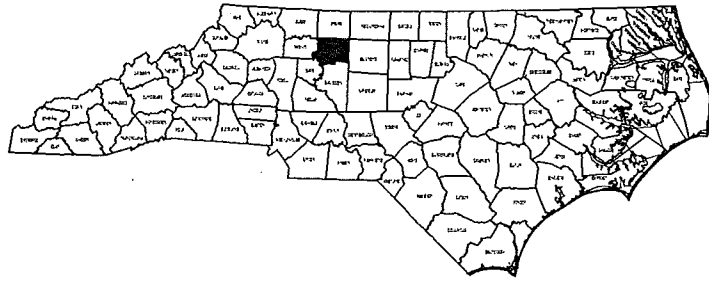


PROJECT NO: 41665.5B

CONTRACT NO:



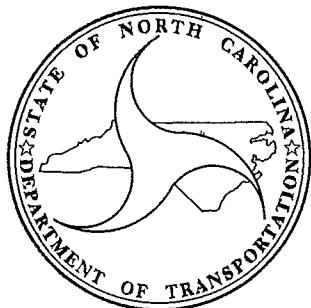
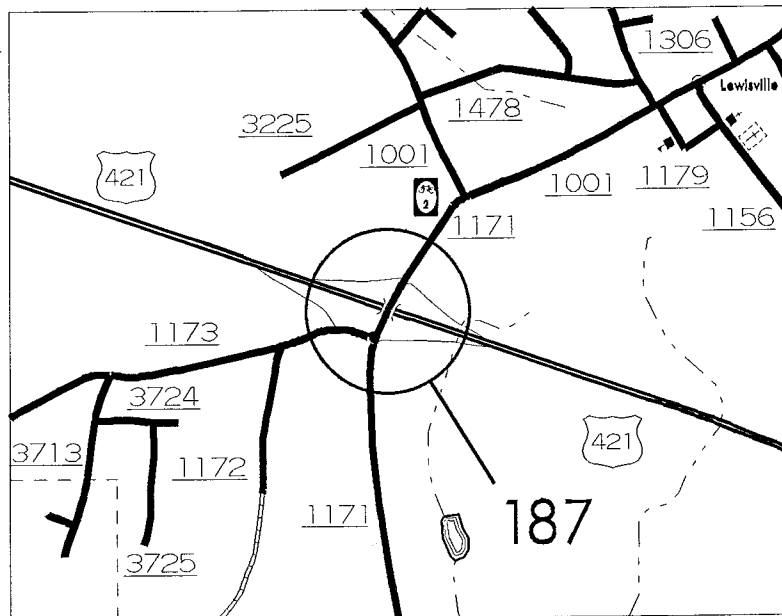
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

FORSYTH COUNTY

LOCATION: BRIDGE #187 ON SR 1171 (WILLIAMS ROAD) OVER US 421

TYPE OF WORK: BRIDGE REHABILITATION AND RECONSTRUCTION: SUPERSTRUCTURE AND DECK REPLACEMENT, PARTIAL SUBSTRUCTURE REPLACEMENT AND REPAIR OF EXISTING BRIDGE.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	9B.203414	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
9B.203414		P.E.	
41665.5B		CONSTR	



DESIGN DATA

ADT 2011=8900

PROJECT LENGTH

PROJECT LENGTH - 0.067 MI

Prepared In the Office of:
**DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**
STRUCTURES MANAGEMENT UNIT - PRESERVATION & REPAIR GROUP
1000 BIRCH RIDGE DR. RALEIGH, N.C. 27610

TIMOTHY M. SHERRILL, P.E.
PROJECT ENGINEER

2012 STANDARD SPECIFICATIONS

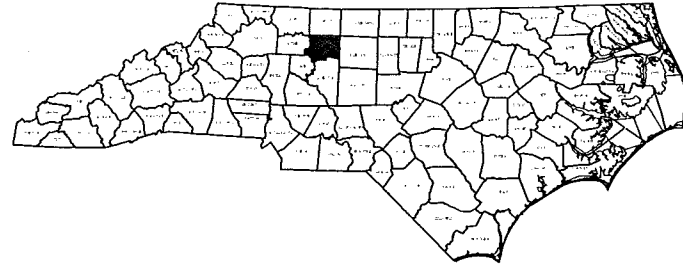
LETTING DATE:
NOVEMBER 12, 2014



FARZIN ASEFNIA, P.E.
PROJECT DESIGN ENGINEER

PROJECT NO: 41665.5B

CONTRACT NO:



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

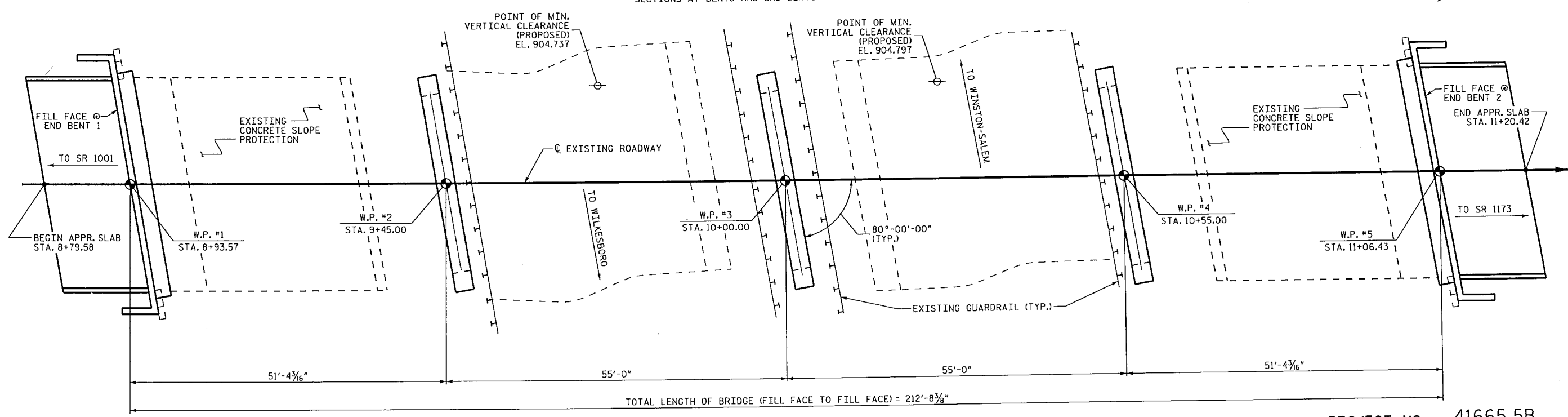
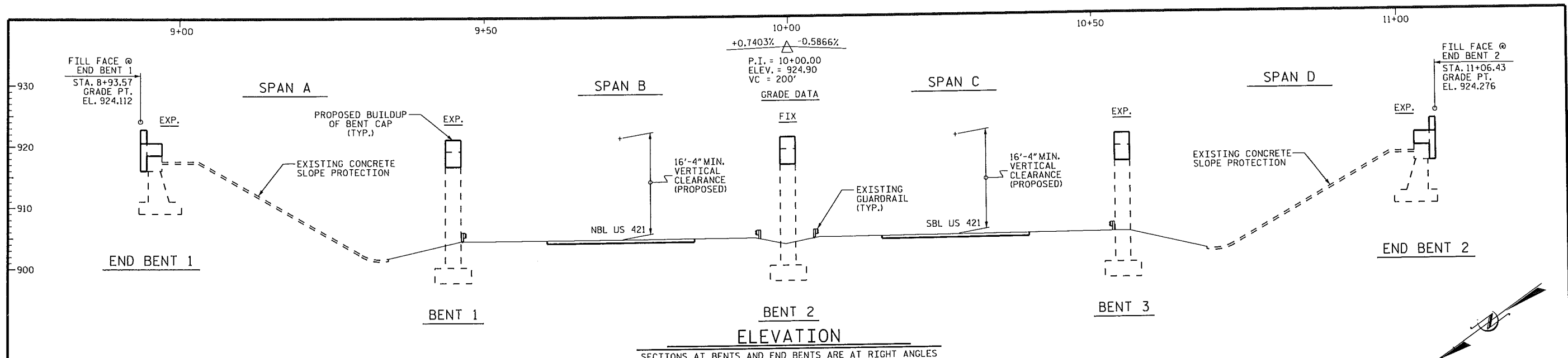
FORSYTH COUNTY

LOCATION: BRIDGE #187 ON SR 1171 (WILLIAMS ROAD) OVER US 421

TYPE OF WORK: BRIDGE REHABILITATION AND RECONSTRUCTION: SUPERSTRUCTURE AND DECK REPLACEMENT, PARTIAL SUBSTRUCTURE REPLACEMENT AND REPAIR OF EXISTING BRIDGE.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	9B.203414	1A	
STATE PROJECT NO.	F.A.PROJ.NO.	DESCRIPTION	
9B.203414		PE	
41665.5B		CONSTR	

<u>SHT#</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
1A	INDEX OF SHEETS
S-1 THRU S-39	STRUCTURAL REHABILITATION PLANS
SN	STANDARD NOTES



PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

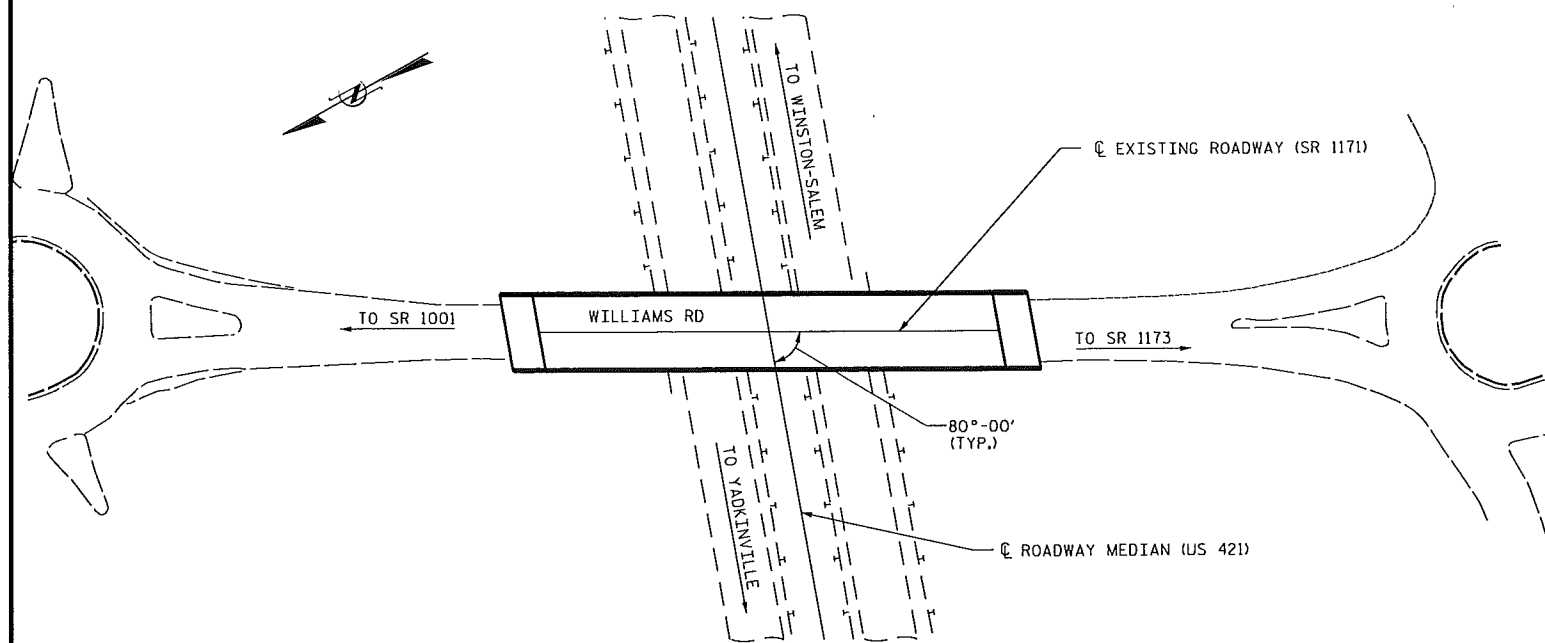
GENERAL DRAWING
 BRIDGE OVER US 421 ON
 SR 1171 BETWEEN
 SR 1001 AND
 SR 1173

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



DRAWN BY: D.V. JOYNER DATE: 01/14
 CHECKED BY: J. YANACCONI DATE: 01/14

BM #1: R/R SPIKE SET IN NORTH ROOT OF 12" WHITE OAK TREE. LOCATION N 854530 E 157725, EL. 917.00'
 BM #2 R/R SPIKE SET IN NORTHEAST ROOT OF 36" MAPLE TREE. LOCATION, N 855172 E 1577309, EL. 919.44'



LOCATION SKETCH

THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING UTILITIES.

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
 THIS BRIDGE SUPERSTRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
 FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
 FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
 FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
 FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
 FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
 EXISTING DIMENSIONS AND BRIDGE CONDITION ARE FROM BEST INFORMATION AVAILABLE. THE CONTRACTOR SHALL FIELD VERIFY THE INFORMATION SHOWN ON THE PLANS AND NOTIFY THE ENGINEER IF ACTUAL DIMENSIONS AND CONDITIONS DIFFER.
 THE EXISTING SUPERSTRUCTURE, CONSISTING OF FOUR SPANS (50'-4", 55', 55', AND 50'-4") OF REINFORCED CONCRETE DECK OVER FOUR LINES OF PRECAST PRESTRESSED CONCRETE GIRDERS, WITH A 28'-0" CLEAR ROADWAY WIDTH, SHALL BE REMOVED, SEE SPECIAL PROVISIONS. THE PROPOSED SUPERSTRUCTURE CONSISTS OF FOUR SPANS (50'-4", 55' AND 55'-4") OF REINFORCED CONCRETE DECK OVER SIX LINES OF STEEL I-BEAMS, WITH A 33'-6" CLEAR ROADWAY WIDTH, ATOP RECONSTRUCTED REINFORCED CONCRETE BENT CAPS AND END BENTS.
 FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
 REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
 NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1 1/2" IN DEPTH.
 ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
 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 EXISTING CONDUITS ATTACHED TO THE BRIDGE SHALL BE REMOVED AND TERMINATED WITHIN THE PROPOSED APPROACH BACKFILL.
 THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN 'ROADWAY STANDARD DRAWINGS' HIGHWAY DESIGN BRANCH - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY, 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED PART OF THESE PLANS:

STD. NO.	TITLE
DIVISION 6 - MAJOR STRUCTURES	
422.10	REINFORCED BRIDGE APPROACH FILLS
DIVISION 8 - INCIDENTALS	
862.01	GUARDRAIL PLACEMENT
862.02	GUARDRAIL INSTALLATION
862.03	STRUCTURE ANCHOR UNITS

TOTAL BILL OF MATERIAL

	REINFORCED BRIDGE APPROACH FILL	GRADING	INCIDENTAL MILLING	ASPHALT CONC BASE COURSE, TYPE B25.0B	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A	ASPHALT BINDER FOR PLANT MIX	GUARDRAIL ANCHOR UNITS, TYPE III	GUARDRAIL ANCHOR UNITS, TYPE 350 TL-2	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	APPROX. 207,455 LBS STRUCTURAL STEEL	ANODIZED BLACK TWO BAR METAL RAIL	1'-3/4" X 2'-10" CONCRETE PARAPET	ELASTOMERIC BEARINGS	CONCRETE REPAIRS	SHOTCRETE REPAIRS	EPOXY RESIN INJECTION	FOAM JOINT SEALS	PARTIAL REMOVAL OF EXISTING STRUCTURE	ARCHITECTURAL CONCRETE SURFACE TREATMENT
	LUMP SUM	LUMP SUM	SO. YDS.	TONS	TONS	TONS	EA.	EA.	SO. FT.	SO. FT.	CU. YDS.	LUMP SUM	LBS.	LUMP SUM	LIN. FT.	LIN. FT.	LUMP SUM	CU. FT.	CU. FT.	LIN. FT.	LUMP SUM	LUMP SUM	SO. FT.
SUPERSTRUCTURE									7,528	6,060					421	482							
END BENT 1	LUMP SUM										15.4		2,572					1.3					
BENT 1												9.8	1,975					4.8	10.2	3.0			
BENT 2												10.5	1,975					2.1	3.1	8.0			
BENT 3												10.2	1,975					1.0	20.3	8.0			
END BENT 2	LUMP SUM										16.3		2,594					1.0	0.25	3.5			
TOTAL	LUMP SUM	LUMP SUM	200	14	22	2.1	4	4	7,528	6,060	62.2	LUMP SUM	11,091	LUMP SUM	421	482	LUMP SUM	10.2	33.9	22.5	LUMP SUM	LUMP SUM	3,029

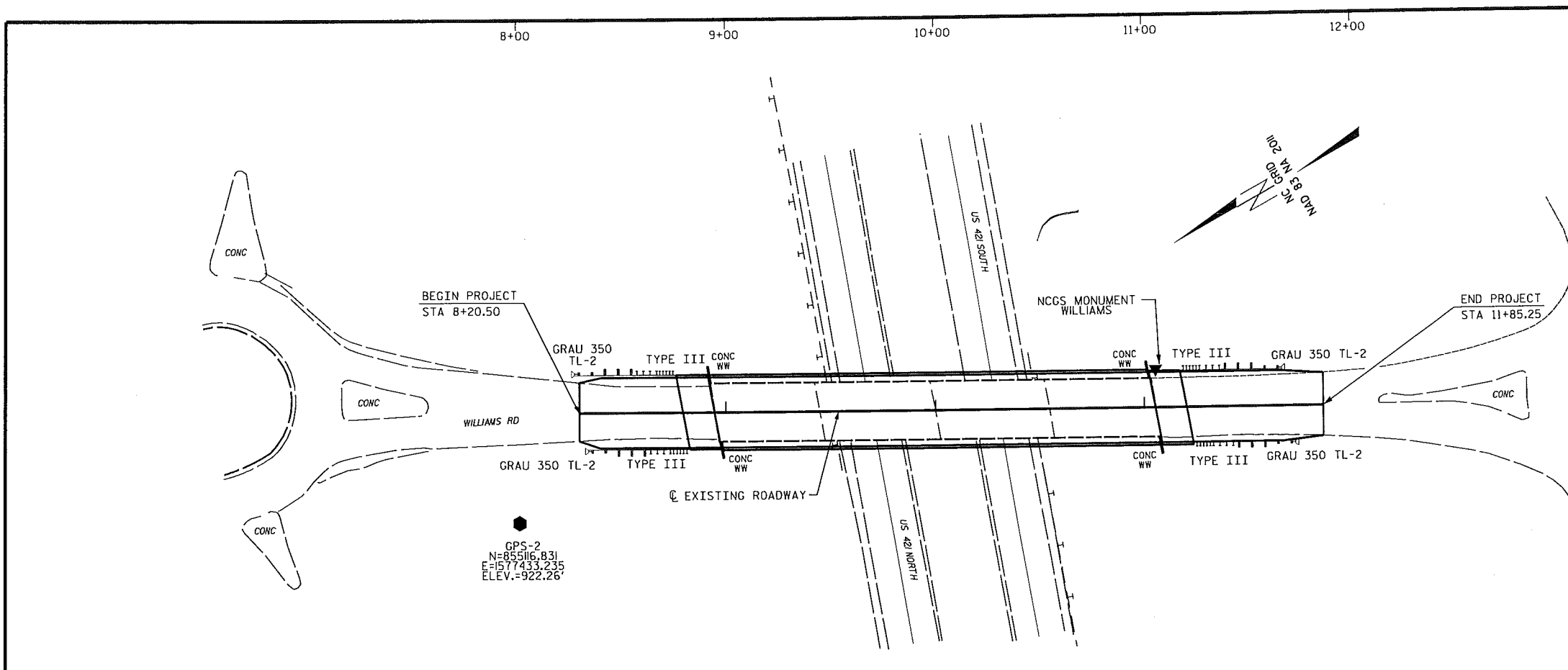
PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO. 187



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 TOTAL BILL OF MATERIALS
 BRIDGE OVER US 421 ON SR 1171 BETWEEN SR 1001 AND SR 1173

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

DRAWN BY : D.V. JOYNER DATE : 1/2014
 CHECKED BY : J. YANNAACONE DATE : 1/2014



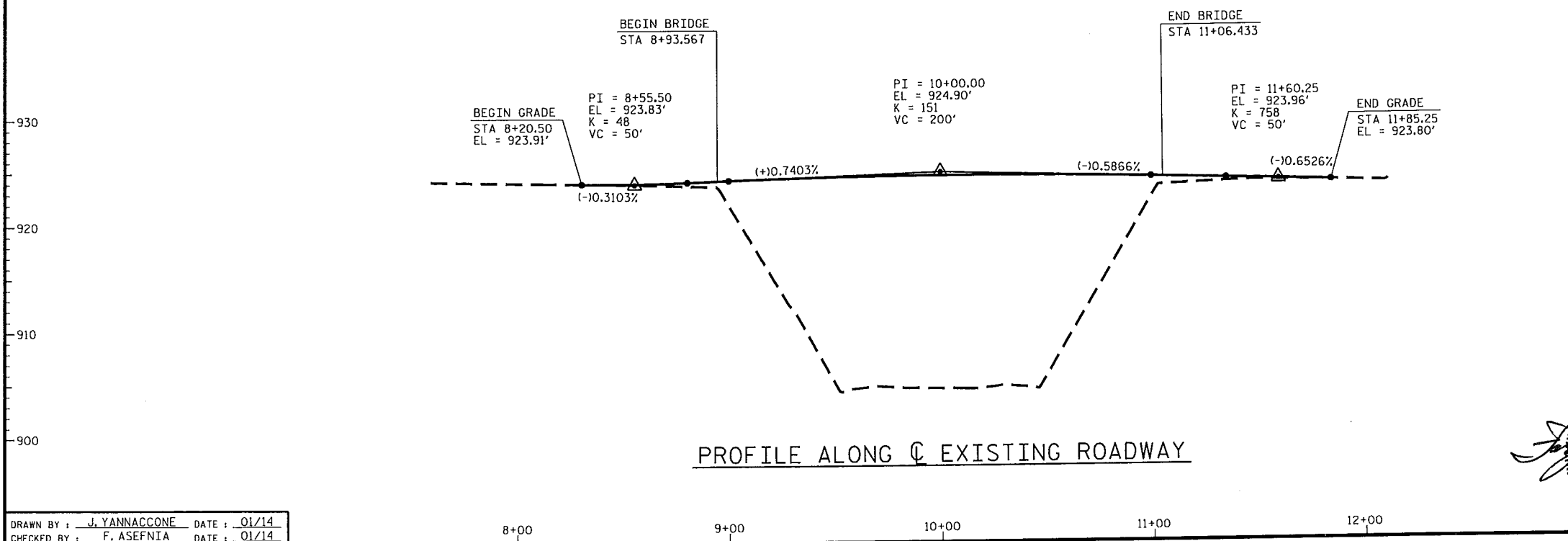
NOTES

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

REMOVAL OF EXISTING ASPHALT PAVEMENT FOR THE PROPOSED BRIDGE APPROACH SLABS WILL BE PAID AT THE CONTRACT LUMP SUM PRICE FOR "REINFORCED BRIDGE APPROACH FILL".

PLAN

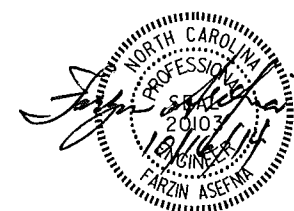


PROFILE ALONG C EXISTING ROADWAY

PROJECT NO. 41665.5B
FORSYTH COUNTY
 BRIDGE NO.: 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**ROADWAY PLAN
 AND PROFILE**



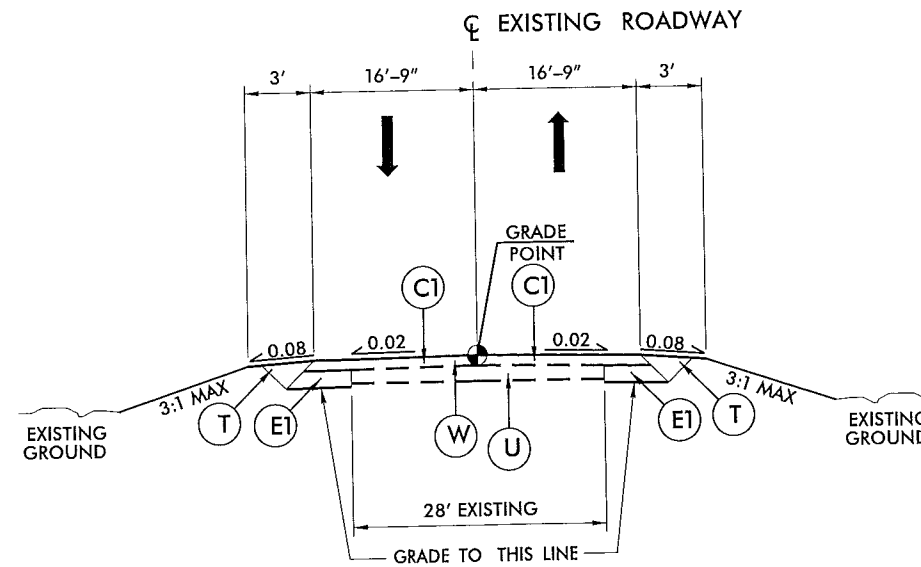
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			39

DRAWN BY : J. YANACCONO DATE : 01/14
 CHECKED BY : F. ASEFNIA DATE : 01/14

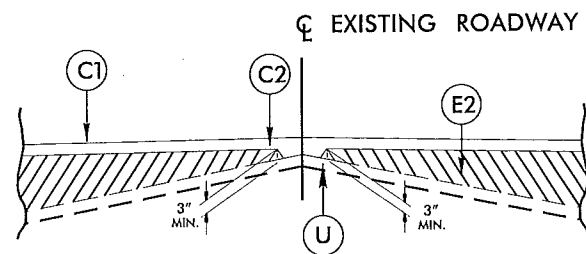
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 fosefnia

PAVEMENT SCHEDULE FINAL PAVEMENT DESIGN	
C1	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.50 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 5.5" IN DEPTH.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL SHOWING METHOD OF WEDGING)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



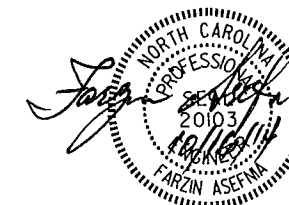
TYPICAL SECTION



Detail Showing Method of Wedging

PROJECT NO. 41665.5B
FORSYTH COUNTY
BRIDGE NO.: 187

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
ROADWAY DETAILS					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
TOTAL SHEETS					39



DRAWN BY: J. YANNAKONE DATE: 01/14
CHECKED BY: F. ASEFNIA DATE: 01/14

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

LOAD FACTORS:

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

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:

-
-
-
-

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93) **

② DESIGN LOAD RATING (HS-20) **

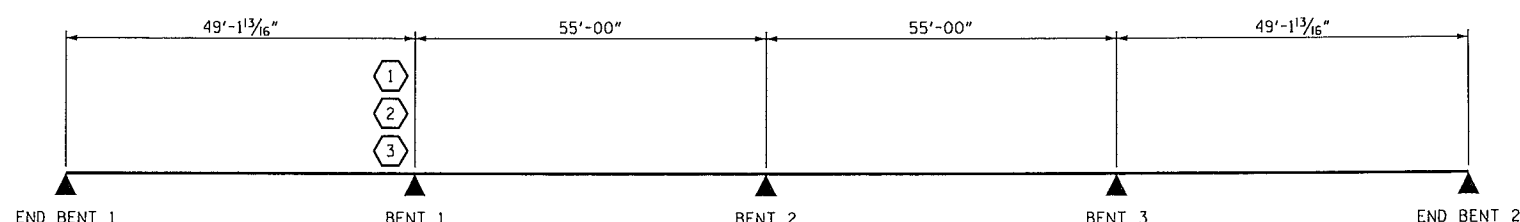
③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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

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	1.304	--	1.75	0.596	1.30	A	EL	49.15	0.718	3.09	D	I	0.00	1.30	0.596	1.87	A	EL	49.15		
	HL-93 (OPERATING)	N/A		1.691	--	1.35	0.596	1.69	A	EL	49.15	0.718	4.00	D	I	0.00	1.00	0.596	2.43	A	EL	49.15		
	HS-20 (INVENTORY)	36.00	②	2.486	89.496	1.75	0.596	2.49	A	EL	49.15	0.718	3.84	A	I	49.15	1.30	0.596	3.81	A	EL	19.66		
	HS-20 (OPERATING)	36.00		3.223	116.028	1.35	0.596	3.22	A	EL	49.15	0.718	4.97	A	I	49.15	1.00	0.596	4.95	A	EL	19.66		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		7.596	102.546	1.40	0.596	7.60	A	EL	49.15	0.689	9.99	A	I	0.00	1.30	0.596	7.57	A	EL	19.66	
		SNGARBS2	20.000		5.286	105.720	1.40	0.596	5.29	A	EL	49.15	0.718	8.07	A	I	49.15	1.30	0.596	5.97	A	EL	19.66	
		SNAGRIS2	22.000		4.823	106.106	1.40	0.596	4.82	A	EL	49.15	0.718	7.48	A	I	49.15	1.30	0.596	5.81	A	EL	19.66	
		SNCOTTS3	27.250		3.541	96.492	1.40	0.596	3.54	A	EL	49.15	0.718	5.66	D	I	0.00	1.30	0.596	3.85	A	EL	19.66	
		SNAGGRS4	34.925		2.858	99.816	1.40	0.596	2.86	A	EL	49.15	0.718	4.68	D	I	0.00	1.30	0.596	3.36	A	EL	19.66	
		SNS5A	35.550		2.829	100.571	1.40	0.596	2.83	A	EL	49.15	0.718	4.73	A	I	49.15	1.30	0.596	3.32	A	EL	19.66	
		SNS6A	39.950		2.585	103.271	1.40	0.596	2.58	A	EL	49.15	0.718	4.33	A	I	49.15	1.30	0.596	3.09	A	EL	19.66	
		SNS7B	42.000		2.473	103.866	1.40	0.596	2.47	A	EL	49.15	0.718	4.26	A	I	49.15	1.30	0.596	2.97	A	EL	19.66	
	TRUCK TRACTOR SEMI-TRAILER (TTS)	TNAGRIT3	33.000		3.150	103.950	1.40	0.596	3.15	A	EL	49.15	0.718	5.16	D	I	0.00	1.30	0.596	3.87	A	EL	19.66	
		TNT4A	33.075		3.169	104.815	1.40	0.596	3.17	A	EL	49.15	0.718	5.04	A	I	49.15	1.30	0.596	3.77	A	EL	19.66	
		TNT6A	41.600		2.622	109.075	1.40	0.596	2.62	A	EL	49.15	0.718	4.59	A	I	49.15	1.30	0.596	3.20	A	EL	19.66	
		TNT7A	42.000		2.612	109.704	1.40	0.596	2.61	A	EL	49.15	0.718	4.44	A	I	49.15	1.30	0.596	3.24	A	EL	19.66	
		TNT7B	42.000		2.674	112.308	1.40	0.596	2.67	A	EL	49.15	0.718	4.21	A	I	49.15	1.30	0.596	3.29	A	EL	19.66	
		TNAGRIT4	43.000		2.499	107.457	1.40	0.596	2.50	A	EL	49.15	0.718	4.04	A	I	49.15	1.30	0.596	3.17	A	EL	19.66	
FATIGUE	HL-93 (INVENTORY)	$\gamma_{LL}=0.75$																						

