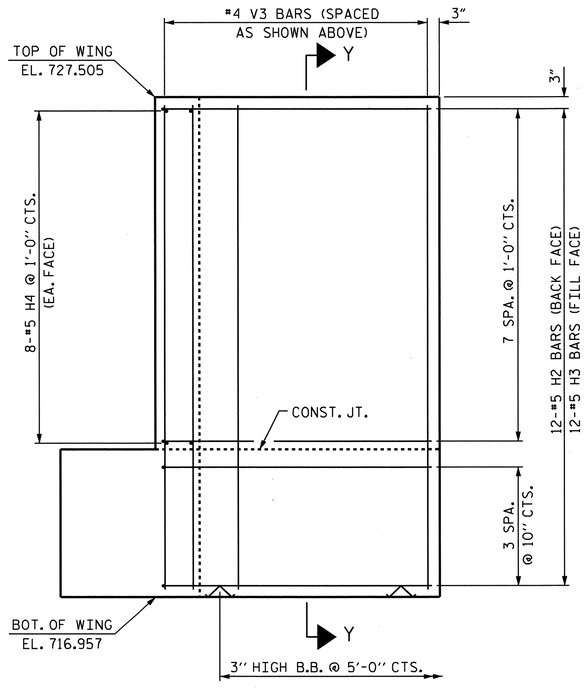
PLAN OF WING W1



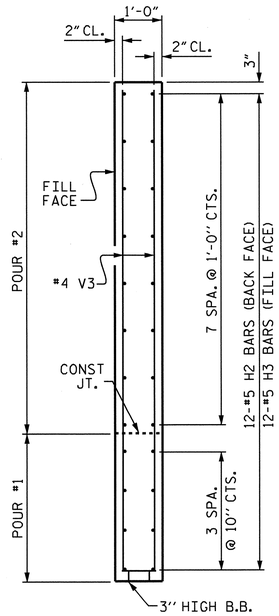
PLAN OF WING W2



SECTION X-X



ELEVATION OF WING W2



SECTION Y-Y

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 2

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-142
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 10/15/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

28-JUL-2010 15:24
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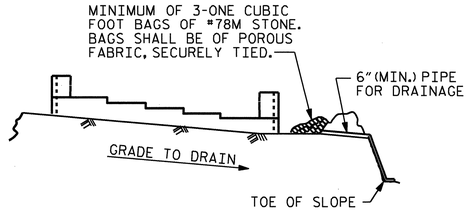
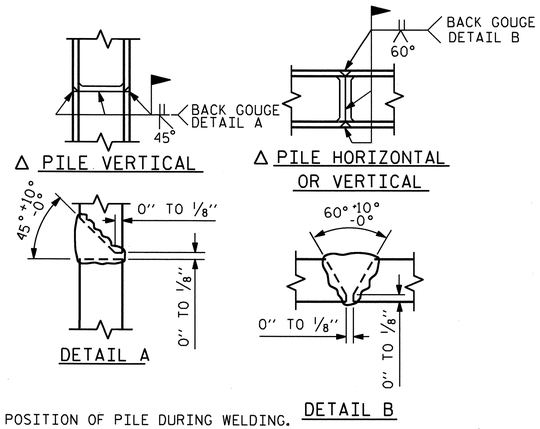


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

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

TEMPORARY DRAINAGE AT END BENT

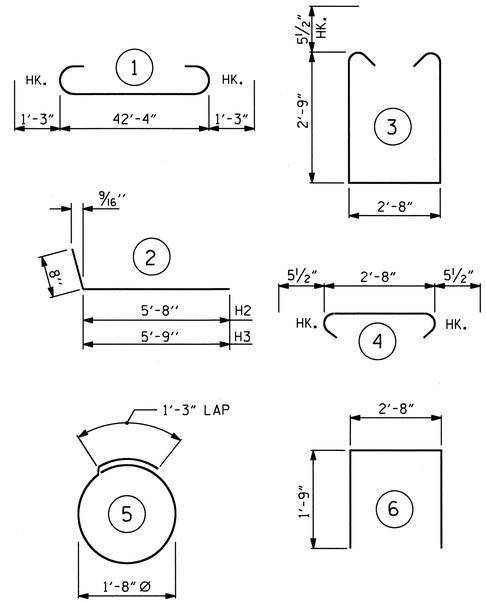


Δ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT.

