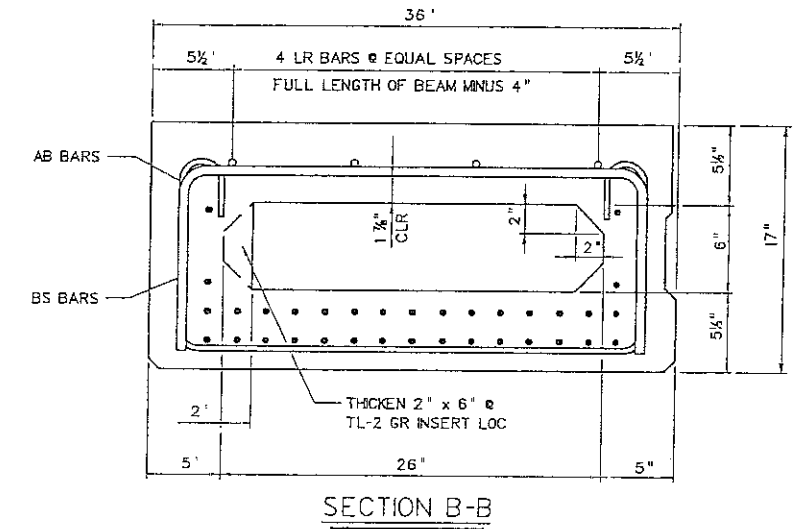
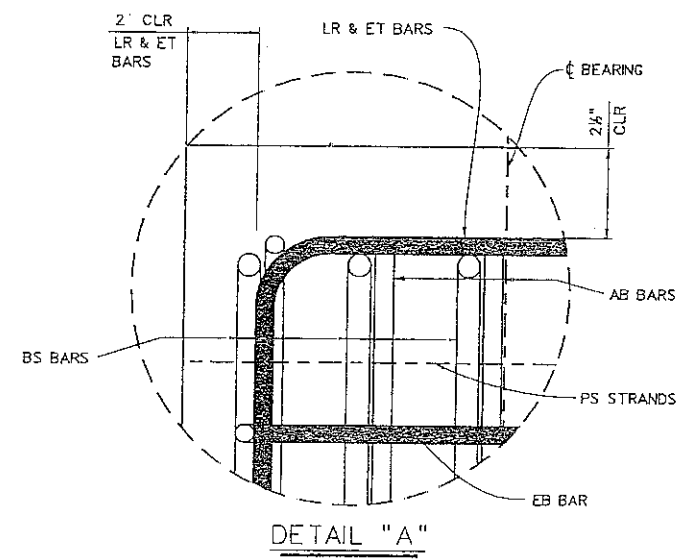
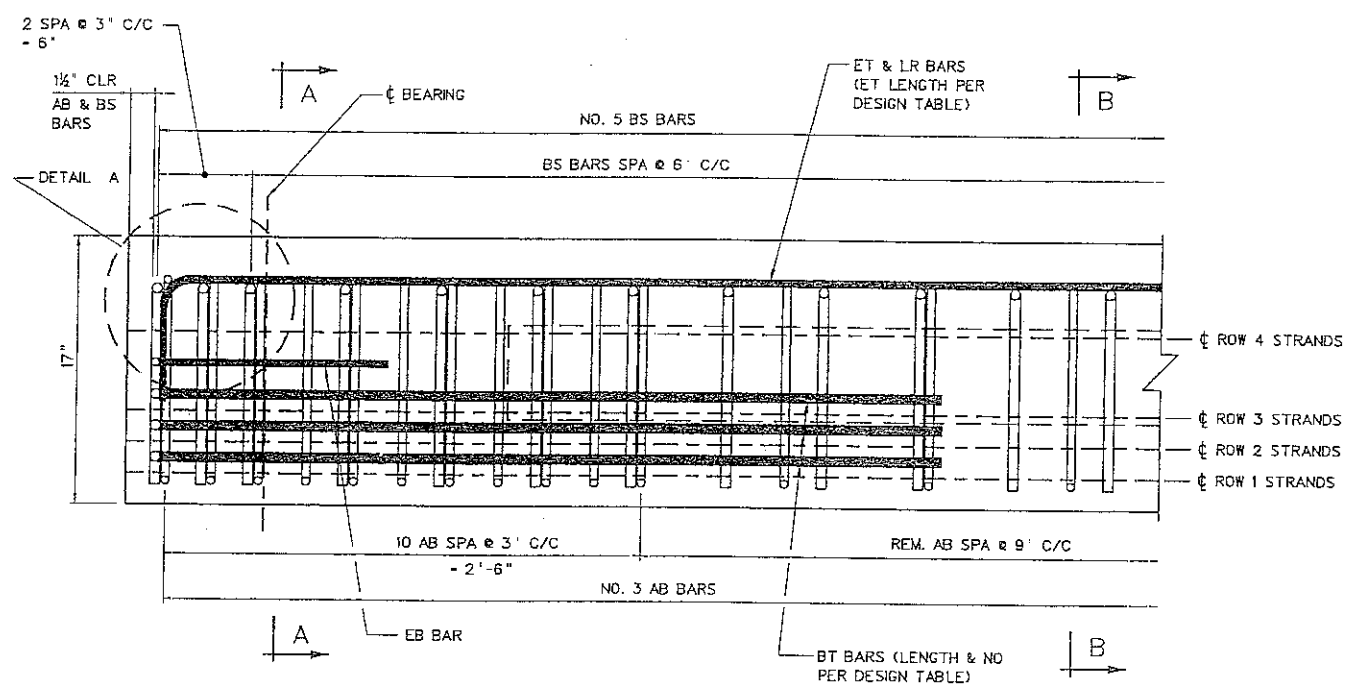
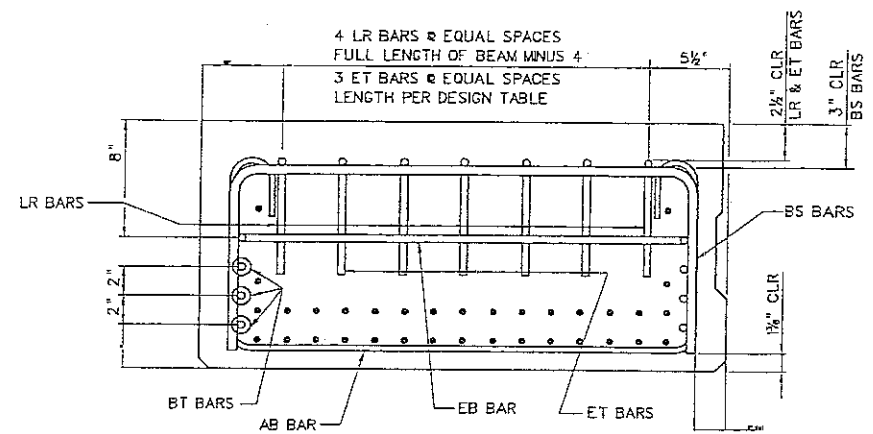
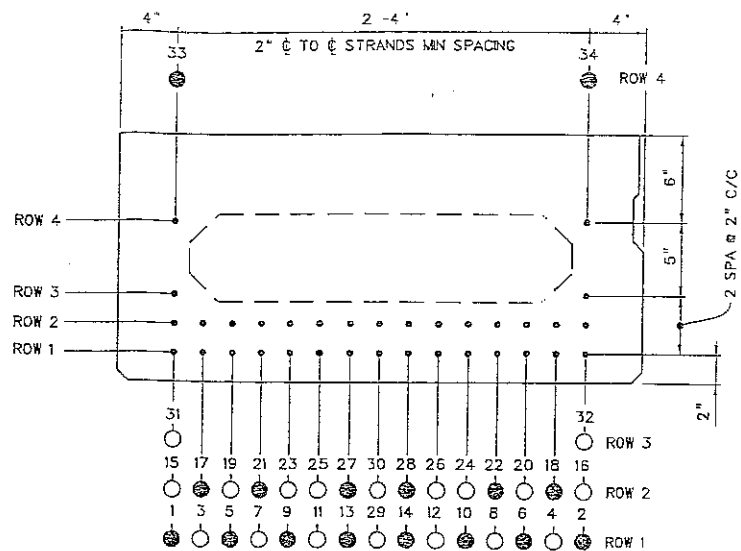
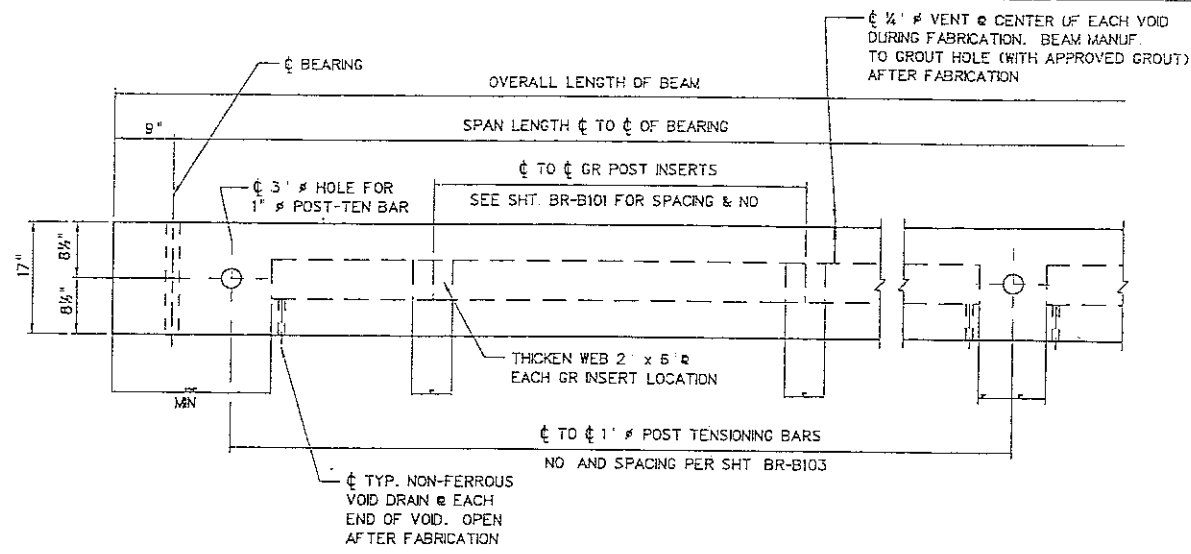


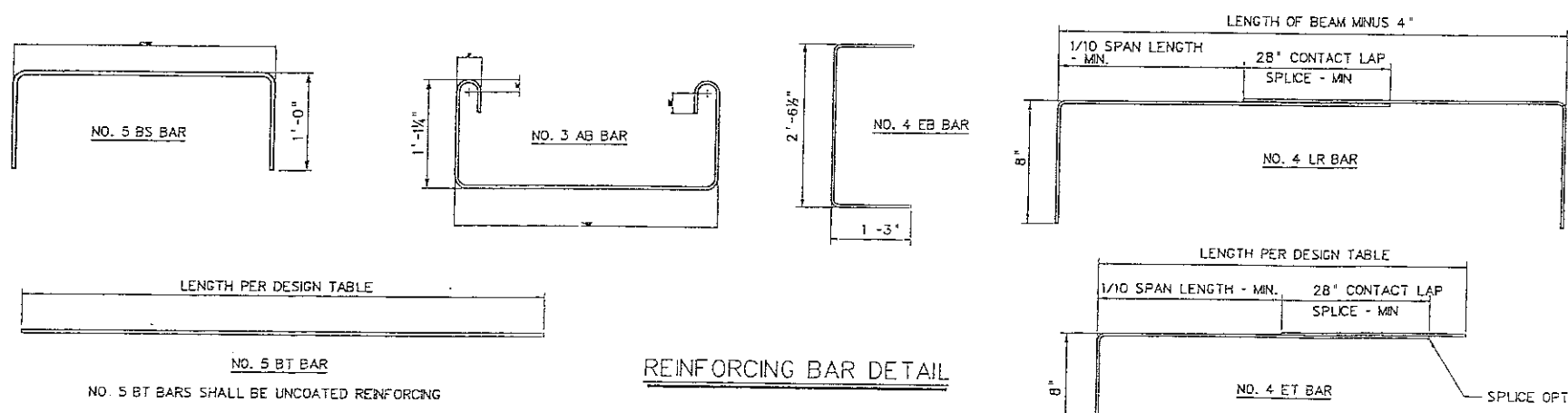
STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S325-20-0.23	N/A	4	MARION	3	11



NOTES:

- REFER TO SHEET BR-B102A FOR SHEAR KEY DETAILS
- DESIGNER SHALL USE THE FOLLOWING KEY TO INDICATE STRAND AND DEBONDING PATTERN ON "BEAM PRESTRESSING VIEW" THIS SHEET.
 - - ACTIVE STRAND
 - ▽ - DEBOND STRAND: LENGTH FROM END OF BEAM
 - △ - DEBOND STRAND: LENGTH FROM END OF BEAM
 - - DEBOND STRAND: LENGTH FROM END OF BEAM
- THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17B, BR-B100, BR-B101, BR-B102A & B, BR-B103, BR-B104 BR-B105A & B AND BR-B106 AS APPLICABLE.

WHEN A POST-TEN ACCESS POCKET IS USED AS DETAILED ON SHEET BR-103 STRANDS IN ROWS 3 AND 4 SHALL BE ELIMINATED THE BEAM SHALL BE REDESIGNED AS NECESSARY.



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

APPROVED: *Dwight Bailey* DIRECTOR, ENGINEERING DIVISION DATE: 10-25-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

17" PRESTRESSED CONCRETE
BOX BEAMS
DESIGN AND ASSEMBLY DETAILS

STANDARD SHEET BR-B17A

PREPARED: 07-02-07

REVISIONS:

DESIGNED BY: TW/
DRAWN BY: BH/
CHECKED BY: THB/
REVIEWED BY: TW/
DATE: 04-10
SCALE:
SHEET 3 OF 11
BRIDGE NO. 6776.1

WILLOW TREE W-BEAM BRIDGE

17" PRESTRESSED BOX BEAM
DESIGN AND ASSEMBLY DETAILS

G:\Projects\Marion\WillowTree\Structure.dgn 28-APR-2010 07:10 6907949

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
5325-20-0.23	N/A	4	MASON	4	11

DESIGN DATA FOR 17" DEPTH ADJACENT BOX BEAM

MIN. CONCRETE STRENGTH @ RELEASE	= 5500 PSI
MIN. CONCRETE STRENGTH @ 28 DAYS	= 8000 PSI
INITIAL PULL/STRAND	= 33,820 LBS
CROSS-SECTION AREA/STRAND	= 0.167 SQ. IN.