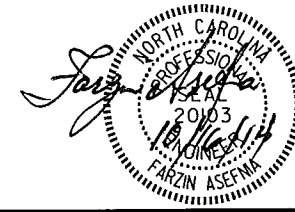


LRFR SUMMARY

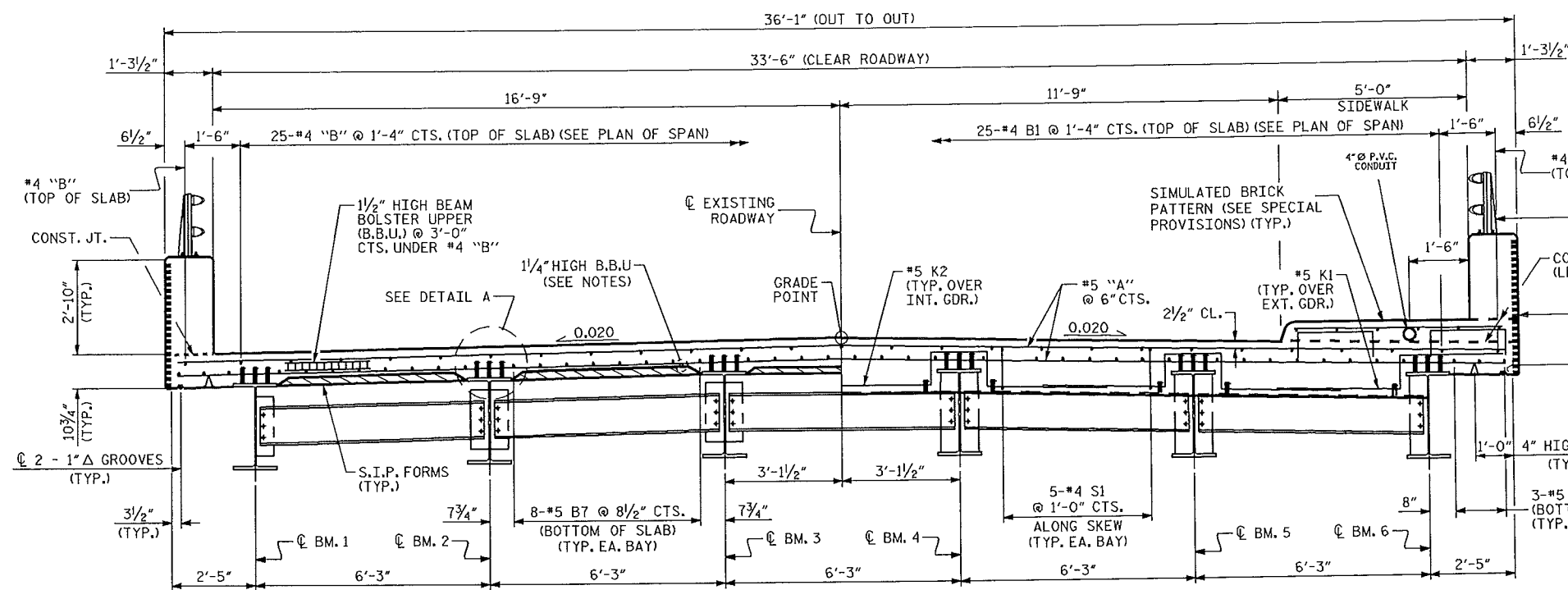
PROJECT NO. 41665.5B
FORSYTH COUNTY
 BRIDGE NO.: 187

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

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



ASSEMBLED BY: D. JOYNER DATE: 10/13
 CHECKED BY: J. YANNAKONE DATE: 10/13
 DRAWN BY: MAA 1/08 REV. 1/12/08RR MAA/GM
 CHECKED BY: GM/DI 2/08 REV. 10/1/11 MAA/GM

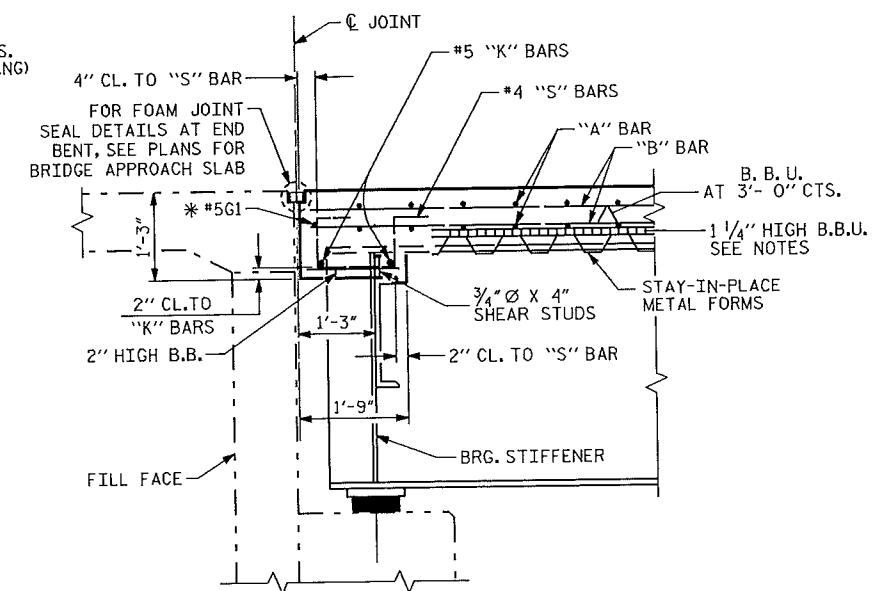


PART TYPICAL SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS)

PART TYPICAL SECTION
(SHOWING END BENT DIAPHRAGMS)

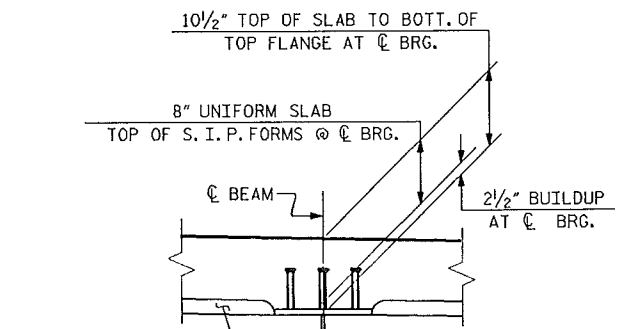
NOTES:

- PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.
- 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.
- PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.
- STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.
- 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 DECK DRAINS, SEE "DRAIN CONNECTOR DETAIL" ON SHEET S-15.

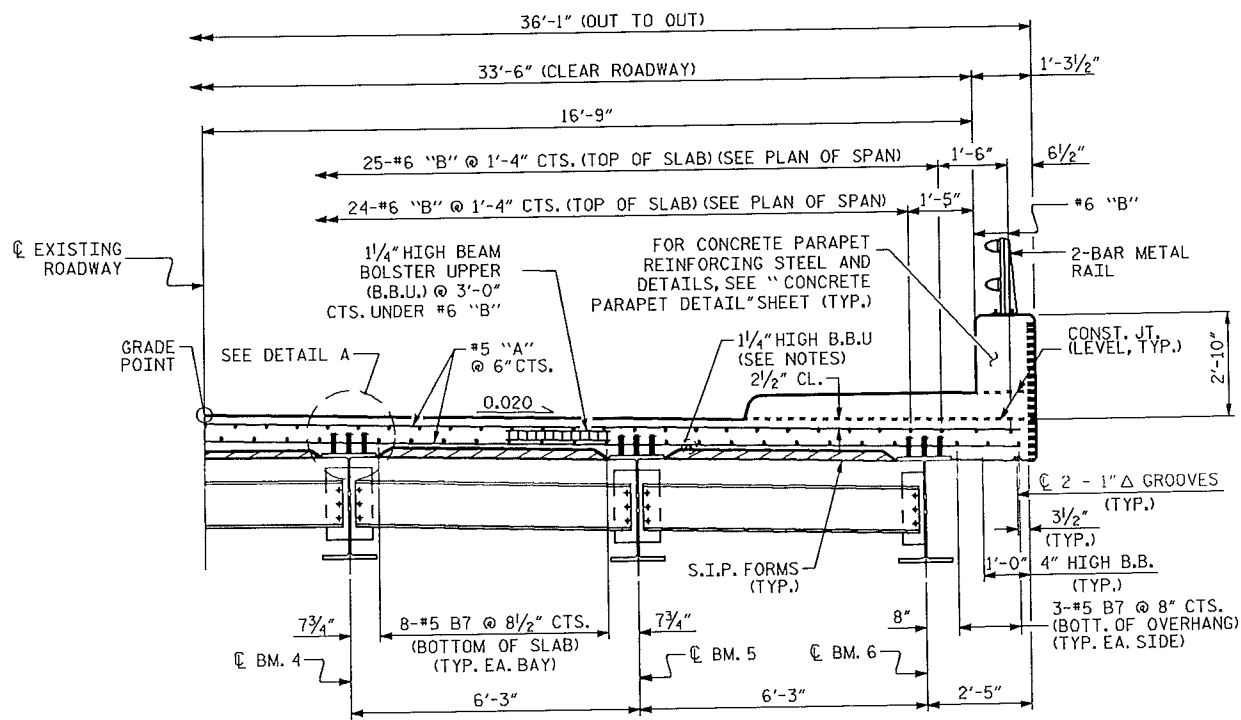


SECTION AT END BENT

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



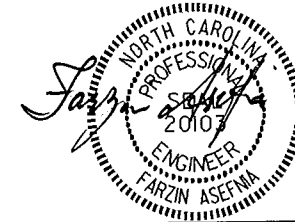
DETAIL A



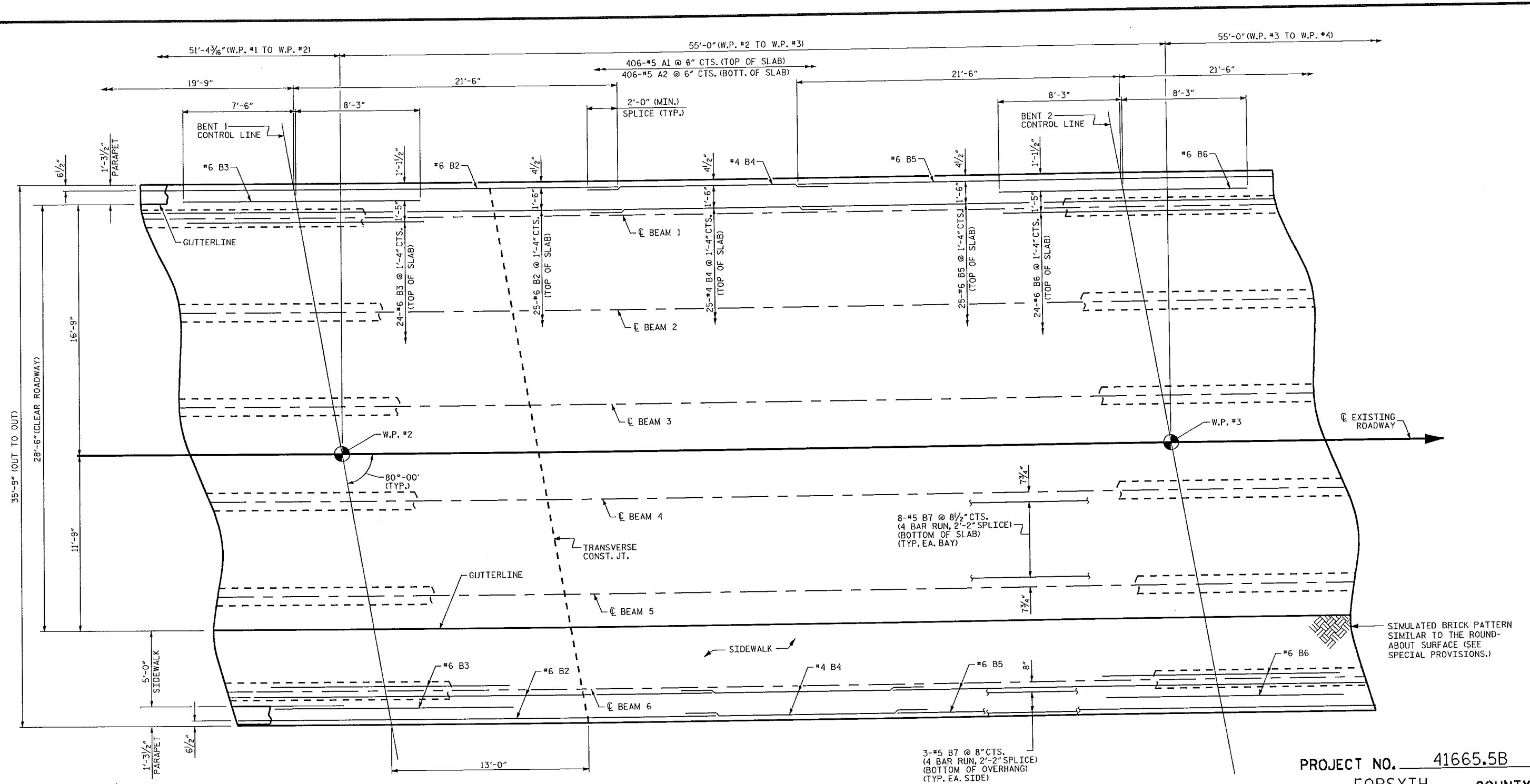
PART TYPICAL SECTION
(SHOWING BENT DIAPHRAGMS)

PROJECT NO. 41665.5B
FORSYTH COUNTY
 BRIDGE NO. 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTIONS



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



SPAN B

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO. 187

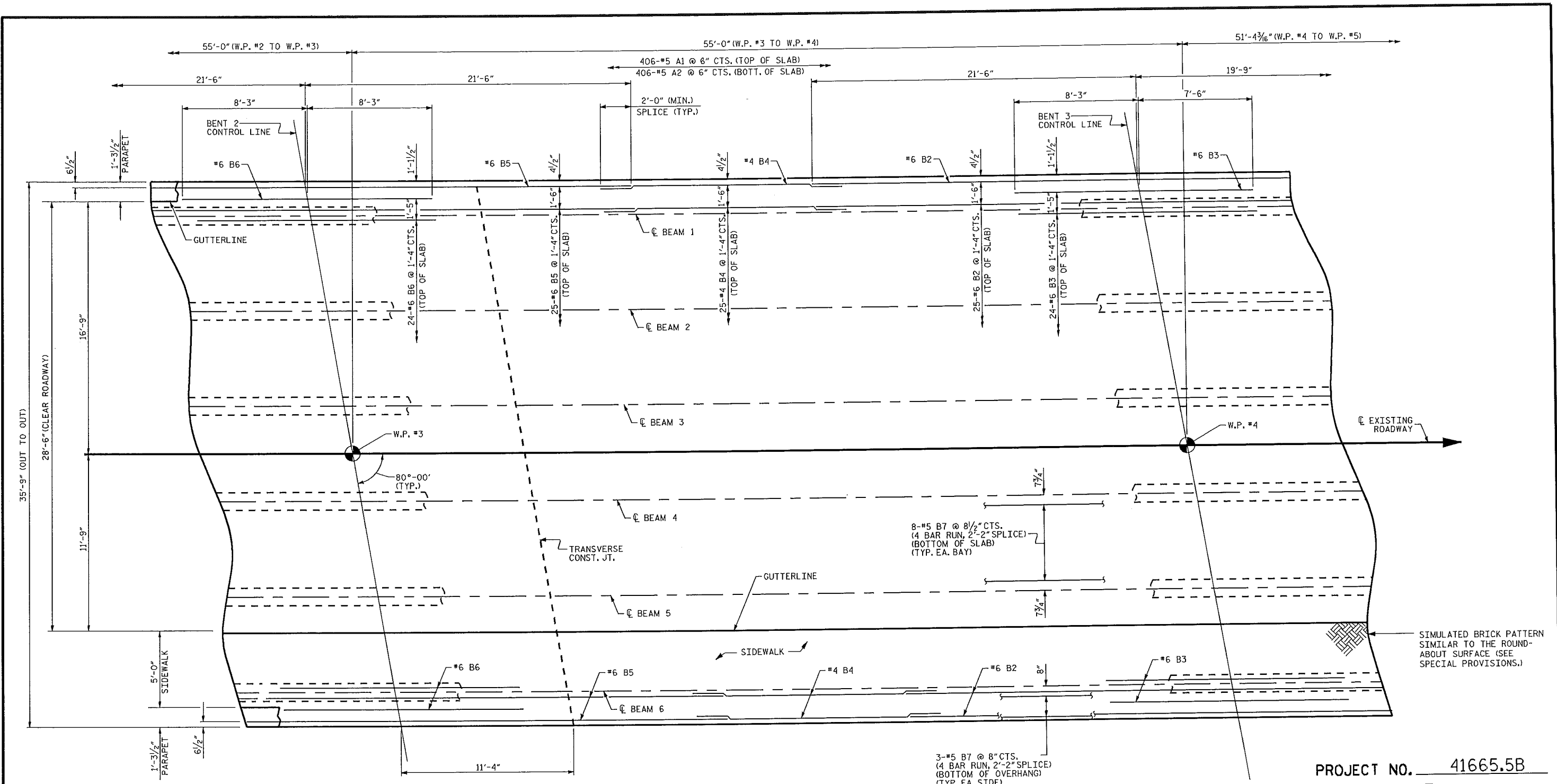
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPANS

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



DRAWN BY: D. JOYNER DATE: 10/13
 CHECKED BY: J. YANACCONO DATE: 10/13



SPAN C

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO. 187

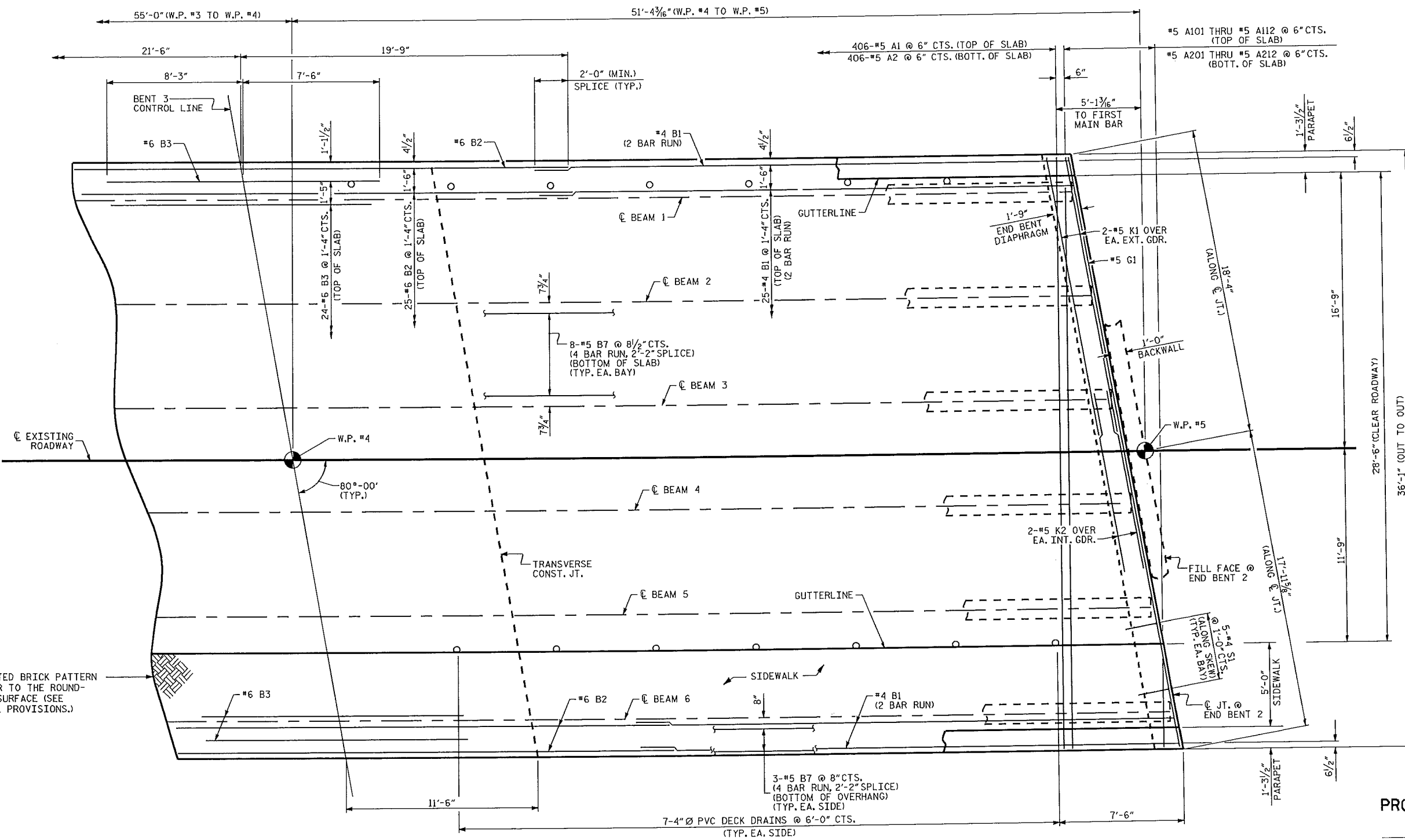
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPANS

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



DRAWN BY: D. JOYNER DATE: 10/13
 CHECKED BY: J. YANACCONO DATE: 10/13



SPAN D

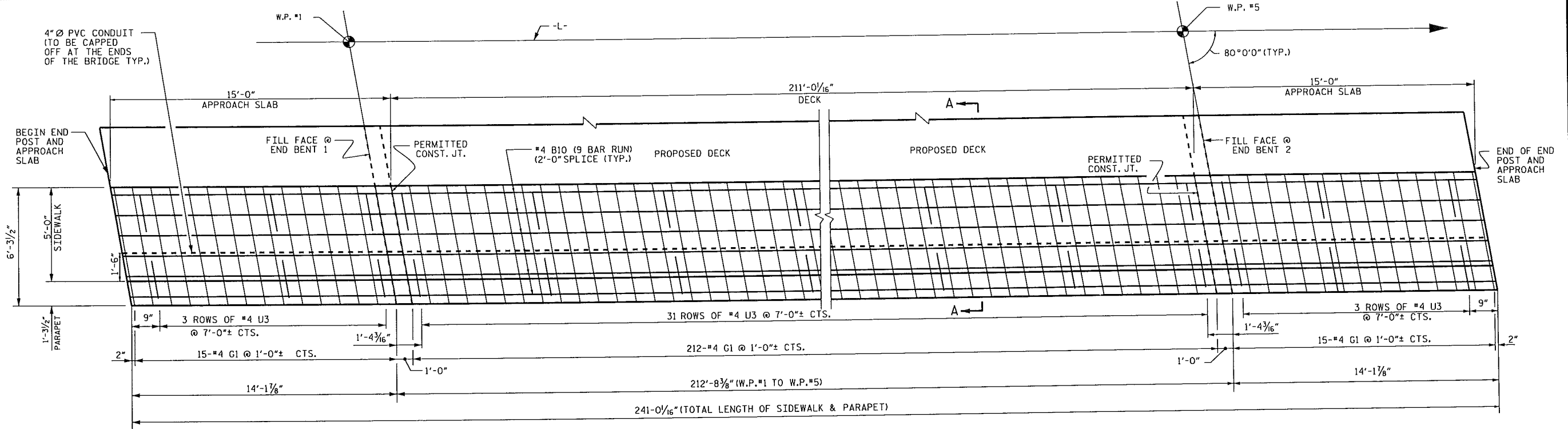
PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO. 187

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

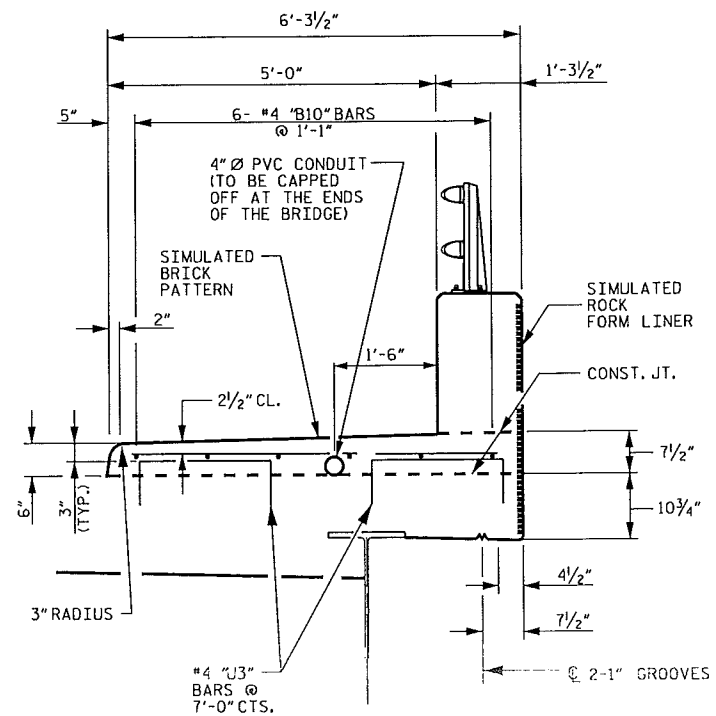


REVISIONS						SHEET NO.	
NO.	BY	DATE	NO.	BY	DATE	S-10	
1			3			TOTAL SHEETS	39
2			4				

DRAWN BY: D. JOYNER DATE: 10/13
 CHECKED BY: J. YANACCONO DATE: 10/13



PLAN OF SIDEWALK
(SIMULATED BRICK PATTERN SURFACE)



SECTION A-A

BILL OF MATERIAL						BAR TYPE	
CONCRETE SIDEWALK							
BAR	No.	SIZE	TYPE	LENGTH	WEIGHT		
* B10	54	#4	STR	28'-7"	1031		
* G1	242	#4	STR	5'-6"	889		
* U3	74	#4	1	3'-4"	165		
				2085	(LBS.)		
* EPOXY COATED REINFORCING STEEL							
CLASS AA CONCRETE				24.6	CU. YDS.		

NOTES FOR SIDEWALKS AND CONCRETE MEDIAN:

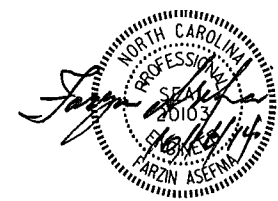
- THE SIDEWALK ON A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL CONCRETE IN THE UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
- ALL REINFORCING STEEL IN THE SIDEWALK, PARAPET AND END POSTS SHALL BE EPOXY COATED.
- GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED 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.
- FOR REINFORCING IN PARAPET, SEE "RAIL POST SPACINGS & END POST DETAILS" SHEET.
- SIDEWALKS ON THE BRIDGE EXTENDING TO THE END OF THE APPROACH SLABS ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL AND PAID FOR AS PART OF THE REINFORCED CONCRETE DECK PAY ITEM.
- THE #4 U3 DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER DECK OR APPROACH SLAB HAS BEEN SCREEDED OFF, EXCEPT AS NOTED.