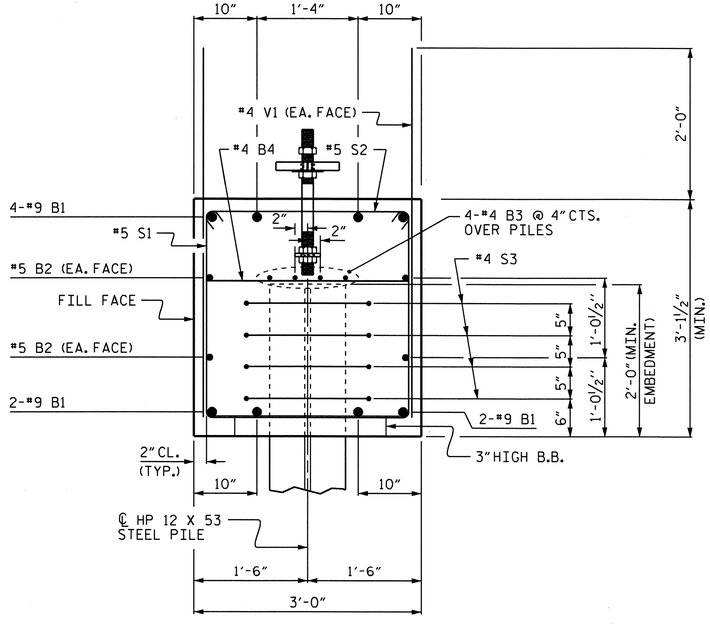


BILL OF MATERIAL

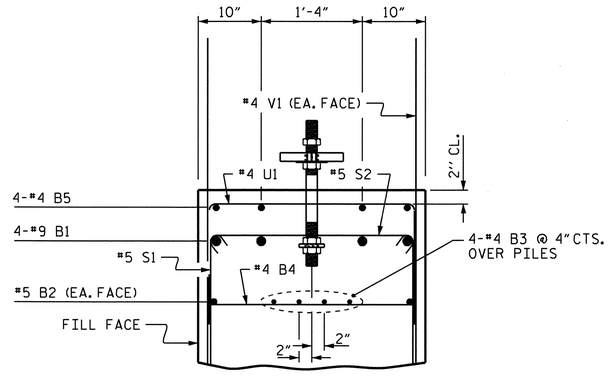
END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	44'-10"	1219
B2	4	#5	STR	42'-5"	177
B3	8	#4	STR	22'-5"	120
B4	11	#4	STR	2'-8"	20
B5	4	#4	STR	17'-3"	46
H1	24	#5	STR	4'-7"	115
H2	12	#5	2	6'-4"	79
H3	12	#5	2	6'-5"	80
H4	16	#5	STR	2'-8"	45
S1	74	#5	3	9'-1"	701
S2	74	#5	4	3'-7"	277
S3	28	#4	5	6'-6"	122
U1	12	#4	6	6'-2"	49
V1	70	#4	STR	4'-11"	230
V2	12	#5	STR	11'-0"	138
V3	18	#4	STR	10'-2"	122

REINFORCING STEEL	LBS.	3,540
CLASS A CONCRETE BREAKDOWN :		
POUR #1 - CAP & LOWER WINGS	CU. YDS.	17.0
POUR #2 - UPPER WINGS	CU. YDS.	3.6
TOTAL	CU. YDS.	20.6
HP 12 x 53 STEEL PILES NO. = 7	LIN. FT.	560
PILE REDRIVES	EA.	4



SECTION A-A



PART SECTION B

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
INTEGRAL
END BENT 2

— RIGHT LANE —

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-143
1			3			TOTAL SHEETS
2			4			146

STR. #4

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

DRAWN BY : A.S. CALLAWAY DATE : 10/15/09
CHECKED BY : T.L. CLELLAND DATE : 6/1/10

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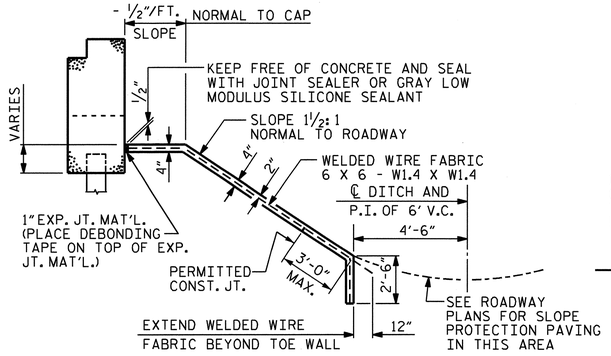
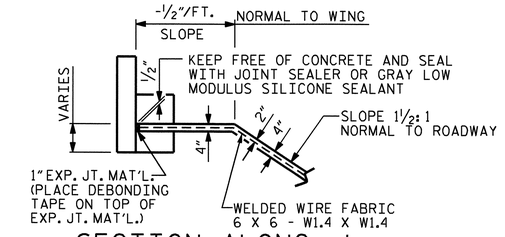