SPAN LENGTH @ TO @ BEARING		20'-0"	22'-0"	24'-0"	26'-0"	28'-0"	30'-0"	32'-0"	34'-0"	36'-0"	38'-0"	40'-0"	39'-0"						
OVERALL LENGTH OF BEAM		21'-6"	23'-6"	25'-6"	27'-6"	29'-6"	31'-6"	33'-6"	35'-6"	37'-6"	39'-6"	41'-6"	40'-6"						
NO. OF 270 KSI, 1/2" Ø LOW-RELAXATION STRANDS, AREA/STRAND = 0.167 SQ. IN.		10	10	10	10	12	12	14	14	16	16	16	16						
STRAND POSITION NUMBER	ROW 1	1,2,11,12	1,2,11,12	1,2,11,12	1,2,11,12	1,2,7,8,13,14	1,2,7,8,13,14	1,2,7,8,13,14	1,2,7,8,13,14	1,2,5,6,9,10,13,14	1,2,5,6,9,10,13,14	1,2,5,6,9,10,13,14	1,2,5,6,9,10,13,14						
	ROW 2	17,18,25,26	17,18,25,26	17,18,25,26	17,18,25,26	17,18,27,28	17,18,27,28	17,18,27,28	17,18,27,28	17,18,21,22,27,28	17,18,21,22,27,28	17,18,21,22,27,28	17,18,21,22,27,28						
	ROW 3	---	---	---	---	---	---	---	---	---	---	---	---						
	ROW 4	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34					
PRESTRESSING FORCE IMMEDIATELY AFTER STRAND RELEASE, P _{pt} , (KIPS/BEAM)		326	326	326	326	389	389	451	451	512	512	513	515						
EFFECTIVE PRESTRESSING FORCE AFTER ALL LOSSES, P _{pe} , (KIPS/BEAM)		293	293	294	294	348	348	396	397	443	445	447	471						
REQUIRED FACTORED MOMENT @ STRENGTH I, M _u (FT-KIPS/BEAM)		204	231	260	289	319	349	382	418	453	491	531	445						
FACTORED FLEXURAL RESISTANCE, M _r (FT-KIPS/BEAM)		408	408	408	408	496	496	566	566	646	646	646	646						
TOTAL NO. DEBONDED STRANDS		---	---	---	---	---	---	---	---	---	---	---	---						
DEBONDED STRAND POSITION NUMBER & SHIELDING LENGTH FROM EACH END	ROW 1	---	---	---	---	---	---	---	---	---	---	---	---						
	ROW 2	---	---	---	---	---	---	---	---	---	---	---	---						
NUMBER & LENGTH #4 ET TOP TENSION BARS @ EACH END		3 - #4 x 3'-6"	3 - #4 x 3'-6"	3 - #4 x 4'-0"	3 - #4 x 4'-0"	3 - #4 x 4'-0"	3 - #4 x 4'-6"	3 - #4 x 4'-6"	3 - #4 x 5'-0"	3 - #4 x 9'-0"	3 - #4 x 9'-0"	3 - #4 x 9'-6"	3 - #4 x 9'-6"						
NUMBER & LENGTH #5 BT BOTTOM TENSION BARS @ EACH END		2 - #5 x 4'-0"	2 - #5 x 4'-0"	2 - #5 x 4'-6"	2 - #5 x 4'-6"	2 - #5 x 4'-6"	2 - #5 x 4'-6"	2 - #5 x 5'-0"	2 - #5 x 5'-0"	2 - #5 x 5'-6"	2 - #5 x 5'-6"	2 - #5 x 5'-6"	2 - #5 x 6'-0"						
DESIGN CAMBER +/- POSITIVE (UP) (INCHES)	@ RELEASE	0.13	0.14	0.16	0.17	0.28	0.30	0.40	0.42	0.59	0.60	0.63	0.63						
	@ ERECTION	0.21	0.24	0.26	0.27	0.45	0.47	0.64	0.65	0.93	0.95	0.95	1.00						
	@ FINAL	0.27	0.29	0.30	0.30	0.53	0.53	0.71	0.69	1.03	0.99	0.92	1.10						
NUMBER & SPACING OF TL-2 GUARDRAIL INSERTS	NO OF INSERTS REQD																		
	END OF BEAM TO @ OF FIRST INSERT EA. END																		
SEE NOTE 6	@ OF 1st INSERT TO @ 2nd INSERT EA. END																		
WEIGHT OF TYPICAL BEAM INCLUDING DIAPHRAGM (TONS)		5.6	6.1	6.6	7.1	7.5	8.1	8.6	9.1	9.6	10.1	10.6	10.6						

NOTES

- BEAM WEIGHTS LISTED IN THE DESIGN TABLE ARE BASED ON ZERO SKEW, 2 FT. LONG ENDBLOCK AND DIAPHRAGMS SPACED @ 15 FT C/C. WEIGHTS FOR SKEWED BEAMS LONGER ENDBLOCKS AND ADDITIONAL DIAPHRAGMS SHOULD BE ADJUSTED ACCORDINGLY.
FOR ADDITIONAL DIAPHRAGMS ADD 135 LBS/DIAPHRAGM.
FOR SKEW ADD 17 LBS/DEGREE OF SKEW/END.
FOR LONGER ENDBLOCK ADD 163 LBS/LF/END.
- DESIGNERS SHOULD NOTE THAT DATA IN STANDARD TABLE IS BASED ON EVEN SPAN LENGTHS, A TWO LANE STRUCTURE 8 BEAMS WIDE AND ZERO SKEW. SUPERIMPOSED DEAD LOADS INCLUDE TYPE F PARAPET (321 PLF) AND A FWS OF 50 PSF. FOR NON-STANDARD BRIDGES DATA SHOULD BE VERIFIED AND IF REQUIRED NEW DESIGN DATA ENTERED INTO BLANK COLUMNS IN NO CASE SHALL THE STANDARD DESIGN TABLE BE ALTERED.
- PREDICTED DESIGN CAMBER VALUES LISTED IN THE TABLE ARE BASED ON EMPIRICAL FORMULAS AND AS SUCH ARE APPROXIMATE. FOR MEMBERS WITH SPAN-TO-DEPTH RATIOS AT OR EXCEEDING 25, THE TOLERANCE VALUES LISTED IN APPENDIX B OF PCI MANUAL FOR QUALITY CONTROL MNL-116 MAY NOT APPLY. MEASUREMENT OF CAMBER FOR COMPARISON TO PREDICTED DESIGN VALUES SHOULD BE COMPLETED WITHIN 72 HOURS OF RELEASE. ADDITIONALLY CAMBER SHOULD BE EVALUATED UNDER CONDITIONS THAT MINIMIZE THE EFFECT OF TEMPERATURE VARIATION.

- DESIGNER FABRICATOR AND ERECTOR SHALL BE AWARE THAT SKEWED END BEAMS MAY TWIST OR WARP, CAUSING UNEVEN BEAM SEATING AT THE BEARINGS. THE CONTRACTOR IS REQUIRED TO CORRECT AT THE TIME OF ERECTION, BEFORE THE BEAMS ARE SECURED IN PLACE. METHOD OF CORRECTION SHALL PROVIDE AN EVEN, TOTAL BEARING AND A LEVEL TOP BEAM SURFACE. TOLERANCE, AFTER CORRECTION, SHALL BE (+/-) 1/8 INCH. THE FABRICATOR SHALL NOTIFY THE CONTRACTOR AND DESIGNER IF CORRECTIONS ARE REQUIRED PRIOR TO SHIPMENT.
- MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.
- DESIGNER INPUT VALUES OF NUMBER OF INSERTS, DISTANCE FROM END OF BEAM TO @ FIRST INSERT AND @ FIRST INSERT TO @ SECOND INSERT ABOVE VALUES SHALL BE BASED ON THE REQUIRED 6'-3" GUARDRAIL POST SPACING ACROSS THE BRIDGE.
- SPECIAL STRAND NOTE FOR 17" BOX SECTION ONLY: WHEN TL-2 GUARDRAIL INSERTS ARE REQUIRED THE BOTTOM INSERT (TYPE 2A ANCHOR) CONFLICTS WITH STRAND NO 15. STRANDS 15 AND 16 HAVE BEEN MOVED TO POSITIONS 17 AND 18. FOR UNIFORMITY PURPOSES ALL BEAMS OF THE SAME DESIGN SHALL USE SAME STRAND PATTERN.
- THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A BR-B100 BR-B101 BR-B102A & B BR-B103 BR-B104 BR-B105A & B AND BR-B106 AS APPLICABLE.

APPROVED: *Doreen Bailey* DIRECTOR, ENGINEERING DIVISION DATE: 10-25-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGN TABLE FOR 17"
PRESTRESSED BOX BEAM
STANDARD SHEET BR-B17B

PREPARED: 07-02-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED BY: TBE/

DRAWN BY: TBE/

CHECKED BY: TW/

REVIEWED BY: TW/

DATE: 04-10

SCALE:

SHEET NO. 4 OF 11

BRIDGE NUMBER: 67781

WILLOW TREE W-BEAM BRIDGE

DESIGN TABLE FOR 17"
PRESTRESSED BOX BEAM

C:\Projects\Wilton\Wilton\Wilton\Structure.dgn

28-APR-2010 07:10

0907949

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
5325-20-0-23	N/A	4	MARION	5	11

GOVERNING SPECIFICATIONS

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES ADOPTED 2000 AS AMENDED BY THE CURRENT SUPPLEMENTAL SPECIFICATIONS. THE CONTRACT PLANS AND CONTRACT SPECIAL PROVISIONS ARE THE GOVERNING PROVISIONS APPLICABLE TO THIS PROJECT

ALL BEAMS ARE DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS DATED 1998 AS AMENDED BY THE 2003 INTERIM SPECIFICATIONS.

DESIGN NOTES

ALL STANDARD ADJACENT PRESTRESSED CONCRETE BRIDGE BEAMS ARE DESIGNED TO MEET THE FOLLOWING CRITERIA:

- DESIGN LOADS:
 - HL-93 LIVE LOAD IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
 - FUTURE WEARING SURFACE OF 50 PSF OF ROADWAY
 - TYPE F PARAPET WEIGHING 321 PLF
 - DIAPHRAGM DEAD LOAD NUMBER REQUIRED BASED ON 15'-0" MAX SPACING.
- TWO LANE BRIDGE WITH AN OVERALL WIDTH OF 24'-5" (INCL 1/4" GAP BETWEEN ADJ. BEAMS) A CURB-TO-CURB WIDTH OF 22'-1" TRANSVERSE POST-TENSIONING AND ZERO SKEW
- DESIGN STRENGTH AND UNIT STRESSES:

MINIMUM CONCRETE STRENGTH @ STRAND RELEASE	5500 PSI
MINIMUM CONCRETE STRENGTH @ 28 DAYS	8000 PSI
TEMPORARY STRESS LIMITS IN CONCRETE BEFORE LOSSES:	
COMPRESSION STRESS LIMIT @ STRAND RELEASE	3600 PSI
TENSION STRESS LIMIT @ STRAND RELEASE	-200 PSI
COMPRESSIVE STRESS LIMITS IN CONCRETE @ SERVICE I AFTER LOSSES:	
@ FINAL 1 (PS+DL+LL)	4800 PSI
@ FINAL 2 (PS+DL)	3600 PSI
@ FINAL 3 (50%PS+DL+LL)	3200 PSI
TENSILE STRESS LIMIT IN CONCRETE @ SERVICE II AFTER LOSSES:	
@ FINAL 1 (PS+DL+LL)	-270 PSI
TENDON STRESS LIMIT PRIOR TO TRANSFER:	202.5 KSI
TENDON STRESS LIMIT AFTER ALL LOSSES:	194.4 KSI
- DEBONDING OR SHIELDING OF STRANDS TO REDUCE TEMPORARY TENSILE STRESSES IS PERMITTED, HOWEVER DEBONDING IS LIMITED TO 40% PER ROW AND 25% TOTAL. IN NO INSTANCES SHALL OUTER STRANDS BE DEBONDED. DEBONDED STRANDS SHALL BE SEPARATED BY AT LEAST ONE FULLY BONDED STRAND AND SHALL BE SYMMETRICAL ABOUT THE C OF THE BEAM. SHIELDING OF STRANDS SHALL BE ACCOMPLISHED BY TAPING OR TIGHT FITTING PLASTIC TUBES TAPED AT EACH END
- THE ELASTOMERIC BEARING PADS PROVIDED IN THE STANDARD DESIGNS ARE BASED ON ZERO GRADE AND ARE LIMITED TO A MAXIMUM OF 5% GRADE. IN INSTANCES OF GRADES EXCEEDING THIS LIMIT, PADS SHALL BE SPECIFICALLY DESIGNED. INDIVIDUAL PAD DESIGNS SHALL BE IN ACCORDANCE WITH SECTION 14 AASHTO LRFD BEVELED SOLE PLATES ARE PERMITTED
- MAXIMUM BEAM SKEW SHALL BE 30 DEGREES
- WHEN ALTERNATE DESIGNS OR SITE SPECIFIC DESIGNS ARE PROVIDED, CRITERIA SET FORTH IN THESE STANDARDS SHALL APPLY
- NEGATIVE DESIGN CAMBER AFTER ALL LOSSES IS NOT PERMITTED
- EACH BEAM PROVIDED IN THESE STANDARD DESIGNS HAS BEEN LOAD RATED IN ACCORDANCE WITH SECTION 3.15 OF THE WEST VIRGINIA DIVISION OF HIGHWAYS BRIDGE DESIGN MANUAL, 2004. ADDITIONALLY LOAD RATING PROCEDURES ARE IN ACCORDANCE WITH THE AASHTO MANUAL FOR CONDITION EVALUATION AND LOAD AND RESISTANCE FACTOR RATING OF HIGHWAY BRIDGES 2003.

BAR SIZE	NO. 3	NO. 4	NO. 5	NO. 6
SPlice LEN.	21"	28"	34"	41"

THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B BR-B101 BR-B102A & B BR-B103 BR-B104 BR-B105A & B AND BR-B106 AS APPLICABLE

MATERIALS & FABRICATION NOTES

THE PRESTRESSED CONCRETE BEAMS SHALL CONFORM TO ALL APPLICABLE PROVISIONS OF SECTION 603 OF THE STANDARD SPECIFICATIONS

MILD REINFORCEMENT:

- ALL MILD REINFORCING STEEL SHALL BE GRADE 60 DEFORMED BILLET STEEL AND SHALL BE EPOXY COATED EXCEPT WHERE NOTED. ALL UNCOATED REINFORCING SHALL MEET THE REQUIREMENTS OF AASHTO M31. ALL EPOXY COATED REINFORCING SHALL MEET THE REQUIREMENTS OF AASHTO M284 EXCEPT WHERE AMENDED BY SECTION 709.1 OF THE STANDARD SPECIFICATIONS
- ALL TENSION LAP SPLICES SHALL BE A CLASS B CONTACT TYPE. MINIMUM LAP SPlice LENGTHS SHALL BE AS GIVEN IN THE "LAP SPlice TABLE", THIS SHEET. ADDITIONALLY IF LAP SPlicing OF ET, LR, AND BT BARS IS USED, TERMINATION OF THE SPlice SHALL BE NO CLOSER TO THE END OF THE BEAM THAN 1/10 OF THE SPAN LENGTH
- MINIMUM BAR BENDING DIAMETER SHALL BE 6 BAR DIAMETERS EXCEPT THAT NO. 4 AS BARS MAY HAVE A MINIMUM BEND DIAMETER OF 4 BAR DIAMETERS
- MINIMUM CONCRETE COVER SHALL BE AS SPECIFIED IN SECTION 603.5 OF THE STANDARD SPECIFICATIONS EXCEPT WHERE NOTED ON THE PLANS

PRESTRESSING STRAND:

- ALL PRESTRESSING STEEL SHALL BE 1/2" #7, GRADE 270 7 WIRE UNCOATED LOW-RELAXATION STRAND MEETING THE REQUIREMENTS OF AASHTO M203 SUPPLEMENT S1
- ALL BEAMS DESIGNED IN THESE STANDARDS UTILIZE STRANDS WITH A NOMINAL AREA OF 0.167 SQ IN. STRANDS WITH A NOMINAL AREA OF 0.153 SQ IN IS PERMITTED FOR INDIVIDUAL OR ALTERNATE DESIGNS HOWEVER THE DESIGNER IS ENCOURAGED TO USE THE LARGER STRAND FOR UNIFORMITY REASONS. IN NO CASES WILL STRESS-RELIEVED STRAND BE PERMITTED.
- ALL STRANDS SHALL BE ENCLOSED INSIDE THE STIRRUP CAGE FOR THE FULL LENGTH OF THE BEAM.
- ALL EXPOSED PRESTRESSING STRAND AT EACH BEAM END SHALL BE SHOP COATED WITH A LIQUID COLD-APPLIED BITUMINOUS ELASTOMERIC WATERPROOFING MEMBRANE MATERIAL SHALL MEET ASTM C836-84

CONCRETE:

- ALL CONCRETE USED IN MANUFACTURING PRESTRESSED CONCRETE BEAMS SHALL MEET THE REQUIREMENTS OF SECTION 603.6 OF THE STANDARD SPECIFICATIONS. DESIGN STRENGTHS SHALL MEET OR EXCEED THE MINIMUM VALUES SET FORTH IN THESE PLANS.
- ALL CONCRETE USED IN PARAPETS AND CURBS SHALL BE CLASS K CONCRETE.