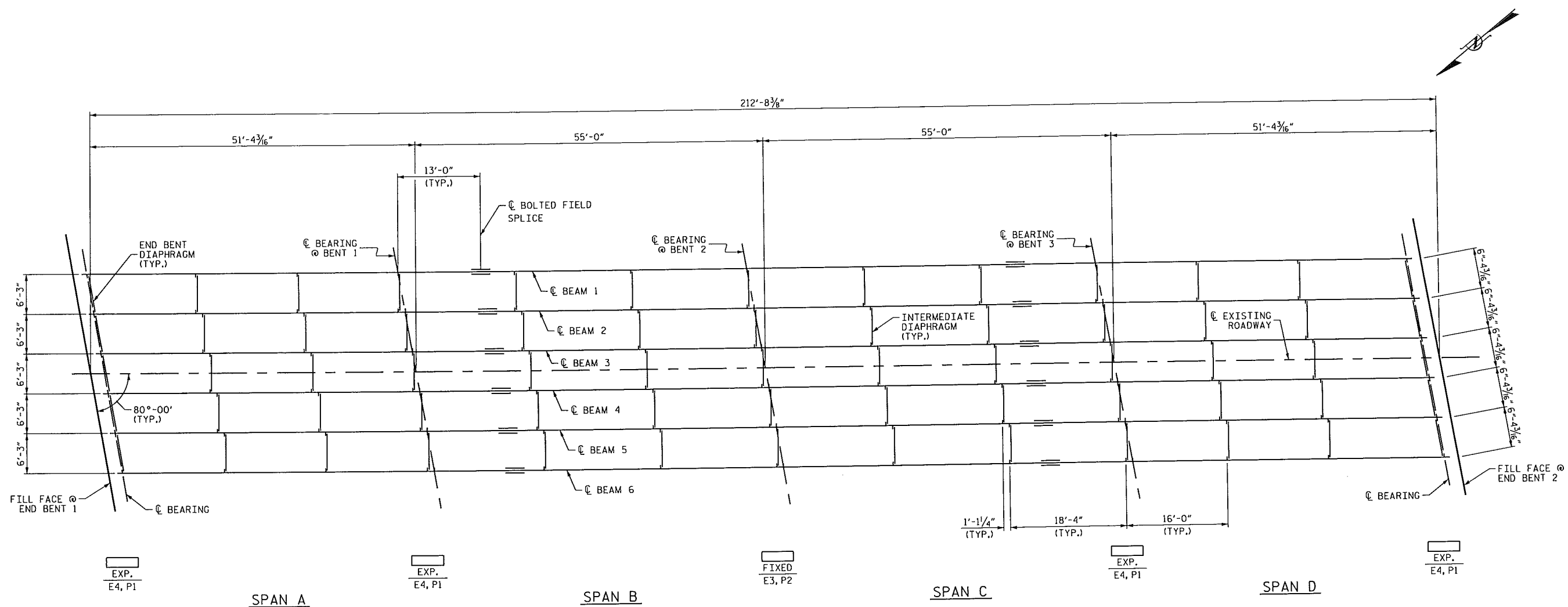
PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO. 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 SIDEWALK DETAILS

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

DRAWN BY : M. WELDON DATE : 9/2014
 CHECKED BY : F. ASEFNIA DATE : 9/2014





FRAMING PLAN

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

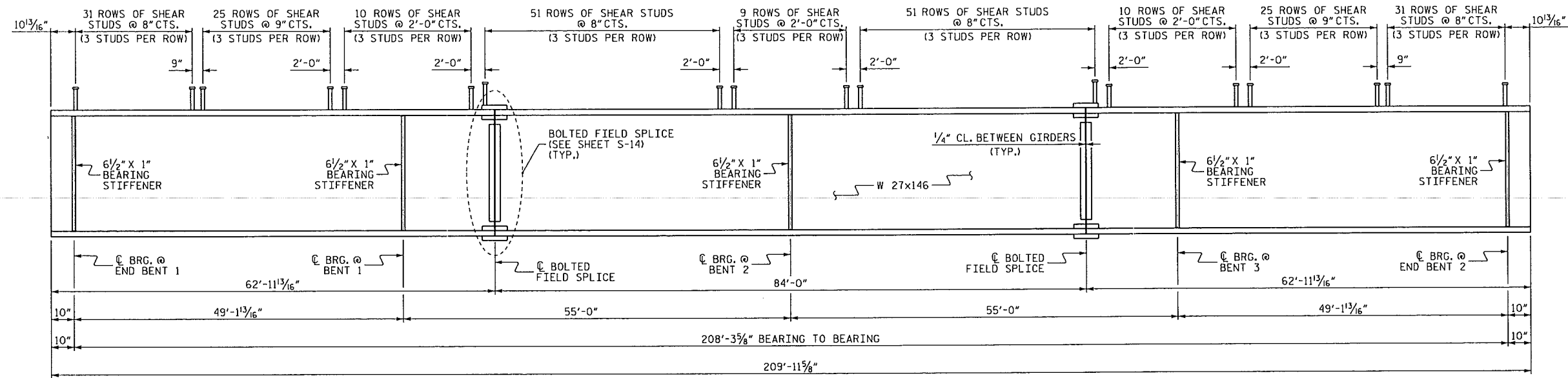
SUPERSTRUCTURE
 FRAMING PLAN

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

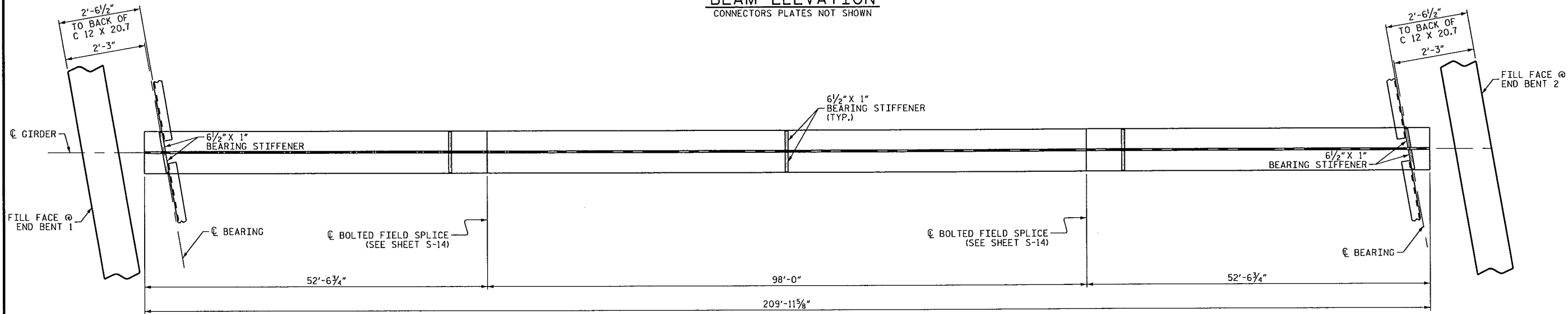


DRAWN BY : M. WELDON DATE : 10/2013
 CHECKED BY : J. YANNAKONE DATE : 10/2013

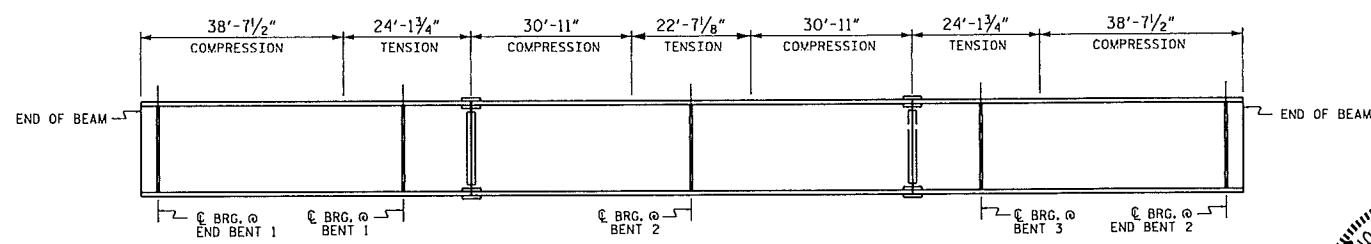
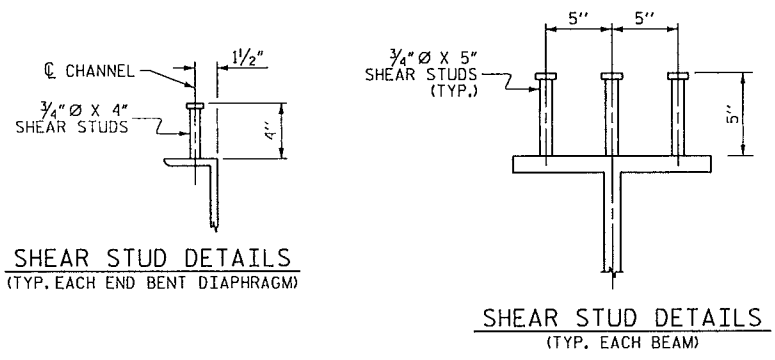
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BEAM ELEVATION
 CONNECTORS PLATES NOT SHOWN



BOTTOM FLANGE DETAIL



TOP FLANGE TENSION & COMPRESSION ZONES

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

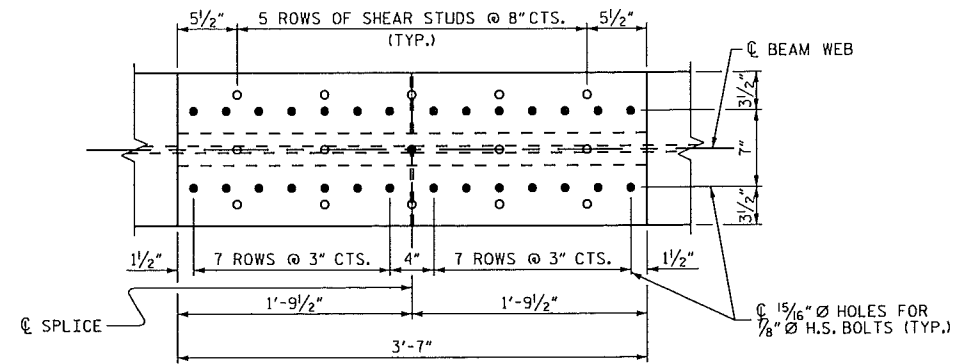
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STRUCTURAL STEEL DETAILS

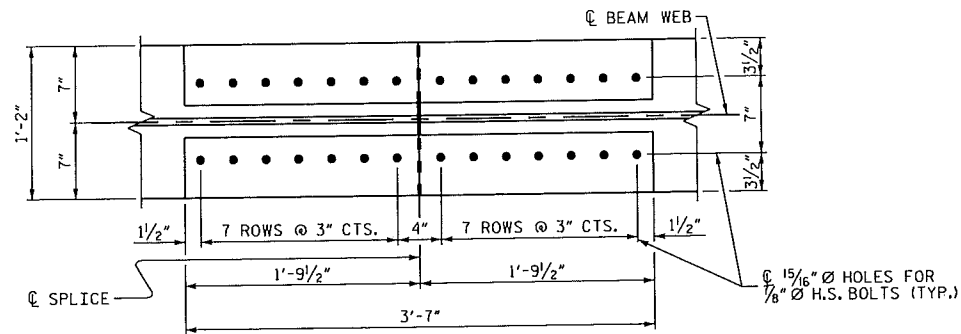
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13	
1			3			TOTAL SHEETS	39
2			4				

PROFESSIONAL SEAL
 NORTH CAROLINA
 2013
 FARZIN ASEFAMA

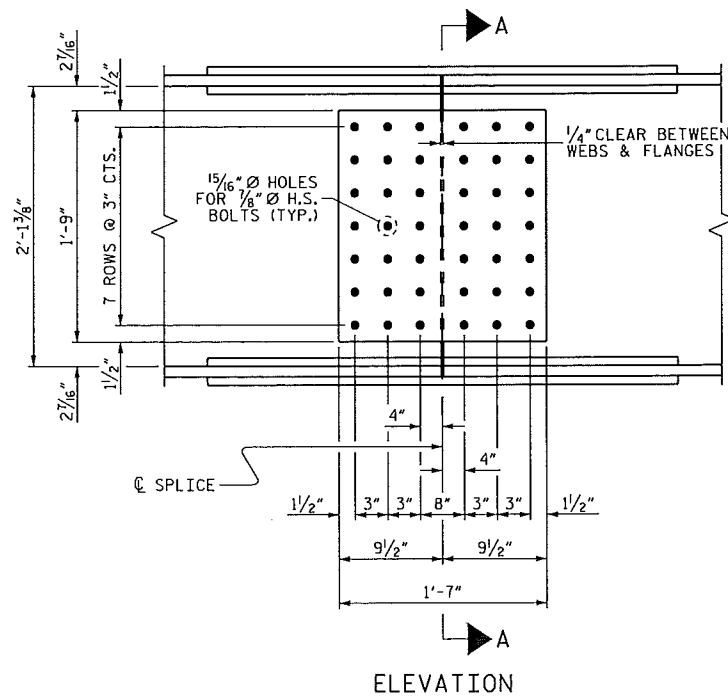
DRAWN BY: J. YANACCONO DATE: 01/14
 CHECKED BY: Z. WAFA DATE: 01/14



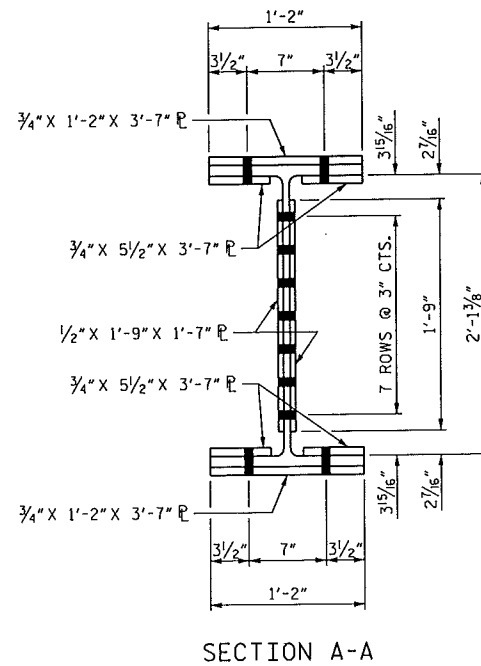
PLAN (TOP OF TOP FLANGE)



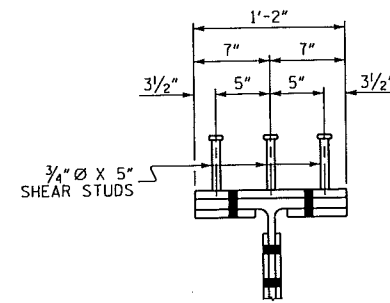
PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A



SHEAR STUD DETAIL FOR TOP FLANGE SPLICE PLATE

BOLTED FIELD SPLICE DETAILS

PROJECT NO. 41665.5B
FORSYTH COUNTY
 BRIDGE NO.: 187

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-14
SUPERSTRUCTURE						TOTAL SHEETS 39
STRUCTURAL STEEL DETAILS						
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DRAWN BY: J. YANACCONO DATE: 10/13
 CHECKED BY: Z. WAFA DATE: 01/14



NOTES

ALL STRUCTURAL STEEL SHALL BE AASHTO M270 GRADE 50W AND PAINTED IN ACCORDANCE WITH SYSTEM 4 OF ARTICLE 442-8 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.

STIFFENERS ARE NOT REQUIRED ON THE OUTSIDE OF EXTERIOR BEAMS.

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

A CHARPY V-NOTCH TEST IS REQUIRED ON ALL BEAM SECTIONS AND SPLICE PLATES IN ACCORDANCE WITH ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE BEAM, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR ELASTOMER.

TENSION ON THE ASTM A325 BOLTS SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH ARTICLE 440-8 OF THE STANDARD SPECIFICATIONS.

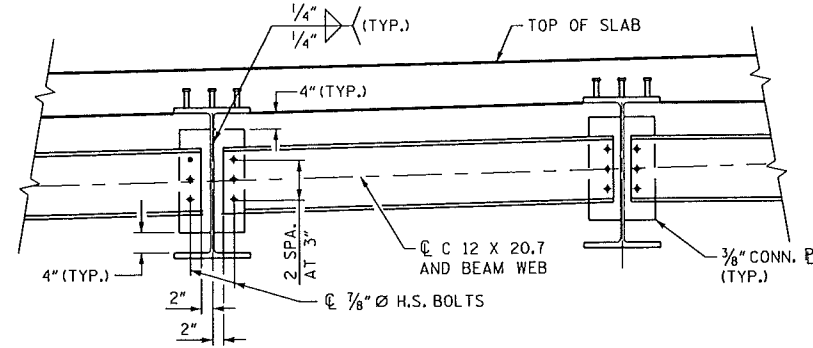
END OF BEAMS AND GIRDERS SHALL BE PLUMB.

BEARING STIFFENER MAY REQUIRE COPING IF WIDER THAN BOTTOM FLANGE.

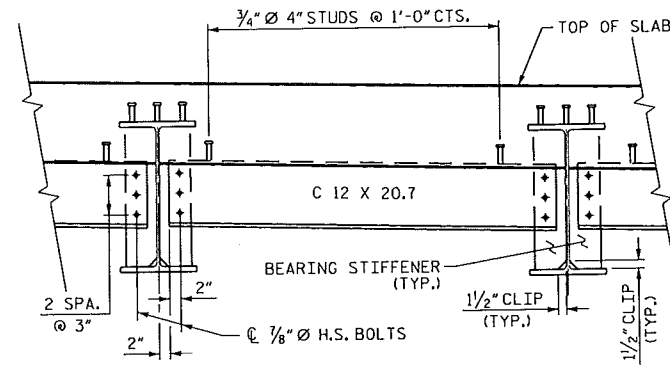
NEEDLE BEAM TYPE SUPPORTS ARE REQUIRED FOR THE OVERHANG FALSEWORK IN THE SPANS WITH 27" BEAMS.

FABRICATORS SHALL DETAIL DIAPHRAGM MEMBERS AND CONNECTIONS FOR FULL DEAD LOAD FIT UP. BEAMS SHALL BE PLUMB AFTER THE FULL AMOUNT OF DEAD LOAD IS APPLIED.

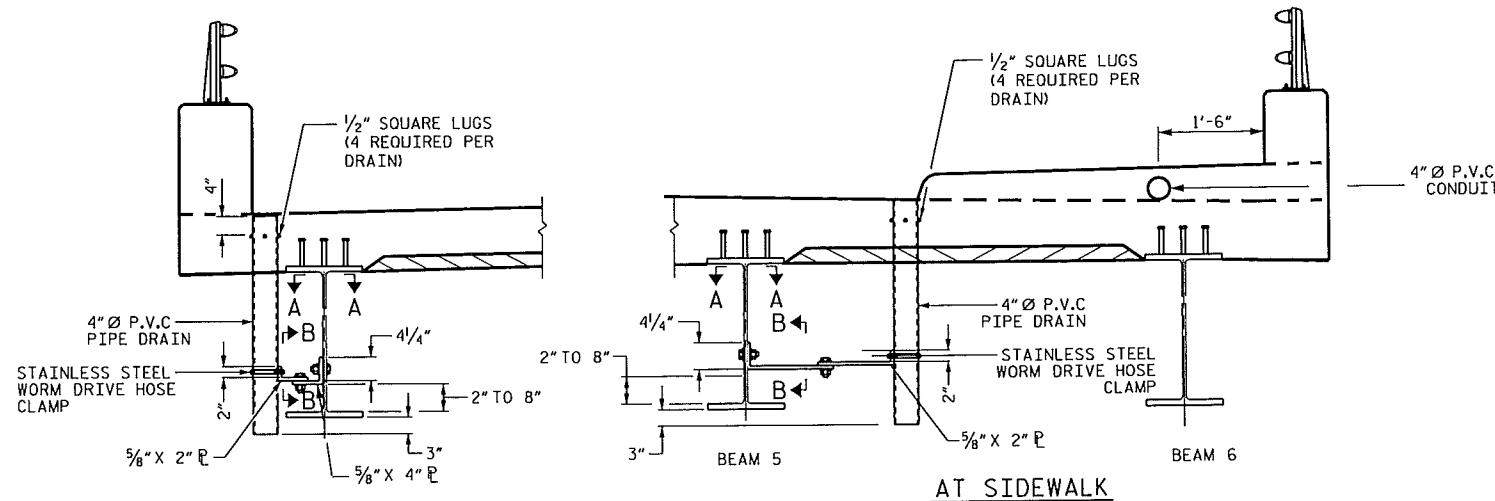
STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.



TYPICAL INTERMEDIATE DIAPHRAGM

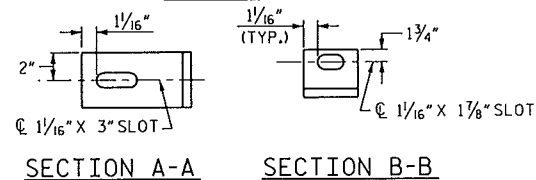


TYPICAL END BENT DIAPHRAGM



AT PARAPET

AT SIDEWALK



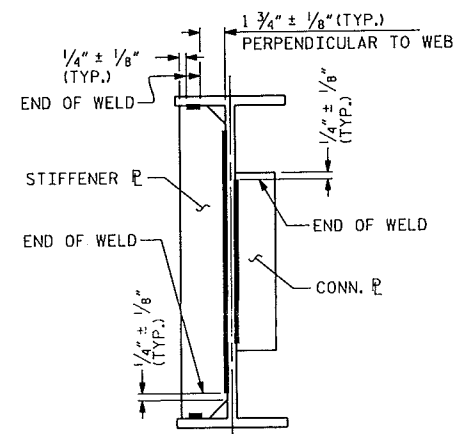
SECTION A-A SECTION B-B

DRAIN CONNECTOR DETAIL

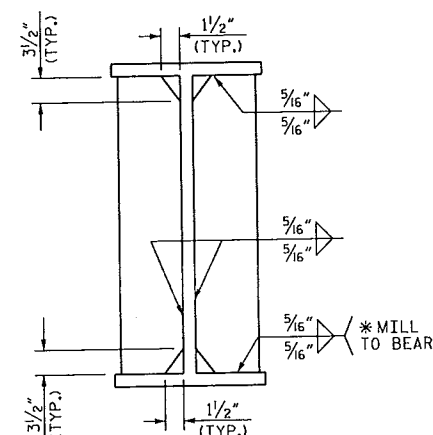
COUPLING IN DRAIN PIPE WILL BE PERMITTED AS APPROVED BY ENGINEER.
 TOP OF FLOOR DRAIN TO BE SET 3/8" BELOW SURFACE OF SLAB.
 4- 1/2" SQUARE LUGS TO BE GLUED TO THE P.V.C. PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.
 BOLT SIZE TO BE SAME AS DIAPHRAGM AND CROSSFRAME CONNECTIONS. STAINLESS STEEL WORM HOSE CLAMP SHALL BE COMMERCIAL QUALITY.
 THE 4" Ø PVC PLASTIC PIPE AND FITTING SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

PVC DECK DRAINS SHALL BE PAINTED WITH TWO COATS OF BROWN PRIMER MEETING THE REQUIREMENTS OF ARTICLE 1080-11 OF THE STANDARD SPECIFICATIONS. EACH COAT SHALL BE 2 DRY MILS (0.050MM) THICK. DECK DRAINS SHALL BE ROUGHENED PRIOR TO PAINTING. NO SEPARATE PAYMENT SHALL BE MADE FOR PAINTING PVC DECK DRAINS AS THIS IS CONSIDERED INCIDENTAL TO THE PAY ITEM FOR REINFORCED CONCRETE DECK SLAB.

28 DRAIN AND DRAIN CONNECTOR ASSEMBLIES REQUIRED.
 SEE PLAN OF SPANS FOR LOCATION OF 4" Ø PVC PIPE DRAINS.



TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS
 WELD TERMINATION DETAILS



BEARING STIFFENER DETAILS

* WELD TO BOTTOM FLANGE IS ONLY REQUIRED WHEN BEARING STIFFENER IS ALSO CONNECTOR PLATE

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO. 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 STRUCTURAL DETAILS



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-15
1			3			TOTAL SHEETS
2			4			39

DRAWN BY : M. WELDON DATE : 10/13
 CHECKED BY : J. YANNAKONE DATE : 10/13

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

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

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

FOR PAINTED STRUCTURAL STEEL (EXCLUDING AASHTO M270 GRADE 50W), SOLE PLATES, ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

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

- ONCE THE DECK HAS CURED, THE BEAMS SHALL BE JACKED AND THE ELASTOMERIC BEARING SLOTS CENTERED AS NEARLY AS PRACTICAL ABOUT THE BEARING STIFFENER. THIS OPERATION SHALL BE PERFORMED AT APPROXIMATELY 60° F.

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

MAXIMUM ALLOWABLE SERVICE LOADS

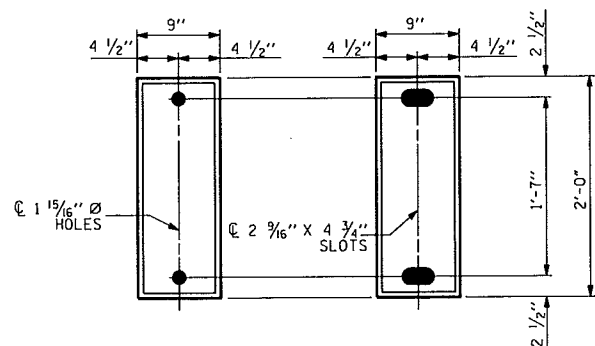
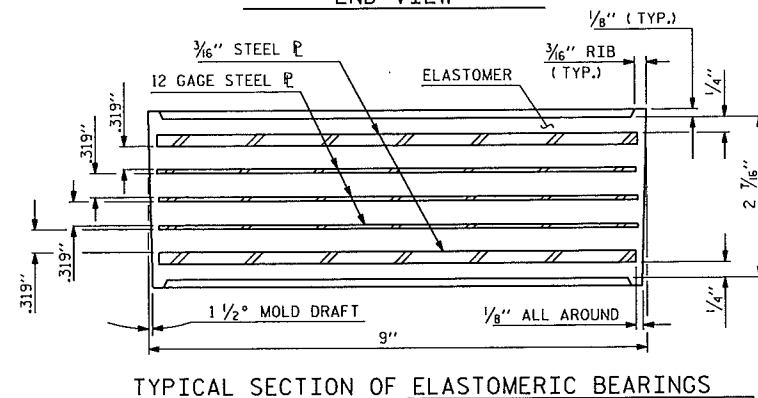
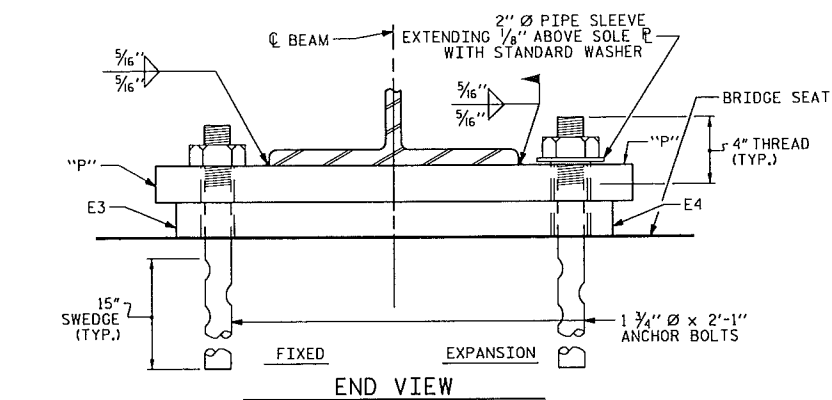
D.L.+L.L. (NO IMPACT)

TYPE II	180 k
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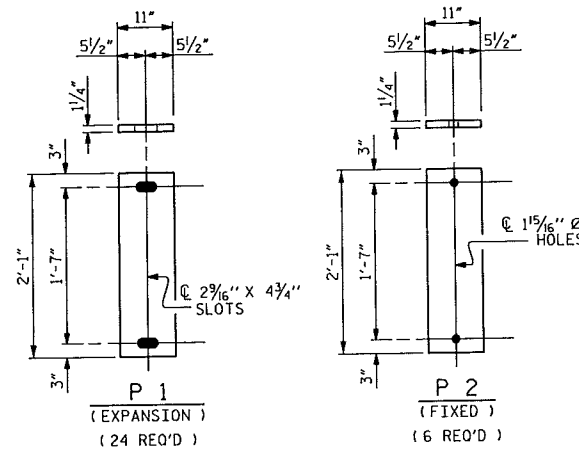
PROJECT NO. 41665.5B
FORSYTH COUNTY
 BRIDGE NO.: 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
**ELASTOMERIC BEARING
 DETAILS**
 (STEEL SUPERSTRUCTURE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-16
2			4			39

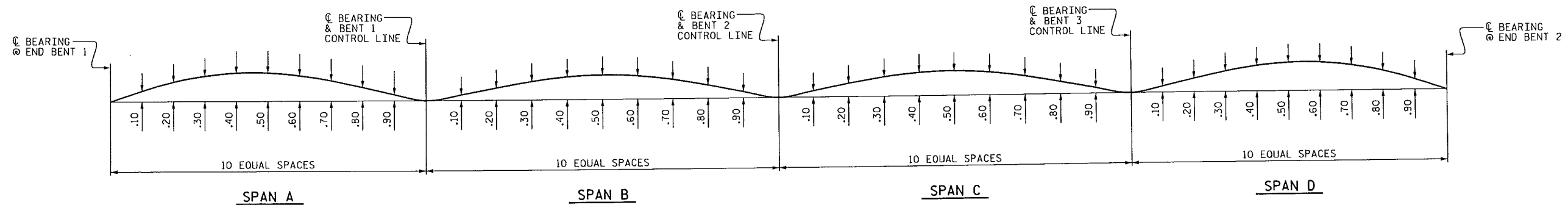


E3 (6 REQ'D) E4 (24 REQ'D)
 PLAN VIEW OF ELASTOMERIC BEARING
TYPE II



SOLE PLATE DETAILS ('P')

ASSEMBLED BY : J. YANACCONI	DATE : 10/13
CHECKED BY : F. ASEFNIA	DATE : 12/13
DRAWN BY : JWB	11/87
CHECKED BY : ARB	11/87
REV. 5/1/06	TLA/GM
REV. 10/1/11	MAA/GM
REV. 6/13	AAC/MAA



SCHEMATIC OF CAMBER ORDINATES

FOR CAMBER VALUES AT EACH BEAM TENTH POINT, SEE TABLE BELOW.
SLOPE FOR ZERO CAMBER BASE LINE VARIES.

DEAD LOAD DEFLECTION TABLE FOR BEAMS																						
TENTH POINTS	SPAN A										SPAN B											
	BEAMS 1 THRU 6										BEAMS 1 THRU 6											
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	
DEFLECTION DUE TO WEIGHT OF BEAM	0.000	0.002	0.003	0.004	0.004	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.001	0.002	0.002	0.003	0.003	0.002	0.001	0.000	0.000	
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.009	0.016	0.022	0.024	0.024	0.020	0.015	0.009	0.003	0.000	0.000	0.001	0.005	0.010	0.013	0.015	0.014	0.011	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.004	0.005	0.005	0.005	0.003	0.002	0.001	0.000	0.000	0.000	0.001	0.002	0.003	0.003	0.003	0.002	0.001	0.000	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.013	0.023	0.031	0.034	0.033	0.029	0.021	0.013	0.005	0.000	0.000	0.001	0.007	0.014	0.019	0.021	0.020	0.015	0.009	0.003	0.000
VERTICAL CURVE ORDINATE	0.000	0.007	0.013	0.017	0.019	0.020	0.019	0.017	0.013	0.007	0.000	0.000	0.009	0.016	0.021	0.024	0.025	0.024	0.021	0.016	0.009	0.000
REQUIRED CAMBER	0	1/4"	3/16"	3/16"	5/8"	5/8"	3/16"	3/16"	3/16"	1/8"	0	0	1/8"	1/4"	3/16"	1/2"	3/16"	1/2"	3/16"	5/16"	1/8"	0

DEAD LOAD DEFLECTION TABLE FOR BEAMS																					
TENTH POINTS	SPAN C										SPAN D										
	BEAMS 1 THRU 6										BEAMS 1 THRU 6										
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	0
DEFLECTION DUE TO WEIGHT OF BEAM	0.000	0.000	0.001	0.002	0.003	0.003	0.002	0.002	0.001	0.000	0.000	0.001	0.002	0.003	0.004	0.004	0.004	0.004	0.003	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.002	0.006	0.011	0.014	0.015	0.013	0.010	0.005	0.001	0.000	0.003	0.009	0.015	.020	0.024	0.024	0.022	0.016	0.009	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.003	0.003	0.002	0.001	0.000	0.000	0.001	0.002	0.003	0.005	0.005	0.005	0.005	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.003	0.009	0.015	0.020	0.021	0.019	0.014	0.007	0.001	0.000	0.005	0.013	0.021	0.029	0.033	0.034	0.031	0.023	0.013	0.000
VERTICAL CURVE ORDINATE	0.000	0.009	0.016	0.021	0.024	0.025	0.024	0.021	0.016	0.009	0.000	0.010	0.018	0.024	0.027	0.029	0.027	0.024	0.018	0.010	0.000
REQUIRED CAMBER	0	1/8"	5/16"	7/16"	1/2"	3/16"	1/2"	7/16"	1/4"	1/8"	0	0	1/8"	5/16"	7/16"	3/16"	5/8"	3/16"	7/16"	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).