SECTION ALONG RIGHT LANE CONTROL LINE

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



SECTION ALONG -L-

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

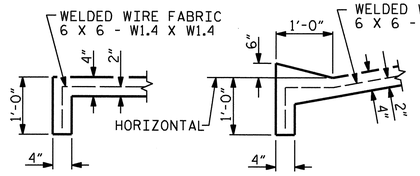
BRIDGE @ STA. 58+97.14 -L-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	316	632
END BENT 2	238	477

* QUANTITY SHOWN IS BASED ON 5' POURS.

NOTES

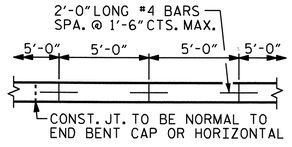
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

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, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.



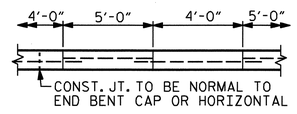
SECTION A-A

SECTION B-B



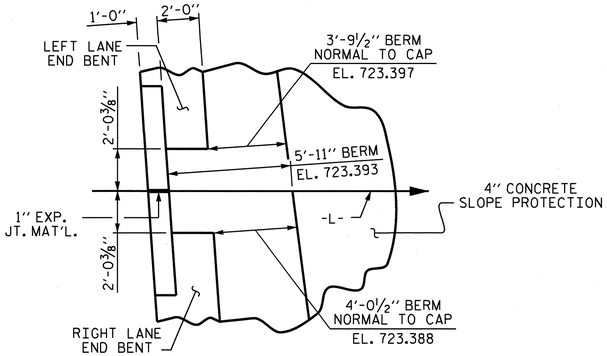
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL

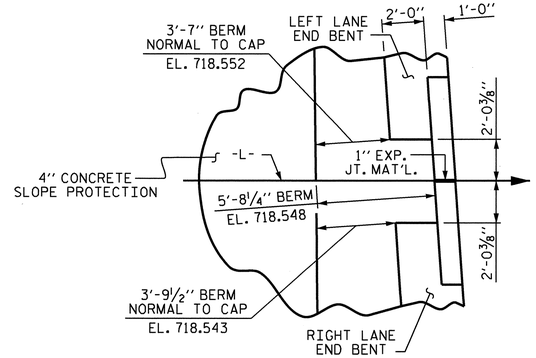


POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

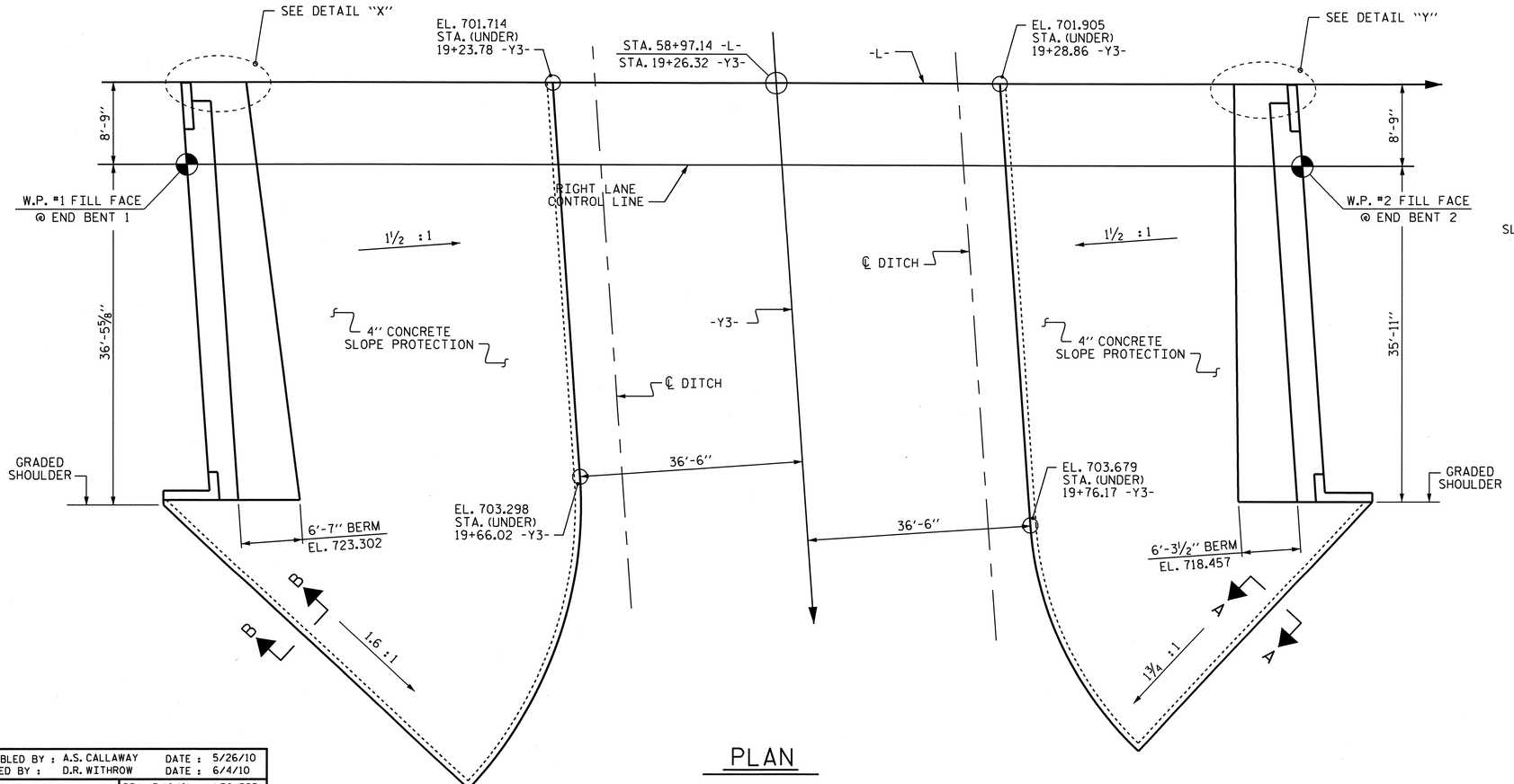
OPTIONAL POURING DETAIL



DETAIL "X"



DETAIL "Y"



PLAN

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SLOPE PROTECTION DETAILS
— RIGHT LANE —

ASSEMBLED BY : A.S. CALLAWAY	DATE : 5/26/10
CHECKED BY : D.R. WITHROW	DATE : 6/4/10
DRAWN BY : ELR 5/92	REV. 7/10/01 LES/RDR
CHECKED BY : GRP 6/92	REV. 5/7/03 RWW/JTE
	REV. 5/1/06 TLA/GM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-144
1			3			TOTAL SHEETS
2			4			146