ELASTOMERIC BEARING PADS:

- ALL BEARING PADS SHALL MEET THE APPLICABLE REQUIREMENTS AS SET FORTH IN SECTION 18.2 OF THE AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS 1998 EDITION WITH CURRENT INTERIMS. ALL BEARINGS SHALL BE STEEL REINFORCED LAMINATED BEARINGS.
- THE ELASTOMER MATERIAL SHALL BE 60 DUROMETERS WITH A MINIMUM LOW TEMPERATURE GRADE OF 3 (ZONE C).
- ALL STEEL REINFORCING SHALL MEET THE REQUIREMENTS OF AASHTO M270 GRADE 36.

GUARDRAIL, GUARDRAIL POSTS, TUBING & INSERTS:

- ALL W-BEAM GUARDRAIL AND ATTACHMENT HARDWARE SHALL BE IN ACCORDANCE WITH SECTION 712.4 OF THE STANDARD SPECIFICATIONS. GUARDRAIL POSTS STRUCTURAL TUBING POST ATTACHMENT INSERTS AND HARDWARE SHALL MEET THE LISTED MATERIAL AND COATING SPECIFICATIONS:

ITEM	DESCRIPTION	MATERIAL SPEC	COATING SPEC.
POST	W6x25	AASHTO M270 GR 36	AASHTO M11
PLATE	1/2" x 7'	AASHTO M270 GR 36	AASHTO M11
TUBING	TS 8x4x3/16	ASTM A500, GR B	AASHTO M11
CHANNEL	C7x9.8	AASHTO M270 GR 36	AASHTO M11
FERRULE	TYPE 2A 1/4" # x 2 1/2" MN LEN.	ASTM A108 (11L7 STEEL)	AASHTO M232
WIRE	ANCHOR 3/8"	ASTM A510 (1018 STEEL)	AASHTO M232
STUDS	1/4" # x 8' LONG	ASTM A108 (1045 C.D. STEEL)	AASHTO M232
NUTS	1/4" #	AASHTO M291, CLASS C	AASHTO M232
COUPLERS	TYPE 1A 1/4" # x 5' LONG	ASTM A108 (12L14 STEEL)	AASHTO M232
BOLTS	ANCHOR 1/4" # x 12' LONG	AASHTO M164 (TYPE 1 HH)	AASHTO M232
BOLTS	3/8" # x ALL LEN.	AASHTO M164 (TYPE 1 HH)	AASHTO M232
NUTS	3/8" #	AASHTO M291, CLASS C	AASHTO M232
WASHERS	ALL	AASHTO M293	AASHTO M232

WELDING:

- TACK WELDING OF REINFORCEMENT IS NOT PERMITTED. REINFORCING CAGES AND LONGITUDINAL STEEL SHALL BE ADEQUATELY TIED WITH APPROVED MEANS TO PREVENT RACKING AND MISALIGNMENT.
- ALL WELDING OF FABRICATED ITEMS AS SHOWN IN THESE PLANS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF AASHTO/AWS D1.5 2002

POST-TENSIONING BARS:

- POST-TENSIONING THREAD BARS SHALL BE ONE INCH DIAMETER 150 KSI STEEL, AND SHALL CONFORM TO AASHTO M275, TYPE II. STEEL THREAD BARS SHALL BE DESIGNED TO ALLOW THE USE OF HEAVY HEX NUTS AND COUPLERS THAT THREAD ONTO THE END OF THE DEFORMATIONS. HEAVY HEX NUTS AND COUPLERS SHALL BE OF A DESIGN AND MATERIAL RECOMMENDED BY THE BAR MANUFACTURER TO DEVELOP THE FULL TENSILE STRENGTH OF THE BAR. PROPERLY DOCUMENTED CERTIFIED MILL TEST REPORTS SHALL BE PROVIDED FOR EACH HEAT OF STEEL THREAD BARS.
- ALL POST-TENSIONING THREAD BARS NUTS, BEARING PLATES, COUPLERS, AND ANCILLARY HARDWARE SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH AASHTO M111. THE GALVANIZING PLANT SHALL ADMINISTER ADEQUATE QUALITY CONTROL MEASURES TO SAFEGUARD AGAINST HYDROGEN EMBRITTLMENT. QUALITY CONTROL MEASURES SHALL COMPLY WITH ASTM A-143. CERTIFICATION FOR HOT-DIP GALVANIZING SHALL BE PROVIDED BY THE GALVANIZING PLANT.
- ALL POST-TENSIONING BEARING PLATES SHALL CONFORM TO AASHTO M270 GRADE 36.

SHEAR KEY GROUT:

- SHEAR KEY GROUT SHALL BE A GROUT THAT IS RECOMMENDED BY THE MANUFACTURER FOR A DURABLE GROUT APPLICATION AND THAT BASED ON THE MANUFACTURER'S TEST DATA WILL ATTAIN A MINIMUM OF 4500 PSI COMPRESSIVE STRENGTH IN 3 DAYS UNDER CONDITIONS REPRESENTATIVE OF THE CONDITIONS TO BE EXPERIENCED AT THE SITE. THE GROUT MUST BE LISTED ON THE APPROVED LIST OF GROUTS PUBLISHED BY THE WEST VIRGINIA DIVISION OF HIGHWAYS MATERIALS CONTROL SOIL AND TESTING DIVISION. THE CONTRACTOR SHALL PRE-TEST THE PROPOSED GROUT FOR COMPRESSIVE STRENGTH AT 3 AND 7 DAYS AND SUBMIT THE RESULTS TO THE BRIDGE PROJECT MANAGER FOR APPROVAL PRIOR TO INSTALLATION OF THE GROUT IN THE STRUCTURE. THE TESTS WILL BE BASED ON A POURABLE CONSISTENCY WITH THE SAME WATER/GROUT MIXTURE RATIO TO BE USED IN THE STRUCTURE.
- THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT FOR EACH PROJECT THE GROUT PRE-TEST RESULTS OBTAINED IN THE NOTE ABOVE. THE CONTRACTOR SHALL BE REQUIRED TO PERFORM A NEW PRE-TEST AND SUBMISSION FOR APPROVAL UNDER ANY OF THE FOLLOWING CONDITIONS:
 - A PERIOD OF 18 MONTHS HAS ELAPSED SINCE LAST PRE-APPROVAL TESTING.
 - GROUT MANUFACTURER HAS REVISED OR CHANGED THE GROUT SPECIFICATIONS.
 - THE CONTRACTOR ALTERS THE WATER/GROUT MIXTURE RATIO.
 - THE CONTRACTOR CHANGES GROUT MANUFACTURER.
 - THE CONTRACTOR IS REQUIRED TO COMPLETE THE GROUT STRENGTH TABLE ON BR-B103
- TEST PROCEDURE FOR DETERMINING THE COMPRESSIVE STRENGTH OF GROUT SHALL USE CUBE SPECIMENS IN ACCORDANCE WITH ASTM C109 AS MODIFIED BY ASTM C107. GROUT TESTING IN ACCORDANCE WITH AASHTO T23 (STANDARD CYLINDER TEST) IS NOT ACCEPTABLE.

PROTECTIVE SURFACE TREATMENT:

- EACH PRESTRESSED CONCRETE BEAM SHALL BE TREATED BY THE MANUFACTURER AT THE FABRICATION PLANT WITH AN APPROVED CONCRETE SEALER (SILANE). AN APPROVED LIST OF CONCRETE SEALERS ARE ON FILE AT THE WEST VIRGINIA DIVISION OF HIGHWAYS MATERIALS CONTROL, SOIL AND TESTING DIVISION. COVERAGE SHALL INCLUDE TOP AND BOTTOM OF INTERIOR BEAMS AND TOP, BOTTOM AND EXTERIOR SIDE OF EXTERIOR BEAM. APPLICATION RATE SHALL BE PER TREATMENT MANUFACTURER'S RECOMMENDATION.
- AFTER COMPLETION OF THE SILANE TREATMENT BY FABRICATOR AND A MAXIMUM OF FIVE WORKING DAYS PRIOR TO SHIPMENT OF THE BEAMS, THE FABRICATOR SHALL BE RESPONSIBLE FOR ABRASIVE BLAST CLEANING TO CLEAN WHITE CONCRETE THE INTERIOR SIDES OF BEAMS FOR THE FULL LENGTH. CLEAN WHITE CONCRETE SHALL MEAN REMOVAL OF ALL DIRT, GREASE, OIL, AND LOOSE CONCRETE LAITANCE AND PROVIDE A ROUGHENED CONCRETE SURFACE. BLASTING MEDIUM SHALL BE APPROVED BY THE DIVISION OF HIGHWAYS.

SHOP DRAWINGS:

THE FABRICATOR SHALL BE RESPONSIBLE FOR THE PREPARATION OF SHOP DRAWINGS IN ACCORDANCE WITH THE WEST VIRGINIA DIVISION OF HIGHWAYS DOCUMENTS, DD-102 AND THE STANDARD SPECIFICATIONS. ADDITIONAL INFORMATION IS PROVIDED IN SECTION 7 OF THE BRIDGE DESIGN MANUAL. SHOP DRAWINGS SHALL INCLUDE THE FABRICATOR'S DETENSIONING PLAN.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

Ernest Bailey
DIRECTOR, ENGINEERING DIVISION

DATE: 10-25-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION
PRESTRESSED CONCRETE BEAM

DESIGN & ASSEMBLY NOTES
STANDARD SHEET BR-B100

PREPARED: 07-02-07

WILLOW TREE W-BEAM BRIDGE

PRESTRESSED CONCRETE BEAM

DESIGN & ASSEMBLY NOTES

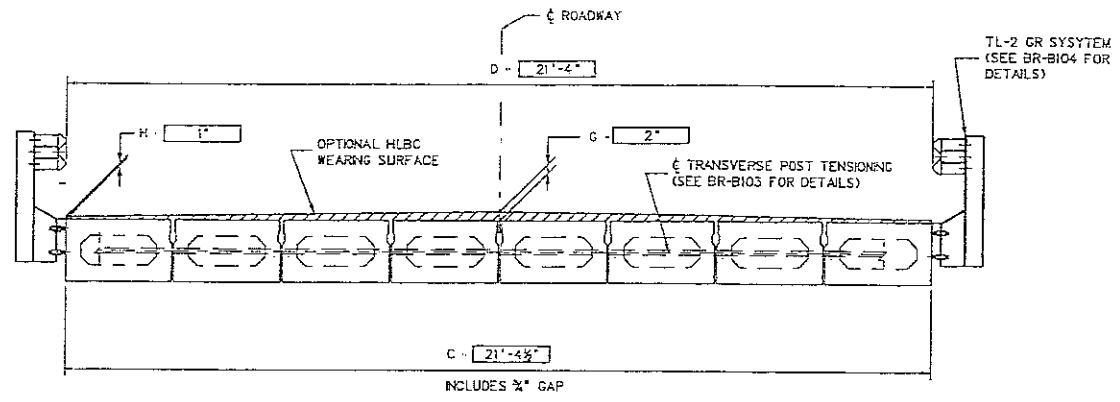
DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TM/
REVIEWED BY: TR/
DATE: 04-10
SCALE:
SHEET NO. 5 OF 11
BRIDGE NUMBER
6776.1

C:\Projects\Marion\WillowTree\Structure.dgn

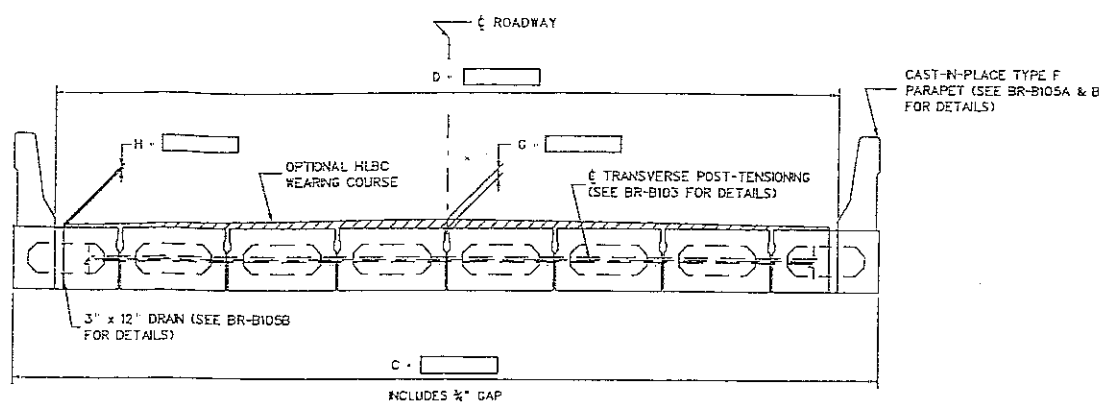
20-APR-2010 07:10

B997949

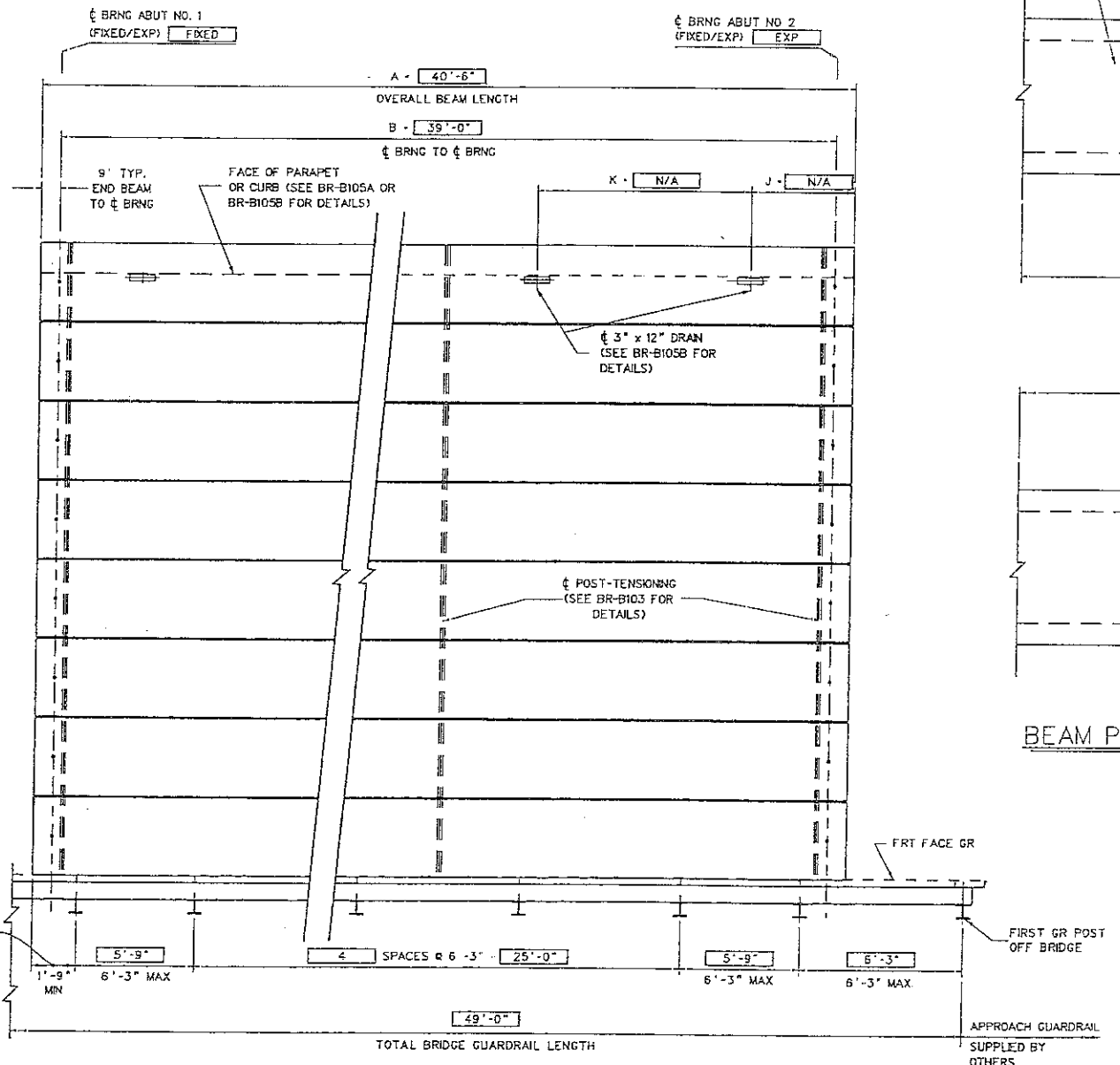
STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST NO.	COUNTY	SHEET NO.	TOTAL SHEET
S325-20-0.23	N/A	4	MARION	6	11