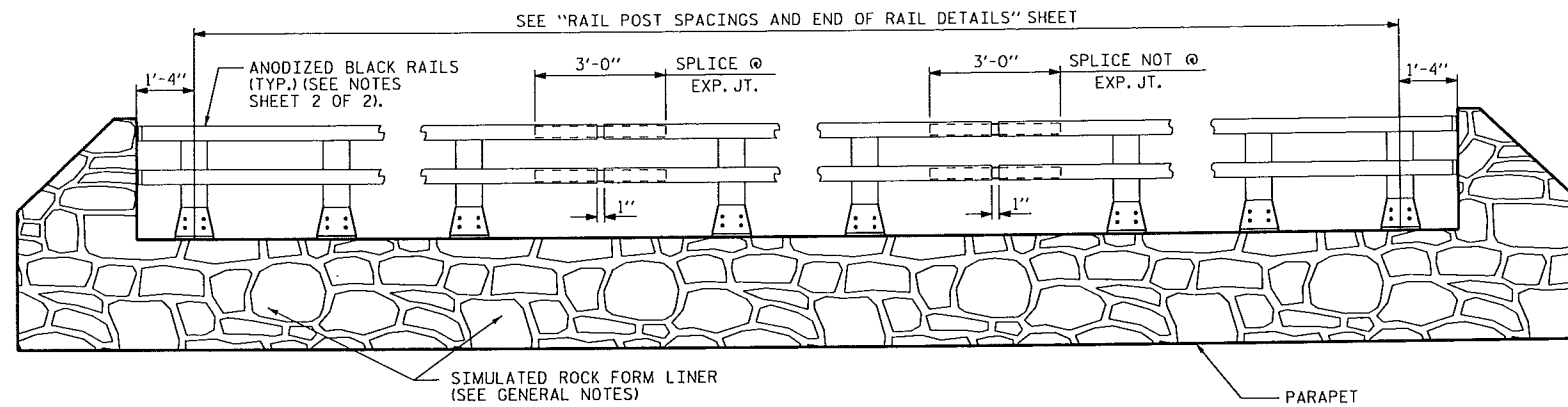
PROJECT NO. 41665.5B
FORSYTH COUNTY
BRIDGE NO.: 187



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
DEAD LOAD DEFLECTIONS

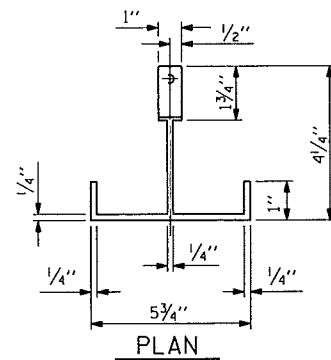
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	5-17
1			3			TOTAL SHEETS 39
2			4			

DRAWN BY: D.V. JOYNER DATE: 02/14
CHECKED BY: J. YANACCONI DATE: 02/14

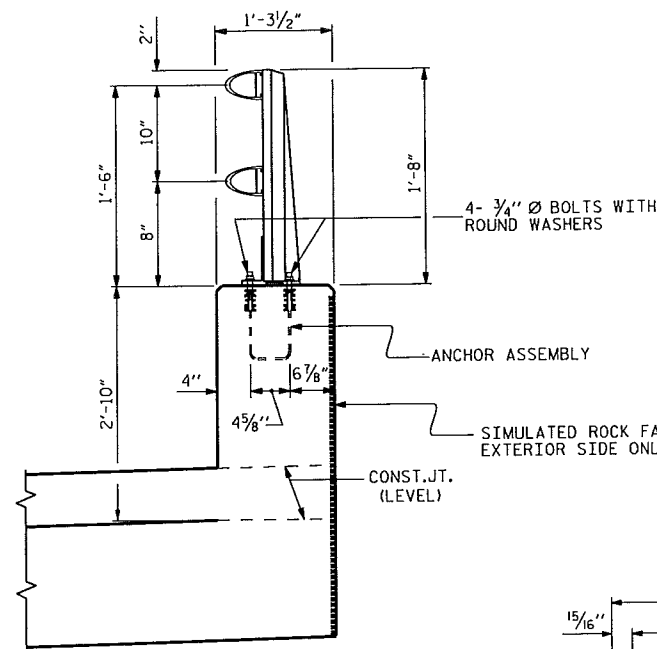


ELEVATION

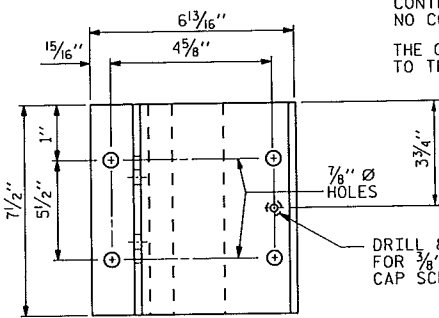
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



PLAN



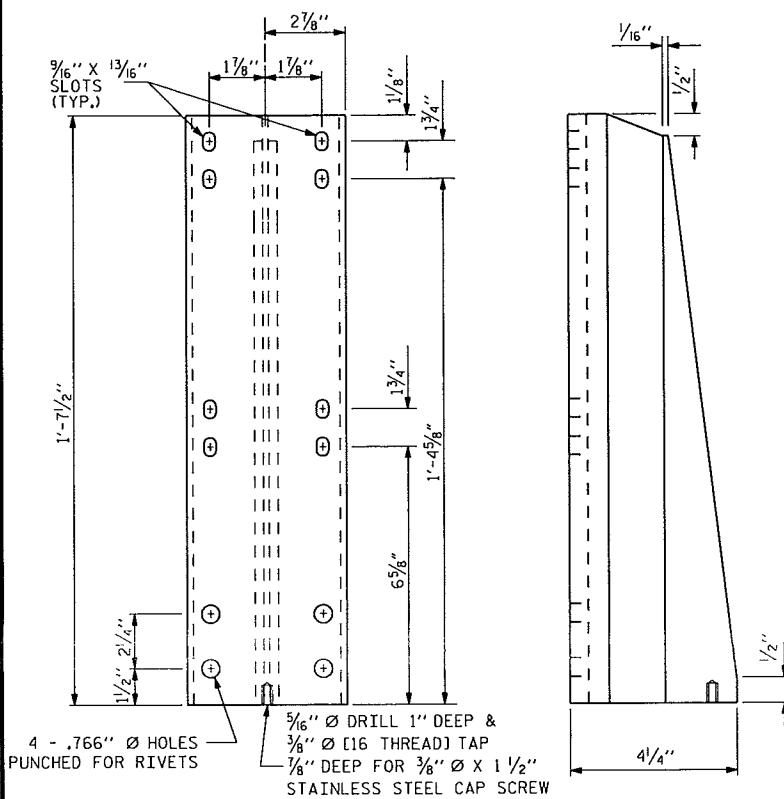
SECTION THRU PARAPET AND RAIL



PLAN

DRILL & COUNTER BORE FOR 3/8" Ø [16 THREAD] CAP SCREW

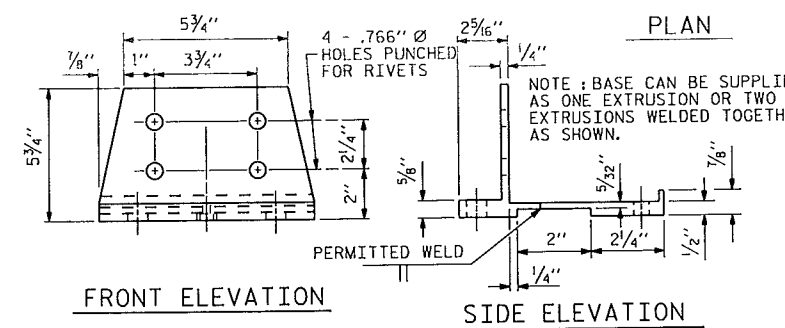
PAY LENGTH	
TOTAL	467.0 LIN. FT.



FRONT ELEVATION

SIDE ELEVATION

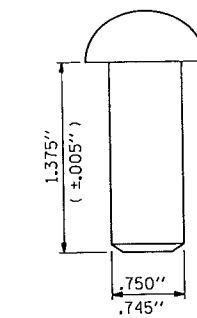
DETAILS OF POST



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

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. THE 2 BAR METAL RAIL FINISH SHALL BE ANODIZED BLACK.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY. MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS: POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111. RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL, WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE. METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT. ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

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

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8FT. TO 10FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

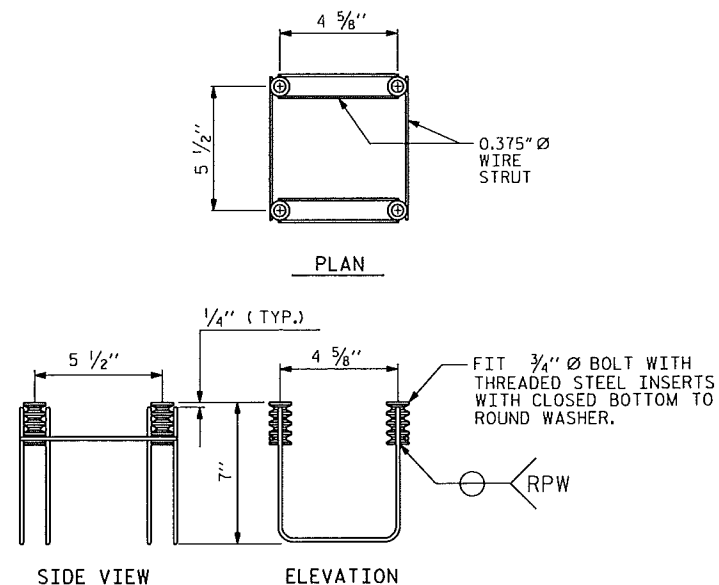
THE CONTRACTOR SHALL SUBMIT THE SIMULATED ROCK FACING PATTERN AND LAYOUT TO THE ENGINEER FOR REVIEW. SEE SPECIAL PROVISIONS.

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

SHEET 1 OF 2

STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
STANDARD					
2 BAR METAL RAIL					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-18
TOTAL SHEETS					39

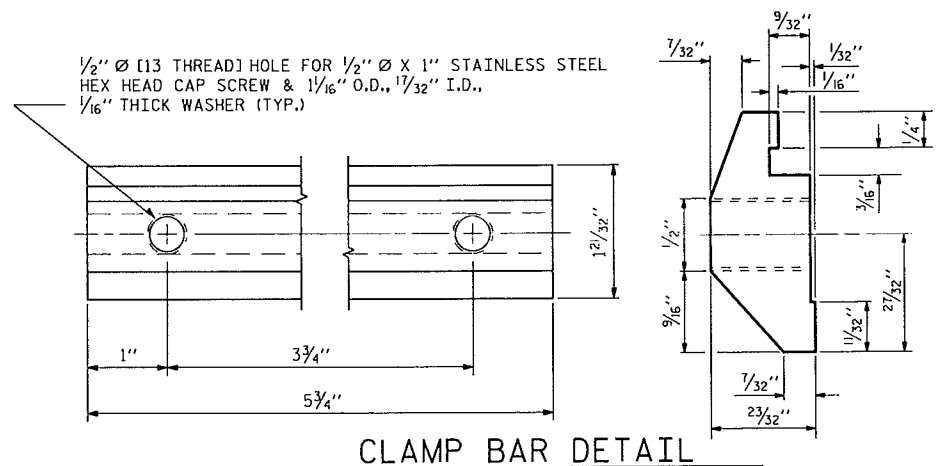
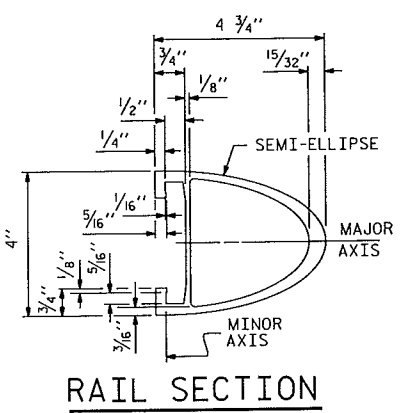
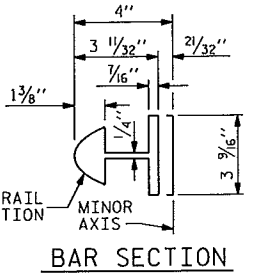
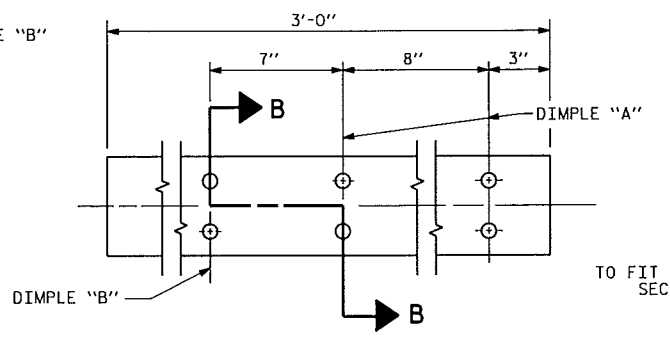
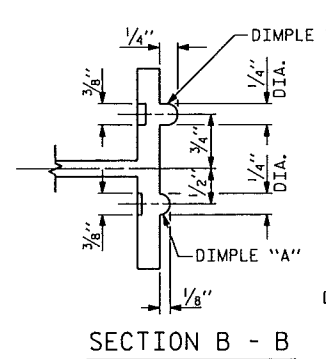
ASSEMBLED BY : D.V. JOYNER	DATE : 9/2014
CHECKED BY : F. ASEFNIA	DATE : 9/2014
DRAWN BY : EEM 6/94	REV. 10/17/00 LES/RDR
CHECKED BY : RGW 6/94	REV. 5/7/03R RWW/JTE
	REV. 5/1/06 TLA/GM



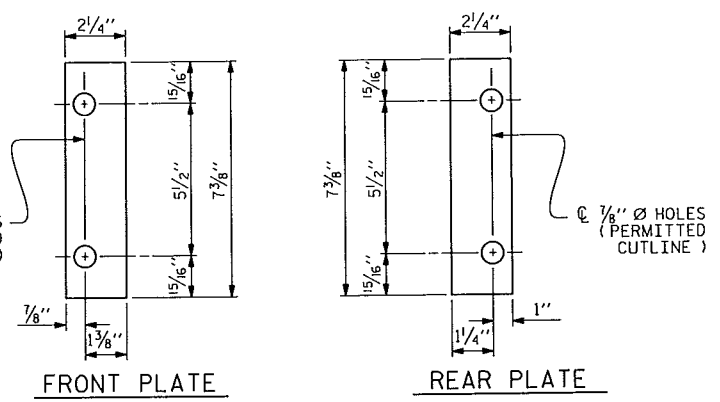
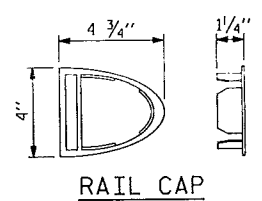
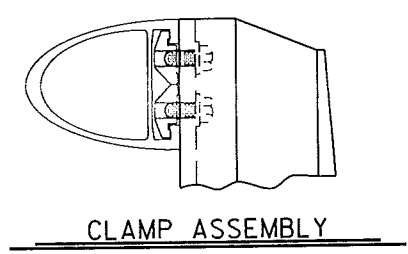
MINIMUM LENGTH OF THREADS IN INSERT (FERRULE): 1 3/4"

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(45 ASSEMBLIES REQUIRED)



CLAMP BAR DETAIL
(4 REQUIRED PER POST)



SHIM DETAILS

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

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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

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

ANODIZING

ALUMINUM FOR POSTS, RAILS, EXPANSION BARS, RIVETS, CAPS, AND SHIMS SHALL BE ANODIZED. THE CONTRACTOR SHALL SUBMIT THREE SETS OF ASTM B-21 6061-T6 ALUMINUM SAMPLES ANODIZED BLACK TO THE ENGINEER. NO OTHER COLOR SCHEME WILL BE ACCEPTED.

ANY DAMAGE TO THE ANODIZED SURFACE OF THE RAIL OR COMPONENTS DURING THE CONSTRUCTION SHALL BE REPAIRED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AT THE DIRECTION OF THE ENGINEER AND AT THE CONTRACTOR'S EXPENSE.

AFTER ERECTION OF THE ANODIZED ALUMINUM RAILING, ALL EXPOSED ANCHOR BOLTS, NUTS, WASHERS, MACHINE SCREWS, CAP SCREWS, SCREWS, BOLTS, ATTACHMENT BRACKETS, HOLD-DOWN PLATES, AND BUILT UP ANGLES SHALL BE COATED WITH TWO COATS OF THE SAME PAINT.

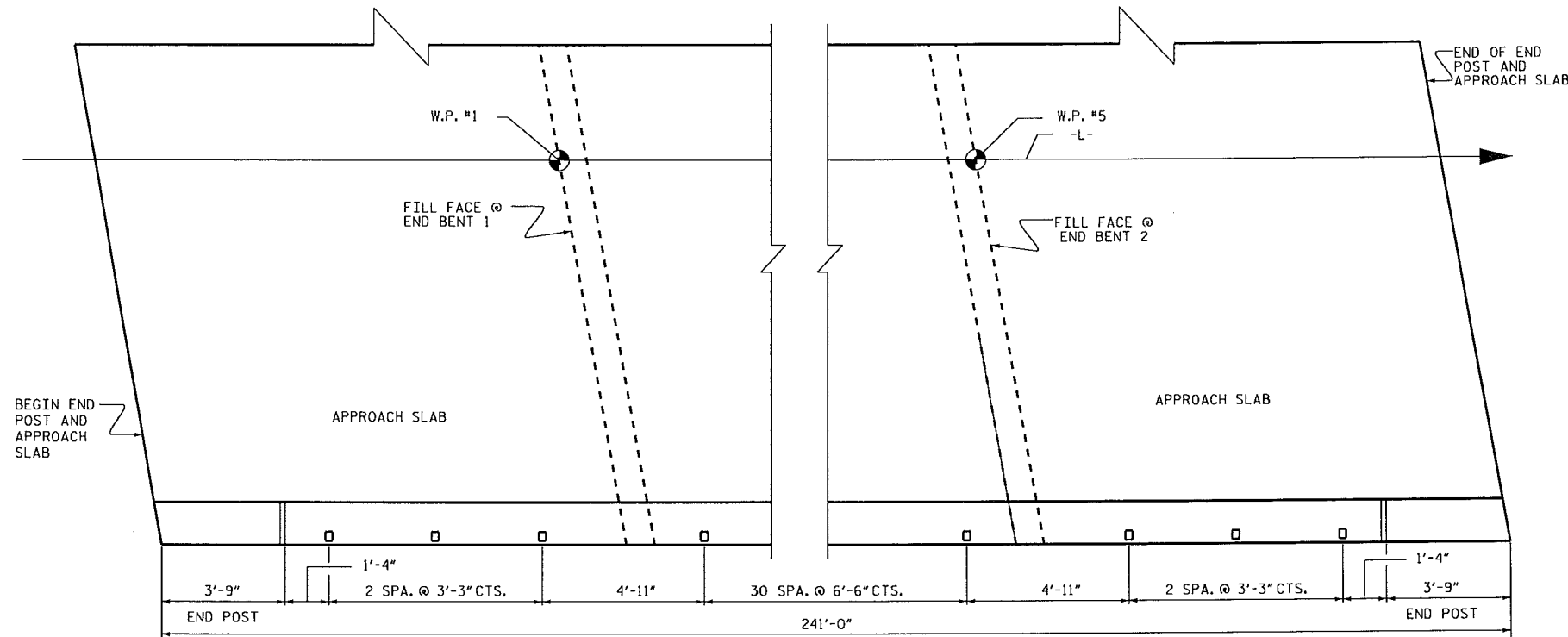
PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 2 BAR METAL RAIL

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

ASSEMBLED BY: D.V. JOYNER	DATE: 9/2014
CHECKED BY: F. ASEFNI	DATE: 9/2014
DRAWN BY: EEM 6/94	REV. 2/6/97 EEM/RGW
CHECKED BY: RGW 6/94	REV. 8/16/99 MAB/LES
	REV. 5/1/06R KMM/GM



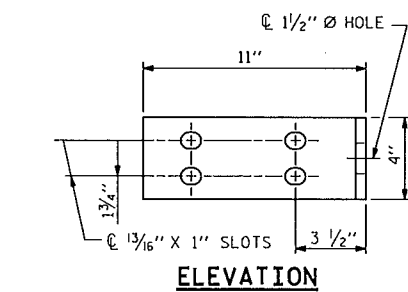
PLAN OF RAIL END POST SPACING
(TYPICAL EACH SIDE)

NOTES
STRUCTURAL CONCRETE INSERT

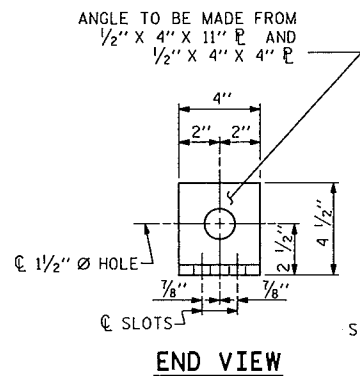
THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
 FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER, BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S 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.)
 WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES
METAL RAIL TO END POST CONNECTION

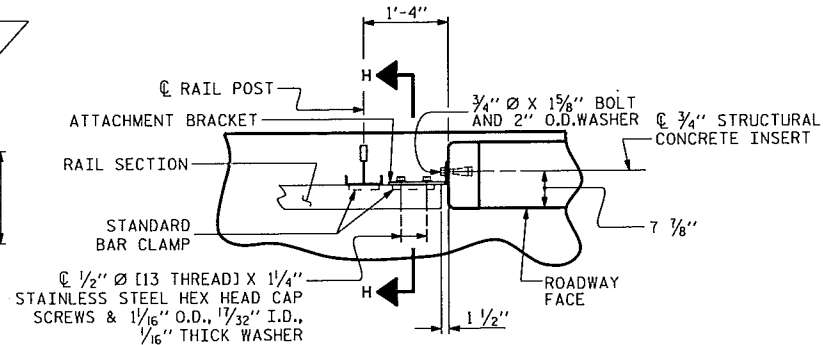
THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
 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.
 STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.
 THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.
 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.



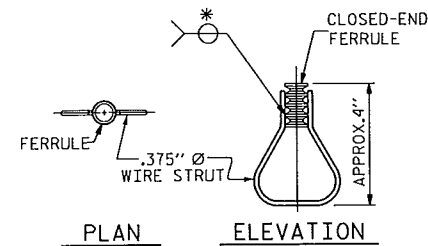
ELEVATION



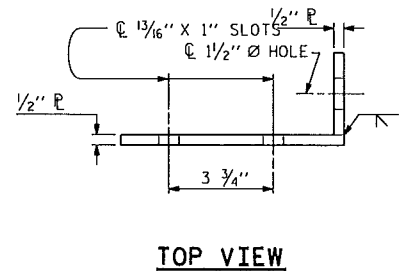
END VIEW



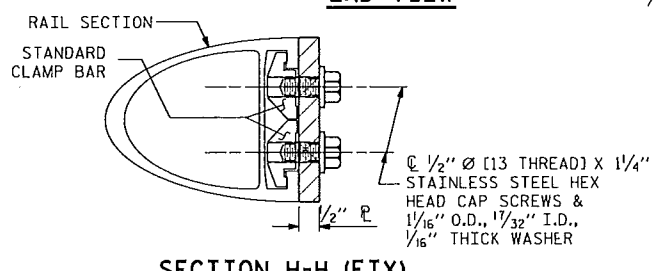
PLAN - RAIL AND END POST



PLAN ELEVATION



TOP VIEW



SECTION H-H (FIX)

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST

STRUCTURAL CONCRETE INSERT

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

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 RAIL POST SPACINGS
 AND
 END OF RAIL DETAILS
 FOR ONE OR TWO BAR METAL RAILS



DRAWN BY: M. WELDON DATE: 9/2014
 CHECKED BY: F. ASEFNIA DATE: 9/2014

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

TOTAL SHEETS: 39

NOTES

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

ALL REINFORCING STEEL IN CONCRETE PARAPETS SHALL BE EPOXY COATED.

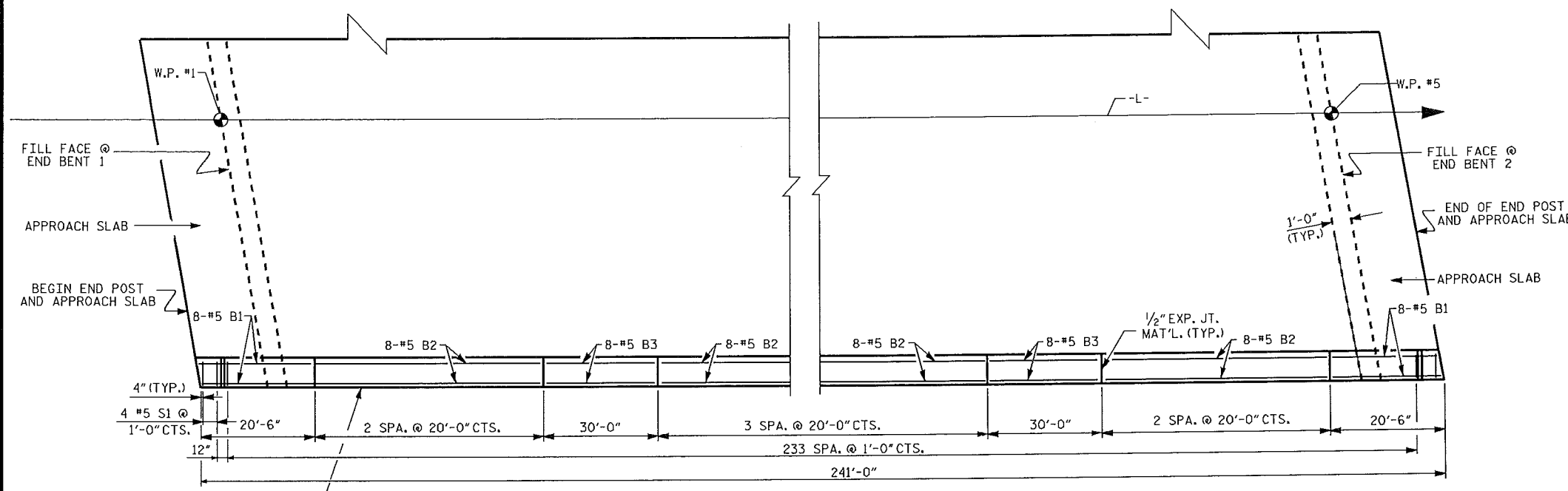
SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET FOR CONCRETE INSERT DETAILS.

SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS" SHEET FOR GUARDRAIL ANCHOR ASSEMBLY.

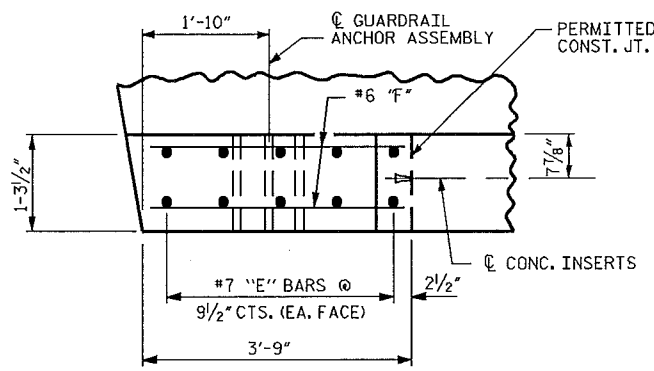
THE #5 S1 & S2 BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE 1/2" EXPANSION JOINT MATERIAL IN PARAPET

THE #5 S3 BAR SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. LEVEL TWO FIELD TESTING IS REQUIRED, AND THE YIELD LOAD FOR THE #5 S3 BAR IS 18.6 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

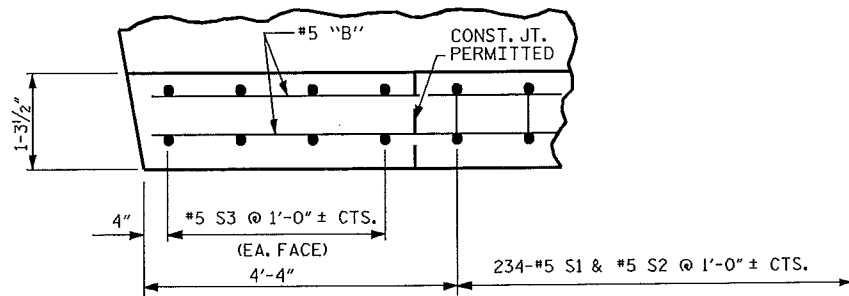
THE EXTERIOR FACE OF EACH CONCRETE PARAPET AND END POST SHALL HAVE A SIMULATED ROCK PATTERN. THE CONTRACTOR SHALL SUBMIT THE SIMULATED ROCK PATTERN AND LAYOUT TO THE ENGINEER FOR REVIEW AND APPROVAL, PRIOR TO CASTING PARAPET. SEE SPECIAL PROVISIONS.



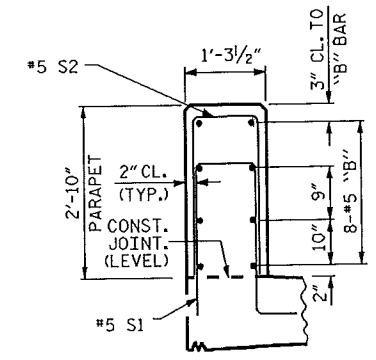
PLAN OF PARAPET & END POST
(TYP. EA. SIDE)



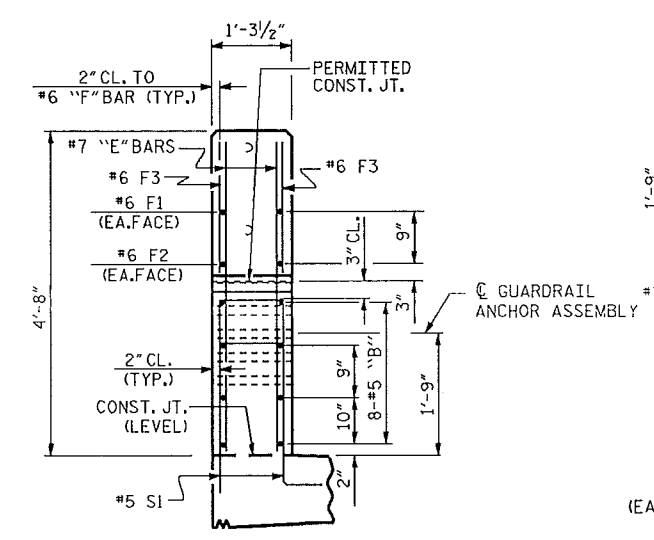
PLAN OF END POST DETAIL



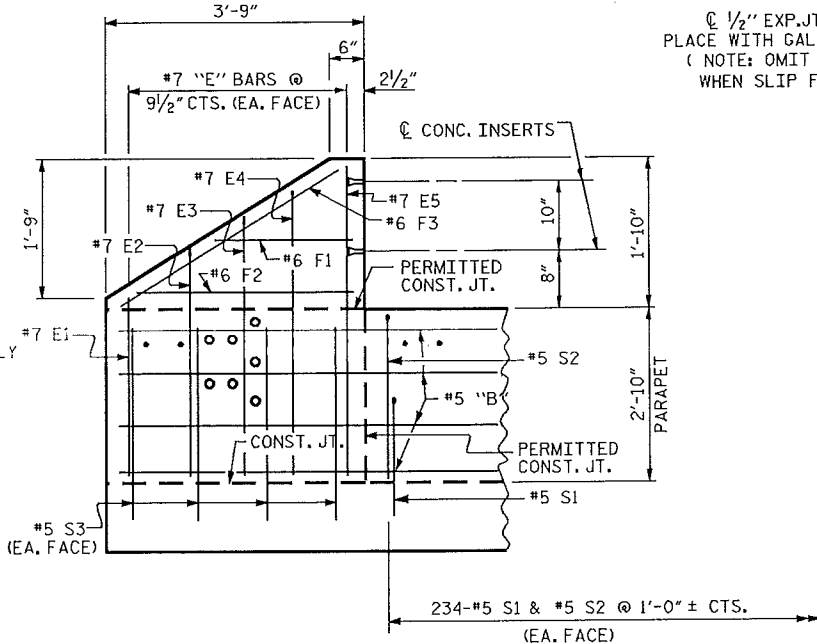
PLAN OF PARAPET DETAIL



SECTION THRU PARAPET

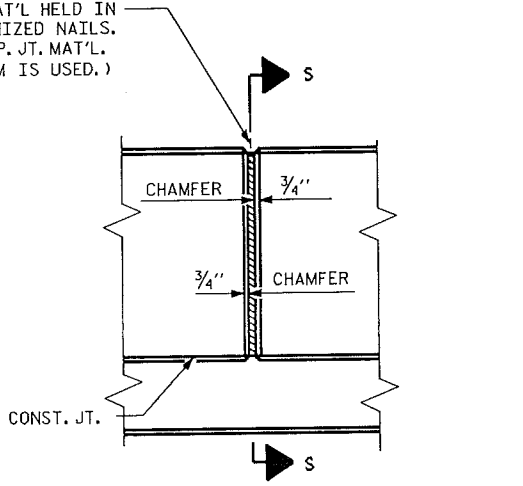


END VIEW

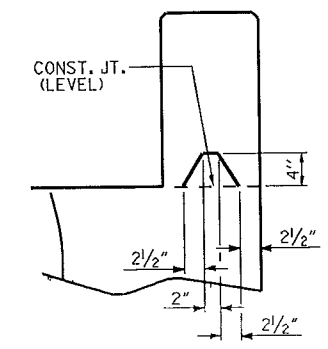


ELEVATION

1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS. (NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)



ELEVATION AT JOINT IN PARAPET



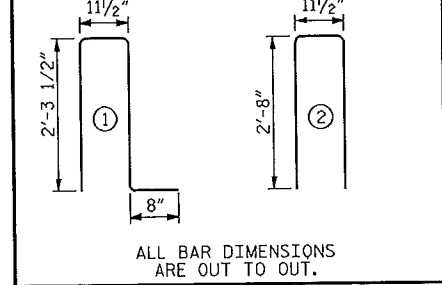
SECTION S-S

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

BILL OF MATERIAL
PARAPET & FOUR END POSTS

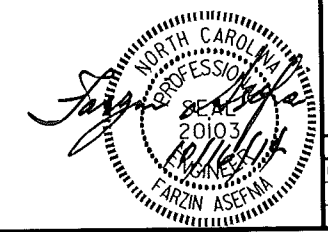
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	32	#5	STR	26'-0"	673
* B2	112	#5	STR	19'-8"	2297
* B3	32	#5	STR	29'-8"	990
* E1	8	#7	STR	2'-10"	46
* E2	8	#7	STR	3'-4"	55
* E3	8	#7	STR	3'-8"	60
* E4	8	#7	STR	4'-1"	67
* E5	8	#7	STR	4'-4"	71
* F1	8	#6	STR	1'-10"	22
* F2	8	#6	STR	3'-3"	39
* F3	8	#6	STR	3'-4"	40
* S3	32	#5	STR	3'-4"	111
* S1	468	#5	1	6'-1"	2969
* S2	468	#5	2	6'-2"	3010
* EPOXY COATED REINFORCING STEEL					10450
1'-3 1/2" x 2'-10" CONCRETE PARAPET				482.0	LIN. FT.
CLASS AA CONCRETE				66.0	CU. YD.