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/30/10

STR. #4

STD. NO. SP1

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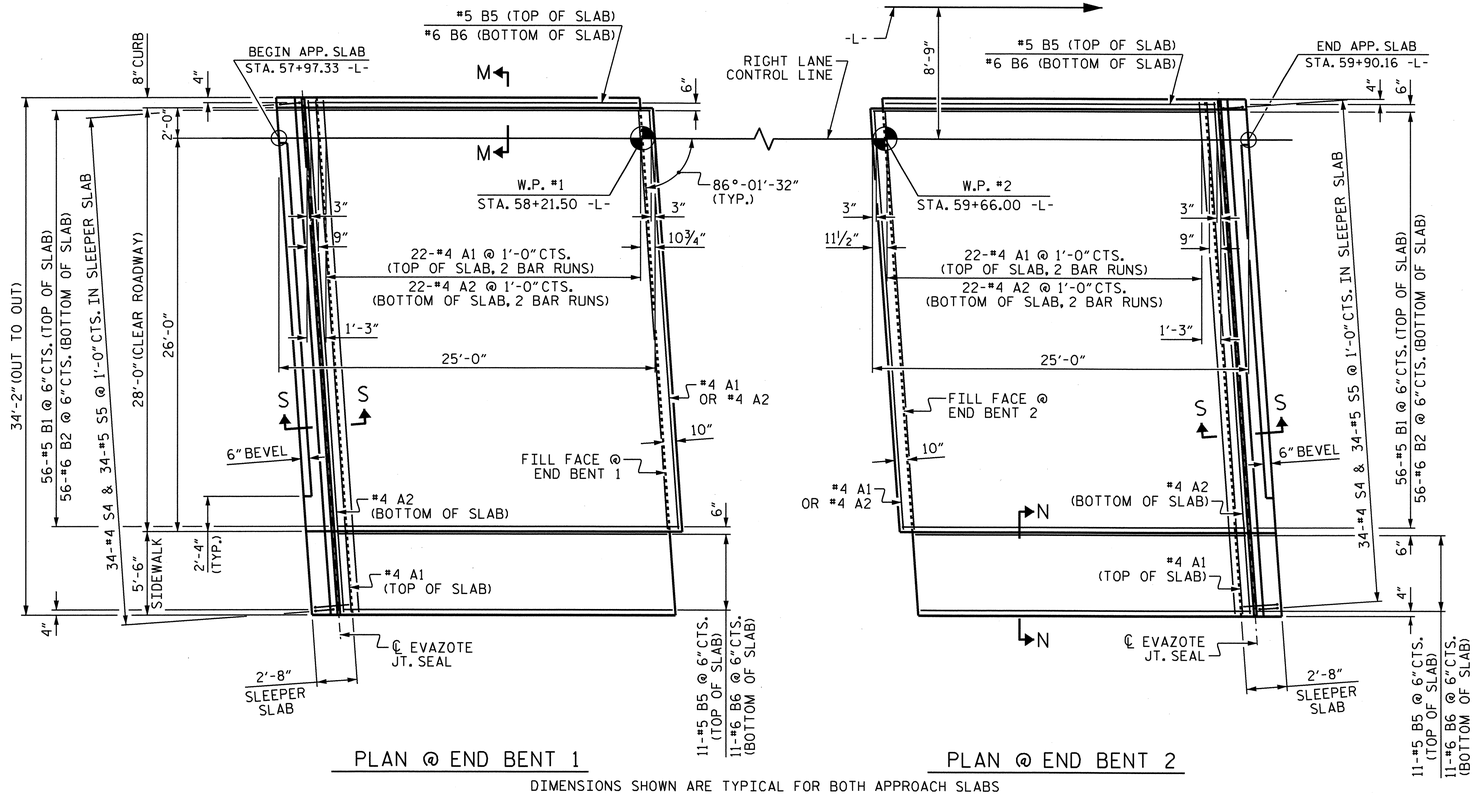
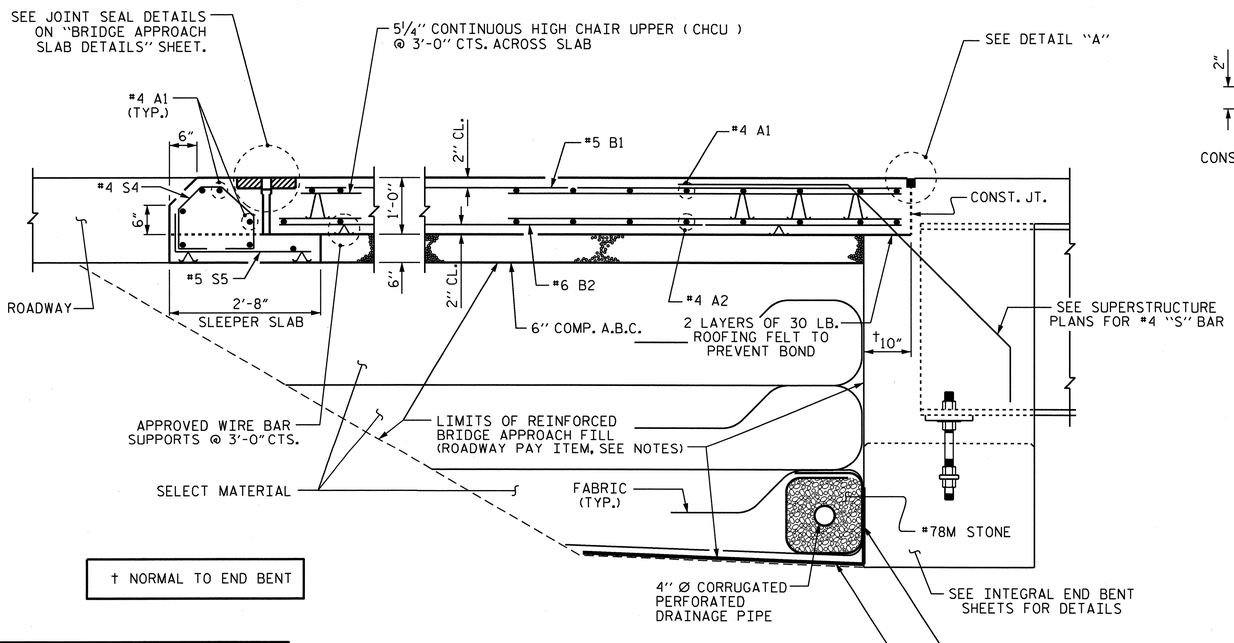