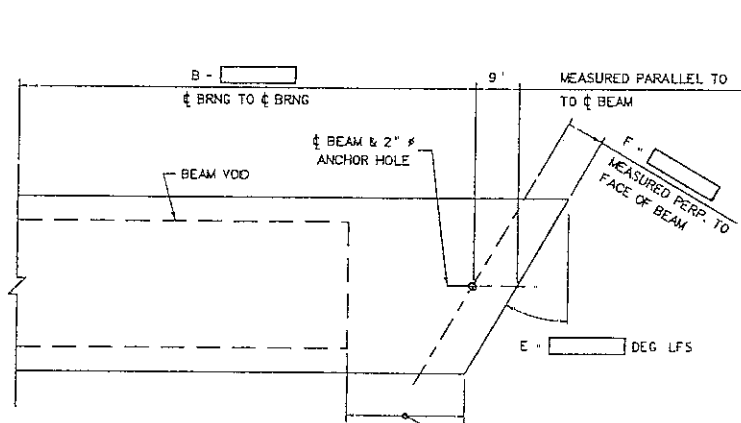
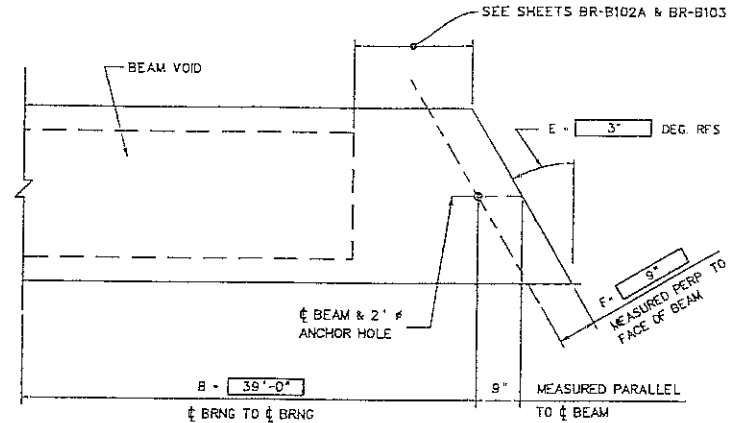
TYPICAL CROSS-SECTION WITH GUARDRAIL



TYPICAL CROSS-SECTION WITH PARAPET OR CURB



DECK PLAN VIEW



BEAM PLAN VIEW - SKEWED ENDS

CONTROL DIMENSIONS		
DESCRIPTION	CODE	VALUE
OVERALL BEAM LENGTH	A	40'-6"
SPAN LENGTH CL BEARING TO CL BEARING	B	39'-0"
SUPERSTRUCTURE WIDTH - OUT TO OUT	C	21'-4 1/2"
ROADWAY WIDTH - FACE GR/PARAPET TO FACE GR/PARAPET	D	21'-4"
NUMBER OF BEAMS REQUIRED	---	7
BEAM SIZE (WIDTH x DEPTH)	---	36x17
SKEW ANGLE (NORMAL DEG RFS OR DEG LFS)	E	3" RFS
PERPENDICULAR DISTANCE FROM FACE OF BEAM TO CL BEARING	F	9'
HLBC WEARING COURSE REQUIRED (YES/NO)	---	YES
THICKNESS OF WEARING COURSE CL OF DECK OR ROADWAY	G	2"
THICKNESS OF WEARING COURSE CL EDGE OF DECK OR PARAPET	H	1"
TL-2 BRIDGE GUARDRAIL SYSTEM REQUIRED (YES/NO)	---	YES
FABRICATOR TO SUPPLY TL-2 BRIDGE GUARDRAIL (YES/NO)	---	YES
FABRICATOR TO INSTALL BRIDGE GUARDRAIL PRIOR TO SHIPMENT (YES/NO) (IF NO, FABRICATOR TO SHIP LOOSE)	---	YES
NUMBER OF GUARDRAIL POST INSERTS REQUIRED PER SIDE	---	7
TYPE F PARAPET REQUIRED (YES/NO)	---	NO
DRAINS REQUIRED (YES/NO)	---	NO
NUMBER OF DRAINS REQUIRED PER SIDE	---	N/A
10" CURB REQUIRED (YES/NO)	---	NO

ESTIMATE OF QUANTITIES			
ITEM NO.	DESCRIPTION	UNITS	QUANTITY
603016-007	17X36 INCH PRESTRESSED CONCRETE BOX BEAM	LF	283.5

- NOTES:
- WHEN BRIDGE GUARDRAIL IS TO BE SUPPLIED BY THE BEAM FABRICATOR COST OF ALL BRIDGE GUARDRAIL ITEMS TO INCLUDE POSTS, RAIL ELEMENTS, ATTACHMENT HARDWARE, AND MISCELLANEOUS ITEMS NEEDED TO COMPLETELY INSTALL BRIDGE GUARDRAIL SHALL BE INCLUDED IN ITEM 603016 "PRESTRESSED CONCRETE BOX BEAM."
 - THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B BR-B100 BR-B102A & B BR-B103 BR-B104 BR-B105A & B AND BR-B106.

APPROVED: *[Signature]* DATE: 10-25-07
DIRECTOR, ENGINEERING DIVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED BY: THB/CSS
DRAWN BY: THB/CSS
CHECKED BY: TM/ALS
REVIEWED BY: TM/ALL
DATE: 04-10
SCALE:
SHEET NO 6 OF 11
BRIDGE NUMBER
67761

PREPARED: 07-02-07
DESIGN AND ASSEMBLY NOTES
STANDARD SHEET BR-B101

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

WILLOW TREE W-BEAM BRIDGE

PRESTRESSED CONCRETE BEAM
DESIGN & ASSEMBLY NOTES

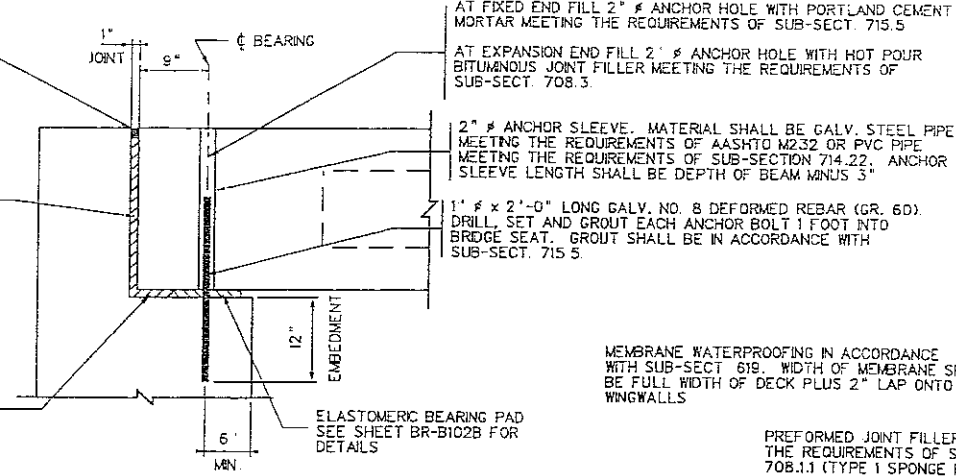
C:\Projects\Marion\WillowTree\Structure.dgn
20-APR-2010 07:10
B987949

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST NO.	COUNTY	SHEET NO.	TOTAL SHEETS
SS25-20-023	N/A	4	MARION	7	11

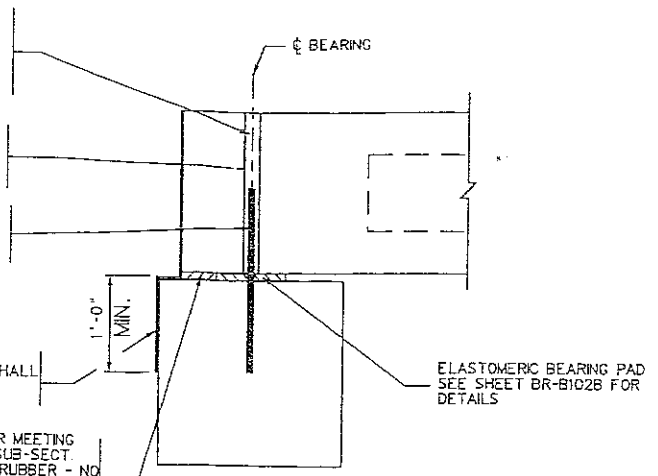
SEAL JOINT WITH HOT POUR JOINT SEAL MATERIAL MEETING THE REQUIREMENTS OF SUB-SECT 70B.3. MIN DEPTH OF SEAL - 1"

PERFORMED JOINT FILLER MEETING THE REQUIREMENTS OF SUB-SECT 70B.1.1 (TYPE 1 SPONGE RUBBER - NO COLOR REQUIREMENT) CONTINUOUS FULL WIDTH OF DECK PLUS 1" EXT. EACH SIDE.

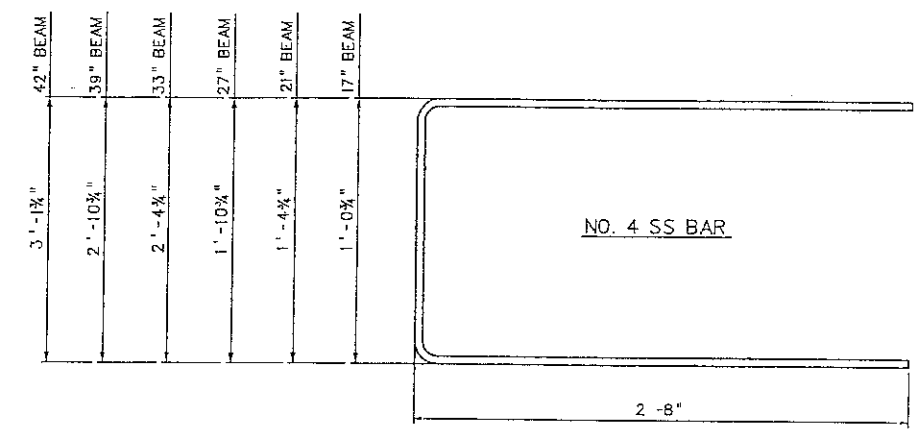
PERFORMED JOINT FILLER MEETING THE REQUIREMENTS OF SUB-SECT 70B.1.1 (TYPE 1 SPONGE RUBBER - NO COLOR REQUIREMENT) CONTINUOUS FULL WIDTH OF DECK PLUS 1" EXT. PAST EACH FACIA BEAM. THICKNESS SHALL BE BEARING PAD THICKNESS PLUS 1/4"



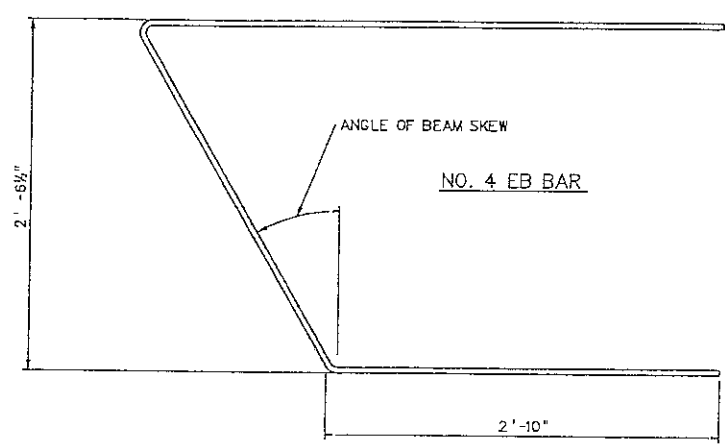
END BEARING DETAIL WITH BACKWALL



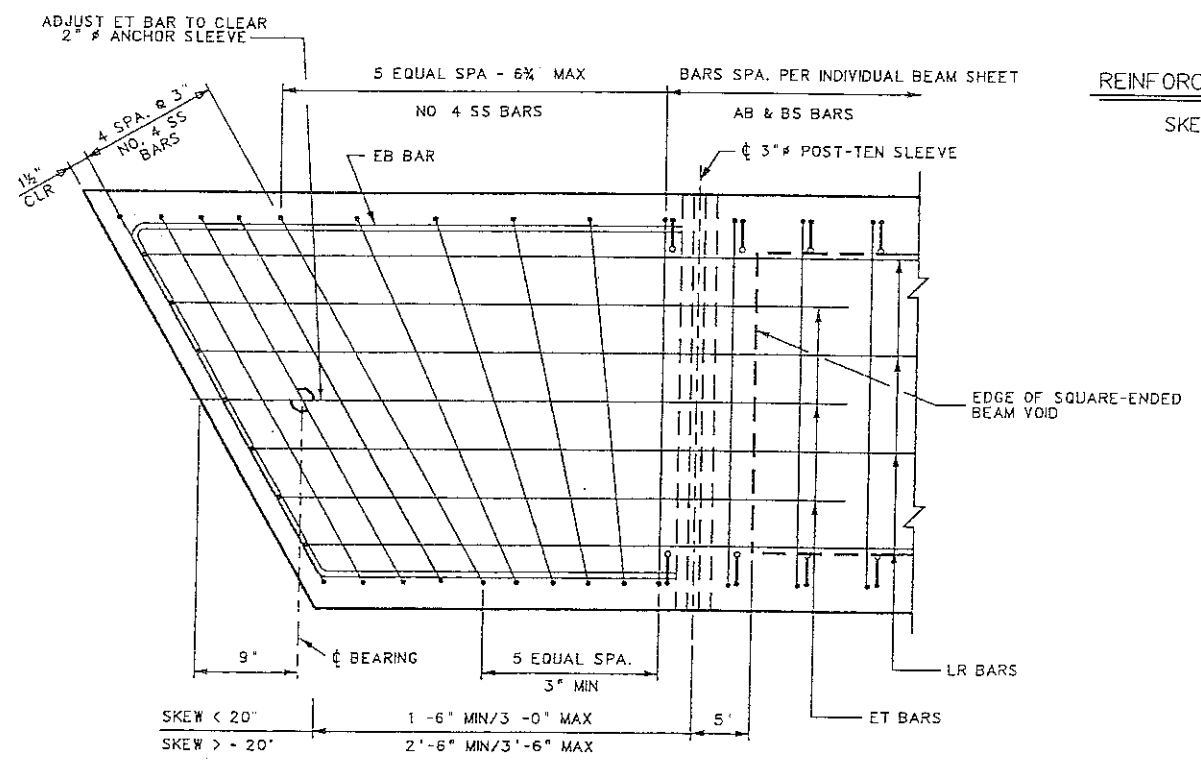
END BEARING DETAIL WITHOUT BACKWALL



REINFORCING BAR DETAIL SKEWED BEAMS



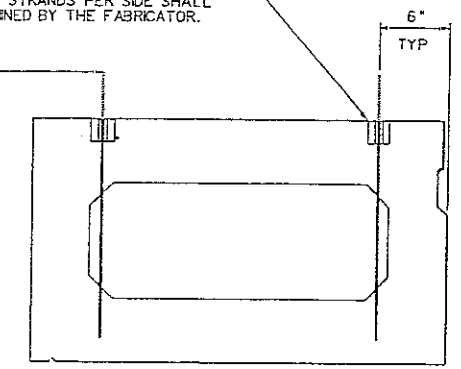
SHEAR KEY DETAIL



END BLOCK DETAIL - SKEWED BEAMS W/POST-TEN. ACCESS POCKET

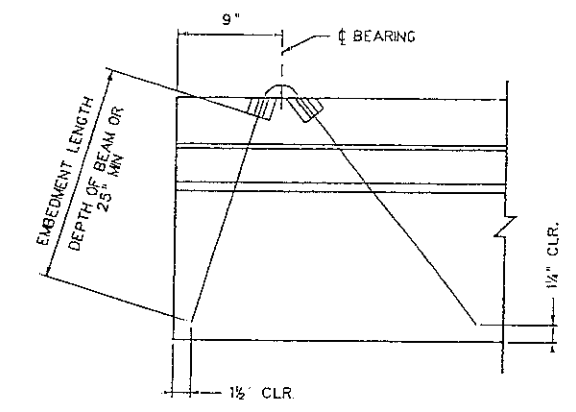
1/2" # STRAND LIFTING LOOPS EMBEDDED FULL DEPTH OF BEAM MINUS COVER OR A MINIMUM OF 25 INCHES. NUMBER OF STRANDS PER SIDE SHALL BE DETERMINED BY THE FABRICATOR.