BAR TYPE

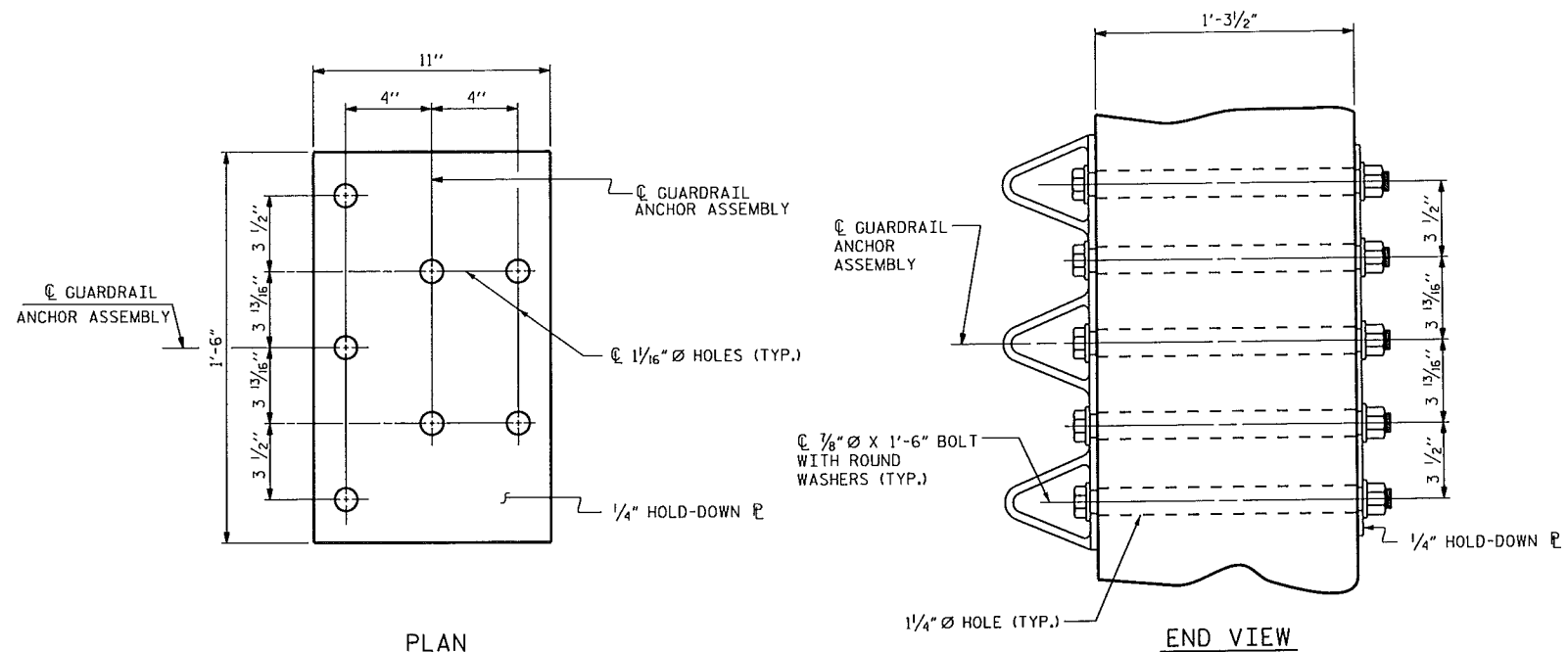


PROJECT NO. 41665.5B
FORSYTH COUNTY
BRIDGE NO.: 187

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
CONCRETE PARAPET
DETAILS



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



GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 1/8" 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 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

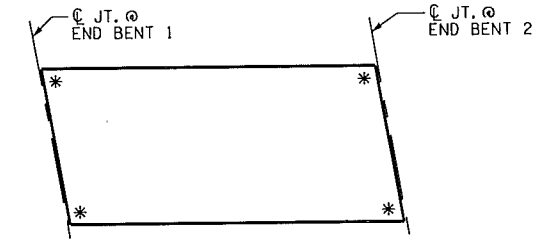
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

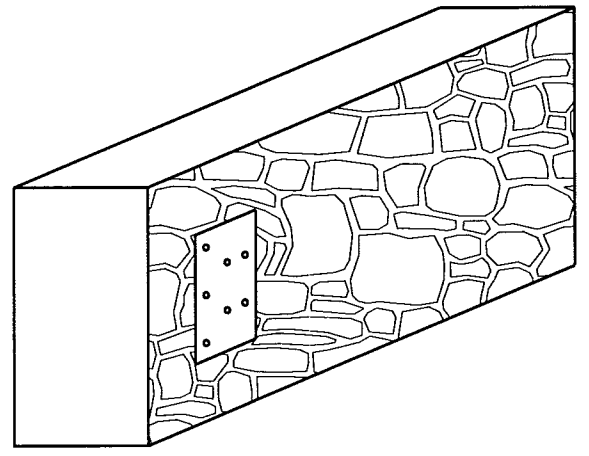
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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

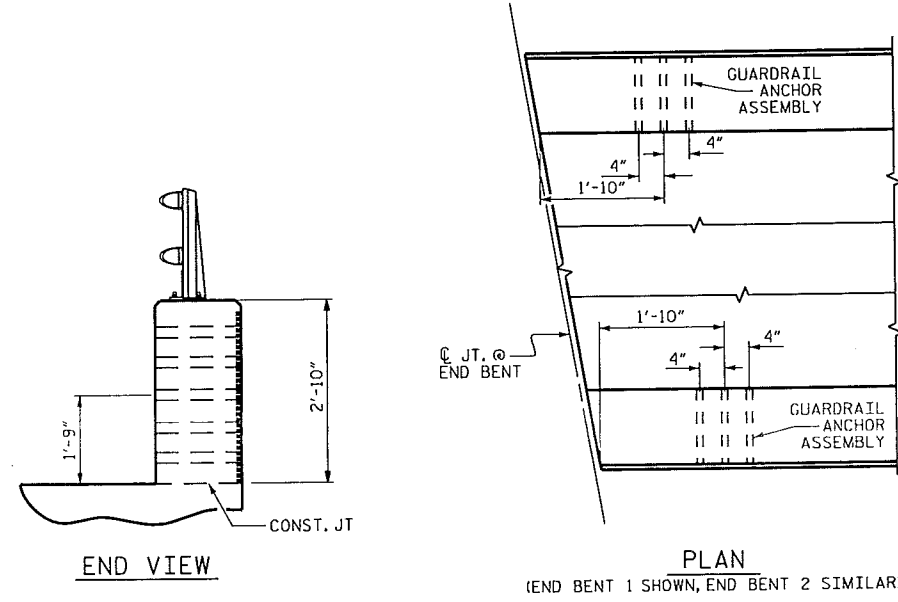


SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



GUARDRAIL ANCHOR ASSEMBLY BLOCK OUT AT EXTERIOR FACE



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. 41665.5B
FORSYTH COUNTY
 BRIDGE NO.: 187

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			5-22
2			4			39



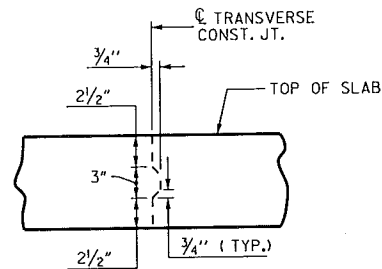
ASSEMBLED BY : J. YANNACCONE DATE : 10/2013
 CHECKED BY : F. ASEFNIA DATE : 10/2013
 DRAWN BY : MAA 5/10
 CHECKED BY : GM 5/10
 REV. 10/1/11 MAA/GM
 REV. 12/5/11 MAA/GM
 REV. 6/13 MAA/GM

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"			

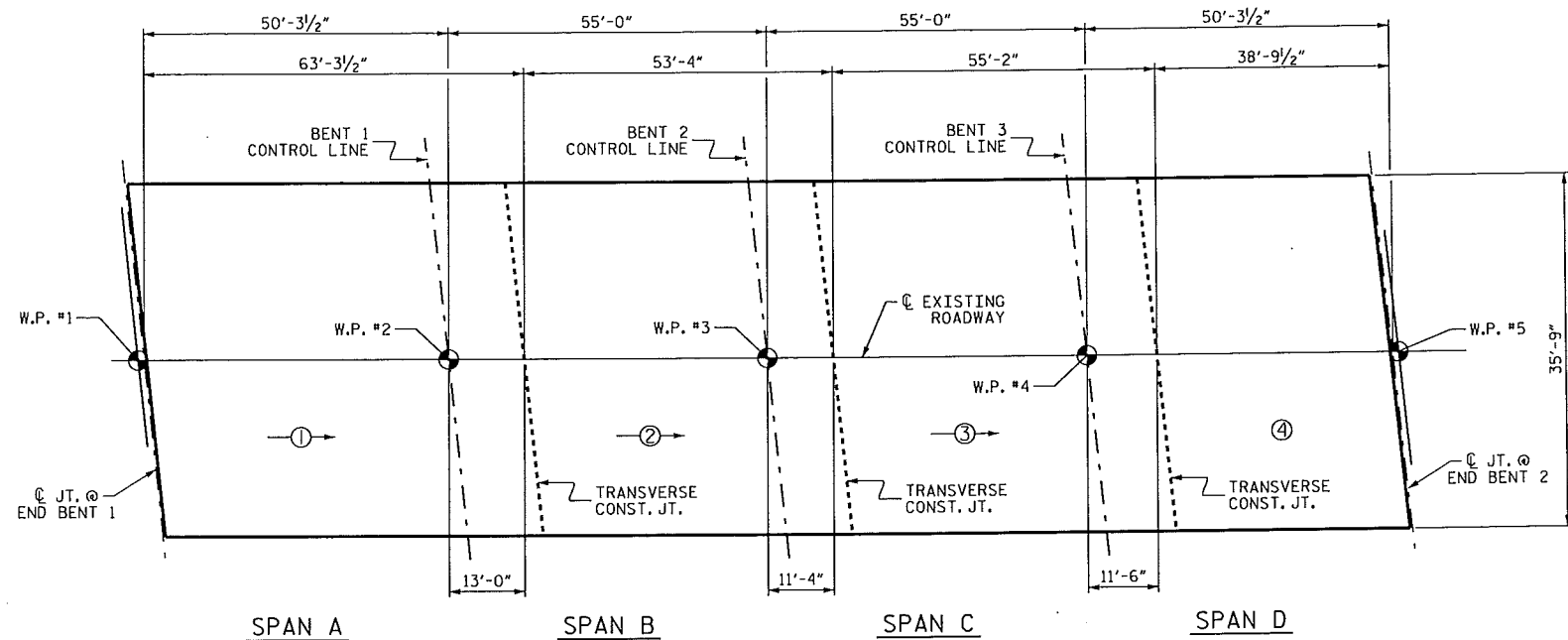
GROOVING BRIDGE FLOORS

APPROACH SLABS	725 SQ. FT.
BRIDGE DECK	5,335 SQ. FT.
TOTAL	6,060 SQ. FT.



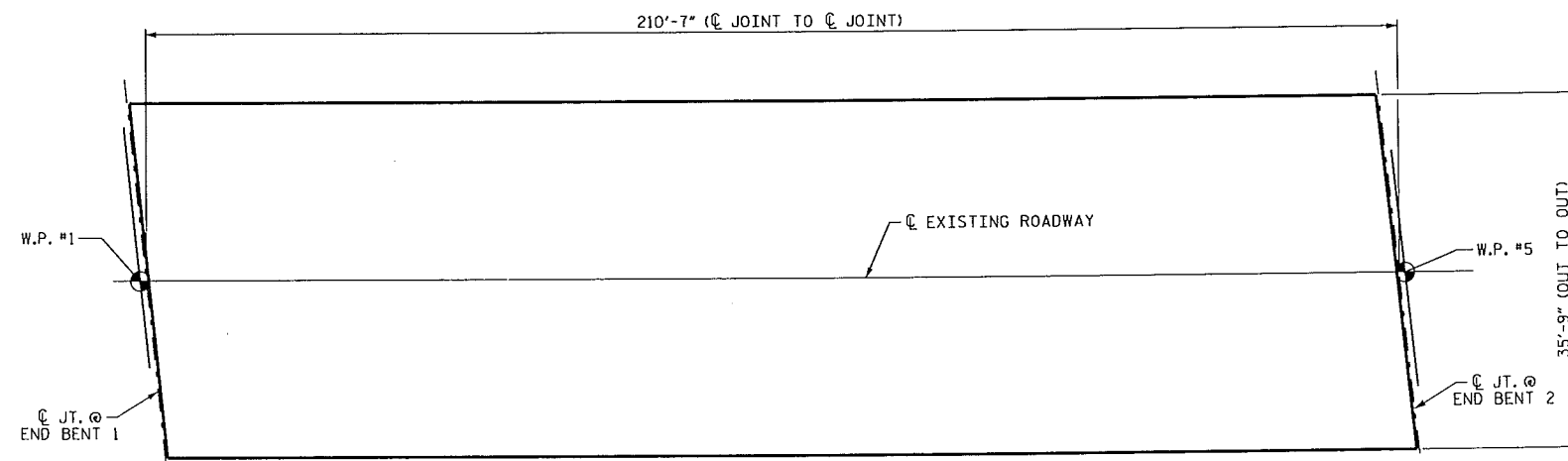
TRANSVERSE CONSTRUCTION JOINT DETAIL

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



POURING SEQUENCE

⊕ = INDICATES POUR NUMBER AND DIRECTION OF POUR

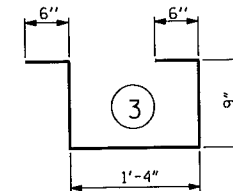
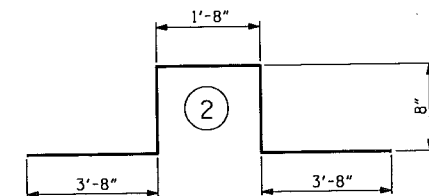
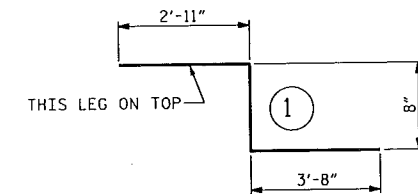


LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ. FT. = 7,528)

REINFORCING STEEL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	406	#5	STR	35'-5"	14997
A2	406	#5	STR	35'-5"	14997
*A101	2	#5	STR	33'-9"	70
*A102	2	#5	STR	30'-11"	64
*A103	2	#5	STR	28'-1"	59
*A104	2	#5	STR	25'-3"	53
*A105	2	#5	STR	22'-5"	47
*A106	2	#5	STR	19'-7"	41
*A107	2	#5	STR	16'-9"	35
*A108	2	#5	STR	13'-11"	29
*A109	2	#5	STR	11'-1"	23
*A110	2	#5	STR	8'-3"	17
*A111	2	#5	STR	5'-5"	11
*A112	2	#5	STR	2'-7"	5
A201	2	#5	STR	35'-3"	74
A202	2	#5	STR	33'-7"	70
A203	2	#5	STR	30'-9"	64
A204	2	#5	STR	27'-11"	58
A205	2	#5	STR	25'-1"	52
A206	2	#5	STR	22'-3"	46
A207	2	#5	STR	19'-5"	41
A208	2	#5	STR	16'-7"	35
A209	2	#5	STR	13'-9"	29
A210	2	#5	STR	10'-11"	23
A211	2	#5	STR	8'-1"	17
A212	2	#5	STR	5'-3"	11
*B1	108	#4	STR	17'-2"	1238
*B2	54	#6	STR	41'-3"	3346
*B3	52	#6	STR	15'-9"	1230
*B4	54	#4	STR	16'-0"	577
*B5	27	#6	STR	43'-0"	1744
*B6	26	#6	STR	16'-6"	644
B7	184	#5	STR	54'-3"	10411
*G1	2	#5	STR	35'-11"	75
*K1	8	#5	1	7'-3"	60
*K2	16	#5	2	10'-4"	172
*S1	50	#4	3	3'-10"	128
REINFORCING STEEL					= 25,928 LBS
*EPOXY COATED REINF. STEEL					= 24,665 LBS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

POUR NO.	CLASS AA CONCRETE (CU. YD.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
#1	71.0		
#2	59.2		
#3	61.3		
#4	43.8		
TOTALS **	235.3	25,928	24,665

** QUANTITIES FOR CONCRETE PARAPET NOT INCLUDED

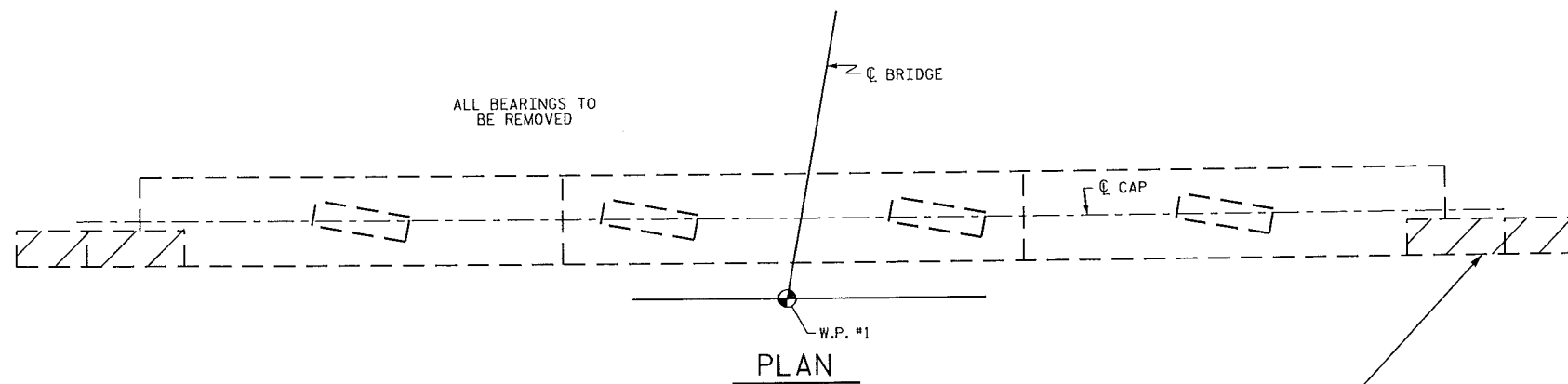
PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO. 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 SUPERSTRUCTURE
 BILL OF MATERIAL

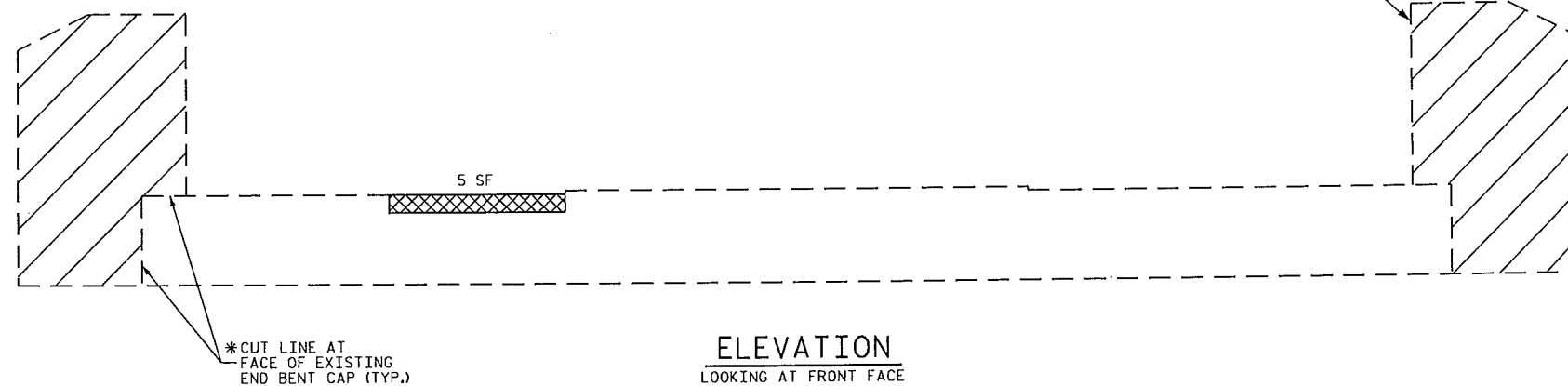


REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S-23
1			3			TOTAL SHEETS 39
2			4			

DRAWN BY: J. YANNAKONE DATE: 10/13
 CHECKED BY: F. ASEFNIA DATE: 10/13



REMOVE CONCRETE & REINFORCING STEEL IN HATCHED AREAS (TYP.)



* EXISTING REINFORCING STEEL SHALL BE CUT FLUSH WITH THE EDGE OF THE EXISTING END BENT CAP. APPLY EPOXY PROTECTIVE COATING TO SURFACES OF THE END BENT CAP WHERE CUT REINFORCING STEEL IS EXPOSED.

EXISTING DEMOLITION AND REPAIR

REPAIR QUANTITY TABLE				
REPAIRS END BENT 1	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF.	VOLUME CF.	AREA SF.	VOLUME CF.
CAP	0.0	0.0		
CONCRETE REPAIRS	5.0	1.3		
EPOXY RESIN INJECTION			LN. FT.	LN. FT.
CAP		0.0		

☒ CONCRETE REPAIR

▨ SHOTCRETE REPAIR

ERI - EPOXY RESIN INJECTION

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MIN. OF 1" BEHIND REBAR AND MIN. 1" CL TO SAWCUT. SEE REPAIR DETAILS.

NOTE:

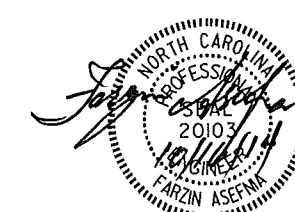
REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER SHALL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATION AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE REPAIR QUANTITY TABLE.

PROJECT NO. 41665.5B
FORSYTH COUNTY
 BRIDGE NO.: 187

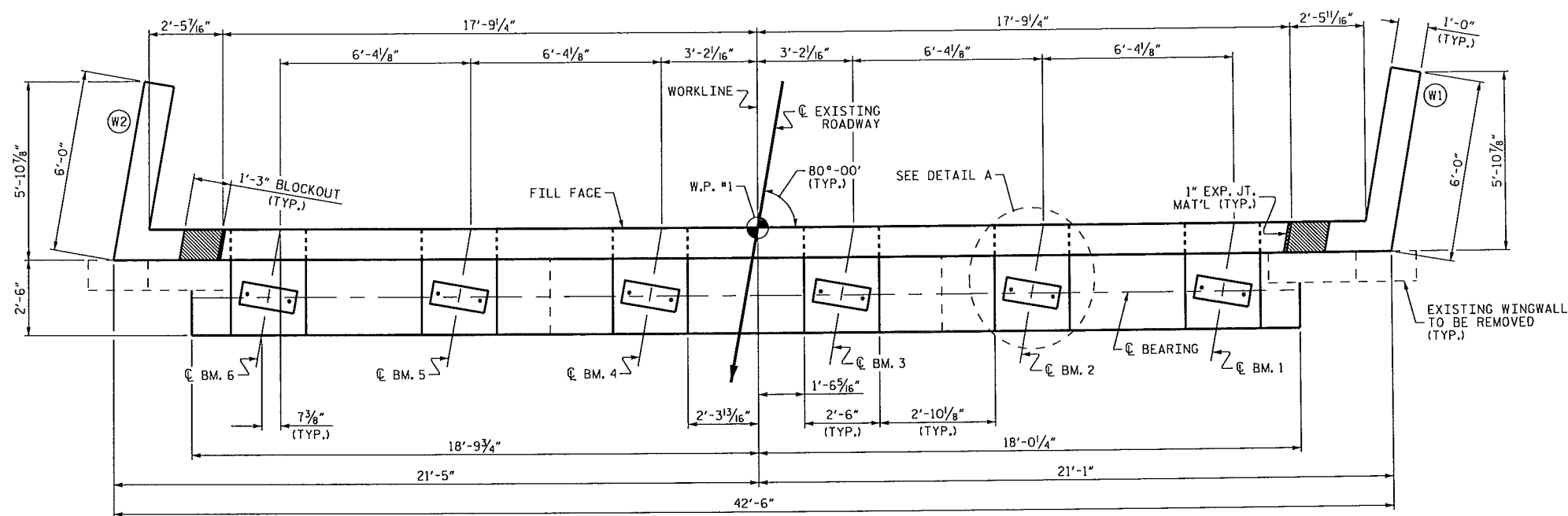
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 DEMOLITION AND
 REPAIR
 END BENT 1**

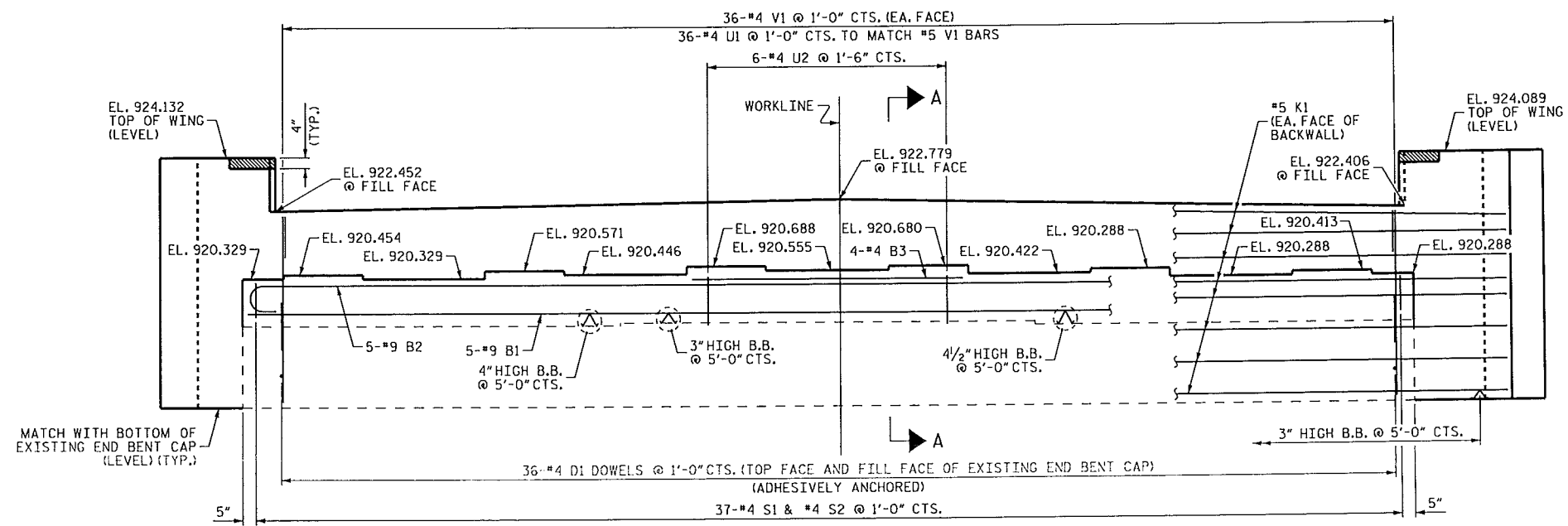
REVISIONS						SHEET NO. S-24
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			2			TOTAL SHEETS 39
2			4			



DRAWN BY : BCH DATE : 04/2013
 CHECKED BY : ZHW DATE : 04/2013



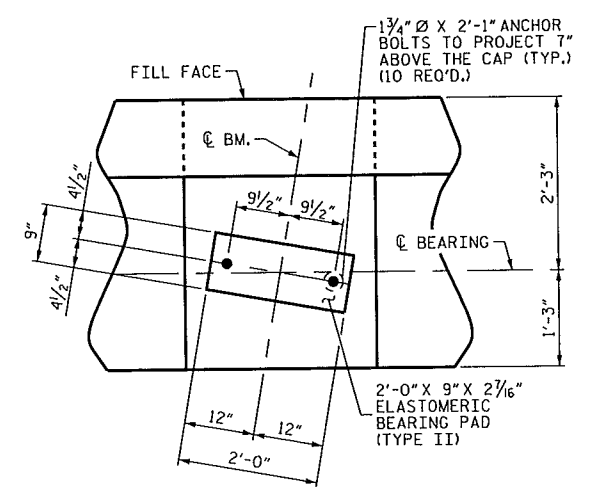
PLAN



ELEVATION
FOOTINGS AND COLUMNS NOT SHOWN FOR CLARITY

NOTES

- STIRRUPS AND "U" BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.
- INSTALL D1 DOWELS INTO THE EXISTING END BENT CAP USING AN ADHESIVE ANCHORING SYSTEM. LEVEL 1 FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE DOWELS IS 12.0 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE ARTICLE 420-13 OF THE STANDARD SPECIFICATIONS.
- INSTALL THE 4" Ø DRAIN PIPE THROUGH THE WINGWALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY STANDARD DRAWINGS. REINFORCING STEEL IN THE WINGWALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILD-UPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT 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 RAILS ARE CAST IF SLIP FORMING IS USED.
- EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.



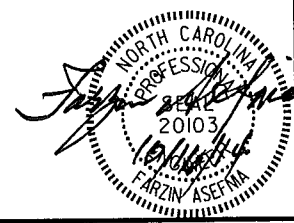
DETAIL A
(TYP. EA. GDR.)