PLAN @ END BENT 1

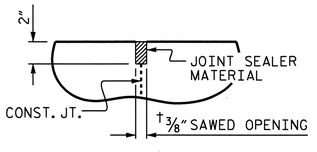
PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

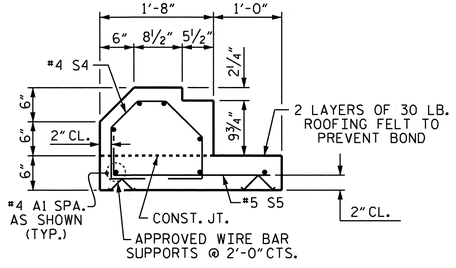


† NORMAL TO END BENT

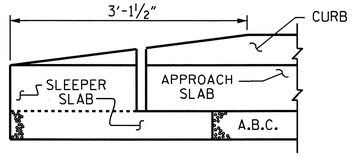
SECTION THRU SLAB



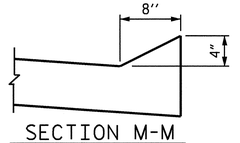
DETAIL "A"



SECTION S-S
SHOWING SLEEPER SLAB



END OF CURB WITHOUT
SHOULDER BERM GUTTER



SECTION M-M

NOTES

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

FOR REINFORCED BRIDGE APPROACH FILL INCLUDING FABRIC, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, *78M STONE, 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 6" COMP. A.B.C. SHALL BE FLUSH WITH THE SLEEPER SLAB AND SHALL EXTEND 1'-0" OUTSIDE OF EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE SLEEPER SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE SLEEPER SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

THE VERTICAL JOINT ON THE RIGHT AND LEFT SIDE OF THE APPROACH SLAB AT THE ENDS OF THE EVAZOTE JOINT SHALL BE FILLED WITH SILICONE OR OTHER APPROVED MATERIAL IN ORDER TO PREVENT BACKFILL FROM ENTERING THE JOINT OPENING.

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 TYPE SL LOW MODULUS SILICONE SEALANT.

WITH EVAZOTE JOINT SEAL

FOR EVAZOTE JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE EVAZOTE JOINT SEAL SHALL BE 2½".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

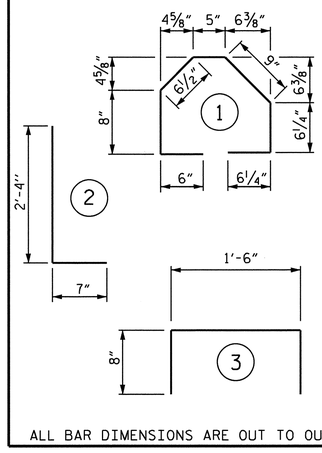
FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	62	#4	STR	17'-11"	742
A2	48	#4	STR	17'-10"	572
* B1	56	#5	STR	22'-4"	1304
B2	56	#6	STR	22'-10"	1921
* B3	4	#4	STR	22'-0"	59
* B4	4	#4	STR	1'-3"	3
* B5	11	#5	STR	21'-6"	247
B6	11	#6	STR	22'-0"	363
* G1	23	#4	STR	5'-0"	77
* S4	34	#4	1	3'-11"	89
S5	34	#5	2	2'-11"	103
* U1	10	#4	3	2'-10"	19

REINFORCING STEEL	LBS.	2959
* EPOXY COATED REINFORCING STEEL	LBS.	2290

CLASS AA CONCRETE		
POUR #1 - SLAB & CURB	C.Y.	29.2
POUR #2 - SLEEPER SLAB	C.Y.	3.6
POUR #3 - SIDEWALK	C.Y.	3.0
TOTAL	C.Y.	35.8

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. U-3110B

ALAMANCE COUNTY

STATION: 58+97.14 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT

—RIGHT LANE—

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-145
1			3			TOTAL SHEETS
2			4			146

STR. #4

STD. NO. BAS11

ASSEMBLED BY :	D. R. WITHROW	DATE :	7/6/09
CHECKED BY :	A.S. CALLAWAY	DATE :	8/3/09
DRAWN BY : TLA	10/05	ADDED 5/1/06R	KMM/GM
CHECKED BY : GM	5/06		