2" # OR 3" # FOAM BLOCKOUT AFTER ERECTION, CUT STRANDS FLUSH WITH BOTTOM OF VOID AND FILL WITH GROUT MEETING THE REQUIREMENTS OF SUB-SECT 715.5

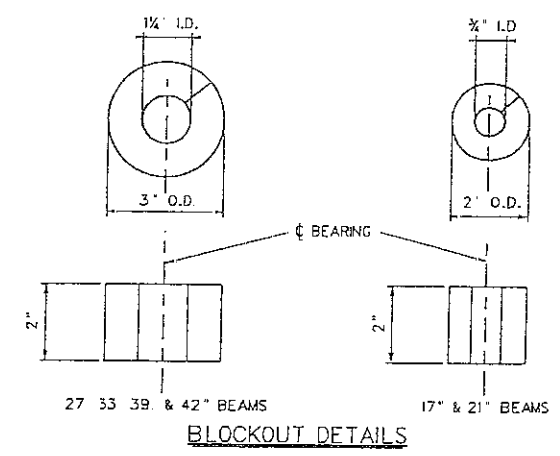


END VIEW

LIFTING DETAILS



SIDE VIEW



BLOCKOUT DETAILS

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

APPROVED: *Gregory Bailey* DATE: 10-25-07
DIRECTOR, ENGINEERING DIVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PREPARED: 07-02-07

REVIEWED:

PRESTRESSED CONCRETE BEAM
SKEWED END REINFORCING
MSC DESIGN AND ASSEMBLY DETAILS

STANDARD SHEET BR-B102A

DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TM/
REVIEWED BY: TW/
DATE: 04-10
SCALE:
SHEET 7 OF 11
BRIDGE NO 5775.1

WILLOW TREE W-BEAM BRIDGE

PRESTRESSED CONCRETE BEAM
SKEWED END REINFORCING
MSC DESIGN AND ASSEMBLY DETAILS

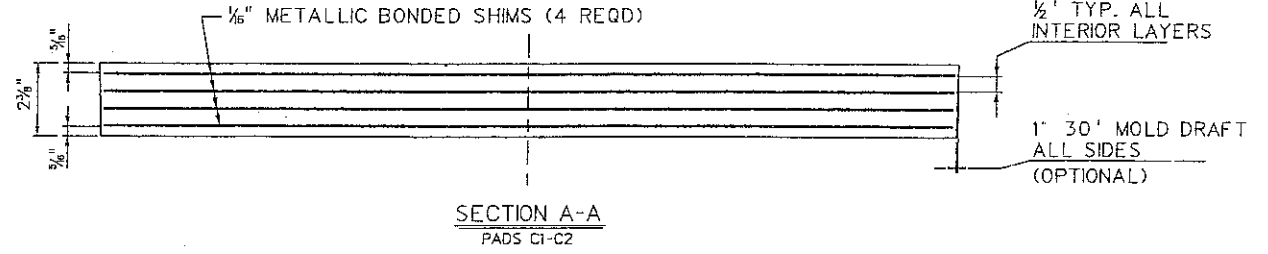
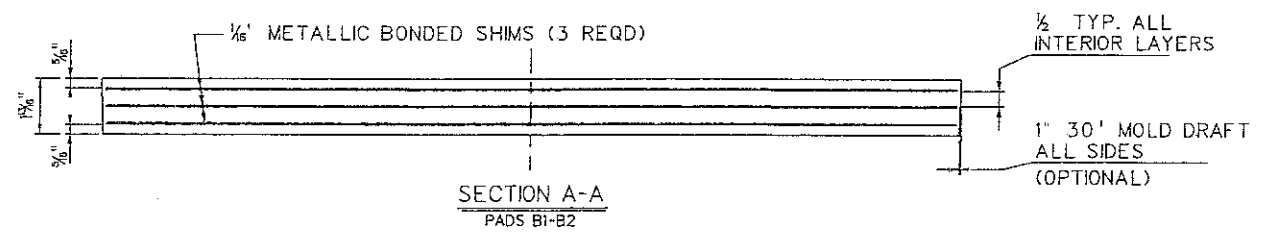
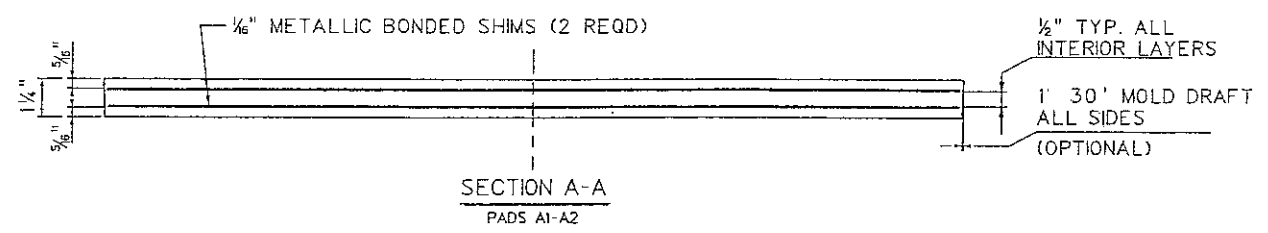
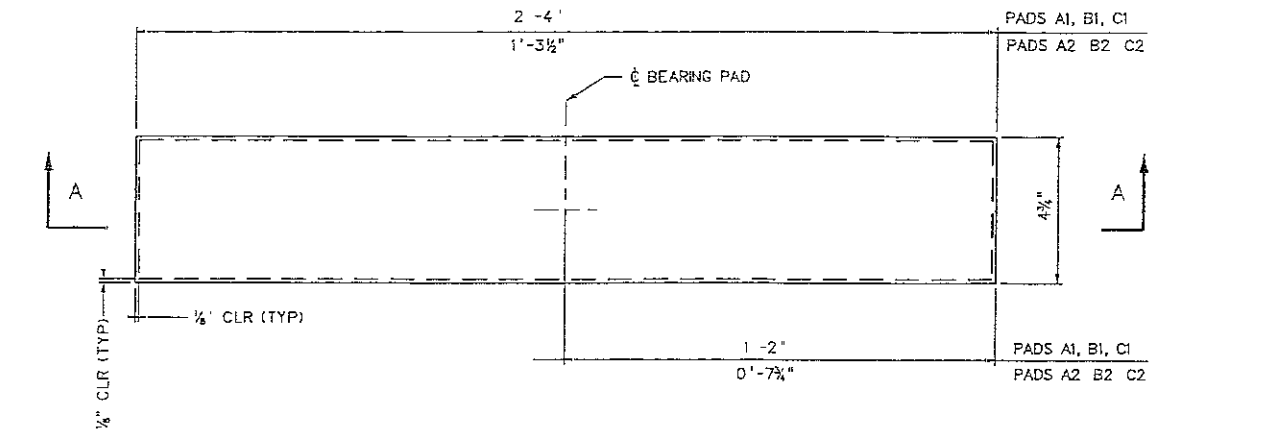
THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B, BR-B100, BR-B101, BR-B102B, BR-B103, BR-B104, BR-B105A & B AND BR-B106 AS APPROPRIATE.

C:\Projects\Marion\WillowTree\Structure.dgn

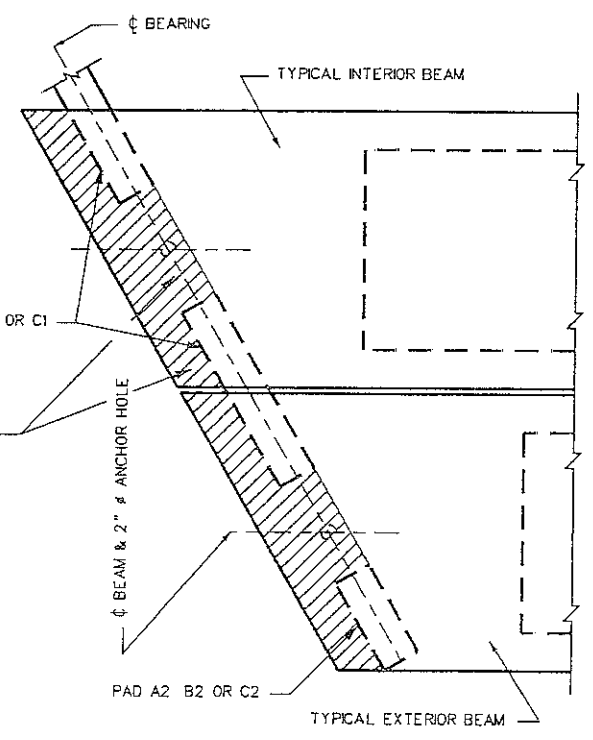
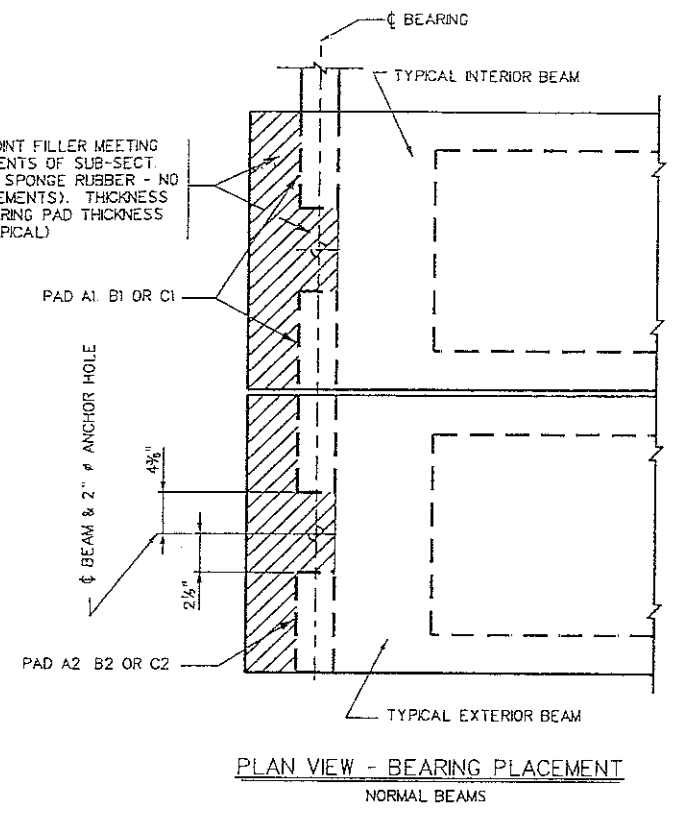
20-APR-2010 07:10

8987949

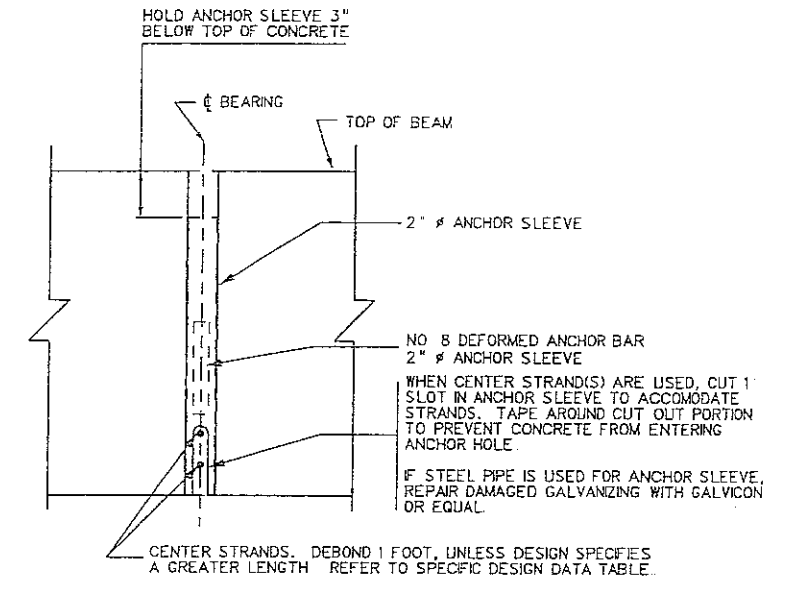
STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
5325-20-023	N/A	4	MARION	8	11



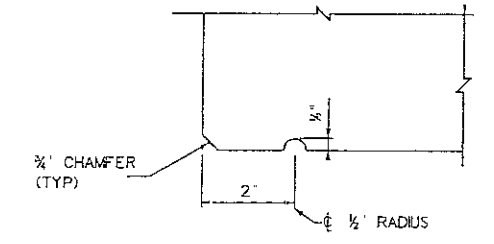
PREFORMED JOINT FILLER MEETING THE REQUIREMENTS OF SUB-SECT. 708.11 (TYPE 1 SPONGE RUBBER - NO COLOR REQUIREMENTS). THICKNESS SHALL BE BEARING PAD THICKNESS PLUS 1/4" (TYPICAL)



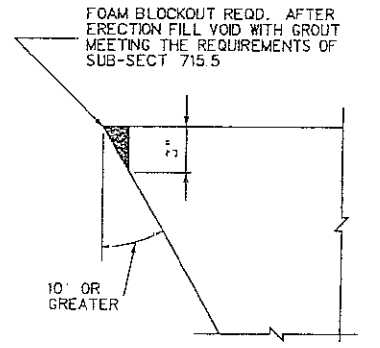
PREFORMED JOINT FILLER MEETING THE REQUIREMENTS OF SUB-SECT. 708.11 (TYPE 1 SPONGE RUBBER - NO COLOR REQUIREMENTS). THICKNESS SHALL BE BEARING PAD THICKNESS PLUS 1/4" (TYPICAL)



ANCHOR SLEEVE DETAIL



DRIP GROOVE DETAIL EXTERIOR BEAMS



SKEW BLOCKOUT DETAIL

NOTES:

- ELASTOMERIC BEARING PADS ARE DESIGNED IN ACCORDANCE WITH DESIGN METHOD B CONTAINED IN SECTION 14 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FABRICATION SHALL BE IN ACCORDANCE WITH SECTION 18 OF THE AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS
- ALL BEARINGS ARE DESIGNED FOR A LOW TEMPERATURE ZONE C AND SHALL HAVE A DUROMETER HARDNESS OF 60 METALLIC REINFORCEMENT SHALL HAVE A MINIMUM YIELD STRENGTH OF 36 KSI.
- BEARING PADS ARE DESIGNED FOR ZERO BRIDGE GRADE. FOR BRIDGE GRADES GREATER THAN 5% PADS SHALL BE SPECIFICALLY DESIGNED FOR THE GRADE. AS AN ALTERNATE CAST-IN-PLACE BEVELED SOLE PLATES MAY BE USED.
- DESIGNER, FABRICATOR AND ERECTOR SHALL BE AWARE THAT SKEWED END BEAMS MAY TWIST OR WARP, CAUSING UNEVEN BEAM SEATING AT THE BEARINGS. THE CONTRACTOR IS REQUIRED TO CORRECT AT THE TIME OF ERECTION, BEFORE THE BEAMS ARE SECURED IN PLACE. METHOD OF CORRECTION SHALL PROVIDE AN EVEN, TOTAL BEARING AND A LEVEL TOP BEAM SURFACE. TOLERANCE AFTER CORRECTION SHALL BE ± 1/8 INCH. THE FABRICATOR SHALL NOTIFY THE CONTRACTOR AND DESIGNER IF CORRECTIONS ARE REQUIRED PRIOR TO SHIPMENT.
- FOR BEAMS WITH STEPPED ENDS USE PADS A2, B2 OR C2 ON BOTH SIDES OF EACH BEAM.
- ELASTOMERIC BEARING PADS SHALL BE INCLUDED IN THE PRICE OF THE BEAMS.
- THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B BR-B100 BR-B101 BR-B102A BR-B103, BR-B104 BR-B105A & B AND BR-106 AS APPROPRIATE.