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

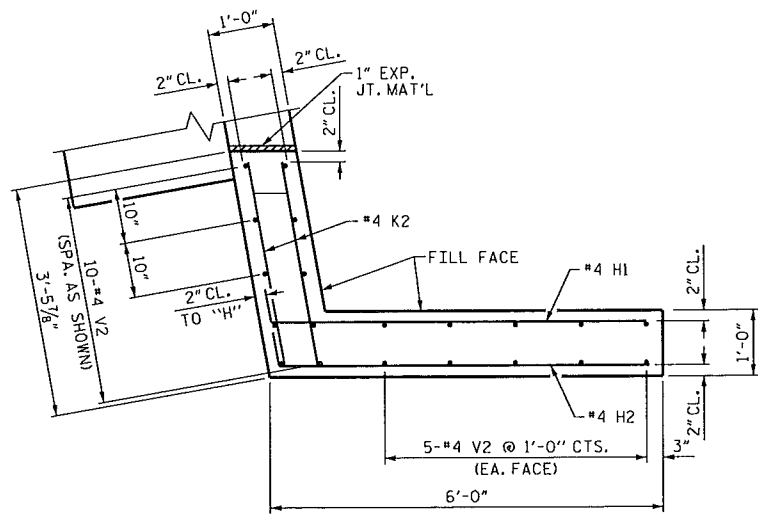
SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1

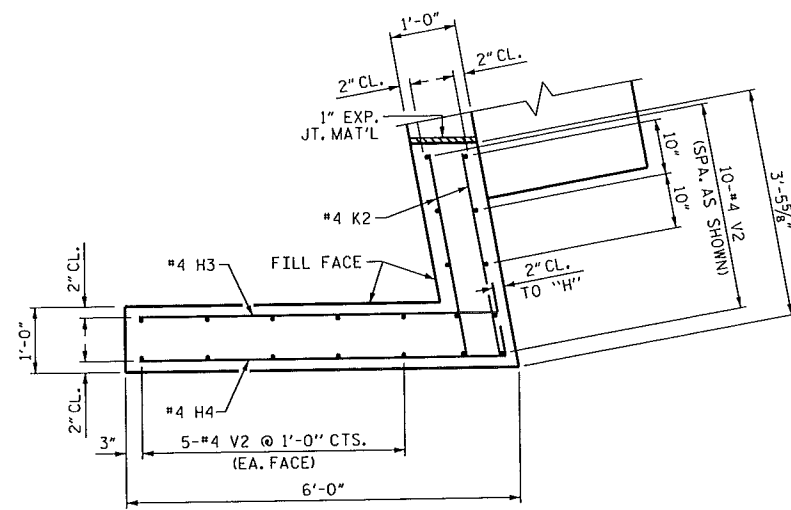
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS 39
2			4			



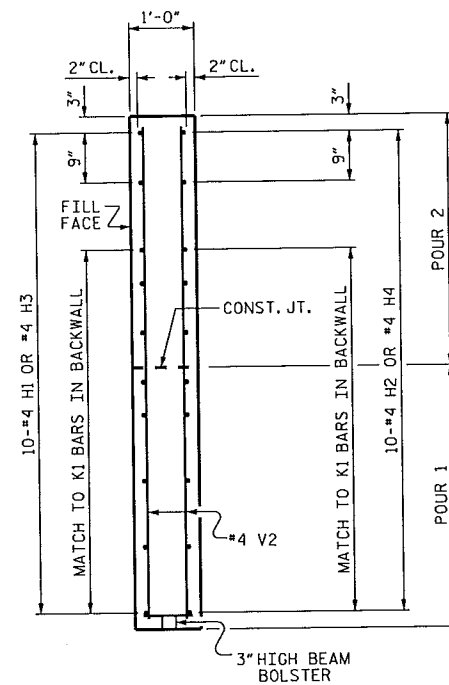
DRAWN BY : D.V. JOYNER DATE : 01/14
 CHECKED BY : J. YANACCONI DATE : 01/14



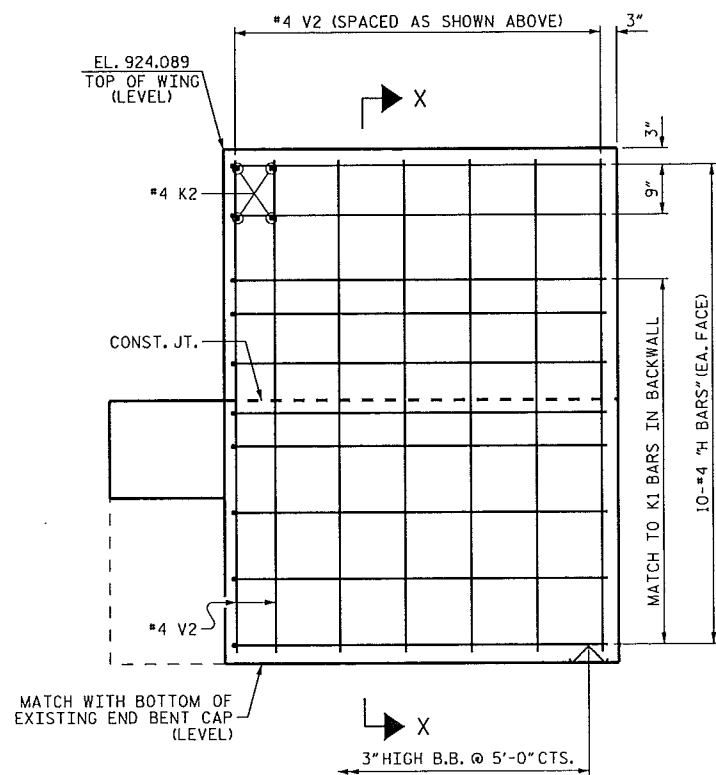
PLAN OF WING W1



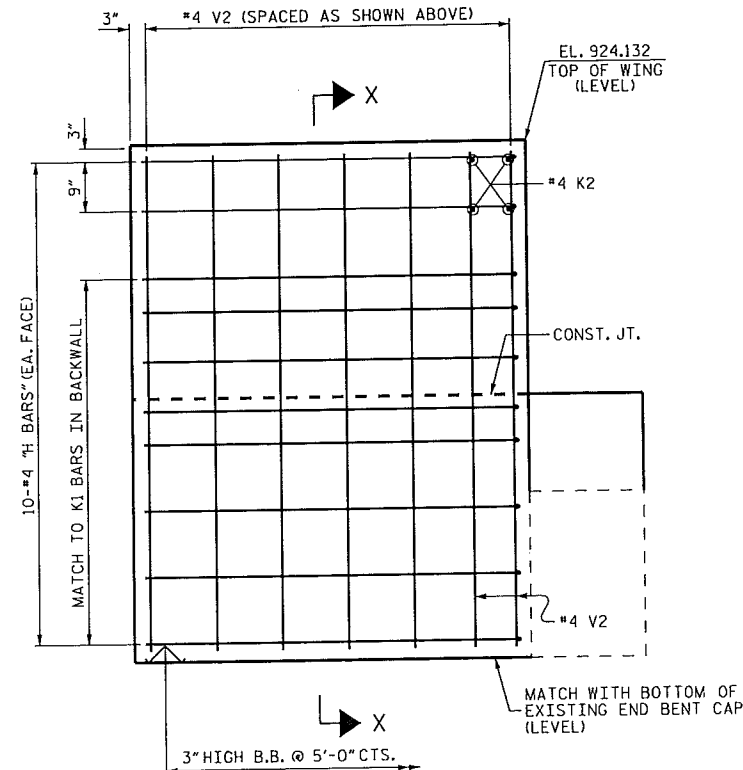
PLAN OF WING W2



SECTION X-X



ELEVATION OF WING W1

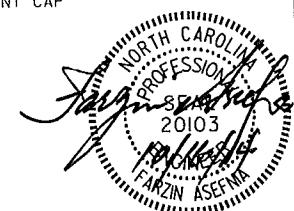


ELEVATION OF WING W2

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

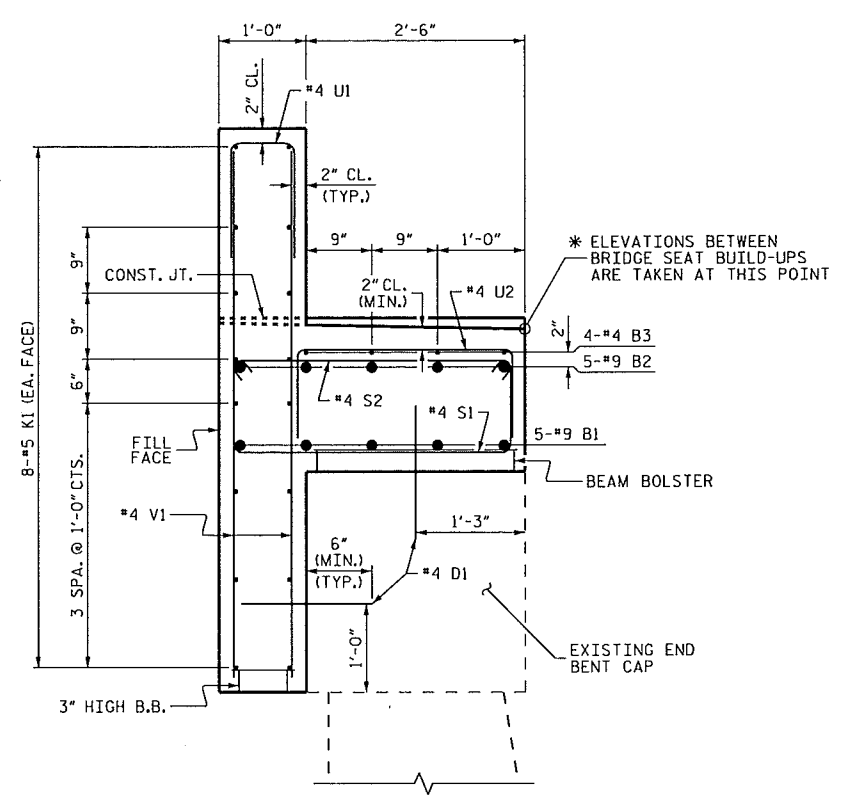
SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1



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

DRAWN BY: M. WELDON DATE: 01/14
 CHECKED BY: J. YANACCONO DATE: 01/14

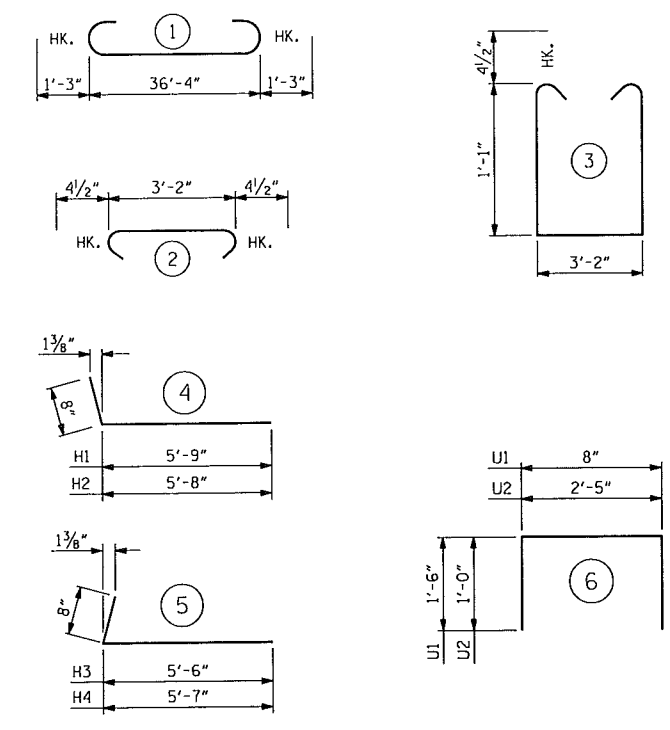


SECTION A-A

DRAWN BY : D.V. JOYNER DATE : 01/14
 CHECKED BY : J. YANACCONO DATE : 01/14

08-DCT-2014 0912
 S:\PRG\PCV\Squad C\Preservation\Projects\9B.203414 (41665.5B)\Final\06Ns\9B.203414_5D.E*.dgn
 mweldon

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

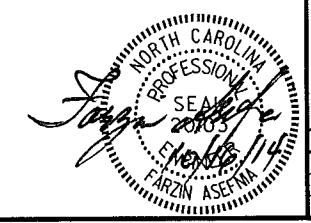
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	STR	36'-6"	621
B2	5	#9	1	38'-10"	130
B3	4	#4	STR	21'-2"	23
D1	72	#4	STR	1'-9"	84
H1	10	#4	4	6'-5"	43
H2	10	#4	4	6'-4"	42
H3	10	#4	5	6'-2"	41
H4	10	#4	5	6'-3"	42
K1	16	#5	STR	42'-1"	702
K2	8	#4	STR	3'-1"	16
S1	37	#4	3	6'-3"	150
S2	37	#4	2	4'-1"	97
U1	36	#4	6	3'-8"	88
U2	6	#4	6	4'-5"	18
V1	72	#4	STR	5'-9"	277
V2	40	#4	STR	7'-5"	198

REINFORCING STEEL	LBS.	2572
CLASS A CONCRETE		
POUR #1 - CAP & LOWER BACKWALL & LOWER WINGWALL	CU. YDS.	10.2
POUR #2 - UPPER BACKWALL & UPPER WINGWALL	CU. YDS.	5.2
TOTAL	CU. YDS.	15.4

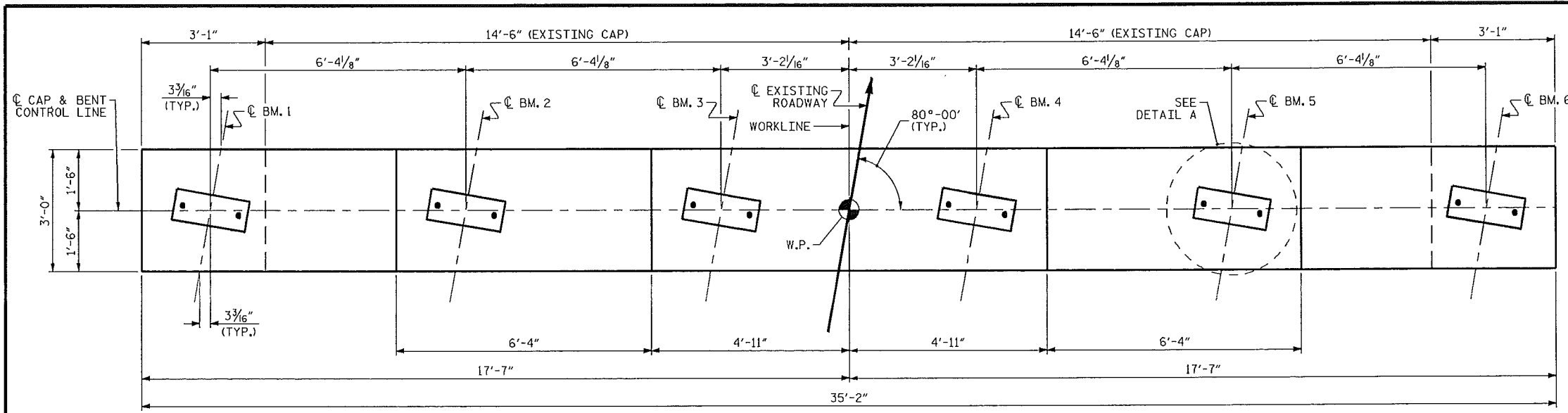
PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1



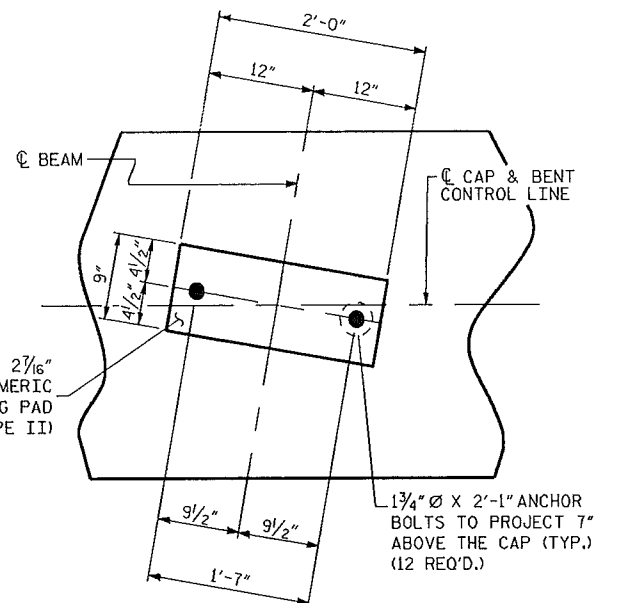
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS 39
2			4			



PLAN

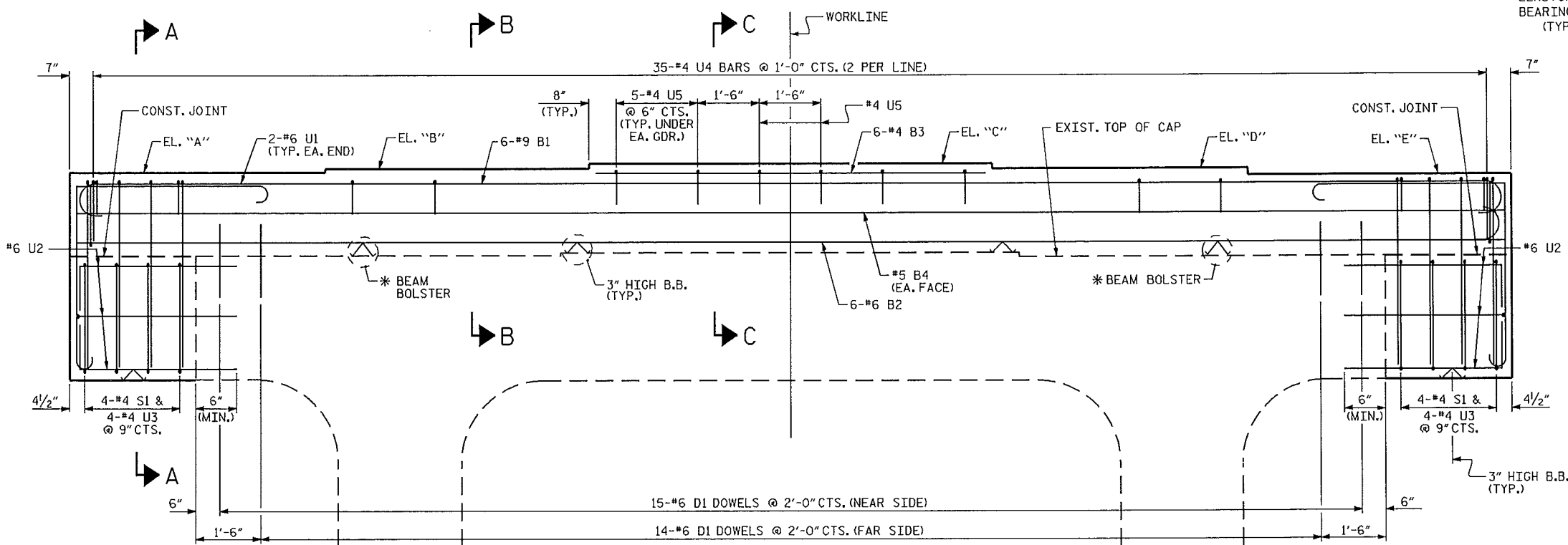
NOTES

THE "U" BARS IN CAP BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 INSTALL D1 AND U2 BARS INTO THE EXISTING BENT CAP USING AN ADHESIVE ANCHORING SYSTEM. LEVEL 1 FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE BARS IS 26.4 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE ARTICLE 420-13 OF THE STANDARD SPECIFICATIONS.



DETAIL A
(TYP. EA. BEAM)

TOP OF CAP ELEVATIONS			
LOCATION	BENT 1	BENT 2	BENT 3
A	920.718	920.877	920.823
B	920.848	920.997	920.945
C	920.980	921.123	921.065
D	920.863	920.999	920.935
E	920.742	920.875	920.807

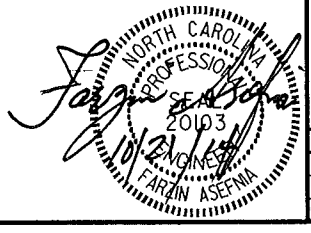


ELEVATION

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

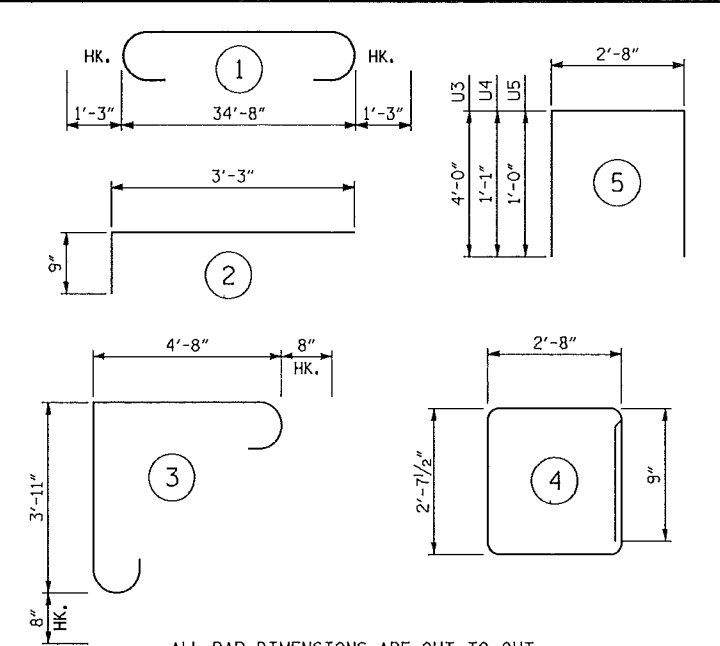
BENTS 1, 2 & 3



DRAWN BY: M. WELDON DATE: 10/13
 CHECKED BY: J. YANACCONE DATE: 10/13

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

BAR TYPES



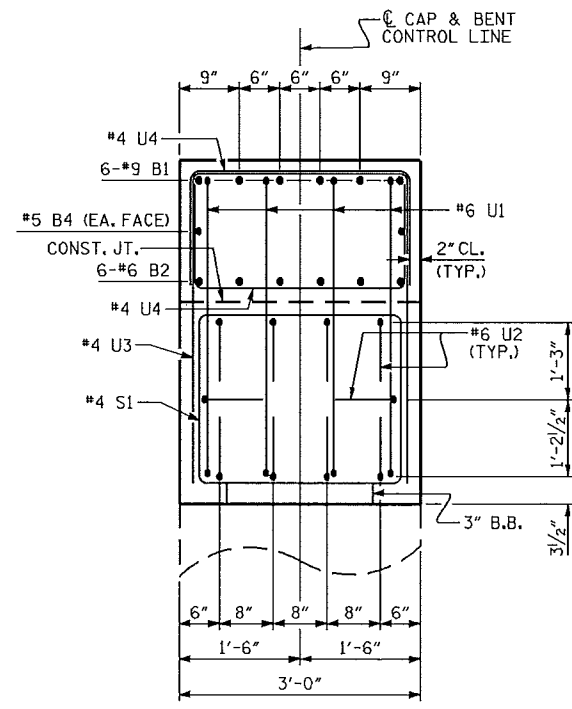
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

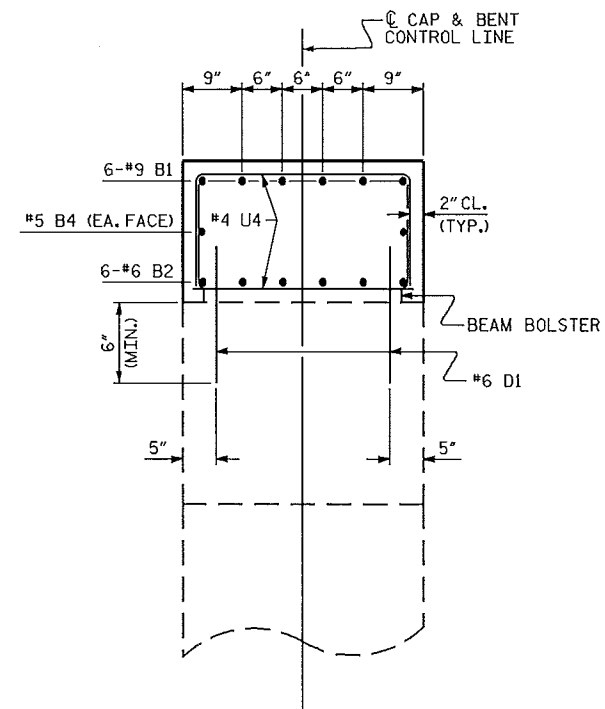
FOR ONE BENT					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	1	37'-2"	758
B2	6	#6	STR	34'-10"	314
B3	6	#4	STR	9'-6"	38
B4	2	#5	STR	34'-10"	73
D1	29	#6	STR	2'-6"	109
S1	8	#4	4	11'-4"	61
U1	8	#6	3	9'-11"	119
U2	20	#6	2	4'-0"	120
U3	8	#4	5	10'-8"	57
U4	70	#4	5	4'-10"	226
U5	32	#4	5	4'-8"	100

REINFORCING STEEL 1975 LBS

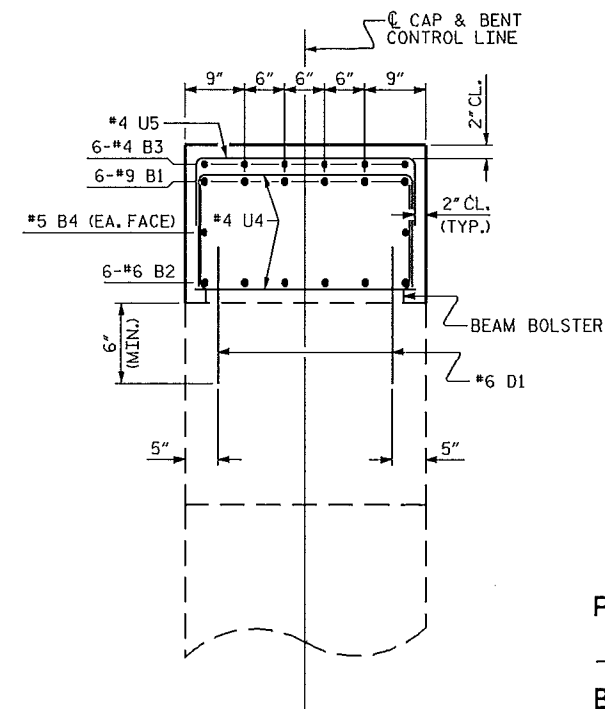
CLASS A CONCRETE	
BENT 1	9.8 CY
BENT 2	10.5 CY
BENT 3	10.2 CY



SECTION A-A



SECTION B-B



SECTION C-C

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

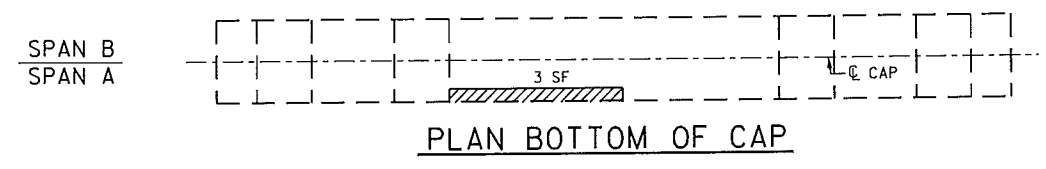
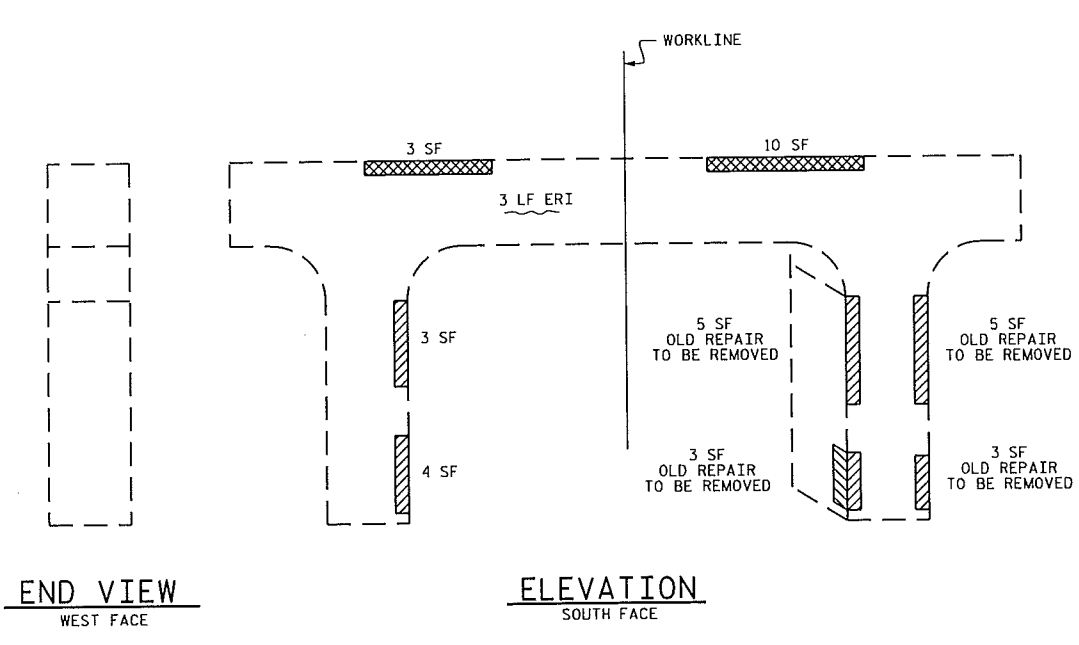
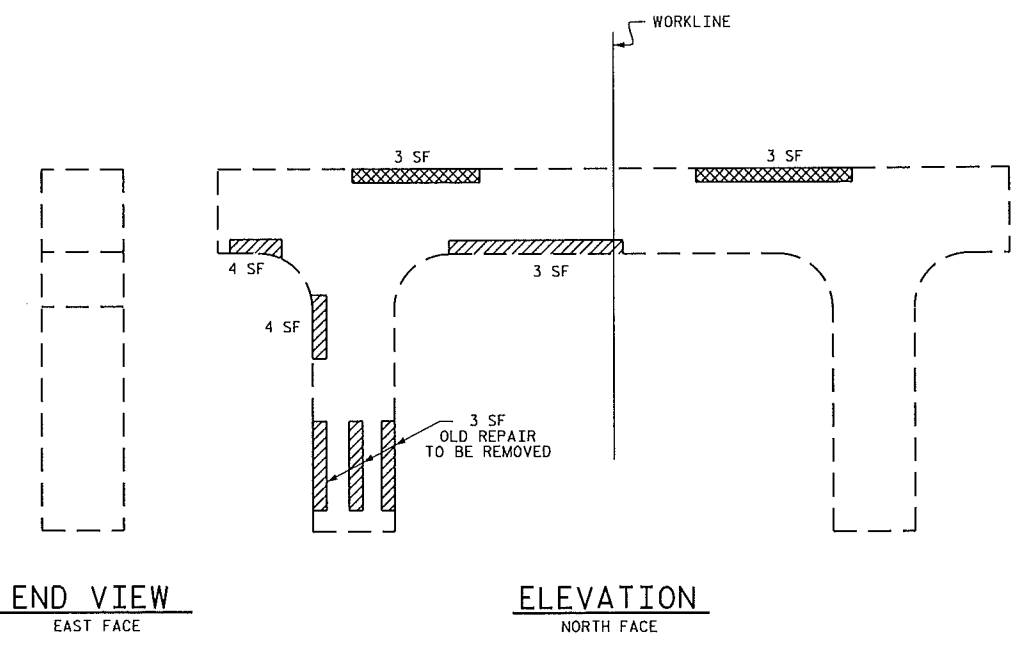
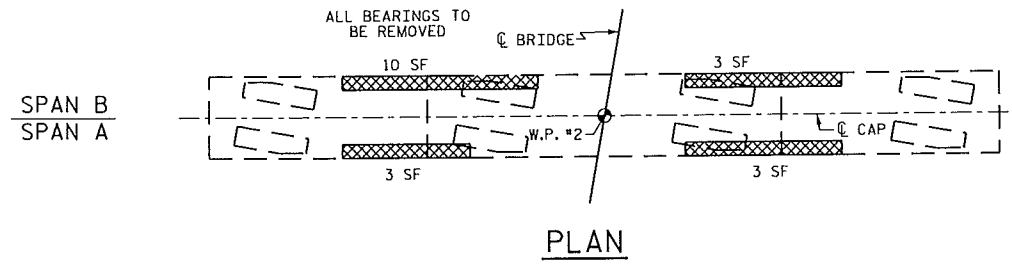
BENTS 1, 2 & 3



DRAWN BY: M. WELDON DATE: 10/13
 CHECKED BY: J. YANNACCONE DATE: 10/13

21-OCT-2014 07:44
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REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29	
1			3			TOTAL SHEETS	
2			4			39	



REPAIR QUANTITY TABLE				
REPAIRS BENT 1	QUANTITIES			
	ESTIMATE		ACTUAL	
	AREA SF.	VOLUME CF.	AREA SF.	VOLUME CF.
SHOTCRETE REPAIRS				
CAP (VERTICAL FACE)	0	0		
CAP (HORIZONTAL FACE)	7.0	1.8		
COLUMN (VERTICAL FACE)	36.0	8.4		
CONCRETE REPAIRS	19.0	4.8		
EPOXY RESIN INJECTION			LN. FT.	LN. FT.
CAP		3.0		
COLUMN		0		

- CONCRETE REPAIR
- SHOTCRETE REPAIR
- ERI - EPOXY RESIN INJECTION

NOTE:
REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER SHALL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATION AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE REPAIR QUANTITY TABLE.