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10

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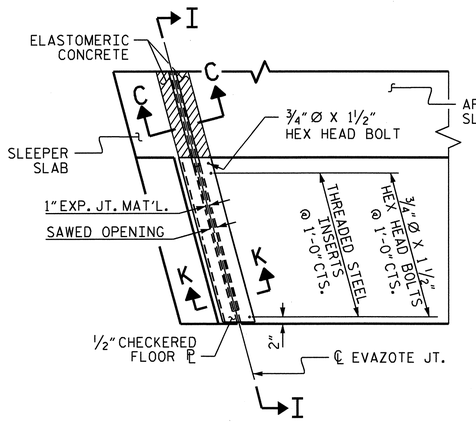
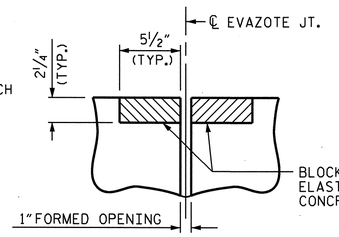
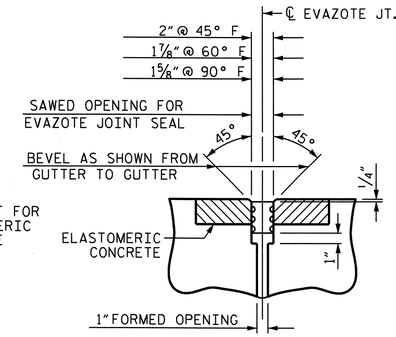


PLAN
(AT SIDEWALK - RIGHT)



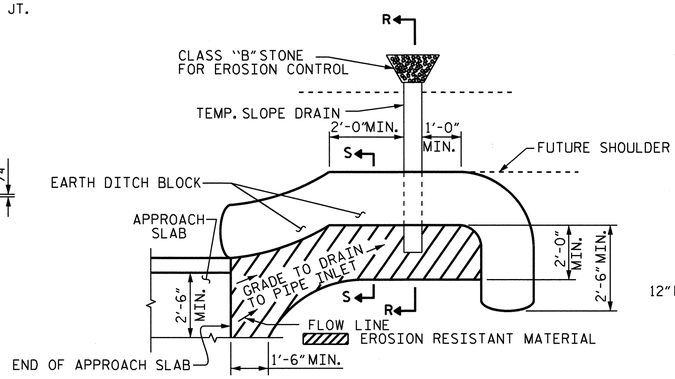
SECTION C-C
EVAZOTE JOINT SEAL
(PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)



SECTION C-C
EVAZOTE JOINT SEAL
(EXPANSION)

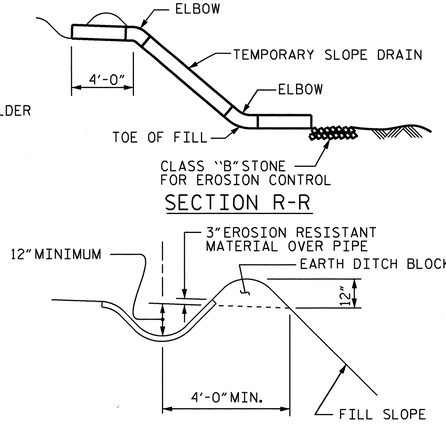
ELASTOMERIC CONCRETE	
APPROACH SLAB NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	4.8
2	4.8
TOTAL	9.6

* BASED ON THE MINIMUM BLOCKOUT SHOWN.



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.

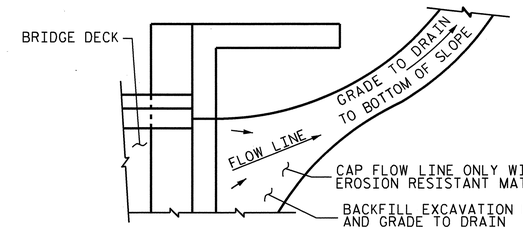
PLAN VIEW



SECTION S-S

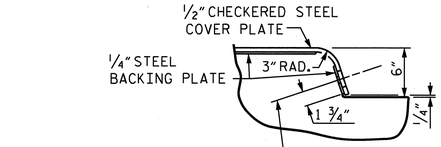
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