PAD	LENGTH	WIDTH	HEIGHT	NO SHIMS	SHIM SIZE	SPAN RANGES	MAXIMUM REACTION	MAXIMUM MOVEMENT ONE DIRECTION
A1	4 1/2"	28"	1 1/4"	2	1/8" x 4 1/2" x 2'-3 3/4"	20 - 38	55 KIPS	0.39'
B1	4 1/2"	28"	1 1/2"	3	1/8" x 4 1/2" x 2'-3 3/4"	40 - 78	75 KIPS	0.60'
C1	4 1/2"	28"	2 1/2"	4	1/8" x 4 1/2" x 2'-3 3/4"	80 - 100	89 KIPS	1.02'
A2	4 1/2"	15 1/2"	1 1/4"	2	1/8" x 4 1/2" x 1'-3 3/4"	20 - 38	28 KIPS	0.39"
B2	4 1/2"	15 1/2"	1 1/2"	3	1/8" x 4 1/2" x 1'-3 3/4"	40 - 78	38 KIPS	0.60"
C2	4 1/2"	15 1/2"	2 1/2"	4	1/8" x 4 1/2" x 1'-3 3/4"	80 - 100	45 KIPS	1.02"

PLAN VIEW - BEARING PLACEMENT

APPROVED: *Gregory Baile* DIRECTOR, ENGINEERING DIVISION DATE: 10-25-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION

PREPARED: 07-02-07

REVIS: _____

PRESTRESSED CONCRETE BEAM ELASTOMERIC BEARING PAD DETAILS MSC DESIGN AND ASSEMBLY DETAILS

STANDARD SHEET BR-B102B

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION

DESIGNED BY: THB/

DRAWN BY: THB/

CHECKED BY: TM/

REVIEWED BY: THB/

DATE: 04-10

SCALE:

SHEET 8 OF 11

BRIDGE NO. 6776.1

WILLOW TREE W-BEAM BRIDGE

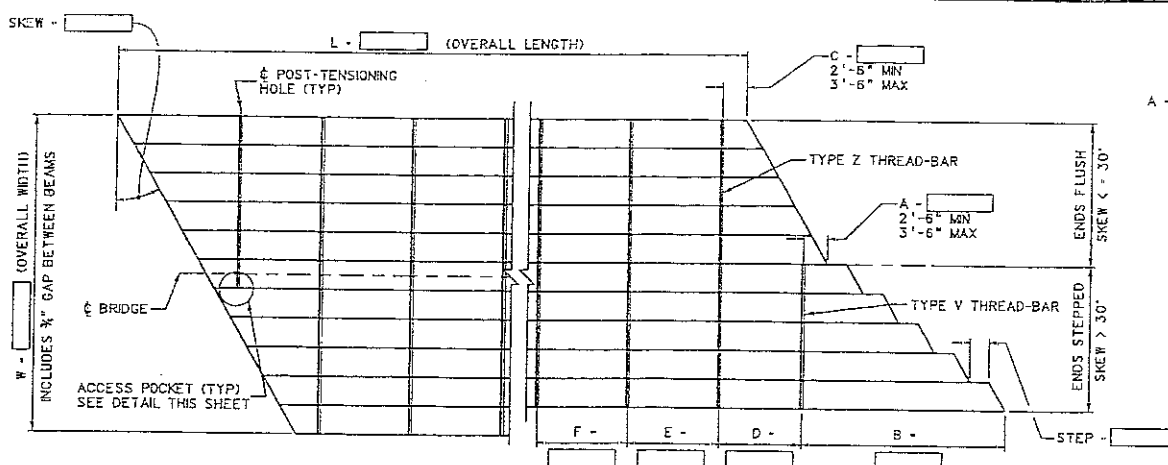
PRESTRESSED CONCRETE BEAM ELASTOMERIC BEARING PAD DETAILS MSC. DESIGN AND ASSEMBLY DETAILS

C:\Projects\Marion\WillowTree\Structure.dgn

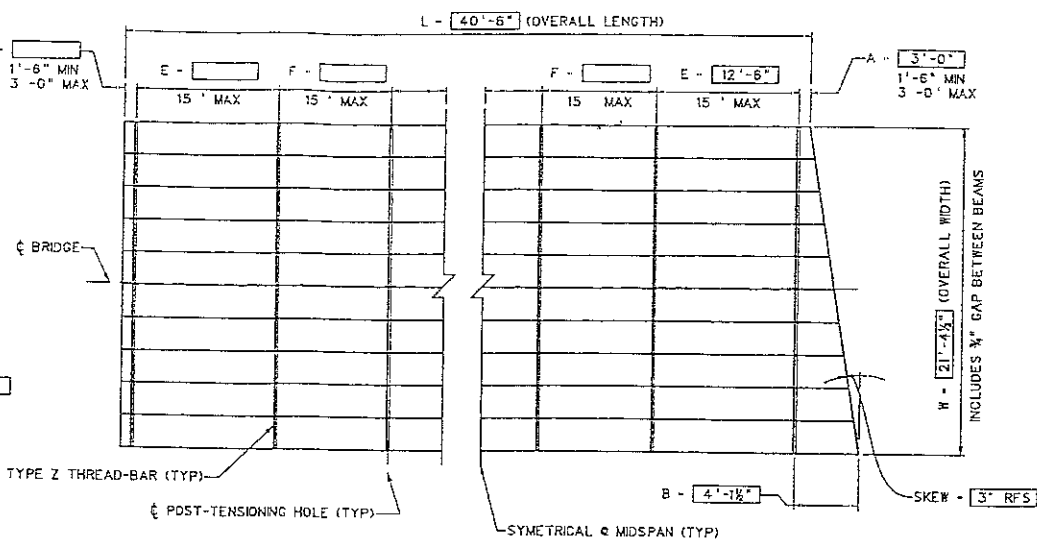
28-APR-2010 07:40

8987949

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S325-20-023	N/A	4	MARION	9	11

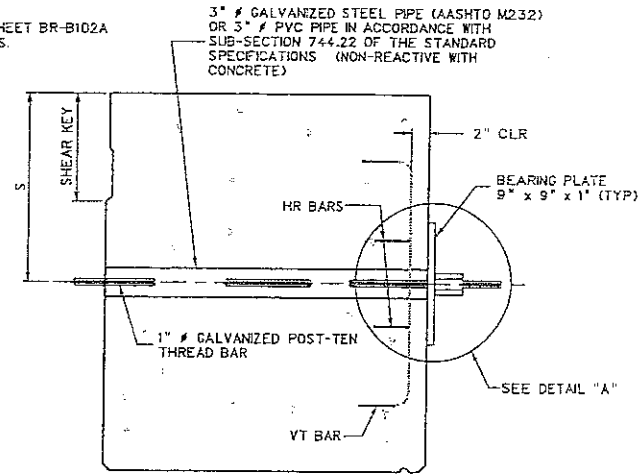


POST-TENSIONING BAR SPACING PLAN
SKEW > 20'

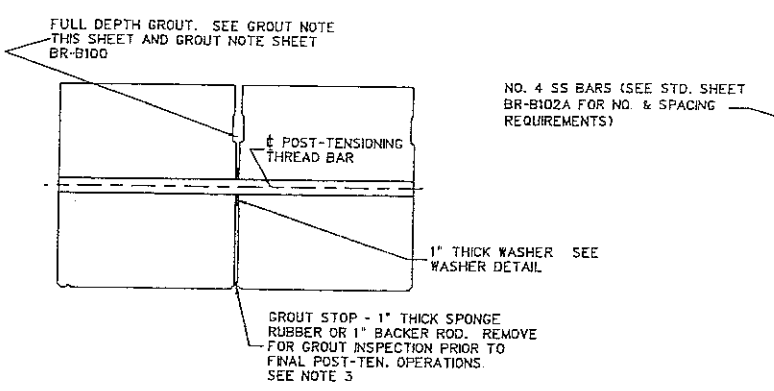


POST-TENSIONING BAR SPACING PLAN
NORMAL OR SKEW < 20'

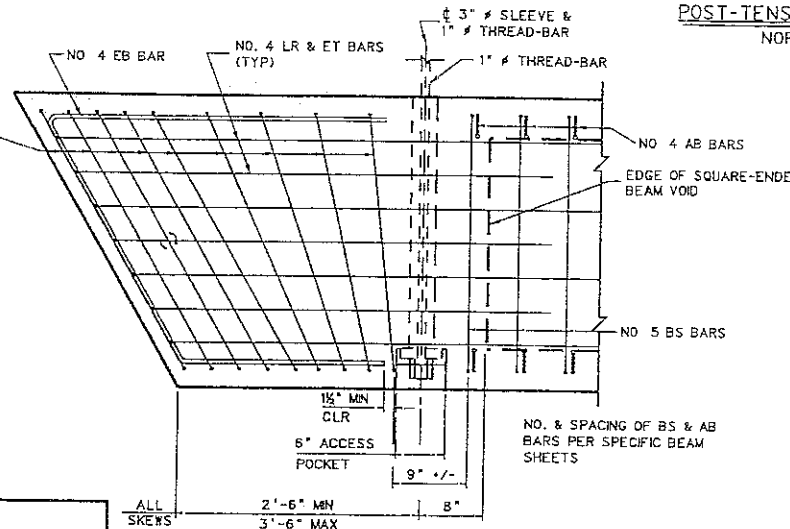
REFER TO STANDARD SHEET BR-B102A FOR SHEAR KEY DETAILS.



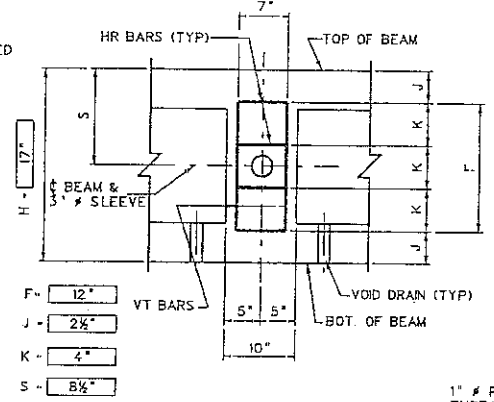
POST-TENSIONING BAR DETAILS



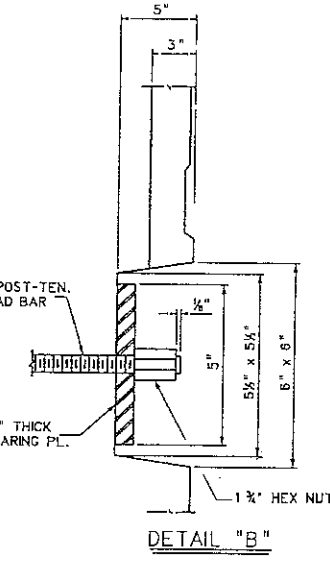
GROUT DETAILS



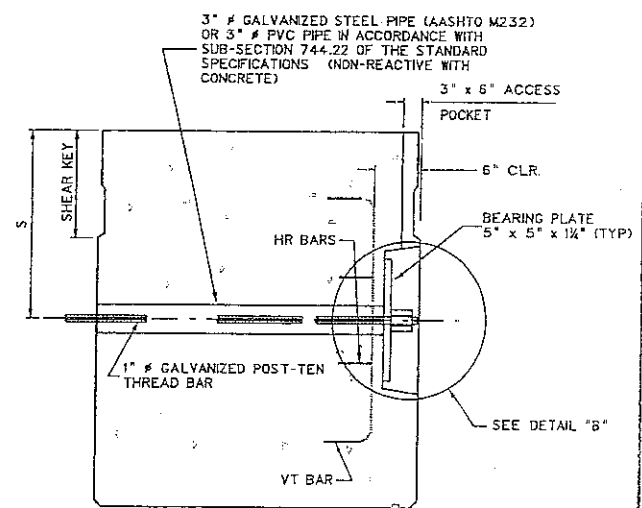
SHEAR REINFORCEMENT DETAIL
BEAMS WITH ACCESS POCKETS



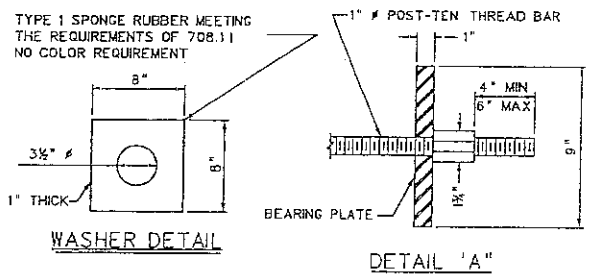
REINFORCING DETAILS @ DIAPHRAGM
EXTERIOR BEAM & POCKETS ONLY



REINFORCING BAR DETAIL
ALL BARS GR 60 - EPOXY COATED



ACCESS POCKET, END POST-TENSIONING BAR



WASHER DETAIL

DETAIL 'A'

PROCEDURE NOTES

- INSTALL ONE INCH THICK WASHER AND GROUT STOP BY GLUING TO ONE SIDE, FOR THE ENTIRE LENGTH OF EACH BEAM PRIOR TO SETTING BEAMS. GLUE SHALL BE AN APPROVED CONSTRUCTION TYPE GLUE OR EPOXY ADHESIVE. GROUT STOP MAY BE INSTALLED AFTER BEAMS ARE SET.
- GLUE A 3/4" x 2" x 2" PIECE OF PRESSURE TREATED PLYWOOD AT EACH THREAD-BAR LOCATION TO INSURE THAT A 3/4" GAP IS OBTAINED. PLYWOOD SPACERS TO BE OFFSET APPROXIMATELY 2 FEET FROM THE THREAD-BAR HOLE AND CENTERED ON THE HOLE DEPTH. PLYWOOD SPACERS ARE REQUIRED ON ONLY ONE BEAM EDGE FACE OF ABUTTING BEAMS. AFTER THE BEAMS ARE SET AND THE THREAD-BARS INSTALLED, PULL THE ENTIRE SUPERSTRUCTURE TOGETHER BY APPLYING A POST-TENSIONING FORCE OF APPROXIMATELY 3000 POUNDS. AT THIS STAGE THE GAP BETWEEN BEAMS SHALL BE A UNIFORM 3/4" WITH ALL SWEEP REMOVED. RECORD THE ACTUAL FORCE APPLIED.
- FILL THE GAP BETWEEN BEAMS AND SHEAR KEY FULL DEPTH WITH THE PRE-APPROVED, PRE-TESTED GROUT MIXTURE. FROM EACH BATCH, PREPARE JOB CONTROL GROUT CUBES FOR THREE AND SEVEN DAY TESTS. THESE JOB CONTROL SAMPLES WILL BE USED TO DETERMINE WHEN THE GROUT HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI. A MINIMUM OF THREE SPECIMENS PER TEST SHALL BE OBTAINED, AND THE AVERAGE OF THE TEST RESULTS USED. ACCEPTANCE SAMPLING AND TESTING OF THE GROUT IS THE RESPONSIBILITY OF THE CONTRACTOR; HOWEVER, A REPRESENTATIVE OF THE NYDOH SHALL WITNESS ALL OF THE ACCEPTANCE SAMPLING AND TESTING.