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MIN. OF 1" BEHIND REBAR AND MIN. 1" CL TO SAWCUT. SEE REPAIR DETAILS.

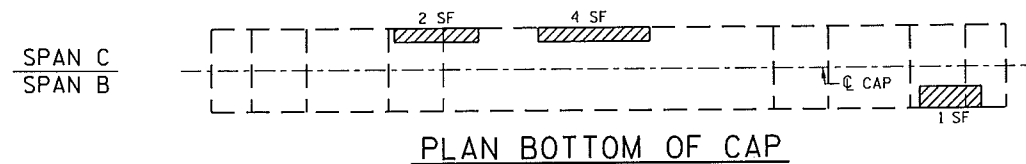
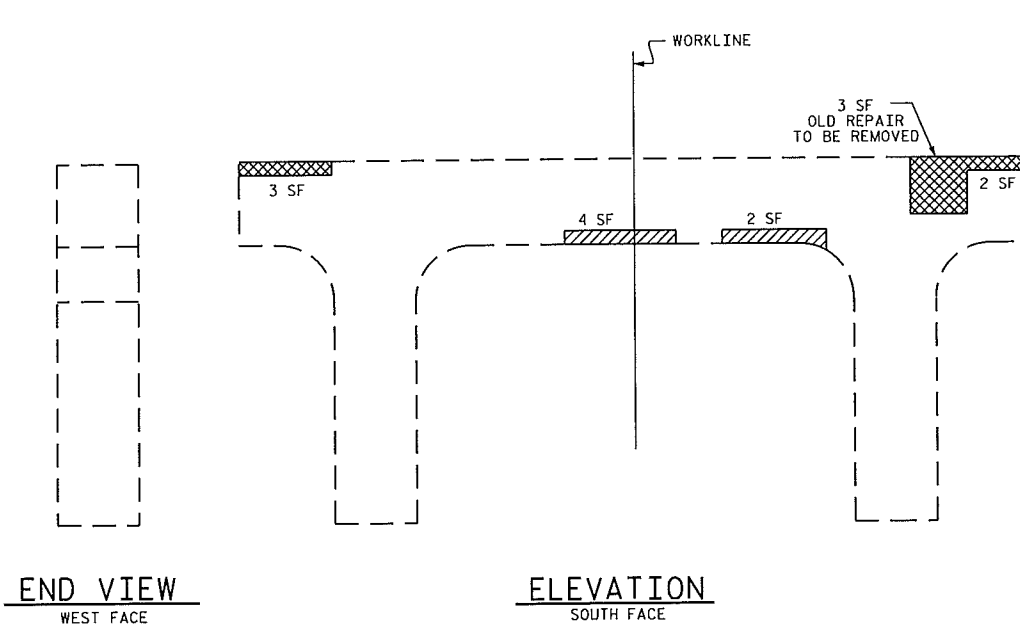
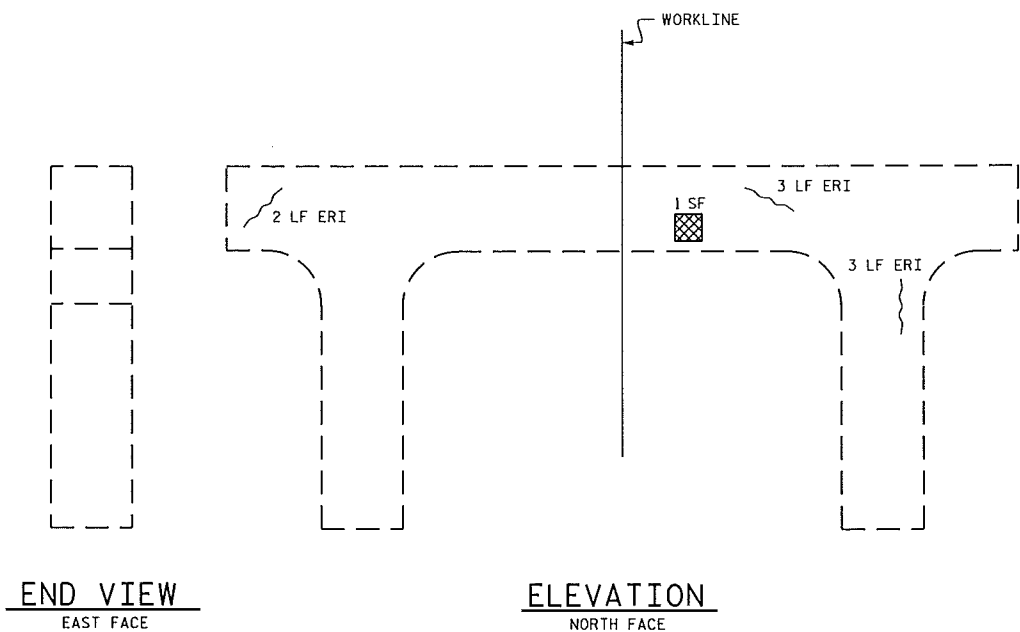
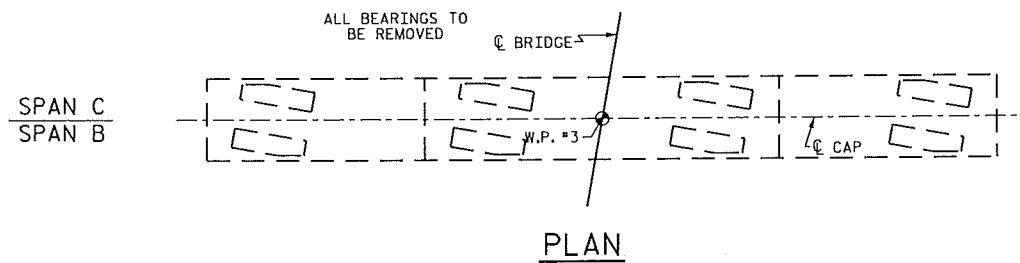
PROJECT NO. 41665.5B
FORSYTH COUNTY
 BRIDGE NO.: 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE REPAIR
 BENT 1

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			39



DRAWN BY : BCH DATE : 04/2013
 CHECKED BY : ZHW DATE : 04/2013



REPAIR QUANTITY TABLE				
REPAIRS BENT 2	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF.	VOLUME CF.	AREA SF.	VOLUME CF.
CAP (VERTICAL FACE)	0	0		
CAP (HORIZONTAL FACE)	7.0	3.1		
COLUMN (VERTICAL FACE)	0	0		
CONCRETE REPAIRS	9.0	2.1		
EPOXY RESIN INJECTION			LN. FT.	LN. FT.
CAP		5.0		
COLUMN		3.0		

- CONCRETE REPAIR
- SHOTCRETE REPAIR
- ERI - EPOXY RESIN INJECTION

NOTE:

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VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MIN. OF 1" BEHIND REBAR AND MIN. 1" CL TO SAWCUT. SEE REPAIR DETAILS.

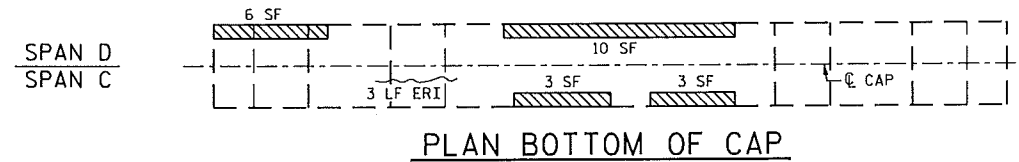
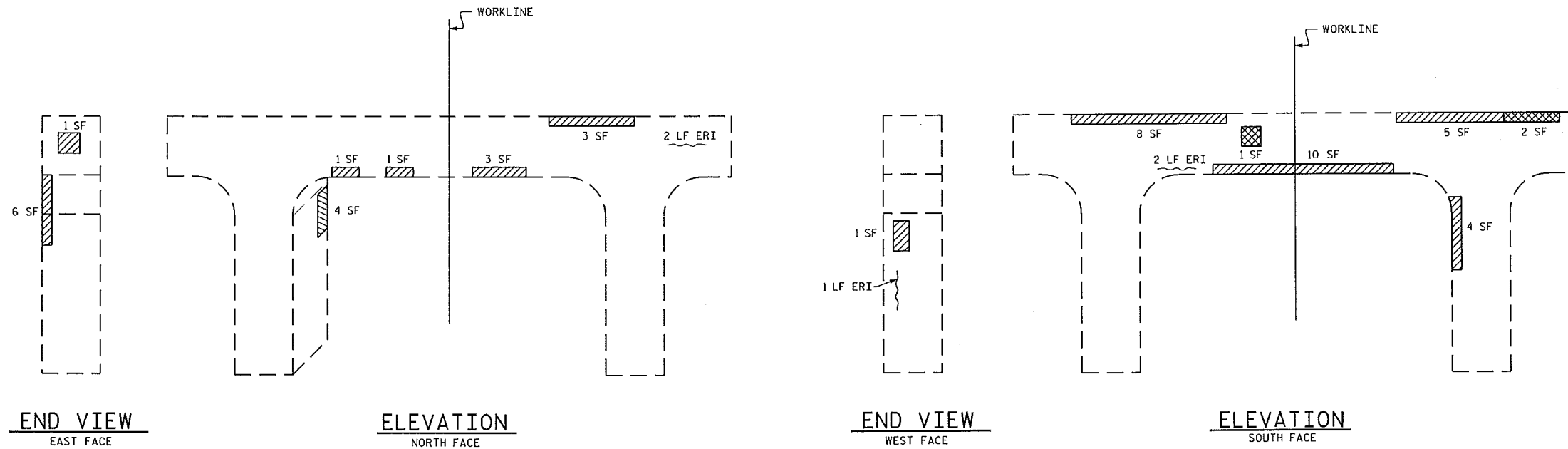
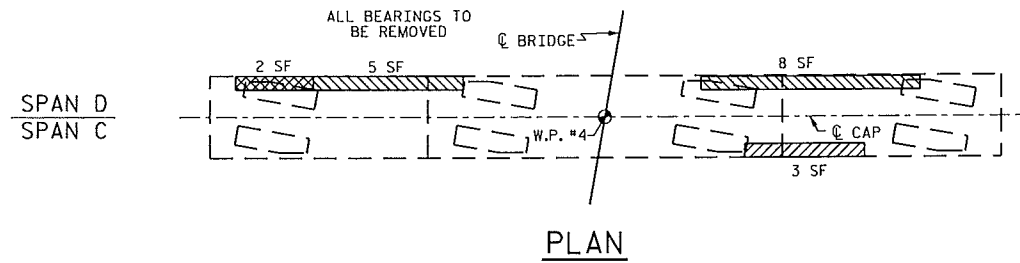
PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE REPAIR
 BENT 2

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



DRAWN BY : BCH DATE : 04/2013
 CHECKED BY : ZHW DATE : 04/2013



REPAIR QUANTITY TABLE				
REPAIRS BENT 3	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF.	VOLUME CF.	AREA SF.	VOLUME CF.
CAP (VERTICAL FACE)	1.0	0.3		
CAP (HORIZONTAL FACE)	40.0	18.7		
COLUMN (VERTICAL FACE)	5.0	1.3		
CONCRETE REPAIRS	3.0	1.0		
EPOXY RESIN INJECTION		LN. FT.		LN. FT.
CAP		7.0		
COLUMN		1.0		

- CONCRETE REPAIR
- SHOTCRETE REPAIR
- ERI - EPOXY RESIN INJECTION

NOTE:

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VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MIN. OF 1" BEHIND REBAR AND MIN. 1" CL TO SAWCUT. SEE REPAIR DETAILS.

PROJECT NO. 41665.5B
FORSYTH COUNTY
 BRIDGE NO.: 187

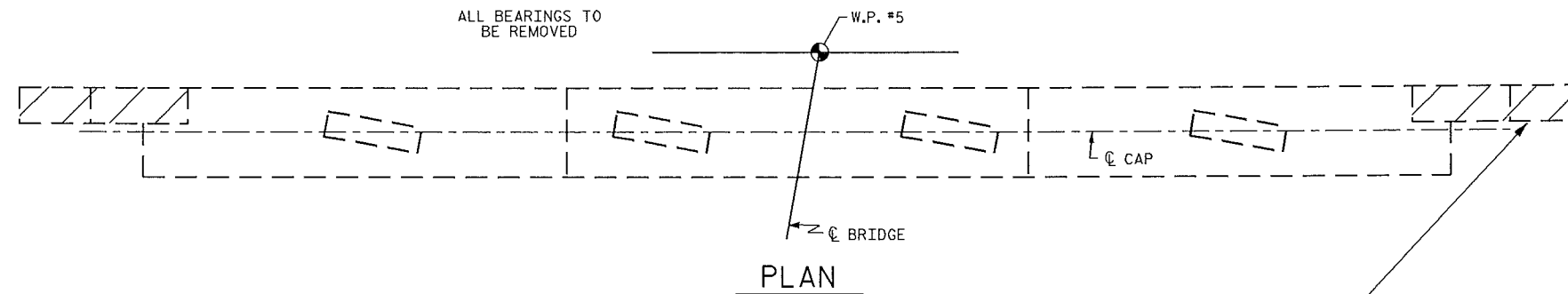
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE REPAIR
 BENT 3

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

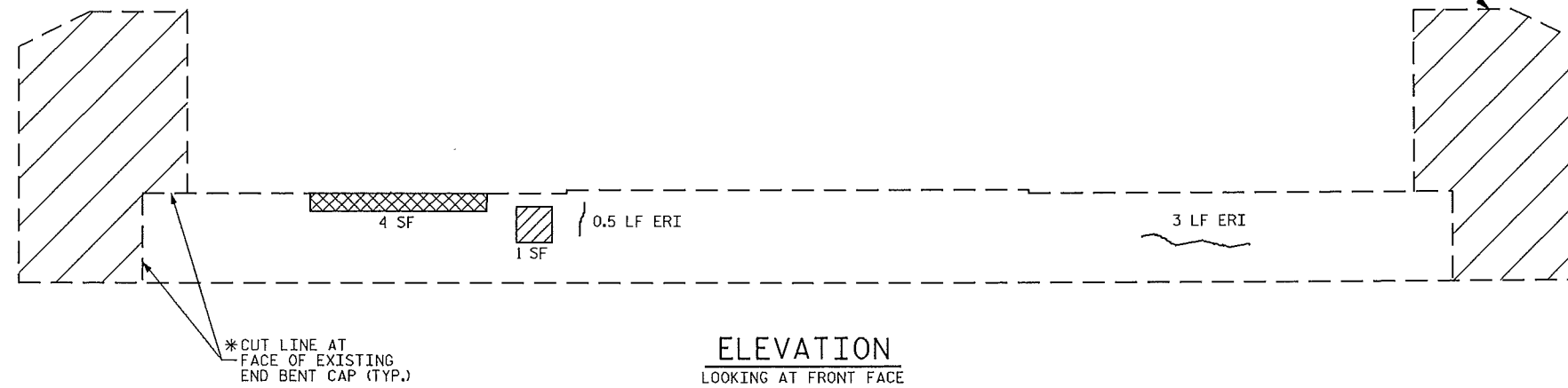
TOTAL SHEETS
39



DRAWN BY : BCH DATE : 04/2013
 CHECKED BY : ZHW DATE : 04/2013



REMOVE CONCRETE & REINFORCING STEEL IN HATCHED AREAS (TYP.)



* CUT LINE AT FACE OF EXISTING END BENT CAP (TYP.)

* EXISTING REINFORCING STEEL SHALL BE CUT FLUSH WITH THE EDGE OF THE EXISTING END BENT CAP. APPLY EPOXY PROTECTIVE COATING TO SURFACES OF THE END BENT CAP WHERE CUT REINFORCING STEEL IS EXPOSED.

EXISTING DEMOLITION AND REPAIR

REPAIR QUANTITY TABLE				
REPAIRS END BENT 2	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF.	VOLUME CF.	AREA SF.	VOLUME CF.
CAP	1.0	0.25		
CONCRETE REPAIRS	4.0	1.0		
EPOXY RESIN INJECTION		LN. FT.		LN. FT.
CAP		3.5		

CONCRETE REPAIR

SHOTCRETE REPAIR

ERI - EPOXY RESIN INJECTION

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MIN. OF 1" BEHIND REBAR AND MIN. 1" CL TO SAWCUT. SEE REPAIR DETAILS.

NOTE:

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PROJECT NO. 41665.5B
FORSYTH COUNTY
 BRIDGE NO.: 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

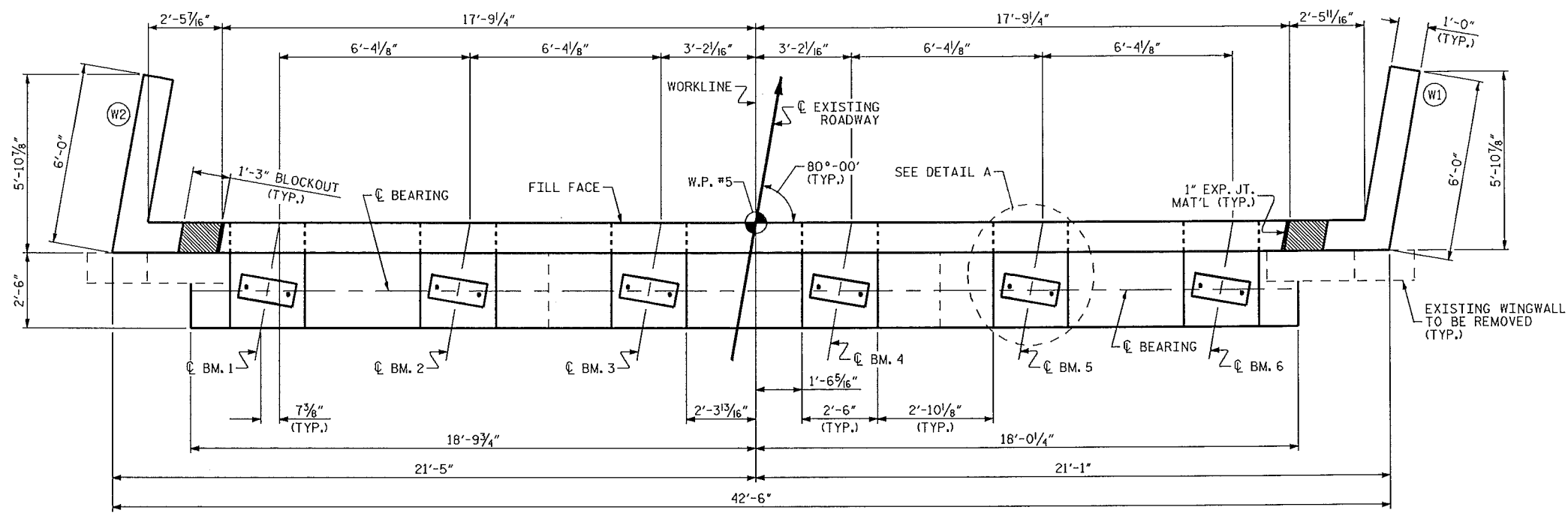
**SUBSTRUCTURE
 DEMOLITION AND
 REPAIR
 END BENT 2**

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

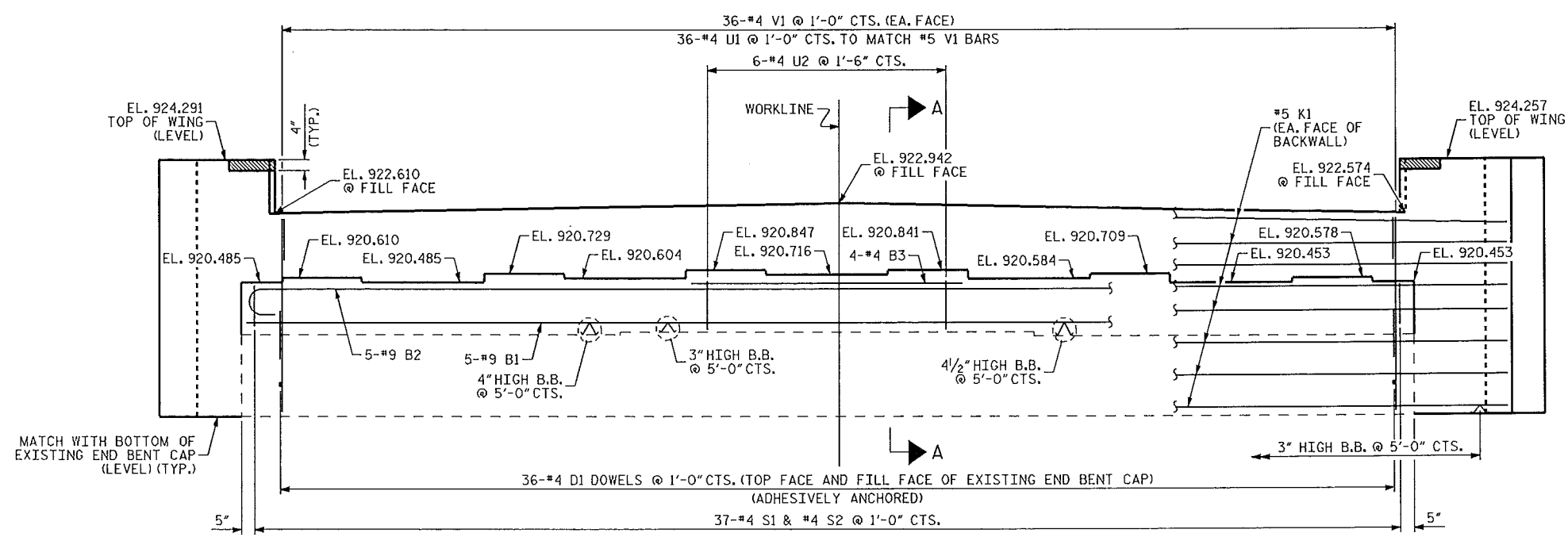
S-33



DRAWN BY: BCH DATE: 04/2013
 CHECKED BY: ZHW DATE: 04/2013



PLAN

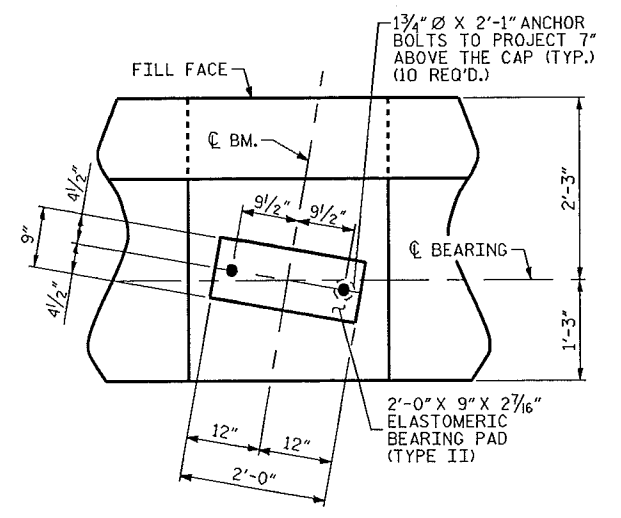


ELEVATION

FOOTINGS AND COLUMNS NOT SHOWN FOR CLARITY

NOTES

- STIRRUPS AND "U" BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.
- INSTALL D1 DOWELS INTO THE EXISTING END BENT CAP USING AN ADHESIVE ANCHORING SYSTEM. LEVEL I FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE DOWELS IS 12.0 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE ARTICLE 420-13 OF THE STANDARD SPECIFICATIONS.
- INSTALL THE 4" Ø DRAIN PIPE THROUGH THE WINGWALL AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY STANDARD DRAWINGS. REINFORCING STEEL IN THE WINGWALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.
- BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
- THE TOP SURFACE AREAS OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
- THE TOP SURFACE OF THE END BENT CAP EXCEPT THE BRIDGE SEAT BUILD-UPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT 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 RAILS ARE CAST IF SLIP FORMING IS USED.
- EPOXY COAT THE END BENT CAP AFTER ADJUSTMENTS ARE MADE TO BEARINGS AND ANCHOR BOLTS ARE GROUTED.



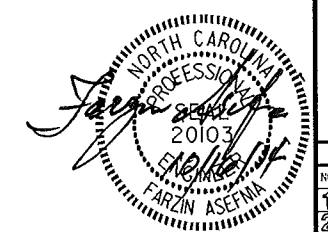
DETAIL A

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187

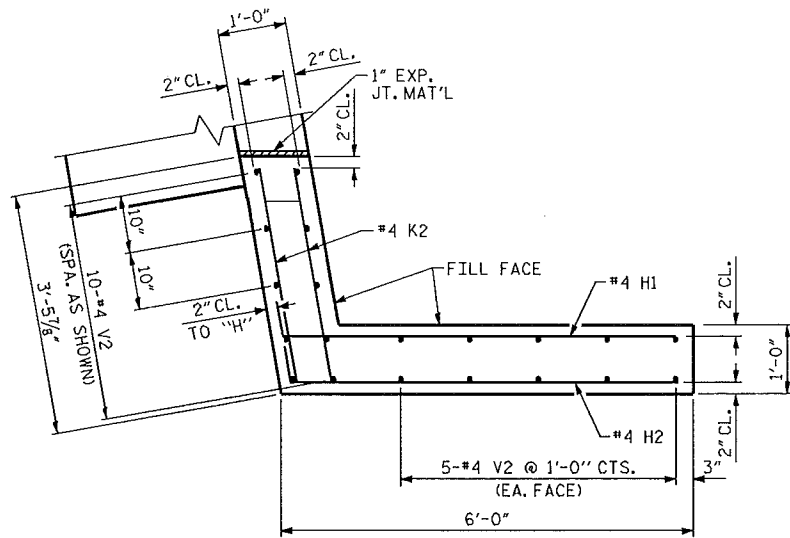
SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2

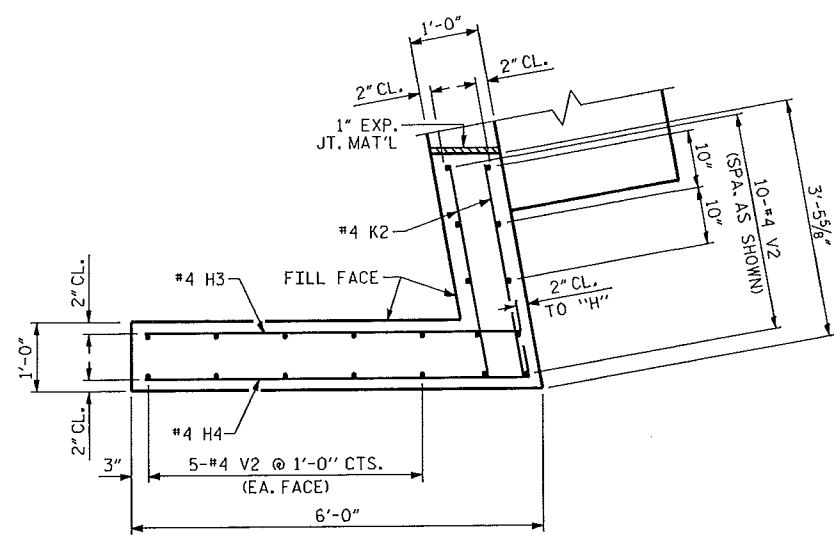
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-34	
1			3			TOTAL SHEETS	
2			4			39	



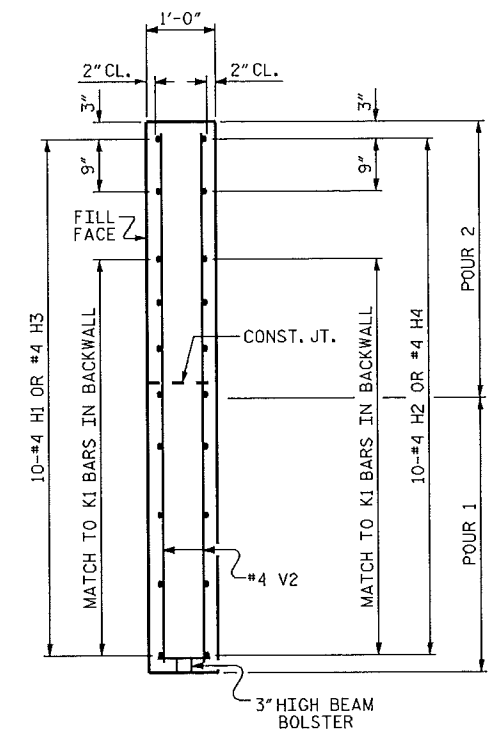
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 CHECKED BY: J. YANACCONO DATE: 01/14