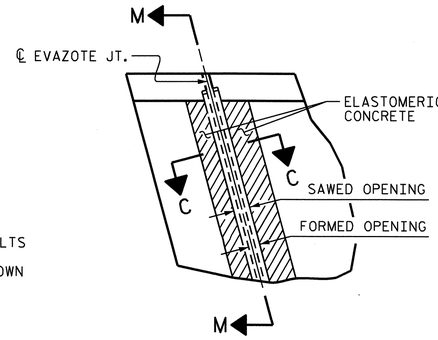


NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

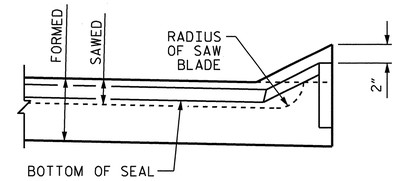
TEMPORARY DRAINAGE DETAIL



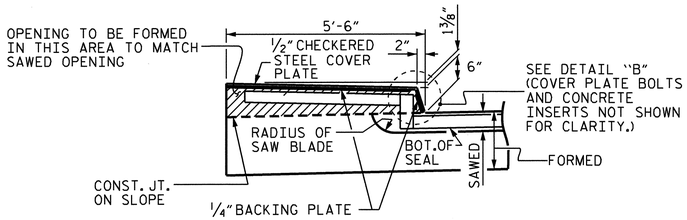
DETAIL "B"



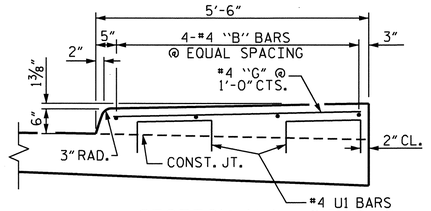
PLAN
(AT CURB - LEFT)



SECTION M-M

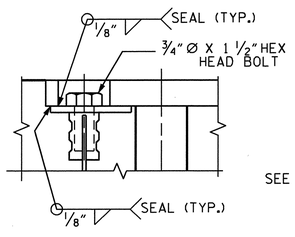


SECTION I-I

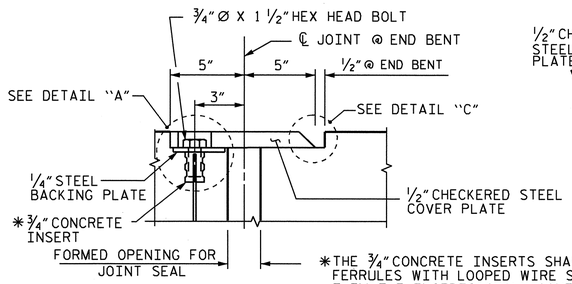


SECTION N-N

CURB DETAILS

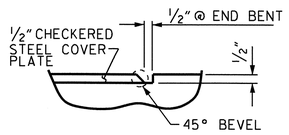


DETAIL "A"



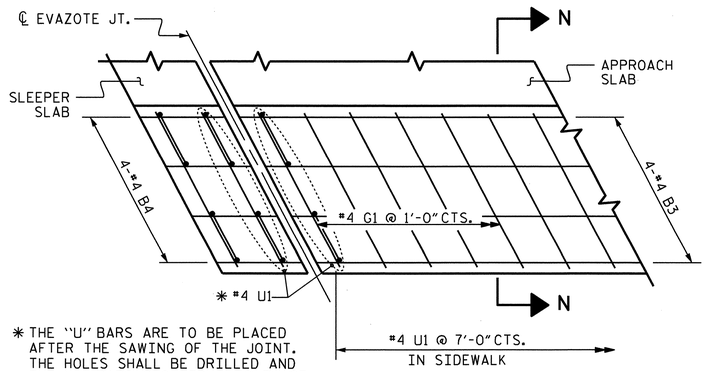
SECTION K-K

*THE ¾" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.



DETAIL "C"

JOINT SEAL DETAILS @ SLEEPER SLAB



*THE "U" BARS ARE TO BE PLACED AFTER THE SAWING OF THE JOINT. THE HOLES SHALL BE DRILLED AND THE "U" BARS GROUTED INTO PLACE.

PLAN

SIDEWALK DETAILS

ASSEMBLED BY :	D. R. WITHROW	DATE :	7/6/09		
CHECKED BY :	A.S. CALLAWAY	DATE :	8/3/09		
DRAWN BY : FCJ	11/88	REV. 10/17/00	RWW/LES		
CHECKED BY : ARB	11/88	REV. 5/7/03	RWW/JTE		
		REV. 5/1/06R	MAA/KMM		

28-JUL-2010 15:24
R:\Structures\str04\rwithrow\u3110b_sd_as_04.dgn
lsutton

PROJECT NO. U-3110B
ALAMANCE COUNTY
STATION: 58+97.14 -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:	S-146
1			3			TOTAL SHEETS
2			4			146

STR. #4

STD. NO. BAS10

NORTH CAROLINA PROFESSIONAL SEAL 21638 ENGINEER LAURA E. SUTTON
7/29/10