TEST PROCEDURE SHALL BE ASTM C109 AS MODIFIED BY ASTM C107. IN NO INSTANCE SHALL THE CONTRACTOR PROCEED WITH POST-TENSIONING OR OTHER BEAM ERECTION PROCEDURES UNTIL THE REQUIRED MINIMUM GROUT STRENGTH IS ATTAINED AND VERIFIED BY THE ENGINEER. IN THE EVENT THAT THE MINIMUM GROUT STRENGTH IS NOT ATTAINED, THE ENGINEER SHALL BE NOTIFIED AND CORRECTIVE ACTION TAKEN AT THE DIRECTION OF THE ENGINEER. SEE SHEAR KEY GROUT NOTE SHEET BR-B100 FOR ADDITIONAL REQUIREMENTS.

AFTER THE GROUT HAS REACHED AN INITIAL SET CONDITION AND PRIOR TO ANY FINAL POST-TENSIONING PROCEDURES, THE CONTRACTOR SHALL REMOVE THE GROUT STOP AND INSPECT THE GROUT FOR VOIDS OR OTHER IRREGULARITIES. ANY VOIDS DEEPER THAN 2" FROM THE BOTTOM SHALL BE REGROUTED IN A MANNER ACCEPTABLE TO THE ENGINEER.

- AFTER GROUT AS BEEN PLACED AND REACHED IT'S MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI AND HAS CURED A MINIMUM OF 3 DAYS, APPLY 50% OF THE FINAL POST-TENSIONING FORCE TO ALL THREAD-BARS, WORKING BEAM ENDS TO MIDSPAN. AFTER ALL THREAD-BARS HAVE BEEN TENSIONED TO 50% APPLY THE REMAINING PERCENTAGE OF FINAL POST-TENSIONING FORCE WORKING IN THE SAME SEQUENCE AS THE FIRST STAGE OF FINAL TENSIONING.
- MEASURE AND RECORD, IN THE ELONGATION TABLE, THIS SHEET, THE ACTUAL TOTAL ELONGATION OF EACH THREAD-BAR. COMPARE THE MEASURED ELONGATION TO THE CALCULATED ELONGATION. A SIGNIFICANT DIFFERENCE BETWEEN MEASURED AND CALCULATED ELONGATIONS COULD INDICATE IMPROPER JACKING TECHNIQUES, FAULTY MATERIALS, FAULTY JACKS, OR IMPROPERLY CALIBRATED JACKS. IF THE DIFFERENCE IS GREATER THAN 15% THEN THE JACK SHALL BE RE-CALIBRATED AND THE JACKING TECHNIQUES EVALUATED. IF, AFTER THE ABOVE STEPS ARE TAKEN, THE PERCENTAGE DIFFERENCE IS GREATER THAN 10%, THEN THE ENGINEER SHALL BE NOTIFIED AND CORRECTIVE ACTION TAKEN AT THE DIRECTION OF THE ENGINEER. ALL COSTS INVOLVED IN CORRECTION SHALL BE AT THE CONTRACTORS EXPENSE.
- USING SAW TRIM EXCESS THREAD-BAR LEAVING 4" TO 6" PAST THE NUT. DO NOT TRIM THREAD-BARS BY TORCH CUTTING. TOUCH-UP TRIMMED ENDS WITH GALVANIC OR EQUAL.
- INSTALL ANCHOR DOWELS AS DETAILED ON STANDARD SHEETS BR-B101 AND BR-B102A.

FINAL POST-TENSIONING FORCE
TYPE Z BARS - 80 KIPS
TYPE V BARS - 40 KIPS

SPAN	1		
SKEW	3' RFS		
L	40'-6"		
W	21'-4 1/2"		
A	3'-0"		
B	4'-1 1/2"		
C	N/A		
D	N/A		
E	12'-6"		
F	N/A		
STEP	N/A		

BEAM SIZE	REINFORCEMENT DIM	BAR SPACING	BAR DIST
H	F	J	K
IN.	IN.	IN.	IN.
17	12	2 1/2	4
21	12	4 1/2	4
27	18	4 1/2	6
33	24	4 1/2	8
39	30	4 1/2	10
42	33	4 1/2	11

PRE-TEST STRENGTH	3 DAY (PSI)	7 DAY (PSI)
JOB CONTROL STRENGTH		
GROUT TYPE & MANUFACTURER		

BAR	FORMULA	LENGTH
VIEWEN)	3'-3"	
Z	8'-3"	24'-4 1/2"
V(ODD)	3'-4'-6"	

BAR	CODE	CALC.	MEASURED													
			NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO.	NO.				
Z	⊗	3/8"														
V	⊗															

CALCULATED ⊗ - WGT. 1 / 24.8
CALCULATED ⊗ - WGT. 1 / 99.2

SPECIAL WARNING NOTES

- DO NOT STAND IN LINE WITH THE POST-TENSIONING BAR DURING TENSIONING PROCEDURES.
- NUTS, COUPLERS AND EXTENSION RODS USED IN THE POST-TENSIONING WORK SHALL BE THE MATERIAL APPROVED BY THE MANUFACTURER OF THE HIGH STRENGTH POST-TENSIONING RODS. IN NO CASE SHALL THE CONTRACTOR USE NON-APPROVED MATERIAL OR MATERIAL FROM TWO DIFFERENT SOURCES.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM
TRANSVERSE POST-TENSIONING DETAILS
STANDARD SHEET BR-B103

DATE: 10-25-07
PREPARED: 07-02-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

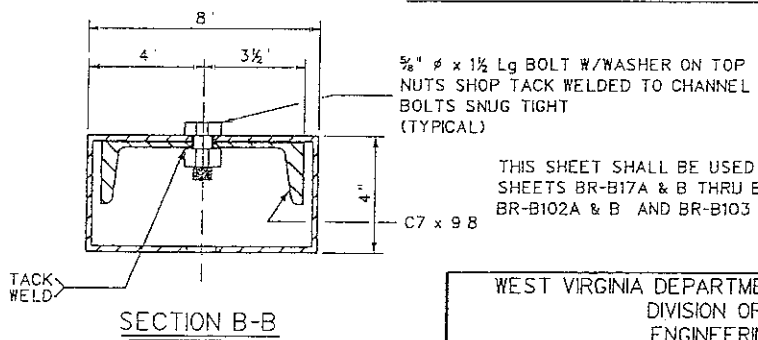
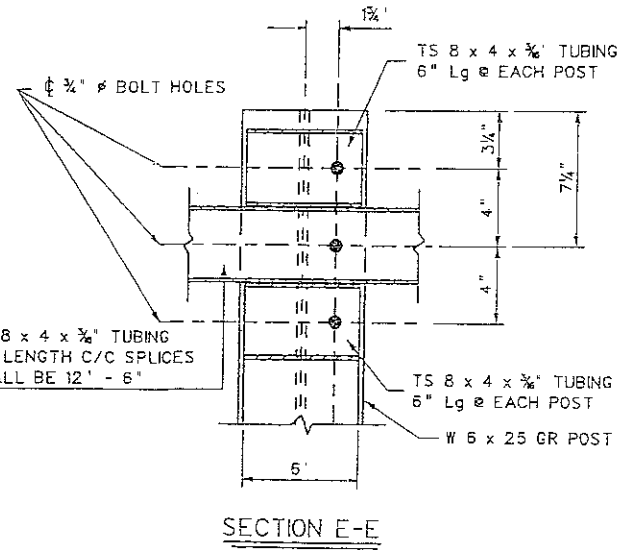
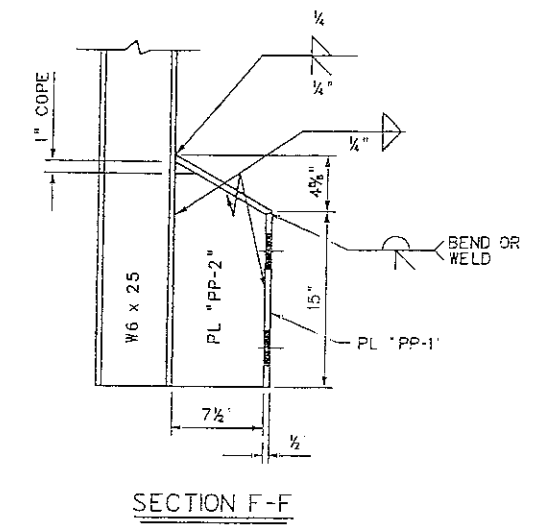
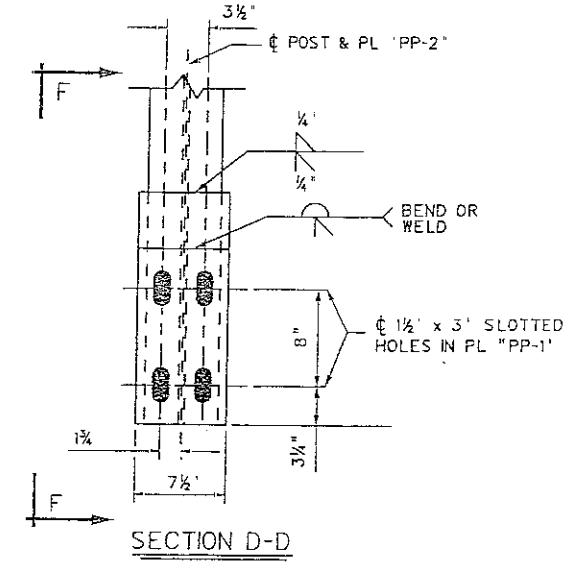
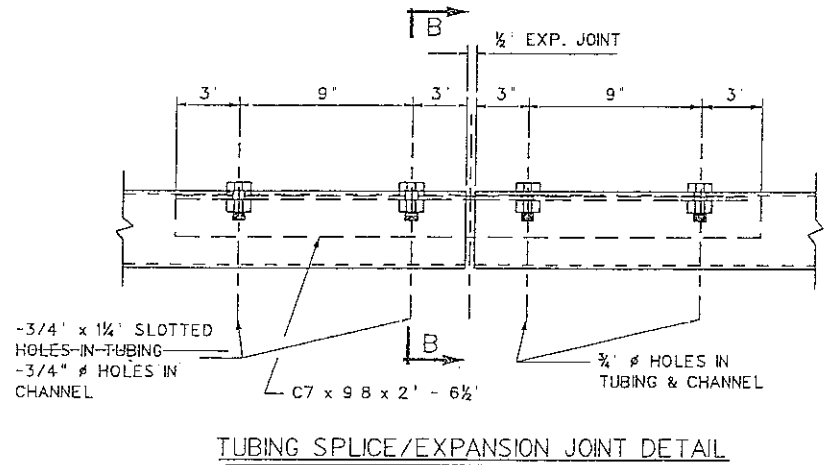
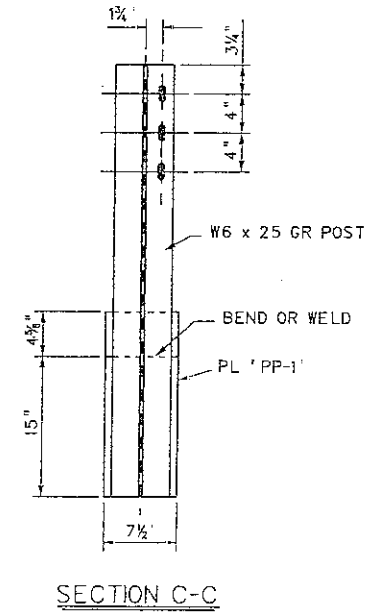
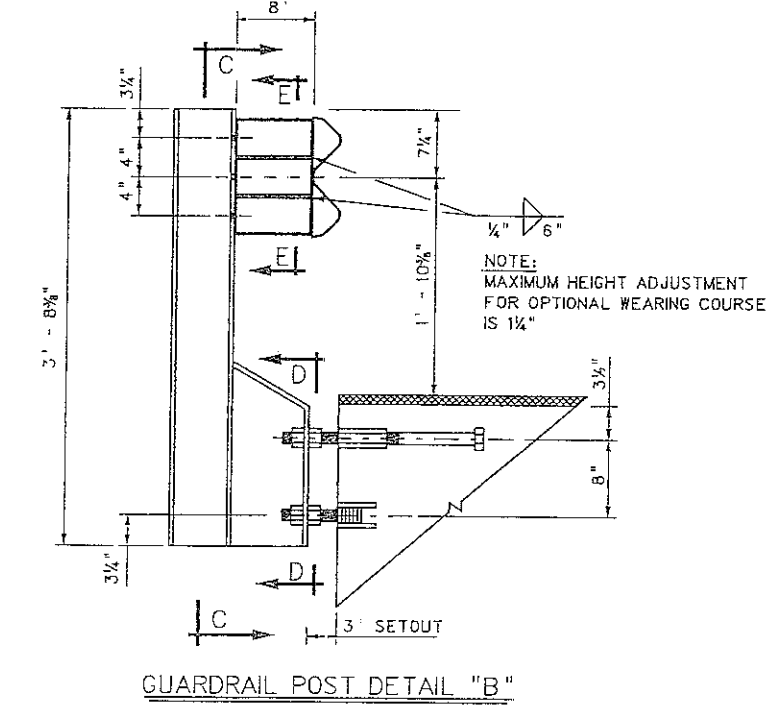
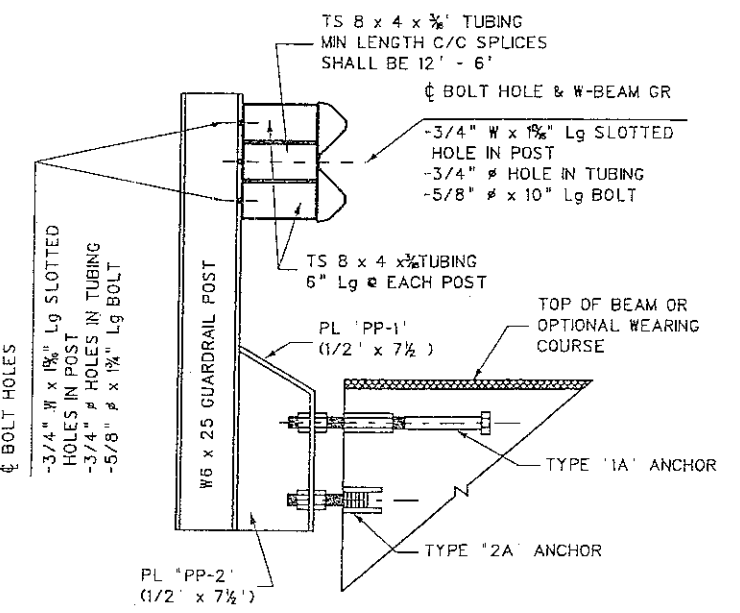
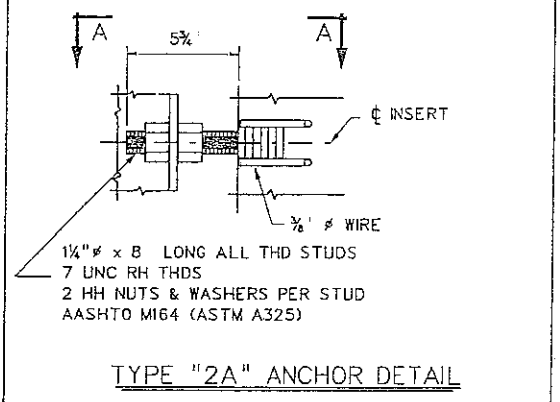
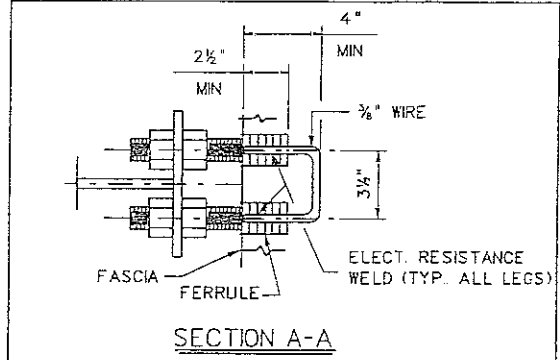
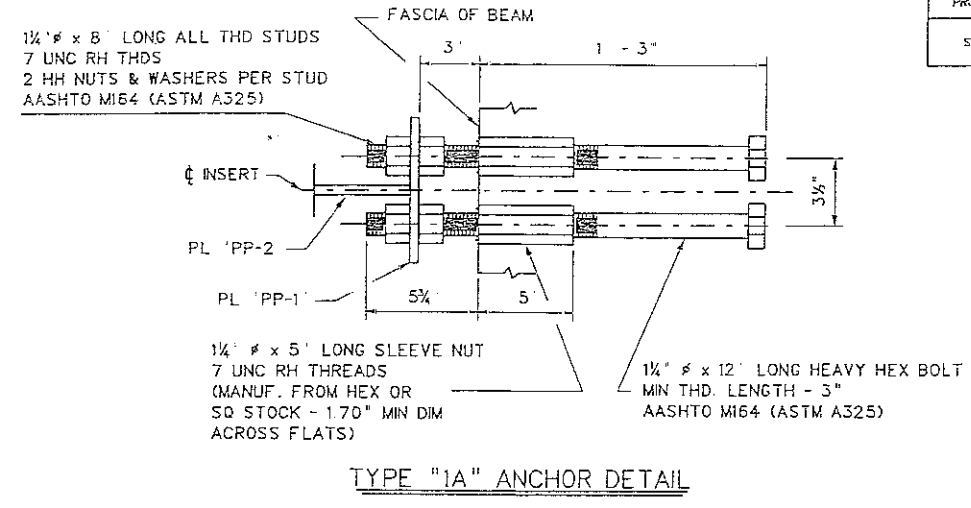
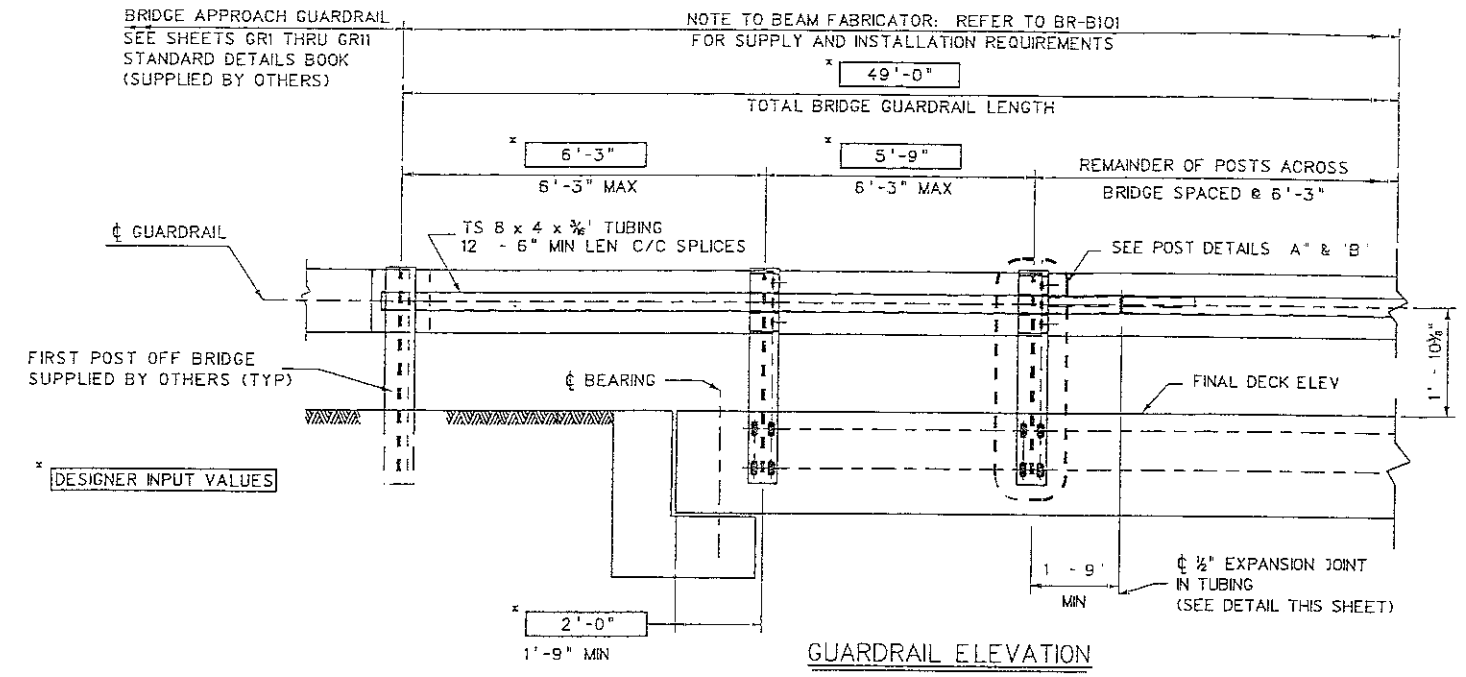
WILLOW TREE W-BEAM BRIDGE