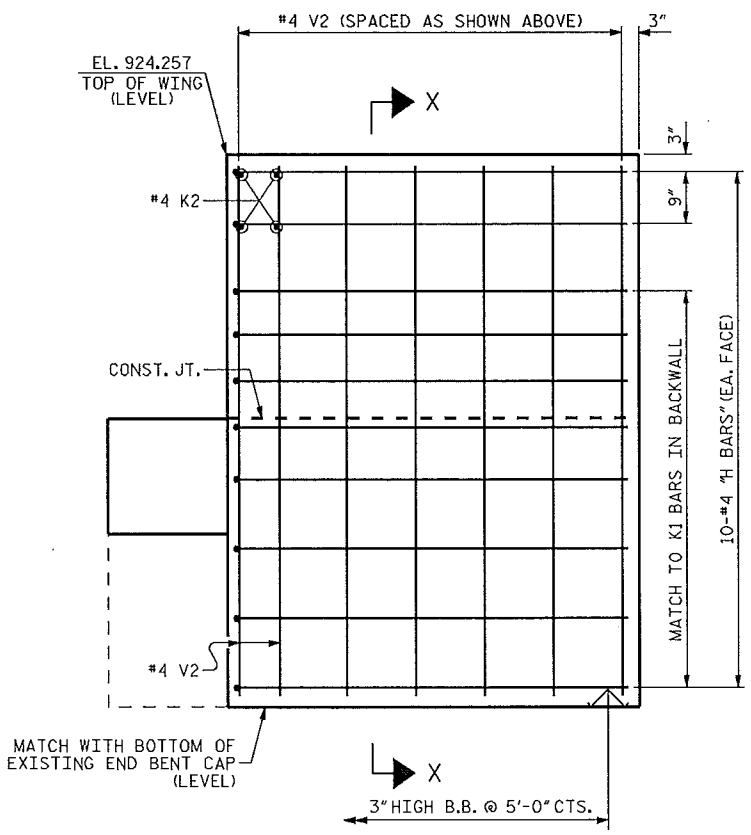
PLAN OF WING W1



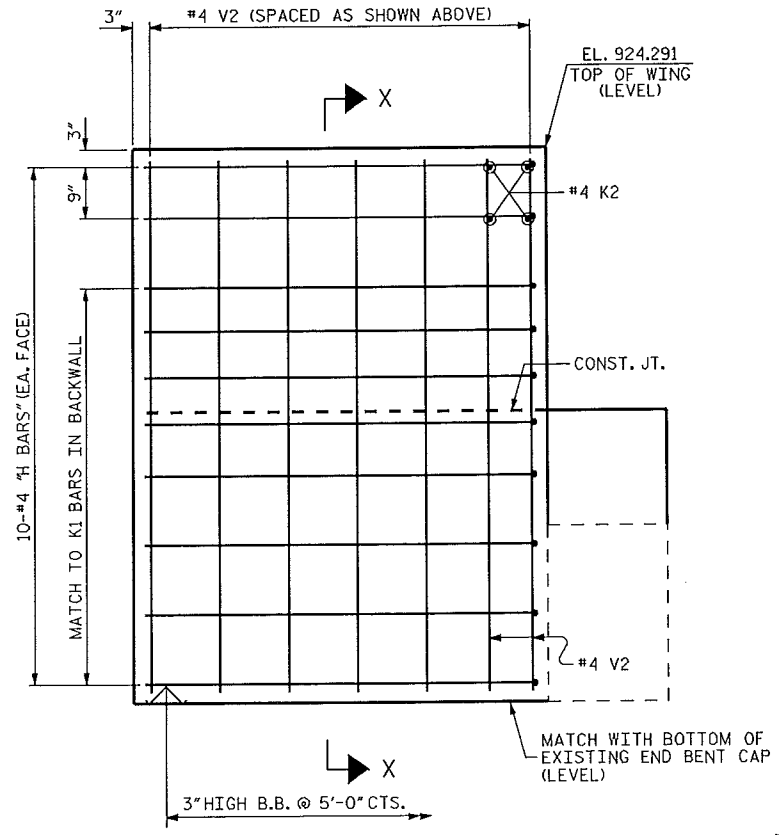
PLAN OF WING W2



SECTION X-X



ELEVATION OF WING W1



ELEVATION OF WING W2

PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187
 SHEET 2 OF 3

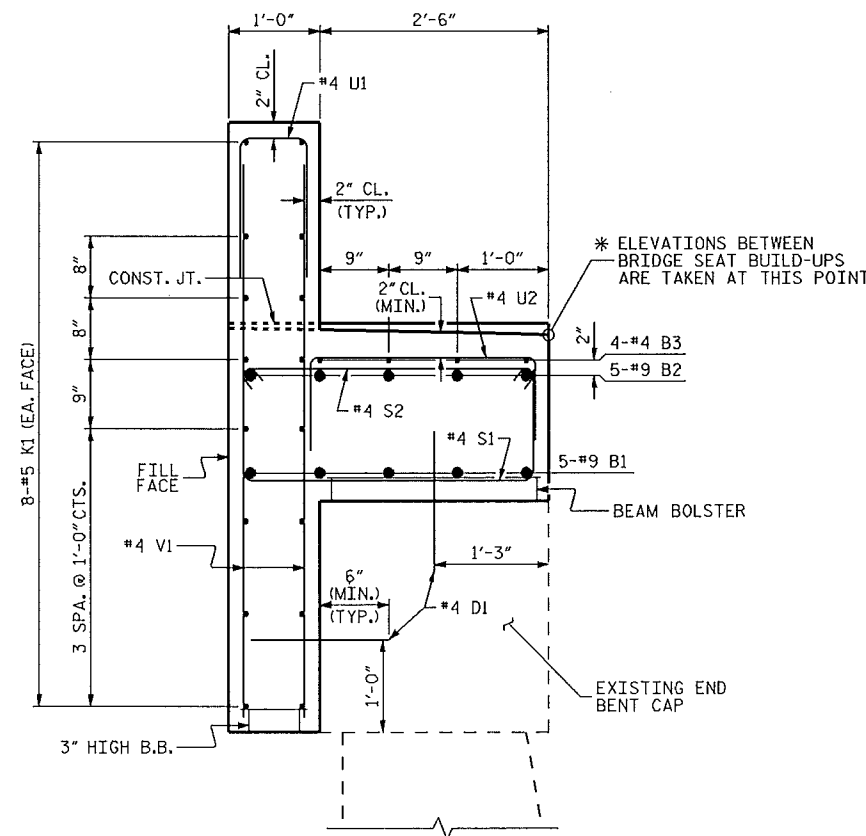
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2

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

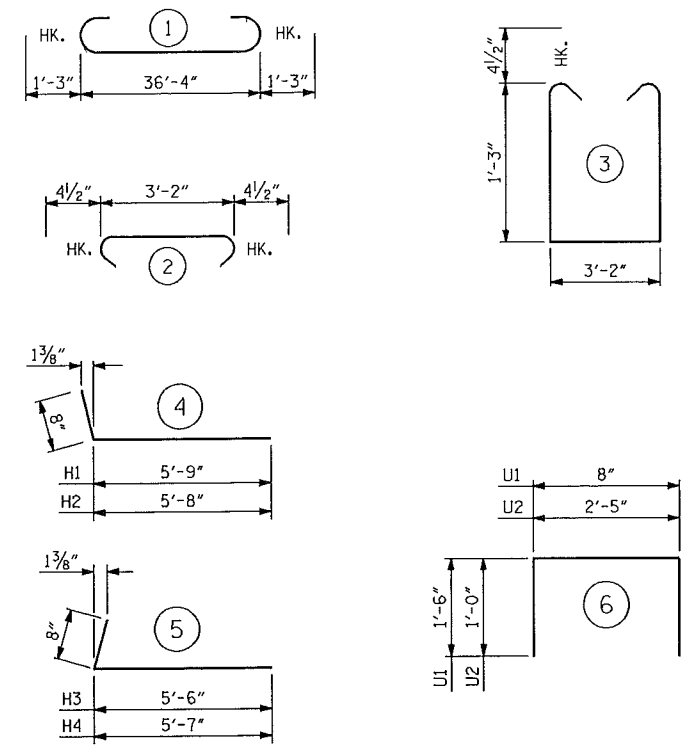


DRAWN BY: M. WELDON DATE: 01/14
 CHECKED BY: J. YANNAACONE DATE: 01/14



SECTION A-A

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	5	#9	STR	36'-6"	621
B2	5	#9	1	38'-10"	130
B3	4	#4	STR	8'-6"	23
D1	72	#4	STR	1'-9"	84
H1	10	#4	4	6'-5"	43
H2	10	#4	4	6'-4"	42
H3	10	#4	5	6'-2"	41
H4	10	#4	5	6'-3"	42
K1	16	#5	STR	42'-1"	702
K2	8	#4	STR	3'-1"	16
S1	37	#4	3	6'-5"	159
S2	37	#4	2	3'-11"	97
U1	36	#4	6	3'-8"	88
U2	6	#4	6	5'-2"	18
V1	72	#4	STR	5'-11"	285
V2	40	#4	STR	7'-7"	203
REINFORCING STEEL				LBS.	2594
CLASS A CONCRETE					
POUR #1 - CAP & LOWER BACKWALL & LOWER WINGWALL				CU. YDS.	11.1
POUR #2 - UPPER BACKWALL & UPPER WINGWALL				CU. YDS.	5.2
TOTAL				CU. YDS.	16.3

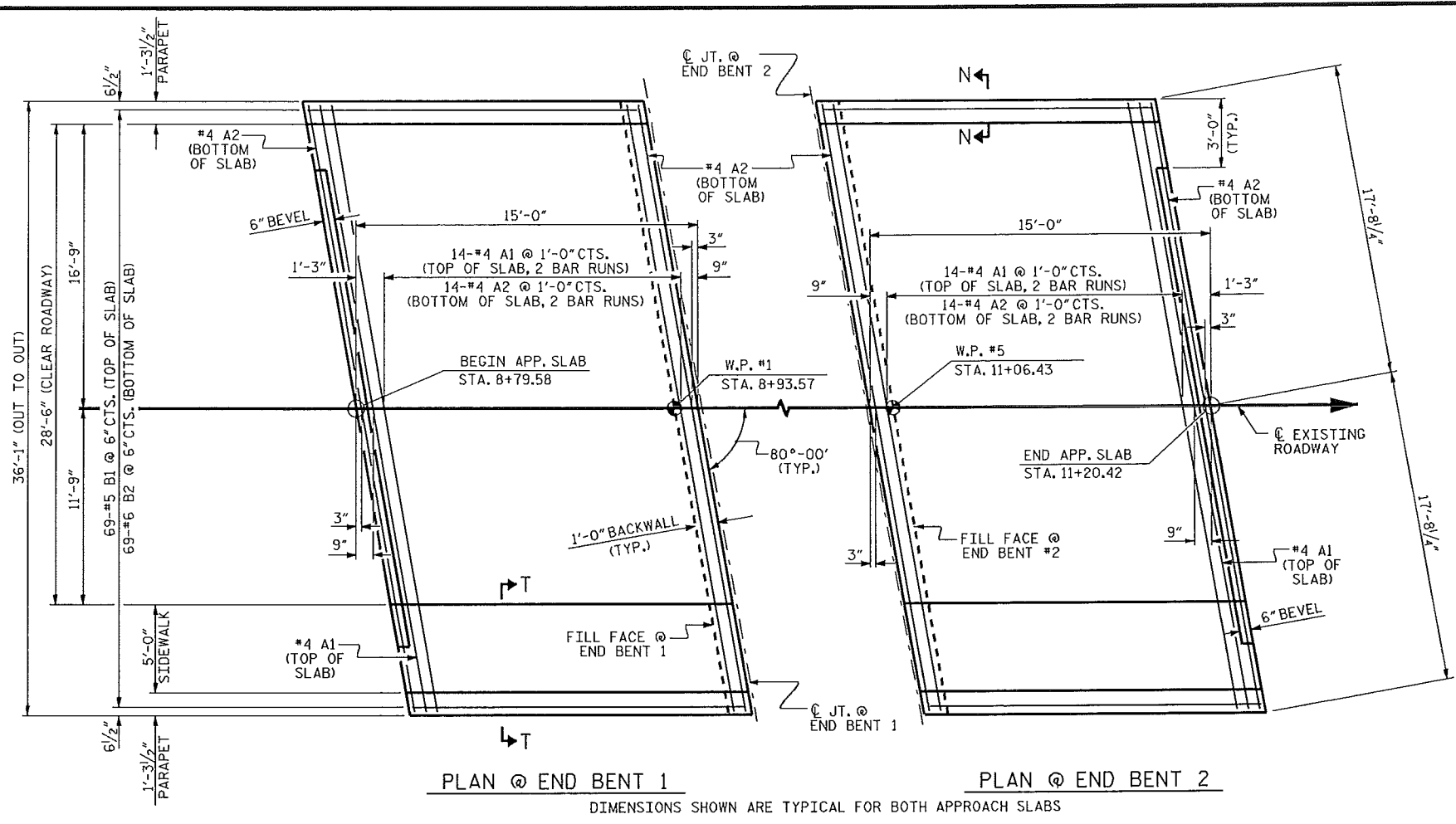
PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO.: 187
 SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 2



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

DRAWN BY: D.V. JOYNER DATE: 01/14
 CHECKED BY: J. YANNAKONE DATE: 01/14



BILL OF MATERIAL					
APPROACH SLAB AT EBT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	30	#4	STR	18'-7"	372
A2	32	#4	STR	18'-5"	394
*B1	69	#5	STR	13'-9"	990
B2	69	#6	STR	14'-7"	1511
REINFORCING STEEL					LBS. 1905
* EPOXY COATED REINFORCING STEEL					LBS. 1362
CLASS AA CONCRETE					C. Y. 22.8
APPROACH SLAB AT EBT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	30	#4	STR	18'-7"	372
A2	32	#4	STR	18'-5"	394
*B1	69	#5	STR	13'-9"	990
B2	69	#6	STR	14'-7"	1511
REINFORCING STEEL					LBS. 1905
* EPOXY COATED REINFORCING STEEL					LBS. 1362
CLASS AA CONCRETE					C. Y. 22.8

NOTES

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

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

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

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

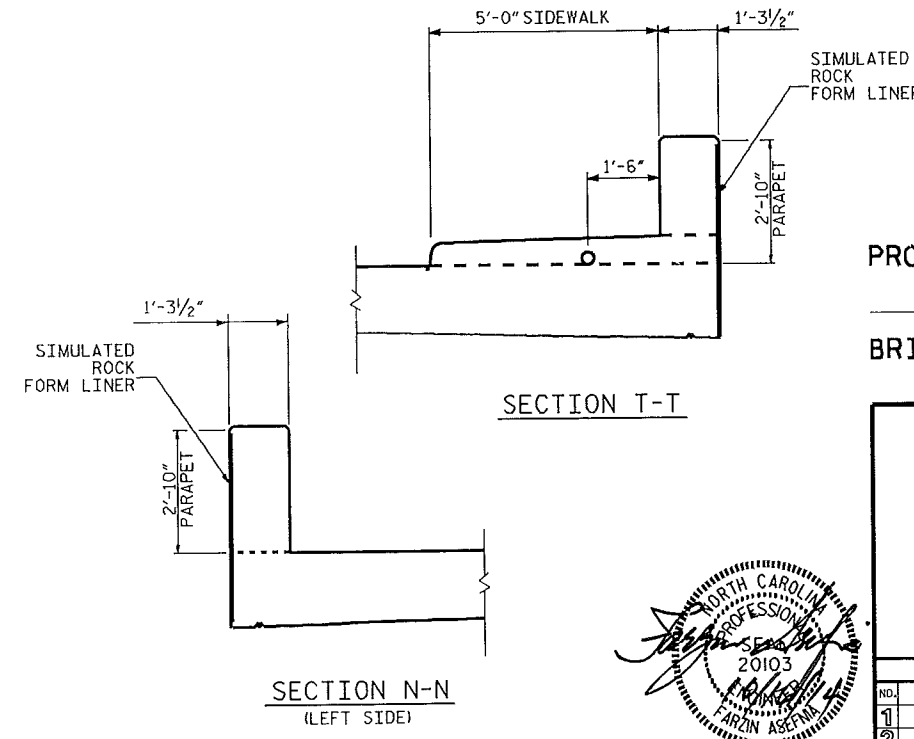
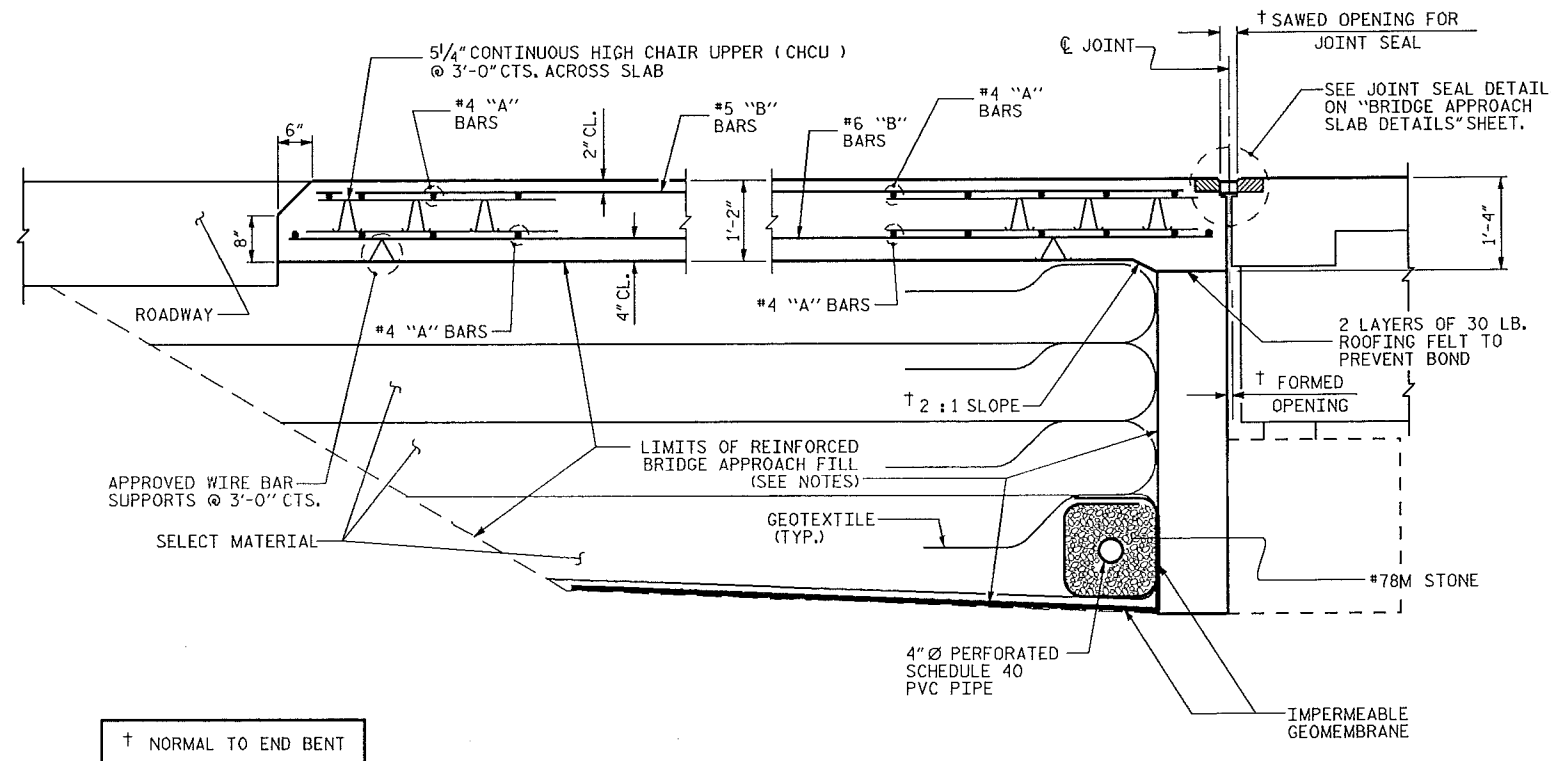
FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

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

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

FOR CONSTRUCTION OF SIDEWALK ON APPROACH SLABS, SEE "SIDEWALK DETAILS" ON SHEET S-11.

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



PROJECT NO. 41665.5B
 FORSYTH COUNTY
 BRIDGE NO. 187

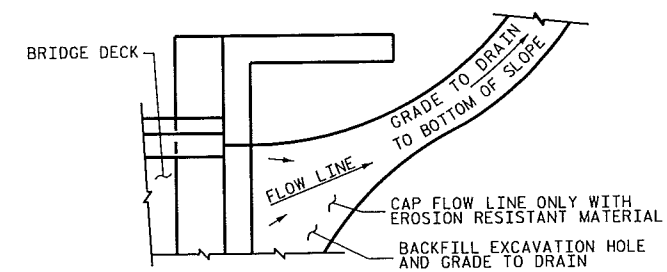
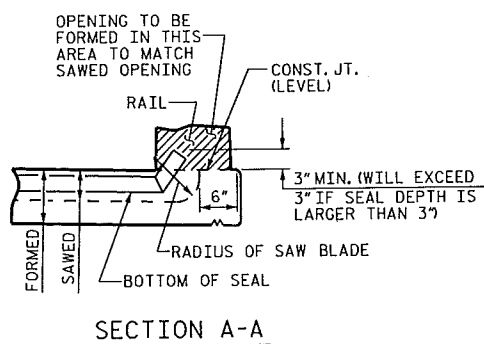
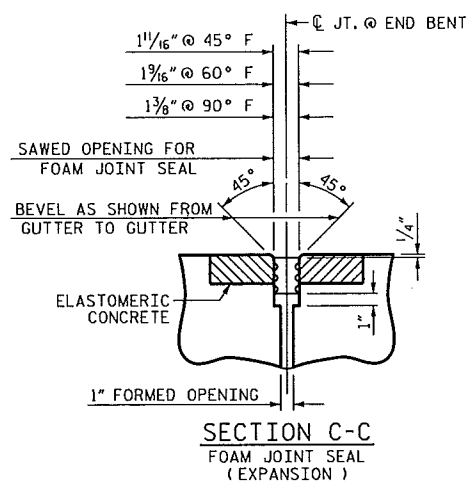
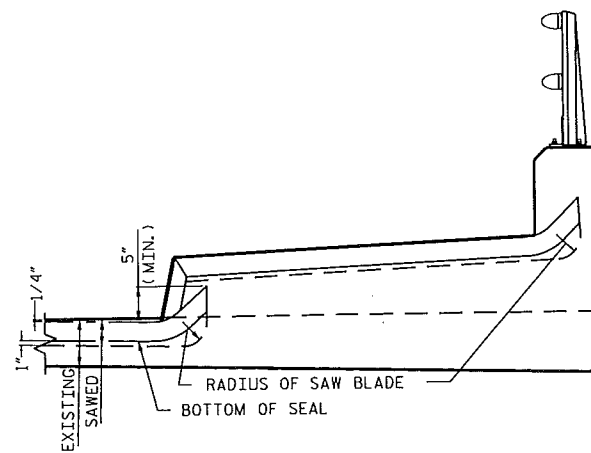
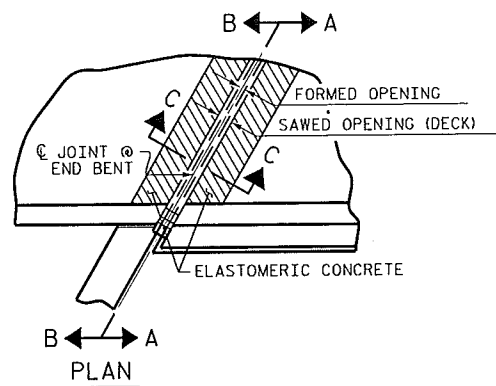
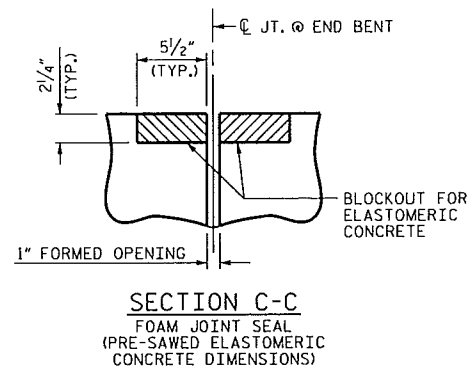
STATE OF NORTH CAROLINA
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 RALEIGH

STANDARD
 BRIDGE APPROACH SLAB
 FOR FLEXIBLE PAVEMENT

REVISIONS				SHEET NO.	
NO.	BY	DATE	NO.	BY	DATE
1			3		
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TOTAL SHEETS: 39

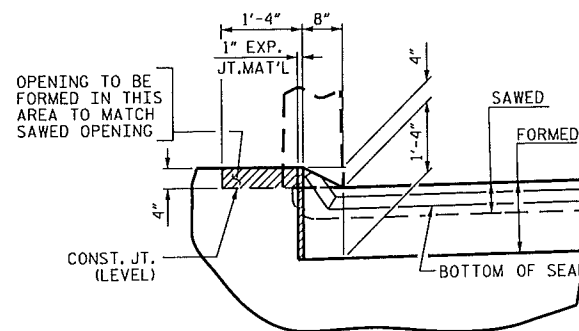
ASSEMBLED BY: D.V. JOYNER DATE: 10/13
 CHECKED BY: J. YANACCONI DATE: 10/13
 DRAWN BY: EEM 3/95 REV. 10/17/11 MAA/GM
 CHECKED BY: VAP 3/95 REV. 12/21/11 MAA/GM
 REV. 6/13 MAA/GM



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.

ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	6.2
2	6.2
TOTAL	12.4

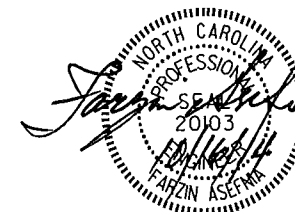
* BASED ON THE MINIMUM BLOCKOUT SHOWN.



JOINT SEAL DETAILS @ END BENT

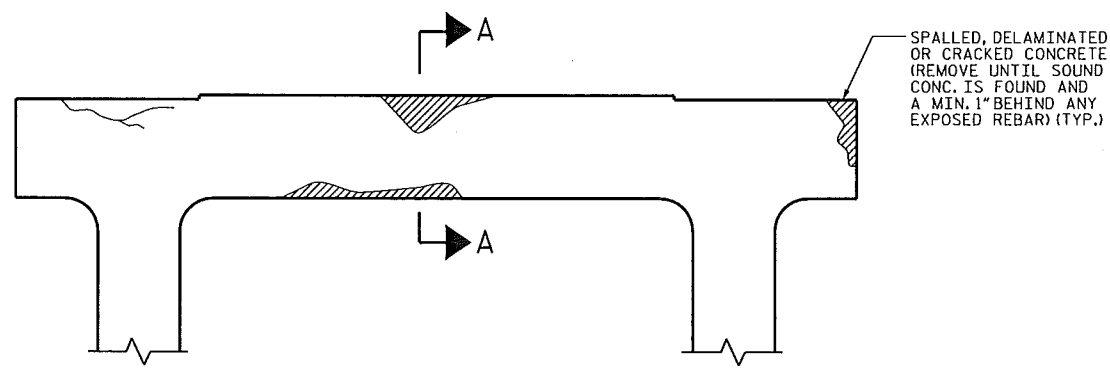
FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.
THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.

PROJECT NO. 41665.5B
FORSYTH COUNTY
BRIDGE NO.: 187

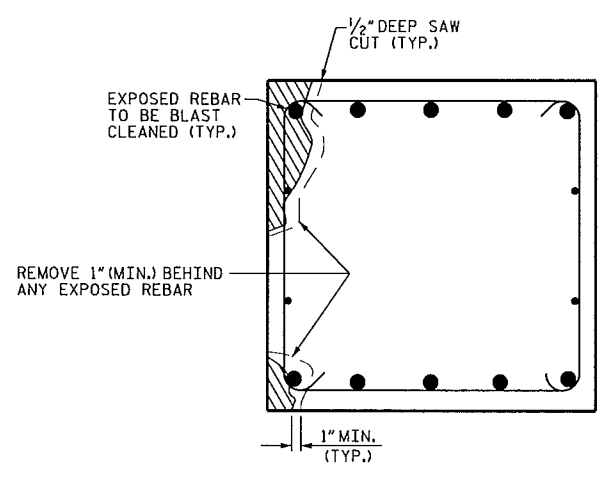


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
FOAM JOINT DETAIL					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 39

ASSEMBLED BY : D.V. JOYNER	DATE : 10/13
CHECKED BY : J. YANNAKONE	DATE : 10/13
DRAWN BY : FCJ 11/88	REV. 10/1/11 MAA/GM
CHECKED BY : ARB 11/88	REV. 7/12 MAA/GM
	REV. 6/13 MAA/GM

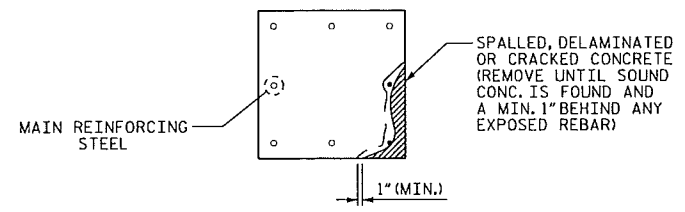


BENT CAP REPAIRS

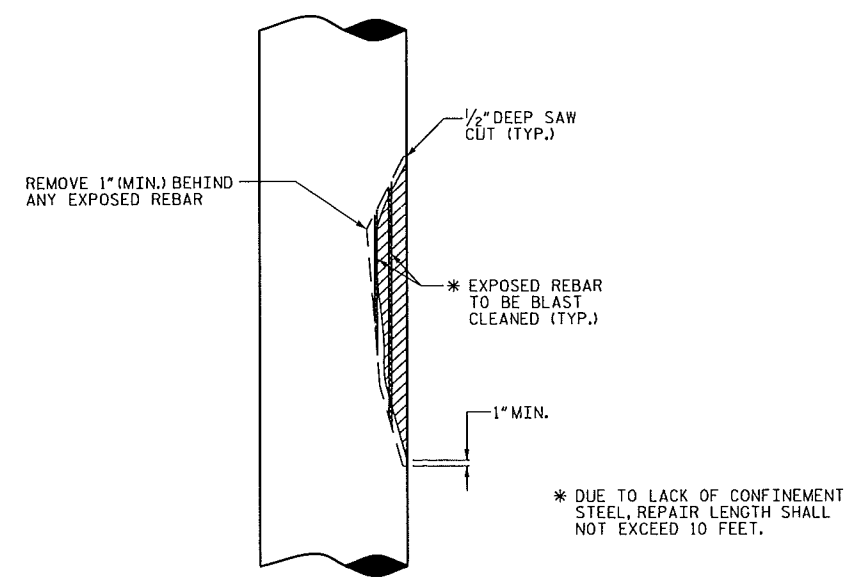


SECTION THRU CAP

CAP REPAIR



PLAN OF COLUMN



ELEVATION OF CAP

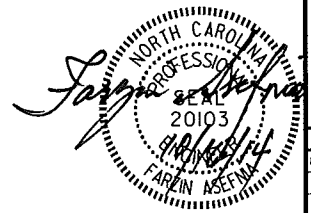
COLUMN REPAIR

PROJECT NO. 41665.5B
 COUNTY: FORSYTH
 BRIDGE NO. 187

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

TYPICAL
 CAP AND COLUMN
 REPAIR DETAILS

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



DRAWN BY: J. YANNAKONE DATE: 5/13
 CHECKED BY: F. ASEFNIA DATE: 5/13

02-001-2014 1013
 S:\PDS\98\Squad C\Preservation\Project\98.203414\Final\06\98.203414.50.Repairs.dgn
 fosefnia

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

STD. NO. SN