PRESTRESSED CONCRETE BEAM
TRANSVERSE POST-TENSIONING DETAILS

DESIGNED BY: THE/CSS
DRAWN BY: THE/CSS
CHECKED BY: TW/ALS
REVIEWED BY: TR/ALL
DATE: 04-10
SCALE:
SHEET NO 9 OF 11
BRIDGE NUMBER: 6776 1

C:\Projects\Marion\WillowTree\Structure.dgn 25-APR-2010 07:11 6987949

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S325-20-0.25	N/A	4	MARION	10	11



THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B, BR-B100 BR-B101 BR-B102A & B AND BR-B103 AS APPLICABLE

APPROVED: <i>James Bailey</i> DIRECTOR, ENGINEERING DIVISION	DATE: 10-25-07
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION	PREPARED: 1-14-05
PRESTRESSED CONCRETE BEAM TYPE TL-2 GUARDRAIL SYSTEM DESIGN & ASSEMBLY DETAILS	REVIEWED:
STANDARD SHEET BR-B104	

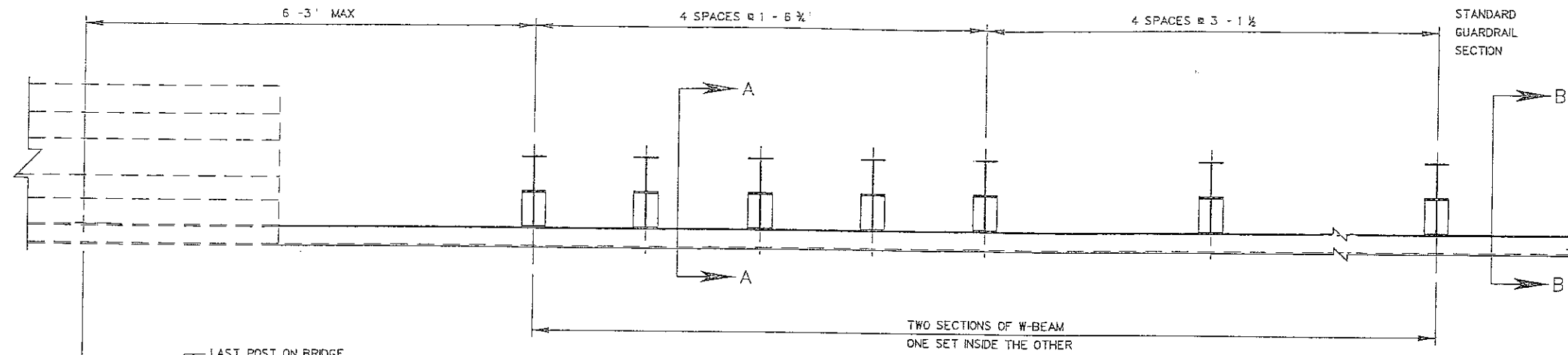
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION	
DESIGNED BY: THB/CSB	
DRAWN BY: THB/CSB	
CHECKED BY: TM/ALS	
REVIEWED BY:	
DATE: 04-10	
SCALE:	
SHEET NO 10 OF 11	
BRIDGE NUMBER 67761	
WILLOW TREE W-BEAM BRIDGE	
PRESTRESSED CONCRETE BEAM TYPE TL-2 GUARDRAIL SYSTEM DESIGN & ASSEMBLY DETAILS	

C:\Projects\Marion Willow Tree\Structure.dgn

28-APR-2010 07:11

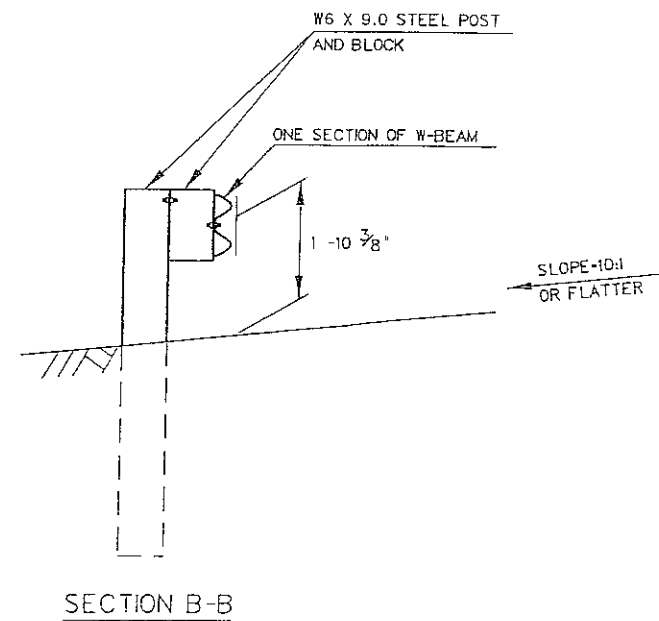
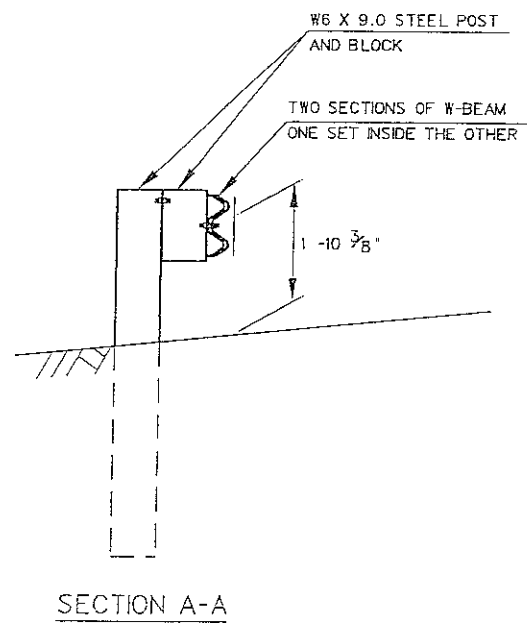
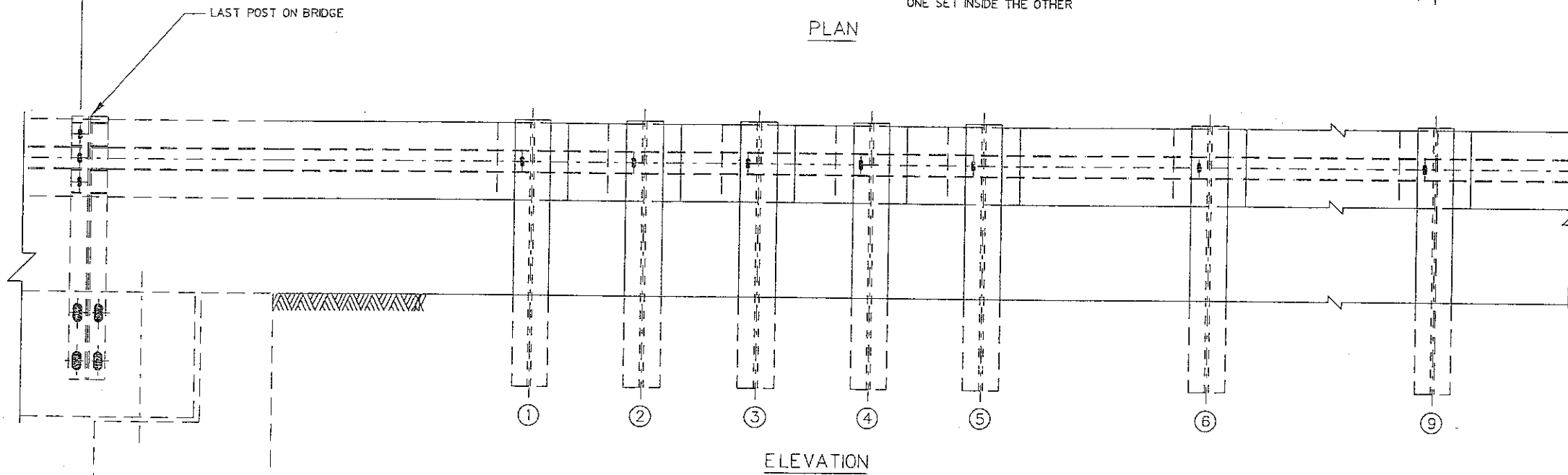
8887949

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S325-20-0.23	N/A	4	MARION	11	11



NOTES

- 1 THIS GUARDRAIL TRANSITION IS APPROPRIATE FOR CONNECTION TO GUARDRAIL ON BRIDGE.
- 2 W-BEAM IS NOT BOLTED TO POSTS AT POSTS 2 THROUGH 4 AND POST 6.
- 3 SEE STANDARD SHEET BR-B104 FOR ANCHOR DETAILS
- 4 THERE IS NO SEPARATE PAY ITEM FOR THIS CONNECTION AND ALL COMPONENTS AS DETAILED HEREIN SHALL BE INCLUDED IN THE CONTRACT PRICE FOR GUARDRAIL.



THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B, BR-B100, BR-B101 BR-B102A & B BR-B103 AND BR-B104 AS APPLICABLE

APPROVED: <i>Gregory Bailey</i> DIRECTOR, ENGINEERING DIVISION	DATE: 10-25-07
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION	PREPARED: 07-02-07
PRESTRESSED CONCRETE BEAM TYPE TL-2 GUARDRAIL SYSTEMS DESIGN & ASSEMBLY DETAILS	REVISION:
STANDARD SHEET BR-B106	

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION	
WILLOW TREE W-BEAM BRIDGE	
DESIGNED BY: TW/	DRAWN BY: BH/
CHECKED BY: TW/	REVIEWED BY: THB/
DATE: 04-10	SCALE:
SHEET 11 OF 11	BRIDGE NO. 6776.1
TYPE TL-2 GUARDRAIL TRANSITION	